Comhshaol, Pobal agus Rialtas Áitiúil
Environment, Community and Local Government

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

NATIONAL REPORT BY IRELAND

DEPARTMENT OF THE ENVIRONMENT, COMMUNITY & LOCAL GOVERNMENT

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CONTENTS

Section A: Introduction

Ireland became a member of the International Atomic Energy Agency in 1970. In March, 2000, Ireland was the 25th State to ratify the IAEA Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, thus bringing the Convention into force.

This, Ireland's Fourth National Report under the terms of the Convention, details the framework of appropriate legislation, regulatory and administrative measures necessary for the implementation of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management in Ireland. It also sets out measures adopted to implement the relevant obligations of the Convention noting that Ireland does not have any spent nuclear fuel to deal with. This National Report has been prepared taking into account comments and questions on Ireland's previous Report of 2008 and is laid out according to the requirements and headings contained in the IAEA Information Circular INFCIRC/604 of July 2002 (Ref 1) and according to the definitions in the IAEA INFCIRC/546 December 1997.

Ireland is also a member of the EU and, therefore, transposes into its national legislation, EU Council Directives concerning the safety of nuclear installations and spent fuel, radioactive waste and radiation protection measures for workers and the public. In addition, Ireland is a signatory to a number of international Conventions and Agreements which contain elements relating to nuclear and radiological matters, including the OSPAR Convention on the Protection of the Marine Environment of the North-East Atlantic. Where relevant, these are referred to later in the report.

Ireland currently meets its electricity requirements from a combination of thermal and renewable energy sources. Ireland has chosen not to develop a nuclear power industry and the Government has no plans for a change of policy in this respect. Factors informing the formation of this policy include concerns about public health and safety, environmental protection and security, as well as concern at the continued absence of an acceptable solution to the problem of the long-term management of the large quantities of radioactive waste produced by nuclear power stations.

Ireland has:

- No nuclear power stations.
- No defence reactors for research or other purposes.
- No spent nuclear reactor fuel in storage or awaiting treatment and no associated spent fuel reprocessing facilities of any sort.
- No trans-boundary movement of spent nuclear fuel from other countries across its territory, nor through its territorial waters.

Moreover, Ireland has no civilian research reactors (including those for production of isotope sources, any requirements for which are met by importing sources in a readymade form).

However, like all modern societies, Ireland uses radioactive materials in the form of sealed and unsealed sources in support of its high technology industries and its medical and other societal infrastructure. These activities give rise to waste materials such as disused sealed sources. There is also a quantity of natural uranium that was previously incorporated in a sub-critical assembly in a university details of which are included in this report. There are also small amounts of naturally occurring radioactive materials that are produced and also discharged as a result of Ireland's exploitation of natural resources.

Ireland, therefore, has a small but well-developed infrastructure to control and monitor these materials and to provide the necessary protection of public and workers health. This is exercised through the Radiological Protection Institute of Ireland (RPII) which is the national competent authority and regulatory body for regulating, *inter alia*, the custody, use and disposal of radioactive substances and irradiating apparatus (See Section E Article 20 for functions of the RPII).

In late 2010 the Government adopted a policy outlining principles and key future steps to be taken with regard to Radioactive Waste Management in Ireland. Further detail on this policy is given in Section B of this report.

In respect of Article 32 of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, Ireland's National Report focuses on radioactive waste arising from the medical, industrial and research applications of radioisotopes.

The scope of the application of the Convention states that the Convention shall not apply to waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source or it is declared as radioactive waste for the purposes of this Convention by the Contracting Party. To demonstrate Ireland's commitment to safety and the protection of its population from all sources of ionising radiation, reference is made in this National Report to the control of such sources and materials.

Summary of Achievements during the Reporting Period

As will be detailed in the report, significant improvements have been achieved during the reporting period and these include:

- The adoption by Government of a national policy on radioactive waste management which provides for a national used source reduction programme and the establishment of a centralised storage facility for the interim storage and management of residual sources.

- The establishment of a National Implementation Committee to coordinate the national source reduction programme.
- The Establishment of a Technical Working Group to advise on the design and siting of a national storage facility for the interim storage and management of residual sources.
- The agreement by Government of an operational protocol for dealing with seized and orphaned sources.
- Actual reductions in locations where disused sources are stored as well as an overall reduction in the number of disused sources stored.
- A comprehensive report on the management of spent radioactive sources in the republic of Ireland completed in July 2010.
- The adoption of a regulatory position on the authorisation of the use of holding tanks for the decay storage of effluent from radioiodine ablation facilities.
- The publication of a series of regulatory guidance documents on the management of certain radioactive wastes including:
    - A Guidance Note on the Management of X-ray Units at End-of-Life
    - A Guidance Note on the Management of Waste Ionisation Chamber Smoke Detectors (ICSDs)
    - A Guidance Note for the Disposal of Decayed Sources to Landfill Facilities
    - A Guidance Note for the Disposal of Prepared Uranium and Thorium Compounds
- Ireland has requested an Integrated Regulatory Review Service (IRRS) mission from the IAEA which is scheduled to take place during 2015.

Section B: Policies and Practices

Article 32. Reporting

Article 32. Spent Fuel Management Policy

Ireland has no civil or defence reactors to deal with.

Article 32. Spent Fuel Management Practices

Ireland has no fuel processing facilities to deal with.

Article 32. Radioactive Waste Management Policy

In late 2010 the Government adopted a policy outlining principles and key future steps to be taken with regard to Radioactive Waste Management in Ireland. Development of the policy was guided by the following principles:

- The need to address the storage and disposal of legacy and orphan sources into the future in a safe, secure and sustainable way that meets Ireland's international commitments and addresses domestic concerns.

- To aim to do this in a way that has the support of stakeholders (including those who hold and use radioactive sources, and relevant Government Departments and Agencies) and of the public.

- The development and implementation of the policy needs a "whole of Government" approach, with a high level of inter-agency co-operation in a context of agreed and clearly defined demarcation of roles and responsibilities.

- There is no "one size fits all" solution to the variety of waste sources and requires a number of parallel and complementary strands.

- The resource requirements of implementing the policy should be addressed, as far as possible, according to the "polluter pays" principle.

- The policy reflects the specific roles of key stakeholders including the role of the regulatory authority in terms of licensing and compliance monitoring.

The key elements of the policy are:

- A National Radioactive Waste Storage Facility for disused radioactive sources is to be established. A National Implementation Committee, comprising of the RPII, Environmental Protection Agency (EPA) and Department of Environment, Community and Local Government (DECLG) has been constituted to draw up a detailed specification for the facility and make recommendations on the siting, management and resourcing of the facility.

- An inventory of disused radioactive sources currently stored in Ireland is to be reduced through a co-ordinated and phased Inventory Reduction Programme.

- Interim centralisation of sources by sector in a small number of sector-specific existing storage facilities.

- The Group has been mandated to give further consideration to options for the final disposal of Ireland's disused radioactive sources.

- Further updates will be provided to Government, as necessary, as this work progresses.

Radioactive Waste Management Guiding Principles

Ireland follows the principles of;

- minimisation of the generation of radioactive waste in any form
- avoidance of the importation of radioactive waste in any form.

Another principle is the management of all sealed sources from "cradle to grave". This includes a licensing system and take-back arrangements with the original overseas supplier of the sources (discussed in detail below).

If available, the practice of replacement of radioactive sources by non-radioactive alternatives is applied. This includes, for example, prohibiting the import and use of lightning conductors that employ radioactive sources or of radium used in luminising materials.

The disposal limits in licence conditions relating to the disposal of radioactive waste in Ireland are generally set at levels such that it can be demonstrated that doses to the public will be very low and typically less than 10 µSv/year.

Criteria Used to Define and Categorise Radioactive Waste

Categorisation of radioactive materials and radioactive waste in Ireland is based on a pragmatic approach consistent with the relatively simple needs of the country.

The definition of radioactive waste is derived from Council Directive 93/3/EURATOM, which states that 'radioactive waste' means any material which contains or is contaminated by radio-nuclides and for which no use is foreseen.

The waste categorisation scheme under the current categories applicable in Ireland are disused sealed sources in storage/custody; unsealed radioactive material arising from medical applications that are disposed of, and the uranium rods as described in Section J.

In Ireland, sealed and unsealed sources are used in the State and private sectors of the economy. In the public sector, the main users are medical and educational establishments. The uses of sealed sources in the private sector includes in gauges, as check sources and in medical devices. The lists of sources that are now classified as disused and held in custody have been summarised in Appendix 1 (Table 1.1 – 1.16) of the Report. They are illustrated by sector (medical, industrial, educational and state) and categorised by half life (< 1 y, 1-5 y, 5-10 y, > 10 y).

The regulation by the RPII of practices involving ionising radiation and radioactive materials in Ireland is provided for in Ireland's Radiological Protection Act 1991 (Ionising Radiation) Order, 2000 (S.I. No. 125 of 2000). This is discussed in more detail under Section E Article 20.

