Nuclear Decommissioning Authority

DEPARTMENT OF ENERGY & CLIMATE CHANGE

The 2010 UK Radioactive Waste Inventory:

Main Report

URN 10D/985
NDA/ST/STY(11)0004
February 2011

The 2010 UK Radioactive Waste Inventory

Main Report

Report prepared for the Department of
Energy & Climate Change (DECC) and the
Nuclear Decommissioning Authority (NDA)
by Pöyry Energy Limited

PREFACE

The Department of Energy & Climate Change (DECC)[1] and the Nuclear Decommissioning Authority (NDA) have commissioned the 2010 UK Radioactive Waste Inventory (2010 Inventory) to provide information on the status of radioactive waste at 1 April 2010 and forecasts of future arisings in the UK. Its aim is to provide comprehensive and up-to-date data in an open and transparent manner for those interested in radioactive waste issues. It is part of an ongoing programme of research jointly conducted by DECC and NDA.

Waste volumes are given for the UK as a whole, for each type of waste producing activity and for each of the main organisations producing wastes. The report also presents information on the radioactivity and the material content of the wastes.

The report includes high, intermediate and low level wastes produced from uranium enrichment, nuclear fuel manufacture, nuclear power production, spent fuel reprocessing, research and development, medical and industrial sources and defence activities.

The assumptions used in the forecasts of future waste arisings are presented and discussed. Also the waste quantities in the present Inventory are compared with corresponding information from previous inventories and any differences are explained.

This report has been prepared on the basis of information supplied by the UK waste producers to Pöyry Energy, the principal contractor for the production of the 2010 Inventory. This information was verified in accordance with arrangements established by Pöyry Energy.

The information given in this report represents the best available knowledge at the time of compilation of the 2010 Inventory based upon the processes, strategies and assumptions that were applicable at that time. Revision of the predictions, particularly of the long-term forecasts, may be necessary as plans change and estimates are refined.

2010 Inventory documents

Information collected for producing the 2010 Inventory is presented in a series of reports, as listed below.

- A summary of the 2010 Inventory;
- The main report for the 2010 Inventory (this document);
- A summary of Information for International Reporting;
- A review of the processes contributing to radioactive wastes in the UK (the report published in 2008 has not been updated);
- Information on other radioactive substances that may require long-term management as radioactive waste in the UK is presented in a separate report.

These reports are available in both printed and electronic format.

The 2010 Inventory documents can be obtained from the NDA (see contact details opposite) or via the UK Radioactive Waste Inventory website www.nda.gov.uk/ukinventory.

[1] The results of this work will be used in the formulation of Government policy, but views expressed in this report do not necessarily represent Government policy.

Conditions of Publication

This report is made available under the NDA transparency policy. In line with this policy, the NDA is seeking to make information on its activities readily available, and to enable interested parties to have access to and influence on its future programmes. The report may be freely used for non-commercial purposes. However, all commercial uses, including copying and re-publication, require permission from the NDA. All copyright, database rights and other intellectual property rights reside with the NDA. Applications for permission to use the report commercially should be made to the NDA Information Manager.

Although great care has been taken to ensure the accuracy and completeness of the information contained in this publication, the NDA can not assume any responsibility for consequences that may arise from its use by other parties.

© Nuclear Decommissioning Authority 2011. All rights reserved.

ISBN 978-1-905985-21-0

Feedback & Queries

You are invited to provide feedback to the NDA on the content, clarity and presentation of this report and the UK Radioactive Waste Inventory (i.e. the Inventory). Please do not hesitate to contact the NDA if you have any queries on the Inventory and radioactive waste issues. Such feedback and queries should be addressed to:

Nuclear Decommissioning Authority
Information Access Manager
Herdus House
Westlakes Science & Technology Park
Moor Row
Cumbria
CA24 3HU

Tel: 01925 802077

foi@nda.gov.uk

NDA Document Library

If you would like to see other reports available from NDA, a complete listing can be viewed at our website www.nda.gov.uk, or please contact the NDA at the address provided above.

CONTENTS

1	**INTRODUCTION**	**1**
2	**SCOPE AND CONVENTIONS**	**3**
2.1	Sources of radioactive waste	3
2.2	Categories of radioactive waste	6
2.3	Scope of the Inventory	7
2.4	Conventions	8
2.5	Data collection and processing	13
2.6	Radioactive waste management	14
3	**SCENARIO FOR FUTURE WASTE ARISINGS**	**17**
3.1	Introduction	17
3.2	Nuclear Decommissioning Authority sites	17
3.3	EDF Energy sites	25
3.4	Ministry of Defence sites	26
3.5	United Kingdom Atomic Energy Authority site	29
3.6	GE Healthcare Ltd sites	29
3.7	Urenco site	30
3.8	Minor waste producers	30
3.9	Discussion of scenario	30
4	**WASTE QUANTITIES FROM ALL SOURCES**	**35**
4.1	Introduction	35
4.2	Total for all wastes	35
4.3	Wastes at 1 April 2010	36
4.4	Future arisings	38
4.5	Comparison with previous inventories	40
4.6	Wastes for England, Scotland and Wales	45
4.7	Wastes from overseas materials	45
4.8	Disposals of waste	47
4.9	Uncertainty in waste volumes	48

5 MATERIAL CONTENT OF WASTE 51
5.1 Introduction 51
5.2 Waste conditioning 51
5.3 Material components 52
5.4 Comparison with the 2007 Inventory 55
6 RADIOACTIVITY CONTENT OF WASTE 57
6.1 Introduction 57
6.2 Radionuclide production 57
6.3 Total for all wastes 59
6.4 Wastes at 1 April 2010 60
6.5 Comparison with the 2007 Inventory 62
7 REFERENCES 69

ANNEXES
ANNEX 1: Waste volumes from all sources 71
ANNEX 2: Waste volumes from each business activity 77
ANNEX 3: Waste volumes from each site 81
ANNEX 4: List of waste streams in the Inventory and their volumes 89
ANNEX 5: Glossary of terms and abbreviations 121

ACKNOWLEDGEMENTS 131

1 INTRODUCTION

The 2010 Inventory provides the latest national record of information on radioactive wastes in the United Kingdom (UK). It has been compiled by Pöyry Energy, jointly funded by the Department of Energy and Climate Change (DECC) and the Nuclear Decommissioning Authority (NDA). Its publication is one facet of the continuing commitment of the Government[1] and the organisations responsible for radioactive wastes to openness and transparency in matters relating to the management of these wastes.

The Inventory is updated periodically with the best available information. The impacts of changes in plant operating lifetimes, decommissioning programmes and waste management strategies are incorporated. The 2010 Inventory contains information on radioactive wastes in the UK that existed at 1 April 2010 and those that were projected to arise after that date. The Inventory includes information on the quantities, types and characteristics of wastes.

Forecasts of radioactive waste arisings in the UK are based on assumptions as to the nature and scale of future operations and activities. However, these forecasts, particularly in the longer term, may change for policy, commercial, technological or regulatory reasons, and current information may be subsequently refined.

Not all radioactive materials in the UK are classified as waste. Nuclear materials such as plutonium, uranium and spent nuclear fuel have potential value - uranium and plutonium can be used to make nuclear fuel, and spent nuclear fuel can be reprocessed to recover uranium and plutonium for reuse. However, this might change in the future if there was no further use for some or all of these materials. Information on UK civil nuclear materials and other potential radioactive waste is given in a separate document [1].

Preparation of the 2010 Inventory has involved the compilation and assessment of detailed numerical and descriptive information for 1,312 waste streams. The data have been provided by the organisations that operate sites in the UK where there are radioactive wastes. Data relating to all activities, including defence, have been included on a voluntary basis. The 2010 Inventory has comprised a full update of waste stream volumes and a partial update of other information. The information provided has been checked for consistency and correct use of reporting conventions. However no attempt has been made to validate the assumptions or quantities reported, which are those of the waste producers.

Preparation of a UK Inventory of radioactive waste is driven by the commitment to openness and transparency and by two international obligations: the Euratom Community Plan of Action in the Field of Radioactive Waste and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

The Euratom Plan of Action requires the Commission to provide the Council periodically with an analysis of the situation and prospects in the field of radioactive waste management in Member States. This is based on data provided by the Member States, including the amounts of the various categories of waste disposed or in interim storage, and an estimate of future arisings. The latest report was published in September 2008 [2].

The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management came into force in June 2001 and requires each Contracting Party to submit a report on the measures taken to implement the obligations of the Convention. These national reports contain an inventory of radioactive waste that is held in storage, that has been disposed or that has resulted from past practices. The UK's

[1] The use of "Government" in this report refers collectively to the UK Government and the devolved administrations for Scotland, Wales and Northern Ireland.

third national report for the Convention was provided to the International Atomic Energy Agency (IAEA) in May 2008 [3].

The Inventory also provides a consistent reference source of information on radioactive wastes used by:

- UK Government Departments, Devolved Administrations and Agencies responsible for radioactive waste management policy and for regulation of waste management operations and disposal;
- NDA, a non-departmental public body with responsibilities for overseeing the decommissioning and clean up of the UK's public sector civil nuclear liabilities and, more recently, for developing, delivering and implementing programmes for interim storage and disposal of UK higher activity wastes;
- Those concerned with the planning, operation and performance of systems and facilities for the management of radioactive wastes in the UK;
- Other interested parties.

The structure of the remainder of this report is as follows. Chapter 2 describes the sources and categories of radioactive waste, the scope of the Inventory and the terms and conventions used in reporting Inventory data, and the data collection and processing procedures used. It also provides an overview of how radioactive wastes are managed in the UK. Chapter 3 describes the scenario that forms the basis of the forecast of future waste arisings. Chapter 4 presents waste volumes in total from all sources and a comparison with the 2007 Inventory. Chapter 5 gives information on the material content of wastes, and Chapter 6 gives information on their radioactivity. All references are listed in Chapter 7.

Annexes 1-4 provide supplementary information on waste volumes at different levels of detail: in total from all sources (Annex 1), from each business activity (Annex 2), from each site (Annex 3) and for each waste stream (Annex 4). Annex 5 provides a glossary of terms and abbreviations.

In addition to the report giving information on UK civil nuclear materials and other potential radioactive waste [1], two companion reports have also been issued. *Radioactive Wastes in the UK - A Summary of the 2010 Inventory* [4] provides an overview of radioactive wastes and their management in the UK, and gives a summary of their quantities and characteristics. *The 2010 UK Radioactive Waste Inventory - A Summary of Information for International Reporting* [5] provides an overview of the quantities of radioactive wastes in the UK to facilitate international reporting obligations.

All reports are available on NDA's website at www.nda.gov.uk/ukinventory.

2.1 SOURCES OF RADIOACTIVE WASTE

Radioactive wastes are produced in the UK as a result of the generation of electricity in nuclear power stations and from the associated production and processing of the nuclear fuel, from the use of radioactive materials in industry, medicine and research, and from military nuclear programmes.

Radioactive wastes may contain naturally occurring radioactive materials, generally uranium, thorium and the products into which they decay, and radioactive materials arising from the activities of man. Most of the "man-made" radioactive materials result from the fission (splitting) of uranium atoms in nuclear reactors. They include fission products themselves (and their radioactive decay products), and activation products (and their radioactive decay products) produced in reactor internal and structural materials by the absorption of neutrons released during the fission process. Some of the radioactive materials used in medicine, industry and research, which can give rise to radioactive wastes, are produced in particle accelerators rather than nuclear reactors.

Figure 2.1 shows the sites of the major radioactive waste producers. Labels indicate the type or principal type of activity at a site, in terms of six areas covering all uses of radioactive materials in the UK. Many "small users" of radioactive materials such as hospitals and industrial, educational and research establishments produce small quantities of radioactive wastes; their sites are not shown. In the Inventory these establishments are collectively referred to as *Minor Waste Producers*.

The major producers of radioactive wastes in the UK are the following organisations.

2.1.1 Nuclear Decommissioning Authority

The NDA does not produce radioactive waste, but has responsibility for overseeing continuing operations and the decommissioning and clean up at its 19 sites. It has established Site Licence Companies, which carry the licences to operate these sites:

- *Sellafield Ltd* operates Sellafield and the adjacent Windscale and Calder Hall sites in Cumbria and Capenhurst in Cheshire. Sellafield is a large, complex nuclear chemical facility undertaking spent nuclear fuel reprocessing, mixed oxide (MOX) fuel fabrication and providing LLW treatment services. At Windscale the site's research and development facilities, including its three reactors, are being decommissioned. Calder Hall houses a Magnox power station; this is no longer operational and is being decommissioned. At Capenhurst in Cheshire the redundant uranium enrichment diffusion plant is being decommissioned.
- *Magnox South* operates five Magnox sites: Berkeley in Gloucestershire; Bradwell in Essex; Dungeness A in Kent; Hinkley Point A in Somerset; Sizewell A in Suffolk. These power stations are no longer operational and are being decommissioned.
- *Magnox North* operates five Magnox sites: Oldbury in South Gloucestershire and Wylfa in Anglesey have operational power stations; stations at Chapelcross near Annan in Dumfries and Galloway, Hunterston A in Ayrshire and Trawsfynydd in Gwynedd are no longer operational and are being decommissioned.
- *LLW Repository Ltd* operates the Low Level Waste Repository (LLWR) near the village of Drigg in Cumbria. The site has operated as a national disposal and storage facility for Low Level Waste since 1959.

Figure 2.1: Major waste producers' sites

(1) The national LLW disposal facility, the LLWR, is located near the village of Drigg, four miles south of Sellafield.

(2) There are 36 major waste producer sites (including the LLWR). There are no major waste producer sites in Northern Ireland.

- *Dounreay Site Restoration Ltd* operates Dounreay in Caithness. The site was the UK centre for fast reactor research and development comprising three reactors, fuel reprocessing and various other fuel cycle facilities. The reactors and other facilities are no longer operational and are being decommissioned.
- *Research Sites Restoration Ltd* operates Harwell in Oxfordshire[1] and Winfrith in Dorset. These sites carried out nuclear research and development work. All facilities, including a number of research, experimental and prototype reactors, have closed down and have either already been decommissioned or are currently being decommissioned.
- *Springfield Fuels Ltd*[2] operates Springfields near Preston in Lancashire. Nuclear fuel products are manufactured for the UK's nuclear power stations and for international customers. Natural uranium hexafluoride is supplied to Urenco and other organisations for enrichment.

2.1.2 EDF Energy

EDF Energy through its licence holder company British Energy Generation Ltd operates Advanced Gas-cooled Reactor (AGR) power stations at seven sites: Dungeness B in Kent; Hartlepool in County Durham; Heysham 1 and 2 in Lancashire; Hinkley Point B in Somerset; Hunterston B in Ayrshire and Torness in East Lothian. The company also operates the Sizewell B Pressurised Water Reactor (PWR) power station at Sizewell in Suffolk.

2.1.3 Ministry of Defence

The Ministry of Defence (MoD) is a major user of radioactive materials in its naval nuclear propulsion and atomic weapons programmes, and in other activities. Whilst the management of major MoD sites and facilities has been subject to a process of contractorisation or privatisation, MoD remains the legal owner of all defence wastes.

- *The Atomic Weapons Establishment (AWE)* at Aldermaston in Berkshire undertakes research and development, design, manufacturing, servicing and decommissioning of nuclear warheads.
- *Naval dockyards* at Devonport in Devon, Rosyth near Dunfermline in Fife and the Clyde submarine base at Faslane near Helensburgh in Dunbartonshire, support the operation, refuelling, refitting and decommissioning of the nuclear submarine fleet. Development of nuclear propulsion systems is carried out at the Naval Reactor Test Establishment (NRTE) Vulcan at Dounreay. At Derby, Rolls-Royce Marine Power Operations Ltd (RRMPOL) develops and manufactures reactor cores and associated equipment for the nuclear submarine fleet. At Barrow in Cumbria, BAE Systems Marine Ltd (BAESM) builds, tests and commissions nuclear powered submarines.
- *Eskmeals Range* in Cumbria was used for test firing of depleted uranium projectiles.
- *The Defence Storage and Distribution Agency's (DSDA)* regional centre located at Donnington in Shropshire and HM Naval Base at Portsmouth in Hampshire store radioactive wastes.
- *Defence Estates* manages a major programme to assess and remediate contaminated ground at non-nuclear MoD sites in the UK.

[1] The Harwell site is owned by UKAEA Ltd and leased to the NDA.
[2] On 1 April 2010 responsibility for the commercial fuel manufacturing business and Springfields Fuels Ltd was transferred from NDA to Westinghouse. NDA retains responsibility for the historic nuclear liabilities on the site.

2.1.4 United Kingdom Atomic Energy Authority

The United Kingdom Atomic Energy Authority (UKAEA) manages the UK fusion research programme and operates the Joint European Torus (JET) on behalf of the European Fusion Development Agreement (EFDA) at Culham in Oxfordshire[3].

2.1.5 GE Healthcare Ltd

GE Healthcare Ltd is a health science company providing products and services for use in healthcare and life science research. The company is a supplier of radioisotopes for medical, research and industrial uses. In the UK the company sites are The Grove Centre at Amersham in Buckinghamshire and The Maynard Centre at Cardiff. The company also has facilities on UKAEA Ltd's site at Harwell in Oxfordshire.

2.1.6 Urenco

Urenco is engaged in uranium enrichment at Capenhurst in Cheshire. The site receives natural uranium hexafluoride from Springfields for U235 enrichment in gas centrifuge plants. Enriched uranium hexafluoride is returned to Springfields for conversion into uranium dioxide, which is used in the fabrication of nuclear fuel and intermediate products.

2.2 CATEGORIES OF RADIOACTIVE WASTE

Material that has no further use, and is contaminated by, or incorporates, radioactivity above certain levels defined in UK legislation, is known as radioactive waste. Radioactive wastes range from those that contain high concentrations of radioactivity to general industrial and medical wastes that are only lightly contaminated with radioactivity.

In the UK radioactive wastes are classified in terms of the nature and quantity of radioactivity they contain and their heat-generating capacity, as High Level Wastes, Intermediate Level Wastes or Low Level Wastes.

High Level Wastes (HLW)

Wastes in which the temperature may rise significantly as a result of their radioactivity, so this factor has to be taken into account in the design of storage or disposal facilities.

Intermediate Level Wastes (ILW)

Wastes exceeding the upper boundaries for LLW, but which do not require heating to be taken into account in the design of storage or disposal facilities.

Low Level Wastes (LLW)

Wastes having a radioactive content not exceeding 4 GBq (gigabecquerels) per tonne of alpha, or 12 GBq per tonne of beta/gamma activity.

[3] Although the Culham site is currently owned and operated by United Kingdom Atomic Energy Authority, the NDA understands that the part of the site occupied by the JET facility will transfer to NDA ownership from the date when JET operation ceases.

The lower activity limit for LLW, below which waste is not required to be subject to specific regulatory control, is:

- For certain natural radionuclides in the uranium and thorium decay chains, the levels specified in Schedule 1 of the Radioactive Substances Act 1993 (RSA93) [6], below which the substances are outside the scope of the Act; or
- For other artificial or man-made radionuclides, the levels laid down in the current suite of Exemption Orders issued under RSA93, below which controls additional to those specified in the Exemption Order, are not required. The most notable of these is the Substances of Low Activity (SoLA) Exemption Order. This specifies a level for exemption from regulatory control of 0.4Bq (Becquerels) per gram for wastes which are substantially insoluble in water.

Very Low Level Waste (VLLW) is a sub-category of LLW that comprises:

- Low Volume VLLW ('dustbin loads') - wastes that can be safely disposed of to an unspecified destination with municipal, commercial or industrial waste, each 0.1 cubic metre of material containing less than 400kBq (kilobecquerels) of total activity, or single items containing less than 40kBq of total activity. There are additional limits for carbon-14 and tritium in wastes containing these radionuclides.
- High Volume VLLW (bulk disposals) – wastes with maximum concentrations of 4MBq (megabecquerels) per tonne of total activity that can be disposed of to specified landfill sites. There is an additional limit for tritium in wastes containing this radionuclide.

The principal difference between the two VLLW categories is the need for controls on the total volumes of high volume VLLW being deposited at any one particular landfill site. Low Volume VLLW is generated principally by so called "small users", while most High Volume VLLW is produced at nuclear licensed sites.

2.3 SCOPE OF THE INVENTORY

The UK Radioactive Waste Inventory includes HLW, ILW and LLW, and some High Volume VLLW where there is reasonable certainty of the total waste arisings. This is illustrated in Table 2.1.

The 2010 Inventory also includes LLW held in Vaults 8 and 9 at the LLWR that are currently classed as stored, not disposed[4].

The Inventory does not include liquid and gaseous wastes containing very low concentrations of radioactivity that are routinely discharged to the environment in accordance with statutory regulations. Discharges are made within authorised limits, usually after some form of treatment. Also excluded are small quantities of solid wastes with very low concentrations of radioactivity typically from hospitals, universities and the non-nuclear industry (small users) that can be disposed of with domestic refuse to landfill, either directly or after incineration.

[4] Most of the waste in Vault 8 is classed as disposed under the terms of an authorisation granted by the Environment Agency and so is not included in the 2010 Inventory.

Table 2.1: Wastes reported in the Inventory

Category	Major waste producers	Minor waste producers
HLW		None produced
ILW		
LLW		See Note 1
VLLW sub category	See Note 2	See Note 3

Wastes included in 2010 Inventory

Note 1: Excludes low volumes of waste that can be disposed of by "controlled burial" at landfill sites.

Note 2: Includes High Volume VLLW from facilities decommissioning and site clean up at nuclear licensed sites. However some waste producers have chosen to report potentially contaminated ground in the Radioactive Materials report [1] until there is more certainty on the volumes that might arise (see Chapter 4.9).

Note 3: Not reported in the Inventory. Such VLLW is of low volume and is disposed of separately, or with municipal, commercial and industrial wastes, at landfill sites. It is not mixed with controlled waste.

The Inventory covers radioactive wastes that existed on 1 April 2010 and those forecast to arise in the future. It gives, for each radioactive waste its:

- Name;
- Waste classification;
- Volume;
- Radioactivity concentration;
- Material composition;
- Current or planned treatment and packaging.

This report also gives the volumes of past and anticipated future LLW consigned to the LLWR.

2.4 CONVENTIONS

Radioactive wastes arise from diverse sources, and in a large number of different forms. A number of conventions have been adopted in order to collate and report information on the wastes in a consistent manner.

2.4.1 Waste stream identification

The fundamental designation used in the Inventory is that of the *waste stream*. Waste streams are designated to summarise waste or a collection of waste items at a particular site, usually in a particular facility and/or from particular processes or operations. It is often distinguishable by its radionuclide content and in many cases also by its physical and chemical characteristics.

Each waste stream in the Inventory is allocated a unique identifier. Historically the first character of the identifier indicated the custodian of the waste[5]. However, with the recent reorganisation of the nuclear industry and transfer of custodianship at a number of sites, this is no longer the case.

In the 2010 Inventory the first two characters uniquely identify the site (and hence its custodian), and are followed by a two- or three- digit number. Numbers in the range 01 to 99 identify operational wastes, and a three-digit number identifies decommissioning wastes.

For example:

Waste stream 3K02: 3K (Site = Hartlepool; Custodian is EDF Energy)

02 (Waste stream; operational)

A waste stream that has been conditioned in a suitable container for long-term management, or is being conditioned directly it arises, includes a /C suffix (e.g. 2D02/C).

A complete list of waste streams in the 2010 Inventory, and their identifiers, is given in Annex 4. Numbers are not sequential because over previous inventories some waste streams have been amalgamated, others split up and renumbered. Others have been disposed, or are not now expected to arise. In practice, waste streams may not be physically segregated when in storage or when disposed.

2.4.2 Waste classification

Every waste stream in the Inventory is classified as HLW, ILW or LLW (see Chapter 2.2). The LLW classification includes waste streams that fall into the VLLW sub-category.

Some practices can result in an ILW stream becoming a LLW stream. Thus, a small number of ILW streams are being interim-stored to allow time for radioactive decay to take place. Some ILW streams may be decontaminated to allow classification as LLW, with the radioactivity concentrated in a much smaller volume of ILW. Also there are some ILW streams that may be conditioned to LLW through the addition of grout. Such waste streams are included as ILW, because convention is to classify existing waste according to its radioactivity at a reference time (for this Inventory 1 April 2010) and to classify future wastes according to its radioactivity at the time it is forecast to arise. The volumes of ILW that are expected to become LLW are given in Chapter 4.

Similarly, certain LLW metal may be decontaminated so that it is no longer classified as radioactive waste and can be released into the scrap metals market. Where this treatment is part of current waste management strategy, reduced LLW volume arising estimates are included in the 2010 Inventory.

Other waste streams have specific activities close to the upper limits for LLW. If waste streams cannot be classified definitively they are designated ILW.

2.4.3 Operational and decommissioning wastes

In general, the wastes that are produced in a nuclear power station or other facility during its operating lifetime are different in nature and radioactivity content from those wastes that remain after the facility is shut down.

[5] The custodian is the licensee of the site where the waste is currently stored or will arise. The custodian has all responsibilities for the safe and environmental compliant management of the waste. For a very small number of waste streams, some of the waste has been generated at another site.

Operational wastes arise during the normal day-to-day operations of a plant or facility, from its start-up to its final shutdown. They consist principally of organic materials such as cellulose and plastic, metals and various inorganic materials. Examples of operational wastes are redundant equipment, fuel element components, filters, change room wastes, ion exchange resins and sludges from the treatment of liquid effluents. Wastes from defuelling nuclear reactors, and wastes from Post-Operational Clean Out (POCO) activities that prepare a plant for decommissioning, are designated as operational wastes because they are of a similar nature to those that arise during operation. Future arisings of operational wastes can often be based on experience of past production rates.

Decommissioning wastes arise after shutdown of a facility, although the radioactivity already exists. They consist mainly of building materials such as reinforced concrete, blockwork and steelwork, larger items of plant and equipment including pipework, process vessels and ventilation systems, and soil from land remediation. Once a plant or facility processing radioactive material has started up, equipment and structures become radioactive, so decommissioning wastes are certain to arise no matter how long or short its operational life.

The precise timing of decommissioning and the procedures to be used are often yet to be finalised, so waste volumes, and the timing of their arising, are usually subject to greater uncertainty than for operational wastes.

While the Inventory contains separate waste streams for operational and decommissioning wastes, the information presented in this report does not distinguish between wastes from operation and decommissioning.

2.4.4 Reporting of waste volumes

The total volume of radioactive waste in the UK changes over time as further waste is generated and as existing wastes and new arisings are packaged for long-term storage and management.

Volumes are reported for wastes that existed on 1 April 2010 and for wastes that were forecast to be produced after this date (future arisings). Volumes are also reported for wastes once they have been packaged for long-term management. As packaging schemes are often still under development, particularly for decommissioning wastes, there is greater uncertainty in the resulting volumes.

Waste at 1 April 2010

Waste at 1 April 2010 comprises radioactive materials that had been declared as waste and were being held at this date. The volumes reported are those that the wastes occupied in tanks, vaults, silos, drums etc. in which they were contained.

Most of the wastes existed in either an untreated or partly treated state. Many wastes are treated shortly after they arise, principally to reduce volume and so minimise containment requirements. Treatments include evaporation of liquid wastes and compaction of solid wastes. As an example, the volume of liquid HLW refers to the amount of liquor stored in a tank after evaporation and not to the amount of liquor arising directly from the first stage of spent fuel reprocessing. Similarly, suitable solid LLW is routinely compacted within mild steel drums, and the number of these drums determines the volume.

At 1 April 2010 some wastes had already been conditioned in suitable containers for long-term management, mostly by encapsulation in a cement-based medium, or in the case of HLW in glass. For these wastes, designated by the /C suffix in the stream identifier, the volume reported is the conditioned volume.

Future waste arisings

These are radioactive materials that waste producers forecast will be declared as waste at some specified time in the future. Most of the radioactivity already exists (for example in reactor structures), but will only arise as waste during the decommissioning of nuclear facilities and site clean up. Other radioactive waste - that from future planned operations - has yet to be produced.

In general the volumes of future arisings reported reflect current waste management practices. So for most future arisings the volume reported is that for untreated or partly treated waste. There are a small number of waste streams where fresh arisings are being conditioned directly in suitable containers for long-term management. For these wastes, designated by the /C suffix in the stream identifier, the volume reported is the conditioned volume.

A reliable forecast of future waste arisings is required for planning waste handling, storage, transport and the capacity of waste processing facilities.

The volumes of future waste arisings are given for financial years April to March, not calendar years; although for medium and longer-term forecasts this distinction is unlikely to matter. For simplicity in presentation and discussion of waste volumes the financial year April 2010 to March 2011, for example, is referred to as '2010', and the period April 2010 to March 2011, for example, is referred to as '2010-2011'.

Packaged waste volume

Packaging is the loading of waste into a container for long-term management. In most but not all cases this involves conditioning. The packaged waste volume is the displacement volume of the container (see Figure 2.2). It represents a "final" waste volume. Typically the packaged waste volume is between 20% and 50% greater than the conditioned waste volume, depending on the type of container. The number of packages is also reported in the Inventory[6].

It is necessary to know packaged volumes and the numbers of packages as these determine the required capacity of storage and disposal facilities.

Most LLW is packaged in large mild steel International Organisation for Standardisation (ISO) freight containers, which have a nominal capacity of 15.6m^3, and is then consigned to the LLWR. The UK Inventory does not compile data on any packaging that may be associated with LLW suitable for landfill disposal.

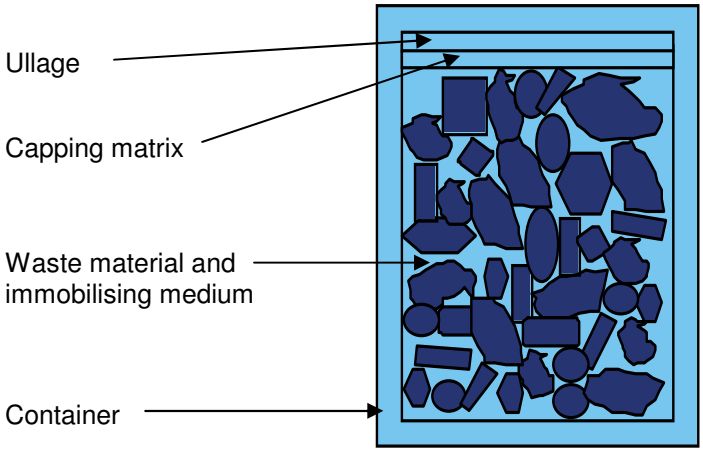
Historically wastes that could not be disposed were stored, whilst plans for their long-term management were developed. Since the 1980s, facilities such as the Thermal Oxide Reprocessing Plant (Thorp) and the Fuel Handling Plant (FHP) at Sellafield have been designed and constructed along with purpose-built packaging plants to process wastes as they arise, and purpose-built stores to hold the waste packages.

There are a number of radioactive waste packaging plants operating in the UK. HLW is being conditioned and packaged at Sellafield in the Waste Vitrification Plant (WVP). Current arisings are being blended with historic holdings. The vitrification process converts the liquid waste into a borosilicate glass in 150-litre stainless steel canisters.

[6] For those streams where the waste producer has not specified the type of package, it has been assumed in calculations that operational and early stage decommissioning ILW would go into 500 litre drums, final stage decommissioning ILW into 4m boxes (capacity 11m^3), and all LLW into half height ISO containers (nominal capacity 15.6m^3).

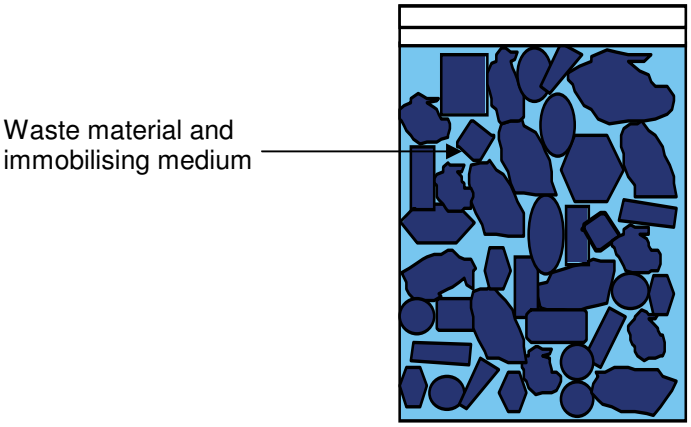
Figure 2.2: Illustration of packaged waste and conditioned waste volumes

Packaged waste volume (coloured area)



Note: Some packages do not contain any capping matrix or ullage

Conditioned waste volume (coloured area)



At Sellafield the Magnox Encapsulation Plant (MEP) processes Magnox swarf from FHP and other minor waste streams, the Waste Packaging and Encapsulation Plant (WPEP) processes floc from the treatment of liquid effluents, the Wastes Encapsulation Plant (WEP) processes wastes from Thorp, and the Waste Treatment Complex (WTC) processes plutonium contaminated materials. All these plants immobilise waste in a cement-based medium in 500-litre stainless steel drums.

Other packaging plants are operating at Dounreay, Windscale, Harwell and Trawsfynydd. The Dounreay Cementation Plant (DCP) immobilises Materials Testing Reactor (MTR) liquors in a cement matrix within 500-litre stainless steel drums, and the site Waste Receipt Assay Characterisation and Supercompaction (WRACS) facility processes and packages solid LLW. The Windscale Advanced Gas-cooled Reactor (WAGR) Packaging Plant immobilises operational and decommissioning wastes from the reactor in a cement matrix in large concrete boxes. At Harwell, solid ILW is being retrieved from existing stores,

monitored and inspected, and packaged in 500-litre stainless steel drums. The wastes will be immobilised in cement within the drums at a future date. At Trawsfynydd the Resin Solidification Plant immobilises ion exchange material in a polymer within Type 1803 drums, and the Miscellaneous Activated Components (MAC) Encapsulation Plant and Fuel Element Debris (FED) Retrieval & Processing Plant immobilise MAC and FED in cement within 3m^3 stainless steel boxes. A mobile facility (Transportable Intermediate Level Waste Solidification Plant - TILWSP) is being used at the site to immobilise sludges in cement in 3m^3 stainless steel drums.

Conditioned waste volume

Conditioning is immobilisation of radioactive waste in a suitable medium, such as a cement-based material, glass or polymer, to produce a solid and stable wasteform within a container. Immobilising the waste reduces the hazard it presents compared with its untreated or partly treated form. The conditioned waste volume is the volume of the wasteform (waste plus immobilising medium) within the container (see Figure 2.2).

Waste held in Vaults 8 and 9 at the LLWR is conditioned by immobilising it in cement grout. Suitable waste is first supercompacted to minimise its volume, in facilities such as the Waste Monitoring and Compaction (WAMAC) plant at Sellafield. The WRACS facility at Dounreay supercompacts LLW from that site and from the adjacent Vulcan (MoD) site, and there is a supercompaction service on the Winfrith site.

Conditioned volumes are needed for the development of safety cases for waste disposal.

Rounding of numerical data

Individual waste stream volumes cover a wide range, from less than 1m^3 to more than 1,000,000m^3, and there are uncertainties in the volumes associated with the methods of measuring existing wastes and calculating future arisings. Therefore summed waste stream volumes throughout this report are rounded to three significant figures, as any impression of undue arithmetic accuracy can be misleading.

Summed numbers of waste packages are also rounded to three significant figures, except for waste packages at 1 April 2010 where the actual numbers being held are reported.

Summed waste stream masses and activities are rounded to two significant figures.

Rounding errors affecting the last significant figure can occur if totals are compared with the sums of individual values within tables of data; this is purely an arithmetical effect and has no practical significance.

2.5 DATA COLLECTION AND PROCESSING

2.5.1 Data compilation

Preparation of this Inventory has involved the collation of detailed numerical and descriptive data for 1,312 radioactive waste streams produced in the UK

The number of waste streams is about 40 more than in the previous (2007) Inventory. This is the result of better waste characterisation. Most notably there have been increases at some Magnox sites undergoing decommissioning, where low volume wastes are being identified as separate streams for management purposes, and at Sellafield.

Information on these wastes was gathered by requesting the data in a standard form for each waste stream [7]. Some sites, accounting for the majority of waste streams,

independently compiled an update of their inventory data. For the remaining sites, preliminary 2010 Inventory information was estimated by extrapolating from data in the 2007 Inventory. This information was sent to the waste producing sites for endorsement or amendment.

In summary, the 2010 Inventory data comprise a full update of waste stream volumes, and a partial update of waste stream material compositions and radionuclide activities.

Over 200 persons across all waste producing sites were involved in providing the 2010 Inventory data.

2.5.2 Data assessment

The data provided have been checked by Pöyry Energy for consistency and completeness, and the information compared with that in the 2007 Inventory. Feedback was provided, as a result of which some revisions to data were made by waste producers. However, no attempt was made to validate the assumptions and quantities reported, which are those of the waste producers.

2.5.3 The Inventory database

Following the completion of data assessment, the information for each waste stream was transferred into a database. This information was then processed to produce summary and detailed outputs for the 2010 Inventory documents. The data providers have approved the publication of their data in the 2010 Inventory reports.

2.6 RADIOACTIVE WASTE MANAGEMENT

Government radioactive waste management policy is supported by a regulatory framework that aims to ensure that all radioactive wastes are safely and appropriately managed in ways that pose no unacceptable risks to people or the environment.

Current practice is that vitrified HLW should be stored for at least 50 years before disposal. The period of storage allows the amount of heat produced by the waste to fall, which makes it easier to transport and dispose. Most ILW is stored at the producing sites, although some waste producers, including minor waste producers, make use of an ILW store at Harwell and facilities at Sellafield.

Under the “Managing Radioactive Waste Safely” programme an independent Committee on Radioactive Waste Management (CoRWM) was appointed in 2003 to review the options for managing the UK’s legacy higher activity radioactive waste (HLW and ILW), and to recommend the best option that could provide a long-term solution. CoRWM reported in July 2006 with a package of recommendations including geological disposal, preceded by safe and secure interim storage [8]. The UK Government and Devolved Administrations for Wales and Northern Ireland accepted CoRWM's recommendation as the way forward.

Following public consultation, the UK Government and Devolved Administrations for Wales and Northern Ireland published in June 2008 a White Paper “*Managing Radioactive Waste Safely: A Framework for Implementing Geological Disposal*” [9]. This set out the approach to siting a geological disposal facility based on voluntarism and partnership with local communities, coupled with the use of appropriate site screening and assessment criteria. It is also acknowledged that there should be a programme of ongoing research and development for which NDA will have primary responsibility.

The Scottish Government policy for higher activity waste is that long-term management should be in near-surface facilities. Facilities should be located as near to the site where the waste is produced as possible and developers will need to demonstrate how the facilities will be monitored and how waste packages, or waste, could be retrieved.

Disposal routes for solid low activity radioactive wastes already exist in the UK. Most low activity waste is sent to the LLWR near Drigg in Cumbria or in certain cases to specific landfill sites.

There are also plans to construct a shallow, engineered LLW disposal facility adjacent to the Dounreay site in Caithness. This will take wastes from decommissioning at Dounreay and the neighbouring Vulcan nuclear site. The facility is scheduled to operate from 2014 subject to regulatory consent.

A Low Level Waste policy was announced in March 2007 to address the diminishing capacity issue at the LLWR and set out a more flexible, sustainable approach for managing solid low level radioactive waste in the long-term [10]. NDA has published a UK-wide strategy for managing LLW from the nuclear industry [11][7]. Central to the strategy is the implementation of the waste hierarchy: non-creation of waste where practicable; minimisation where creation is unavoidable; re-use and recycling; and, ultimately, disposal.

The strategy also includes how best use can be made of existing disposal capacity, and the extent to which other waste management and disposal options might be employed to accommodate the wide range in the make up and radioactivity of LLW.

Since September 2009 certain suitable LLW has been processed in a metals recycling facility at Workington in Cumbria. This facility uses size reduction and shot-blasting techniques to minimise quantities of LLW metal sent for disposal to the LLWR. The recovered material can be released back into the scrap metals market for a variety of uses. A small quantity of secondary waste is generated and consigned to the LLWR for disposal.

In practice there is some LLW which, because of its radionuclide content or its physical/chemical properties, may have to be managed along with ILW. Of the total amount of LLW forecast from the operation and decommissioning of current nuclear plant, less than one per cent by volume is unsuitable for the LLWR.

The Health and Safety Executive (HSE) regulates the safety of nuclear installations in the UK. It does so through a system of licensing of nuclear sites. All nuclear installations as defined in the Nuclear Installations Act 1965 (as amended) (NIA65) require a licence from HSE and every activity, including the accumulation and storage of radioactive wastes, must be undertaken in accordance with the conditions HSE attaches to the licence. NIA65 does not apply to activities carried out directly by the MoD or the armed forces. However, regulation of such operations at MoD sites is to the same standards as at nuclear sites.

The disposal of radioactive wastes from nuclear and non-nuclear sites – including the transfer of solid wastes for burial, incineration or storage elsewhere, as well as the discharge of liquid and gaseous wastes to the environment – is regulated under RSA93 [6]. The regulatory bodies are the Environment Agency (EA) in England and Wales, the Scottish Environment Protection Agency (SEPA) in Scotland, and the Environment and Heritage Service of the Department of Environment in Northern Ireland. For radioactive wastes arising on non-nuclear licenced sites, the environment agencies have regulatory responsibility for both accumulation and disposal.

[7] In December 2010 Government published a consultation document on a strategy for the management of solid low level radioactive waste from the non-nuclear industry in the UK.

3.1 INTRODUCTION

The figures given in the 2010 Inventory for future waste arisings are projections made by the organisations that operate sites where radioactive waste is generated on the basis of their assumptions as to the nature, scale and timing of future operations and activities. These projections represent their planning positions at 1 April 2010, which have been constructed for the purpose of preparing data for the 2010 Inventory. Projections may need to be amended as plans and arrangements are developed or are changed for commercial, policy or funding reasons, or if improved data become available.

Since the 1 April 2010 there have been developments in the forward plans at a number of sites. This means that certain assumptions used in preparing data for the 2010 Inventory have already been revised or are being reviewed, and there will be or are likely to be some changes to waste estimates. Revisions can affect either or both the quantity and timing of future arisings.

Chapter 3.9 describes how certain changes in the assumptions used to prepare 2010 Inventory data could affect projections of future waste arisings.

3.2 NUCLEAR DECOMMISSIONING AUTHORITY SITES

3.2.1 Sellafield

Sellafield is a large, complex nuclear chemical facility, which has supported the civil nuclear power programme since the 1940s. Operations at Sellafield include spent fuel reprocessing, mixed oxide (MOX) fuel fabrication; and the storage of nuclear materials and radioactive wastes.

The scenario assumptions described below were constructed for the 2010 Inventory. Actual quantities of fuel to be reprocessed and/or stored are subject to contractual arrangements to be agreed between NDA and its customers.

The Magnox reprocessing plant at Sellafield reprocesses spent fuel from the UK's Magnox stations. At 1 April 2010, the total quantity of fuel reprocessed was approximately 51,000tU. This includes spent fuel from the overseas Magnox reactors at Latina in Italy and Tokai Mura in Japan, which the authors estimate, from publicly available sources, to total about 3,000tU. It is anticipated that all spent fuel from the continuing operation of Magnox stations in the UK will be reprocessed, and that the reprocessing plant will continue to operate until 2016. The lifetime throughput of the plant is expected to be approximately 55,000tU.

The Thermal Oxide Reprocessing Plant (Thorp) reprocesses spent fuel from the UK's Advanced Gas-cooled Reactor (AGR) power stations, as well as spent fuel from overseas Light Water Reactor (LWR) power stations. In addition, Thorp will reprocess the smaller quantities of spent fuel from the Windscale AGR (WAGR) and the Winfrith Steam Generating Heavy Water Reactor (SGHWR). The current strategy is to complete LWR and AGR reprocessing contracts as soon as reasonably practicable and cease reprocessing at Thorp. If additional spent oxide fuel management services are required, NDA will review and discuss the options with Government. At 1 April 2010, the total quantity of fuel reprocessed was about 6,000tU. Thorp has an order book that currently extends to around 2021, and the lifetime throughput of the plant is expected to be approximately 9,900tU.

The estimate of lifetime waste arisings from Thorp has assumed the reprocessing of approximately 5,500tU AGR fuel. All other spent fuel generated during the lifetimes of the UK's seven AGR power stations will be held in long-term storage at Sellafield. Measures including the reuse of pond furniture and continuing improvements in pond management practices will result in only small volumes of wastes being generated during fuel storage. Estimated arisings of such wastes are included in the Inventory. It is anticipated that spent fuel would be stored on site until about 2085, pending disposal in a purpose built repository.

Waste arisings from overseas LWR spent fuel reprocessing in Thorp are based on a total throughput of approximately 4,400tU. Spent fuel from the Pressurised Water Reactor (PWR) station at Sizewell is not included (see Chapter 3.3).