Exemption

Exemptions from the requirements of S.I. No. 125 of 2000 are covered under Article 5 of the S.I. and include exemptions with respect to the specific and total activity of materials that are being handled, used or disposed of as radioactive waste and also exemptions with respect to practices. With respect to the former, these are based on the Schedule to and text of Annex I of EU Council Directive 96/29 Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation (Ref 2) and are, therefore, fully consistent with other EU Countries. The Annex and Article 5 of S.I. No. 125 of 2000 also include practices that may be treated as exempt from the regulatory regime. Practices may be exempt if it can be shown that under all circumstances doses will not exceed certain prescribed values.

Clearance levels

Regarding Clearance, this concept is deliberately excluded from S.I. No. 125 of 2000. The RPII must license the disposal, recycling or reuse of radioactive substances or radioactive materials arising from any licensed practice. In drafting the legislation and recognising that Ireland does not have a nuclear industry, it was decided not to include the concept of clearance levels in the legislation.

NORM (Naturally Occurring Radioactive Material)

Hazards from ionising radiation due to natural sources of radiation are covered within Ireland's Radiological Protection Act 1991 (Ionising Radiation) Order 2000 (S.I. No. 125 of 2000) Part 6 (Work Activities Involving Natural Radiation Sources). Essentially, this states that the use or disposal of naturally occurring radioactive materials (NORM) in Irish workplaces are subject to regulation if they are liable to give rise to a radiation dose of greater than 1 mSv/year.

As previously reported, the RPII has carried out an extensive survey of such industries and the materials they handle and dispose of, including those involving discrete sources (e.g. thoriated products) and diffuse sources (mainly those arising from extractive industries, especially oil and gas but also peat burning and bauxite and cement production). Because of the wide range of processes involved, the RPII has found it necessary to adopt a sector-specific approach to the risk assessment methodologies it has adopted. The results of the associated studies have been published (Ref 3).

The overall conclusion from this work is that no worker is likely to receive a dose in excess of 1 mSv, where the NORM waste would be subject to regulation under S.I. No. 125 of 2000 (Ref 4), and, as such, the industries in question do not need additional regulatory oversight from the viewpoint of exposure to radiation. The assessments undertaken have also demonstrated that doses likely to be received by members of the public are considerably lower than those received by workers and are well within limits set in national legislation.

Future Changes

As previously reported, Ireland is fully cognisant of developments in the area of the categorisation of radioactive waste in general such as those set out in EUR 18324 EN1998 (Ref 5) and of sealed sources in particular, such as that proposed by the IAEA (Ref 6). The current licensing system and methods of record keeping will readily be able to accommodate such categorisation when required. Moreover, the current licensing and inspection regime in Ireland is designed to reflect the level of hazard posed by different types of sources and practices, i.e. the more hazardous practices and sources are inspected most frequently and in greatest detail.

The European Council has recently adopted a new directive (2011/70/EURATOM) establishing a community framework for the responsible and safe management of spent fuel and radioactive waste. The directive applies, *inter alia*, to radioactive waste management, from generation to disposal, when radioactive waste results from civilian activities. It provides for the establishment of national policies and national programmes on radioactive waste management and sets out certain criteria that should be used in developing such policies and procedures. In particular, it strongly encourages Member States to make arrangements for the disposal of wastes in the Member State in which it was produced though it does allow for international arrangements. It sets out the requirements for a national waste management framework including the competent regulatory authority as well as the responsibilities of licence holders. It has provisions on transparency and reporting and specifically provides for a peer review of national arrangements every ten years. The end date for transposition of the directive into national legislation is 23rd August 2013 and will guide future actions in relation to radioactive waste management and disposal.

Section C: Scope of Application

Article 3(1). Reprocessing

Ireland does not carry out any storage or reprocessing of spent fuel from any civil nuclear programme, current or historic and, therefore, has not declared any spent fuel for the purposes of the Convention, pursuant to Article 3 (1).

Article 3(2). Naturally Occurring Radioactive Materials (NORM)

The issue of NORM is addressed in Section B of this Report.

Article 3(3). Spent Fuel or Radioactive Waste (Within Military or Defence Programmes)

Ireland has no defence, research or other reactors, current, or historic and, therefore, has declared no spent fuel within military or defence programmes for the purposes of the Convention, pursuant to Article 3 (3).

Ireland has also declared small amounts of radium. Further details are given under Section J (disused sealed sources).

Section D: Inventories and Lists

Article 32. Reporting - Paragraph 2 Inventory and lists

The only materials declared as radioactive waste under the current categories applicable in Ireland are disused sealed sources in storage/custody; unsealed radioactive material arising from medical applications that are disposed of, and the uranium rods described in Section J.

Ireland introduced a detailed licensing system for users (and their premises) using sealed sources in 1977. This has allowed a detailed pattern of the locations and life histories of sources to be built up, allowing tracking of those that are still in use and those which are now disused (and considered to be radioactive waste) to be maintained. It also allows a regular schedule of inspections and monitoring to be carried out by the RPII. The RPII's bespoke Structured Query Language (SQL) compliant database is used to maintain licensing information relating to all sources of ionising radiation held under licence throughout Ireland. From the source's first entry into the licensing system, its history is tracked from the authorisation to acquire the source, through information on any transfers between licensees to the return of the source to the supplier through the mandatory take-back agreement. The database includes information detailing the radionuclide type, activity, number of sources and location. Licensees are required to advise the RPII of any changes relating to any of the items for which they are licensed and the RPII's database is updated accordingly. Information held on the RPII's database is routinely audited by RPII inspectors during inspections of these licensees. The system of licensing and on-going developments is described in further detail below.

Using the licence records, the RPII is able to give a breakdown of the total number of sources that are disused and in safe storage (under the relevant licence conditions) and their locations. A summary list of the nuclides and total number of disused sources from the RPII data is shown in Appendix 1 (Table 1.1 – 1.16). Further details of the dominant sources are given in Section J.

As most of the material is in sealed sources, the physical size of the inventory, even taking account of shielding and packaging, is also small in comparison to the large volumes encountered in fuel cycle programmes. A report commissioned in 2010 estimated that the current waste inventory would require a storage capacity of only fifty-three 200 litre drums though this could increase significantly if a source reduction programme was not implemented and take back agreements were not exercised.

Section E: Legislative and Regulatory System

Article 18. Implementing Measures

Responsibility for nuclear safety policy is vested in the Minister for the Environment, Community and Local Government. Within DECLG, there is a dedicated Environmental Radiation Policy Unit, whose responsibilities include:

- Policy development and advice to Government in relation to nuclear matters;
- Transposition into national legislation of relevant EU and other international instruments;
- Representation at meetings of the EU, IAEA and other international organisations.

The Environmental Radiation Policy Unit is assisted in these activities by the Radiological Protection Institute of Ireland (RPII) described in more detail under Article 20 of this Section.

Ireland's policy on nuclear weapons non-proliferation and disarmament is the responsibility of the Department of Foreign Affairs. For many years now, Ireland has been very proactive in promoting and supporting nuclear weapons non-proliferation and nuclear disarmament.

Article 19. Legislative and Regulatory Framework

Because Ireland is a member of the European Union, its regulatory framework in respect of radioactive waste and the protection of workers and the public from the hazards associated with ionising radiation is based on the relevant EU Directives and Regulations.

The framework legislation governing the nuclear and radiation protection sectors in Ireland is the Radiological Protection Act, 1991 as amended. This Act repealed the Nuclear Energy Act, 1971. Under the 1991 Act, the Minister for the Environment, Community and Local Government has Ministerial responsibility in relation to nuclear and radiological protection matters. The Act also established the Radiological Protection Institute of Ireland (RPII) as the national Regulatory body.

The Radiological Protection Act, 1991 (Ionising Radiation) Order, 2000 (S.I. No.125 of 2000), which was made under Section 30 of the Radiological Protection Act of 1991, gives legal effect in Ireland to EU Council Directive 96/29/Euratom of 13 May 1996, which lays down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation (Ref 2), and EU Council Directive 90/641/Euratom of 4 December 1990 on the operational protection of outside workers exposed to the risk of ionising radiation during their activities in

controlled areas. Under S.I. No. 125 of 2000, all activities involving radioactive sources, save those which meet the criteria for exemption specified in the S.I., require a licence from the RPII. In addition, the Radiological Protection Act 1991 (Control of High Activity Sealed Radioactive Sources) Order (S.I. No. 875 of 2005) gives effect to Council Directive 2003/122/EURATOM on the control of high activity sealed radioactive sources and orphan sources.

The Radiological Protection Act, 1991 sets out the functions of the RPII as well as the legislative powers of the Minister for the Environment, Community and Local Government in the areas of nuclear safety and radiological protection. The Act also provides for the implementation of future European Union legislation in the area of radiation protection by means of Ministerial Order. It also sets out specific responsibilities of other Government Ministers and functions of the Food Safety Authority of Ireland, principally in regard to the protection of individuals from radiological hazards in food.

The Radiological Protection Act, 1991 (Ionising Radiation) Order, 2000 (S.I. No. 125 of 2000) is divided into a number of sections and areas, which include the following: -

- Regulation of practices and work activities. A distinction is drawn between practices involving ionising radiation emanating from artificial or natural sources and work activities involving exposure to natural radiation such as radon (in excess of 400 Bq m^{-3}) or other natural sources.
- Justification, optimisation and dose limitation.
- Estimation of effective dose.
- Protection of exposed workers, apprentices and students.
- Radiation protection of the population for practices in normal circumstances.
- Intervention and Emergency Preparedness.
- Enforcement.

In addition to the Radiological Protection Act, 1991 and S.I. No. 125 of 2000, the principal Irish legislation directly or indirectly relating to nuclear matters and radiological protection includes the following:

- Radiological Protection Act, 1991 (Nuclear Safety) Order, 2011 (S.I. No. 390 of 2011)
- European Communities (Supervision and Control of Certain Shipments of Radioactive Waste and Spent Fuel) Order, 2009 (S.I. No. 86 of 2009)
- Radiological Protection Act 1991 (Control of high-activity sealed radioactive sources) Order 2005 (S.I. No. 875 of 2005).

- Radiological Protection Act, 1991 (Licensing Application and Fees) Regulations, 2007 (S.I. No. 654 of 2007).
- Health Act, 1953 (No. 26 of 1953).
- Safety, Health & Welfare at Work Act, 2005 (No. 10 of 2005).
- Dumping at Sea Act, 1996 (No. 14 of 1996).
- Harbours Act, 1996 (No. 11 of 1996), as amended by the Harbours (Amendment) Act 2000 (No. 21 of 2000).
- Containment of Nuclear Weapons Act 2003 (No. 35 of 2003).
- Nuclear Test Ban Act 2008 (No. 16 of 2008).
- European Communities (Radiological Emergency Warning to Public) Regulations 1993 (S.I. No. 209 of 1993).
- Electricity Regulation Act 1999 (No. 23 of 1999).

There is also other legislation relating to the transport of radioactive materials which is described later.

A list of the main Irish legislation pertaining to ionising radiation is provided in Appendix 2.

It was reported previously that RPII, as part of an initiative of continual improvement and seeking best regulatory practice initiated an inter-comparison of regulatory activities with its counterpart in Luxembourg with the focus on the implementation of Council Directive 96/29/Euratom. This valuable process commenced with a visit to the Division de la Radioprotection, Direction de la Santé, Ministère de la Santé, Grand Duché De Luxembourg, and was concluded with a return visit in November 2008.

The mission to Luxembourg addressed in general the following areas of mutual interest: High Activity Sealed Sources (HASS), radon (work done in homes and workplaces), cosmic ray exposure to aircrew, gamma monitoring stations, licensing and regulatory systems, classification of workers, management of waste, and the industrial and medical uses of ionising radiation. A visit to an iodine ablation facility was also arranged which was very informative. A tour of the environmental radioactivity laboratory and the emergency planning facility was also provided. On the return mission to the RPII in Dublin in November 2008, the following items were addressed: enforcement activities, implementation of the HASS Directive, incident reporting in the medical sector, peer review projects (NDT sector, industrial sterilisation facilities and radiotherapy facilities), licensing of radioiodine facilities, accreditation of inspection services to ISO 17020 and the Association of Competent Authorities in Transport of Radioactive Material. The Luxembourg representative also witnessed a formal half day inspection of an industrial facility using radioactive sources.

Both organisations found the inter-comparison extremely useful. The opportunity to

compare and discuss national regulatory arrangements with another national regulatory organisation was of great mutual benefit.

Article 20. Regulatory Body

The Radiological Protection Institute of Ireland (RPII)

Mission Statement

"To ensure that people in Ireland are protected from the harmful effects of radiation"

The RPII is an independent public State sponsored body that reports to and is partially funded by the Department of the Environment, Community and Local Government. In 2010 the Government provided approximately 65% of the RPII expenditure by way of a grant, with the remaining 35% being funded by earned income. RPII was established under the Radiological Protection Act, 1991. The Regulatory Service of the RPII is under the overall responsibility of the Director of Regulation and Information Management who reports to the Chief Executive of the RPII. The RPII has the following duties and responsibilities:

- To provide advice to the Government, the Minister for Environment, Community and Local Government and other Ministers on matters relating to radiological safety.
- To provide information to the public on any matters relating to radiological safety which the Institute deems fit.
- To maintain and develop a national laboratory for the measurement of levels of radioactivity in the environment and to assess the significance of these levels for the Irish population.
- To regulate by licence the custody, use, manufacture, importation, transportation, distribution, exportation and disposal of radioactive substances, irradiating apparatus and other sources of ionising radiation.
- To assist in the development of national plans for emergencies arising from nuclear accidents and to act in support of such plans.
- To provide a radioactivity measurement and certification service.
- To prepare codes and guidance for the safe use of ionising radiation.
- To carry out or promote research in relevant fields.
- To monitor developments abroad relating to nuclear installations and radiological safety generally and to keep the Government informed of their implications for Ireland.

- To co-operate with the relevant authorities in other states and with appropriate international organisations.
- To represent the State on international bodies.
- To be the competent authority under international conventions on nuclear matters.

The RPII has also been designated the national competent authority for the purposes of the IAEA Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency and the Convention on Early Notification of a Nuclear Accident and is the National Authority responsible for the physical protection of nuclear material.

In 2010, the RPII developed and adopted a new strategic plan for the three years 2011 to 2013 which identifies four strategic priorities focused on delivering on its mission. They are to:

- Provide the expertise, technical capability and information essential to the protection of the Irish population and the environment
- Regulate the safe and secure use of ionising radiation in Ireland in a sustainable and transparent manner
- Work in partnership with others to implement national radiological protection initiatives
- Deliver value to the public in everything we do

Under the Radiological Protection Act of 1991, the RPII regulates the custody, use and disposal of radioactive materials in Ireland through a licensing scheme, the terms and conditions of which are set out under S.I. No.125 of 2000 (referred to earlier), which is a Ministerial Order made under Section 30 of the 1991 Act. S.I. No. 125 of 2000, in addition to providing for the licensing scheme, also transposes Council Directive 96/29 Euratom of 13 May 1996, referred to earlier, into national legislation.

The RPII publishes an Annual Report on its activities. The 2010 Annual Report will be published shortly (Ref 7).

The Licensing System

The licensing system operated by the RPII according to the requirements of the Radiological Protection Act, 1991 and of S.I. No. 125 of 2000 is central to the control of radioactive materials and radioactive waste in Ireland. There are currently 1737 active licences covering a broad range of activities including radiotherapy, research, non destructive testing and process irradiation. They are summarised in Figure 1. In addition, the High Activity Sealed Radioactive Sources and Orphan Sources (HASS) Directive was transposed into Irish Law in December 2005, Radiological Protection Act 1991 (Control of high-activity sealed radioactive sources) Order 2005 (S.I. No. 875 of 2005). The RPII

is designated as the Competent Authority for the purposes of the Legislation and the Directive.

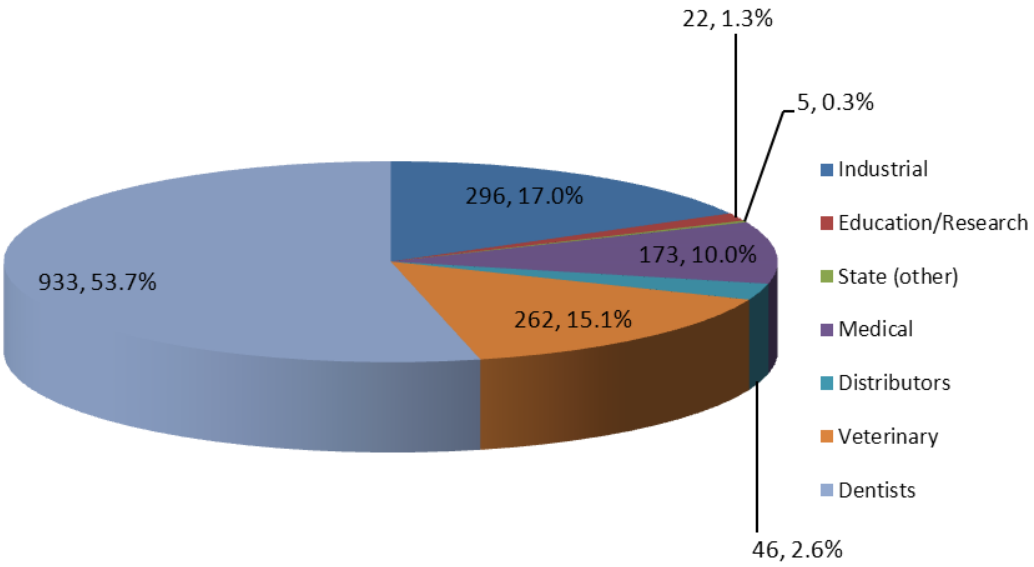

Figure 1: Licensees by Sector (1st January 2011)

Key aspects of licensing central to implementing the overall policy on radioactive waste are as follows (it also covers aspects of the responsibilities of licence holders):-

- The licensing system in Ireland for sealed and unsealed sources has been in operation since 1977. As part of that system, information has been gathered and maintained on all such sources. This database provides a useful tool in the "cradle to grave" management of sources.