Waste arisings from Thorp also include those from reprocessing 28tU of WAGR fuel, 120tU of SGHWR fuel and 44tU DFR breeder material, plus a small amount of other Post Irradiation Examination (PIE) type materials.

MOX fuel fabrication in the Sellafield MOX Plant (SMP) started in 2002. The facility uses plutonium separated from reprocessing, and blends it with uranium to make MOX fuel. Waste arisings are based on fuel fabrication continuing until 2036.

In addition to the wastes from the reprocessing plants and SMP, there are routine waste arisings on the Sellafield site from waste packaging plants, effluent treatment plants, plutonium and fuel handling plants, other facilities and site construction activities.

Decommissioning activities for nuclear chemical plants at Sellafield are broken down into the following phases:

Initial Decommissioning which seeks to remove or fix further loose radioactive material with the intention of enabling useful manual access for the interim decommissioning phase. It typically involves decontamination activities to reduce dose rates and removal of ancillary equipment and may include installation of systems to support the surveillance and maintenance phase (if required).

Surveillance and Maintenance (S&M) describes the period of supervision of a plant or facility that may occur between the end of Post Operational Clean Out (POCO) and prior to the start of the Interim Decommissioning phase. It would typically include operation and maintenance of radiological monitoring and ventilation systems in addition to the more general maintenance of the fabric of the building. This phase only occurs in the event of a requirement to delay decommissioning.

Interim Decommissioning involves the removal of the active plant, equipment and associated systems. In general, the end-point of this phase is a building shell that contains only traces of activity, which are assumed to be localised LLW. It is anticipated that decontamination may not be entirely effective, so it is expected that more remote decommissioning activities may be required.

Care and Maintenance describes the period of supervision of a building shell, at minimal cost. This would normally entail minimum maintenance of the fabric of the building with the objective of ensuring that it presents no physical hazard to individuals or adjacent plants, while preventing any significant deterioration of the building. As with the S&M phase, plants and facilities only undergo this phase when there is a requirement to delay the final decommissioning phase.

Final Decommissioning is the final activity associated with bringing a plant or facility to its agreed or assumed end-point (but excluding any contaminated ground or groundwater remediation). This is assumed to be the demolition/deconstruction to base slab or ground level depending on the principles of ALARP (As Low As Reasonably Practicable). It is assumed that this will be carried out using predominantly conventional techniques.

Groundwater Remediation covers the activities necessary to remediate any contaminated groundwater.

Contaminated Ground Remediation covers activities necessary to remediate any contaminated ground.

There is a wide range of facilities on the Sellafield site, and the development of a decommissioning strategy takes into account both plant specific and site wide considerations. The decommissioning plan for each facility is considered individually, but basic strategies can be summarised as follows:

Reprocessing and Associated Plant which contain radionuclides that emit significant gamma radiation, some of which have comparatively short half-lives. Deferring decommissioning for some of these plants can therefore offer safety and cost benefits.

Plutonium plants present less of a radiation hazard however over time it has the potential to increase due to decay of specific radioactive isotopes. Deferring decommissioning presents no advantage and so equipment removal from these plants on an early timescale is preferred in order to remove any hazard and to restrict the additional radiological constraints that are posed by the 'in-growth' of, for example, americium.

Decommissioning scheduling is subject to overall site priorities and is driven primarily by hazard and risk management with due consideration of environmental and security requirements.

Key Dates

- All reprocessing activities, including POCO (except for the already contracted storage of fuel and POCO of associated plants), will cease by about 2030; decommissioning of the majority of associated facilities will commence shortly thereafter. Note some commercial activities continue on the site to at least 2085.
- Prior to 2045, contaminated ground and groundwater activities are assumed to be based around monitoring and characterisation.
- Significant contaminated ground and groundwater activities will commence at 2050.
- Decommissioning activities will be largely complete (waste stored on site) by 2070.
- All buildings/waste stores (except product stores and supporting ancillary buildings) will be demolished by 2120.
- It is assumed that institutional control will be maintained after 2120.
- WAMAC will cease operation in 2020[1].

3.2.2 Windscale

There are three shutdown reactors on the Windscale site: the Windscale Advanced Gas-cooled Reactor (WAGR), Pile 1 and Pile 2. WAGR, which was operated until 1981, is currently undergoing interim decommissioning, scheduled to be complete by 2014. Final decommissioning (Stage 3) of WAGR will be complete by 2030.

The two pile reactors were operated until 1957 when a fire damaged the Pile 1 core. Stage 2 decommissioning has been completed for Pile 2 and will be complete for Pile 1 in 2021. Following a period of care and maintenance, Stage 3 decommissioning (removal of core and bioshield) will be complete by 2036 for Pile 1 and by 2044 for Pile 2.

[1] Due to the planned closure of WAMAC, Sellafield has reported raw waste volumes for LLW arisings post-2020. For the purpose of the 2010 Inventory, these raw volumes have been converted to packaged volumes based on the same assumptions relating to treatment and packaging practices applied to pre-2020 arisings.

LLW will be consigned for disposal as it arises, although decay storage to allow disposal as Exempt waste is also an option. ILW will be repackaged appropriately and stored on site until a national long-term management solution is available.

The timetable for the operation and decommissioning of remaining major facilities on the Windscale site is shown in Table 3.1 below.

Table 3.1: Proposed decommissioning timetable for major Windscale facilities

Facility	Operation	Decommissioning (1)		
		Stage 1	Stage 2	Stage 3
Pile 1	1950 – 1957	Ends 2021		2026 – 2036
Pile 2	1950 – 1957	Complete		2035 – 2044
WAGR	1962 – 1981	Complete	Ends 2014	Ends 2030

(1) For an explanation of the three stages of decommissioning see Chapter 3.2.7.

3.2.3 Capenhurst

The Capenhurst Uranium Gaseous Diffusion Plant operated from 1961 to 1982. The site is the UK's primary uranic storage facility, holding uranium tails from the enrichment operations and other uranium stocks. The site has almost completed its main plant decommissioning programme and is close to concluding its waste disposal operations for materials arising from that programme. This includes the processing and packaging of legacy low-level wastes, and consignment to the LLWR and the Clifton Marsh landfill site; the investigation and implementation of a management strategy for any contaminated ground; and preparing the site and buildings for remaining storage operations.

The current plan for the site is to reduce progressively and remove historical hazards from the site, and undertake the necessary arrangements to hold a UK strategic stock of uranium to 2120 and beyond. During the storage period, the uranium tails will be converted from uranium hexafluoride to oxide form, starting no later than 2020. Longer term, any remaining ground contamination under the storage buildings will be investigated and removed when the stores are replaced in 2050.

3.2.4 Magnox stations

Eleven Magnox power stations came into operation over the period 1956 to 1971. At 1 April 2010 two stations were still operating: Oldbury and Wylfa. Nine stations are shut down: Berkeley, Bradwell, Calder Hall, Chapelcross, Dungeness A, Hinkley Point A, Hunterston A, Sizewell A and Trawsfynydd.

A timetable for the operation and decommissioning of all Magnox stations is given in Table 3.2.

Table 3.2: Proposed timetable for Magnox stations (1)

Site	Operation	Defuelling & Care and Maintenance Preparations	Care and Maintenance	Final Site Clearance
Calder Hall	1956 – 2003	2003 – 2032	2033 – 2104	2105 – 2114
Chapelcross	1959 – 2004	2005 – 2022	2022 – 2089	2089 – 2095
Berkeley(2)	1962 – 1989	1989 – 2026	2026 – 2074	2070 – 2080
Bradwell(3)	1962 – 2002	2002 – 2027	2027 – 2087	2083 – 2093
Hunterston A	1964 – 1990	1990 – 2020	2020 – 2072	2072 – 2080
Trawsfynydd	1965 – 1993	1993 – 2021	2022 – 2074	2074 – 2083
Hinkley Point A	1965 – 2000	2000 – 2031	2031 – 2085	2081 – 2091
Dungeness A	1965 – 2006	2007 – 2034	2034 – 2092	2088 – 2098
Sizewell A	1966 – 2006	2007 – 2034	2034 – 2092	2088 – 2098
Oldbury(4)	1967 – 2011	2011 – 2027	2027 – 2095	2096 – 2101
Wylfa(5)	1971 – 2011	2011 – 2025	2025 – 2096	2096 – 2101

(1) The dates in the table refer to financial years not calendar years. All future dates for operation, defuelling and care and maintenance preparations are under review and could change. Dates given are those used in preparing waste volumes data for inclusion in the Inventory.

(2) Berkeley Site comprises the Magnox station site and that part of what was Berkeley Centre containing the R&D active handling facilities.

(3) In October 2010, a business case was submitted to the NDA to accelerate decommissioning activities at Bradwell to place it into early Care and Maintenance by 2015. This will be subject to business case approval and funding availability.

(4) Since the 2010 Inventory data were compiled, NDA has announced it is engaging with nuclear regulators and Government to secure a short-term life extension for Oldbury, subject to business and safety case approval.

(5) In October 2010, it was announced that Wylfa Power Station will continue operating for up to two additional years beyond December 2010. Extended generation will be subject to safety case approval.

The decommissioning strategy for the Magnox sites is “Deferred Site Clearance”:

Defuelling & Care and Maintenance Preparations: Removing the fuel from the reactor; removing most plants and structures other than the reactor buildings. This takes about 14 to 37 years.

Care and Maintenance: A period of deferment, planned to extend to between about 50 and 70 years.

Final Site Clearance: Dismantling of all remaining structures, clearing and restoring the site. This is assumed to take between 5 and 10 years.

After defuelling, exterior cladding on the reactor containment building would be replaced as necessary with high-integrity materials and un-needed openings would be in-filled to create a low-maintenance structure.

Wastes that arise during the defuelling of Magnox reactors are the same as those that arise during operation. For this reason they are included with operational wastes.

The active handing facilities at Berkeley Site (previously part of Berkeley Centre) used to provide research and development facilities including a post-irradiation examination service. Operations ended in 2005, and the facilities are undergoing decommissioning.

3.2.5 LLWR

The Low Level Waste Repository (LLWR) near the village of Drigg is the national disposal site for low level wastes. It has operated since 1959, and accepts LLW from a wide variety of sources throughout the UK including nuclear licensed sites, hospitals, research establishments and industrial concerns.

Operations at the site are forecast to continue beyond 2080, and will generate small quantities of LLW.

The site has also been used for storing plutonium contaminated materials (PCM), initially in former munitions storage magazines, subsequently in a custom built drum store. During 2007 all remaining PCM was retrieved and removed from the site for long-term storage at nearby Sellafield. Current plans include the redundant magazines and drum store being decommissioned and demolished by the end of 2010.

3.2.6 Dounreay

The three reactors on the Dounreay site are shut down. The Prototype Fast Reactor (PFR) and Dounreay Fast Reactor (DFR) are undergoing decommissioning. The Dounreay Materials Test Reactor (DMTR) is currently under a Care and Maintenance regime, Stage 1 decommissioning having been completed.

Both fuel reprocessing plants are shut down. There will be no further arisings of MTR raffinate, DFR raffinate or PFR raffinate. It is intended that existing stocks will be conditioned in the Dounreay Cementation Plant or the planned Remote Handled Intermediate Level Waste (RHILW) Encapsulation, Immobilisation and Storage Facility.

The Dounreay Historic High Beta Gamma Storage Facility will be emptied of waste. Some decontamination of the rock may be undertaken, at least to LLW levels. The Silo will be emptied and decontaminated, and the structure will be removed. The Dounreay Historic High Beta Gamma Storage Facility and Silo waste will be conditioned in the planned Waste Treatment Plant. Solid ILW currently in store and other decommissioning ILW will be conditioned in the RHILW Encapsulation, Immobilisation and Storage Facility.

Table 3.3: Proposed decommissioning timetable for major Dounreay facilities

Facility	Operation	Decommissioning – Key Dates		
		Stage 1	Stage 2	Stage 3
PFR	1974 – 1994	PFR decommissioning complete by 2025		
DFR	1959 – 1977	DFR decommissioning complete by 2025		
DMTR	1958 – 1969	DMTR decommissioning complete by 2023		
PFR reprocessing plant	1980 – 2001	2007 – 2018	2018 – 2019	2019 – 2021
MTR reprocessing plant	1959 – 1998	Complete	To be completed by 2014	
Development laboratory	1985 – 2022	2022 – 2023	2023 – 2024	2024
HHBGSF	1959 – 1971	Retrieval and packaging 2017 – 2021		
		HHBGSF decommissioning 2023 – 2024		
Silo	1971 – 1998	Retrieval and packaging 2017 – 2023		
		Silo decommissioning 2023 – 2024		

Note: The dates in the table refer to calendar years.

The site plan is that all redundant facilities will be decommissioned by 2025[2]. The timetable for the operation and decommissioning of the major facilities on the Dounreay site is shown in Table 3.3 above.

3.2.7 Harwell

Three redundant reactors remain on the Harwell site since GLEEP decommissioning was completed in 2005. The BEPO reactor and the materials test reactors DIDO and PLUTO were decommissioned to Stage 2 several years ago, and all are currently under a minimum Care and Maintenance regime.

The reference strategy at 1 April 2010 is to decommission and remediate the site so that by 2031 the only licensed facilities remaining would be stores for packaged operational and decommissioning ILW. Final decommissioning of the reactors is scheduled to start in 2015 for BEPO and 2021 for the MTRs.

The radiochemical facility ceased operations in 2004, although parts of the building are now being used to treat certain historic wastes and for the interim storage of contact-handled ILW in drums. Stage 1 decommissioning of certain laboratories was undertaken before full shutdown, and under the reference plan, the whole of the building should be decommissioned by 2023.

The timetable for the operation and decommissioning of the remaining major facilities on the Harwell site is shown in Table 3.4 below.

Table 3.4: Proposed decommissioning timetable for major Harwell facilities

Facility	Operation	Decommissioning		
		Stage 1	Stage 2	Stage 3
BEPO	1948 – 1968	Complete	Complete	2015 – 2023
DIDO	1956 – 1990	Complete	Complete	2021 – 2031
PLUTO	1957 – 1990	Complete	Complete	2021 – 2031
Radiochemical facility	1947 – 2004	Complete 2012	2016 – 2023	

Decommissioning is divided into three stages:

Stage 1: For reactors: remove fuel, coolant and non-fixed items of plant such as process materials and rigs. For other facilities: remove all radioactive sources and readily removable equipment. Prepare facility for a period of Care and Maintenance if required.

Stage 2: Dismantle and remove most of the remaining fixed radioactive material. Prepare facility for a further period of Care and Maintenance if required.

Stage 3: Return facility to a condition where no significant hazard remains.

[2] This was the position at 1.4.2010. The NDA draft strategy published September 2010 states that the date is now 2039.

3.2.8 Winfrith

There are two remaining shutdown reactors on the Winfrith site: the SGHWR and the Dragon high temperature gas-cooled reactor. Most of the secondary facilities associated with these buildings have been decommissioned, and the reactors will continue in care and maintenance until final decommissioning starts in 2023.

The timetable for the operation and decommissioning of remaining major facilities on the Winfrith site is shown in Table 3.5.

Legacy wastes at Winfrith, largely comprising the SGHWR sludges, will be immobilised by the end of 2010. The External Active Sludge Tanks (EAST) and Winfrith EAST treatment plant (WETP) will be decommissioned by 2012.

Table 3.5: Proposed decommissioning timetable for major Winfrith facilities

Facility	Operation	Decommissioning (1)		
		Stage 1	Stage 2	Stage 3
SGHWR	1968 – 1990	Complete	2023 – 2038	
Dragon	1964 – 1975	Complete	2023 – 2032	

(1) For an explanation of the three stages of decommissioning see Chapter 3.2.7.

3.2.9 Springfields

Operations at Springfields comprise the fabrication of oxide fuels for AGRs and LWRs, intermediate fuel products such as powders, granules and pellets, the production and delivery of natural uranium hexafluoride and the delivery of Magnox fuel stocks. In addition, redundant plants and buildings are being demolished, and there is an ongoing programme to recover the site's historic legacy of uranic residues via residues recovery facilities.

Estimates of future arisings at the site are based on a number of projections. Magnox fuel deliveries will continue to supply the remaining two operational Magnox power stations until they cease operations. The final recovery of legacy natural and enriched uranium residues is due for completion by approximately 2017/18. Uranium hexafluoride (Hex) production will continue until 2016 at about 5,000tU per year.

Oxide manufacturing will continue until 2023 supplying AGR fuel in line with the current planned closure dates of the AGR power stations, and uranium dioxide products for UK and overseas customers. The annual capacity for AGR fuel manufacture is approximately 260tU, with current demand at 215tU. Intermediate oxide product annual demand is between 200 and 400tU.

The decommissioning of the Magnox and Residue Recovery plant has been delayed due to the need to utilise these facilities for residues storage and processing. Decommissioning of residues facilities is now expected to be completed by 2017, and the Hex Plant and Oxide Fuels Complex have a provisional date of 2045. Final site clean up and remediation now has a provisional date of ~2100.

3.3 EDF ENERGY SITES

EDF Energy through its licence holder company British Energy Generation Ltd operates seven AGR power stations and one PWR power station.

The AGR stations came into operation in the UK over the period 1976 to 1988, and the PWR station in early 1995. All eight stations are still operating. Predicted waste arisings from AGR stations assume an operational lifetimes of 31, 35 or 40 years, depending on the station. The PWR station is assumed to operate for 40 years.

A timetable for the operation and decommissioning of stations is given in Table 3.6.[3]

Table 3.6: Proposed timetable for EDF Energy power stations

Station	Operation	Defuelling & Care and Maintenance Preparations	Care and Maintenance	Final Site Clearance
AGR				
Hinkley Pt B	1976 – 2016	2016 – 2024	2024 – 2101	2101 – 2109
Hunterston B	1976 – 2016	2016 – 2024	2024 – 2101	2101 – 2109
Dungeness B	1983 – 2018	2018 – 2026	2026 – 2103	2103 – 2111
Heysham 1	1983 – 2014	2014 – 2022	2022 – 2099	2099 – 2107
Hartlepool	1983 – 2014	2014 – 2022	2022 – 2099	2099 – 2107
Heysham 2	1988 – 2023	2023 – 2031	2031 – 2108	2108 – 2116
Torness	1988 – 2023	2023 – 2031	2031 – 2108	2108 – 2116
PWR				
Sizewell B	1995 – 2035	2035 – 2045	Not applicable	2045 – 2055

Note: The dates in the table refer to calendar years and not to financial years.

EDF Energy has proposed an "Early Safestore" strategy for AGR decommissioning, with the start of final reactor dismantling deferred for a period of at least 85 years after the end of generation for AGRs. The decommissioning strategy is divided into three stages as follows:

Defuelling & Care and Maintenance Preparations: The reactor is defuelled and the fuel transferred for reprocessing or storage. Non-radioactive buildings and plant external to the reactor area are dismantled. Accumulated operational waste is retrieved and packaged. A Safestore is constructed to retain all of the active plant and materials on the site in a safe and secure state. These activities are assumed to take about 8 years.

Significant plant decommissioning activities that were planned to take place coincident with reactor dismantling (about 85 years after end of generation) are now to be carried out in the first few years following reactor shutdown.

[3] Since 2010 Inventory data were compiled, EDF Energy has announced operational life extensions for Heysham 1 and Hartlepool of 5 years to 2019. Moreover, the company announced that full deployment of its Plant Lifetime Extension programme could enable extended lifetimes for all AGR stations by an average of 5 years and for Sizewell B by 20 years.

Care and Maintenance: There is a period of care and maintenance with inspection and repair as necessary. The duration is assumed to be at least 77 years for the AGRs.

Final Site Clearance: Safestore dismantling and final site clearance is envisaged to start about 85 years after reactor shutdown. All activities are assumed to take about 8 years.

For the Sizewell B PWR the strategy is Early Site Clearance, with reactor dismantling deferred for a period of 10 years after station shutdown. All decommissioning work on the site is planned to be completed 20 years after station shutdown. This strategy has been adopted following a review of international best practice for PWR decommissioning.

Wastes arising during the defuelling of the reactors are the same as those which arise during operation. For this reason they are included with the operational wastes.

EDF Energy has contracts that cover the management of spent fuel generated during the lifetimes of the AGR power stations. The contracts provide for a mixture of long-term storage and reprocessing at Sellafield, and the radioactive wastes generated are included in wastes reported for Sellafield site.

For the Sizewell B PWR, the strategy is to store spent fuel until a disposal route is available, although this does not foreclose potential alternative options.

3.4 MINISTRY OF DEFENCE SITES

The MoD produces radioactive wastes primarily as a result of the nuclear weapons and nuclear propulsion plant programmes, research and development activities and through the redundancy of assorted equipments that contain radioactive substances. In addition, volumes of waste are produced as a result of the remediation of radioactively contaminated ground on both nuclear and non-nuclear defence sites.

The figures for future waste arisings are projections made by MoD and/or its site operators on the basis of assumptions as to the nature and scale of future operations and activities, and reflect the most likely national defence strategy.

Many of MoD's sites are operated on its behalf by contractor organisations. For some sites ownership has also been transferred. However the ownership of radioactive wastes at all sites rests with the MoD, which also bears the cost of waste management and decommissioning.

3.4.1 Atomic Weapons Establishment Aldermaston

UK Government policy is to sustain a credible deterrent capability through to the 2020s and beyond. The existing nuclear warhead design will last into the 2020s. The MoD does not yet have sufficient information to know whether it can, with some refurbishment, be extended beyond that point or whether it will need to develop a replacement warhead: a decision is likely to be necessary in the next Parliament.

The Atomic Weapons Establishment (AWE) sites at Aldermaston and Burghfield undertake research and development, design, manufacturing, servicing and decommissioning of nuclear warheads. The AWE sites are operated under a Government Owned Contractor Operated (GOCO) arrangement. AWE plc operates the sites on behalf of MoD which owns the sites and assets. Wastes from Burghfield are included with those from Aldermaston, from where radioactive waste storage and disposal is co-ordinated.

Legacy sea disposal packages suitable for disposal at the LLWR will be overpacked and consigned. Many older facilities have come to the end of their operational lives, and are either under Care and Maintenance pending decommissioning or are actually being decommissioned.

3.4.2 Her Majesty's Naval Base Devonport

The Devonport site comprises the Naval Base (owned and operated by the MoD) and its co-located Dockyard (owned and operated by Babcock International Group plc).

Devonport provides maintenance and support services for the operational UK nuclear submarine squadrons. It has the facilities to carry out operations associated with submarine refitting and defuelling. Since 2004 all UK nuclear submarine refitting work has been carried out at Devonport.

Operational waste arisings from Devonport have been derived by extrapolation of historical data and are forecasted up to 2100.

3.4.3 Rosyth Royal Dockyard

Submarine refitting and refuelling activities at Rosyth ceased in 2003. Progressive site decommissioning has started, and is forecast to continue until 2013/14.

3.4.4 HMNB Clyde

HMNB Clyde (Faslane) provides maintenance and support services for the operational UK nuclear submarine squadrons. It deals with radioactive wastes arising from the operation at sea and the maintenance ashore of submarine nuclear propulsion systems.

Operational wastes are at a significantly lower level than those resulting from refitting work at Devonport. The predicted arisings are based on the number of submarines maintained and future development work, and are thus subject to change.

3.4.5 Decommissioned nuclear powered submarines

When nuclear powered submarines leave Naval service the nuclear fuel is removed, equipment taken off and the vessel prepared for storage afloat. This process is called decommissioning, but in the Naval sense, and is distinct from the decommissioning of nuclear power stations. After Naval decommissioning, radioactivity remains contained within the reactor compartment structures.

To date 16 nuclear-powered submarines have left naval service, and 11 have been defuelled. They are being stored afloat at Rosyth and Devonport dockyards.

Future arisings of submarine decommissioning wastes assume a continuing naval nuclear propulsion programme with a fleet of up to 8 SSNs (nuclear powered, conventionally armed submarines) and 4 SSBNs (nuclear powered submarines with ballistic nuclear weapons). Submarines are assumed to have a hull life of between 25 and 30 years and to be stored afloat for 30 years before being cut up and the waste processed. Future arisings of submarine decommissioning wastes are forecast up to 2100.

MoD's Project SDP (Submarine Dismantling Project) formerly know as ISOLUS (Interim Storage Of Laid Up Submarines) is reviewing options for interim storage of decommissioned nuclear submarines pending the implementation of a UK strategy for the long-term management of ILW. The chosen interim storage route may affect the current 30-year afloat storage policy, which may in turn affect the rate at which the waste is processed.

3.4.6 HMNB Portsmouth

HMNB Portsmouth is involved in managing naval stores and de-equipping redundant naval surface vessels that can contain equipment and instrumentation incorporating radioactive materials. The base produces small quantities of radioactive waste from these activities.

3.4.7 Dounreay (Vulcan)

The Naval Reactor Test Establishment (NRTE) Vulcan at Dounreay is involved in development work, acting as the test bed for prototype submarine nuclear reactors. Operations are forecast to continue to the end of core life in 2014.

This will be followed by a post-operational phase that is estimated to continue until 2020. Decommissioning is assumed to take place during the period 2020 until 2050.

3.4.8 Rolls Royce Marine Power Operations Ltd Derby

Rolls Royce Marine Power Operations Ltd (RRMPOL) operates two nuclear licensed sites at Raynesway in Derby, where work is carried out in support of the MoD's nuclear submarine programme. RRMPOL manufactures the reactors for the Navy's nuclear powered submarines, and operates the low energy Neptune reactor used to develop submarine reactor designs.

The future of the sites is inextricably linked to the future operational requirements of the submarine fleet. It is envisaged that both of the nuclear licensed sites will operate at the current levels of activity for at least the next six years.

3.4.9 BAE Systems Marine Ltd Barrow-in-Furness

BAE Systems Marine (BAESM) Ltd builds, tests and commissions nuclear submarines in support of the MoD nuclear submarine programme. The site generates only small quantities of radioactive waste associated with the commissioning of submarine nuclear reactors.

3.4.10 Eskmeals

The Eskmeals site, operated by QinetiQ on behalf of MoD, has been used for proof firing of a wide range of different calibre weapons by the UK's armed services. This included test firing of projectiles made up in part of depleted uranium, and the use of 'hard targets' for testing the effectiveness of armour plating containing depleted uranium.

The firing programme using depleted uranium projectiles is currently suspended, but there are no plans to close the site.

QinetiQ are in the closing stages of the first phase of decommissioning for the MoD, but do not yet have full figures of how much LLW and VLLW this has produced.

3.4.11 Defence Storage and Distribution Agency

The Defence Storage and Distribution Agency (DSDA)[4] at Donnington holds redundant equipment containing radioactive materials pending a decision on their future use, and when declared as waste are disposed of as soon as possible in accord with current legislation.

[4] DSDA was renamed Joint Supply Chain Services (JSCS) with effect from 1 August 2010.

The future needs of the MoD together with any changes in policy governing the procurement of radioactive equipment will govern waste arisings. It is assumed that waste will continue to arise at current levels.

3.4.12 Defence Estates

Defence Estates is responsible for managing the MoD Estate.

As part of their work Defence Estates manages a major Land Quality Assessment (LQA) programme to assess and manage land contamination, including radioactive land contamination across the MoD Estate. This has the potential to create volumes of low level waste comprising predominantly soil, ash and rubble from the remediation of radioactively contaminated ground. The principal source of the contamination is expected to be radium associated with the historic maintenance and disposal of luminised equipment.

3.5 UNITED KINGDOM ATOMIC ENERGY AUTHORITY SITE

Small quantities of ILW and LLW will continue to be produced from the operational phase of the JET fusion experiment located at Culham. The reference decommissioning strategy at 1 April 2010 assumes that operations continue to 2013, and the facility then moves immediately into decommissioning.

However, the length of future operations is uncertain. United Kingdom Atomic Energy Authority's contract to operate JET is dependent on the experimental requirements, the performance of the JET machine and on EU funding, and operations are expected to continue for some time in support of ITER. There is some uncertainty over what further experiments will take place, and therefore what will be the final inventory of the plant and of the resultant decommissioning waste quantities. There is, however, an agreed limit on the maximum neutron production from deuterium-tritium operations, and this has been used to define a bounding inventory for the wastes.

United Kingdom Atomic Energy Authority has been investigating possible treatment and packaging options for JET ILW streams including options for reduction of the tritium inventory to enable its return to source. On the basis of a start date of January 2014 for the decommissioning, removal of the torus facility is programmed for completion in 2020. The Active Gas Handling System needs to remain operational during the dismantling of the JET machine, but should then be fully decommissioned by 2022, and the JET site completely cleared by the end of 2023.

3.6 GE HEALTHCARE LTD SITES

Expansion of GE Healthcare Ltd's activities is expected to be mainly in non-radioactive products. Future radioactive waste arisings are estimated up to 2040. Volumes are based on a continuation of the current rate of arising. Market forces will govern future business and manufacturing activities, so the medium and longer-term estimates of waste volumes and type can only be approximate.

Predictions for decommissioning waste arisings are included in operational wastes, since facilities do not have a fixed operating lifetime but are refurbished as necessary. The rate of arising of refurbishment wastes reflects expected facilities development plans for commercial activities.

3.7 URENCO SITE

Future arisings at Urenco's Capenhurst site will be dependent on the commercial contracts won by the group and the installation of new enrichment capacity. The use of either natural uranium or recycled uranium from reprocessing as the enrichment feedstock will be a commercial and regulatory decision. Waste volumes are estimated up to 2030. Uranium recovery routes are in place for some waste materials, and it is assumed that these will remain open in the short term. In the long term it is envisaged that uranium recovery will be undertaken at Capenhurst.

3.8 MINOR WASTE PRODUCERS

Most radioactive waste produced by minor waste producers is not reported in the UK Inventory as it is either low volumes of LLW that can be disposed of by "controlled burial" at landfill sites, or low volume VLLW that can be disposed of with municipal, commercial and industrial wastes at landfill sites.

The rates of arisings from the minor waste producers that are reported in the 2010 Inventory are difficult to predict. In recent years annual arisings of ILW have fallen, and are now at very low levels. Future arisings are expected to be minimal. Most LLW reported in the 2010 Inventory is consigned to the LLWR near Drigg. The rate of future arisings of this LLW is assumed to be the same as current arisings, and is estimated up to 2080.

3.9 DISCUSSION OF SCENARIO

3.9.1 Fuel manufacturing and uranium enrichment

Springfields manufactures oxide fuels for AGRs and LWRs, and intermediates for export. Uranium hexafluoride continues to be manufactured and exported. Future operations at Springfields will depend on commercial strategies and the outlook for the worldwide nuclear power industry. The 2010 Inventory scenario assumes that oxide fuel and product manufacture and uranium enrichment operations do not continue beyond 2030.

Urenco's business at Capenhurst supplies enriched uranium for oxide fuel manufacture. Future operations at Capenhurst will depend on the outlook for the worldwide nuclear power industry. The 2010 Inventory scenario assumes that uranium enrichment operations do not continue beyond 2030.

Fabrication of MOX fuel in the SMP at Sellafield will also depend on the future level of business. Further to the 2010 contract with overseas utilities for its continued use, NDA will continue to evaluate the performance of the SMP, which has not met original expectations, together with commercial opportunities associated with its role in repatriating foreign owned plutonium. However, at the time the 2010 Inventory data were collated the SMP was scheduled to operate up to 2036 and the waste forecasts in the 2010 Inventory are consistent with this date.

Assumptions could be revised to accommodate an extension of AGR lifetimes or a renaissance of nuclear energy generation in the UK and overseas.

3.9.2 Nuclear power station operation

Power station operating lifetimes are those in operators' existing corporate plans. However, market conditions or technical and safety issues could result in revisions to lifetimes.

A White Paper on Nuclear Power published in January 2008 set out the UK Government's decision that "*new nuclear power stations should have a role to play in this country's future energy mix*" and that "*it would be in the public interest to allow energy companies the option of investing in new nuclear power stations; and that the Government should take active steps to facilitate this*" [12]. In November 2009 the UK Government published its draft Nuclear National Policy Statement (NPS), which named ten sites potentially suitable for new nuclear deployment by the end of 2025. Having considered the responses to the public consultation and the outputs of the parliamentary scrutiny process, the UK Government has issued a revised draft Nuclear NPS listing eight potentially suitable sites [13].

A number of operators have plans to construct new nuclear generation in the UK, and two reactor designs are being considered in the Generic Design Assessment (GDA) process. However it is anticipated to be mid-2011 before the GDA process will be completed, first site licences/construction consents are given, and decisions on planning applications are made.

Possible alternatives to current lifetime assumptions for the remaining operational Magnox stations (Oldbury and Wylfa)[5], the AGR stations[6] and the PWR station are early closure or extended operation. To illustrate the impact of power station lifetime changes, the authors have estimated waste volumes from one year's operation of Magnox, AGR and PWR stations (see Table 3.7). The figures do not include wastes from the reprocessing of one year's discharged fuel.

Longer or shorter operating lifetimes for power stations would not have a significant effect on overall future waste volumes from the stations, which are dominated by wastes from decommissioning.

[5] Since the 2010 Inventory data were compiled, NDA has announced it is engaging with nuclear regulators and Government to secure short-term life extensions for Oldbury and Wylfa, subject to business and safety case approvals.

[6] Since the 2010 Inventory data were compiled, EDF Energy has announced operational life extensions for Heysham 1 and Hartlepool of 5 years to 2019.

Table 3.7: Predicted waste volumes from 1 year's operation of power station

Waste type	Station	Volume arising (m^3)	When all waste has been packaged	
			Packaged volume (m^3)	Conditioned volume (m^3)
ILW	Magnox (1)	15	21	19
	AGR (2)	21	46	36
	PWR (3)	8.1	17	14
LLW	Magnox (1)	61	61	49
	AGR (2)	50	44	35
	PWR (3)	35	91	73

(1) Average annual arising for remaining periods of operation at Oldbury and Wylfa.

(2) Average annual arising for period 2010-2014 at AGR stations.

(3) Average annual arising for period 2010-2015 at Sizewell B.

3.9.3 Reprocessing of spent fuel from nuclear power stations

Waste volumes in the 2010 Inventory are based on a scenario that assumes the reprocessing of all spent Magnox fuel, SGHWR and WAGR fuel, about 5,500tU of AGR fuel and about 4,400tU of overseas LWR fuel.

This does not include about 3,100tU of AGR fuel that are forecast to arise over UK power station lifetimes, and Sizewell B fuel. There are no current plans to reprocess fuel from Sizewell B. It is assumed that these fuels will be held in long-term storage. However they could be treated in a number of ways, including reprocessing. To illustrate the impact of such reprocessing, the authors have estimated waste volumes using 2010 Inventory data for reprocessing operations in Thorp.

If the 3,100tU of AGR fuel were to be reprocessed, packaged waste volumes are estimated to be about 170m^3 of HLW, 10,000m^3 of ILW and 5,000m^3 of LLW. Additional volumes of LLW will arise from waste treatment and site services facilities.

If Sizewell B fuel were to be reprocessed, packaged waste volumes are estimated to about 90m^3 of HLW, 2,700m^3 of ILW and 3,400m^3 of LLW. These figures assume the reprocessing of 1,049tU of fuel. Additional volumes of LLW will arise from waste treatment and site services facilities.

3.9.4 Nuclear research and development

Nearly all of the major facilities built in the UK over more than 50 years to undertake research and development in support of nuclear energy generation and fuel cycle operations have been closed down, and have either already been decommissioned or are currently being decommissioned.

The JET fusion facility is assumed to operate until the end of 2013. However, the extent of future operations is uncertain, and JET could well operate beyond this date for several years in support of ITER. Because annual operational arisings are low, any change to the 2013 date will not have a significant effect on overall radioactive waste volumes.

3.9.5 Ministry of Defence activities

Spent fuel from nuclear powered submarines has not been declared as waste. It is held in long-term storage at Sellafield.

While MoD has stated that Eskmeals will be maintained for the foreseeable future, no comment has been made about the future of the battery. There have not yet been any steps taken to estimate the volume of defence wastes likely to arise from decommissioning of the battery.

The Submarine Dismantling Project addresses the process for deciding and implementing future policy for managing the hulls, and particularly the reactors, of decommissioned nuclear submarines. Any change in this programme would affect future waste arisings.

The MoD Estate is subject to a rolling programme of prioritised Land Quality Assessment (LQA). This assessment includes the potential for radioactive contamination. In light of the ongoing LQA programme, the current volume estimate for arisings associated with the remediation of contaminated ground in the UK Inventory is subject to potential significant change.

3.9.6 Nuclear materials

In addition to commercial spent fuel for which there are no current plans to reprocess (see Chapter 3.9.3), the UK has stocks of spent nuclear fuel from research and demonstration reactors with no current reprocessing route. There are also uranic materials, plutonium (from the reprocessing of spent nuclear fuel), Magnox Depleted Uranium (MDU – a by-product of Magnox spent fuel reprocessing) and “Hex tails” (a by-product of the uranium enrichment process).

Government in consultation with NDA and other stakeholders is considering the most effective management strategies for nuclear materials, including what proportions of these materials should be retained as a strategic stock and what proportions might be regarded as waste.

The quantities of UK civil nuclear materials are given in a separate document [1].

4.1 INTRODUCTION

This chapter presents summary information on the volumes of radioactive wastes in the 2010 Inventory, and on corresponding masses and numbers of waste packages. The information is derived from the volumes, densities and packaging plans for each individual waste stream[1]. The volumes of LLW disposals in the UK are also given.

Annexes 1-4 provide further and more detailed information on volumes of wastes at 1 April 2010, estimated volumes of future waste arisings, and the numbers of packages, with corresponding packaged and conditioned volumes. Annex 1 gives information on wastes from all sources. Annex 2 gives information on wastes from each business activity, including separately for Magnox, AGR and PWR stations. Annex 3 gives information on wastes from each site, and for the organisations that own the sites. Annex 4 provides information for each waste stream in the 2010 Inventory.

4.2 TOTAL FOR ALL WASTES

The total volume of radioactive waste from all sources is 4,720,000m^3. Of this waste, 93.9% by volume is LLW (4,430,000m^3), 6.1% is ILW (287,000m^3) and less than 0.1% is HLW (1,020m^3).

Table 4.1 gives these waste volumes and corresponding masses. Figure 4.1 illustrates the relative contributions of HLW, ILW and LLW to the total radioactive waste volume from all sources.

HLW is generated from reprocessing spent nuclear fuel at Sellafield. The volume and mass of HLW reported do not include waste from reprocessing overseas fuel that will be exported to the country of origin, and they assume substitution arrangements are implemented (see Chapter 4.7 for more information).

Table 4.1: Wastes at 1 April 2010 and estimated for future arisings Volumes and masses

	HLW (2)	ILW (3)	LLW (4, 5)	Total
Volume (m^3) (1)	1,020	287,000	4,430,000	4,720,000
Mass (tonnes)	2,700	300,000	4,700,000	5,000,000

(1) For HLW conditioned volume and mass are reported. Quantities of ILW and LLW are for untreated or partly treated waste, apart from conditioned waste streams (i.e. those with a /C in the identifier) where the conditioned volume and mass are reported. The convention for reporting waste volumes and an explanation of the terms used are given in Chapter 2.4.4.

(2) HLW conditioned volume and mass have been reduced to account for exports of HLW and assumed substitution arrangements are implemented.

(3) ILW includes 8,690m^3 (9,400te) of waste that are expected to become LLW as a result of decontamination or decay storage.

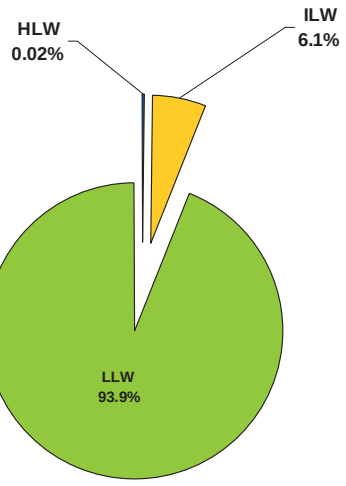
(4) LLW includes 3,060,000m^3 (3,080,000te) of VLLW and a further 239,000m^3 (375,000te) of mixed VLLW/LLW.

(5) LLW includes 10,500m^3 (15,300te) held in Vault 8 and 4,360m^3 (6,320te) held in Vault 9 at the LLWR, as well as 16,800m^3 (~16,800te) previously disposed at Dounreay that is to be retrieved and repackaged as LLW. It does not include waste already disposed in the trenches and in Vault 8 at the LLWR (see Chapter 4.8).

[1] Sellafield Ltd has provided data on stored waste volumes, final package volumes and package numbers; from which the loading of waste per package has been calculated.

Nearly three quarters of all LLW volume (3,300,000m^3) falls into the VLLW sub-category or is mixed VLLW/LLW. Much of this waste is forecast to arise from decommissioning existing facilities. In general current arisings of VLLW are disposed of to landfill shortly after they arise.

Figure 4.1: Proportions of waste volumes by type



Note: LLW includes 3,060,000m^3 of VLLW (69%) and 239,000m^3 of mixed VLLW/LLW (5%).

All HLW and ILW will be packaged for long-term management. It is estimated that 6,770 HLW packages would be produced and retained in the UK, equivalent to a packaged volume of 1,330m^3, and about 225,000 ILW packages would be produced, equivalent to a packaged volume of 488,000m^3.

It is estimated that about 64,300 LLW packages would be produced. LLW package numbers exclude those streams suitable for landfill disposal, as the UK Inventory does not compile information on waste packaging for this disposal route. The volume of all LLW after packaging is about 4,550,000m^3.

4.3 WASTES AT 1 APRIL 2010

At 1 April 2010 the volume of radioactive waste in the UK was 162,000m^3. Table 4.2 gives the volumes and masses of HLW, ILW and LLW from all sources at 1 April 2010. The volumes and masses of wastes not yet conditioned and those already conditioned for long-term management are given separately. The table also gives the numbers of waste packages in stores at 1 April 2010.

ILW and HLW are accumulating in stores, as there are no current disposal routes for these waste types. At 1 April 2010 the volume of ILW was about 94,300m^3, of which about 66,500m^3 was at Sellafield. Most of the other ILW was at Aldermaston, Dounreay, Harwell and the Magnox and AGR power stations. At 1 April 2010 the volume of HLW was about 1,620m^3, all of which was at Sellafield.

At 1 April 2010 the volume of LLW was about 66,000m^3, of which about 14,900m^3 is waste that has already been conditioned and is in Vaults 8 and 9 at the LLWR near Drigg[2]. The larger volumes of the remaining LLW are at Chapelcross (20,000m^3), Dounreay (9,360m^3) and Sellafield (6,310m^3). At Dounreay LLW is being stored pending the planned opening of a new disposal facility at the site in 2014. At Chapelcross, Sellafield and other sites, most LLW at 1 April 2010 was in temporary storage awaiting either consignment to the LLWR, or if suitable disposal to landfill. Other wastes are being held for characterisation, processing and/or repackaging before being consigned to the LLWR. A small fraction of LLW, about 200m^3, was unsuitable for consignment to the LLWR or disposal to landfill because the wastes do not meet current acceptance criteria.

Table 4.2: Wastes at 1 April 2010
Volumes, masses and package numbers

Waste Type	At 1.4.2010	Volume (m^3)(1)	Mass (tonnes)(1)	No of packages(4) (5)
HLW	**Total**	**1,620**	**3,300**	
	Not yet conditioned	850	1,300	0
	Already conditioned	766	2,000	5,108
ILW	**Total**	**94,300**	**110,000**	
	Not yet conditioned(2)	69,800	68,000	1,091
	Already conditioned	24,500	46,000	46,571
LLW(3)	**Total**	**66,000**	**76,000**	
	Not yet conditioned	44,300	45,000	0
	Already conditioned	21,700	30,000	1,288

(1) Volume and mass "not yet conditioned" are for untreated or partly treated waste; volume and mass "already conditioned" are the conditioned volume and corresponding mass for wastes that have been encapsulated in a cement-based material, polymer or glass (i.e. waste streams with a /C in the identifier). The convention for reporting waste volumes and an explanation of the terms used are given in Chapter 2.4.4.

(2) ILW "not yet conditioned" includes 2,070m^3 (2,100te) of waste that is expected to become LLW as a result of decontamination or decay storage.

(3) LLW includes 12,400m^3 (6,000te) of VLLW and a further 82m^3 (120te) of mixed VLLW/LLW.

(4) ILW package numbers include 1,716 1803-type mild steel drums. These drums are expected to be overpacked in larger capacity boxes (6 drums per box).

(5) LLW package numbers exclude those in short-term storage before consignment to the LLWR and include 431 packages with waste that is being stored unconditioned.

The quantity of conditioned waste is increasing, as a significant fraction of current arisings is being conditioned. Most LLW is immobilised in cement within mild steel ISO containers at the LLWR. Conditioned ILW comprises various types of waste immobilised in cement in stainless steel or concrete containers, and wastes immobilised in polymer in mild steel containers. These mild steel containers will be overpacked at a later date. Conditioned HLW is liquid waste that is dried and then vitrified in stainless steel canisters.