- Holders of disused sources are required to verify their holdings at specific periods which are set out in their licences and to report any anomalies to the RPII. Sealed sources, whether in use or not, must be leak tested not less than once every two years or as recommended by the manufacturers and reported to the RPII.

- Licence conditions include requirements for the management of radioactive waste.

- Licensees are required, as a prerequisite to licence issue, to have an agreement with the source supplier or manufacturer to take back sources ("take back agreement") when they become disused. The RPII looks for written evidence from the supplier or

manufacturer that the source will be accepted back when no longer required before issuing a licence.

- Many categories of licensees are required to appoint a Radiation Protection Adviser (RPA). Furthermore the RPII maintains a Register of all persons approved to act as RPAs to undertakings in the medical, dental, educational and veterinary sectors.

- Licensees wishing to transfer sources between sites must comply with the international transport regulations and any licence conditions that the RPII may consider important to impose. A specialised training course for those involved in the transport of relevant radioactive consignments was first approved by the RPII in 2007 and has been re-evaluated on an annual basis since then. Similar arrangements apply to transboundary shipments (see Section I). Transboundary shipments of sources within the EU are governed by specific pieces of European Community legislation.

- General requirements of the licence include a duty on licensees to keep records, to ensure proper labelling of sources and containers, to provide training and to arrange for the appointment of responsible persons by the licensees. Licensees are obliged to inform the RPII of any changes in the inventory of radioactive waste for which they are responsible and to have their licence amended accordingly.

- Inspectors from the RPII carry out inspections to assess compliance with the licence conditions (see below). Information on the number of inspections carried out in 2010 is presented in Appendix 3.

As a result of a combination of a well established licensing system, take back arrangements and a comprehensive inventory of sources, there have been very few incidents involving orphan sources. The number of such sources that have been discovered is very low and the RPII has dealt with them in consultation with the Department of Environment, Community and Local Government on a case-by-case basis. Where orphan sources have been identified and seized they have been taken into the safe custody of existing licensees. There is now an operational protocol mandated by Government, in place to deal with the management of such sources.

The licence conditions specify that adequate provision must be made, by way of a financial security or any other equivalent means appropriate to high activity sealed sources (HASS), for the safe management of HASS when they become disused sources. A documented financial costing for the safe management of HASS is required with all licence applications/amendments for HASS. This costing shall be signed by the General Manager or equivalent of the company concerned. In addition, a written guarantee from the General Manager or equivalent of the company concerned to cover the cost of management/disposal is required to accompany all licence applications/amendments. This guarantee covers the return or disposal of HASS, including all packaging, transport and return fees even in the event of the applicant/licensee becoming insolvent or going out of business. Any changes in the financial arrangements have to be confirmed in writing to the RPII on an annual basis.

The status of licence conditions is laid down in the Radiological Protection Amendment Act 2002 (Article 3 1B). This article states that "A person who fails to comply with a condition, or any provision of such condition, that is attached to a licence granted pursuant to an order or regulations made under section 30 (as amended by the Radiological Protection (Amendment) Act, 2002) shall be guilty of an offence."

The RPII has powers of enforcement under the Radiological Protection Act of 1991 and under S.I. No. 125 of 2000. It uses these powers where the appropriate standards of radiation protection are not upheld. In particular, the RPII has taken fifty prosecutions in the period between 1992 and 2011 (for offences ranging from a breach of licence conditions to unlicensed disposal of an irradiating apparatus and radon related issues). Of these thirty five resulted in convictions and fines, seven were proven but benefited from the Probation Act, three were proven but struck out and five cases were dismissed. In addition, the RPII has responded to incidents involving orphan sources and contaminated scrap and has worked with all of the actors concerned to resolve the issues involved.

Public Information

One of the key strategic goals for the RPII is to provide information on radiation protection, in a readily accessible and understandable format, so that the public has the necessary information to protect themselves from the harmful effects of exposure to radiation. A range of communication activities are undertaken each year to meet this objective and to promote the work of the RPII through the media, events, advertising, the RPII website, free phone call centre for radon advice, presentations and publications.

The media play a significant role in disseminating information and in reporting on radiological protection issues of public concern. Press releases (on average eight per year) are issued to coincide with the RPII's major events and media interest in RPII activities is strong with staff participating in over 40 television and radio programmes on an annual basis. The print media also have a keen interest in RPII activities. Feature articles have also been placed in publications which assist in highlighting the array of activities that the RPII is responsible for. The RPII ensures that all public communications are focused and use the media to target various groups in the community and continuously develops their existing relationships with the media.

Each year the RPII hosts a number of events including report launches, seminars and presentations with the objective of disseminating information to targeted groups. The RPII's website, www.rpii.ie, is a valuable source of key information. It is the primary communications tools for the RPII and its users. As part of the website redevelopment, the new website has been subject to usability testing by a focus group consisting of members of the public. The testing included consideration of the ease of understanding of website including the text and the tone of the content.

Each year, the RPII produce a number of publications, including reports, guidance notes,

codes of practice, information leaflets and posters – all of which are available free of charge on www.rpii.ie.

Section F: Other General Safety Provisions

Article 21. Responsibility of the Licence Holder

Duties and responsibilities of licence holders in Ireland are described in the licence conditions in Section E Article 20 above.

The principle of prime responsibility of the licence holder is met by a sum of regulatory requirements including justification and adherence to specific licence conditions set down by the Competent Authority (RPII).

Ireland operates a Common Law legal system in which the law comprises a combination of principles adopted and developed by the courts through successive precedent cases and primary and secondary legislation passed by the legislature and government. In summary, the vesting of primary safety responsibility in the person carrying out an activity in Ireland derives from both principles of law developed by the courts and from legislation.

In Ireland primary responsibility for the safety of an installation would rest with the person or body owning and/or operating that installation. Such an allocation of responsibility would derive primarily from legal principles developed by the courts in the area of tortuous liability (i.e. negligence, occupier's and employer's liability etc). The imposition of such primary responsibility on the party carrying out an activity has been reinforced through primary legislation such as the health and safety legislation and miscellaneous secondary legislation such as S.I. No. 125 of 2000.

Article 22. Human and Financial Resources

The organisational structure and the assignment of staff of the RPII is shown in Figure 2. The RPII had a staff of 46.2 at the time of reporting. However, due to the current economic crisis being experienced in Ireland a recruitment embargo has been imposed on the public service including the RPII. Under this embargo, RPII has to reduce its staff numbers to 42 by 2014[1].

[1] Staff Grades: PSO (Principal Scientific Officer), SSO (Senior Scientific Officer), SO (Scientific Officer), Sen Tech (Senior Technician, Tech (Technician), HEO (Higher Executive Officer), EO (Executive Officer), SO (Staff officer), CO (Clerical Officer) , ST O (Staff Officer)

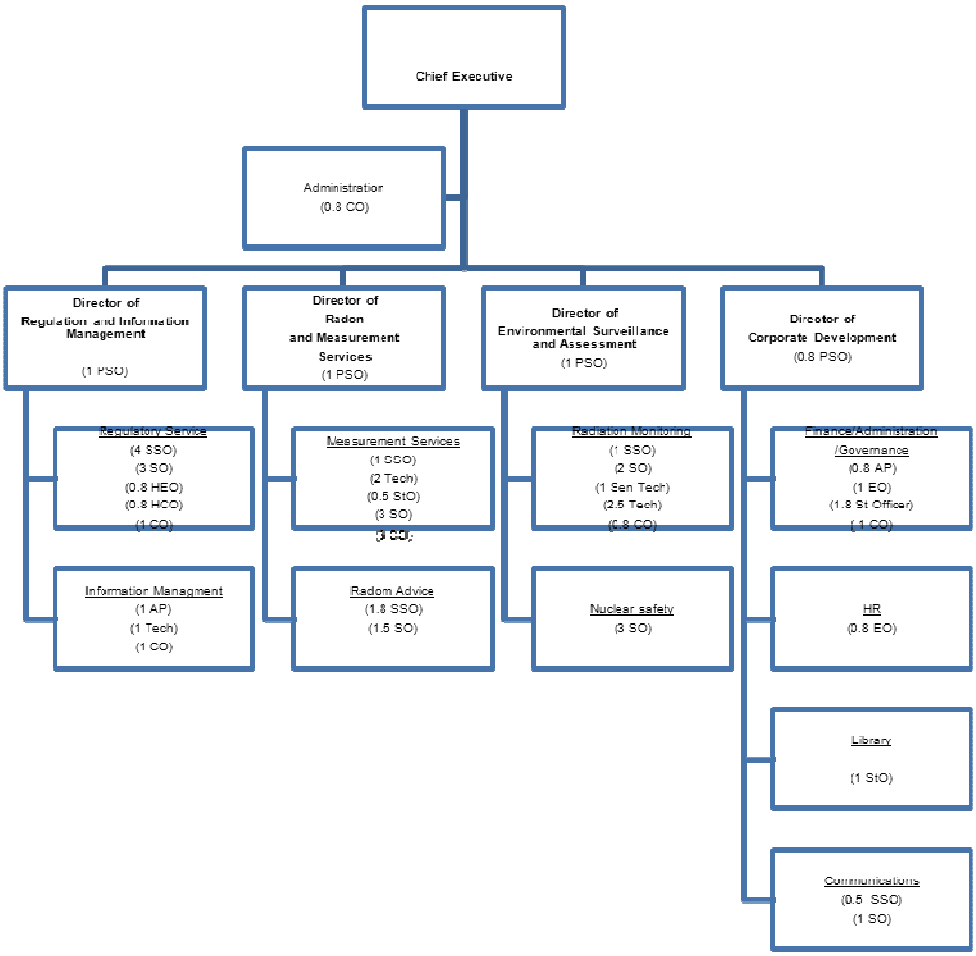

Figure 2: RPII Organisation Chart (2011)

The RPII has a number of inspectors who carry out regular inspections of licensees' premises and facilities to ensure that they comply with their relevant licence conditions. The frequency of the inspections is generally adjusted to be consistent with the degree of hazard and risk involved in the practices covered by each licence. The inspection schedule in 2010 is set out in Appendix 3. A recent history of inspection activities is provided in Figure 3.