At 1 April 2010 there were 857 packages of conditioned LLW. These were at the LLWR, apart from three packages at Windscale. A further 431 LLW packages containing unconditioned waste were in temporary storage at Dounreay. These packages will be

[2] 14,900m^3 of waste in Vaults 8 and 9 are currently classed as stored, not disposed. Most of the waste in Vault 8 is classed as disposed under the terms of an authorisation granted by the Environment Agency and so is not included in the 2010 Inventory. Volumes of disposed LLW are given in Chapter 4.8.

immobilised in cement and transferred to the new site LLW disposal facility once this is operational.

There were 46,571 packages of conditioned ILW and 5,108 packages of conditioned HLW in long-term storage facilities. There were also 1,091 packages containing ILW that are being stored unconditioned at Sellafield and Harwell. All HLW packages and 41,165 of the ILW packages were at Sellafield.

4.4 FUTURE ARISINGS

Table 4.3 gives the volumes and masses of HLW, ILW and LLW from all sources projected to arise after 1 April 2010. Future arisings are forecast on the basis of information given in Chapter 3.

Table 4.3: Estimated future waste arisings Volumes and masses

	HLW[(1) (2)]	ILW[(3)]	LLW[(4)]	Total
Volume (m^3)	-601	192,000	4,360,000	4,550,000
Mass (tonnes)	-610	190,000	4,600,000	4,800,000

(1) Quantities of HLW represent the change in volume and mass at 1 April 2010 once all HLW is conditioned. Quantities of ILW and LLW are for untreated or partly treated waste, apart from conditioned waste streams (i.e. those with a /C in the identifier) where the conditioned volume and mass are reported. The convention for reporting waste volumes and an explanation of the terms used are given in Chapter 2.4.4.

(2) HLW conditioned volume and mass are net of exports of HLW and assume substitution arrangements are implemented.

(3) ILW includes 6,610m^3 (7,300te) of waste that are expected to become LLW as a result of decontamination.

(4) LLW includes 3,050,000m^3 (3,050,000te) of VLLW and a further 238,000m^3 (375,000te) of mixed VLLW/LLW.

4.4.1 High Level Waste

HLW is generated from reprocessing spent nuclear fuel at Sellafield. Future arisings are forecast from continuing Magnox and oxide fuel reprocessing. In the 2010 Inventory scenario Magnox reprocessing is scheduled to end in 2016, and oxide reprocessing around 2021.

Information for HLW is reported in a different way to that for ILW and LLW because volumes will actually fall in the future. The Nuclear Installations Inspectorate has placed a legal requirement upon Sellafield to reduce the volume of liquid HLW in storage tanks by converting this liquid to a passively safe waste form (solid glass blocks). Consequently Sellafield is committed to a programme that will result in a progressive fall in the total volume of HLW as existing and fresh arisings of liquid waste are conditioned to produce a solid glass product of lower volume.

The figure of -601m^3 is the anticipated decrease in the HLW volume existing at 1 April 2010 once all HLW has been conditioned. Sellafield forecasts that all liquid waste will be conditioned by 2023, although some further waste will arise during subsequent POCO of high level waste plants. The figure of -610 tonnes is the corresponding decrease in mass once all liquid HLW has been conditioned.

The volume and mass of HLW are net of exports of HLW and assume substitution arrangements are implemented (see Chapter 4.7 for more information).

4.4.2 Intermediate Level Waste

The forecast future arisings of ILW are about 192,000m^3. About 54% (104,000m^3) is from Sellafield. Most of the other ILW is from Magnox (47,500m^3) and AGR power stations (21,300m^3).

About 81% (156,000m^3) of all forecast future arisings are from decommissioning of existing reactors and other facilities.

Forecast annual arisings of ILW are on average about 2,000m^3 in the period up to 2020. From 2020 up to 2050 average annual arisings are about 2,300m^3; largely from legacy waste conditioning and facility decommissioning at Sellafield. Between 2050 and 2070 total annual arisings average only about 900m^3 as decommissioning activities decrease. However final dismantling and site clearance at power stations between 2070 and 2116 give rise to larger waste volumes, averaging about 2,000m^3 per year over this period.

4.4.3 Low Level Waste

The forecast future arisings of LLW are about 4,360,000m^3. About 75% of this volume comprises either waste that falls into the VLLW sub-category (3,050,000m^3) or mixed VLLW/LLW waste from Springfields (239,000m^3). Nearly two-thirds of all future LLW is attributable to a single stream - high volume VLLW arising from the decommissioning of reprocessing and associated plants, waste storage and treatment plants, and site service facilities at Sellafield.

About 75% (3,250,000m^3) of all forecast future LLW arisings is from Sellafield. Much of the other LLW is from Magnox sites (472,000m^3) and Springfields (240,000m^3), with smaller contributions from AGR power stations (110,000m^3), Harwell (91,100m^3) and Dounreay (63,900m^3).

Approximately 91% (3,970,000m^3) of all forecast future arisings are from decommissioning of existing reactors and other facilities and the remediation of contaminated ground. Only 9% (392,000m^3) is from operations, about two-thirds of which is from Sellafield.

About 75% (2,990,000m^3) of decommissioning and site remediation wastes is associated with the dismantling and demolition of spent fuel reprocessing and other facilities at Sellafield. Final stage decommissioning of reactors and ancillary plant at Magnox and AGR power stations is forecast to produce 351,000m^3 and 61,500m^3 respectively. Decommissioning of uranium processing and fabrication facilities at Springfields is forecast to produce 204,000m^3.

Forecast annual arisings of LLW are on average about 40,000m^3 in the period up to 2020, and then fall to an average of about 30,000m^3 up to 2030 as operations and early decommissioning programmes at a number of sites are completed. After 2030 arisings are largely determined by the timing of decommissioning programmes at Sellafield - and can fluctuate quite markedly from one year to the next. From 2030 up to 2040 the total forecast average annual arisings are 22,000m^3. From 2040 up to 2050 forecast annual arisings are much higher at about 54,000m^3; this includes 11,000m^3 from decommissioning of uranium processing and fabrication facilities at Springfields. From 2050 up to 2070 the average annual arisings are 35,000m^3, and from 2070 up to 2120 are 43,000m^3. Final dismantling and site clearance activities at power stations contribute an average of 10,000m^3 per year in the period 2072 - 2113.

4.5 COMPARISON WITH PREVIOUS INVENTORIES

Inventories of radioactive wastes in the UK have been prepared periodically since 1984. During this time wastes have been accumulated, estimates of future arisings have changed as new information became available and plans were amended, and increasing quantities of waste have been packaged for long-term management. The information presented here summarises the changes compared with volumes in the 2007 Inventory report [14]. The principal reasons for differences in waste volumes are outlined. The trends in projected waste volumes are also illustrated, with information from Inventory reports published over the past 10 years.

For wastes at 1 April 2010, most remain in an untreated or partly treated state. However, legacy wastes at Sellafield, Dounreay, Harwell, Windscale and Trawsfynydd are being retrieved from stores and packaged for long-term management. Furthermore, current arisings from the Fuel Handling Plant and the Magnox and Thorp reprocessing plants at Sellafield, and from WAGR decommissioning at Windscale, are being packaged as they arise.

Progress in the packaging of wastes, as indicated by the build up in the number of waste packages produced, is illustrated in Table 4.4. Packaging of HLW and ILW began on the Sellafield site in 1990 with the start-up of the Waste Vitrification Plant and the Magnox Encapsulation Plant. Since then further ILW conditioning facilities have been built and are operating at Sellafield and at a number of other sites.

The number of LLW packages at 1 April 2010 includes those being stored in Vault 8 and Vault 9 at the LLWR, which respectively numbered 604 and 250. LLW packages at Dounreay are being stored temporarily pending the opening of a new disposal facility at the site.

Table 4.4: Numbers of waste packages produced

Number of packages	HLW[3]	ILW	LLW[2]	Total
At 1.4.1994[1]	529	4,466	-	4,995
At 1.4.1998	1,633	17,027	-	18,660
At 1.4.2001	2,281	21,654	23	23,958
At 1.4.2004	3,037	31,557	123	34,717
At 1.4.2007	4,319	40,797	8,527	53,643
At 1.4.2010	5,108	47,662	1,288	54,058

(1) Packages at 1.4.1994 are estimates based on reported conditioned volumes in the 1994 Inventory.

(2) LLW package numbers exclude those in short-term storage before consignment to the LLWR. Packages at 1.4.2007 and 1.4.2010 include those held in vaults at the LLWR and which had not been classed as disposed. Most of the packages reported at 1.4.2007 were classed as disposed at 1.4.2010.

(3) At 1.4.2010 HLW packages were at Sellafield, ILW packages were at Sellafield, Dounreay, Harwell, Windscale, Winfrith and Trawsfynydd, and LLW packages were at the LLWR, Dounreay and Windscale.

4.5.1 High Level Waste

Table 4.5 gives the volume changes in accumulated HLW and estimated future arisings compared with the 2007 Inventory. Future arisings are reported in a way to show the

planned fall in the total accumulated volume of HLW as existing and fresh arisings of liquid waste are conditioned to produce a solid glass product of lower volume.

The total conditioned volume of HLW is forecast to be about 1,020m^3, which is 70m^3 less than in the 2007 Inventory despite an increase in the amount of AGR spent fuel reprocessed. The reasons for this decrease are the lower estimates of high level contaminated process items from vitrification plant operations and waste from POCO.

Table 4.5: Changes in HLW volumes between the 2010 and 2007 Inventories

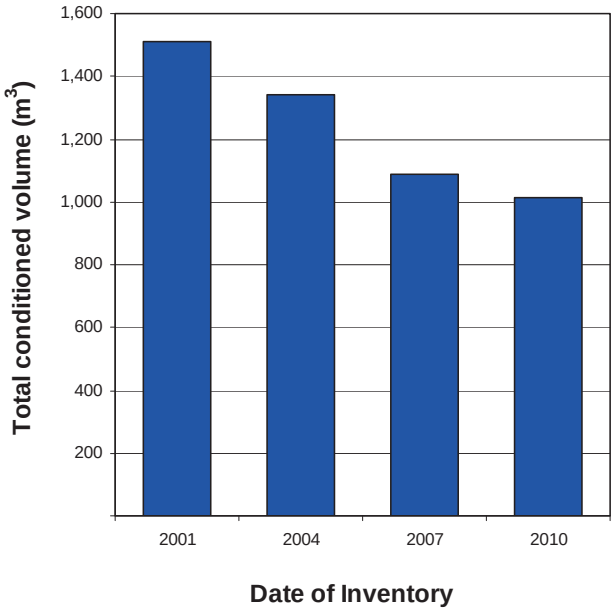
Volume (m^3)	2010 Inventory	2007 Inventory	Change
At 1 April (already conditioned)	766	648	+118
At 1 April (not yet conditioned)	850	1,090	-240
Total at 1 April	1,620	1,730	-110
Future arisings (1)	-601	-646	+45
Total (conditioned)	1,020	1,090	-70

(1) Future arisings is the anticipated decrease in the volume existing at 1 April once all liquid HLW at 1 April and arising in the future has been conditioned.

The total volume of HLW at 1 April 2010 was 1,620m^3, a decrease of 110m^3 compared with waste at 1 April 2007. This decrease is the net result of two factors: a decrease of 240m^3 in liquid waste and an increase of 118m^3 in conditioned waste from Magnox and oxide fuel reprocessing at Sellafield.

Figure 4.2 shows that forecasts of HLW volume have changed significantly in past inventories as assumptions regarding the scale of fuel reprocessing and assumptions regarding POCO have been revised.

Figure 4.2: HLW past and current volume projections (conditioned waste)



4.5.2 Intermediate Level Waste

Table 4.6 gives the volume changes in accumulated ILW and estimated future arisings compared with the 2007 Inventory.

Table 4.6: Changes in ILW volumes between the 2010 and 2007 Inventories

Volume (m^3)	2010 Inventory	2007 Inventory	Change
At 1 April (already conditioned)	24,500	21,000	+3,500
At 1 April (not yet conditioned)	69,800	71,500	-1,700
Total at 1 April	94,300	92,500	+1,800
Total in future arisings(1)	192,000	143,000	+49,000
Total	287,000	236,000	+51,000

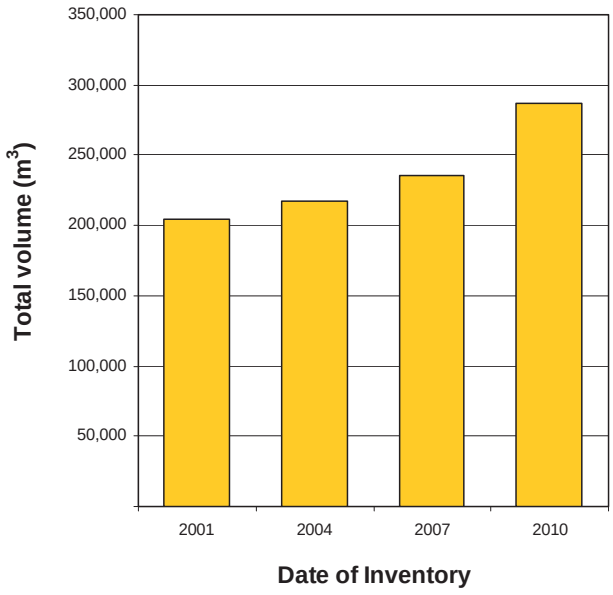
(1) Future arisings are untreated or partly treated waste, apart from conditioned waste streams (i.e. those with a /C in the identifier) where the conditioned volume is reported. The convention for reporting waste volumes and an explanation of the terms used are given in Chapter 2.4.4.

The total volume of ILW is forecast to be 287,000m^3, which is about 51,000m^3 more than in the 2007 Inventory. There are revised estimates of ILW volumes throughout the 2010 Inventory from re-evaluations of future arisings and some changes in the nature of future activities.

The principal reason for the increase in the total volume of ILW is an additional 54,200m^3 of waste from decommissioning at Sellafield where a reassessment of wastes from all site decommissioning activities has been carried out.

Some estimates of ILW volumes are lower than in the 2007 Inventory. The largest reduction is one of 3,200m^3 at Cardiff resulting from revised estimates of future production.

Figure 4.3: ILW past and current volume projections



The total volume of ILW at 1 April 2010 was 94,300m^3, an increase of 1,800m^3 or about 2% compared with waste at 1 April 2007. Conditioned wastes were 3,500m^3 greater at 24,500m^3, while accumulations of wastes yet to be conditioned were 1,700m^3 lower at 69,800m^3. Projected future arisings of ILW are 192,000m^3. This is about 49,000m^3 more than future arisings reported in the 2007 Inventory.

Figure 4.3 above shows that forecasts of ILW volume have changed in past inventories as the scale of projected future activities and estimates of waste arisings have been revised. Changing oxide fuel reprocessing assumptions and revisions in decommissioning waste estimates as programmes have been refined have been particularly significant.

4.5.3 Low Level Waste

Table 4.7 gives the volume changes in accumulated LLW and estimated future arisings compared with the 2007 Inventory.

Table 4.7: Changes in LLW volumes between the 2010 and 2007 Inventories

Volume (m^3)	2010 Inventory	2007 Inventory	Change
At 1 April (already conditioned)(1)	21,700	160,000	-138,000
At 1 April (not yet conditioned)	44,300	36,300	+8,000
Total at 1 April	66,000	196,000	-130,000
Total in future arisings(2)	4,360,000	3,000,000	+1,360,000
Total	4,430,000	3,190,000	+1,240,000

(1) Volume at 1 April already conditioned includes wastes in vaults at the LLWR that have yet to be classed as disposed.

(2) Future arisings are untreated or partly treated waste, apart from conditioned waste streams (i.e. those with a /C in the identifier) where the conditioned volume is reported. The convention for reporting waste volumes and an explanation of the terms used are given in Chapter 2.4.4.

The total volume of LLW is forecast to be 4,430,000m^3, which is about 1,240,000m^3 more than in the 2007 Inventory. There are revised estimates of LLW volumes as a result of re-evaluations of future arisings and changes in the nature of future activities.

The principal reason for this increase is an additional 1,610,000m^3 expected from decommissioning activities at Sellafield. Previous estimates of LLW were based on the volume of concrete/brickwork in the building structures prior to demolition, whereas the revised estimates take account of the fact that there will be a volume increase when buildings are knocked down and become piles of rubble.

The overall volume increase in Sellafield decommissioning LLW is made up of an increase of 1,690,000m^3 in the VLLW sub-category and a decrease of 87,600m^3 in LLW with a higher radioactivity as a result of a reassessment of the radioactivity content of some wastes from final decommissioning.

Other major changes in LLW volumes include:

- The inclusion in the inventory of newly reported VLLW asbestos at Chapelcross with a volume of 28,200m^3;
- The classification of most of the waste in Vault 8 at the LLWR as disposed. Hence these wastes are no longer included in the UK Inventory, resulting in a decrease of 145,000m^3;

- A reassessment of the calculation model used to determine decommissioning wastes at Springfields, resulting in a decrease of 140,000m^3;
- A 56,000m^3 reduction in the expected total volume of empty uranium hexafluoride containers at Capenhurst, correcting an overestimate in the 2007 Inventory;

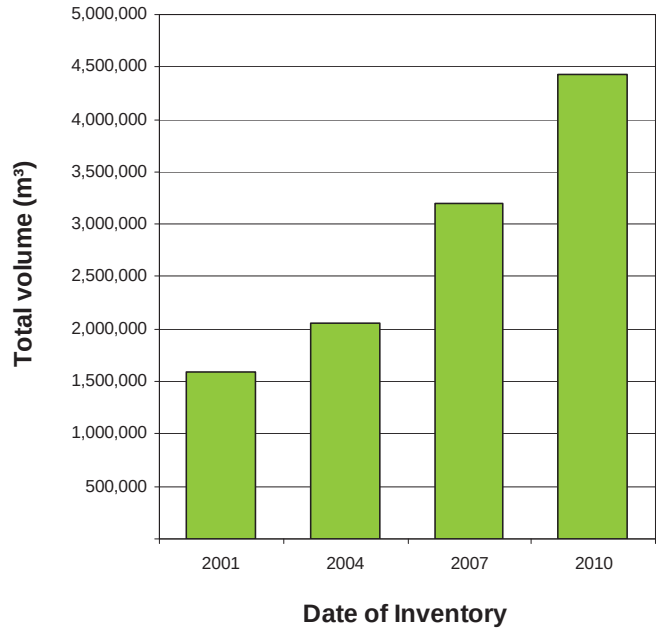
It is noteworthy that there has been a decrease of 123,000m^3 in the total volume of LLW that does not fall into the VLLW sub-category. This is in addition to the volume decrease resulting from the change in classification of waste in Vault 8 at the LLWR. Much of this decrease is at Sellafield as noted above.

The total volume of LLW at 1 April 2010 was 66,000m^3, a decrease of about 130,000m^3 compared with waste at 1 April 2007. The principal reason for this change is that most waste in Vault 8 at the LLWR is now classed as disposed.

There have been accumulations of decommissioning waste at a number of sites, with the largest increase (about 17,200m^3) at Chapelcross. There were also higher volumes of LLW at Dounreay, where waste is being stored until a planned new LLW disposal facility at the site is operational. At most sites volumes in temporary storage largely determine accumulations at any particular date.

Projected future arisings of LLW are 4,360,000m^3. This is about 1,370,000m^3 more than future arisings reported in the 2007 Inventory.

Figure 4.4: LLW past and current volume projections (1) (2)



(1) In 2007, LLW includes 1,410,000m^3 (1,500,000te) of VLLW and a further 385,000m³ (630,000te) of mixed VLLW/LLW.

(2) In 2010, LLW includes 3,060,000m^3 (3,080,000te) of VLLW and a further 239,000m^3 (375,000te) of mixed VLLW/LLW.

Figure 4.4 above shows that forecasts of LLW volume have changed in past inventories as the scale of projected future activities and estimates of waste arisings have been revised. Of most significance have been the inclusion of contaminated ground at a number of sites in 2004 and the inclusion of VLLW and waste being stored in Vault 8 at the LLWR in 2007. The reasons for the further increase in volume estimates in 2010 are explained above.

4.6 WASTES FOR ENGLAND, SCOTLAND AND WALES

On 1 July 1999 responsibility for radioactive waste management in Scotland and Wales was devolved to the Scottish Executive and the National Assembly for Wales respectively. In England responsibility continues to rest with the UK Government.

Table 4.8 overleaf gives volumes of waste separately for England, Scotland and Wales at 1 April 2010, in projected future arisings and in total. The volumes for England include wastes currently stored in vaults at the LLWR near Drigg in Cumbria – these wastes originated from sites throughout the UK. Also, some of the radioactive wastes produced in England are from the reprocessing of spent fuel from reactors in Scotland and Wales.

Approximately 91% of all radioactive wastes in the UK are located in England, 6% in Scotland and 3% in Wales.

There are currently no nuclear licensed sites in Northern Ireland; only very small quantities of radioactive waste are produced there from hospitals and industry.

4.7 WASTES FROM OVERSEAS MATERIALS

A proportion of the waste from the Thorp and Magnox reprocessing plants at Sellafield results from reprocessing overseas spent fuel. All reprocessing contracts with overseas customers signed since 1976 include a provision to return packaged wastes back to the country of origin.

Government policy is that wastes resulting from the reprocessing of overseas spent fuel should be returned to the country of origin, and HLW should be returned as soon as practicable after vitrification. The policy allows “waste substitution” arrangements that ensure broad environmental neutrality for the UK. Waste substitution is the process whereby an additional amount of HLW from reprocessing would be returned, which is smaller in volume but equivalent in radiological terms to customers’ ILW and LLW that would otherwise be returned.

Exports of vitrified HLW started in January 2010 and are scheduled to continue for about ten years. In total about 1,850 canisters of vitrified HLW (about 278m^3) is planned for export, and this volume assumes that substitution arrangements are implemented. Future arisings of HLW are net of exports to overseas reprocessing customers, so that the total volume/number of containers represents only the HLW that is a UK liability.

During the 1990’s about 1,000 tonnes of materials test reactor fuel was reprocessed at Dounreay for customers in Europe and Australia. The contracts for this work require that the radioactive wastes produced be returned to the countries of origin within 25 years of reprocessing. The contracts are backed by inter-governmental letters. The UK and Scottish Governments are currently consulting on the arrangements for returning wastes. The Inventory includes 75m^3 of raffinate (210m^3 when packaged) subject to return.

Table 4.8: Wastes at 1 April 2010 and estimated for future arisings

England

Waste Type		Volume (m^3)	Mass (tonnes)
HLW	**Total**	**1,020**	**2,700**
	1.4.2010	1,620	3,300
	Future arisings	-601	-610
ILW	**Total**	**247,000**	**250,000**
	1.4.2010	83,200	99,000
	Future arisings	164,000	150,000
LLW	**Total**	**4,050,000**	**4,200,000**
	1.4.2010	35,000	47,000
	Future arisings	4,010,000	4,200,000

Scotland

Waste Type		Volume (m^3)	Mass (tonnes)
HLW	**Total**	**0**	**0**
	1.4.2010	0	0
	Future arisings	0	0
ILW	**Total**	**25,400**	**35,000**
	1.4.2010	8,080	8,900
	Future arisings	17,400	26,000
LLW	**Total**	**275,000**	**320,000**
	1.4.2010	30,500	28,000
	Future arisings	245,000	290,000

Wales

Waste Type		Volume (m^3)	Mass (tonnes)
HLW	**Total**	**0**	**0**
	1.4.2010	0	0
	Future arisings	0	0
ILW	**Total**	**13,800**	**20,000**
	1.4.2010	3,070	6,100
	Future arisings	10,800	14,000
LLW	**Total**	**106,000**	**130,000**
	1.4.2010	539	260
	Future arisings	106,000	130,000

Note: The totals for HLW are conditioned volume and mass. Quantities of ILW and LLW are for untreated or partly treated waste, apart from conditioned waste streams (i.e. those with a /C in the identifier) where the conditioned volume and mass are reported. The convention for reporting waste volumes and an explanation of the terms used are given in Chapter 2.4.4.

4.8 DISPOSALS OF WASTE

Between 1949 and 1982 about 33,000m^3 of radioactive waste were disposed of in the North Atlantic and UK coastal waters.

Since 1959 most of the UK's solid LLW has been transported to the near-surface disposal facility, the LLWR, near the village of Drigg in Cumbria. Between 1959 and 1995 about 800,000m^3 of waste was disposed in a series of clay-lined trenches and covered with soil.

Since 1988 most waste has been placed in large metal containers, similar to shipping containers. These are then filled with cement and placed in engineered concrete vaults (Vaults 8 & 9). Suitable LLW is first supercompacted to minimize its volume. In this process drums or boxes of waste are compacted under high pressure of up to 2,000 tonnes per square metre.

At 1 April 2010 disposed waste containers occupied nearly 176,000m^3 of vault space. A small proportion of the waste containers in Vaults 8 and all containers in Vault 9 waste are not yet classed as disposed; these are included in the LLW quantities presented throughout this report.

Consignments to the LLWR over the past 10 years have totalled 100,000m^3 (see Table 4.9).

Table 4.9: Annual consignments to the LLWR 2000 – 2009

Year	Total volume (m^3) (1)
2000	8,400
2001	6,100
2002	10,800
2003	11,400
2004	12,900
2005	12,800
2006	12,900
2007	9,100
2008	8,600
2009	7,000

(1) Volume is for waste and its primary containment.

Waste for consignment to the LLWR must comply with the site's Waste Acceptance Criteria, which stipulate that certain materials must not be present in the waste, and places limits on the maximum concentration of certain radionuclides for which the LLWR has authorised annual disposal limits. To comply with the Waste Acceptance Criteria wastes must also have a valid Waste Stream Characterisation Document (WSCD) at the time of disposal. The WSCD describes the physical, chemical and radionuclide content, gives estimated arisings, conditioning and packaging information, and a justification of assessment methodology.

The capacity of the LLWR is subject to an authorisation from the Environment Agency for further waste disposals, and planning consent for additional engineered concrete vaults.

For current operational planning purposes, it is currently assumed that the site will be operational beyond 2080 and will generate small quantities of LLW.

There is a disposal facility at Dounreay consisting of six shallow pits, which has been used for LLW from the site and from the adjacent Vulcan site. Total disposals are about 33,600m^3. As the facility does not meet current standards, the waste is to be retrieved. It is expected that half the waste volume will be exempt from regulatory control, with the remaining half repackaged and consigned to a planned new site solid LLW disposal facility. Current LLW arisings are being stored on site as an interim measure while this new facility is developed.

Some bulk wastes from the major waste producers at the lower end of the LLW activity range are classified as high volume VLLW and where authorised are disposed of to off-site landfill, and a few nuclear licensed sites have authorised on-site disposal for certain solid LLW. However, these arrangements are not widespread. High volume VLLW is included in the 2010 Inventory where there is reasonable certainty in the volume arisings.

Table 4.10 gives a projection of waste consignments to the LLWR over the next few years. The values are packaged volumes for waste streams that are identified in the 2010 Inventory as routinely consigned to the LLWR or in interim storage pending future consignment to the LLWR. The former category accounts for about 93% of the waste. A further 55,600m^3 are identified as "expected to be disposed of to the LLWR" over the same period. Most of this waste is concrete, steel, rubble and soil from facilities decommissioning.

There are no disposal facilities in the UK for HLW and ILW. These wastes are being accumulated in stores.

Table 4.10: Projected future consignments to the LLWR 2010 – 2015

Year (1)	Total volume (m^3)(2)
2010	11,200
2011	10,900
2012	9,170
2013	8,760
2014	7,740
2015	8,320

(1) Financial years.

(2) Volume is the packaged volume and reflects the effect of both waste compaction and containerisation.

4.9 UNCERTAINTY IN WASTE VOLUMES

For most existing wastes there is a high level of confidence in the volume, based on measurement.

The greatest uncertainty rests with future arisings of waste, particularly from facilities decommissioning and site clean up. This is particularly the case for wastes at the lower end of the LLW activity range, where uncertainty about regulatory requirements and disposal routes, lack of definition of site decommissioning and clean up plans, and the fact

that much characterisation work remains to be carried out, all make estimation of waste volumes somewhat speculative. Furthermore the benefit of decontamination that might allow waste volume to be below the lower threshold level for LLW must be considered against the cost and dose uptake to workers.

The 2010 Inventory includes current best estimates of High Volume VLLW from facilities decommissioning and site clean up. However because of the uncertainties described above, some waste producers have chosen to report potentially contaminated ground with radioactive materials [1] until there is more certainty on the waste volumes that might arise.

As decommissioning projects progress through initial scoping studies, detailed planning and then implementation, and as ground contamination surveys are extended and refined, volume estimates can be determined with increasing certainty.

The Inventory reports waste volumes once they have been packaged for long-term management. As packaging schemes are under development for many wastes, particularly decommissioning wastes, there is greater uncertainty in the resulting volumes than there is in waste volumes at the point of generation.

5.1 INTRODUCTION

This chapter presents summary information on the material content of radioactive wastes in the 2010 Inventory. The values for material content are derived from data on the materials composition of each individual waste stream. For each waste stream, the total mass of each material is calculated from the mass fraction of each constituent material multiplied by the waste bulk density and the total waste volume. The resulting masses for individual wastes are then summed for all relevant waste streams. Where a complete quantified breakdown of a waste stream is unavailable, the mass fraction of the stream for which there is no numerical data is designated “unspecified”.

For waste that has been conditioned, the material content includes the encapsulating matrix, but excludes the container and any capping material. Similarly for the small quantity of waste that has been packaged but has not been encapsulated, the material content is that of the waste, and excludes the container.

5.2 WASTE CONDITIONING

The material composition of waste changes when it is conditioned. It is therefore necessary to distinguish between those wastes that are being conditioned (i.e. waste streams with a /C in the identifier) and all other wastes.

Conditioning of liquid HLW at Sellafield commenced in 1990 with the start-up of the Waste Vitrification Plant. The vitrification process converts the highly active liquid into a borosilicate glass. The process results in a significant reduction in waste volume because the liquid waste is first heated to dryness. The final conditioned waste form is made up of about 25% calcined waste oxide and 75% glass by mass.

Increasing quantities of ILW at Sellafield and at other sites are being conditioned for safe longer-term storage by immobilising the wastes in cement-based or polymer matrices. On 1 April 2010 there were accumulations of conditioned ILW at:

- Sellafield – Magnox fuel cladding, EARP floc, AGR and LWR fuel cladding, PCM, centrifuge cake, barium carbonate slurry and MEB crud, pond sludge, miscellaneous beta/gamma waste and maintenance scrap, all in cement-based matrices;
- Dounreay – MTR liquors in a cement-based matrix;
- Harwell –liquors in cement-based matrices;
- Windscale – fuel stringer debris and decommissioning wastes from WAGR in a cement-based matrix;
- Winfrith – sludges in a cement-based matrix;
- Trawsfynydd – ion exchange material in an organic polymer, and Magnox fuel element debris, miscellaneous activated components and pond debris in cement-based matrices;

The composition of conditioned ILW is governed by the nature of the waste, but typically varies between about 50% and 80% encapsulating material by mass.

At the LLWR all containers of solid LLW are first grouted using low viscosity cement before being placed in vaults. In addition to the conditioned waste at the LLWR, at 1 April 2010 there were small volumes of LLW that had been immobilised in cement-based matrices at:

- Bradwell - sludge;

- Hinkley Point A – filters;
- Windscale – decommissioning waste from WAGR;
- Aldermaston – sludge;
- Devonport – sludge, ion exchange material and filters;

The proportion of cement that makes up these conditioned products typically varies between about 40% and 80% by mass depending on the particular waste.

5.3 MATERIAL COMPONENTS

Table 5.1 overleaf gives the total mass of materials in HLW, ILW and LLW. This includes wastes at 1 April 2010 that had been conditioned as well as future arisings that are reported as conditioned waste. The materials are categorised as metals, organics, inorganics, soil, and unspecified. Where waste is reported to be metal, but the type of metal is not given, its mass is included with "other metals". The same approach is adopted for organics and inorganics where the type of material is not given. Where the composition of waste is not reported, its mass is designated "unspecified".

5.3.1 High Level Waste

HLW is initially produced as a concentrated nitric acid solution containing fission products from the primary stage of reprocessing spent nuclear fuel. The Inventory includes liquids that are awaiting conditioning, the glass product of conditioning, and small quantities of contaminated scrap items from the vitrification plant, which consist mostly of metal and ceramic and which are treated as HLW because they are contaminated with small quantities of vitrified HLW glass. There are also insoluble fission products (IFPs) recovered during POCO.

The mass of conditioned HLW at 1 April 2010 was 2,000 tonnes. A further 1,300 tonnes of liquid waste remained to be conditioned. Once all waste at 1 April 2010 and projected future arisings of liquid waste and contaminated scrap items are conditioned the total mass will be 2,700 tonnes. This does not include HLW that will be exported.

5.3.2 Intermediate Level Waste

The major components are steels, graphite, concrete, cement and sand, and sludges and flocs. There is a wide range of steel items, including plant items and equipment, fuel cladding and reactor components. Most graphite is in the form of moderator blocks from final stage reactor dismantling at Magnox and AGR power stations.

The majority of waste reported as "concrete, cement, sand and rubble" is cement associated with conditioned waste. The remainder is mostly higher activity concrete and rubble from building decommissioning. Most sludge and floc waste is from the treatment of liquid effluents and from the corrosion of stored Magnox fuel cladding waste.

Figure 5.1 illustrates the materials content of the conditioned ILW reported in the Inventory (i.e. waste streams with a /C in the identifier), and that of unconditioned ILW. The principal material components of unconditioned ILW are metals (mainly steels), graphite, sludges and flocs and concrete cement and sand.

The material composition of conditioned ILW reflects the nature of the encapsulating medium and of the wastes that are being conditioned. Sellafield waste streams that are encapsulated in cement-based matrices account for about 87% of the conditioned waste

mass. These streams include Magnox fuel cladding and associated sludge, steel fuel cladding, Zircaloy fuel cladding, EARP floc and PCM.

Table 5.1: Material components of wastes from all sources

Material	Mass (tonnes) [1]		
	HLW	ILW	LLW
METALS:			
Stainless steel	0.7	40,000	120,000
Other steel	1.2	49,000	430,000
Magnox	0	7,300	110
Aluminium	0	1,200	17,000
Zircaloy	0	1,400	25
Other metals [2]	21	3,100	210,000
ORGANICS:			
Cellulosics	0	2,000	100,000
Plastics	0	6,900	48,000
Rubbers	0	1,700	13,000
Other organics [2]	0	1,200	35,000
INORGANICS:			
Concrete, cement & sand	0	59,000	2,700,000
Graphite	0	81,000	15,000
Glass & Ceramics	2,000	610	9,700
Sludges, flocs & liquids	0	31,000	11,000
Other inorganics [2]	640	2,000	50
SOIL & RUBBLE	0	1,500	790,000
UNSPECIFIED	0	16,000	160,000
TOTAL	2,700	300,000	4,700,000

(1) HLW material components masses are those of conditioned waste. ILW and LLW material component masses are those for untreated or partly treated waste, apart from conditioned waste streams where the components masses are those of conditioned waste.

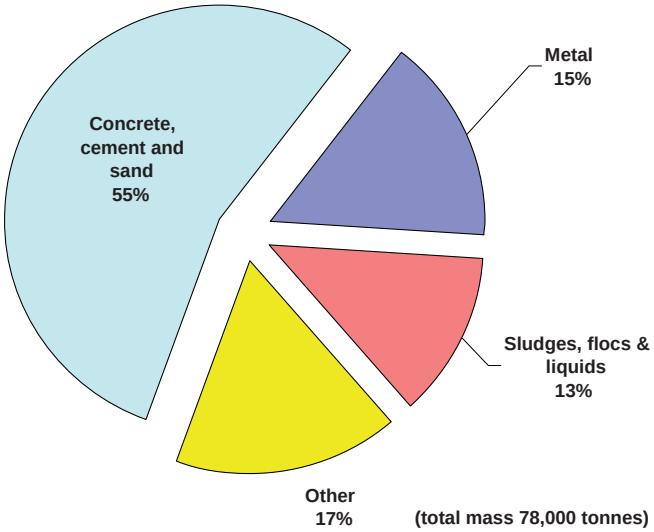
(2) Other metals include unspecified metals; other organics include ~10,000 tonnes plastics/rubber and unspecified organics; other inorganics include unspecified inorganics. Unspecified metals, organics and inorganics are likely to comprise the materials listed in the table, but have not been apportioned to specific materials by waste producers.

5.3.3 Low Level Waste

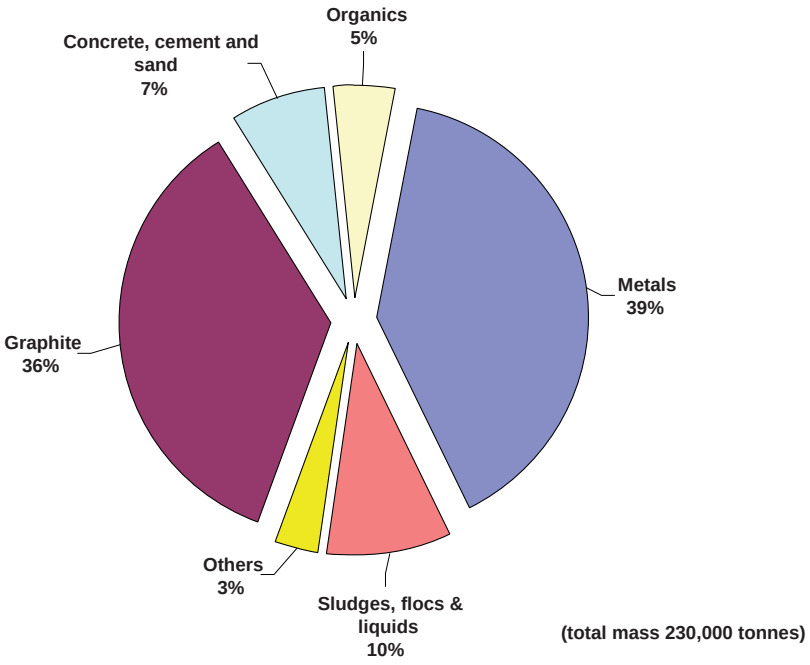
The major components of LLW are building rubble, soil and steel items such as framework, pipework and reinforcement from the dismantling and demolition of nuclear reactors and other nuclear facilities and the clean up of nuclear sites.

Figure 5.2 illustrates the materials content of unconditioned LLW reported in the Inventory. This represents most LLW, as only about 31,000 tonnes (0.7% by mass) is reported as conditioned waste. Nearly 70% of this conditioned waste is that currently held in Vaults 8 and 9 at the LLWR, which has been encapsulated with a cement grout, and has a cement content of about 50%.

Figure 5.1: Material composition of ILW from all sources

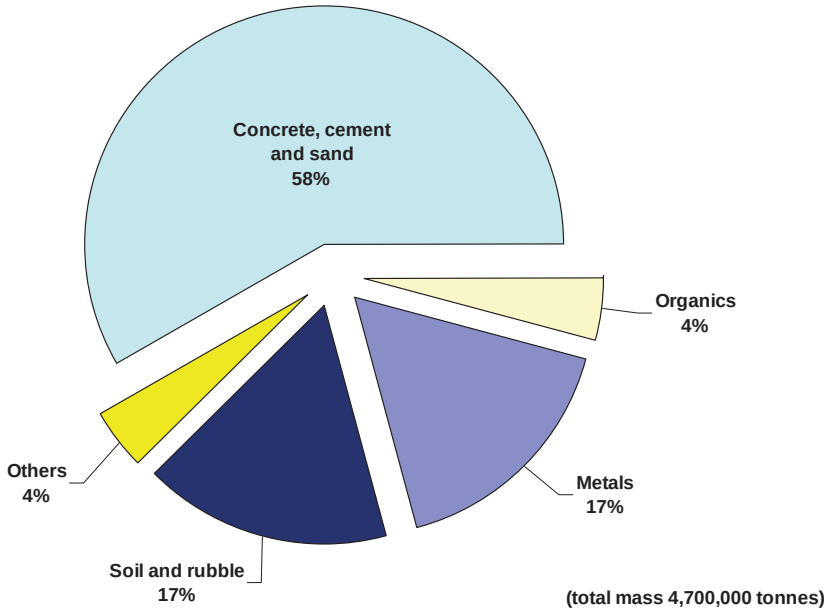


Composition of conditioned waste



Composition of unconditioned waste

Figure 5.2: Material composition of LLW from all sources



Composition of unconditioned waste

5.4 COMPARISON WITH THE 2007 INVENTORY

The principal reasons for changes in total waste masses compared with those reported in the 2007 Inventory [14] are the same as those for changes in waste volumes (see Chapter 4.5).

The material mass of HLW is similar, as is the material composition, which reflects the glass and waste oxide make up of the vitrified product.

The material mass of ILW has increased by about 30,000 tonnes. The principle reason is that the mass of steel wastes from dismantling of reprocessing and associated plants at Sellafield has increased. The compositions of conditioned and unconditioned ILW are very similar.

There has been a significant change in the total mass and in the composition of LLW, with a higher mass and proportion of concrete and cement and of soil and rubble and a lower mass and proportion of metals and other components. The total mass of LLW has increased by about 1,100,000 tonnes. The principal reason is that the 2010 Inventory now includes a higher estimate of VLLW from facility decommissioning (principally concrete and rubble).

6.1 INTRODUCTION

This chapter presents summary information on the radioactivity (hereafter shortened to 'activity') content of wastes in the 2010 Inventory.

Activities (in TBq) are derived from the specific activity (in TBq/m^3) and volume (in m^3) of each waste stream. Values may be given using scientific notation (e.g. 16,000TBq is expressed as 1.6E+04TBq). In the 2010 Inventory there are a number of ILW and LLW streams where specific activity is not quantified. In the case of ILW, the number of waste streams is small, all are of low volume, and specific activities are not anticipated to be significant. However, in the case of LLW, a number of decommissioning waste streams have high forecast volumes and therefore potentially significant total activities even though their specific activities are likely to be very low. Consequently, the total activity of LLW streams in the 2010 Inventory may be underestimated. Nonetheless, this activity remains a very small fraction of the total activity from all wastes.

Before reporting the activities of wastes, some background information is provided on the sources of radioactivity and the radionuclides to be found in radioactive wastes.

6.2 RADIONUCLIDE PRODUCTION

6.2.1 Introduction

The term radionuclide is used to describe an atom or nucleus of an element that undergoes radioactive decay. There are about 2,300 known radionuclides, most of which are not naturally occurring. Several hundred of these are produced in nuclear reactors; many are of short half-life and so decay completely or to very low levels before they can appear in wastes.

The 2010 Inventory includes information on 112 radionuclides that have the potential to impact on the safe handling, transport, storage and disposal of radioactive waste generated in the UK [15]. Clearly, not each of these 112 radionuclides will exist in every waste stream. The list of the so-called relevant radionuclides is regularly reviewed to ensure it remains valid and applicable.

Radionuclides are specified by the symbol of their chemical element and their atomic mass (for example Cl36 is the radioactive nuclide of chlorine with an atomic mass of 36). Some radionuclides exist in a metastable state: this is indicated by a suffix "m" or "n" (for example Ag110m).

The principal radioactive decay modes of radionuclides are:

- **Alpha**, which involves emission of an alpha particle;
- **Beta -**, which involves emission of a negative beta particle (electron);
- **Isomeric transition**, which involves the transition of a nuclide from one energy state to another accompanied by the emission of a gamma ray;
- **Electron capture** / **Beta +**, which involves the conversion of a proton into a neutron either by the proton capturing an orbital electron or emitting a positive beta particle (positron).

In general gamma ray, X-ray and Auger electron emission are associated with alpha, beta minus and electron capture / beta plus decay processes.

6.2.2 Production

The radionuclides in the wastes can be divided into three broad groups, according to the ways in which they are produced: *Fission products, Activation products* and *Actinides* (including their decay products).

Fission products

Fission products are produced from the fission (splitting) of heavy nuclei present in nuclear fuels. Fission products include those produced directly by the fission process or by the decay of fission fragments. The main source of fission products in both natural uranium and enriched uranium fuels is thermal-neutron binary fission of U235. This produces nuclides with mass numbers ranging from approximately 70 to 160, with peaks occurring at mass numbers around 95 (e.g. Sr90, Tc99) and 140 (e.g. Cs137, Ce144). A substantial fraction of fission products is also produced from fission of Pu239 produced from uranium during fuel irradiation in nuclear reactors. Fission products predominantly undergo beta/gamma decay.

Reprocessing of spent nuclear fuel separates the fission products from reusable uranium and plutonium, and results in a number of process waste streams that contain fission product contamination. In addition, where nuclides of the more volatile elements (e.g. iodine, caesium) have been released from the fuel while it is in the reactor or in store at the reactor site before being transported for reprocessing, these radionuclides will appear in reactor waste streams.

Activation products

Activation products arise from the neutron activation of stable isotopes of all masses. Reactions involving the absorption of a neutron followed by the emission of a gamma ray tend to produce the largest amounts of activation products. Since fission products mostly have atomic masses in the range 70 to 160, radionuclides outside this atomic mass range normally arise as activation products. Activation reactions will be the primary source of radionuclides in the mass range 70 to 160 when the fission product yield of the radionuclide is low. Examples of radionuclides that arise predominantly as activation products are: C14, Cl36, Co60, Ni63 and Nb94. Activation products predominantly undergo beta/gamma decay.

Actinides and their decay products

Actinides consist of actinium (atomic number 89) and the elements of higher atomic number. They include thorium, protactinium, uranium, neptunium, plutonium, americium and curium.

The actinides in the wastes are principally of two types: uranium and its decay products, and actinides of higher atomic number, such as plutonium, produced from uranium by neutron capture reactions during fuel irradiation in nuclear reactors. The higher actinides also undergo radioactive decay. In general, as the burnup of the fuel is increased the total quantities of the higher actinides also increase. Actinides predominantly undergo alpha decay.

The reprocessing of spent nuclear fuel separates uranium and plutonium from the other actinides and fission products. Wastes arising from fuel reprocessing operations will contain varying quantities of these radionuclides.

6.3 TOTAL FOR ALL WASTES

To determine total activities in waste at 1 April 2010, the activities of all relevant waste streams are summed. This is valid, because the activities of waste at 1 April 2010 refer to a particular point in time. However, this is not true for future arisings, where the specific activity of a waste stream is that estimated to exist at the time the waste arises. As different waste streams are generated over different periods of time, between 2010 and 2120, summed activities will not represent the actual total activity content of the wastes at any particular time.

To overcome this, the total activity of accumulated wastes at times after the reference date of 1 April 2010 is calculated by taking account of the radioactive decay of each waste stream. The period of decay for wastes that existed at 1 April 2010 is from that date, and for waste arisings after 1 April 2010 is from the time that the waste arises. All radionuclide activity data include contributions from short-lived daughter nuclides.

The activities given in Table 6.1 are those for accumulated wastes at 1 April 2010, 2050, 2100 and 2150[1]. The values show that most of the activity in radioactive waste is in HLW.

Table 6.1: Total activity of all wastes

Waste type	Total activity (TBq)			
	At 1.4.2010	At 1.4.2050	At 1.4.2100	At 1.4.2150
HLW	80,000,000	31,000,000	9,800,000	3,200,000
ILW	3,900,000	1,800,000	890,000	550,000
LLW	40	310	190	150
Total	84,000,000	33,000,000	11,000,000	3,800,000

Figure 6.1 illustrates how the total activities of accumulated HLW, ILW and LLW change with time after 1 April 2010.

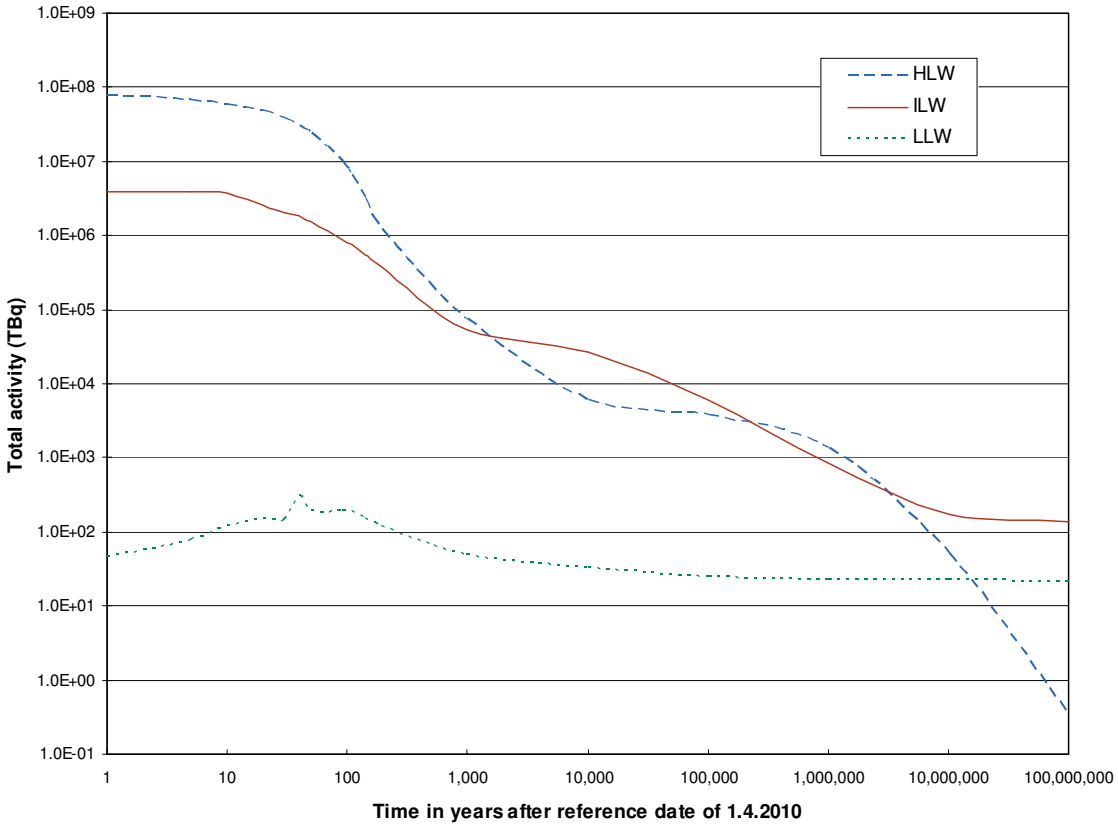
For HLW, ILW and LLW total activities initially increase, as the additional activity in projected future arisings is greater than the reduction in activity from radioactive decay of the waste as a whole.

Once all projected waste has arisen, total activities fall in a manner that reflects the decay of the major radionuclide species. No HLW is projected to arise after 2025. There are no further arisings of ILW and LLW beyond 2120 when the final stage decommissioning of all power reactors, the dismantling of all reprocessing and associated plants and site clean up activities are forecast to be complete.

At 2150 the total activity in all wastes is forecast to be 3,800,000TBq. About 91% of the activity is from beta/gamma-emitting radionuclides. The total alpha and beta/gamma activities are 340,000TBq and 3,400,000TBq respectively.

[1] Where stock activity data from the 2007 UK Radioactive Waste Inventory have been carried over into the 2010 Inventory, the authors have decayed these activities to 1 April 2010.

Figure 6.1: Total activity of HLW, ILW and LLW as a function of time



In time the total activity of HLW falls below that of ILW and LLW because of the lower quantities of uranium, which with its daughter products is the major contributor to total activities beyond about 1 million years. LLW shows a markedly smaller decrease in activity over time from its peak level than either HLW or ILW. This is because a relatively high proportion of the activity of LLW at the time of arising is from uranium, which has a long half-life (see Figure 6.6).

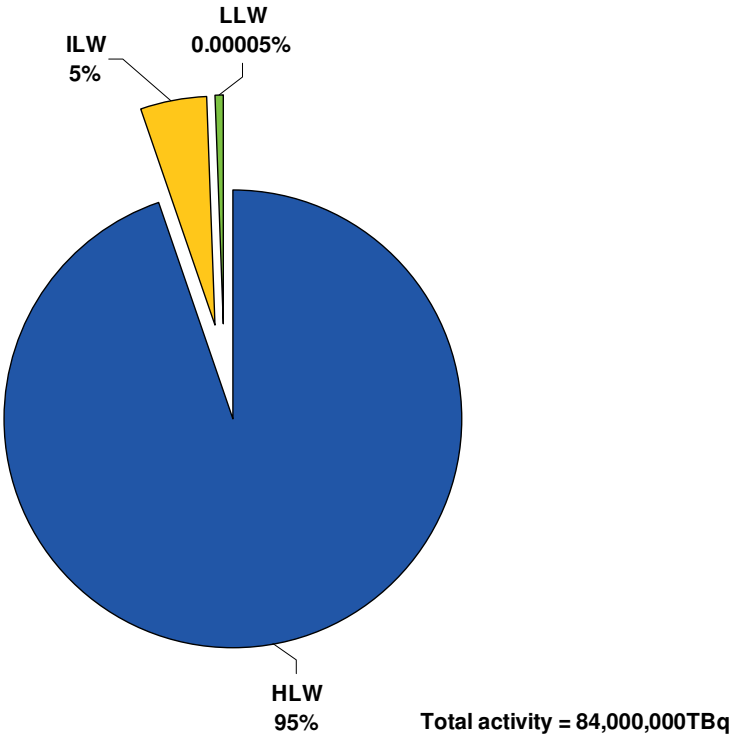
Figures 6.4-6.6 at the end of this chapter show those radionuclides that are the major contributors to the activity of HLW, ILW and LLW, and how these contributions change with time.

6.4 WASTES AT 1 APRIL 2010

For most waste streams with stocks at 1 April 2010, the specific activities relate to that date. These activities take into account radioactive decay from the time the waste was generated. For a very few waste streams, the specific activities reported by waste producers relate to earlier dates. The activities of these streams have been decayed so that they relate to 1 April 2010.

Figure 6.2 shows the relative contributions of HLW, ILW and LLW to the activity in waste at 1 April 2010 from all sources at that date. Most of the activity (80,000,000TBq) was contained in HLW. The total activity in ILW was lower (3,900,000TBq), while the activity content of LLW was very much lower still (40TBq).

Figure 6.2: Proportions of activity by waste category at 1 April 2010

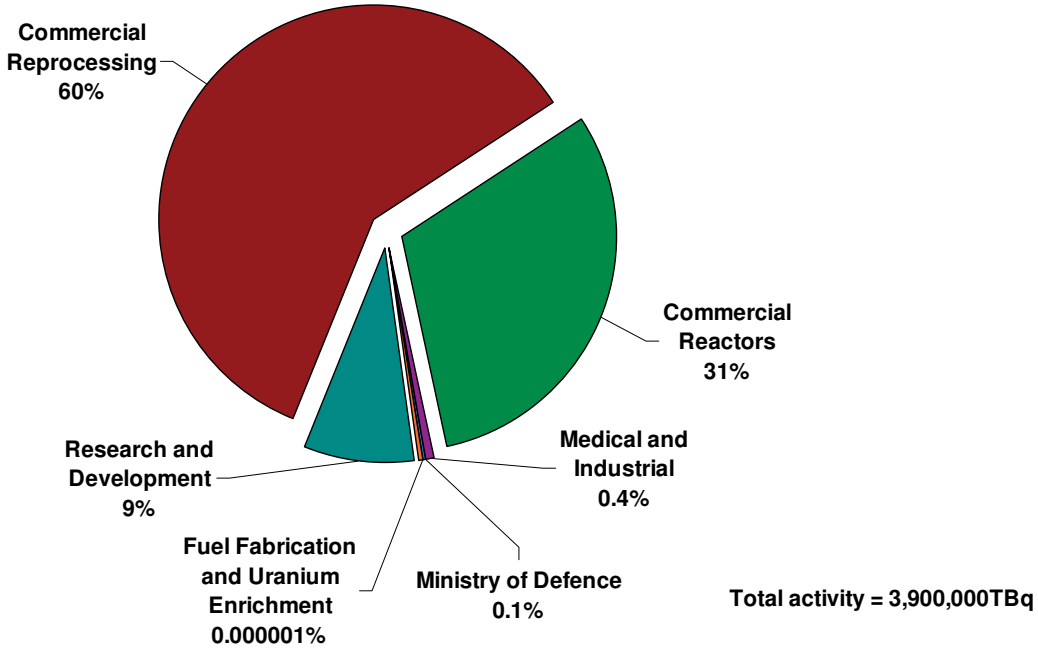


About 99% of the activity in waste at 1 April 2010 was from beta/gamma-emitting radionuclides. The total alpha and beta/gamma activities were 470,000TBq and 84,000,000TBq respectively.

All HLW is generated from spent fuel reprocessing at Sellafield.

Figure 6.3 illustrates the contributions of the different business activities to total activity in ILW at 1 April 2010. Spent fuel reprocessing and nuclear power reactors accounted for about 90% of the activity. For spent fuel reprocessing the activity is primarily from fission products that along with residual uranium etc. are transferred in varying degrees to wastes. In the case of nuclear power reactors most of this activity arises as activation products in fuel element and reactor core components that have been subjected to neutron irradiation.

Figure 6.3: Proportions of activity by business activity in ILW at 1 April 2010



In terms of volume about a quarter of all LLW at 1 April 2010 was stored in Vaults 8 and 9 at the LLWR. The other wastes were spread across the different business activities. Before LLW is consigned to the LLWR, or in a few cases to landfill, it is usually held in interim storage on site for a short period only, so the proportion from each activity at any date is subject to continual change. For these reasons an analysis of the activity source has not been undertaken.

Table 6.2 on pages 66 and 67 gives the total activities of radionuclides in HLW, ILW and LLW at 1 April 2010. The table lists only those radionuclides that have a quantified activity.

6.5 COMPARISON WITH THE 2007 INVENTORY

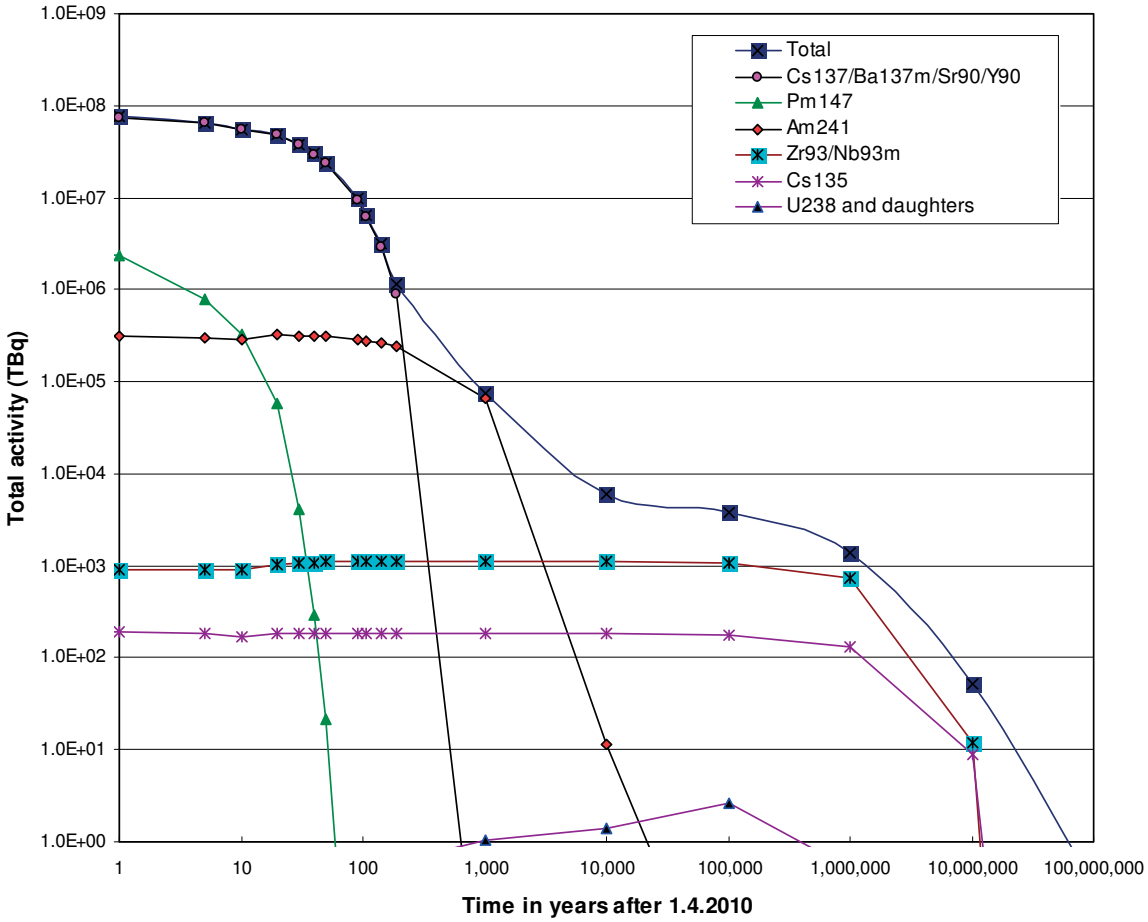
Compared with wastes at 1 April 2007, the total activities of HLW, ILW and LLW at 1 April 2010 are very similar, indicating that additional activity in further accumulations has been balanced by a decrease in activity from radioactive decay or from more recent and improved data.

The calculated total activities of HLW and ILW at 2150 are similar, as there has been no significant change to the inventory for these waste types.

The calculated total activity of LLW at 2150 is about two-thirds the corresponding activity in the 2007 Inventory primarily as a result of a large volume decrease of empty uranium hexafluoride containers at Capenhurst, correcting an overestimate in the 2007 Inventory. There has also been a reassessment of the activity and volume of LLW decommissioning graphite at Calder Hall, resulting in a decrease in total activity.

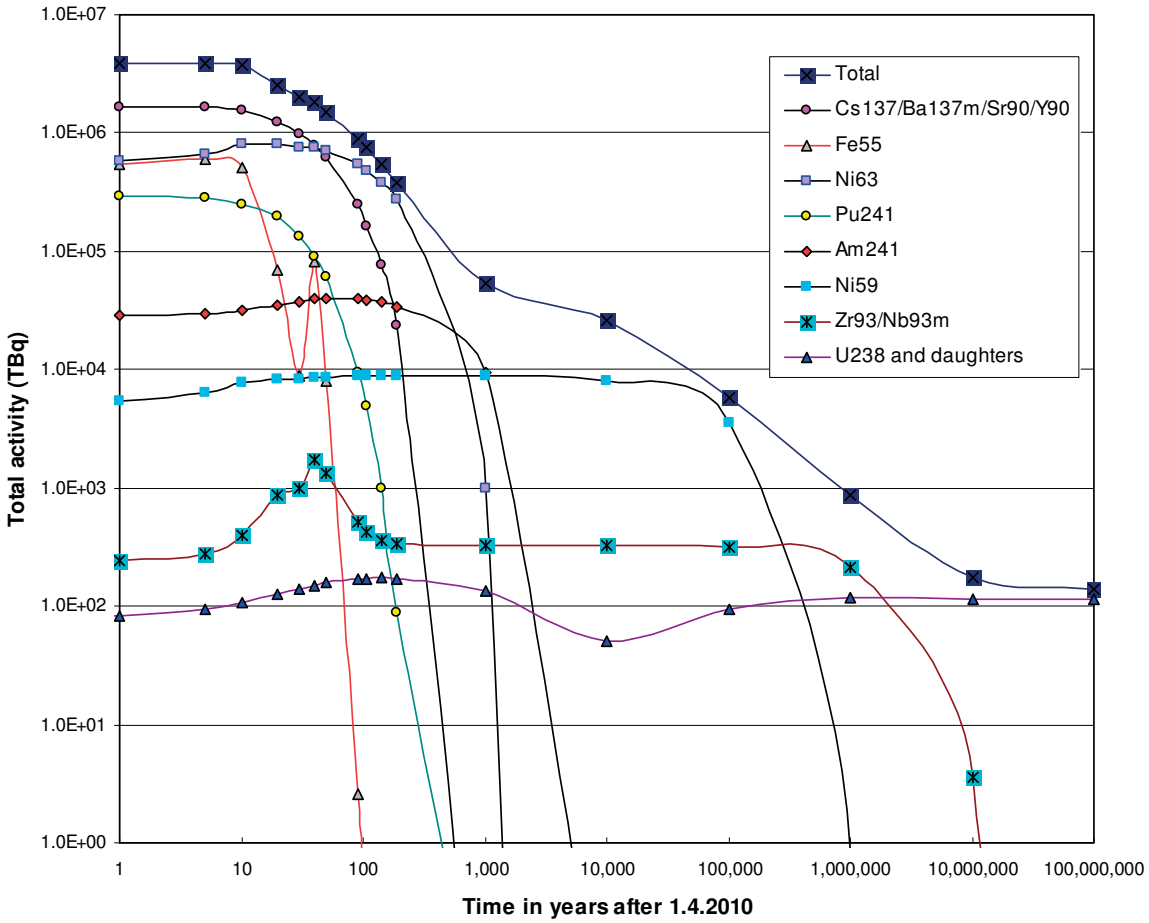
.

Figure 6.4: Total activity of HLW as a function of time



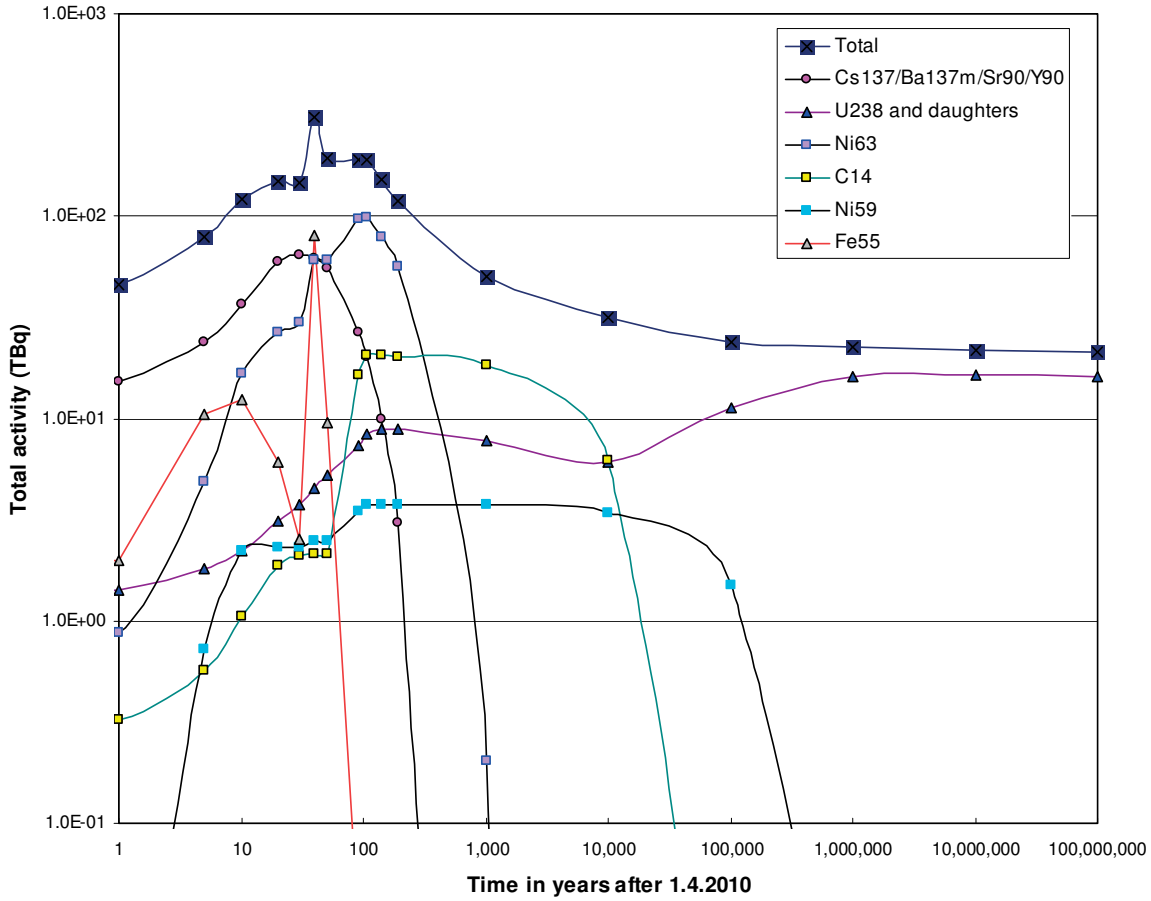
Note: The activities of Cs137 and Sr90 include the equilibrium activities of their short-lived daughter radionuclides Ba137m and Y90.

Figure 6.5: Total activity of ILW as a function of time



Note: The activities of Cs137 and Sr90 include the equilibrium activities of their short-lived daughter radionuclides Ba137m and Y90.

Figure 6.6: Total activity of LLW as a function of time



Note: The activities of Cs137 and Sr90 include the equilibrium activities of their short-lived daughter radionuclides Ba137m and Y90.

Table 6.2: Radionuclide activities in all wastes

Nuclide [3]	Half life (years)	Radionuclide activity (TBq) [1]					
		At 1.4.2010			At 1.4.2150 [2]		
		HLW	ILW	LLW	HLW	ILW	LLW
H3	1.23E+01	1.7E+2	2.4E+4	1.1E+1	3.0E-2	5.1E+1	1.3E+0
Be10	1.60E+06	4.0E-2	3.7E-1	6.5E-7	3.4E-2	3.8E-1	3.4E-6
C14	5.73E+03	1.0E+1	7.3E+2	3.6E-1	4.6E+0	8.8E+3	2.0E+1
Cl36	3.02E+05	1.3E+0	1.0E+1	5.8E-2	1.5E+0	3.8E+1	7.4E-1
Ar39	2.69E+02	-	3.6E-1	-	-	1.6E+0	1.5E-3
Ar42	3.30E+01	-	3.5E-7	-	-	1.6E-4	4.9E-12
K40	1.28E+09	6.6E-15	1.0E-2	4.2E-4	1.0E-14	6.1E-2	8.5E-3
Ca41	1.03E+05	1.2E-1	3.6E+0	1.1E-3	1.6E-1	2.0E+1	5.9E+0
Mn53	3.70E+06	1.2E-7	1.8E-6	6.7E-12	9.6E-8	3.2E-3	1.5E-9
Mn54	8.56E-01	6.8E+0	3.2E+3	3.3E-2	-	2.2E-17	5.2E-15
Fe55	2.70E+00	5.8E+3	5.7E+5	1.9E+0	4.0E-12	1.3E-5	3.0E-5
Co60	5.27E+00	2.2E+4	5.0E+5	2.2E+0	2.6E-4	1.3E-1	1.6E-3
Ni59	7.49E+04	3.0E+0	5.2E+3	5.7E-3	2.9E+0	8.9E+3	3.8E+0
Ni63	1.00E+02	3.4E+2	5.6E+5	7.9E-1	1.3E+2	3.8E+5	7.9E+1
Zn65	6.69E-01	1.6E-2	1.9E+2	9.1E-3	-	2.9E-20	-
Se79	6.50E+04	1.0E+2	4.6E+0	1.4E-6	9.8E+1	4.8E+0	2.1E-5
Kr81	2.10E+05	-	1.0E-5	-	-	3.8E-1	2.3E-6
Kr85	1.07E+01	-	4.7E+3	6.2E-3	-	6.4E-1	3.0E-6
Rb87	4.80E+10	6.8E-3	1.8E-5	2.3E-12	6.7E-3	7.7E-4	3.8E-4
Sr90/Y90	2.91E+01	3.2E+7	6.2E+5	3.5E+0	1.2E+6	2.6E+4	2.8E+0
Zr93	1.53E+06	5.8E+2	1.5E+2	2.8E-4	5.7E+2	1.7E+2	3.8E-3
Nb91	6.80E+02	4.2E-12	3.5E-3	7.1E-10	3.0E-12	1.1E-1	3.1E-7
Nb92	3.50E+07	9.4E-10	1.8E-5	2.3E-14	7.7E-10	5.6E-5	4.0E-8
Nb93m	1.64E+01	3.1E+2	8.1E+1	4.9E-5	5.7E+2	1.9E+2	4.4E-3
Nb94	2.03E+04	1.6E-1	1.2E+2	1.6E-4	1.8E-1	2.7E+2	3.0E-2
Mo93	3.50E+03	1.9E-1	3.9E+1	5.8E-6	2.1E-1	8.6E+1	7.7E-1
Tc97	2.60E+06	8.2E-9	4.3E-9	7.9E-15	6.7E-9	5.3E-6	1.0E-8
Tc99	2.13E+05	2.5E+3	4.8E+2	2.5E-1	2.7E+3	1.1E+3	1.3E+0
Ru106/Rh106	1.01E+00	3.9E+5	3.1E+4	6.5E-2	-	3.5E-11	9.8E-12
Pd107	6.50E+06	2.9E+1	6.0E-1	3.4E-7	3.0E+1	6.1E-1	9.6E-6
Ag108m	4.18E+02	2.5E-3	1.5E+3	1.4E-3	1.7E-3	1.6E+3	1.4E-1
Ag110m	6.84E-01	4.1E+1	1.2E+2	8.1E-4	-	-	-
Cd109	1.27E+00	1.7E-2	2.8E+0	3.2E-3	-	-	-
Cd113m	1.41E+01	2.6E+3	2.4E+2	1.1E-5	2.7E+0	9.1E-1	6.1E-6
Sn119m	8.02E-01	3.0E+0	6.3E-3	5.7E-7	-	-	-
Sn121m	5.00E+01	5.2E+3	1.7E+2	3.7E-6	7.1E+2	3.7E+1	5.0E-2
Sn123	3.54E-01	1.0E+0	2.3E-4	7.2E-12	-	-	-
Sn126	1.00E+05	2.2E+2	5.2E+0	2.8E-5	2.1E+2	5.5E+0	2.7E-4
Sb125	2.73E+00	1.4E+5	6.6E+3	1.6E-2	1.8E-10	3.7E-10	6.9E-7
Sb126	3.39E-02	3.0E+1	2.2E+0	6.5E-4	3.0E+1	7.7E-1	3.8E-5
Te125m	1.59E-01	3.5E+4	6.7E+3	1.3E-2	1.9E-10	4.0E-10	7.3E-7
Te127m	2.98E-01	1.5E+0	1.7E-5	1.0E-4	-	-	-
I129	1.57E+07	9.0E-2	5.9E-1	3.4E-4	7.5E-2	7.3E-1	8.0E-2
Cs134	2.06E+00	2.5E+5	4.8E+3	4.4E-2	1.5E-14	7.5E-7	1.1E-7
Cs135	2.30E+06	1.9E+2	6.8E+0	1.5E-4	1.8E+2	7.8E+0	1.0E-3
Cs137/Ba137m	3.00E+01	4.2E+7	1.1E+6	8.0E+0	1.7E+6	5.0E+4	7.0E+0
Ba133	1.05E+01	4.4E-4	6.5E-1	3.1E-2	3.3E-8	1.4E-2	1.4E-4
La137	6.00E+04	4.6E-4	9.8E-3	6.7E-11	3.8E-4	5.3E-2	6.2E-7
La138	1.05E+11	1.6E-8	1.3E-10	1.4E-16	1.4E-8	3.0E-8	1.4E-9
Ce144/Pr144	7.80E-01	2.7E+5	3.5E+4	4.4E-1	-	5.4E-14	2.2E-14
Pm145	1.77E+01	2.0E-2	3.8E-1	4.5E-10	1.4E-4	2.9E-3	6.5E-5
Pm147	2.62E+00	3.0E+6	2.9E+4	6.0E-2	9.9E-10	4.7E-8	3.3E-6
Sm147	1.06E+11	2.6E-3	1.4E-5	4.5E-12	2.6E-3	1.7E-5	4.4E-8
Sm151	8.87E+01	1.2E+5	4.4E+3	3.1E-3	3.9E+4	1.5E+3	4.7E-1
Eu152	1.33E+01	1.2E+3	2.9E+4	4.5E-2	8.4E-1	2.0E+1	1.8E-1
Eu154	8.60E+00	3.2E+5	5.0E+3	1.9E-2	6.3E+0	9.8E-2	4.8E-4
Eu155	4.96E+00	9.0E+4	2.3E+3	8.9E-3	4.8E-4	2.3E-5	1.8E-5
Gd153	6.61E-01	2.2E-1	1.7E-5	2.9E-5	-	-	-
Ho163	4.57E+03	8.1E-6	1.3E-5	4.5E-12	6.5E-6	9.4E-4	1.0E-4
Ho166m	1.20E+03	8.0E-2	1.9E-2	1.3E-9	7.1E-2	5.4E-1	8.4E-3

Nuclide [3]	Half life (years)	Radionuclide activity (TBq) [1]					
		At 1.4.2010			At 1.4.2150 [2]		
		HLW	ILW	LLW	HLW	ILW	LLW
Tm170	3.52E-01	1.0E-5	4.0E-6	2.5E-18	-	-	-
Tm171	1.92E+00	1.4E+0	7.7E-4	1.7E-9	-	8.2E-20	-
Lu174	3.31E+00	-	8.5E-6	6.2E-12	-	1.5E-14	1.7E-20
Lu176	3.61E+10	-	1.3E-8	1.4E-15	-	3.5E-7	1.2E-7
Hf178n	3.10E+01	-	7.8E-3	-	-	4.5E-1	5.1E-5
Hf182	8.99E+06	1.9E-10	3.6E-9	1.5E-15	1.6E-10	3.8E-4	5.6E-13
Pt193	5.07E+01	-	1.4E-2	6.9E-8	-	1.8E+0	4.2E-5
Tl204	3.78E+00	-	1.3E+2	1.2E-3	-	5.6E-8	6.0E-10
Pb205	1.52E+07	4.3E-7	1.0E-4	1.5E-6	4.6E-7	1.5E-4	2.3E-4
Pb210	2.23E+01	9.0E-5	3.0E-1	1.7E-3	2.9E-3	4.4E+1	1.2E+0
Bi208	3.68E+05	-	1.8E-7	5.8E-14	-	2.6E-5	1.2E-9
Bi210m	3.00E+06	1.1E-11	1.8E-7	2.0E-4	1.4E-11	3.4E-5	2.0E-4
Po210	3.79E-01	8.5E-5	2.0E-1	1.6E-3	2.8E-3	4.4E+1	1.2E+0
Ra223	3.13E-02	2.7E-3	1.9E-2	2.0E-7	6.8E-3	3.5E-1	9.4E-3
Ra225	4.08E-02	1.4E-5	6.2E-3	3.3E-8	1.7E-4	3.5E-2	2.3E-3
Ra226	1.60E+03	3.7E-4	4.6E+1	1.1E+0	3.6E-3	4.4E+1	1.2E+0
Ra228	5.75E+00	2.9E-8	1.6E-1	2.3E-3	4.0E-8	4.4E-1	2.2E-1
Ac227	2.18E+01	2.7E-3	9.5E+0	1.7E-4	6.8E-3	3.5E-1	9.4E-3
Th227	5.12E-02	2.7E-3	1.9E-2	2.0E-7	6.7E-3	3.5E-1	9.3E-3
Th228	1.91E+00	3.0E-1	9.3E-1	6.2E-3	2.1E-4	9.3E-1	2.3E-1
Th229	7.34E+03	1.4E-5	6.3E-3	3.4E-8	1.7E-4	3.5E-2	2.3E-3
Th230	7.54E+04	5.4E-2	7.3E-2	3.4E-4	5.6E-2	1.1E-1	1.9E-2
Th232	1.41E+10	3.7E-8	2.3E-1	6.0E-3	4.0E-8	4.4E-1	2.3E-1
Th234	6.60E-02	2.7E-2	6.3E+0	2.6E-2	2.5E-2	1.9E+1	2.7E+0
Pa231	3.28E+04	6.8E-3	1.5E-1	5.6E-5	6.9E-3	1.8E-1	1.7E-3
Pa233	7.39E-02	2.9E+1	6.6E+1	4.2E-3	4.6E+1	1.1E+2	1.1E-1
U232	6.98E+01	5.6E-4	1.0E+0	9.0E-5	2.1E-4	4.8E-1	4.1E-3
U233	1.59E+05	9.1E-4	1.6E+0	8.9E-4	2.4E-2	2.1E+0	3.4E-1
U234	2.46E+05	6.2E-2	1.7E+1	1.0E-1	4.1E-1	2.2E+1	2.5E+0
U235	7.04E+08	9.7E-4	5.5E-1	4.6E-3	9.9E-4	7.2E-1	3.9E-1
U236	2.34E+07	6.2E-3	1.5E+0	1.6E-2	9.7E-3	1.7E+0	2.0E-1
U238	4.47E+09	2.7E-2	1.7E+1	1.0E-1	2.5E-2	1.9E+1	2.7E+0
Np237	2.14E+06	2.9E+1	6.9E+1	5.1E-3	4.6E+1	1.1E+2	1.1E-1
Pu236	2.90E+00	2.6E-3	4.9E+0	1.3E-6	8.8E-17	1.5E-13	-
Pu238	8.77E+01	9.3E+2	4.4E+3	5.5E-1	7.3E+2	2.2E+3	4.3E-1
Pu239	2.41E+04	2.5E+2	9.2E+3	6.6E-1	2.7E+2	1.2E+4	3.0E+0
Pu240	6.56E+03	4.3E+2	9.8E+3	9.9E-2	8.1E+2	1.3E+4	1.2E+0
Pu241	1.44E+01	2.4E+4	3.0E+5	2.5E+0	6.4E+1	9.9E+2	3.6E-1
Pu242	3.74E+05	8.1E-1	5.6E+0	3.3E-4	1.0E+0	1.3E+1	4.2E-3
Am241	4.33E+02	3.1E+5	2.8E+4	5.7E+0	2.7E+5	3.7E+4	8.7E+0
Am242m	1.41E+02	9.9E+2	2.0E+2	7.8E-4	5.1E+2	1.0E+2	2.9E-3
Am243	7.36E+03	1.5E+3	1.9E+1	5.1E-5	1.8E+3	2.1E+1	3.4E-4
Cm242	4.46E-01	8.7E+2	4.3E+2	6.9E-4	4.2E+2	8.5E+1	2.4E-3
Cm243	3.00E+01	1.1E+3	4.4E+1	3.3E-4	5.8E+1	1.8E+0	5.7E-5
Cm244	1.81E+01	1.0E+5	6.9E+2	3.9E-3	7.9E+2	4.5E+0	3.0E-3
Cm245	8.50E+03	1.8E+1	4.0E-2	3.2E-8	2.4E+1	4.8E-2	2.2E-1
Cm246	4.73E+03	3.7E+0	7.6E-3	1.3E-8	5.4E+0	1.1E-2	2.0E-2
Cm248	3.40E+05	2.8E-5	7.8E-3	5.8E-14	4.7E-5	7.8E-3	4.6E-4
Cf249	3.51E+02	2.3E-4	4.5E-4	5.7E-10	2.9E-4	4.2E-4	1.4E-9
Cf250	1.31E+01	8.2E-4	3.3E-4	2.1E-7	1.2E-6	1.3E-6	1.3E-10
Cf251	8.98E+02	1.0E-5	7.9E-8	1.0E-6	1.6E-5	5.2E-7	9.1E-7
Cf252	2.65E+00	6.5E-5	4.0E-3	8.4E-6	1.8E-19	4.7E-19	-

(1) Only waste streams with a quantified radionuclide concentration contribute to this table.

(2) Activities at 1.4.2150 are decayed values.

(3) For Sr90, Ru106, Cs137 and Ce144 the equilibrium activities of the short-lived daughter radionuclides (Y90, Rh106, Ba137m and Pr144) are included. These are in the ratios 1:1, 1:1, 1:0.946 and 1:0.982 respectively. Reported half-lives are those of the parent radionuclides.

7 REFERENCES

1 *Radioactive Materials Not Reported in the 2010 UK Radioactive Waste Inventory.* URN 10D/988, NDA/ST/STY(11)0007. February 2011.

2 *Sixth Situation Report on Radioactive Waste and Spent Fuel Management in the European Union*. SEC(2008)2416. September 2008.

3 HSE. *The United Kingdom's Third National Report on Compliance with the Obligations of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*. 30 May 2008.

4 *Radioactive Wastes in the UK - A Summary of the 2010 Inventory.* URN 10D/986, NDA/ST/STY(11)0005. February 2011.

5 *The 2010 UK Radioactive Waste Inventory - A Summary of Information for International Reporting.* URN 10D/987, NDA/ST/STY(11)0006. February 2011.

6 *Radioactive Substances Act 199*3.

7 Pöyry Energy Ltd. *Conventions for the Preparation of the 2010 UK Radioactive Waste Inventory.* Contractor's Report to NDA, Ref. No. 390763/GN 2. 17 December 2009.

8 Committee on Radioactive Waste Management. *Managing Our Radioactive Waste Safely: CoRWM's Recommendations to Government.* CoRWM Document 700. July 2006.

9 *Managing Radioactive Waste Safely: A Framework for Implementing Geological Disposal.* Cm 7386. June 2008.

10 Department for Environment, Food and Rural Affairs. *Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom*. March 2007.

11 Nuclear Decommissioning Authority. *UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry.* August 2010.

12 Department for Business Enterprise & Regulatory Reform. *Meeting the Energy Challenge: A White Paper on Nuclear Power.* Cm 7296. January 2008.

13 Department of Energy and Climate Change. Revised Draft National Policy Statement for Nuclear Power Generation (EN-6). October 2010.

14 *The 2007 United Kingdom Radioactive Waste Inventory – Main Report.* DEFRA/RAS/08.002, NDA Report NDA/RWMD/004. March 2008.

15 United Kingdom Nirex Limited. *The Identification of Radionuclides Relevant to Long-Term Waste Management in the United Kingdom*. Nirex Report N/105. November 2004.

ANNEX 1 WASTE VOLUMES FROM ALL SOURCES

This annex presents waste volumes and package numbers from all sources, for HLW, ILW and LLW, and in total. It also provides this information separately for England, Scotland and Wales.

Information is given in a number of tables, listed below.

Content	Table[1-3]
All wastes	A1.1, A1.2
Wastes from sites in England	A1.3, A1.4
Wastes from sites in Scotland	A1.5, A1.6
Wastes from sites in Wales	A1.7, A1.8

(1) Tables A1.1, A1.3, A1.5 and A1.7 give waste volumes at 1 April 2010 and estimated for future time periods.

(2) Tables A1.2, A1.4, A1.6 and A1.8 give the number of packages, packaged volumes and conditioned volume existing at 1 April 2010, and the number of packages, packaged volume and conditioned volume once all wastes at 1 April 2010 and future arisings have been packaged. LLW package numbers exclude those streams suitable for landfill disposal, as the UK Inventory does not compile information on waste packaging for this disposal route.

(3) All wastes from decommissioned nuclear powered submarines, which are berthed at Devonport and Rosyth, are included in wastes from sites in England.

Table A1.1: All wastes Volume at 1 April 2010 and estimated for future arisings (m^3)

	HLW	ILW	LLW	Total
Total	**1,020**	**287,000**	**4,430,000**	**4,720,000**
At 1.4.2010	1,620	94,300	66,000	**162,000**
Future arisings	-601	192,000	4,360,000	**4,550,000**
Arisings 2010	-96	2,340	47,100	**49,400**
Arisings 2011-2014	-331	7,700	147,000	**155,000**
Arisings 2015-2019	-226	9,760	202,000	**211,000**
Arisings 2020-2029	51.8	17,400	305,000	**323,000**
Arisings 2030-2039	0	21,600	220,000	**241,000**
Arisings 2040-2059	0	40,500	893,000	**934,000**
Arisings 2060-2099	0	65,200	1,490,000	**1,560,000**
Arisings post 2100	0	27,800	1,060,000	**1,080,000**

(1) Quantities are for untreated or partly treated waste, apart from conditioned wastes (i.e. waste streams with a /C in the identifier) where the conditioned volume is reported.

(2) Future arisings of HLW have negative volumes. This is because Sellafield has reported future arisings of HLW to show that the volume of accumulated waste (liquid plus vitrified product) will fall as liquid waste existing at 1.4.2010 and forecast in the future is conditioned to a vitrified product. Thus, the volume of 1,620m^3 at 1.4.2010 is expected to fall by 601m^3, to 1,020m^3, by 2026 when all liquid waste (plus IFP residues) is expected to be conditioned.

(3) ILW includes 8,690m^3 of waste that are expected to become LLW as a result of decontamination or decay storage. This comprises 2,070m^3 at 1.4.2010 and 6,610m^3 for future arisings.

Table A1.2: All wastes Number of packages, packaged and conditioned volumes (m^3)

	HLW	ILW	LLW	Total
At 1.4.2010				
Number of packages	5,108	46,571	1,288	**52,967**
Packaged volume	1,000	33,000	24,900	**58,900**
Conditioned volume	766	26,300	21,800	**48,900**
When all wastes at 1.4.2010 and future arisings are packaged				
Number of packages	6,770	225,000	64,300	**296,000**
Packaged volume	1,330	488,000	4,550,000	**5,030,000**
Conditioned volume	1,020	378,000	4,400,000	**4,780,000**

(1) Package numbers and volumes at 1.4.2010 are for those wastes that had been conditioned (i.e. waste streams with a /C in the identifier) and wastes that have been packaged for later conditioning. In addition there were 1,091 ILW packages with waste that is being stored unconditioned. There were 431 LLW packages included with waste that is being stored unconditioned.