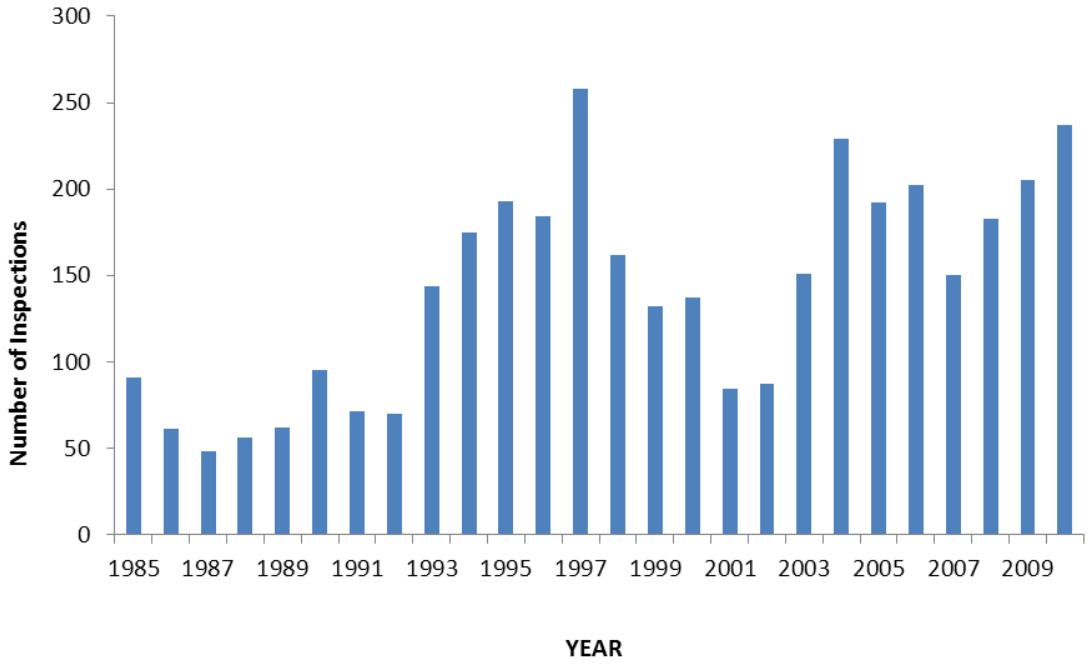

Figure 3: Inspections Undertaken by the Competent Authority (1985 – 2010)

Other aspects of operational radiation protection are described below (Article 24 of the Convention).

The income of the RPII is made up of a grant from the Irish Government and from licence and other fees paid by users of its services. Licence fees are as set out in the Radiological Protection Act, 1991 (Licensing Application and Fees) Regulations, 2007 (S.I. No. 654 of 2007).

Article 23. Quality Assurance

The RPII continually seeks to improve the quality and consistency of its service to its customers. In 2007 the RPII developed a quality system for its inspection activities in line with ISO 17020 (General Criteria for the Operation of Various Types of Bodies

Performing Inspection), an international standard specifically designed for inspection bodies. The quality system provides a framework for planning and reviewing the annual inspection programme, for the conduct of inspections, the follow up to inspections and the training of inspectors. Furthermore, the system facilitates continuous improvement through a transparent process of document management and periodic audits involving all staff. Accreditation was awarded in December 2008 by the Irish National Accreditation Board (INAB) and has been successfully maintained since.

As part of its programme of continuous improvement, the RPII regularly upgrades its laboratory practices and facilities so as to ensure the delivery of a state-of-the-art measurement service. The laboratories of the RPII are accredited to ISO 17025 Standard and also participate in national and international inter laboratory comparison studies.

As reported previously, an IAEA Peer Review Mission conducted in 2000 found that the essential infrastructure for radiation protection in Ireland is well established and that the regulatory programme is effective. The report included a number of recommendations to improve the system of regulation and inspection. These include, in particular, increasing the number of staff, reducing the administrative work load through a combination of increasing the period of validity of licences, and streamlining licensing procedures, in particular for low risk practices. The Peer Review also recommended that inspection programmes include an examination of actual work practices such as that of onsite radiography procedures. It also recommended an improvement in co-operation with other agencies such as the Department of Health. These recommendations have been addressed.

As reported previously, a team from the European Commission visited Ireland in May 2007. The scope of the visit was to verify, under Article 35 of the Euratom Treaty, the operation and efficiency of the facilities for continuous monitoring of the level of radioactivity in the air, water and soil, as well as the monitoring of aerial and liquid radioactive discharges into the environment from nuclear medicine in hospitals in Ireland. The team visited a number of environmental radioactivity monitoring sites and two hospitals. The team concluded (Ref 8) that the requirements of Article 35 are fully met by the facilities, staff and monitoring programme of the RPII and that the work is carried out efficiently and effectively

Article 24. Operational Radiation Protection

Ireland has no historic or current nuclear reactors or spent fuel storage or reprocessing activities. Its operational radiation protection measures are, therefore, centred on:

- Inspections of the premises and procedures of licence holders. An appropriate focus is given to licensees holding custody licences for disused radioactive sources. This has already been covered in Section E under Article 20.

- Emergency monitoring systems. These are described in detail separately (under Article 25 below).

- Routine environmental radiation monitoring of food and water, mainly from the marine environment. This is mainly aimed at ensuring protection from the effects of discharges from the Sellafield re-processing plants in the UK and also commitments to various EU Directives. It also supports Ireland's commitments to OSPAR. In 2010, a total of about 1932 samples were collected and analysed.

- Personnel dosimetry of occupationally exposed workers. The RPII currently operates a personnel radiation dosimetry service using thermoluminescent dosimeters (TLDs). Licensees are entitled to use any personnel dosimetry service, which is accredited by the Irish National Accreditation Board or by its equivalent in another EU Member State.

- Licence conditions which include limits on the quantities of radioactive materials that may be disposed of to the environment.

- In the case of unplanned or uncontrolled release of radioactive materials into the environment, the appropriate measures under the emergency preparedness plan referred to in Article 25 would be initiated.

Article 25. Emergency Preparedness

Ireland's Emergency preparedness is divided into three main areas, i.e.,

- Site emergency planning. These plans relate to licensees' responsibilities in the keeping of sources or of disused sources or their transport.

- Local/regional emergency planning. These plans relate to the response to major emergencies at the local and regional level by the emergency services (Police, Fire Service, Ambulance, Coastguard) and their associated agencies.

- National emergency planning - designed to cater for a widely dispersed radiological emergency or crisis such as that arising from a major incident at a nuclear installation abroad resulting in radioactive contamination reaching Ireland. Certain elements of the national emergency response would also come into play in the case of a local emergency depending on the extent of the emergency.

These are described in outline below.

Site Emergency Plans

Undertakings licensed to carry on certain defined categories of practice, such as transportation of radioactive materials, industrial radiography, industrial irradiation, nuclear medicine and radiotherapy are required, under the Ionising Radiation Order, to prepare detailed emergency plans when directed to do so by the RPII. These plans must be based on risk assessment and must address potential risks to workers, intervention

personnel (e.g. fire services) and, where appropriate, members of the public. These plans must address issues such as resources, consultation with relevant stakeholders, emergency procedures, training, exercises and review. S.I. No. 125 of 2000 requires that undertakings submit the plans to the RPII. It also requires that undertakings immediately notify the RPII of an emergency and to inform the local emergency services of the circumstances with respect to the emergency. A multi-agency protocol has been prepared by the DECLG to assist inter-agency emergency response by fire, ambulance and police services to local radiological incidents. It should be noted that Ireland does not have any sources equivalent to Threat Categories I or II as defined for the purposes of IAEA Safety Requirements GS-R-2 (Ref 9).