(2) The number of LLW packages excludes those in short-term storage before transfer to the LLWR. Of the total number of LLW packages at 1.4.2010, 854 were being stored in vaults at the LLWR.

(3) ILW packages at 1.4.2010 include 1,716 1803-type drums at Trawsfynydd. These drums are expected to be overpacked in 4m boxes (6 drums per box). The conditioned volume of these wastes at 1.4.2010 is for the overpacked waste. The number of packages given for all wastes includes these 4m boxes and not the number of drums.

(4) All wastes at 1.4.2010 and future arisings includes 1,000 packages, 19,000m^3 packaged volume and 16,400m^3 conditioned volume of ILW that are expected to become LLW as a result of decontamination or decay storage.

Table A1.3: Wastes at sites in England Volume at 1 April 2010 and estimated for future arisings (m^3)

	HLW	ILW	LLW	Total
Total	**1,020**	**247,000**	**4,050,000**	**4,290,000**
At 1.4.2010	1,620	83,200	35,000	**120,000**
Future arisings	-601	164,000	4,010,000	**4,180,000**
Arisings 2010	-96	2,120	33,000	**35,100**
Arisings 2011-2014	-331	6,990	110,000	**116,000**
Arisings 2015-2019	-226	8,440	150,000	**158,000**
Arisings 2020-2029	51.8	15,900	243,000	**258,000**
Arisings 2030-2039	0	21,500	215,000	**236,000**
Arisings 2040-2059	0	40,500	893,000	**934,000**
Arisings 2060-2099	0	47,700	1,340,000	**1,390,000**
Arisings post 2100	0	21,200	1,030,000	**1,050,000**

(1) Quantities are for untreated or partly treated waste, apart from conditioned wastes (i.e. waste streams with a /C in the identifier) where the conditioned volume is reported.

(2) Future arisings of HLW have negative volumes. This is because Sellafield has reported future arisings of HLW to show that the volume of accumulated waste (liquid plus vitrified product) will fall as liquid waste existing at 1.4.2010 and forecast in the future is conditioned to a vitrified product. Thus, the volume of 1,620m^3 at 1.4.2010 is expected to fall by 601m^3, to 1,020m^3, by 2026 when all liquid waste (and IFP residues) is expected to be conditioned.

(3) ILW includes 7,730m^3 of waste that are expected to become LLW as a result of decontamination or decay storage. This comprises 1,400m^3 at 1.4.2010 and 6,330m^3 for future arisings.

Table A1.4: Wastes at sites in England Number of packages, packaged and conditioned volumes (m^3)

	HLW	ILW	LLW	Total
At 1.4.2010				
Number of packages	5,108	41,638	857	**47,603**
Packaged volume	1,000	25,300	16,500	**42,700**
Conditioned volume	766	21,400	15,100	**37,300**
When all wastes at 1.4.2010 and future arisings are packaged				
Number of packages	6,770	207,000	41,400	**255,000**
Packaged volume	1,330	424,000	4,040,000	**4,460,000**
Conditioned volume	1,020	326,000	3,960,000	**4,280,000**

(1) Package numbers and volumes at 1.4.2010 are for those wastes that had been conditioned (i.e. waste streams with a /C in the identifier) and wastes that have been packaged for later conditioning. In addition there were 1,091 ILW packages with waste that is being temporarily stored unconditioned.

(2) The number of LLW packages excludes those in short-term storage before transfer to the LLWR.

(3) All wastes at 1.4.2010 and future arisings includes 893 packages, 16,900m^3 packaged volume and 14,700m^3 conditioned volume of ILW that are expected to become LLW as a result of decontamination or decay storage.

Table A1.5: Wastes at sites in Scotland Volume at 1 April 2010 and estimated for future arisings (m^3)

	ILW	LLW	Total
Total	**25,400**	**275,000**	**300,000**
At 1.4.2010	8,080	30,500	**38,600**
Future arisings	17,400	245,000	**262,000**
Arisings 2010	196	13,600	**13,800**
Arisings 2011-2014	609	35,800	**36,400**
Arisings 2015-2019	1,230	46,900	**48,100**
Arisings 2020-2029	1,430	56,600	**58,000**
Arisings 2030-2039	38.6	1,630	**1,670**
Arisings 2040-2059	38.6	300	**339**
Arisings 2060-2099	8,280	71,200	**79,500**
Arisings post 2100	5,530	18,600	**24,100**

(1) Quantities are for untreated or partly treated waste, apart from conditioned wastes (i.e. waste streams with a /C in the identifier) where the conditioned volume is reported.

(2) ILW includes 770m^3 of waste that are expected to become LLW as a result of decontamination or decay storage. This comprises 493m^3 at 1.4.2010 and 276m^3 for future arisings.

Table A1.6: Wastes at sites in Scotland Number of packages, packaged and conditioned volumes (m^3)

	ILW	LLW	Total
At 1.4.2010			
Number of packages	3,142	431	**3,573**
Packaged volume	1,790	8,400	**10,200**
Conditioned volume	1,570	6,720	**8,290**
When all wastes at 1.4.2010 and future arisings are packaged			
Number of packages	15,900	16,700	**32,600**
Packaged volume	41,400	374,000	**416,000**
Conditioned volume	34,000	324,000	**358,000**

(1) Package numbers and volumes at 1.4.2010 are for those wastes that had been conditioned (i.e. waste streams with a /C in the identifier) and wastes that have been packaged for later conditioning. There were 431 LLW packages with waste that is being temporarily stored unconditioned.

(2) The number of LLW packages excludes those in short-term storage before transfer to the LLWR.

(3) All wastes at 1.4.2010 and future arisings includes 99 packages, 1,920m^3 packaged volume and 1,530m^3 conditioned volume of ILW that are expected to become LLW as a result of decontamination or decay storage.

Table A1.7: Wastes at sites in Wales Volume at 1 April 2010 and estimated for future arisings (m^3)

	ILW	LLW	Total
Total	**13,800**	**106,000**	**120,000**
At 1.4.2010	3,070	539	**3,600**
Future arisings	10,800	106,000	**116,000**
Arisings 2010	29.3	512	**542**
Arisings 2011-2014	102	1,990	**2,090**
Arisings 2015-2019	85.4	4,650	**4,730**
Arisings 2020-2029	102	6,310	**6,410**
Arisings 2030-2039	49.7	3,570	**3,620**
Arisings 2040-2059	0	80.6	**80.6**
Arisings 2060-2099	9,250	80,300	**89,600**
Arisings post 2100	1,150	8,170	**9,320**

(1) Quantities are for untreated or partly treated waste, apart from conditioned wastes (i.e. waste streams with a /C in the identifier) where the conditioned volume is reported.

(2) ILW includes 187m^3 of waste that are expected to become LLW as a result of decontamination or decay storage. This comprises 184m^3 at 1.4.2010 and 3m^3 for future arisings.

Table A1.8: Wastes at sites in Wales Number of packages, packaged and conditioned volumes (m^3)

	ILW	LLW	Total
At 1.4.2010			
Number of packages	1,791	0	**1,791**
Packaged volume	5,990	0	**5,990**
Conditioned volume	3,330	0	**3,330**
When all wastes at 1.4.2010 and future arisings are packaged			
Number of packages	2,040	6,230	**8,270**
Packaged volume	22,300	132,000	**154,000**
Conditioned volume	18,000	122,000	**140,000**

(1) Package numbers and volumes at 1.4.2010 are for those wastes that had been conditioned (i.e. waste streams with a /C in the identifier) and wastes that have been packaged for later conditioning.

(2) The number of LLW packages excludes those in short-term storage before transfer to the LLWR.

(3) ILW packages at 1.4.2010 include 1,716 1803-type drums at Trawsfynydd. These drums are expected to be overpacked in 4m boxes (6 drums per box). The number of packages given for all wastes includes these 4m boxes and not the number of drums.

(4) All wastes at 1.4.2010 and future arisings includes 12 packages, 234m^3 packaged volume and 187m^3 conditioned volume of ILW that are expected to become LLW as a result of decontamination or decay storage.

ANNEX 2 WASTE VOLUMES FROM EACH BUSINESS ACTIVITY

This annex provides a breakdown of waste volumes and package numbers for HLW, ILW and LLW, and in total, in terms of the following business activities:

- **Fuel fabrication and uranium enrichment**, which includes activities carried out at Springfields and Capenhurst;
- **Nuclear power reactors**, which includes all Magnox, AGR and PWR nuclear power station sites;
- **Spent fuel reprocessing**, which includes all activities at Sellafield[1];
- **Nuclear energy R & D**, which includes activities at Dounreay[2], Harwell[3], Windscale, Winfrith, Culham and Berkeley Centre[4];
- **Defence**, which includes activities at sites throughout the UK supporting Ministry of Defence activities;
- **Medical and industrial**, which includes the activities of GE Healthcare Ltd at Amersham, Cardiff and Harwell, the LLWR near Drigg, and minor waste producers.

Information is given in a number of tables, listed below.

Business activity	Table(1-3)
All activities (all wastes)	A2.1
All activities (wastes at 1.4.2010) All activities (all wastes)	A2.2 A2.3

(1) Table A2.1 gives waste volumes at 1 April 2010 and a consolidated estimate for future arisings.

(2) Table A2.2 gives the number of packages, packaged volume and conditioned volume existing at 1 April 2010.

(3) Table A2.3 gives the number of packages, packaged volume and conditioned volume once all wastes at 1 April 2010 and for future arisings have been packaged. LLW package numbers exclude those streams suitable for landfill disposal, as the UK Inventory does not compile information on waste packaging for this disposal route.

[1] Includes wastes arising at Sellafield associated with defence activities, R & D work and MOX fuel fabrication.

[2] At Dounreay fast reactor and materials testing reactor spent fuel reprocessing was carried out in the past. These activities were on a much smaller scale than those at Sellafield.

[3] Excludes waste from the activities of GE Healthcare Ltd.

[4] Berkeley Centre is now part of Berkeley Site.

Table A2.1: Volume at 1 April 2010 and estimated for future arisings (m^3)

Business activity			HLW	ILW	LLW	Total
Fuel fabrication & uranium enrichment		**Total**	**0**	**2.5**	**247,000**	**247,000**
		1.4.2010	0	0.66	2,190	**2,190**
		Future arisings	0	1.8	244,000	**244,000**
Nuclear power reactors	**Magnox**	**Total**	**0**	**58,800**	**497,000**	**556,000**
		1.4.2010	0	11,300	25,300	**36,600**
		Future arisings	0	47,500	471,000	**519,000**
	AGR	**Total**	**0**	**24,300**	**111,000**	**136,000**
		1.4.2010	0	2,990	560	**3,550**
		Future arisings	0	21,300	111,000	**132,000**
	PWR	**Total**	**0**	**4,470**	**16,800**	**21,300**
		1.4.2010	0	88	183	**271**
		Future arisings	0	4,380	16,600	**21,000**
Spent fuel reprocessing		**Total**	**1,020**	**171,000**	**3,260,000**	**3,430,000**
		1.4.2010	1,620	66,500	6,310	**74,400**
		Future arisings	-601	104,000	3,250,000	**3,360,000**
Nuclear energy R & D		**Total**	**0**	**15,400**	**196,000**	**211,000**
		1.4.2010	0	7,470	13,600	**21,100**
		Future arisings	0	7,930	182,000	**190,000**
Defence		**Total**	**0**	**11,700**	**52,200**	**63,900**
		1.4.2010	0	5,420	2,360	**7,780**
		Future arisings	0	6,290	49,800	**56,100**
Medical & Industrial		**Total**	**0**	**1,350**	**49,200**	**50,600**
		1.4.2010	0	599	15,500	**16,100**
		Future arisings	0	751	33,800	**34,500**
Total		**Total**	**1,020**	**287,000**	**4,430,000**	**4,720,000**
		1.4.2010	**1,620**	**94,300**	**66,000**	**162,000**
		Future arisings	**-601**	**192,000**	**4,360,000**	**4,550,000**

(1) Quantities are for untreated or partly treated waste, apart from conditioned wastes (i.e. waste streams with a /C in the identifier) where the conditioned volume is reported.

(2) Future arisings of HLW have negative volumes. This is because Sellafield has reported future arisings of HLW to show that the volume of accumulated waste (liquid plus vitrified product) will fall as liquid waste existing at 1.4.2010 and forecast in the future is conditioned to a vitrified product. Thus, the volume from spent fuel reprocessing of 1,620m^3 at 1.4.2010 is expected to fall by 601m^3, to 1,020m^3 when all liquid waste (plus IFP residues) has been conditioned.

Table A2.2: Wastes at 1 April 2010
Number of packages, packaged volume and conditioned volume

Business activity		At 1.4.2010	HLW	ILW	LLW	Total
Fuel fabrication & uranium enrichment		Number of packages	0	0	0	**0**
		Packaged volume	0	0	0	**0**
		Conditioned volume	0	0	0	**0**
Nuclear power reactors	**Magnox**	Number of packages	0	1,791	0	**1,791**
		Packaged volume	0	5,990	108	**6,100**
		Conditioned volume	0	3,330	86.4	**3,420**
	AGR	Number of packages	0	0	0	**0**
		Packaged volume	0	0	0	**0**
		Conditioned volume	0	0	0	**0**
	PWR	Number of packages	0	0	0	**0**
		Packaged volume	0	0	0	**0**
		Conditioned volume	0	0	0	**0**
Spent fuel reprocessing		Number of packages	5,108	40,402	0	**45,510**
		Packaged volume	1,000	23,300	0	**24,300**
		Conditioned volume	766	20,200	0	**21,000**
Nuclear energy R & D		Number of packages	0	4,378	434	**4,812**
		Packaged volume	0	3,750	8,480	**12,200**
		Conditioned volume	0	2,770	6,770	**9,550**
Defence		Number of packages	0	0	0	**0**
		Packaged volume	0	0	80.3	**80.3**
		Conditioned volume	0	0	64.2	**64.2**
Medical & Industrial		Number of packages	0	0	854	**854**
		Packaged volume	0	0	16,200	**16,200**
		Conditioned volume	0	0	14,900	**14,900**
Total		**Number of packages**	**5,108**	**46,571**	**1,288**	**52,967**
		Packaged volume	**1,000**	**33,000**	**24,900**	**58,900**
		Conditioned volume	**766**	**26,300**	**21,800**	**48,900**

(1) Package numbers and volumes are for those wastes that had been conditioned (i.e. waste streams with a /C in the identifier) and wastes that have been packaged for later conditioning. There were 763 ILW packages from spent fuel reprocessing, 328 ILW packages and 431 LLW packages from nuclear energy R & D with waste that is being stored unconditioned.

(2) The number of LLW packages excludes those in short-term storage before transfer to the LLWR. There were 854 packages being stored in vaults at the LLWR (reported under medical and industrial).

(3) ILW packages from Magnox nuclear power reactors include 1,716 1803-type drums. These drums are expected to be overpacked in 4m boxes (6 drums per box).

Table A2.3: All wastes when packaged
Number of packages, packaged volume and conditioned volume

Business activity		When all wastes at 1.4.2010 and future arisings are packaged	HLW	ILW	LLW	Total
Fuel fabrication & uranium enrichment		Number of packages	0	5.3	2,720	**2,730**
		Packaged volume	0	3.0	249,000	**249,000**
		Conditioned volume	0	2.5	245,000	**245,000**
Nuclear power reactors	**Magnox**	Number of packages	0	8,090	30,700	**38,700**
		Packaged volume	0	84,900	640,000	**725,000**
		Conditioned volume	0	71,300	580,000	**651,000**
	AGR	Number of packages	0	3,590	6,060	**9,650**
		Packaged volume	0	52,700	120,000	**173,000**
		Conditioned volume	0	38,000	105,000	**143,000**
	PWR	Number of packages	0	1,020	689	**1,710**
		Packaged volume	0	3,260	13,400	**16,700**
		Conditioned volume	0	2,440	10,700	**13,200**
Spent fuel reprocessing		Number of packages	6,770	181,000	12,300	**200,000**
		Packaged volume	1,330	302,000	3,170,000	**3,470,000**
		Conditioned volume	1,020	231,000	3,150,000	**3,380,000**
Nuclear energy R & D		Number of packages	0	20,800	7,130	**27,900**
		Packaged volume	0	34,400	244,000	**279,000**
		Conditioned volume	0	26,800	219,000	**246,000**
Defence		Number of packages	0	8,500	2,550	**11,000**
		Packaged volume	0	9,000	65,600	**74,600**
		Conditioned volume	0	6,940	55,700	**62,600**
Medical & Industrial		Number of packages	0	1,480	2,110	**3,590**
		Packaged volume	0	1,110	47,800	**48,900**
		Conditioned volume	0	915	41,600	**42,500**
Total		**Number of packages**	**6,770**	**225,000**	**64,300**	**296,000**
		Packaged volume	**1,330**	**488,000**	**4,550,000**	**5,030,000**
		Conditioned volume	**1,020**	**378,000**	**4,400,000**	**4,780,000**

ANNEX 3 WASTE VOLUMES FROM EACH SITE

This annex provides a breakdown of waste volumes and package numbers for HLW, ILW and LLW for each site and by site ownership. The site owners are:

- **Nuclear Decommissioning Authority (NDA)[1];**
- **EDF Energy;**
- **Ministry of Defence** (includes contractor owned and contractor operated sites)**;**
- **United Kingdom Atomic Energy Authority**
- **GE Healthcare Ltd;**
- **Urenco;**
- **Minor producers.**

Information is given in a number of tables, listed below.

Site Owner	Table(1-4)
All site owners (all wastes)	A3.1
All site owners (wastes at 1.4.2010) All site owners (all wastes)	A3.2 A3.3
By site (wastes at 1 April 2010 and all wastes)	A3.4

(1) Table A3.1 gives waste volume at 1 April 2010 and a consolidated estimate for future arisings.

(2) Table A3.2 gives the number of packages, packaged volume and conditioned volume existing at 1 April 2010.

(3) Table A3.3 gives the number of packages, packaged volume and conditioned volume once all wastes at 1 April 2010 and for future arisings have been packaged. LLW package numbers exclude those streams suitable for landfill disposal, as the UK Inventory does not compile information on waste packaging for this disposal route.

(4) Table A3.4 gives waste volume at 1 April 2010, and gives the number of packages, packaged volume and conditioned volume once all wastes at 1 April 2010 and for future arisings have been packaged. LLW package numbers exclude those streams suitable for landfill disposal, as the UK Inventory does not compile information on waste packaging for this disposal route.

[1] Includes the Harwell site, which is owned by UKAEA Ltd and leased to the NDA.

Table A3.1: Volume at 1 April 2010 and estimated for future arisings (m^3)

Site owner		HLW	ILW	LLW	Total
NDA	**Total**	**1,020**	**245,000**	**4,210,000**	**4,450,000**
	1.4.2010	1,620	85,300	61,500	**148,000**
	Future arisings	-601	160,000	4,140,000	**4,300,000**
Ministry of Defence	**Total**	**0**	**11,700**	**52,200**	**63,900**
	1.4.2010	0	5,420	2,360	**7,780**
	Future arisings	0	6,290	49,800	**56,100**
EDF Energy	**Total**	**0**	**28,800**	**128,000**	**157,000**
	1.4.2010	0	3,080	743	**3,820**
	Future arisings	0	25,700	128,000	**153,000**
United Kingdom Atomic Energy Authority	**Total**	**0**	**193**	**6,570**	**6,760**
	1.4.2010	0	30.	600	**630**
	Future arisings	0	163	5,970	**6,130**
GE Healthcare	**Total**	**0**	**728**	**24,000**	**24,800**
	1.4.2010	0	428	0	**428**
	Future arisings	0	299	24,000	**24,300**
Urenco	**Total**	**0**	**2.5**	**2,810**	**2,810**
	1.4.2010	0	0.7	231	**231.7**
	Future arisings	0	1.8	2,580	**2,580**
Minor Producers	**Total**	**0**	**97.5**	**7,500**	**7,590**
	1.4.2010	0	97.5	568	**666**
	Future arisings	0	0	6,930	**6,930**
Total	**Total**	**1,020**	**287,000**	**4,430,000**	**4,720,000**
	1.4.2010	**1,620**	**94,300**	**66,000**	**162,000**
	Future arisings	**-601**	**192,000**	**4,360,000**	**4,550,000**

(1) Quantities are for untreated or partly treated waste, apart from conditioned wastes (i.e. waste streams with a /C in the identifier) where the conditioned volume is reported.

(2) Future arisings of HLW have negative volumes. This is because the NDA Sellafield site has reported future arisings of HLW to show that the volume of accumulated waste (liquid plus vitrified product) will fall as liquid waste existing at 1.4.2010 and forecast in the future is conditioned to a vitrified product. Thus, the volume of 1,620m^3 at 1.4.2010 is expected to fall by 601m^3, to 1,020m^3, when all liquid waste (plus IFP residues) has been conditioned.

Table A3.2: Wastes at 1 April 2010
Number of packages, packaged volume and conditioned volume

Site owner	At 1.4.2010	HLW	ILW	LLW	Total
NDA	Number of packages	5,108	46,571	1,288	**52,967**
	Packaged volume	1,000	33,000	24,800	**58,800**
	Conditioned volume	766	26,300	21,700	**48,800**
Ministry of Defence	Number of packages	0	0	0	**0**
	Packaged volume	0	0	80.3	**80.3**
	Conditioned volume	0	0	64.2	**64.2**
EDF Energy	Number of packages	0	0	0	**0**
	Packaged volume	0	0	0	**0**
	Conditioned volume	0	0	0	**0**
United Kingdom Atomic Energy Authority	Number of packages	0	0	0	**0**
	Packaged volume	0	0	0	**0**
	Conditioned volume	0	0	0	**0**
GE Healthcare	Number of packages	0	0	0	**0**
	Packaged volume	0	0	0	**0**
	Conditioned volume	0	0	0	**0**
Urenco	Number of packages	0	0	0	**0**
	Packaged volume	0	0	0	**0**
	Conditioned volume	0	0	0	**0**
Minor Producers	Number of packages	0	0	0	**0**
	Packaged volume	0	0	0	**0**
	Conditioned volume	0	0	0	**0**
Total	**Number of packages**	**5,108**	**46,571**	**1,288**	**52,967**
	Packaged volume	**1,000**	**33,000**	**24,900**	**58,900**
	Conditioned volume	**766**	**26,300**	**21,800**	**48,900**

(1) Package numbers and volumes are for those wastes that had been conditioned (i.e. waste streams with a /C in the identifier). In addition there were 1,091 ILW packages with waste that is being stored unconditioned from NDA sites. The number of LLW packages at 1.4.2010 excludes those in short-term storage before transfer to the LLWR for disposal. There are 1,288 packages in longer-term storage, of which 854 are at the LLWR.

(2) ILW packages from NDA include 1,716 type 1803 drums. These drums are expected to be overpacked in 4m boxes (6 drums per box).

Table A3.3: All wastes when packaged
Number of packages, packaged volume and conditioned volume

Site owner	When all wastes at 1.4.2010 and future arisings are packaged	HLW	ILW	LLW	Total
NDA	Number of packages	6,770	210,000	53,600	**271,000**
	Packaged volume	1,330	421,000	4,310,000	**4,730,000**
	Conditioned volume	1,020	329,000	4,200,000	**4,530,000**
Ministry of Defence	Number of packages	0	8,500	2,550	**11,000**
	Packaged volume	0	9,000	65,600	**74,600**
	Conditioned volume	0	6,940	55,700	**62,600**
EDF Energy	Number of packages	0	4,610	6,750	**11,400**
	Packaged volume	0	55,900	134,000	**190,000**
	Conditioned volume	0	40,500	116,000	**157,000**
United Kingdom Atomic Energy Authority	Number of packages	0	101	458	**557**
	Packaged volume	0	817	8,100	**8,920**
	Conditioned volume	0	364	6,350	**6,710**
GE Healthcare	Number of packages	0	943	423	**1,370**
	Packaged volume	0	807	15,600	**16,400**
	Conditioned volume	0	654	13,900	**14,600**
Urenco	Number of packages	0	5.3	0	**5.3**
	Packaged volume	0	3.0	2,810	**2,810**
	Conditioned volume	0	2.5	2,810	**2,810**
Minor Producers	Number of packages	0	99.6	529	**629**
	Packaged volume	0	56.9	10,100	**10,100**
	Conditioned volume	0	40.0	8,030	**8,070**
Total	**Number of packages**	**6,770**	**225,000**	**64,300**	**296,000**
	Packaged volume	**1,330**	**488,000**	**4,550,000**	**5,030,000**
	Conditioned volume	**1,020**	**378,000**	**4,400,000**	**4,780,000**

Table A3.4 Location of wastes Volume at 1 April 2010 and quantities of all wastes when packaged

Location	Site owner	Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
				Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
Amersham	GE	ILW	161	525	341	278
		LLW	0	210	4,090	3,270
AWE Aldermaston	MoD	ILW	4,630	8,280	4,730	4,110
		LLW	998	2,150	41,900	33,500
BAESM Barrow-in-Furness	MoD	LLW	20	2	37.5	30
Berkeley	NDA	ILW	1,600	1,060	6,910	6,120
		LLW	298	1,540	30,300	27,800
Bradwell	NDA	ILW	918	477	5,770	5,110
		LLW	748	2,580	51,400	47,300
Calder Hall	NDA	ILW	2.9	472	9,410	5,140
		LLW	1,430	2,500	51,000	46,200
Capenhurst	NDA	LLW	1,860	2,640	5,580	2,690
	Urenco	ILW	0.7	6	3	2.5
		LLW	231	0	2,810	2,810
Cardiff	GE	ILW	267	419	466	377
		LLW	0	212	11,400	10,600
Chapelcross	NDA	ILW	310	415	6,230	5,740
		LLW	20,000	7,080	167,000	145,000
HMNB Clyde	MoD	LLW	6.5	40	770	616
Culham	UKAEA	ILW	30	101	817	364
		LLW	600	458	8,100	6,350
Defence Estates	MoD	LLW	38.7	3	55.6	44.5
RRMPOL Derby	MoD	LLW	30	101	1,960	1,570
HMNB Devonport	MoD	ILW	35.6	17	328	263
		LLW	488	85	17,600	17,300
DSDC North Donnington	MoD	LLW	20	7	125	100
Dounreay	NDA	ILW	4,090	12,900	11,300	9,450
		LLW	9,360	4,860	113,000	94,200
Dungeness (A & B)	NDA (A)	ILW	325	607	6,940	6,210
		LLW	789	1,750	34,900	32,000
	EDF (B)	ILW	446	592	7,080	5,120
		LLW	78.5	990	19,600	17,300
Eskmeals	MoD	LLW	76	6	101	81
Hartlepool	EDF	ILW	310	421	7,680	5,530
		LLW	37	746	14,700	12,700

Location	Site owner	Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
				Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
Harwell	NDA	ILW	2,130	2,540	6,870	5,240
		LLW	2,820	881	99,600	96,200
	GE	ILW	0.1	1.0	0.1	0.1
		LLW	0	3	40.4	32.3
Heysham (1 & 2)	EDF (1)	ILW	280	470	7,620	5,480
		LLW	99.1	772	15,200	13,100
	EDF (2)	ILW	298	514	7,670	5,530
		LLW	79	967	19,100	16,900
Hinkley Point (A & B)	NDA (A)	ILW	1,340	928	7,270	6,540
		LLW	520	2,860	57,400	52,700
	EDF (B)	ILW	600	494	7,340	5,310
		LLW	74.1	787	15,500	13,600
Hunterston (A & B)	NDA (A)	ILW	2,600	1,440	8,350	7,490
		LLW	949	2,880	57,600	53,300
	EDF (B)	ILW	839	697	8,030	5,840
		LLW	100	776	15,300	13,400
LLWR near Drigg	NDA	ILW	73	438	250	221
		LLW	14,900	1,160	22,100	19,600
NRTE Vulcan	MoD	ILW	8.5	8	156	124
		LLW	0	2	35.7	28.5
Oldbury	NDA	ILW	578	632	6,120	5,600
		LLW	23.3	1,660	32,900	29,500
HMNB Portsmouth	MoD	ILW	0.1	1.0	0.2	0.2
		LLW	9.2	1.0	17.9	14.4
Rosyth & Devonport (Submarines)	MoD	ILW	721	187	3,670	2,350
		LLW	652	146	2,840	2,270
Rosyth Royal Dockyard	MoD	ILW	16.8	6	116	92.8
		LLW	26.6	11	183	142
Sellafield (Sellafield Ltd)	NDA	HLW	1,620	6,770	1,330	1,020
		ILW	66,500	181,000	302,000	231,000
		LLW	6,310	12,300	3,160,000	3,140,000
Sellafield (NNL)	NDA	LLW	0	44	856	787
Sizewell (A & B)	NDA (A)	ILW	868	457	6,140	5,720
		LLW	231	1,890	38,700	36,100
	EDF (B)	ILW	88	1,020	3,260	2,440
		LLW	183	689	13,400	10,700
Springfields	NDA	LLW	98.8	83	240,000	240,000
Torness	EDF	ILW	221	404	7,260	5,220
		LLW	92	1,020	20,300	17,800
Trawsfynydd	NDA	ILW	1,980	865	13,400	9,770
		LLW	389	3,030	60,700	56,900

Location	Site owner	Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
				Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
Windscale	NDA	ILW	668	4,070	13,800	10,800
		LLW	17.8	280	12,100	13,600
Winfrith	NDA	ILW	538	1,160	1,590	904
		LLW	654	547	9,560	7,460
Wylfa	NDA	ILW	818	757	8,430	7,880
		LLW	149	2,980	59,500	54,800
MWP (Various Sites)	MWP	ILW	97.5	100	56.9	40
		LLW	568	530	10,100	8,030
Flasks & Flatrols (Magnox)	NDA	LLW	0	5	80.7	64.6
Flasks & Flatrols (AGR)	EDF	LLW	0	3	485	474

(1) Waste volumes at 1.4.2010 are for untreated or partly treated waste, apart from conditioned wastes (i.e. waste streams with a /C in the identifier) where the conditioned volume is reported.

(2) Berkeley Power Station and that part of Berkeley Centre originally containing the R&D active handling facilities are now combined as a single site known as Berkeley.

ANNEX 4 LIST OF WASTE STREAMS IN THE INVENTORY AND THEIR VOLUMES

The table below shows the number of waste streams in the 2010 Inventory for each waste type from each waste producer.

Number of waste streams in the 2010 Inventory

Site owner	HLW	ILW	LLW	Total
GE Healthcare Ltd	-	11	9	20
NDA	5	532	459	996
EDF Energy	-	81	125	206
Minor producers	-	2	3	5
MoD	-	25	56	81
Urenco	-	1	3	4
	5	**652**	**655**	**1,312**

All 1,312 waste streams in the 2010 Inventory are listed on the following pages in order of waste stream identifier. Each site is identified, together with the site owner and waste custodian. For sites with operational and decommissioning wastes, the operational waste streams are listed first. Some stream titles contain abbreviations; these are explained in the Glossary in Annex 5.

The following information is given for each waste stream: stream identifier; stream title; waste type; the volume of waste at 1 April 2010; the forecast total number of waste packages, the forecast total packaged volume and the forecast total conditioned volume when all wastes at 1 April 2010 and projected future arisings have been packaged.

The forecast number of waste packages, the packaged volume and the conditioned volume are determined from reported packaging plans. For waste streams where waste packaging plans are not yet fully defined, assumptions have been made so that package numbers, and packaged and conditioned volumes, can be estimated. These assumptions are given in Chapter 2.

The volume of waste at 1 April 2010 is the reported value in cubic metres (m^3) to 1 decimal place. Volumes of less than 0.05m^3 are displayed as "<0.1". The number of waste packages and the packaged and conditioned volumes for all wastes at 1 April 2010 and future arisings are calculated values given to 3 significant figures, or, for values below 10, to the nearest 0.1. Fractional package numbers are not rounded up to the nearest whole number. This would overestimate the number of packages, particularly as small volume waste streams of the same type and the same or similar composition at a site will be packaged together.

Total volumes and package numbers are zero for waste streams that are to be incinerated or recycled, or where arisings are not estimated.

Package numbers for waste streams that fall into the VLLW sub-category of LLW and are to be consigned to landfill sites for disposal are reported as zero (as the UK Inventory does not include packaging information for these wastes).

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
GE Healthcare Limited – GE Healthcare Ltd - Amersham						
1A01	LLW Compactable Drummable	LLW	0	24.2	471	377
1A02	LLW Non-Compactable Drummable	LLW	0	53.3	1,040	832
1A03	LLW Non-Compactable Non-Drummable	LLW	0	113	2,210	1,760
1A04	LLW Non-Compactable Drummable (Spoil)	LLW	0	19.2	375	300
1A07	ILW	ILW	124.0	476	272	222
1A08	Decay Stored Waste	ILW	16.0	2.2	43.0	34.4
1A09	Incinerated Waste	LLW	0	0	0	0
1A10	ILW Containing Radium	ILW	20.0	42.9	24.5	20.0
1A11	Sealed Sources	ILW	1.3	2.8	1.6	1.3
GE Healthcare Limited – GE Healthcare Ltd – Cardiff						
1B02	LLW Non-Compactable Drummable	LLW	0	0	3,300	3,300
1B03	LLW Non-Compactable Non-Drummable	LLW	0	212	4,120	3,300
1B04	ILW Containing Tritium Excluding Free Liquid	ILW	167.5	10.9	212	170
1B05	ILW Containing Carbon-14 Excluding Free Liquid	ILW	45.0	101	57.6	47.0
1B07	ILW Containing Tritium and Carbon-14	ILW	13.5	276	157	129
1B08	Incinerated Waste	ILW	11.6	0	0	0
1B09	Very Low Level Waste	LLW	0	0	4,000	4,000
1B10	ILW Containing Carbon-14 Free Liquid	ILW	13.0	30.0	17.2	14.0
1B11	ILW Containing Tritium Free Liquid	ILW	16.5	1.1	21.9	17.5
GE Healthcare Limited - GE Healthcare Ltd - Harwell						
1C01	High Beta/Gamma Sources	ILW	0.1	0.1	0.1	0.1
1C02	Miscellaneous Low Level Waste	LLW	0	2.1	40.4	32.3
Nuclear Decommissioning Authority - Sellafield Ltd - Calder Hall						
2A01	Redundant Activated Control Rods ILW	ILW	2.9	3.0	14.1	5.1
2A04	Calder Hall LLW Lagging	LLW	120.0	8.0	156	134
2A06	Redundant Activated Control Rods LLW	LLW	7.6	1.0	19.5	8.2
2A07	Redundant Fuel Transport Flasks & Liners	LLW	27.2	6.0	117	93.4
2A30	Waste Oils	LLW	72.0	0	0	0
2A100	Care & Maintenance : General Reactor LLW	LLW	0	3.0	58.4	53.7
2A910	Care and Maintenance Preparation (Reactor LLW)	LLW	0	576	11,200	10,300
2A911	C&M Preparation; Control Rod Mechanism Workshop Dismantling LLW	LLW	0	8.3	162	149
2A914	C&M Preparations Calder Hall Lagging - HVVLLW	LLW	1,200.0	0	1,200	1,200
2A303	Final Dismantling & Site Clearance : Graphite LLW	LLW	0	0.4	7.8	7.0
2A304	Final Dismantling & Site Clearance : Mild Steel (Reactor) LLW	LLW	0	503	10,100	9,050
2A305	Final Dismantling & Site Clearance : Stainless Steel (Reactor) LLW	LLW	0	0.4	7.4	6.7
2A306	Final Dismantling & Site Clearance : Mild Steel (Non-Reactor) LLW	LLW	0	261	5,240	4,710
2A307	Final Dismantling & Site Clearance Concrete (Reactor & Non-Reactor) LLW	LLW	0	1,020	20,500	18,400
2A308	Final Dismantling & Site Clearance: Misc Metals & Materials (Reactor and Non-Reactor) LLW	LLW	0	44.5	891	801
2A309	Final Dismantling & Site Clearance : Secondary Wastes LLW	LLW	0	68.7	1,380	1,240
2A310	Final Dismantling & Site Clearance : Graphite ILW	ILW	0	387	7,750	4,250
2A311	Final Dismantling & Site Clearance : Mild Steel (Reactor) ILW	ILW	0	70.0	1,400	765

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
2A312	Final Dismantling & Site Clearance : Stainless Steel (Reactor) ILW	ILW	0	9.0	180	93.6
2A313	Final Dismantling & Site Clearance : Miscellaneous Metal (Reactor) ILW	ILW	0	3.0	60.1	24.8
Nuclear Decommissioning Authority - Sellafield Ltd - Capenhurst						
2B03	Empty Uranium Hexafluoride Containers	LLW	54.5	129	1,680	803
2B17	Incinerator Ash and Sorbent - HVVLLW	LLW	0.5	3.0	0.6	0.5
2B102	Capenhurst Decommissioning Waste - Tc Contaminated LLW	LLW	1.8	1.0	19.5	2.6
2B103	Capenhurst Decommissioning Waste - Tc Contaminated HVVLLW	LLW	567.2	1,710	360	341
2B107	Capenhurst Decommissioning Waste - Tc Free LLW	LLW	1.8	2.0	39.0	2.4
2B108	Capenhurst Decommissioning Waste - Tc Free HVVLLW	LLW	194.7	706	148	120
2B109	Tritium Contaminated Building Materials - HVVLLW	LLW	1,038.0	87.0	3,330	1,420
Nuclear Decommissioning Authority - Magnox North Ltd - Chapelcross						
2C01	Ion Exchange Resins AW500 (Zeolite)	ILW	37.8	37.5	97.9	90.1
2C02	Miscellaneous Activated Components, Activated Liners	ILW	1.5	0.4	2.0	1.5
2C03	Miscellaneous Reactor Components Stored dry	ILW	13.0	3.7	17.5	13.0
2C05	Sludge	ILW	8.0	6.7	17.4	16.0
2C06	Ceramic Pellets	ILW	12.0	25.8	14.7	12.0
2C07	Contaminated Plant Components (CXPP Cave Line)	ILW	5.0	2.9	9.6	7.9
2C08	Hydraulic Fluid	LLW	0.9	0.1	1.1	0.9
2C10	Chapelcross Process Plant Tritiated Waste	LLW	57.0	11.5	224	179
2C11	Reactor and Associated Areas LLW	LLW	810.5	60.8	1,190	948
2C12	Cartridge Cooling Ponds LLW	LLW	21.4	1.8	34.3	27.5
2C13	Large Items from Reactor Areas	LLW	1,224.0	111	2,170	1,740
2C14	Large Items from Ponds	LLW	71.9	7.2	140	112
2C15	Rotary Pump Oil	ILW	0.3	2.0	6.5	5.4
2C16	UO3 Contaminated Low Level Waste	LLW	28.6	1.0	18.8	15.0
2C18	Miscellaneous Beta/Gamma Waste (CXPP Magnox/Aluminium)	ILW	0.2	0.1	0.2	0.2
2C20	Fuel Skips in Pond	ILW	186.0	11.9	233	186
2C22	Pond Skip Decontamination Sludge	ILW	0	1.7	4.3	4.0
2C23	Desiccant	ILW	15.0	15.0	39.1	36.0
2C27	Miscellaneous Activated Reactor Components - Magnox / Steel Chips	ILW	<0.1	<0.1	<0.1	<0.1
2C28	Miscellaneous Reactor Components stored wet	ILW	7.0	5.0	16.4	13.5
2C29	Vacuum Furnaces	ILW	0.6	0.2	0.7	0.6
2C30	Uranium Furnaces	ILW	0.7	0.3	0.8	0.7
2C31	Cobalt Cartridges	ILW	1.0	0.4	1.2	1.0
2C32	CEGB Cartridges (Bradwell)	ILW	0.2	0.1	0.2	0.2
2C33	Activated Charcoal	LLW	0	0	0	0
2C34	Spark Arrestors	ILW	1.5	0.6	1.8	1.5
2C35	Tritiated Mercury	ILW	<0.1	<0.1	<0.1	<0.1
2C36	Chapelcross Process Plant Product Containers	ILW	1.7	0.6	2.1	1.7
2C37	CXPP Delay Tank Sludges	ILW	0.2	0.1	0.2	0.2
2C38	Miscellaneous Activated Reactor Components	ILW	18.6	1.1	23.0	21.7
2C100	Care & Maintenance : General Reactor LLW	LLW	0	4.5	87.1	69.7
2C920	Care and Maintenance Preparation (Reactor LLW)	LLW	6,786.0	3,590	70,100	56,100
2C921	Care and Maintenance Preparation Ponds LLW	LLW	2,254.0	810	15,800	12,600
2C922	Care and Maintenance Preparation (Pipeline Concrete LLW)	LLW	0	270	5,270	4,220

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
2C923	Care and Maintenance Preparation (Pipeline Steel LLW)	LLW	0	22.5	439	351
2C924	Care and Maintenance Preparation (North Site LLW)	LLW	357.8	186	3,630	2,910
2C925	Care and Maintenance Preparation (Chapelcross Processing Plant Dismantling) LLW	LLW	343.9	160	3,120	2,500
2C926	Care and Maintenance Preparation (Chapelcross Processing Plant Dismantling ILW)	ILW	0	14.3	46.8	38.6
2C927	Contaminated Asbestos VLLW	LLW	0	0	3,200	3,200
2C928	Tritium Contaminated Asbestos VLLW	LLW	8,000.0	0	25,000	25,000
2C929	Pipeline Lime Scale	LLW	3.6	0.9	17.6	14.0
2C930	Reactor VLLW	LLW	0	0	0	0
2C303	Final Decommissioning Contaminated Soil	LLW	0	61.7	1,240	1,170
2C304	Final Dismantling & Site Clearance : Graphite LLW	LLW	0	0.4	7.4	7.0
2C305	Final Dismantling & Site Clearance : Mild Steel (Reactor) LLW	LLW	0	382	7,650	7,210
2C306	Final Dismantling & Site Clearance : Stainless Steel (Reactor) LLW	LLW	0	0.3	6.2	5.8
2C307	Final Dismantling & Site Clearance : Mild Steel (Non-Reactor) LLW	LLW	0	261	5,240	4,930
2C308	Final Dismantling & Site Clearance : Concrete (Reactor and Non-Reactor) LLW	LLW	0	1,020	20,500	19,300
2C309	Final Dismantling & Site Clearance : Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	36.5	732	690
2C310	Final Dismantling & Site Clearance : Secondary Wastes LLW	LLW	0	68.8	1,380	1,300
2C311	Final Dismantling & Site Clearance : Graphite ILW	ILW	0	225	4,510	4,250
2C312	Final Dismantling & Site Clearance : Mild Steel (Reactor) ILW	ILW	0	48.3	967	912
2C313	Final Dismantling & Site Clearance : Stainless Steel (Reactor) ILW	ILW	0	8.5	170	92.8
2C314	Final Dismantling & Site Clearance : Miscellaneous Metal (Reactor) ILW	ILW	0	2.2	44.7	24.4
Nuclear Decommissioning Authority - Sellafield Ltd - Sellafield						
2D02	High Level Liquid Waste	HLW	849.9	0	0	0
2D02/C	Vitrified High Level Waste - Magnox	HLW	379.2	3,210	629	482
2D03	Plutonium Contaminated Materials; Drums	ILW	4,960.0	2,380	1,360	1,200
2D06	Plutonium Contaminated Materials; Crates and Filters	ILW	4,297.0	1,810	1,030	912
2D07	Pile Fuel Cladding and Miscellaneous Solid Waste	ILW	3,231.0	2,470	8,160	5,320
2D08	Magnox Cladding and Miscellaneous Solid Waste	ILW	3,450.0	3,850	12,700	8,270
2D09	Magnox Cladding and Miscellaneous Solid Waste	ILW	2,850.0	3,180	10,500	6,830
2D11	Pond Sludge	ILW	323.0	308	1,020	647
2D12	Miscellaneous Solid Waste in Pond and Bays	ILW	326.0	160	529	344
2D13	Ion Exchange Material in Skips (AW500)	ILW	303.9	184	607	396
2D14	Miscellaneous Beta/Gamma Waste	ILW	2,232.5	1,350	4,460	2,910
2D16	Magnox Fuel Storage Pond Sludge	ILW	1,169.0	1,170	3,860	2,460
2D17	Cemented Wastes in Skips	ILW	62.0	37.5	124	80.7
2D18	Settling Pond Sludge	ILW	40.0	76.0	251	163
2D19	Aluminium-Ferric Floc from Effluent Treatment	ILW	5,497.1	0	0.1	0.1
2D21	Stored Miscellaneous Beta/Gamma Active Solid Waste	ILW	330.0	120	396	336
2D22	Magnox Cladding and Miscellaneous Solid Waste	ILW	1,040.0	1,160	3,830	2,490
2D23	Filters in Concrete Box	ILW	16.0	5.7	18.9	16.0
2D24	Magnox Cladding and Miscellaneous Solid Waste	ILW	1,370.0	1,530	5,040	3,280
2D25	Miscellaneous Solid Waste	ILW	395.0	440	1,450	947
2D26	Ion Exchange Material (Clinoptilolite) and Sand	ILW	946.0	2,800	9,230	6,010
2D27/C	Encapsulated Floc from Effluent Treatment	ILW	6,789.5	25,600	14,600	12,800

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
2D30	Waste Oils	LLW	107.4	0	0	0
2D31	Redundant Transport Flasks Magnox Fuel	LLW	110.8	1.0	19.5	6.2
2D33	Fuel Handling Plant Sludges	ILW	12.5	38.9	128	83.7
2D34	Sludge from Sand Filters and Transfers	ILW	823.0	2,140	7,060	4,600
2D35	Magnox Cladding and Miscellaneous Solid Waste	ILW	738.0	823	2,720	1,770
2D35/C	Encapsulated Retrieved Magnox Cladding	ILW	1,204.9	2,470	1,410	1,200
2D38/C	Encapsulated Magnox Cladding	ILW	7,805.6	21,200	12,100	10,400
2D39	Miscellaneous Beta/Gamma Waste Store	ILW	2,670.5	1,530	7,210	5,370
2D39.3	Magnox Fuel Storage Pond Bay ILW to MBGWS	ILW	0	105	494	368
2D42	Magnox Pond Furniture	ILW	0	69.0	1,350	1,230
2D43	Pond Skips	LLW	1,246.0	38.9	759	698
2D45	Magnox Fuel End Crops	ILW	27.6	16.7	55.1	35.9
2D55	Stored Filters	ILW	14.0	5.0	16.5	14.0
2D57	Hydrocyclone Solids from Effluent Treatment	ILW	1.8	10.3	5.9	4.8
2D58	Uranium Residues in Pile Fuel Storage Pond	ILW	39.2	19.3	63.6	41.4
2D59	Magnox Fuel End Crops	ILW	21.0	12.7	42.0	27.3
2D72	Sludge Settling Tank	ILW	36.3	69.0	228	148
2D73	Miscellaneous Beta/Gamma Waste in Voids	ILW	10.0	11.2	36.8	24.0
2D74	Pile Fuel Storage Pond Ion Exchange Material	ILW	0.8	5.5	18.2	11.9
2D76/C	Encapsulated Retrieved Pond Sludge	ILW	0.5	1.0	0.6	0.5
2D77/C	Encapsulated Retrieved Miscellaneous Beta/Gamma Waste	ILW	0.5	1,000	571	501
2D78	Decanner Settling Tank Sludge	ILW	35.0	35.1	116	73.6
2D79	Magazines in Magnox Fuel Storage Pond	ILW	36.5	22.1	72.9	47.5
2D83/C	Encapsulated Plutonium Contaminated Materials	ILW	1,068.0	2,120	1,210	1,070
2D85.3/C	SPP1 Secondary Waste ILW	ILW	0	24.0	79.2	51.6
2D86.3/C	BEP Secondary Waste ILW	ILW	0	44.0	145	94.6
2D87.1.3/C	SDP Secondary Waste	ILW	0	2,050	6,760	4,410
2D87.2.3/C	SWR Secondary ILW	ILW	0	687	2,270	1,480
2D90	Plutonium Contaminated Materials; Drums	ILW	3,887.8	3,280	1,870	1,660
2D100	Pile chimney decommissioning waste	ILW	39.4	14.1	46.4	39.4
2D108	Miscellaneous Plants Initial/Interim Decommissioning: Ponds	LLW	0	143	2,790	2,570
2D109	Miscellaneous Plants Initial/Interim Decommissioning: Processing Plants, Tanks, Silos etc.	LLW	0	1,600	31,200	28,700
2D110	Miscellaneous Plants Initial/Interim Decommissioning: Product Stores	LLW	0	71.9	1,400	1,290
2D111	Plutonium Plants Initial/Interim Decommissioning: Processing Plants	LLW	0	99.7	1,940	1,790
2D112	Plutonium Plants Initial/Interim Decommissioning: Stores	LLW	0	1.1	22.3	20.5
2D113	Uranium Plants Initial/Interim Decommissioning: Processing Plants	LLW	0	7.6	148	136
2D115	Miscellaneous Plants Initial/Interim Decommissioning: Ponds	ILW	0	569	1,880	1,540
2D116	Miscellaneous Plants Initial/Interim Decommissioning: Processing Plants, Tanks, Silos etc.	ILW	0	29,600	97,600	79,900
2D117	Miscellaneous Plants Initial/Interim Decommissioning: Product Stores	ILW	0	152	502	410
2D118	Plutonium Plants Initial/Interim Decommissioning: Processing Plants	ILW	0	219	723	590
2D120	Uranium Plants Initial/Interim Decommissioning: Processing Plants	ILW	0	160	528	431
2D122	Miscellaneous Plants Final Decommissioning: Ponds	LLW	0	122	2,390	2,190

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
2D123	Miscellaneous Plants Final Decommissioning: Processing Plants, Tanks, Silos, etc.	LLW	0	2,300	44,800	41,200
2D124	Miscellaneous Plants Final Decommissioning: Product Stores	LLW	0	482	9,400	8,640
2D125	Plutonium Plants Final Decommissioning: Processing Plants	LLW	0	43.8	854	785
2D126	Plutonium Plants Final Decommissioning: Stores	LLW	0	76.0	1,480	1,360
2D127	Uranium Plants Final Decommissioning: Processing Plants	LLW	0	21.5	418	385
2D130	Miscellaneous Plants Initial/Interim Decommissioning: Processing Plants, Tanks, Silos, etc (PCM)	ILW	0	8,820	5,030	4,450
2D132	Plutonium Plants Initial/Interim Decommissioning: Processing Plants (PCM)	ILW	0	5,730	3,270	2,890
2D136	Miscellaneous Plants Final Decommissioning: Ponds	ILW	0	219	723	589
2D137	Miscellaneous Plants Final Decommissioning: Processing Plants, Tanks, Silos, etc.	ILW	0	11,000	36,300	29,700
2D148	HVVLLW from Final Decommissioning	LLW	0	0	2,860,000	2,860,000
Nuclear Decommissioning Authority - Springfields Fuels Ltd - Springfields						
2E15	Drummed Waste for Disposal at LLW Repository	LLW	7.8	1.0	19.8	15.8
2E90	General Waste for Clifton Marsh Disposal	LLW	0	0	34,800	34,800
2E91	Process Wastes for Clifton Marsh	LLW	82.0	0	910	910
2E101	Decommissioning LLW	LLW	9.0	81.9	1,600	1,280
2E191	Decommissioning Wastes for Clifton Marsh Disposal	LLW	0	0	203,000	203,000
Nuclear Decommissioning Authority - Sellafield Ltd - Sellafield						
2F01/C	Vitrified High Level Waste	HLW	387.0	3,060	601	460
2F02	Plutonium Contaminated Materials; Drums	ILW	131.4	127	72.6	64.2
2F03/C	Encapsulated AGR Cladding	ILW	954.0	3,410	1,940	1,730
2F04/C	Encapsulated LWR Cladding	ILW	1,530.6	3,360	1,920	1,710
2F06/C	Encapsulated Barium Carbonate Slurry/MEB Crud	ILW	356.4	1,010	575	476
2F07	AGR Graphite Fuel Assembly Components	ILW	3,984.2	24,400	13,900	6,580
2F08	AGR Stainless Steel Fuel Assembly Components	ILW	541.0	2,820	1,610	801
2F10/C	Encapsulated Centrifuge Cake	ILW	431.9	1,280	732	606
2F14	AGR Pond Furniture (Containers, Skips, Racks)	LLW	0	0	5,070	4,220
2F15	LWR Pond Furniture (MEBs)	ILW	0	445	8,680	7,980
2F17	Redundant Excellox Flasks	LLW	1,139.2	4.0	78.0	68.5
2F18	Redundant TN Flasks	LLW	668.7	3.0	58.5	37.5
2F20	LWR Pond Furniture (Racks and Frames) from First Generation Oxide Storage Pond	LLW	0	176	3,440	3,160
2F21/C	Encapsulated Maintenance Scrap	ILW	80.5	240	137	120
2F22/C	High Level Contaminated Waste	HLW	0	45.0	8.8	6.8
2F26	LWR Pond Sludge	ILW	16.8	57.9	33.0	27.0
2F27	AGR Pond Sludge	ILW	4.9	17.1	9.8	8.0
2F31	Oxide Fuel Hulls from Early Reprocessing	ILW	74.4	83.0	274	178
2F34	Plutonium Contaminated Materials; Drums	ILW	245.2	216	123	109
2F35	Excellox-Type Transport Flasks and French-Design Dry Flasks	LLW	82.7	2.0	32.5	12.9
2F37	Oxide Fuel Transport Flasks & Basket Transfer Containers	LLW	0	0.7	12.8	11.8
2F38/C	Vitrified High Level Waste from POCO	HLW	0	450	88.2	67.5
2F39	LWR Pond Furniture (Racks and Frames) from Thorp Receipt and Storage Pond	LLW	1,485.3	0	0	0
2F40	Fuel Support Frames	LLW	17.7	4.0	78.0	53.8
2F41	LWR Pond Furniture (MEBs) in Interim Storage	LLW	1,345.5	388	7,570	7,570
2F42/C	Encapsulated MEP, Thorp and WEP POCO	ILW	0	722	412	361

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
Nuclear Decommissioning Authority - LLW Repository Ltd - LLWR (near Drigg)						
2N01	Plutonium Contaminated Material; Drummed (Original Inventory)	ILW	47.0	39.2	22.4	19.7
2N03	Plutonium Contaminated Material; Drummed (Operational Soft Waste)	ILW	26.0	55.0	31.4	27.7
2N04	LLW from PCM Operations	LLW	0	7.2	141	113
2N05/C	Vault Eight LLW	LLW	10,525.0	604	11,400	10,500
2N06	LLW from Site LLW Operations	LLW	0	297	5,800	4,640
2N07/C	Vault Nine LLW	LLW	4,358.0	250	4,740	4,360
2N100	Plutonium Contaminated Material; Drummed (Decommissioning Hard Waste)	ILW	0	343	196	173
Nuclear Decommissioning Authority – National Nuclear Laboratory Ltd - Sellafield						
2P02	BTC Rig Hall	LLW	0	7.8	152	140
2P03	BTC Level 3 Laboratories and Other General Active Areas	LLW	0	19.0	370	340
2P04	BTC Alpha Development Laboratories	LLW	0	7.4	145	133
2P05	BTC HA Cells	LLW	0	9.7	190	174
Nuclear Decommissioning Authority – Sellafield Ltd - Windscale						
2S09	Waste from P.I.E. Operations	ILW	20.8	38.0	179	133
2S10/C	WAGR Stringer Graphite Debris - Conditioned	ILW	28.8	5.0	59.0	28.8
2S11	Windscale Uranic Residues	ILW	0.2	0.5	0.3	0.2
2S302	Windscale Pile1 and Pile 2 Graphite and Aluminium Charge Pans	ILW	0	1,930	6,360	5,210
2S303	Windscale Pile 2 LLW	LLW	0	121	2,360	2,160
2S304	Windscale Piles Fuel and Isotopes	ILW	0.1	252	144	126
2S307/C	Conditioned Windscale Advanced Gas-Cooled Reactor (WAGR) Decommissioning LLW	LLW	17.3	3.0	35.6	17.3
2S308/C	Conditioned WAGR Decommissioning ILW	ILW	610.6	107	1,260	616
2S309	AGR Examination Caves LLW	LLW	0	8.0	156	746
2S310	AGR Examination Caves ILW	ILW	0	1.8	36.8	20.0
2S311	Other Facilities Decommissioning LLW	LLW	0.5	148	2,890	3,980
2S312	Other Facilities Decommissioning ILW	ILW	1.0	72.0	254	223
2S313	Windscale Piles Miscellaneous ILW	ILW	6.8	1,660	5,480	4,480
2S314	WAGR - HVVLLW	LLW	0	0	6,660	6,660
2S315	Pile 1 & 2 Interim Store Decommissioning - HVVLLW	LLW	0	0	0	0
Nuclear Decommissioning Authority - Sellafield Ltd - Sellafield						
2X01	PCM Stores and WTC LLW	LLW	0	504	9,820	9,030
2X02	Magnox Plutonium Finishing Lines & Plutonium Stores LLW	LLW	0	24.1	471	433
2X03	Decontamination Centre LLW	LLW	0	24.8	484	445
2X05	Site Clearance LLW	LLW	0	1,170	22,800	21,000
2X05/1	SEP Surface Drainage System Solids and Lagoon Sediment LLW	LLW	0	87.7	1,710	1,570
2X07	Demolition of Development Centre B and Ancilliary buildings	LLW	0	9.8	190	175
2X08	Reprocessing Plant LLW (excluding PS1 and Dissolver Tower Area)	LLW	0	114	2,210	2,040
2X09	Reprocessing Plant: PS1 and Dissolver Tower Area LLW	LLW	0	10.8	212	195
2X10	Reprocessing Plant: Thermal Denitration Plant Area and UO3 Rework Facility LLW	LLW	0	111	2,160	1,990

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
2X11	Reprocessing Plant: MA Evaporator Area	LLW	0	33.6	655	602
2X14	Separation Area Change Rooms LLW	LLW	0	118	2,310	2,120
2X15	HLW Plants: HA Evaporation & Storage LLW	LLW	0	153	2,990	2,750
2X16	Low Active Effluent Management Group: Salt Evaporator LLW	LLW	0	131	2,550	2,340
2X17	Low Active Effluent Management Group: MA Tanks LLW	LLW	0	5.8	113	104
2X18	Low Active Effluent Management Group: LA Treatment & Sludge Tanks	LLW	0	19.8	386	355
2X19	Low Active Effluent Management Group: LA Effluent Treatment Plant and SETP	LLW	0	19.8	386	355
2X20	Magnox Ponds West: Magnox Storage Pond and Decanning Facility	LLW	0	515	10,000	9,240
2X21	Magnox Ponds West: Magnox Flask Maintenance LLW	LLW	0	44.8	873	803
2X22	Calder LLW	LLW	0	67.0	1,310	1,200
2X25	Ponds East River: Fuel Handling Plant LLW	LLW	0	298	5,810	5,340
2X26	Ponds East River: SIXEP LLW	LLW	0	83.3	1,620	1,490
2X27	Ponds East River: AGR Dismantler & Store LLW	LLW	0	80.8	1,570	1,450
2X29	LWR Storage Pond	LLW	0	77.9	1,520	1,400
2X30	AGR Storage Pond	LLW	0	51.9	1,010	930
2X31	Oxide Ponds: THORP Flask Maintenance LLW	LLW	0	16.8	327	301
2X32	THORP Receipt & Storage LLW	LLW	0	139	2,710	2,490
2X35	MEP LLW	LLW	0	17.7	346	318
2X36	WEP LLW	LLW	0	21.0	409	376
2X37	Miscellaneous Beta Gamma Waste Store LLW	LLW	0	18.0	351	323
2X39	WVP: Vitrification Process LLW	LLW	0	236	4,610	4,230
2X49	Safety Equipment Workshop and Medium and High Active Laundry Waste	LLW	0	279	5,440	5,010
2X50	New Effluent Plants	LLW	0	89.9	1,750	1,610
2X51	Feed Pond LLW	LLW	0	3.5	67.6	62.2
2X52	Head End LLW	LLW	0	34.7	676	622
2X53	Uranium Purification/Finishing LLW	LLW	0	12.7	247	227
2X54	Plutonium Purification/Finishing LLW	LLW	0	13.0	254	233
2X55	Uranium (IV) LLW	LLW	0	1.7	33.8	31.1
2X57	Chemical Separation Effluents LLW	LLW	0	13.9	270	249
2X59	Mixed Trash from MDF	LLW	0	4.2	81.9	75.3
2X61	WAMAC LLW	LLW	0	24.0	468	431
2X62	SMP LLW (Uranium Areas)	LLW	0	3.7	72.0	66.2
2X64	SMP LLW (MOX)	LLW	0	78.2	1,520	1,400
2X66	Dosimetry Services LLW	LLW	0	1.0	19.5	12.0
2X68	Analytical Services Facilities	LLW	0	345	6,720	6,180
2X71	Solvent Treatment Plant LLW	LLW	0	12.0	235	216
2X72	Oxide Transport Containers (Baskets and Stools)	LLW	0	17.2	336	343
2X74	Mixed Oxide Areas of MDF	LLW	0	1.7	33.0	30.3
2X80	Railways Monitoring & Decontamination Facilities LLW	LLW	0	4.0	78.6	72.3
2X83	Low Active Drain (LAD) Zone 4	LLW	0	2.0	39.0	22.4
2X90	Tank Farm Contaminated Soils and Gravel SLLW	LLW	0	2.0	39.0	18.6
2X106	Contaminated Land and Groundwater Monitoring Project LLW	LLW	0	19.0	370	332
2X114	Caesium Extraction Plant Decommissioning	LLW	0	1.0	19.5	15.9
2X115	Pile Chimney Decommissioning	LLW	0	92.6	1,810	1,660
2X116	PFR Plant Decommissioning	LLW	0	44.0	858	788
2X117	Pond Decommissioning	LLW	0	110	2,150	1,980
2X118	Purification Plant (Shutdown) - Decommissioning	LLW	0	4.2	81.9	75.3
2X119	Thorp Miniature Pilot Plant Clearance and Decommissioning	LLW	0	37.2	726	667
2X122	Research & Development Laboratories 54 & 54A	LLW	0	1.0	19.5	9.1

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
2X124	Pile Fuel Storage Silo Retrievals Project	LLW	0	93.9	1,830	1,680
2X125	Silo Decommissioning	LLW	0	385	7,510	6,910
2X127	Workshop & Incident Control Centre	LLW	0	24.4	477	438
2X131	Stored Miscellaneous Beta/Gamma Active Solid Waste	LLW	110.0	14.9	291	267
2X133	Magnox Sludge Settling and Transfer Facility LLW	LLW	0	6.0	117	91.1
2X140	Miscellaneous Demolition Waste	LLW	0	23.9	466	428
2X301	Pile 1 LLW	LLW	0	144	2,810	2,590
2X302	Mixed Trash from WAGR , PIE Work and Supporting Operations	LLW	0	171	3,330	3,070
2X307	WAGR Decommissioning LLW	LLW	0	84.8	1,650	1,520
2X927	Wheelabrator Operations LLW	LLW	0	10.0	195	517
Nuclear Decommissioning Authority - Sellafield Ltd - Sellafield						
2Y02	SDP Operational LLW	LLW	0	171	3,320	2,660
2Y06	BEP Operational LLW	LLW	0	43.0	839	671
2Y07	BEPPS 1-4 Operational LLW	LLW	0	14.6	284	227
2Y09	SPP1 Operational LLW	LLW	0	10.9	213	170
2Y49	Analytical Services Process Facilities - Laboratory 188C	LLW	0	5.0	98.0	78.4
2Y50	Analytical Services Process Facilities - Laboratory 195	LLW	0	1.6	31.1	28.6
2Y51	Analytical Services Process Facilities - North Labs	LLW	0	0.1	1.5	1.4
2Y52	Separation Area Ventilation Plant Construction	LLW	0	1.0	19.5	0.4
2Y53	Separation Area Ventilation Plant Decommissioning	LLW	0	7.8	152	139
2Y55	Island SIte Creation - Legacy & HWLWP - Island Site Preparation Works	LLW	0	33.0	644	586
2Y56	Analytical Services Process Facilities - LA Labs	LLW	0	12.5	244	224
2Y57	Excavated Soil and Putrescible Waste - High Volume Very Low Level Waste (HVVLLW)	LLW	0	0	55,300	55,300
EDF Energy - British Energy Generation - Dungeness B						
3J01	Ion Exchange Material	ILW	27.9	170	96.8	79.7
3J02	Sludge	ILW	11.5	71.2	40.7	33.5
3J03	Miscellaneous Contaminated Items	ILW	2.0	3.7	12.1	10.0
3J04	Desiccants ILW	ILW	80.0	26.2	511	409
3J09	Miscellaneous Activated Components	ILW	8.0	1.0	19.0	13.6
3J11	Reactor Vessel Internals and Dry Fuel Route LLW	LLW	20.0	12.6	245	196
3J12	General Reactor LLW	LLW	38.0	29.5	576	461
3J13	Wet Fuel Route LLW	LLW	20.0	12.4	242	194
3J19	Catalysts LLW	LLW	0.5	0.4	8.0	6.4
3J20	Catalysts ILW	ILW	1.0	0.2	4.3	3.4
3J21	Fuel Stringer Debris	ILW	315.9	49.3	987	705
3J110	Care & Maintenance Preparations: Stainless Steel LLW	LLW	0	33.0	643	514
3J111	Care & Maintenance Preparations: Mild Steel LLW	LLW	0	54.0	1,050	843
3J112	Care & Maintenance Preparations: Secondary Waste LLW	LLW	0	74.0	1,440	1,150
3J113	Care & Maintenance Preparations: Miscellaneous Metals and Materials LLW	LLW	0	41.3	804	644
3J114	Care & Maintenance: Miscellaneous Materials LLW	LLW	0	5.0	97.6	78.1
3J311	Decommissioning Stage 3: Stainless Steel (Reactor) ILW	ILW	0	1.3	26.3	18.8
3J312	Decommissioning Stage 3: Mild Steel (Reactor) ILW	ILW	0	33.1	662	473
3J313	Decommissioning Stage 3: Graphite ILW	ILW	0	236	4,720	3,370
3J314	Decommissioning Stage 3: Stainless Steel (Reactor) LLW	LLW	0	184	3,690	3,470
3J315	Decommissioning Stage 3: Mild Steel (Reactor) LLW	LLW	0	219	4,390	4,140
3J317	Decommissioning Stage 3: Graphite LLW	LLW	0	113	2,260	2,130

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
3J318	Stage 3 Decommissioning: Concrete (Reactor and Non-Reactor) LLW	LLW	0	56.2	1,130	1,060
3J319	Stage 3 Decommissioning: Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	3.9	79.0	74.5
3J320	Stage 3 Decommissioning: Secondary Wastes LLW	LLW	0	151	2,940	2,350
EDF Energy - British Energy Generation - Hartlepool						
3K01	Pond Water Ion Exchange Material	ILW	3.3	24.5	14.0	11.5
3K02	Active Effluent Filtration Sludges	LLW	0	0.5	10.5	8.4
3K03	Miscellaneous Contaminated Items	ILW	0	1.5	4.8	4.0
3K04	Desiccant	ILW	67.6	23.9	465	372
3K09	Miscellaneous Activated Components - Mixed Items	ILW	14.4	1.7	34.8	24.8
3K10	Fuel Stringer Debris - Steel & Nimonic	ILW	65.1	7.9	158	113
3K14	Gas Circulator LLW	LLW	12.8	4.6	89.2	71.4
3K15	Dry Fuel Route LLW	LLW	11.6	3.9	75.2	60.2
3K16	Wet Fuel Route LLW	LLW	9.8	9.3	181	145
3K17	Incinerator Ash	LLW	2.0	1.1	21.9	17.5
3K18	Pond Water Filtration Sludge	ILW	2.9	11.2	6.4	5.3
3K20	Gas Circulator Maintenance Sludge	LLW	0.8	0.1	2.0	1.6
3K22	Catalyst	ILW	2.2	0.2	4.6	3.7
3K23	Miscellaneous Activated Components - Control Rods	ILW	0.5	<0.1	0.8	0.6
3K24	Miscellaneous Activated Components - Spalled Oxide & Dust	ILW	8.6	1.0	19.0	13.6
3K25	Fuel Stringer Debris - Graphite & Associated Metals	ILW	145.1	16.8	337	240
3K26	Laundry LLW	LLW	0	0.3	6.8	5.4
3K110	Care & Maintenance Preparations: Stainless Steel LLW	LLW	0	21.1	411	329
3K111	Care & Maintenance Preparations: Mild Steel LLW	LLW	0	144	2,810	2,250
3K112	Care & Maintenance Preparations: Secondary Waste LLW	LLW	0	66.7	1,300	1,040
3K113	Care & Maintenance Preparations: Miscellaneous Metals and Materials LLW	LLW	0	54.2	1,060	846
3K114	Care & Maintenance: Miscellaneous Materials LLW	LLW	0	5.0	97.3	77.8
3K311	Decommissioning Stage 3: Stainless Steel (Reactor) ILW	ILW	0	18.0	359	257
3K312	Decommissioning Stage 3: Mild Steel (Reactor) ILW	ILW	0	17.1	343	245
3K313	Decommissioning Stage 3: Graphite ILW	ILW	0	296	5,940	4,240
3K314	Decommissioning Stage 3: Stainless Steel (Reactor) LLW	LLW	0	81.4	1,630	1,540
3K315	Decommissioning Stage 3: Mild Steel (Reactor) LLW	LLW	0	94.9	1,900	1,790
3K317	Decommissioning Stage 3: Graphite LLW	LLW	0	30.2	605	570
3K318	Stage 3 Decommissioning: Concrete (Reactor and Non-Reactor) LLW	LLW	0	111	2,220	2,090
3K319	Stage 3 Decommissioning: Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	3.9	78.0	73.5
3K320	Stage 3 Decommissioning: Secondary Wastes LLW	LLW	0	114	2,220	1,770
EDF Energy - British Energy Generation - Heysham 1						
3L01	Pond Water Ion Exchange Material	ILW	8.3	59.5	34.0	28.0
3L02	Pond Water Filtration Sludge	ILW	3.3	16.7	9.5	7.8
3L03	Miscellaneous Contaminated Items	ILW	5.0	4.8	15.8	13.0
3L04	Desiccant	ILW	49.0	18.9	368	294
3L09	Miscellaneous Activated Components - Mixed Items	ILW	10.3	1.2	24.5	17.5
3L10	Fuel Stringer Debris - Steel and Nimonic	ILW	55.7	7.0	141	101
3L11	Dry Fuel Route LLW	LLW	12.6	5.4	105	84.1
3L12	Wet Fuel Route LLW	LLW	6.1	11.4	222	178
3L13	General Reactor LLW	LLW	23.3	10.3	201	161

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
3L14	Incinerator Ash	LLW	1.0	0.7	13.7	10.9
3L15	Active Effluent Ion Exchange Material	LLW	5.2	0.4	8.5	6.8
3L16	Active Effluent Filtration Sludges	LLW	50.9	4.0	78.6	62.9
3L17	Gas Circulator Maintenance Sludge	ILW	1.2	8.3	4.8	3.9
3L18	Fuelling Machine Maintenance Sludge	ILW	0.5	2.1	1.2	1.0
3L19	Catalyst	ILW	3.0	0.2	3.9	3.1
3L20	Miscellaneous Activated Components - Control Rods	ILW	0.2	2.3	45.3	32.4
3L21	Miscellaneous Activated Components - Spalled Oxide and Dust	ILW	7.1	0.8	16.6	11.8
3L22	Fuel Stringer Debris - Graphite and Associated Metals	ILW	136.1	15.9	319	228
3L110	Care & Maintenance Preparations: Stainless Steel LLW	LLW	0	21.1	411	329
3L111	Care & Maintenance Preparations: Mild Steel LLW	LLW	0	152	2,970	2,370
3L112	Care & Maintenance Preparations: Secondary Waste LLW	LLW	0	54.7	1,070	854
3L113	Care & Maintenance Preparations: Miscellaneous Metals and Materials LLW	LLW	0	52.2	1,020	814
3L114	Care & Maintenance: Miscellaneous Materials LLW	LLW	0	5.0	97.4	77.9
3L311	Decommissioning Stage 3: Stainless Steel (Reactor) ILW	ILW	0	18.0	360	257
3L312	Decommissioning Stage 3: Mild Steel (Reactor) ILW	ILW	0	17.1	343	245
3L313	Decommissioning Stage 3: Graphite ILW	ILW	0	296	5,930	4,240
3L314	Decommissioning Stage 3: Stainless Steel (Reactor) LLW	LLW	0	81.4	1,630	1,540
3L315	Decommissioning Stage 3: Mild Steel (Reactor) LLW	LLW	0	94.9	1,900	1,790
3L317	Decommissioning Stage 3: Graphite LLW	LLW	0	30.2	605	570
3L318	Stage 3 Decommissioning: Concrete (Reactor and Non-Reactor) LLW	LLW	0	110	2,210	2,080
3L319	Stage 3 Decommissioning: Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	3.9	78.0	73.5
3L320	Stage 3 Decommissioning: Secondary Wastes LLW	LLW	0	134	2,610	2,090
EDF Energy - British Energy Generation - Heysham 2						
3M01	Pond Ion Exchange Material	ILW	1.1	14.0	8.0	6.6
3M02	Pond Water Filter Sludge	ILW	11.4	50.0	28.5	23.5
3M03	Miscellaneous Contaminated Items	ILW	1.0	1.9	6.1	5.0
3M04	Desiccant	ILW	55.8	28.8	562	450
3M06	Miscellaneous Activated Components	ILW	10.9	1.9	37.4	26.7
3M07	Fuel Stringer Debris - Steel and Nimonic	ILW	68.6	10.6	213	152
3M08	Active Effluent Ion Exchange Material	ILW	0.2	9.8	5.6	4.6
3M09	Active Effluent Filters Sludge	ILW	6.5	50.6	28.9	23.8
3M10	Oily Sludge	ILW	0.8	8.2	4.7	3.8
3M13	Wet Fuel Route - Low Level Waste	LLW	11.0	15.2	296	237
3M14	Gas Circulator Maintenance - Low Level Waste	LLW	9.0	2.6	51.6	41.3
3M15	Waste Sorting - Low Level Waste	LLW	22.0	6.7	131	105
3M17	Catalysts	ILW	0	1.1	22.1	17.7
3M18	Fuel Stringer Debris - Graphite	ILW	141.7	21.4	429	306
3M19	Reactors and Dry Fuel Route - Low Level Waste	LLW	37.0	20.0	390	312
3M110	Care & Maintenance Preparations: Stainless Steel LLW	LLW	0	24.1	469	375
3M111	Care & Maintenance Preparations: Mild Steel LLW	LLW	0	67.6	1,320	1,050
3M112	Care & Maintenance Preparations: Secondary Waste LLW	LLW	0	86.8	1,690	1,350
3M113	Care & Maintenance Preparations: Miscellaneous Metals and Materials LLW	LLW	0	56.9	1,110	887
3M114	Care & Maintenance: Miscellaneous Materials LLW	LLW	0	4.9	96.2	77.0
3M311	Decommissioning stage 3: Stainless Steel (Reactor) ILW	ILW	0	11.6	232	165
3M312	Decommissioning Stage 3: Mild Steel (Reactor) ILW	ILW	0	47.8	957	683

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
3M313	Decommissioning Stage 3: Graphite ILW	ILW	0	256	5,130	3,660
3M314	Decommissioning Stage 3: Stainless Steel (Reactor) LLW	LLW	0	74.7	1,500	1,410
3M315	Decommissioning Stage 3: Mild Steel (Reactor) LLW	LLW	0	219	4,380	4,120
3M317	Decommissioning Stage 3: Graphite LLW	LLW	0	43.6	873	823
3M318	Stage 3 decommissioning: Concrete (Reactor and Non-Reactor) LLW	LLW	0	190	3,800	3,580
3M319	Stage 3 Decommissioning: Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	37.0	740	698
3M320	Stage 3 Decommissioning: Secondary Wastes LLW	LLW	0	118	2,310	1,850
EDF Energy - British Energy Generation - Hinkley Point B						
3N01	Ion Exchange Material	ILW	9.5	57.5	32.8	27.0
3N02	Sludge	ILW	21.3	72.4	41.4	34.0
3N04	Desiccants and Catalysts	ILW	160.4	35.7	697	558
3N09	Miscellaneous Activated Components	ILW	68.9	7.4	147	105
3N10	Fuel Stringer Debris: Steel and Nimonic	ILW	221.2	23.6	473	338
3N12	Gas Circulator LLW	LLW	10.0	7.7	151	121
3N13	Wet Fuel Route LLW	LLW	25.0	17.0	331	265
3N14	General Reactor LLW	LLW	30.0	30.0	586	469
3N15	Dry Fuel Route LLW	LLW	5.0	3.1	60.0	48.0
3N16	Decontamination LLW	LLW	0.1	0.8	15.7	12.6
3N17	Fuel Stringer Debris: Graphite	ILW	118.7	12.7	254	181
3N33	Incinerator Ash	LLW	1.0	0.3	4.9	3.9
3N34	Waste Sorting - LLW	LLW	3.0	2.9	57.0	45.6
3N110	Care & Maintenance Preparations: Stainless Steel LLW	LLW	0	13.1	256	205
3N111	Care & Maintenance Preparations: Mild Steel LLW	LLW	0	41.5	809	647
3N112	Care & Maintenance Preparations: Secondary Waste LLW	LLW	0	71.7	1,400	1,120
3N113	Care & Maintenance Preparations: Miscellaneous Metals and Materials LLW	LLW	0	52.4	1,020	817
3N114	Care & Maintenance: Miscellaneous Materials LLW	LLW	0	5.1	98.5	78.8
3N311	Decommissioning Stage 3: Stainless Steel (Reactor) ILW	ILW	0	15.9	319	228
3N312	Decommissioning Stage 3: Mild Steel (Reactor) ILW	ILW	0	48.5	971	693
3N313	Decommissioning Stage 3: Graphite ILW	ILW	0	220	4,410	3,150
3N314	Decommissioning Stage 3: Stainless Steel (Reactor) LLW	LLW	0	84.6	1,700	1,600
3N315	Decommissioning Stage 3: Mild Steel (Reactor) LLW	LLW	0	160	3,210	3,030
3N317	Decommissioning Stage 3: Graphite LLW	LLW	0	31.1	623	587
3N318	Stage 3 Decommissioning: Concrete (Reactor and Non-Reactor) LLW	LLW	0	71.9	1,440	1,360
3N319	Stage 3 Decommissioning: Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	57.5	1,150	1,090
3N320	Stage 3 Decommissioning: Secondary Wastes LLW	LLW	0	135	2,630	2,110
EDF Energy - British Energy Generation - Sizewell B						
3S03	Spent Cartridge Filters (ILW)	ILW	20.0	264	151	132
3S04	Sludges and Concentrates	LLW	13.0	3.4	66.3	53.0
3S05	Miscellaneous Contaminated Items	ILW	40.0	88.9	291	240
3S06	Spent Resins (LLW)	LLW	100.0	134	2,620	2,100
3S07	Station Maintenance and Operations LLW	LLW	60.0	35.0	683	547
3S08	Secondary Cartridge Filters (LLW)	LLW	10.0	4.2	81.9	65.5
3S09	Miscellaneous Activated Components	ILW	6.0	3.4	67.1	47.9
3S12	CVCS Resins and Spent Resins (ILW)	ILW	22.0	546	312	273
3S101	Decommissioning: Station Maintenance LLW	LLW	0	4.2	81.7	65.4
3S301	Decommissioning: Mild Steel LLW	LLW	0	242	4,720	3,770

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
3S302	Decommissioning: Mild Steel ILW	ILW	0	107	2,150	1,540
3S303	Decommissioning: Concrete LLW	LLW	0	47.1	919	735
3S304	Decommissioning: Secondary Wastes LLW	LLW	0	192	3,740	2,990
3S305	Decommissioning: Stainless Steel LLW	LLW	0	26.3	512	410
3S306	Decommissioning: Stainless Steel ILW	ILW	0	11.9	239	171
3S307	Decommissioning: Concrete ILW	ILW	0	2.7	54.4	38.8
EDF Energy - British Energy Generation - Flasks & Flatrols						
3Z202	AGR Fuel Transport Flasks	LLW	0	0	428	428
3Z203	Rail Flatrols	LLW	0	2.9	57.1	45.7
EDF Energy - British Energy Generation - Hunterston B						
4B01	Ion Exchange Resin and Sand	ILW	18.8	171	97.4	80.1
4B04	Sludge	ILW	21.0	133	75.7	62.3
4B06	Desiccants and Catalysts	ILW	245.0	51.3	1,000	800
4B11	Miscellaneous Activated Components	ILW	553.9	57.8	1,160	826
4B12	Wet Fuel Route LLW	LLW	10.0	10.1	197	158
4B13	General Reactor LLW	LLW	85.0	32.8	640	512
4B14	Laundry LLW	LLW	5.0	11.5	225	180
4B110	Care & Maintenance Preparations: Stainless Steel LLW	LLW	0	10.9	213	170
4B111	Care & Maintenance Preparations: Mild Steel LLW	LLW	0	35.8	697	558
4B112	Care & Maintenance Preparations: Secondary Waste LLW	LLW	0	72.8	1,420	1,140
4B113	Care & Maintenance Preparations: Miscellaneous Metals and Materials LLW	LLW	0	51.8	1,010	808
4B114	Care & Maintenance: Miscellaneous Materials LLW	LLW	0	5.1	98.7	79.0
4B311	Decommissioning Stage 3: Stainless Steel (Reactor) ILW	ILW	0	15.9	319	228
4B312	Decommissioning Stage 3: Mild Steel (Reactor) ILW	ILW	0	48.5	971	693
4B313	Decommissioning Stage 3: Graphite ILW	ILW	0	220	4,410	3,150
4B314	Decommissioning Stage 3: Stainless Steel (Reactor) LLW	LLW	0	84.6	1,700	1,600
4B315	Decommissioning Stage 3: Mild Steel (Reactor) LLW	LLW	0	160	3,210	3,030
4B317	Decommissioning Stage 3: Graphite LLW	LLW	0	31.1	623	587
4B318	Stage 3 Decommissioning: Concrete (Reactor and Non-Reactor) LLW	LLW	0	71.9	1,440	1,360
4B319	Stage 3 Decommissioning: Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	57.5	1,150	1,090
4B320	Stage 3 Decommissioning: Secondary Wastes LLW	LLW	0	139	2,710	2,170
EDF Energy - British Energy Generation - Torness						
4C01	Catalyst	LLW	0	1.5	30.0	24.0
4C02	Desiccant	ILW	37.0	21.2	414	331
4C03	Pond Water Filtration Resin	ILW	4.3	41.5	23.7	19.5
4C05	Active Effluent Filtration Sludge	LLW	5.0	4.6	89.4	71.5
4C06	Active Effluent Filtration Resin	LLW	2.0	0.9	18.4	14.7
4C12	Miscellaneous Activated Items	ILW	180.0	29.3	586	418
4C13	Active Effluent and Workshop LLW	LLW	35.0	34.5	672	537
4C16	Dry Fuel Route LLW	LLW	40.0	22.7	443	354
4C17	Wet Fuel Route LLW	LLW	10.0	23.6	460	368
4C110	Care & Maintenance Preparations: Stainless Steel LLW	LLW	0	23.6	461	369
4C111	Care & Maintenance Preparations: Mild Steel LLW	LLW	0	69.5	1,360	1,080
4C112	Care & Maintenance Preparations: Secondary Waste LLW	LLW	0	93.6	1,830	1,460
4C113	Care & Maintenance Preparations: Miscellaneous Metals and Materials LLW	LLW	0	63.5	1,240	990
4C114	Care & Maintenance: Miscellaneous Materials LLW	LLW	0	4.8	93.4	74.7

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
4C311	Decommissioning Stage 3: Stainless Steel (Reactor) ILW	ILW	0	11.6	232	165
4C312	Decommissioning Stage 3: Mild Steel (Reactor) ILW	ILW	0	43.5	871	622
4C313	Decommissioning Stage 3: Graphite ILW	ILW	0	256	5,130	3,660
4C314	Decommissioning Stage 3: Stainless Steel (Reactor) LLW	LLW	0	74.7	1,500	1,410
4C315	Decommissioning Stage 3: Mild Steel (Reactor) LLW	LLW	0	219	4,380	4,120
4C317	Decommissioning Stage 3: Graphite LLW	LLW	0	43.6	873	823
4C318	Stage 3 decommissioning: Concrete (Reactor and Non-Reactor) LLW	LLW	0	190	3,800	3,580
4C319	Stage 3 Decommissioning: Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	37.0	740	698
4C320	Stage 3 Decommissioning: Secondary Wastes LLW	LLW	0	118	2,310	1,850
Nuclear Decommissioning Authority – Dounreay Site Restoration Ltd - Dounreay						
5B01	PFR Raffinate	ILW	206.5	702	401	358
5B02	Low Alpha RHILW	ILW	0	695	397	350
5B03	Operational RHILW	ILW	219.0	820	468	410
5B04	MTR Raffinate	ILW	290.0	0	0	0
5B04/C	Cemented MTR Raffinate	ILW	1,571.0	4,760	2,720	2,380
5B05	DFR Raffinate	ILW	213.8	842	481	429
5B15	Supercompactable Operational LLW	LLW	38.8	39.2	764	611
5B15/C	Compacted LLW	LLW	3,572.4	229	4,470	3,570
5B16	Bulk Operational LLW	LLW	0	30.3	590	472
5B16/C	Conditioned Bulk Operational LLW	LLW	842.4	54.0	1,050	842
5B19	Uranium Contaminated Materials	ILW	61.4	124	70.7	49.5
5B20	Contaminated Solvent and Oils	LLW	137.4	0	0	0
5B22	ADU Floc	ILW	184.0	697	398	348
5B24	Operational CHILW	ILW	813.8	823	470	329
5B25	Historic High Beta Gamma Storage Facility (Contents)	ILW	0	1,310	748	655
5B26	LLLETP Sludge	LLW	18.3	1.5	29.4	23.5
5B27	Thorium Nitrate	ILW	12.4	172	98.1	85.9
5B28	Graphite/THTR Waste	ILW	88.6	354	202	177
5B29	LSA Scale	ILW	232.0	35.0	701	644
5B32	Irradiated Thorium Fuel Pin Pieces	ILW	<0.1	6.7	3.8	3.3
5B33	PFR Mixer Breeder Sections	ILW	0	28.0	16.0	14.0
5B34	DFR Breeder Fuel Removal Waste	ILW	0	11.0	6.3	5.5
5B301	Prototype Fast Reactor LLW	LLW	3.6	737	14,400	11,500
5B301/C	Conditioned Prototype Fast Reactor, LLW	LLW	811.2	52.0	1,010	811
5B302	Prototype Fast Reactor ILW	ILW	2.8	335	1,020	822
5B303	Dounreay Fast Reactor LLW	LLW	3.2	213	4,150	3,320
5B303/C	Conditioned Dounreay Fast Reactor LLW	LLW	187.2	12.0	234	187
5B304	Dounreay Fast Reactor ILW	ILW	0	336	1,430	1,090
5B305	Site Drains and Ducts LLW	LLW	0	130	2,530	2,030
5B305/C	Site Drains and Ducts Conditioned LLW	LLW	312.0	20.0	390	312
5B307	PFR Reprocessing Plant LLW	LLW	11.6	33.3	650	520
5B308	PFR Reprocessing Plant ILW	ILW	15.2	160	91.4	78.3
5B309	Materials Test Reactor LLW	LLW	0	32.3	630	504
5B309/C	Conditioned Materials Test Reactor LLW	LLW	31.2	2.0	39.0	31.2
5B310	Materials Test Reactor ILW	ILW	0	2.0	40.1	26.5
5B311	Development Laboratory LLW	LLW	4.8	12.5	243	195
5B311/C	Conditioned Development Laboratory LLW	LLW	15.6	1.0	19.5	15.6
5B312	Development Laboratory ILW	ILW	108.4	129	73.5	53.4
5B313	HAL Store and Evaporation Plant LLW	LLW	0	24.5	478	382