Licensees are obliged to report incidents within 24 hours to the RPII. Where it is concluded that the incident was the result of failure of equipment or shortcomings in procedures, other licensees who use the same equipment or who are involved in the same or similar procedures and where by implication, the same incident could occur, are advised accordingly. Incidents, which arise from negligence on the part of the licensee, may result in prosecution. (See Section E Article 20 above).

Major Emergency Plans

In Ireland, Major Emergency Plans are in place in all local authority areas and may be activated by any one of the Principal Response Agencies: the Local Authorities (Fire Service), An Garda Síochána (Police) and the Health Service Executive. Major emergencies include those resulting from fires, transport accidents, hazardous substances incidents and severe weather. The Major Emergency Plan of each agency sets out that agency's response, as well as its contribution to the combined response of all agencies.

In September 2006, a new Framework for Major Emergency Management was launched by Government and following from this all Major Emergency Plans have been updated. A series of inter-agency protocols to underpin the multi-agency response to different categories of emergency is being developed including one related to Radiological/Nuclear Emergencies.

The aim of the protocol is to enable the Principal Response Agencies and their Principal Emergency Services to work together and to respond effectively and safely to, and to assist them in working, if necessary, with the RPII and others to successfully manage emergencies that may have a radiological/nuclear dimension. The protocol (currently in working draft form) outlines the arrangements for emergencies such as spills, fire and transport accidents. The response to CBRN incidents and discovered sources are covered in separate, complementary, multi-agency protocols.

The protocols were drafted based on information from international sources, including the International Atomic Energy Agency (IAEA), World Health Organisation (WHO) and the International Commission on Radiological Protection (ICRP). In particular, the advice given in the IAEA's "Manual for First Responders to a Radiological Emergency" was particularly useful in developing the protocols. The Framework for Major

Emergency Management makes provision for linking the local and regional level co-ordination arrangements of the principal response agencies with the "National Emergency Plan for Nuclear Accidents" (NEPNA).

Ireland's National Emergency Plan for Nuclear Accidents (NEPNA)

In accordance with S.I. No. 125 of 2000, the Minister for the Environment Community and Local Government must prepare a plan referred to as the "National Emergency Plan for Nuclear Accidents". NEPNA is intended specifically to cater for a widely dispersed radiological emergency or crisis such as that arising from a major accident at a nuclear installation abroad resulting in radioactive contamination reaching Ireland. NEPNA sets out a framework for a coordinated national response to an event where the response is beyond the resources or capabilities of any individual Government Department or public authority and as such requires the political and strategic involvement of Government. NEPNA is one of a number of complementary national and local authority plans designed to cater for different types of emergency situation. The main elements of NEPNA cover:

- mechanisms for raising the alarm;
- the roles of Ministers of the Government and other public authorities/agencies;
- procedures for mobilisation of the resources and expertise from across the State;
- effective coordination at both political and official levels so as to ensure that all State resources are distributed to good effect and that gaps in the response arrangements are not allowed to develop;
- arrangements for effective communication with the public.

The national response to a widespread radiological emergency or crisis is likely to involve mobilisation of the resources and expertise from a broad range of public authorities/agencies within the State. The NEPNA envisages that in the event of a major radiological emergency, an Emergency Response Coordination Committee (ERCC) would be convened. The ERCC comprises officials from key Government Departments and other public authorities and is chaired by DECLG. This ERCC is responsible for providing advice on countermeasures and for co-ordinating their implementation. The RPII has a special responsibility for radioactivity monitoring and for the provision of advice on the potential consequences of any accident and on the measures to be taken. Other Government Departments and statutory organisations have responsibilities, within the Plan to advise on and establish appropriate procedures to implement measures within their particular fields of competence. In an emergency, the ERCC would meet in a dedicated centre (National Emergency Coordination Centre, NECC) which has been specifically equipped to coordinate the national response.

The main elements of the nuclear emergency response arrangements in existence in Ireland are published in a booklet entitled "National Emergency Plan for Nuclear Accidents" which is available free of charge from the Department of the Environment, Heritage and Local Government. It is also published on the DECLG website (www.environ.ie) and that of the RPII (www.rpii.ie).

Further details of the NEPNA are provided in Appendix 4 to this Report.

Article 26. Decommissioning

Ireland has no historic or current civil or defence nuclear reactors or spent fuel storage or reprocessing facilities. There are currently no centralised waste stores. The issue of the decommissioning of such facilities, therefore, does not apply in Ireland.

Any decommissioning activities relating to disused sealed sources or the sub-critical uranium assembly are readily covered and accommodated with the other relevant guidance and legislation applicable in Ireland. For example, the safety of workers will be covered under the Radiological Protection Act 1991 whilst the relevant Transport Regulations covering radioactive materials (covered in detail in Section I Article 27 below) will cover packaging and transport within and outside Ireland.

Furthermore, Ireland has never carried out mining of uranium for manufacture of nuclear fuel and, as such, there are no requirements in respect of decommissioning such facilities.

Section G: Safety of Spent Fuel Management

Articles 4 and 5. General Safety Requirements and Existing Facilities

As already stated in this Report, Ireland has:

- No nuclear power reactors
- No defence reactors for research or other purposes.
- No spent nuclear reactor fuel in storage or awaiting treatment and no associated spent fuel facilities of any sort.
- No transboundary movement of spent fuel from other countries neither across its territory nor through its territorial waters.

Moreover, Ireland has no research reactors (including those for isotope production).

Furthermore:

- The Nuclear Non-Proliferation Treaty was proposed by Ireland, who as a result received the honour of becoming the first signatory in 1968. By 1992, all five then-declared nuclear weapons States had signed the Treaty, and the Treaty was

renewed in 1995 (and followed by the Comprehensive Test Ban Treaty in 1996).

- While Ireland maintains a policy not to use nuclear energy for the generation of electricity (Ref 10), Ireland recognises the right of States to determine their own energy mix, including whether or not to develop nuclear power.

- The 1999 Electricity Regulation Act (Section 18 of the Act) prohibits the use of nuclear energy for the generation of electricity in Ireland.

- The 2007 White Paper on Energy (Ref 11) states *"The Government will maintain the statutory prohibition on nuclear generation in Ireland. The Government believes that for reasons of security, safety, economic feasibility and system operation, nuclear generation is not an appropriate choice for this country. The Government will continue to articulate its strong position in relation to nuclear generation and transboundary safety concerns in Europe in the context of the EU Energy Strategy. Developments in relation to nuclear generation in the UK and other Member States will be closely monitored in terms of implications for Ireland."*

Article 6. (Siting of proposed facilities)
Article 7. (Design and construction of facilities)
Article 8. (Assessment of safety of facilities)
Article 9. (Operation of facilities) &
Article 10 (Disposal of spent fuel)

Ireland has no historic or current civil or defence nuclear reactors or spent fuel storage or reprocessing activities. There are, therefore, no specific plans relating to the siting, design or operation of spent fuel storage, reprocessing or disposal facilities and no plans relating to the disposal or treatment of spent nuclear fuel to which these Articles of the Convention relate.

Section H: Safety of Radioactive Waste Management

Article 11. General Safety Requirements

General Safety Requirements for radioactive waste in Ireland are laid down in the relevant legislation, particularly in the Radiological Protection Act 1991 (Ionising Radiation Order), 2000 (S.I. No. 125 of 2000). These are enforced by the RPII. The overall principles and policies have been laid out in Section B of this report.

Article 12. Existing Facilities and Past Practices

This section of the National Report is limited to radioactive waste arising from the medical, industrial and research applications of radioisotopes from unsealed sources.

These are described and itemised below. (Disused sealed sources are dealt with separately under Section J Article 28)

Management of Unsealed Radioactive Material

Radioactive waste in unsealed form arises from the use of radionuclides mainly in hospitals and in a few educational and research establishments. The sources are either imported from the relevant overseas suppliers or short-lived ones generated on the main hospital sites.

Requirements for the licensing of the use and disposal of unsealed sources, or exemption from such requirements, are established by Article 5 of the Radiological Protection Act 1991 (Ionising Radiation) Order 2000 (S.I. No. 125 of 2000)). Quantities or concentrations requiring licensing under S.I. No. 125 of 2000 are based on Annex I of the EU Council Directive 96/29/Euratom. Normal practice in regard to requirements for licensing is to apply the limits or concentrations used on a daily basis.

The licence also includes conditions relating to disposal, which have been amended to ensure that the system of reporting takes account of Ireland's obligations under the OSPAR Convention to which Ireland is a signatory (Ref 12).

The main aspects of the safety and management of unsealed sources in Ireland are as follows:

- The generator cores that produce Tc-99 are returned to the supplier. Most are being imported from Holland or the UK. Transport to and from Ireland is in accordance with the appropriate transport Regulations.

- The practice of liquid radioactive waste disposal relates mainly to the medical sector in Ireland. It is a condition of licences granted in the medical sector, where unsealed sources are used, that there is annual reporting of the quantities discharged. This data is now collated annually by the RPII and is available to the OSPAR Commission as part of Ireland's reporting requirements under the OSPAR Convention. In addition, recent assessments have shown that the maximum dose to the critical public group (sewer workers) from such disposals is less than 10 μSv/year.