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
5B314	HAL Store and Evaporation Plant ILW	ILW	0	345	1,240	1,000
5B315	MTR Reprocessing Plant LLW	LLW	0	8.2	161	128
5B315/C	Conditioned MTR Reprocessing Plant LLW	LLW	31.2	2.0	39.0	31.2
5B316/C	Conditioned Pu Laboratory LLW	LLW	312.0	20.0	390	312
5B317	Pu Laboratory ILW	ILW	18.0	18.0	10.3	7.2
5B323	Decommissioning Contaminated Soil	LLW	260.0	1,510	29,500	23,600
5B325	DFR Ion Exchange Columns	ILW	0	10.0	5.7	5.0
5B326	MTR Reprocessing Plant ILW	ILW	1.6	5.0	2.8	2.3
5B327	Waste Treatment Complex Decommissioning LLW	LLW	0	30.6	596	477
5B327/C	Conditioned Waste Treatment Complex Decommissioning LLW	LLW	46.8	3.0	58.5	46.8
5B328	Waste Treatment Complex Decommissioning ILW	ILW	0	2.8	40.4	27.4
5B329	CHILW Retrievable Drum Store LLW	LLW	0	3.5	68.8	55.1
5B330	CHILW Retrievable Drum Store ILW	ILW	0	0.5	0.3	0.2
5B331	RHILW Retrievable Drum Store LLW	LLW	1.5	19.8	386	309
5B332	RHILW Retrievable Drum Store ILW	ILW	0	18.0	10.3	8.2
5B333	DCP Vault Store and Extension LLW	LLW	0	28.2	550	440
5B334	DCP Vault Store and Extension ILW	ILW	0	26.7	15.2	13.3
5B335	Analytical Laboratories LLW	LLW	0.4	30.6	596	477
5B335/C	Conditioned Analytical Laboratories LLW	LLW	124.8	8.0	156	125
5B336	Analytical Laboratories ILW	ILW	17.2	23.5	13.4	9.5
5B337	Decontamination and Waste Services LLW	LLW	10.8	19.4	379	303
5B337/C	Conditioned Decontamination and Waste Services LLW	LLW	187.2	12.0	234	187
5B338	Decontamination and Waste Services ILW	ILW	11.6	11.8	6.7	4.7
5B339	PIE Facility LLW	LLW	3.6	0.2	3.1	2.5
5B339/C	Conditioned PIE Facility LLW	LLW	31.2	2.0	39.0	31.2
5B340	PIE Facility ILW	ILW	5.0	12.3	7.0	6.0
5B341	Pu Fuels Examination Facility LLW	LLW	0	4.7	92.4	74.0
5B342	Pu Fuels Examination Facility ILW	ILW	2.0	67.8	38.7	29.0
5B343	Other Facilities Decommissioning LLW	LLW	2.8	16.5	322	258
5B344	Other Facilities Decommissioning ILW	ILW	2.8	2.8	1.6	1.1
5B345	Service Corridor and Tank Farm LLW	LLW	0	0.9	18.1	14.5
5B347/C	Conditioned MTR Fuel Fabrication Plant LLW	LLW	78.0	5.0	97.5	78.0
5B348	Effluent Treatment Plant LLW	LLW	0.6	147	2,870	2,300
5B349	Uranium Recovery Plant LLW	LLW	20.4	48.1	938	750
5B349/C	Conditioned Uranium Recovery Plant LLW	LLW	140.4	9.0	176	140
5B350	Uranium Recovery Plant ILW	ILW	2.0	4.6	2.6	1.8
5B351	Changerooms LLW	LLW	0	<0.1	0.1	0.1
5B352	Waste Receipt, Assay, Characterisation and Supercompaction Facility LLW	LLW	0	7.1	138	110
5B354	PFR SDP Ion Exchange Columns	ILW	3.6	18.0	10.3	9.0
5B355	Demolition LLW	LLW	2,120.0	0	18,400	18,400
5B356	PFR Absorbers	ILW	3.3	6.0	3.4	3.0
5B357	DFR Pond Ion Exchange Columns	ILW	0	8.0	4.6	4.0
5B358	Previously Disposed LLW to be Retreived	LLW	0	1,290	25,200	20,200
Nuclear Decommissioning Authority – Research Sites Restoration Ltd - Harwell						
5C08	ILW Sea Disposal Packages	ILW	968.4	273	1,190	968
5C18/C	Encapsulated ILW Liquors	ILW	28.5	57.0	32.5	28.5
5C30	Harwell Remote Handled ILW	ILW	146.0	469	268	188
5C33	Harwell Contact Handled ILW	ILW	807.7	809	2,920	2,260
5C38	Radiochemical Lab Operational LLW	LLW	10.4	1.2	22.5	18.0
5C39	Operational LLW	LLW	64.3	39.5	770	616
5C41	Operational LLW Sludge	LLW	6.0	1.3	24.4	19.5

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
5C45	GLEEP Fuel	ILW	1.9	43.2	24.7	17.3
5C46	Uranic Residues	ILW	5.1	11.5	6.6	5.1
5C47	Organic Wastes	LLW	10.0	0	0	0
5C49	Ionium Sludge	ILW	0.9	14.1	8.0	7.0
5C50	Dragon Fuel	ILW	3.4	8.5	4.9	3.4
5C51	LLW Sea Disposal Drums	LLW	54.8	5.5	107	85.5
5C52	Processed RHILW	ILW	164.0	410	234	164
5C53	Stored Legacy LLW Sludges	LLW	18.9	3.2	61.4	49.1
5C53/C	Encapsulated LLW Sludges	LLW	13.0	2.2	42.3	33.8
5C54	Zenith Fuel	ILW	1.0	3.1	1.8	1.2
5C300	High Volume Low Activity Waste from Decommissioning and Site Remediation	LLW	1,000.0	0	82,500	82,500
5C301	BEPO Research Reactor LLW	LLW	0	56.0	1,090	874
5C302	BEPO Research Reactor ILW	ILW	0	92.0	941	806
5C303	Radiochemical Building Decommissioning LLW	LLW	22.8	117	2,290	1,830
5C304	Radiochemical Laboratory Decommissioning RHILW & CHILW	ILW	0	239	540	439
5C305	Dido Reactor Decommissioning LLW	LLW	0	20.8	405	324
5C306	Dido Reactor Decommissioning ILW	ILW	0.2	30.9	304	120
5C307	Pluto Reactor Decommissioning LLW	LLW	0	21.5	419	335
5C308	Pluto Reactor Decommissioning ILW	ILW	0	24.1	238	93.5
5C309	Minor Decommissioning LLW Arisings	LLW	77.5	65.8	1,280	1,030
5C310	Decommissioning Other Facilities ILW	ILW	0	56.4	167	137
5C311	GLEEP LLW	LLW	1,500.0	96.2	1,880	1,500
5C312	Western Storage area LLW	LLW	40.0	5.6	108	86.7
5C313	Co60 Ponds Decommissioning LLW	LLW	0	10.0	195	156
5C314	LETP decommissioning LLW	LLW	0	159	3,090	2,470
5C315	Active Handling Facility Decommissioning LLW	LLW	0	23.7	462	370
5C316	Solid Waste Complex Decommissioning LLW	LLW	0	253	4,920	3,940
Nuclear Decommissioning Authority – Research Sites Restoration Ltd - Winfrith						
5G01	Miscellaneous Reactor Hardware ILW	ILW	0.8	1.8	18.2	6.2
5G03/C	Conditioned SGHWR Sludges	ILW	534.0	1,070	610	534
5G04	Miscellaneous ILW	ILW	0	0.3	0.1	0.1
5G10	ILW Sea Disposal Packages	ILW	3.3	0.3	3.6	3.3
5G16	Operational LLW	LLW	0	12.1	201	155
5G300	Winfrith Contaminated Land	LLW	355.0	29.8	581	465
5G301	SGHWR Decommissioning LLW	LLW	0	329	5,540	4,290
5G302	SGHWR Decommissioning ILW	ILW	0	75.0	767	255
5G303	Dragon Reactor Decommissioning LLW	LLW	0	65.6	1,110	854
5G304	Dragon Reactor Decommissioning ILW	ILW	0	19.0	194	105
5G307	Other Facilities Decommissioning LLW	LLW	298.5	109	2,130	1,700
United Kingdom Atomic Energy Authority - United Kingdom Atomic Energy Authority - Culham						
5H06	LLW Soft Compactable Materials	LLW	50.0	8.7	169	135
5H07	LLW Hard Non-Compactable Materials	LLW	550.0	91.4	1,190	850
5H08	ILW Hard Non-Compactable Materials	ILW	10.0	21.5	12.3	10.0
5H09	ILW Soft Compactable Materials	ILW	20.0	4.5	46.5	20.5
5H301	JET Decommissioning Non-Activated ILW	ILW	0	15.2	155	68.3
5H302	JET Decommissioning Tritiated Non-Activated LLW	LLW	0	50.9	966	768
5H304	JET Decommissioning Tritiated Activated LLW	LLW	0	127	2,280	1,790
5H305	JET Decommissioning Concrete LLW	LLW	0	179	3,500	2,800

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
5H306	JET Decommissioning Activated ILW	ILW	0	59.0	603	265
5H307	LLW Organic Waste	LLW	0	0	0	0
Minor Waste Producers - Minor Waste Producers - Harwell						
6C31	NDS Contact Handled ILW	ILW	97.0	98.1	56.0	39.4
6C32	NDS Remote Handled ILW	ILW	0.5	1.5	0.9	0.6
6C37	National Disposal Service LLW	LLW	14.4	2.7	52.7	42.1
Minor Waste Producers - Minor Waste Producers - Various sites						
6H02	LLW (Minor Users)	LLW	0	503	9,400	7,440
Minor Waste Producers - Minor Waste Producers - Sheffield						
6J01	Contaminated Slag and Other Materials	LLW	554.0	23.0	636	554
Ministry of Defence - AWE plc - AWE Aldermaston						
7A07	Effluent Sludges/Floc	LLW	475.0	79.2	1,540	1,240
7A13	Sea Disposal Packs (Coffins)	ILW	478.0	1,020	581	478
7A21	Operational ILW Plutonium Contaminated	ILW	1,835.0	1,850	1,050	923
7A22	Operational ILW Tritium Hard Waste	ILW	27.0	22.5	12.8	11.3
7A23	Operational LLW Above the LLWR Limit	LLW	164.0	10.9	213	170
7A24	Operational LLW Suitable for Disposal at the LLWR - Depleted/Natural Uranium	LLW	0	39.1	762	610
7A25	Operational Tritiated LLW Suitable for Disposal at the LLWR	LLW	0	22.3	434	347
7A26	Operational LLW Suitable for Disposal at the LLWR - Enriched Uranium	LLW	0	73.7	1,440	1,150
7A27	Operational LLW Suitable for Disposal at the LLWR - Plutonium	LLW	0	865	16,900	13,500
7A28	Operational LLW Suitable for Disposal at the LLWR - Miscellaneous Radionuclides	LLW	0	24.1	470	376
7A29	Uranium Contaminated Operations ILW	ILW	130.0	151	86.1	75.4
7A31	Operational ILW Tritiated (Water)	ILW	7.0	12.3	7.0	6.1
7A32	LLW Closed Sources	LLW	1.5	0.9	17.7	14.2
7A33	Radioactive Contaminated Land	LLW	348.0	343	6,680	5,340
7A34	LLW Contaminated Oil	LLW	5.6	0.8	16.5	13.2
7A35	ILW Contaminated Oil	ILW	21.3	0	0	0
7A36	Pyrochemical Wastes	ILW	21.0	45.1	25.7	21.0
7A37	Contaminated Mercury	LLW	4.4	0	0	0
7A39	ILW Closed Sources	ILW	1.0	0	1.0	1.0
7A40	Experimental Metallic Vessels	ILW	17.1	85.6	48.9	39.9
7A108	Decommissioning LLW Above the LLWR Limit	LLW	0	3.9	75.5	60.4
7A109	Decommissioning Waste from Reactors ILW	ILW	6.0	1.9	6.1	5.0
7A110	Decommissioning Waste Tritium Bearing ILW	ILW	8.0	72.9	41.6	36.5
7A111	Decommissioning Waste PCM ILW	ILW	2,015.0	4,390	2,500	2,190
7A112	Decommissioning LLW Suitable for Disposal at the LLWR - Natural / Depleted Uranium	LLW	0	123	2,400	1,920
7A113	Decommissioning LLW Suitable for Disposal at the LLWR - Tritiated	LLW	0	78.9	1,540	1,230
7A114	Decommissioning LLW Suitable for Disposal at the LLWR - Enriched Uranium	LLW	0	56.8	1,110	886
7A115	Decommissioning LLW Suitable for Disposal at the LLWR - Plutonium	LLW	0	326	6,350	5,080
7A116	Decommissioning LLW Suitable for Disposal at the LLWR - Miscellaneous	LLW	0	100	1,960	1,570
7A117	Decommissioning Waste Uranium Contaminated ILW	ILW	68.0	639	365	320

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
Ministry of Defence - Babcock International Group - HMNB Devonport						
7D22	Soft Trash from Nuclear Repair Activities	LLW	8.8	6.9	135	108
7D23	Hard Trash from Nuclear Repair Activities	LLW	7.0	8.0	155	124
7D24	ILW Reactor Components	ILW	3.3	0.7	14.4	11.5
7D26/C	Conditioned Low Level Ion Exchange Resin (excl. Plant Decontamination)	LLW	3.5	31.7	619	495
7D28	Low Level Waste Resin from Plant Decontamination (MODIX)	LLW	25.2	8.2	159	127
7D29	Intermediate Level Waste Resin from Plant Decontamination (MODIX)	ILW	19.6	4.4	84.9	67.9
7D30/C	Conditioned Sludge from Tank Cleaning Operations	LLW	0.5	2.8	55.5	44.4
7D31/C	Supercompacted Low Level Filters (from Effluent Treatment Processes)	LLW	0.3	1.0	19.2	15.4
7D32	Intermediate Level Filters from Plant Decontamination Processes	ILW	1.0	0.1	1.9	1.5
7D33	TSSBN Refitting: Filters	LLW	0.1	0.1	1.7	1.3
7D34	Ion Exchange Resin from Primary Circuit Decontamination	LLW	5.6	2.5	48.5	38.8
7D35	Boronated LLW Ion Exchange Resin	LLW	4.0	1.1	21.7	17.3
7D36	Low level Waste - LLRF Ion Exchange Resin	LLW	1.2	0.3	5.2	4.2
7D37	Low Level Waste - LLRF Concentrate	LLW	1.5	0.3	6.5	5.2
7D38	Low Level Waste - PWR 1&2 Boron Concentrate	LLW	10.5	4.7	91.0	72.8
7D39/C	LLW Submarine Ion Exchange Resin	LLW	23.4	15.0	293	235
7D40	ILW PCD Ion Exchange Resin	ILW	4.5	5.6	109	87.4
7D41	ILW Submarine Ion Exchange Resin	ILW	7.2	6.0	118	94.3
7D90	Very Low Level Waste (VLLW) Generated from Nuclear Repair Activities	LLW	392.2	0	16,000	16,000
7D100	Solid LLW arising from Plant Decommissioning	LLW	3.9	2.3	44.3	35.5
Ministry of Defence - Babcock International Group - Rosyth Royal Dockyard						
7E22	Submarine Refitting Wastes (Soft Trash)	LLW	16.0	2.0	39.6	31.7
7E23	Metallic Waste	LLW	5.0	3.9	54.4	40.0
7E26	Low Level Resin from Submarines & Effluent Treatment Plant	LLW	2.1	1.4	28.1	22.5
7E27	Submarine Ion Exchange Resin	ILW	1.4	0.6	12.4	9.9
7E28	Ion Exchange Resin from Submarine Decontamination Process	LLW	3.5	1.2	23.5	18.8
7E29	Intermediate Level Ion Exchange Resin (Decontamination)	ILW	15.4	5.3	104	82.8
7E101	Site and Facilities Decommissioning Waste: Steel and Building Rubble	LLW	0	2.1	37.1	29.0
Ministry of Defence - Ministry of Defence - Clyde Submarine Base						
7F22	Submarine Reactor Wastes (Non-metallic)	LLW	2.0	15.6	304	243
7F23	Submarine Reactor Wastes (Metallic LLW)	LLW	0.5	3.0	58.2	46.5
7F26/C	Conditioned Ion Exchange Resin from Nuclear Effluent Plants	LLW	0	9.9	193	154
7F28	Tritiated Desiccant	LLW	4.0	11.0	215	172
Ministry of Defence - Babcock and Ministry of Defence - Rosyth & Devonport (Submarines)						
7G102	Short-Lived ILW from Decommissioned Submarines	ILW	507.4	112	2,180	1,740
7G103	LLW from Decommissioned Submarines	LLW	651.7	146	2,840	2,270
7G104	Long-Lived ILW from Decommissioned Submarines	ILW	213.3	74.3	1,490	602
Ministry of Defence - Ministry of Defence - HMNB Portsmouth						
7J23	Miscellaneous LLW sent to LLWR	LLW	0.8	<0.1	0.4	0.3

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
7J25	Low Level Luminised Waste sent to LLWR	LLW	8.4	0.9	17.6	14.0
7J27	Intermediate Level Tritium Waste	ILW	0.1	0.3	0.2	0.2
Ministry of Defence - QinetiQ - Eskmeals						
7L05	Redundant Equipment Contaminated with Depleted Uranium	LLW	76.0	5.2	101	81.0
Ministry of Defence - Ministry of Defence - DSDC North Donnington						
7N03	DSDA Donnington Miscellaneous LLW	LLW	20.0	6.4	125	100
Ministry of Defence - Ministry of Defence - Defence Estates (Various)						
7S01	Contaminated Soil, Ash & Rubble	LLW	38.7	2.9	55.6	44.5
Ministry of Defence - Ministry of Defence - Dounreay (Vulcan)						
7V24	Metallic ILW from Vulcan	ILW	5.9	7.6	149	119
7V25	Resin from Decontamination Operations	ILW	2.6	0.4	6.9	5.5
7V26	Vulcan Supercompactable Drummed Low Level Waste	LLW	0	1.8	35.7	28.5
Ministry of Defence - Rolls Royce Marine Power Operations Limited - RRMPOL Derby						
7X01	RRMPOL Low Level Wastes	LLW	30.0	100	1,960	1,570
Ministry of Defence - BAE Systems Marine Limited - BAESM Barrow-in-Furness						
7Y01/C	Ion Exchange Resins	LLW	0	0	0	0
7Y02	Redundant Equipment	LLW	0	0	0	0
7Y100	Decommissioning of Redundant Facilities	LLW	20.0	1.3	25.0	20.0
7Y101	Decommissioing of Chemistry Laboratory	LLW	0	0.1	1.3	1.0
7Y102	Decommissioning of Waste Treatment Facility	LLW	0	0.2	3.8	3.0
7Y103	Contaminated Area of DTO Car Park	LLW	0	0.1	2.5	2.0
7Y104	Contaminated Area at D07	LLW	0	0.3	5.0	4.0
Urenco - URENCO - Capenhurst						
8A01	Feed Filter Material	ILW	0.7	5.3	3.0	2.5
8A03	Contaminated Compactable Waste	LLW	100.0	0	2,160	2,160
8A04	Contaminated Non-Compactable Waste	LLW	126.0	0	526	526
8A101	Centrifuge Plant Decommissioning	LLW	5.0	0	125	125
Nuclear Decommissioning Authority - Magnox South Ltd - Berkeley						
9A03	Ion Exchange Material	ILW	12.4	17.0	44.3	37.4
9A18	Desiccant ILW	ILW	10.3	54.2	31.0	25.5
9A25	Ion Exchange Material in Drums	ILW	13.5	18.5	48.2	40.7
9A27	Sludge	ILW	10.6	9.6	25.1	21.2
9A31	FED Graphite	ILW	150.7	62.8	206	166
9A32	FED Graphite	ILW	225.2	93.8	307	249
9A33	FED Graphite	ILW	265.2	110	362	293
9A34	FED Graphite	ILW	156.1	65.0	213	172
9A35	FED Graphite	ILW	65.1	27.1	88.8	71.9
9A36	Miscellaneous Contaminated Items	ILW	0.2	0.1	0.3	0.2
9A37	Miscellaneous Contaminated Items	ILW	0.2	0.1	0.2	0.2
9A38	Miscellaneous Contaminated Items	ILW	10.9	4.0	13.2	10.9
9A39	FED Magnox	ILW	16.0	6.6	21.7	17.6
9A40	FED Magnox	ILW	24.0	10.0	32.6	26.4

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
9A41	FED Magnox	ILW	28.0	11.7	38.2	30.9
9A42	FED Magnox	ILW	17.0	7.1	23.2	18.8
9A43	FED Magnox	ILW	7.0	2.9	9.5	7.7
9A44	Miscellaneous Activated Components	ILW	37.6	11.1	36.2	29.9
9A45	Miscellaneous Activated Components	ILW	10.0	0.6	12.4	11.7
9A46	Miscellaneous Activated Components	ILW	10.0	0.6	12.4	11.7
9A47	FED Stainless Steel	ILW	0.3	0.1	0.4	0.3
9A48	FED Stainless Steel	ILW	0.4	0.2	0.6	0.5
9A49	FED Stainless Steel	ILW	0.5	0.2	0.7	0.6
9A50	FED Stainless Steel	ILW	0.3	0.1	0.4	0.3
9A51	FED Stainless Steel	ILW	0.1	0.1	0.2	0.1
9A52	FED Zirconium	ILW	2.2	0.9	3.0	2.4
9A53	FED Zirconium	ILW	3.3	1.4	4.5	3.6
9A54	FED Zirconium	ILW	4.0	1.7	5.5	4.4
9A55	FED Zirconium	ILW	2.4	1.0	3.2	2.6
9A56	FED Zirconium	ILW	1.0	0.4	1.4	1.1
9A57	Sludge (filter-precoat) from Berkeley Technology Centre	ILW	48.5	52.7	138	116
9A58	Sludge (filter-precoat) from Berkeley Technology Centre	ILW	14.3	15.5	40.6	34.2
9A59	Sludge (filter-precoat) from Berkeley Technology Centre	ILW	0.5	0.5	1.4	1.2
9A60	FED Magnox from Post Irradiation Examination	ILW	0.7	0.3	0.9	0.7
9A61	FED Magnox from Post Irradiation Examination	ILW	61.9	25.8	84.4	68.3
9A62	FED Magnox from Post Irradiation Examination	ILW	1.9	0.8	2.6	2.1
9A63	FED Magnox from Post Irradiation Examination	ILW	0.1	<0.1	0.2	0.1
9A64	FED Magnox from Post Irradiation Examination	ILW	6.8	2.8	9.3	7.5
9A65	FED Magnox from Post Irradiation Examination	ILW	0.5	0.2	0.6	0.5
9A66	Miscellaneous Contaminated Items from Post Irradiation Examination	ILW	0.1	<0.1	0.1	0.1
9A67	Miscellaneous Contaminated Items from Post Irradiation Examination	ILW	0.1	<0.1	0.1	0.1
9A68	Miscellaneous Contaminated Items from Post Irradiation Examination	ILW	53.2	19.9	64.9	53.6
9A69	Miscellaneous Contaminated Items from Post Irradiation Examination	ILW	27.5	10.3	33.6	27.7
9A70	Miscellaneous Contaminated Items from Post Irradiation Examination	ILW	30.8	11.5	37.6	31.0
9A71	BPS ILW Sludge in Drums	ILW	38.6	35.1	91.6	77.2
9A72	BPS ILW Sludge in Drums	ILW	7.6	6.9	18.0	15.2
9A73	Contaminated Gravel	ILW	47.0	17.4	57.0	47.0
9A74	Contaminated Gravel	ILW	47.0	17.4	57.0	47.0
9A75	Contaminated Gravel	ILW	47.0	17.4	57.0	47.0
9A76	Contaminated Gravel	ILW	21.6	8.0	26.2	21.6
9A77	BPS Sludge in Drums	ILW	13.5	12.3	32.0	27.0
9A78	BPS Sludge in Drums	ILW	12.7	11.5	30.1	25.4
9A80	Drummed Sludge	ILW	4.7	4.3	11.1	9.4
9A81	Vaults Furniture	LLW	0	9.3	182	146
9A82	Ion Exchange Material in Drums	ILW	3.0	4.1	10.7	9.0
9A83	Miscellaneous Contaminated Items	ILW	0.1	<0.1	0.2	0.1
9A84	Miscellaneous Contaminated Items from Post Irradiation Examination	ILW	0.1	0.1	0.2	0.1
9A85	Desiccant LLW	LLW	0.7	<0.1	0.9	0.8
9A916	Empty BPS Sludge Cans	ILW	0	14.1	46.2	38.1
9A917	Empty Drums and Liners	ILW	0	8.9	29.1	24.0
9A920	Reactor LLW	LLW	2.8	0.3	5.1	3.9
9A921	AETP and Decontamination LLW	LLW	68.1	46.2	900	720
9A923	AETP Sludge	LLW	0	5.8	75.6	54.1
9A925	Pond Sludge	LLW	2.5	1.6	20.3	14.5

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
9A927	Vault Scabbling Wastes	LLW	0	6.2	120	96.0
9A928	Contaminated Soil	LLW	0	8.3	163	130
9A929	Active Waste Vault Retrieval HEPA Filters	LLW	0	0.3	5.8	4.6
9A930	Active Waste Vault Retrieval Decommissioning.	LLW	0	9.0	176	141
9A931	Active Waste Vault Retrieval: Secondary LLW	LLW	0	3.3	65.0	52.0
9A932	Cooling Water Valve Chamber Sludge	LLW	2.8	1.8	22.8	16.3
9A933	Concrete Slurry	LLW	1.2	0.8	9.8	7.0
9A980	Caesium Removal Plant Decommissioning.	LLW	22.4	55.9	878	666
9A105	Reactor LLW	LLW	0	4.1	80.5	64.4
9A310	Stainless Steel (Reactor) ILW	ILW	0	4.2	85.0	60.7
9A311	Mild Steel (Reactor) ILW	ILW	0	16.7	334	315
9A312	Miscellaneous Metal (Reactor) ILW	ILW	0	7.5	150	60.7
9A313	Stainless Steel (Reactor) LLW	LLW	0	0.4	8.2	7.7
9A314	Mild Steel (Reactor) LLW	LLW	0	286	5,730	5,400
9A315	Mild Steel (Non-Reactor) LLW	LLW	0	213	4,270	4,030
9A316	Graphite LLW	LLW	0	2.0	40.8	38.4
9A317	Concrete (Reactor and Non-Reactor) LLW	LLW	0	601	12,000	11,300
9A318	Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	107	2,140	2,010
9A319	Secondary Wastes LLW	LLW	0	68.9	1,380	1,300
9A320	Contaminated Soil LLW	LLW	0	3.1	61.8	58.3
9A321	Graphite ILW	ILW	0	193	3,860	3,640
Nuclear Decommissioning Authority - Magnox South Ltd - Bradwell						
9B02	Ion Exchange Material	ILW	21.5	28.7	74.8	63.1
9B13	Desiccant	ILW	10.0	11.1	29.0	24.4
9B15	Sludge	ILW	14.6	15.8	41.3	34.8
9B16/C	Sludge	LLW	32.4	4.4	85.6	68.5
9B17	Miscellaneous Contaminated Items	ILW	10.1	5.6	18.2	15.1
9B18	Miscellaneous Contaminated Items	ILW	11.4	4.8	15.8	13.0
9B19	FED Magnox	ILW	57.8	0.9	5.0	2.6
9B20	FED Magnox	ILW	48.1	0.8	4.2	2.2
9B21	FED Magnox	ILW	45.9	0.7	4.0	2.1
9B22	FED Magnox	ILW	48.1	0.8	4.2	2.2
9B23	FED Magnox	ILW	45.9	0.7	4.0	2.1
9B24	FED Magnox	ILW	40.6	0.6	3.5	1.8
9B25	FED Magnox	ILW	38.5	0.6	3.4	1.7
9B26	FED Magnox	ILW	40.6	0.6	3.5	1.8
9B28	Miscellaneous Activated Components - R1	ILW	81.0	6.6	132	94.6
9B29	Miscellaneous Activated Components - R2	ILW	81.0	6.6	132	94.6
9B30	Miscellaneous Activated Components - R1	ILW	3.2	0.3	5.2	3.7
9B31	Miscellaneous Activated Components - R2	ILW	3.2	0.3	5.2	3.7
9B33	Contaminated Gravel	ILW	2.0	0.9	2.8	2.3
9B34	Contaminated Gravel	ILW	2.9	1.3	4.1	3.4
9B35	Contaminated Gravel	ILW	2.8	1.2	3.9	3.2
9B36	Contaminated Gravel	ILW	2.9	1.3	4.1	3.4
9B37	Contaminated Gravel	ILW	2.8	1.2	3.9	3.2
9B38	Contaminated Gravel	LLW	1.6	0.1	2.0	1.6
9B39	Contaminated Gravel	LLW	1.6	0.1	2.0	1.6
9B40	Contaminated Gravel	ILW	1.1	0.5	1.6	1.3
9B41	Contaminated Gravel	ILW	1.1	0.5	1.6	1.3
9B42	Contaminated Gravel	ILW	1.1	0.5	1.6	1.3
9B43	Contaminated Soil	LLW	1.0	0.1	2.5	2.0

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
9B48	Asbestos LLW	LLW	60.0	2.0	39.0	31.2
9B52	Flask Washdown Bay LLW	LLW	18.6	1.6	30.9	24.7
9B53	Fuel Skips in Pond	ILW	65.0	5.4	106	84.5
9B55	Pond Skip Decontamination Sludge	ILW	26.0	21.7	56.5	47.7
9B56	FED Magnox	ILW	29.7	0.5	2.6	1.3
9B57	FED Magnox	ILW	38.1	0.6	3.3	1.7
9B58	FED Magnox	ILW	42.4	0.7	3.7	1.9
9B59	FED Magnox	ILW	10.6	0.2	0.9	0.5
9B60	Contaminated Gravel	ILW	2.8	1.2	3.9	3.2
9B61	Contaminated Gravel	ILW	2.8	1.2	3.9	3.2
9B62	Contaminated Gravel	ILW	2.8	1.2	4.0	3.3
9B63	Contaminated Gravel	ILW	2.8	1.2	4.0	3.3
9B64	Ion Exchange Resin PWTP	ILW	4.6	12.8	33.4	28.2
9B65	Sand and Gravel in Sand Pressure Filters - PWTP	ILW	2.8	6.4	17.3	14.5
9B66	FED Magnox Dust/Sludge	ILW	8.3	0.1	0.7	0.4
9B67	FED Magnox Dust/Sludge	ILW	6.9	0.1	0.6	0.3
9B68	FED Magnox Dust/sludge	ILW	6.6	0.1	0.6	0.3
9B69	FED Magnox Dust/Sludge	ILW	6.9	0.1	0.6	0.3
9B70	FED Magnox Dust/Sludge	ILW	6.6	0.1	0.6	0.3
9B71	FED Magnox Dust/Sludge	ILW	5.8	0.1	0.5	0.3
9B72	FED Magnox Dust/Sludge	ILW	5.5	0.1	0.5	0.2
9B73	FED Magnox Dust/Sludge	ILW	5.8	0.1	0.5	0.3
9B74	FED Magnox Dust/Sludge	ILW	4.2	0.1	0.4	0.2
9B75	FED Magnox Dust/Sludge	ILW	5.4	0.1	0.5	0.2
9B76	FED Magnox Dust/Sludge	ILW	6.1	0.1	0.5	0.3
9B77	FED Magnox Dust/Sludge	ILW	1.5	<0.1	0.1	0.1
9B78	Fuel Skips in Pond	LLW	145.0	9.3	181	145
9B910	Reactor LLW	LLW	302.0	249	4,860	3,890
9B913	Pond Scabbling Wastes	LLW	0	8.0	156	125
9B914	Miscellaneous Contaminated Items PWTP & AETP decommissioning	ILW	0	82.9	271	224
9B915	Miscellaneous Activated Components	ILW	0	4.0	79.9	57.1
9B916	Miscellaneous Activated Components Circulator Hall Waste	ILW	0	0.6	12.3	8.8
9B917	Boilers and Gas Ducts	LLW	0	21.9	439	414
9B918	Low Level Waste Facility Decommissioning	LLW	0	4.9	95.2	76.2
9B919	ILW Retrieval and processing Facility Decommissioning	LLW	0	5.4	106	84.7
9B920	Magnox Dissolution Plant Sludge	ILW	0	10.9	28.5	24.0
9B951	Ponds and Laundry LLW	LLW	185.5	105	2,040	1,630
9B960	Redundant Sealed Sources	LLW	0.1	<0.1	0.3	0.2
9B105	Reactor LLW	LLW	0	3.7	72.8	58.2
9B310	Stainless Steel (Reactor) ILW	ILW	0	17.9	358	195
9B311	Mild Steel (Reactor) ILW	ILW	0	25.4	509	481
9B312	Graphite ILW	ILW	0	187	3,740	3,530
9B313	Miscellaneous Metal (Reactor) ILW	ILW	0	0.6	11.4	8.2
9B314	Mild Steel (Reactor) LLW	LLW	0	197	3,940	3,720
9B315	Mild Steel (Non-Reactor) LLW	LLW	0	188	3,770	3,550
9B316	Graphite LLW	LLW	0	13.3	266	250
9B317	Concrete (Reactor and Non-Reactor) LLW	LLW	0	1,490	29,900	28,200
9B318	Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	38.6	774	729
9B319	Secondary Wastes LLW	LLW	0	64.1	1,280	1,210
9B320	Stainless Steel (Reactor) LLW	LLW	0	<0.1	0.2	0.2
9B321	Contaminated Soil LLW	LLW	0	166	3,320	3,130

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
Nuclear Decommissioning Authority - Magnox South Ltd - Dungeness A						
9C02	PWTP Ion Exchange Material	ILW	28.9	41.3	108	90.8
9C11	Reactor and Boiler Systems LLW	LLW	104.1	7.5	146	117
9C12	Effluent Treatment Plant, Ponds and Decontamination LLW	LLW	87.0	7.8	152	122
9C13	Magnox Dissolution Plant LLW	LLW	67.3	4.5	87.3	69.9
9C14	Desiccant	ILW	6.3	10.2	26.6	22.5
9C15	Incinerator Ash	LLW	20.1	0.9	17.1	13.7
9C16	PWTP Sludge	ILW	0	12.7	33.2	28.0
9C17	Magnox Dissolution Plant Sludge	ILW	6.1	7.4	19.2	16.2
9C20	AETP Sludge	ILW	0	14.5	37.9	32.0
9C21	AETP Sludge	ILW	0	14.5	37.9	32.0
9C25	FED Magnox (Lugs)	ILW	20.0	0.4	0.9	0.8
9C30	Miscellaneous Activated Components	ILW	52.0	3.2	64.3	60.7
9C32	Miscellaneous Activated Components	ILW	8.4	0.5	10.4	9.8
9C33	Miscellaneous Activated Components	ILW	58.0	3.6	71.7	67.7
9C35	Miscellaneous Activated Components	ILW	6.2	0.4	7.7	7.3
9C36	Ion Exchange Resin from Ponds	ILW	25.7	47.4	124	104
9C38	Ion Siv Unit Pre Filters	ILW	1.4	19.0	11.4	5.7
9C39	Ion Siv Unit Cartridges	ILW	0.3	16.0	9.6	1.4
9C40	Ion Siv Unit Post Filters	ILW	0.5	18.0	10.8	5.4
9C41	Ion Siv Unit Pre Filters	ILW	0.9	15.0	9.0	4.5
9C42	Ion Siv Unit Cartridges	ILW	0.2	14.0	8.4	1.3
9C43	Ion Siv Unit Post Filters	ILW	0.6	20.0	12.0	6.0
9C44	Fuel Skips in Pond	ILW	19.5	10.0	195	156
9C45	Fuel Skips in Pond	ILW	17.1	8.7	170	136
9C47	Nimonic Springs and Thermocouples	ILW	0.1	<0.1	0.1	0.1
9C48	Pond Skip Decontamination Sludge	ILW	0	1.6	4.3	3.6
9C49	Pond Skip Decontamination Sludge	ILW	0	1.4	3.6	3.0
9C50	Asbestos and Man-Made Mineral Fibre LLW	LLW	0	13.2	257	206
9C51	Contaminated Zinc Bromide	LLW	<0.1	<0.1	<0.1	<0.1
9C52	Contaminated Sand	LLW	1.1	0.9	17.9	14.3
9C53	Miscellaneous Contaminated Items	ILW	4.0	1.5	4.8	4.0
9C54	Catalyst	ILW	0	2.5	6.5	5.5
9C55	Doulton Filters	LLW	5.0	1.0	18.8	15.0
9C56	Miscellaneous Activated Components	ILW	9.8	0.6	12.1	11.4
9C57	Miscellaneous Activated Components	ILW	8.3	0.5	10.3	9.7
9C58	Cationic Resin - AEWTP	LLW	0	0.8	16.3	13.0
9C59	Anionic Resin - AEWTP	LLW	0	0.4	8.1	6.5
9C61	Contaminated Sand from AETP and PWTP Sand Filters	LLW	0	1.8	34.4	27.5
9C62	Contaminated Gravel from AETP and PWTP Sand Filter	LLW	0	1.8	34.4	27.5
9C63	AETP Sludge	ILW	50.5	71.6	931	666
9C911	Reactor and Boiler Systems LLW	LLW	375.0	162	3,160	2,530
9C912	Effluent Treatment Plant, Ponds and Decontamination LLW	LLW	128.0	81.2	1,580	1,270
9C944	Contaminated Insulation	LLW	0	7.6	148	118
9C945	Pond Scabblings	LLW	0	6.4	125	100
9C946	Pond Scabblings	LLW	0	6.4	125	100
9C950	Redundant Sealed Sources	LLW	1.0	0.4	6.9	5.5
9C105	Reactor and Boiler Systems LLW	LLW	0	3.6	70.2	56.2
9C310	Stainless Steel (Reactor) ILW	ILW	0	8.8	177	167
9C311	Mild Steel (Reactor) ILW	ILW	0	29.4	590	557
9C312	Graphite ILW	ILW	0	211	4,230	3,990

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
9C313	Stainless Steel (Reactor) LLW	LLW	0	0.1	1.2	1.2
9C314	Mild Steel (Reactor) LLW	LLW	0	201	4,030	3,800
9C315	Mild Steel (Non-Reactor) LLW	LLW	0	223	4,460	4,200
9C317	Concrete (Reactor and Non-Reactor) LLW	LLW	0	851	17,000	16,100
9C318	Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	47.0	942	888
9C319	Secondary Wastes LLW	LLW	0	62.9	1,260	1,190
9C320	Miscellaneous Metals (Reactor) ILW	ILW	0	<0.1	0.1	0.1
9C321	Contaminated Soil LLW	LLW	0	57.4	1,150	1,080
Nuclear Decommissioning Authority - Magnox South Ltd - Hinkley Point A						
9D11	Incinerator Ash	LLW	4.3	0.1	2.8	2.2
9D15/C	PWTP Fine Filters LLW	LLW	8.3	1.2	22.4	17.9
9D17	PWTP Fine Filters (ILW)	ILW	19.0	22.9	75.1	61.9
9D18	Desiccant	ILW	1.8	7.3	19.2	16.2
9D22	Sludge	ILW	20.7	21.8	56.9	48.0
9D23	Sludge	ILW	3.7	6.6	17.1	14.4
9D24	Sludge	ILW	12.3	11.9	31.0	26.2
9D25	Ion Exchange Material	ILW	44.0	60.3	157	133
9D26	Ion Exchange Material	ILW	15.0	20.5	53.5	45.1
9D27	Ion Exchange Material	ILW	27.0	37.0	96.6	81.4
9D28	Ion Exchange Material	ILW	25.7	36.2	94.5	79.7
9D29	Ion Exchange Material	ILW	26.0	44.7	117	98.4
9D30	Miscellaneous Contaminated Items	ILW	1.3	0.5	1.6	1.3
9D31	Fuel Skips (ILW)	ILW	92.3	0	0	0
9D32	Contaminated Sand	ILW	0.8	0.7	1.9	1.6
9D33	FED Magnox R1	ILW	207.0	85.9	281	228
9D34	FED Magnox R2	ILW	218.0	90.5	296	240
9D35	Miscellaneous Activated Components R1	ILW	68.0	5.6	111	79.4
9D36	Miscellaneous Activated Components R2	ILW	68.0	5.6	111	79.4
9D37	Miscellaneous Activated Components R1	ILW	2.1	0.2	3.4	2.5
9D38	Miscellaneous Activated Components R2	ILW	2.1	0.2	3.4	2.5
9D39	FED Nimonic R1	ILW	0.4	0.2	0.5	0.4
9D40	FED Nimonic R2	ILW	0.4	0.2	0.5	0.4
9D41	FED Magnox - R1	ILW	165.0	62.3	204	165
9D42	FED Magnox - R2	ILW	155.0	58.5	191	155
9D43	FED Nimonic - R1	ILW	0.1	<0.1	0.1	0.1
9D44	FED Nimonic - R2	ILW	0.1	<0.1	0.1	0.1
9D45	Contaminated Gravel	ILW	10.0	3.7	12.1	10.0
9D46	Contaminated Gravel	ILW	10.0	3.7	12.1	10.0
9D47	Contaminated Sand	ILW	6.8	6.2	16.1	13.6
9D48	Miscellaneous Contaminated Items	LLW	34.0	3.1	60.3	48.2
9D49	Ion Siv Unit Pre Filters	ILW	2.2	0.3	6.7	5.4
9D50	Ion Siv Unit Cartridges	ILW	0.3	5.3	17.5	14.4
9D51	Ion Siv Unit Post Filters	ILW	0.4	0.1	1.1	0.9
9D52	Miscellaneous Activated Components from R1 Pond	ILW	6.0	2.2	7.3	6.0
9D53	VLLW Asbestos and MMMF	LLW	432.0	0	432	432
9D54	Miscellaneous Activated Components from R2 pond	ILW	7.0	2.6	8.5	7.0
9D58	Fuel Skips (R1)	ILW	1.9	0	0	0
9D59	Fuel Skips (R2)	ILW	1.5	0	0	0
9D60	Sand in Sand Pressure Filters - PWTP	ILW	0	17.5	45.5	38.4
9D61	Fuel Skips (LLW)	LLW	5.8	0.1	2.2	1.7
9D64	Contaminated Gravel	ILW	6.6	2.4	8.0	6.6

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
9D65	Ion Exchange Material	ILW	3.4	4.7	12.2	10.2
9D66	Contaminated Gravel	ILW	2.2	0.8	2.7	2.2
9D67	FED Sludge - R1	ILW	5.0	4.5	11.9	10.0
9D68	FED Sludge - R2	ILW	5.0	4.5	11.9	10.0
9D69	FED Sludge - R1	ILW	10.0	9.1	23.7	20.0
9D70	FED Sludge - R2	ILW	10.0	9.1	23.7	20.0
9D71	Ion Exchange Material	LLW	0	4.6	89.4	71.5
9D72	Sludge/resin from operational clean-up	ILW	3.1	7.8	20.3	17.1
9D73	Miscellaneous Activated Components R1	ILW	30.0	2.4	49.0	35.0
9D74	Miscellaneous Activated Components - R2	ILW	30.0	2.4	49.0	35.0
9D75	Vacuum Debris	LLW	0	0.2	3.1	2.5
9D76	AETP Sludge LLW	LLW	15.0	4.2	81.3	65.0
9D77	Desiccant (LLW)	LLW	3.0	0.2	4.0	3.2
9D78	IonSiv Unit Pre Filters (LLW)	LLW	2.5	0.4	7.8	6.2
9D79	IonSiv Unit Post Filters (LLW)	LLW	1.1	0.2	3.4	2.7
9D80	MCI Metallic, contaminated metal from Pond operations	ILW	4.7	1.7	5.7	4.7
9D81	MCI Concrete, contaminated concrete blocks from Pond operations	ILW	1.2	0.5	1.5	1.2
9D82	Vacuum Debris (ILW)	ILW	1.5	0.6	1.8	1.5
9D83	Incinerator Ash (ILW)	ILW	0.8	0.3	0.9	0.8
9D84	Skip Store Skip Coating	ILW	0.7	1.2	3.1	2.6
9D912	Soft Laundry Waste	LLW	0	2.0	39.6	31.7
9D913	Pond & Effluent Treatment Plant LLW	LLW	0	244	4,760	3,800
9D914	General Reactor LLW	LLW	8.3	165	3,210	2,570
9D916	Decontamination Building LLW	LLW	4.3	27.6	539	431
9D917	Sludge/Resin from Post Operational Clean Out	ILW	0	0.9	2.3	1.9
9D918	Ponds and Magnox Vault Wall Scabblings	LLW	0	2.7	53.4	42.7
9D919	Settling Tank Bitumen Linings	ILW	0	0.8	2.7	2.3
9D920	Miscellaneous Decommissioning ILW from Plant Items.	ILW	0	3.7	12.1	10.0
9D921	Sludge Canning Building Plant Items	ILW	0	0.7	2.4	2.0
9D922	Sludge Canning Building Decommissioning LLW	LLW	0	6.6	129	103
9D923	Redundant Sealed Sources	LLW	1.0	0.1	1.6	1.3
9D924	Contaminated Soil LLW	LLW	0	25.0	488	390
9D106	General Reactor LLW	LLW	0	3.3	65.0	52.0
9D310	Stainless Steel (Reactor) ILW	ILW	0	3.8	75.4	71.2
9D311	Mild Steel (Reactor) ILW	ILW	0	23.7	475	448
9D312	Graphite ILW	ILW	0	219	4,390	4,150
9D313	Miscellaneous Metal (Reactor) ILW	ILW	0	1.3	25.7	14.0
9D314	Mild Steel (Reactor) LLW	LLW	0	209	4,190	3,950
9D315	Mild Steel (Non-Reactor) LLW	LLW	0	283	5,660	5,330
9D316	Graphite LLW	LLW	0	2.9	58.1	54.8
9D317	Concrete (Reactor and Non-Reactor) LLW	LLW	0	1,680	33,600	31,600
9D318	Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	85.2	1,710	1,610
9D319	Secondary Wastes LLW	LLW	0	65.4	1,310	1,230
9D320	Stainless Steel (Reactor) LLW	LLW	0	<0.1	0.1	0.1
9D321	Contaminated Soil LLW	LLW	0	43.8	878	827
9D322	Reactor Neutron Sources R1	ILW	0	<0.1	0.6	0.6
9D323	Reactor Neutron Sources R2	ILW	0	<0.1	0.6	0.6
9D324	Debris in Debris Removal Ducts R1	ILW	0	0.1	1.2	1.2
9D325	Debris in Debris Removal Ducts R2	ILW	0	0.1	1.2	1.2