- Solid waste materials from hospitals that contain residual activity are segregated and controlled at source. In particular, they are isolated and stored until the levels of radioactivity are such that disposal is permitted under the conditions set out in the hospitals' licence.

- Licensees are obliged to report the quantities of radionuclides which are actually disposed of to sewers.

- Licence conditions on hospitals include requirements to ensure that precautions are taken to prevent contamination, including contamination in the form of excreta from patients.

- The licence condition places an obligation on hospitals and clinics to keep records of radionuclide administrations to patients which will enable estimates of the quantities excreted to the sewers to be made, using established excretion factors.

- The RPII also requires that any licence application to use unsealed radionuclides for medical purposes be accompanied by an estimation of doses to critical groups. In the case of disposal to sewers, the licensee must demonstrate that doses to sewer workers, who are taken as the critical group, will be below 300 μSv/year. In practice such doses will be below 10 μSv/year.

Use and Potential use of Holding Tanks for Discharges from Hospitals

There are currently four hospitals in Ireland, which are involved in radioiodine thyroid ablation treatments and therefore use significant amounts of radioiodine (~3-5 GBq/patient). In this regard, the doses to critical groups averted by decay tanks must be balanced against the potential radiation doses to workers involved in their maintenance and risks from bacteriological hazards. All hospitals in Ireland that use significant amounts of radionuclides for therapeutic purpose are situated close to the sea. This means that discharges to sewers pass into treatment works and then via a normally short route to the sea where dilution takes place quickly. There are no discharges from such facilities into fresh water that may be used for human consumption. At the time of last reporting, in accordance with its obligations under the OSPAR Convention, Ireland was in the process of reviewing the issue of the need for holding tanks in both existing and any planned facilities. This review was completed in 2008 and was published (Ref 13). The review included an analysis of the following items:

- A summary of international advice (e.g. ICRP, IAEA, EC) on best practice in relation to iodine ablation discharges;

- A summary of current practices relating to the provision of holding tanks in a selection of other EU countries;

- A review of current practices in Ireland;

- A review of the likely future demand for iodine ablation therapies in Ireland and any implications these would have on doses to workers and members of the public and on discharges to, and concentrations in, the environment;

- An evaluation of the merits and demerits of utilising holding tanks in an Irish context including consideration of:-

- Installation: building requirements, cost, retrofitting, green field, maintenance and upkeep requirements;

- Impact on radiation doses to particular groups, including patients, medical staff, hospital maintenance staff, other staff likely to be affected and the public;

- Impact on discharges to the environment and environmental concentrations.

After the review was completed, the following regulatory position was adopted:

- In the case of existing iodine ablation facilities licensees will not be required to retro-fit iodine holding tanks.

- Licensees with existing ablation facilities will be required to undertake both on- and off-site monitoring to validate the assumptions and calculations in their risk assessments.

- Licence applications for new ablation facilities will continue to be assessed on a case-by case basis to determine whether holding tanks are required.

- New and existing licensees will be required to undertake appropriate on and off site monitoring of discharges to validate the assumptions and calculations in their risk assessments during the operation of their facilities.

In 2007 the RPII signed a Memorandum of Understanding with the Health Service Executive, which administers public health services, for the purpose of facilitating cooperation between both agencies in discharging their respective responsibilities with regard to ionising radiation in order to enhance the effectiveness of both. Since then both Agencies have met in plenary session annually with sub-groups taking forward tasks identified by the Agencies.

Article 13. Siting of Proposed Facilities

Radioactive waste management in Ireland centres on the cradle to grave management of sealed sources. Management of unsealed sources is addressed above. Management of disused sealed sources is addressed in Section J where it is shown that disused sources, which for whatever reason cannot be returned to the original supplier, are held in secure store on the premises where they were previously used and subject to any licence conditions which the RPII may see fit to impose and to inspection by the RPII.

As mentioned earlier under Section E (the licensing system), the RPII has updated its inventory of disused sources.

Article 14. Design and Construction of Facilities

It should be noted that if a new radioactive waste storage facility is considered necessary, Ireland would, in the planning and siting of any future waste storage facility and, as a member of both the IAEA and the European Community, take due account of all relevant aspects of the requirements for public consultation (as required by the Aarhus Convention, to which Ireland is a signatory; (Ref 14 & Ref 15) an Environmental Impact Assessment, where required, (Ref 16) and would also take due account of the regulations, both national and international governing the siting, planning, construction and operation of such a facility.

Article 15. Assessment of Safety of Facilities

Under the current regulatory regime, the RPII would assess any application for facilities for the short or long term storage or the disposal of sealed sources in Ireland. The RPII would not license the facility until it was satisfied that it did not present a hazard to persons or the environment. All such applications would have to take due account of the standards for such facilities as promulgated by the IAEA.

Article 17. Institutional Measures after Closure

Ireland has no historic or current civil or defence nuclear reactors or spent fuel storage or reprocessing activities. There are currently no centralised waste stores. There are, therefore, no specific plans or requirements relating to post closure institutional control and associated activities of, for example, monitoring or security. Any institutional regulatory measures for stored waste sources and current disposals in Ireland are fully covered under the current legislative and regulatory regime (notably the Radiological Protection Act 1991 (Ionising Radiation) Order 2000, (S.I. No. 125 of 2000) and are described in Section E Legislative and Regulatory System (especially under licence conditions).

Section I: Transboundary Movement (Article 27)

In Ireland, any internal or transboundary transport of radioactive sources (whether in use or disused) is controlled and authorised by the RPII. The shipment and transfer of radioactive substances are governed by the national legislation derived from the relevant European Commission Directives and Regulations. This means transboundary movements are governed by:

- The provisions of the ADR (European Agreement Concerning the International Carriage of Dangerous Goods by Roads) and of RID (Regulation Concerning the International Carriage of Dangerous Goods by Rail) which apply directly.

- Technical Instructions of the International Civil Aviation Organisation (ICAO) and the Dangerous Goods Regulations of the International Air Transport Association (IATA) that are directly applicable.

- Council Directive 2006/117 EURATOM of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel.

- Commission Decision 2008/312/EURATOM of 5 March 2008 establishing the standard document for the supervision and control of shipments of radioactive waste and spent fuel referred to in Council Directive 2006/117/EURATOM.

- Council Regulation 93/1493/EURATOM of 8 June 1993 on shipments of radioactive substances between Member States.

The transfer of radioactive sources or waste from Ireland to other countries is limited to the return of disused sources to the suppliers or to the transfer of disused sources to an overseas waste management facility.

Section J: Disused Sealed Sources (Article 28)

In Ireland, sealed and unsealed sources are used in the State and private sectors of the economy. In the State sector, the main users are medical and educational establishments. In the private sector, sealed sources have many uses including in gauges, check sources and medical devices. Licence conditions have already been described (Section E Article 20). The lists of sources that are now classified as disused and held in custody are set out in Appendix 1 which relate to the position in June 2011. The following Sections give further details of the main groups.

Inventory of Sealed Sources

Most of the sources that comprise the disused source inventory arise from acquisitions made prior to the introduction of take-back agreements into normal regulatory practice and so the waste issue in Ireland is substantially a legacy issue. The inventory is comprised of items containing such radioisotopes as Cs-137, Co-60, Ra-226, Am-241 and Sr-90. These are detailed in Appendix 1.

Natural Uranium Rods in a Sub-critical Assembly

Ireland has in storage 2.5 tonnes of uranium metal in the form of rods that were originally supplied as an experimental sub-critical assembly to a University Department from the United States under the "Atoms For Peace" programme. The sub-critical assembly was used for student experiments until the 1980s after which it was disassembled. The neutron fluxes and consequent build up of fission products is considered negligible. The rods are currently stored in boxes (Figure 4) and have been declared as radioactive waste for the purposes of the Convention, pursuant to Article 3(2). They are included in Appendix 1 as 1,401 separate sources but are in fact in a single secure store fitted with CCTV cameras and are the subject of inspections and quarterly reports under the Safeguards Agreement with the International Atomic Energy Agency (IAEA) (INFCIRC/263) and the European Atomic Energy Community (EURATOM). The store

is used specifically for these materials so that access is restricted solely to personnel with specific responsibilities for the safekeeping and condition monitoring of the material.

Figure 4: Uranium Rods from the Sub-critical Assembly

The sites where the uranium and plutonium sources are held are also subject to declarations made under the Additional Protocol to the Safeguards Agreement which is transposed into Irish law by the Containment of Nuclear Weapons Act (2003) Regulations 2004.

Return of the uranium rods to the United States would be controlled by the RPII under the relevant transport regulations (see Section I) and also under the appropriate export controls and with agreement of the EURATOM Safeguards Office and the EURATOM Supply Agency in Luxemburg.

Iodine-125 Sources

Appendix 1 (Table 1.4) shows the largest number of disused sources held are 2,500 I-125 seeds. These are prostate brachytherapy sources (max activity 33 MBq) currently held in two hospitals.