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
Nuclear Decommissioning Authority - Magnox North Ltd - Oldbury						
9E01	Sludge	ILW	15.4	24.6	64.1	59.0
9E13	AETP LLW	LLW	1.8	1.3	25.7	20.6
9E14	Ponds and Other Wet Fuel Routes LLW	LLW	3.0	1.7	33.2	26.5
9E17	Sludge	ILW	4.9	41.3	108	99.2
9E20	Ion Exchange Material	ILW	14.2	55.1	144	132
9E22	Miscellaneous Contaminated Items	ILW	4.5	3.5	11.5	9.5
9E23	Miscellaneous Contaminated Items	ILW	10.1	7.4	24.4	20.1
9E24	FED Magnox	ILW	81.4	30.7	101	81.4
9E25	FED Magnox	ILW	81.4	30.7	101	81.4
9E26	FED Magnox	ILW	85.3	32.2	105	85.3
9E27	FED Magnox	ILW	85.3	32.2	105	85.3
9E28	FED Magnox	ILW	43.2	29.6	96.8	78.4
9E31	Miscellaneous Activated Components	ILW	48.4	3.3	66.0	62.3
9E32	Miscellaneous Activated Components	ILW	68.7	4.3	85.5	80.7
9E39	Miscellaneous Activated Components	ILW	1.1	0.1	2.0	1.9
9E40	FED Nimonic	ILW	0.1	<0.1	0.1	0.1
9E41	FED Nimonic	ILW	0.2	0.1	0.2	0.2
9E43	FED Nimonic	ILW	0.1	<0.1	0.1	0.1
9E45	Sludge	ILW	15.6	29.4	76.8	70.6
9E47	Desiccant	ILW	6.2	6.2	16.2	14.9
9E49	Contaminated Gravel	ILW	4.0	1.5	4.8	4.0
9E50	Contaminated Gravel	ILW	4.0	1.5	4.8	4.0
9E55	Ion Siv Unit Pre Filters	ILW	3.0	30.0	18.0	9.0
9E56	Ion Siv Unit Cartridges	ILW	0.3	9.1	29.8	24.5
9E57	Ion Siv Unit Post Filters	ILW	0.8	8.0	4.8	2.4
9E58	Dry Fuel Route (excl BCD) LLW	LLW	12.5	12.5	243	195
9E59	BCD LLW	LLW	1.3	0.3	5.3	4.2
9E60	Active Waste Store, Active Laundry LLW	LLW	3.8	0.9	18.1	14.5
9E61	Fuel Skips in Pond	ILW	0	4.2	81.5	65.2
9E62	Pond Skip Decontamination Sludge	ILW	0	3.3	8.5	7.8
9E63	Redundant Sources	LLW	1.0	0.1	2.5	2.0
9E913	Care & Maintenance Preparation : AETP LLW	LLW	0	191	3,720	2,980
9E914	Care & Maintenance Preparation : Ponds and Other Wet Fuel Routes LLW	LLW	0	62.6	1,220	977
9E958	Care & Maintenance Preparation : Dry Fuel Route (excluding BCD) LLW	LLW	0	270	5,270	4,220
9E959	Care & Maintenance Preparation : BCD LLW	LLW	0	0.1	2.4	1.9
9E960	Care & Maintenance Preparation : Active Waste Store, Active Laundry LLW	LLW	0	6.2	121	97.1
9E104	Care & Maintenance : Dry Fuel Route LLW	LLW	0	4.5	88.4	70.7
9E310	Final Dismantling & Site Clearance : Stainless Steel (Reactor) ILW	ILW	0	8.7	173	94.3
9E311	Final Dismantling & Site Clearance : Mild Steel (Reactor) ILW	ILW	0	30.2	605	571
9E312	Final Dismantling & Site Clearance : Stainless Steel (Reactor) LLW	LLW	0	4.2	84.2	79.3
9E313	Final Dismantling & Site Clearance : Mild Steel (Reactor) LLW	LLW	0	439	8,800	8,290
9E315	Final Dismantling & Site Clearance : Graphite LLW	LLW	0	117	2,340	2,200
9E316	Final Dismantling & Site Clearance : Concrete (Reactor and Non-Reactor) LLW	LLW	0	405	8,120	7,650
9E317	Final Dismantling & Site Clearance : Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	6.1	122	115
9E318	Final Dismantling & Site Clearance : Secondary Wastes LLW	LLW	0	74.4	1,490	1,410
9E319	Final Dismantling & Site Clearance : Graphite ILW	ILW	0	204	4,080	3,850

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
9E320	Final Dismantling & Site Clearance : Miscellaneous Metals (Reactor) ILW	ILW	0	<0.1	0.1	0.1
9E321	Final Dismantling & Site Clearance : Contaminated Soil LLW	LLW	0	61.7	1,240	1,170
Nuclear Decommissioning Authority - Magnox South Ltd - Sizewell A						
9F02	Ion Exchange Material	LLW	2.0	0.8	16.3	13.0
9F10	Reactor Area LLW	LLW	13.2	5.2	101	80.5
9F11	Ponds and Effluent Treatment Plant LLW	LLW	30.7	9.7	190	152
9F13	Incinerator Ash and Other Debris	LLW	1.0	1.2	23.1	18.5
9F14	Desiccant and Catalyst from Gas Conditioning Plant	ILW	9.9	39.6	22.6	19.8
9F17	Sludge	LLW	13.0	6.1	119	95.1
9F18	Miscellaneous Drummed Contaminated and Activated Items	ILW	90.0	5.6	111	105
9F19	Miscellaneous Drummed Contaminated and Activated Items	LLW	47.8	3.0	59.1	55.7
9F20	FED Magnox	ILW	122.0	50.6	166	134
9F21	FED Magnox	ILW	144.2	59.8	196	159
9F22	FED Magnox	ILW	19.8	8.2	26.9	21.8
9F25	Miscellaneous Activated Components	ILW	145.0	9.1	182	172
9F26	Miscellaneous Activated Components - R1	ILW	142.0	8.8	177	167
9F27	Miscellaneous Activated Components - R2	ILW	113.0	7.0	141	133
9F28	Shield Cooling Air Filters - R1	LLW	12.7	0.8	15.7	14.8
9F29	Shield Cooling Air Filters - R2	LLW	15.6	1.0	19.3	18.2
9F31	Ion Siv Unit Pre Filters	ILW	4.0	0.7	12.9	10.3
9F32	Ion Siv Unit Cartridges	ILW	0.3	8.0	4.8	0.7
9F33	Ion Siv Unit Post Filters	ILW	1.4	0.2	4.6	3.7
9F37	Sludge	LLW	1.0	6.4	124	99.4
9F38	PWTP Filters - Sand and Gravel	ILW	0	2.6	51.5	41.2
9F39	Fuel Skips in Pond	ILW	68.4	0.1	1.3	1.0
9F42	AETP Filters - Sand and Gravel	ILW	3.6	3.0	58.5	46.8
9F43	FED Nimonic	ILW	<0.1	0.4	0.2	<0.1
9F44	Pond Sludge	ILW	4.1	3.7	9.6	8.2
9F910	Reactor Area LLW	LLW	0	33.6	655	524
9F911	Ponds and Effluent Treatment Plant LLW	LLW	0	146	2,850	2,280
9F912	Deplanting Active Laundry	LLW	20.0	0.9	17.2	13.7
9F913	VLLW Reactor Area Lagging	LLW	73.1	138	3,680	3,680
9F950	Redundant Sealed Sources	LLW	0.5	<0.1	0.6	0.5
9F105	Care & Maintenance LLW	LLW	0	3.9	75.4	60.3
9F310	Stainless Steel (Reactor) ILW	ILW	0	1.2	23.5	22.2
9F311	Mild Steel (Reactor) ILW	ILW	0	24.6	492	464
9F312	Graphite ILW	ILW	0	223	4,460	4,210
9F313	Miscellaneous Metal (Reactor) ILW	ILW	0	0.3	5.1	2.8
9F314	Stainless Steel (Reactor) LLW	LLW	0	0.1	1.5	1.4
9F315	Mild Steel (Reactor) LLW	LLW	0	228	4,560	4,300
9F316	Mild Steel (Non-Reactor) LLW	LLW	0	171	3,430	3,230
9F318	Concrete (Reactor and Non-Reactor) LLW	LLW	0	966	19,400	18,200
9F319	Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	85.5	1,710	1,610
9F320	Secondary Wastes LLW	LLW	0	64.4	1,290	1,220
9F321	Contaminated Soil LLW	LLW	0	19.0	381	359
Nuclear Decommissioning Authority - Magnox North Ltd - Trawsfynydd						
9G04/C	Ion Exchange Material Conditioned Waste	ILW	300.0	65.9	1,320	719

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
9G14	Desiccant	ILW	15.0	9.4	30.7	25.3
9G15	FED Drummed Magnox	ILW	39.6	13.0	260	142
9G16	Sludge	ILW	5.2	4.4	11.6	10.7
9G16/C	Sludge - Conditioned Material	ILW	67.2	28.0	73.1	67.2
9G17	Sludge	ILW	4.8	4.1	10.6	9.8
9G18/C	Ion Exchange Material - Conditioned Waste	ILW	656.0	144	2,880	1,570
9G19	Ion Exchange Material	ILW	18.5	13.6	272	148
9G19/C	Ion Exchange Material - Conditioned Waste	ILW	160.3	36.0	721	393
9G20/C	Ion Exchange Material - Conditioned Waste	ILW	187.7	42.0	841	458
9G34	FED Magnox	ILW	122.7	40.2	132	109
9G34/C	FED Magnox	ILW	32.4	12.0	39.3	32.4
9G35	FED Magnox	ILW	191.0	62.6	205	169
9G36/C	Conditioned Miscellaneous Activated Components	ILW	43.2	16.0	52.4	43.2
9G37/C	Conditioned Miscellaneous Activated Components	ILW	43.2	16.0	52.4	43.2
9G38	Miscellaneous Activated Components	ILW	21.0	1.3	26.0	24.5
9G39	Miscellaneous Activated Components	ILW	21.0	1.3	26.0	24.5
9G40	FED Nimonic	ILW	0.3	0.1	0.3	0.3
9G41	FED Nimonic	ILW	0.3	0.1	0.3	0.3
9G48/C	Encapsulated Skips and Debris from Fuel Cooling Pond	ILW	8.1	3.0	9.8	8.1
9G55	Oil	ILW	0.4	0.9	0.5	0.4
9G64	Miscellaneous Contaminated Items	ILW	7.0	15.0	8.6	7.0
9G66	Miscellaneous Contaminated Items	LLW	2.0	0.1	2.5	2.0
9G68	Sludge Residues from base of Vault	ILW	5.0	4.2	10.9	10.0
9G69	Miscellaneous Contaminated Items - Debris from Fuel Cooling Ponds	ILW	0.7	0.2	0.8	0.7
9G71	Diversion Culvert Silt	LLW	38.4	6.1	120	95.8
9G72	Ponds - Acceptance Bays Gravel & Sand from North and South Acceptance Bays - Gravel	ILW	0.7	0.3	0.9	0.7
9G73	Wet / Mobile Orphan Waste	ILW	1.0	2.1	1.2	1.0
9G74	Wet / Mobile Orphan Waste	LLW	2.0	0.1	2.5	2.0
9G75	Sludge - RV3	ILW	0	4.2	11.1	10.2
9G76	Concrete from Base of Magnox Debris South Vault	ILW	0	3.6	11.6	9.6
9G77	Concrete from Base of Magnox Debris North Vault	ILW	0	3.6	11.6	9.6
9G104	Care & Maintenance Preparation : Resin Vaults LLW	LLW	19.5	3.7	72.2	57.7
9G105	Care & Maintenance Preparation : Reactor LLW	LLW	48.7	21.7	423	338
9G106	Care & Maintenance Preparation : Ponds LLW	LLW	277.5	47.7	930	744
9G107	Care and Maintenance Preparation : Ion Exchange Material	ILW	28.7	27.6	553	301
9G109	Care & Maintenance Preparation : Pond Scabbling Wastes	LLW	0	15.5	302	242
9G110	Care & Maintenance : Reactor LLW	LLW	0	3.5	67.6	54.1
9G111	Redundant Sealed Sources	ILW	0.1	0.1	0.2	0.1
9G112	Redundant Sealed Sources	LLW	1.0	0.1	1.3	1.0
9G309	Final Dismantling & Site Clearance : Stainless Steel (Reactor) ILW	ILW	0	5.5	111	60.5
9G310	Final Dismantling & Site Clearance : Mild Steel (Reactor) ILW	ILW	0	71.5	1,430	1,350
9G311	Final Dismantling & Site Clearance : Graphite ILW	ILW	0	212	4,240	4,000
9G312	Final Dismantling & Site Clearance : Miscellaneous Metal (Reactor) ILW	ILW	0	1.1	22.2	12.1
9G313	Final Dismantling & Site Clearance : Stainless Steel (Reactor) LLW	LLW	0	0.6	12.4	11.7
9G314	Final Dismantling & Site Clearance : Mild Steel (Reactor) LLW	LLW	0	243	4,870	4,590
9G315	Final Dismantling & Site Clearance : Mild Steel (Non-Reactor) LLW	LLW	0	215	4,300	4,050
9G316	Final Dismantling & Site Clearance : Graphite LLW	LLW	0	3.0	59.3	55.9

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
9G317	Final Dismantling & Site Clearance : Concrete (Reactor and Non-Reactor) LLW	LLW	0	2,160	43,300	40,800
9G318	Final Dismantling & Site Clearance : Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	47.3	947	892
9G319	Final Dismantling & Site Clearance : Secondary Wastes LLW	LLW	0	67.4	1,350	1,270
9G320	Final Dismantling & Site Clearance : Contaminated Soil LLW	LLW	0	198	3,960	3,730
Nuclear Decommissioning Authority - Magnox North Ltd - Wylfa						
9H02	Desiccant	ILW	16.5	21.0	54.8	50.4
9H11	Pile Cap, Dry Fuel Store and Associated Areas LLW	LLW	60.0	10.2	200	160
9H12	Flask Handling Area, AETP and Laundry LLW	LLW	46.8	8.0	156	124
9H13	Incinerator Ash LLW	LLW	3.6	0.5	10.7	8.6
9H14	Auxiliary Gas Systems LLW	LLW	6.4	0.9	17.5	14.0
9H15	Sludge	LLW	12.4	1.4	27.5	22.0
9H16	Sludge	LLW	3.0	0.3	6.5	5.2
9H17	Sludge	LLW	3.0	0.3	6.5	5.2
9H18	Miscellaneous Activated Components	ILW	250.0	16.4	328	309
9H19	Miscellaneous Activated Components	ILW	250.0	16.4	328	309
9H20	Miscellaneous Activated Components	ILW	278.0	18.3	366	345
9H24	Burst Can Detector Coolers	ILW	2.0	9.7	5.5	4.5
9H25	Type H Cleaner Bags	ILW	2.2	3.0	7.8	7.2
9H26	Dry Store Cell 4 Residue	ILW	0	9.2	5.3	4.3
9H27	Auxiliary Gas Systems	ILW	19.1	119	67.8	55.3
9H28	Redundant Sealed Sources	LLW	1.0	0.1	1.3	1.0
9H29	Dry Store Cell 4 Residue	LLW	3.3	0.6	12.1	9.6
9H30	Asbestos and MMMF (Man Made Mineral Fibre) LLW	LLW	10.0	2.0	39.0	31.2
9H911	Care & Maintenance Preparation : Pile Cap, Dry Fuel Store and Associated Areas LLW	LLW	0	5.3	103	82.1
9H912	Care & Maintenance Preparation : Flask Handling Area and AETP LLW	LLW	0	11.3	220	176
9H914	Care & Maintenance Preparation : Auxiliary Gas Systems LLW	LLW	0	1.4	27.6	22.0
9H922	Care & Maintenance Preparation : Mild Steel (Non-Reactor) LLW	LLW	0	79.5	1,550	1,240
9H923	Care & Maintenance Preparation : Concrete (Non-Reactor) LLW	LLW	0	328	6,390	5,120
9H924	Care & Maintenance Preparation : Miscellaneous Metals and Materials (Non-Reactor) LLW	LLW	0	7.5	147	118
9H928	Auxiliary Gas Systems	ILW	0	187	107	87.0
9H104	Care & Maintenance LLW	LLW	0	4.8	93.6	74.9
9H309	Final Dismantling & Site Clearance : Stainless Steel (Reactor) ILW	ILW	0	5.5	110	78.8
9H310	Final Dismantling & Site Clearance : Mild Steel (Reactor) ILW	ILW	0	10.5	211	199
9H311	Final Dismantling & Site Clearance : Graphite ILW	ILW	0	339	6,790	6,410
9H312	Final Dismantling & Site Clearance : Stainless Steel (Reactor) LLW	LLW	0	2.1	42.2	39.7
9H313	Final Dismantling & Site Clearance : Mild Steel (Reactor) LLW	LLW	0	597	12,000	11,300
9H315	Final Dismantling & Site Clearance : Graphite LLW	LLW	0	205	4,110	3,870
9H316	Final Dismantling & Site Clearance : Concrete (Reactor and Non-Reactor) LLW	LLW	0	1,540	30,900	29,100
9H317	Final Dismantling & Site Clearance : Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	7.8	156	147
9H318	Final Dismantling & Site Clearance : Secondary Wastes LLW	LLW	0	97.0	1,940	1,830
9H319	Final Dismantling & Site Clearance : Miscellaneous Metals (Reactor) ILW	ILW	0	2.4	47.2	25.7

A4 List of Waste Streams in the Inventory and their Volumes

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
9H321	Final Dismantling & Site Clearance : Charge Chutes (Reactor) LLW	LLW	0	68.1	1,360	1,280
Nuclear Decommissioning Authority - Magnox North Ltd - Hunterston A						
9J03	Ion Exchange Resins	ILW	11.7	14.6	38.2	35.1
9J18	FED Graphite	ILW	4.0	1.5	4.9	4.0
9J19	FED Graphite	ILW	501.3	189	619	501
9J20	FED Graphite	ILW	460.3	174	569	460
9J21	FED Graphite	ILW	447.2	169	552	447
9J22	FED Graphite	ILW	86.9	32.8	107	86.9
9J23	FED Magnox	ILW	563.7	237	753	620
9J24	FED Magnox	ILW	1.1	0.5	1.5	1.2
9J25	FED Magnox	ILW	0.4	0.2	0.5	0.4
9J26	Miscellaneous Contaminated Items	ILW	26.7	21.7	60.0	53.4
9J27	Miscellaneous Contaminated Items	ILW	22.5	24.7	65.4	59.6
9J28	Miscellaneous Contaminated Items	ILW	16.2	19.1	50.2	46.0
9J29	Miscellaneous Contaminated Items	ILW	17.9	18.6	49.7	45.1
9J30	Miscellaneous Contaminated Items	ILW	17.1	14.5	39.8	35.6
9J33	CCP Sludge	ILW	75.0	62.5	163	150
9J34	CCP Sludge	ILW	87.0	72.5	189	174
9J35	FED Fuel Channel Components	ILW	0.2	0.1	0.2	0.2
9J36	FED Fuel Channel Components	ILW	26.6	10.0	32.9	26.6
9J37	FED Fuel Channel Components	ILW	24.7	9.3	30.5	24.7
9J38	FED Fuel Channel Components	ILW	23.3	8.8	28.8	23.3
9J39	FED Fuel Channel Components	ILW	5.2	2.0	6.4	5.2
9J40	Miscellaneous Activated Components	ILW	0.8	0.3	1.0	0.8
9J41	Miscellaneous Activated Components	ILW	8.7	3.3	10.7	8.7
9J42	Miscellaneous Activated Components	ILW	0.4	0.2	0.5	0.4
9J44	Miscellaneous Activated Components	ILW	0.2	0.1	0.2	0.2
9J45	Miscellaneous Activated Components R1	ILW	0.8	<0.1	1.0	0.9
9J46	Miscellaneous Activated Components R2	ILW	0.6	<0.1	0.7	0.7
9J52	Desiccant	ILW	3.4	4.3	13.9	11.5
9J59	Ion Siv Cartridges	ILW	0	0.9	3.0	2.5
9J60	Ion Siv Unit Post Filters	ILW	0	0.9	3.0	2.5
9J61	Pond Skip Decontamination Liquor	ILW	140.0	87.5	228	210
9J948	Care and Maintenance Preparation : Reactor and Auxiliary Building LLW	LLW	313.4	115	2,230	1,790
9J949	Care & Maintenance Preparation : Pond and Effluent Treatment Plant LLW	LLW	635.0	235	4,590	3,670
9J951	Care and Maintenance Preparations : CCP Sludge	ILW	21.8	31.4	82.0	75.4
9J952	Redundant Sealed Sources	LLW	1.0	0.1	1.3	1.0
9J100	Care & Maintenance : General Reactor LLW	LLW	0	3.5	68.9	55.1
9J301	Final Dismantling & Site Clearance : Graphite ILW	ILW	0	212	4,250	4,010
9J302	Final Dismantling & Site Clearance : Concrete (Reactor and Non-Reactor) LLW	LLW	0	1,800	36,100	34,000
9J303	Final Dismantling & Site Clearance : Mild Steel (Reactor) ILW	ILW	0	15.2	304	287
9J306	Final Dismantling & Site Clearance : Stainless Steel (Reactor) ILW	ILW	0	4.1	82.8	78.2
9J310	Final Dismantling & Site Clearance : Stainless Steel (Reactor) LLW	LLW	0	0.3	6.2	5.8
9J311	Final Dismantling & Site Clearance : Mild Steel (Reactor) LLW	LLW	0	275	5,500	5,180
9J312	Final Dismantling & Site Clearance : Mild Steel (Non-Reactor) LLW	LLW	0	262	5,240	4,940

Site Owner – Waste Custodian - Site		Waste type	Waste volume at 1.4.2010 (m^3)	When all wastes at 1.4.2010 and future arisings are packaged		
Stream Identifier	Title			Number of packages	Packaged volume (m^3)	Conditioned volume (m^3)
9J313	Final Dismantling & Site Clearance : Graphite LLW	LLW	0	0.4	8.7	8.2
9J314	Final Dismantling & Site Clearance : Miscellaneous Metals and Materials (Reactor and Non-Reactor) LLW	LLW	0	114	2,290	2,160
9J315	Final Dismantling & Site Clearance : Secondary Wastes LLW	LLW	0	76.2	1,530	1,440
9J316	Final Dismantling & Site Clearance : Miscellaneous Metals (Reactor) ILW	ILW	0	0.6	11.4	8.1
Nuclear Decommissioning Authority - Magnox South Ltd - Berkeley						
9R02	Miscellaneous ILW	ILW	11.0	4.1	13.3	11.0
9R04	LLW Mixed Trash	LLW	1.0	<0.1	0.7	0.5
9R07	LLW Large Items	LLW	48.6	6.1	84.6	62.0
9R10	ILW Ion Exchange Material	ILW	0.7	0.9	2.4	2.0
9R13	Steel Surveillance Canisters	ILW	0.4	0.1	0.5	0.4
9R14	Depleted Uranium	LLW	<0.1	<0.1	<0.1	<0.1
9R15	Natural Uranium	LLW	<0.1	<0.1	<0.1	<0.1
9R16	Low Enriched Uranium	LLW	<0.1	<0.1	<0.1	<0.1
9R17	Irradiated Uranium	ILW	<0.1	<0.1	<0.1	<0.1
9R18	Thorium	LLW	<0.1	<0.1	<0.1	<0.1
9R19	Graphite Samples	ILW	<0.1	<0.1	<0.1	<0.1
9R101	Berkeley Centre Decommissioning : Primary ILW	ILW	10.2	13.3	43.4	35.8
9R102	Berkeley Centre Decommissioning : Primary LLW	LLW	98.4	75.5	1,370	1,070
9R103	Berkeley Centre Decommissioning : Secondary LLW	LLW	18.1	20.7	329	251
9R105	Berkeley Centre Decommissioning: AETP LLW	LLW	3.3	2.1	26.8	19.2
9R106	Berkeley Centre Decommissioning: LLW HEPA Filters	LLW	21.0	2.0	38.6	30.9
9R111	Berkeley Centre Decommissioning: LLW Ion Exchange Material	LLW	0.1	<0.1	0.5	0.4
9R112	Redundant Radioactive Sources	ILW	0.1	<0.1	0.1	0.1
9R113	Redundant Radioactive Sources	LLW	0.1	<0.1	0.1	0.1
9R114	Sump Tank Sludge	LLW	<0.1	<0.1	0.2	0.2
9R115	Miscellaneous Oily Wastes (WRATs)	LLW	0.2	0.2	2.0	1.4
9R116	High Enriched Uranium	LLW	<0.1	<0.1	<0.1	<0.1
9R117	Active Drains Reception and Vault Tanks	LLW	4.0	2.5	32.5	23.3
9R118	Radiochemical Laboratory Samples	ILW	0.7	1.0	2.6	2.2
9R119	GRP Tank Sludge	LLW	2.8	1.8	22.8	16.3
Nuclear Decommissioning Authority - Magnox North Ltd - Sellafield						
9Z201	Magnox Fuel Transport Flasks	LLW	0	1.5	30.0	24.0
9Z203	Rail Flatrols	LLW	0	2.6	50.7	40.6

ANNEX 5 GLOSSARY OF TERMS AND ABBREVIATIONS

The glossary contains a list of specialised terms and abbreviations used in this report.

3.4E09, 4E-05 etc. This is a convenient format that can represent very large and very small numbers. Its value is the number preceding E multiplied by 10 to the power of the number following E.

For example:

$3.4E09 = 3.4 \times 10^{9} = 3,400,000,000$

$4E\text{-}05 = 4 \times 10^{-5} = 0.00004$

< Less than.

<< Very much less than.

Actinides A series of 15 radioactive elements with increasing atomic numbers from actinium to lawrencium, including thorium, uranium and plutonium.

Activation products Radionuclides produced in materials as a result of neutron capture by atoms that constitute either the materials or impurities in those materials.

ADU Ammonium Diuranate.

AETP Active Effluent Treatment Plant (at reactor site).

AEWTP Active Effluent Waste Treatment Plant (at reactor site).

AGR Advanced Gas-cooled Reactor.

ALARP As Low As Reasonably Practicable.

Alpha activity Radioactivity associated with the emission of alpha particles.

Alpha particle Nucleus of helium atom, consisting of two neutrons and two protons, emitted from the nucleus of a decaying atom.

Auger electron Outer electron ejected by an atom that has been ionised by the prior ejection of an inner electron.

AW500 A proprietary zeolite used in ion exchange processes.

AWE The Atomic Weapons Establishment. A Government owned, contractor-operated company concerned mainly with nuclear weapons technology. Located at Aldermaston, but with a smaller establishment at Burghfield.

BAESM BAE Systems Marine Ltd.

BCD Burst Cartridge Detection.

Becquerel Bq; the standard international unit of measurement of radioactivity – equivalent to one disintegration per second (see also kBq, GBq and TBq).

BEP Box Encapsulation Plant (at Sellafield).

BEPO British Experimental Pile O. Air-cooled graphite-moderated pile (at Harwell site; shut down in 1968).

BEPPS Box Encapsulation Plant Product Store (at Sellafield).

Beta/gamma activity	Radioactivity associated with the emission of beta particles and/or gamma radiation.
Beta particle	An electron or positron emitted from the nucleus of a decaying atom.
BPS	Berkeley Power Station.
British Energy	Now part of EDF Energy. The company operates the AGR and PWR nuclear power stations in the UK.
BTC	British Technology Centre (at Sellafield).
C & M	Care and Maintenance.
Capping material	Cement or other substance forming inactive cover over conditioned waste in a container.
CCP	Cartridge Cooling Pond.
CEGB	Central Electricity Generating Board.
CfA	Conditions for Acceptance.
CHILW	Contact Handled Intermediate Level Waste.
Clifton Marsh	Landfill site (near Preston).
Conditioned volume	The volume of waste after conditioning, consisting of the waste material and encapsulating matrix.
Conditioned waste	Radioactive waste that has undergone *conditioning*.
Conditioning	The process used to prepare waste for long-term storage and/or disposal by converting it into a solid and stable form, e.g. by encapsulation in cement.
Conditioning matrix	The material used to contain and/or stabilise waste for disposal. This may be cement, glass or polymer.
Controlled burial	The authorised disposal of some LLW, arising principally in the non-nuclear sector, at suitable landfill sites that possess good containment characteristics.
CoRWM	The Committee on Radioactive Waste Management. An independent body set up by Government to recommend a strategy for the long-term management of higher activity radioactive wastes in the UK. The Committee reported in July 2006. CoRWM has been re-constituted with modified terms of reference and membership to scrutinize the Managing Radioactive Waste Safely (MRWS) programme and its implementation.
Crud	Any deposits of impurity or corrosion product within a reactor, storage vessel or chemical plant.
CVCS	Chemical Volume and Control System (PWR station).
CXPP	Chapelcross Process Plant.
DCP	Dounreay Cementation Plant.
DECC	Department of Energy and Climate Change. The UK Government department responsible for all aspects of UK energy policy and for tackling global climate change on behalf of the UK.

Decommissioning waste	Wastes arising after the shutdown of a facility associated with the use or handling of radioactive materials. They can consist of plant or equipment, building debris and material from the clean up of surrounding ground.
Depleted uranium	Uranium where the uranium 235 isotope content is below the naturally occurring 0.72% by mass.
DFR	Dounreay Fast Reactor (shut down in 1977).
DIDO	Heavy-water cooled and moderated materials testing reactor (at Harwell site; shut down in 1990).
Disposal	The emplacement of waste in a suitable facility without intent to retrieve it. (Retrieval may be possible but, if intended, the appropriate term is storage.)
DMTR	Dounreay Materials Test Reactor.
DRAGON	Experimental high temperature reactor project sited at Winfrith and funded by the Organisation for Economic Cooperation and Development (shut down in 1976).
DSDA	Defence Storage and Distribution Agency. An agency of the MoD
DSDC	Defence Storage and Distribution Centre.
DSTL	Defence Science and Technology Laboratory. Formed in July 2001 as a new organisation within the MoD. Part of the former Defence Evaluation and Research Agency (DERA).
EA	Environment Agency.
EARP	Enhanced Actinide Removal Plant (at Sellafield).
EAST	External Active Sludge Tanks (at Winfrith).
EFDA	European Fusion Development Agreement.
Enriched uranium	Uranium where the uranium 235 isotope content is above the naturally occurring 0.72% by mass.
Enrichment	The process of increasing the abundance of fissionable atoms in natural uranium.
EU	European Union.
Euratom	European Atomic Energy Community.
FED	Fuel Element Debris.
FHP	Fuel Handling Plant (at Sellafield).
Fission	Spontaneous or induced fragmentation of heavy atoms into two (occasionally three) lighter atoms, accompanied by the release of neutrons and radiation.
Fission products	Atoms, often radioactive, resulting from nuclear fission.
Flatrol	Type of railway wagon. It is used for transporting fuel flasks.
Floc	A product of flocculation, a process of coagulation by the use of reagents.
Fuel cladding	The metal casing around the fuel.

Fuel stringer	A string of fuel element assemblies for an *AGR*.
GBq	Gigabecquerel, one thousand million (10^9) Becquerels.
GDA	Generic Design Assessment.
GE Healthcare Ltd	Previously Amersham plc. A company that provides products and services for use in healthcare and life science research. This includes radioisotopes for medical and research users.
GLEEP	Graphite Low Energy Experimental Pile. Low energy, graphite reactor (at Harwell site; shut down in 1990).
GOCO	Government Owned Contractor Operated.
Government	A collective term for the central government bodies responsible for setting radioactive waste management policy within the UK. It comprises the UK Government and the devolved administrations for Scotland, Wales and Northern Ireland.
HA	High Activity.
HAL	Highly Active Liquor.
HEPA filter	High Efficiency Particulate Air filter.
Hex	Uranium Hexafluoride.
HHBGSF	Historic High Beta Gamma Storage Facility (at Dounreay).
HLW	High Level Waste
HLWP	High Level Waste Plants area (at Sellafield).
HMNB	Her Majesty's Naval Base.
HSE	Health and Safety Executive.
HVVLLW	High Volume Very Low Level Waste.
IAEA	International Atomic Energy Agency.
IFP	Insoluble Fission Products
ILW	Intermediate Level Waste.
Irradiated material	Material that has been exposed to radiation. In the nuclear industry this commonly refers to material that has been exposed to and has captured neutrons, and thus contains activation products.
ISO	International Organisation for Standardisation.
ISOLUS	Interim Storage of Laid Up Submarines.
JET	Joint European Torus - the internationally funded fusion project sited at Culham.
kBq	Kilobecquerel, one thousand (10^3) Becquerels.
LA	Low Activity.
LAEMG	Low Active Effluent Management Group area (at Sellafield).
LETP	Liquid Effluent Treatment Plant.
LLLETP	Low Level Liquid Effluent Treatment Plant.

LLRF	Low Level Refuelling Facility.
LLW	Low Level Waste.
LLWR	The Low Level Waste Repository, near the village of Drigg, south of Sellafield, in Cumbria has operated as a national disposal facility for LLW since 1959.
LQA	Land Quality Assessment.
LSA	Low Specific Activity.
LSPT	Local Sludge Treatment Plant (at Sellafield).
LWR	Light Water Reactor.
m^3	Cubic metres – a measure of volume.
MA	Medium Active.
MAC	Miscellaneous Activated Component.
Magnox	An alloy of magnesium used for fuel element cladding in natural uranium fuelled gas-cooled power reactors, and a generic name for this type of reactor.
MBGWS	Miscellaneous Beta Gamma Waste Store.
MBq	Megabecquerel, one million (10^6) Becquerels.
MCI	Miscellaneous Contaminated Items.
MDF	MOX Demonstration Facility (at Sellafield).
MDU	Magnox Depleted Uranium.
MEB	Multi-Element Bottle. Container used to hold irradiated LWR fuel in cooling ponds prior to reprocessing.
MEP	Magnox Encapsulation Plant (at Sellafield).
Metastable state	A higher energy state of a nuclide that exists in different long-lived energy states with different radioactive properties. A metastable state will frequently decay by isomeric transition.
MMMF	Man-Made Mineral Fibre.
MoD	Ministry of Defence.
MODIX	Multi-stage Oxidative Decontamination with Ion-Exchange. A process used, among other things, to clean the pressure vessels and primary circuit pipework of nuclear submarines prior to refuelling.
MOX	Mixed Oxide. Refers to nuclear fuel consisting of uranium oxide and plutonium oxide for use in reactors.
MRWS	The Managing Radioactive Waste Safely programme was established by Government for developing and implementing a policy for managing the UK's higher activity radioactive wastes in the long-term.
MTR	Materials Testing Reactor.
MWP	Minor Waste Producers

NDA	Nuclear Decommissioning Authority. A public body set up by the Government in April 2005 with responsibility for the UK's public sector civil nuclear liabilities, and their subsequent management. In October 2006, the Government also gave the NDA the responsibility for developing and ensuring delivery and implementation of the programmes for interim storage and geological disposal of the UK's higher activity wastes. From March 2007, the NDA was also given responsibility for developing a UK wide strategy for managing the UK nuclear industry's LLW and for securing disposal capacity for LLW generated by non-nuclear industry users.
NDS	Commercial disposal service formerly operated by AEA Technology Harwell, sometimes referred to as the National Disposal Service.
NIA65	Nuclear Installations Act 1965.
Nimonic	An alloy of the elements nickel, chromium and other minor constituents.
NNL	National Nuclear Laboratory Limited. A Government owned science and technology services company. Formerly known as Nexia Solutions.
NPS	National Policy Statement.
NRTE	Naval Reactor Test Establishment (at Vulcan, Dounreay).
Nuclear fuel	Fuel used in a nuclear reactor. Most fuel is made of uranium, and produces heat when the uranium atoms split into smaller fragments.
Operational waste	Wastes arising from the day-to-day operations of a facility associated with the use or handling of radioactive materials.
Packaged volume	The volume of waste after packaging, consisting of the waste material, any encapsulating matrix, any capping grout and ullage, and the container.
Packaged waste	Radioactive waste that has undergone *Packaging*.
Packaging	The loading of waste into a container for long-term storage and/or disposal. In most but not all cases this includes conditioning.
PCD	Primary Circuit Decontamination.
PCM	Plutonium Contaminated Material.
PFR	Prototype Fast Reactor (at Dounreay site).
PIE	Post Irradiation Examination, of fuel elements etc.
PLUTO	Heavy-water cooled and moderated materials testing reactor (at Harwell site; shut down in 1990).
Plutonium	A radioactive element created in nuclear reactors. It can be separated from spent nuclear fuel by reprocessing. Plutonium is used as a nuclear fuel, in nuclear weapons and as a power source for space probes.
POCO	Post Operational Clean Out. Activity after final shutdown that prepares a plant for decommissioning.

Pond furniture	Various storage racks, skips, frames, containers and MEBs used for storing irradiated fuel in cooling ponds.
Pu	Plutonium.
PWR	Pressurised Water Reactor.
PWTP	Pond Water Treatment Plant (at reactor sites).
Radioactivity	A property possessed by some atoms that split spontaneously, with release of energy through emission of a sub-atomic particle and/or radiation.
Raffinate	A solution resulting from a solvent extraction process. The term is applied to the aqueous solution of fission products (liquid HLW) remaining after the extraction of uranium and plutonium in the first stage or irradiated fuel reprocessing.
Reprocessing	The chemical extraction of reusable uranium and plutonium from waste materials in spent nuclear fuel.
RHILW	Remote Handled Intermediate Level Waste.
RRMPOL	Rolls-Royce Marine Power Operations Ltd.
RV	Resin Vault (at Trawsfynydd).
Safestore	A strategy for decommissioning gas-cooled power stations that involves the construction of containments around all buildings containing active plant. The purpose is to protect the buildings and their contents from deterioration due to weathering so that complete dismantling can be deferred.
SDP	Sodium Disposal Plant (at Dounreay).
SDP	Sellafield Direct Encapsulation Plant.
SEP	Silo Emptying Plant (at Sellafield).
SEPA	Scottish Environment Protection Agency.
SETP	Segregated Effluent Treatment Plant (at Sellafield).
SGHWR	Steam Generating Heavy Water Reactor (at Winfrith site). Shut down in 1990.
SIXEP	Site Ion EXchange Plant (at Sellafield).
SLC	Site Licence Company.
S&M	Surveillance and Maintenance. A term used for a stage of decommissioning for nuclear chemical plants at Sellafield.
Small users	Organisations that use radioactive materials and create radioactive wastes that are not part of the nuclear sector licensed under the Nuclear Installations Act 1965 (as amended), including hospitals, universities and industrial undertakings.
SMP	Sellafield MOX Plant.
SoLA	Substances of Low Activity.
SPF	Sand Pressure Filter.
SPP	Sludge Packaging Plant (at Sellafield).

SSBN	Ship Submersible Ballistic Nuclear. A nuclear powered submarine armed with ballistic missiles.
SSN	Ship Submersible Nuclear. A nuclear powered (hunter-killer) submarine.
Storage	The emplacement of waste in a suitable facility with the intent to retrieve it at a later date.
Supercompaction	A general term that describes the reduction in bulk volume by the application of high external force. It differs from routine compaction methods by using hydraulic equipment capable of exerting forces of 1,000-2,000 tonnes, and the original container (metal drum or box) is supercompacted along with its contents. Waste is often precompacted into steel drums or boxes prior to supercompaction of the drum or box.
SWR	SIXEP Waste Retrieval.
TBq	Terabecquerel, one million million (10^{12}) Becquerels.
Tc	Technetium, an element atomic number 43.
te	Tonnes
tHM	Tonnes of Heavy Metal – a measure of mass.
Thorp	Thermal Oxide Reprocessing Plant (at Sellafield site).
THTR	Thorium High Temperature Reactor.
TILWSP	Transportable Intermediate Level Waste Solidification Plant.
TN	Transnucleaire; a company name.
Treatment	A process that changes the state or form of radioactive waste to facilitate its future management. It may or may not serve to put the waste into its finally conditioned form.
Tritiated	Containing tritium.
Tritium	An isotope of hydrogen (H-3) having a radioactive half-life of about 12 years.
TSSBN	Trident Ship Submersible Ballistic Nuclear. A nuclear powered submarine with Trident ballistic nuclear missiles.
tU	Tonnes of Uranium – a measure of mass.
United Kingdom Atomic Energy Authority	A public body that manages the UK fusion research programme and operates the Joint European Torus (JET). Originally formed in 1954 to carry out nuclear research for the UK Government.
UKAEA Ltd	A subsidiary of Babcock International Group. Before its sale in 2009, the commercial arm of the United Kingdom Atomic Energy Authority.
Ullage	The space remaining within a container above the conditioned waste matrix and any capping material.
Uranium	A radioactive element that occurs in nature. Uranium is used for nuclear fuel and in nuclear weapons.

Vitrification	The process of converting materials into a glass or glass-like form. Vitrification is the process used at Sellafield to convert liquid HLW from spent fuel reprocessing into a borosilicate glass.
VLLW	Very Low Level Waste.
Vulcan	The Naval Reactor Test Establishment, located adjacent to UKAEA's Dounreay site on the north coast of Scotland.
WAGR	Windscale Advanced Gas-cooled Reactor (shut down in 1981).
WAMAC	Waste Monitoring and Compaction facility (at Sellafield site).
Waste package	A container and its content of conditioned radioactive waste.
WEP	Wastes Encapsulation Plant (at Sellafield).
WETP	Winfrith East Treatment Plant.
WPEP	Waste Packaging and Encapsulation Plant (at Sellafield).
WRACS	Waste Receipt Assay Characterisation and Supercompaction facility (At Dounreay).
WRAT	Waste Requiring Additional Treatment.
WSCD	Waste Stream Characterisation Document.
WTC	Waste Treatment Complex (at Sellafield).
WVP	Waste Vitrification Plant (at Sellafield).
Zircaloy	An alloy of the element zirconium used for the cladding of nuclear fuel – particularly in water reactors.

ACKNOWLEDGEMENTS

This report was prepared by Pöyry Energy Ltd. The project team included A Adeogun, A Belton, A McAlley, J Povall, T Scanlon and S Smith under the leadership of M Plews. The assistance and encouragement of M Wakerley, B Cairns, A Craze and L Mortimer of DECC and M McMinn, F Brown and J Nobbs of NDA, was crucial in compiling this report.

Furthermore, acknowledgements are due to the waste producers who provided the information for this report. To name but a few individuals: G Garrs of LLW Repository Ltd; C Cassidy, and J Stirrat of Sellafield Ltd; A Gandhi of Magnox South Ltd; N Westall of Magnox North Ltd; R Brownlow of Springfields Fuels Ltd; R Anderson of British Energy; R Barton and K Thain of DSRL; H Thomason of RSRL; M Barclay, C Barham, R Clark, N Dickinson, K Elwell, R Hendrie, M Hill, D Hull, J Jarvis, M Lambden, P Langham, M Murray, P Northcott, R Winterbourne and C Wood on behalf of the Ministry of Defence; P Hayes of GE Healthcare Ltd; M Peers of Urenco. There were many other contributors of information in these organisations with whom the Pöyry team had no direct contact; their help in compiling this Inventory is gratefully acknowledged.

Finally, we were all saddened to hear of the death of Val White in September 2010. Val made a significant contribution to the UK Radioactive Waste Inventory at Sellafield Ltd for many years, and will be missed by all those fortunate to have known her.

URN 10D/985
NDA/ST/STY (11) 0004
February 2011

Certificate No. 4002929

Certificate No. 4002929/A

Further copies of this and other 2010 Inventory documents can be obtained from the NDA (see contact details below) or via the UK Radioactive Waste Inventory website **www.nda.gov.uk/ukinventory**

Nuclear Decommissioning Authority
Information Access Manager
Herdus House
Westlakes Science & Technology Park
Moor Row
Cumbria
CA24 3HU

T +44 (0) 1925 802077

foi@nda.gov.uk

ISBN: 978-1-905985-21-0

Front cover images: top left - Redundant facilities being demolished at Dounreay in 2007, top right - Asbestos removal at Chapelcross, bottom left - Trawsfynydd ILW store, bottom right - ILW storage at Winfrith.

© Nuclear Decommissioning Authority 2011. Some images courtesy of site licence companies. Every effort is taken to ensure the accuracy of material or images produced or used by the NDA. However, the NDA cannot guarantee that the images shown will always be current, accurate or complete and does not warrant or endorse the accuracy or completeness of the images.
25/02 300