Radium Sources

In common with all countries, Ireland historically (from about 1900 to 1980) used radium in medical and some other applications but has replaced this with safer, more efficient and easier to use radioisotopes. Only small amounts of radium remain in use. Most radium was returned to the main suppliers in the UK. However, Appendix 1 shows that some radium has been retained in Ireland. This is stored under secure and safe conditions where it can be readily monitored and subject to appropriate checks by local radiation protection officers and the RPII inspectors.

Lightning Preventors Incorporating Radium

In the 1970s a number of lightning preventors incorporating radium in semi-sealed sources were imported and used on a number of buildings in Ireland. They are no longer considered to provide any benefit over conventional lightning conductors and the RPII does not allow their importation. While a number remain in use under appropriate licence conditions the rest are in secure storage on the premises of the company that was responsible for their removal (Figure 5).

Figure 5: Disused Lightening Preventors

Technetium 99 (Tc-99).

It is estimated that about 7000 older Tc-99m (t ½ ~6 hours) generators, which were acquired prior to the introduction of the practice of requiring take-back agreements, are held in storage. While, strictly speaking, they are not sealed sources they are included under this heading for the purposes of this Report. The generator cores contain the very long-lived and hence low specific activity Tc-99 daughter. Solutions for the disposal of these items are continually under review.

Disused Educational Sources

It is estimated that there are approximately 475 small teaching sources held by post primary schools that are no longer in use and are awaiting disposal. In addition, there is an estimated 9 kg of thorium and uranium components (unsealed) also awaiting disposal. This actual inventory may be less then these figures but solutions for the disposal of these sources is continually kept under review.

Implementation in Ireland of the HASS Directive

The purpose of the HASS Directive (2003/122/EURATOM) (Ref 17) is to prevent exposure of workers and the public to ionising radiation arising from inadequate control of high activity sealed radioactive sources and orphan sources and to harmonise controls in place in the Member States by defining specific requirements ensuring that each such source is kept under control. The Directive was transposed into Irish Law in December 2005 as the Radiological Protection Act 1991 (Control of high-activity sealed radioactive sources) Order 2005 (S.I. No. 875 of 2005). The RPII is designated as the Competent Authority for the purposes of the Legislation and the Directive.

At present there are approximately 1132 licensed sealed sources in Ireland, which have activities that would bring them under the control of the HASS Directive. The majority of these are used in the irradiation cells of two sterilisation plants. The majority of the remaining sources coming within the scope of the HASS Directive are held by industrial radiography companies, universities, and hospitals and by a manufacturer of radioactive gauges. Only six of these are licensed for custody only (i.e. are disused sources).

Progress on Inventory Reduction

As can be seen from Appendix 1 (Table 1.1 – 1.16), initiatives taken by the RPII during the reporting period have resulted in reductions in source inventory numbers in most categories. These initiatives included encouraging holders through the inspection process to pursue disposal options available from specialist waste management companies. They also included the development of a number of waste related regulatory guidance documents aimed at assisting holders to manage and dispose of certain categories of sources. Guidance included:

- A Guidance Note on the Management of Waste Ionisation Chamber Smoke Detectors (ICSDs)
- A Guidance Note for the Disposal of Decayed Sources to Landfill Facilities
- A Guidance Note for the Disposal of Prepared Uranium and Thorium Compounds

In 2008 there were 98 holders of sources across a range of half-lives and management requirements. At the time of reporting this number had reduced to 50 which marks a

substantial improvement on the previous position. However, it should be noted that during the reporting period and additional 21 licensees have reported that they require disposal or are in the process of exercising take back agreements for an additional 135 sources and RPII will be working with them to resolve these issues over the coming period. In addition to this, one licensee has accumulated a substantial number of domestic smoke detectors containing Am-241 and a smaller number of Ra-226 and is in the process of securing a disposal solution within its own industrial grouping.

Section K: Planned Activities To Improve Safety

The Regulatory Service of the RPII continually reviews its licensing and inspection system to ensure that it remains focused on ensuring a high level of safety and security and takes account of developments in radiation protection philosophy and radiation safety standards. Recently implemented or planned activities to improve safety include the following:-

Key Milestones

- A Temporary Operational Protocol, setting out the arrangements to manage the safe interim storage of an orphan radioactive source or a source identified for seizure, pending its ultimate disposal has been developed.

- A National Radioactive Waste Storage Facility for disused radioactive sources is to be established. A National Implementation Committee, comprising of the RPII, Environmental Protection Agency (EPA) and DECLG has been constituted to draw up a detailed specification for the facility and make recommendations on the siting, management and resourcing of the facility.

- An inventory of disused radioactive sources currently stored in Ireland is to be reduced through a co-ordinated and phased Inventory Reduction Programme.

- Interim centralisation of sources by sector in a small number of sector-specific existing storage facilities.

- Consideration will be given to options for the final disposal of Ireland's disused radioactive sources.

- To continue to work with other interested Departments and organisations towards implementing national policy for the safe long-term management and ultimate disposal of Ireland's radioactive waste materials including: Continuing the work of the interdepartmental High Level Group

- The comprehensive transposition of the EURATOM Council Directive on radioactive waste management by August 2013 and its implementation.

- Ireland has requested an Integrated Regulatory Review Service (IRRS) mission from the IAEA which is scheduled to take place during 2015.

In addition the RPII will take the following specific regulatory actions:

- Continue to target holders of radioactive waste in the annual inspection programme bringing pressure to bear to explore disposal options
- Write to all holders of radioactive waste setting out the source reduction objectives, providing necessary information on disposal options and requiring a disposal plan for each facility and following up on the implementation of those plans
- Develop a radioactive waste resource page on the RPII's website containing all available guidance and contacts to assist in waste disposal activities
- Engage with the Radiation Protection Advisors (RPA) in a future workshop to outline the issues and objectives of the inventory reduction programme and to encourage their active participation in source disposal initiatives.
- Intensify work to find a solution to the inventory of unwanted radioactive sources in secondary schools.
- Continue to pursue live avenues of enquiry in relation to the disposal of specific waste types such as Tc-99m generator cores and lightening preventors.
- Establish the regulatory licensing criteria for the design, construction and operation of a National Waste Management Storage facility.
- Improved co-operation with regulatory authorities in other countries, including, in particular exchange of information arrangements with the UK, France and Norway.
- Introduce a more graded approach to authorisation and to increase to the maximum extent possible taking full cognisant of safety and security issues, the transparency of the regulatory process

Conclusion

This National Report describes how Ireland is meeting its obligations as a Contracting Party to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. It describes the regulatory infrastructure, the operational radiation protection arrangements, the system of emergency preparedness and recent and planned initiatives to improve safety.

Ireland believes that the current Report answers all the comments made and questions posed by other Contracting Parties on the previous Report relating to the infrastructure and operational arrangements in place to ensure the safety of radioactive waste management in Ireland.

Ireland is of the view that its robust regulatory system has led to a situation where the status of all radioactive materials, including those for which no further use is envisaged, is known with a high level of confidence.

Furthermore, a number of steps have been taken to further improve safety since the third Review Meeting.

To conclude, therefore, Ireland believes that it is meeting its obligations under the Joint Convention.

REFERENCES:

Ref 1 IAEA Information Circular INFCIRC/604 of 1 July 2002 - Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. Guidelines regarding the form and structure of National Reports.

Ref 2 Council Directive 96/29/Euratom of 13 May 1996 laying down the basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation.

Ref 3 Radiological Protection Institute of Ireland. Radiation Doses Received by the Irish Population, May 2008

Ref 4 Status of the Implementation of the European Directive 96/29/Euratom in Ireland and with Relation to NORM. C ORGANO, Radiological Protection Institute of Ireland

Ref 5 European Commission. Radioactive Waste Categories. Current Position in the EU Member States and in the Baltic and Central European Countries EUR 18324 EN, 1998.

Ref 6 IAEA-TECDOC-1344 (Categorisation of radioactive sources Revision of IAEA-TECDOC-1191, July 2003).

Ref 7 Radiological Protection Institute of Ireland. Annual Report and Accounts 2010.

Ref 8 European Commission. Technical Report. Verifications under the Terms of Article 35 of the Euratom Treaty – Irish National Monitoring Network for Environmental Radioactivity; Nuclear Medical Installations. Republic of Ireland. 01 to 04 May 2007. IE-07/03

Ref 9 GS-R-2. Preparedness and response for a nuclear or radiological emergency: safety requirements - ISSN 1020-525X. - [9], 72p.: 24 cm. - Jointly sponsored by FAO, IAEA, ILO, OECD/NEA, PAHO, OCHA, WHO.

Ref 10 Statement by Minister Phil Hogan, Minister for Environment, Community & Local Government, to the 55th Session of the IAEA General Conference, 19th September 2011.

Ref 11 Department of Communications, Marine and Natural Resources Energy White Paper. Delivering a Sustainable Energy Future for Ireland. March 2007.

Ref 12 OSPAR Convention. Appendix 1-Criteria for the definition of Practices and Techniques mentioned in Paragraph 3(b)(i) of Article 2 of the Convention.

Ref 13 A review of best practice in relation to iodine-131 ablation discharges to sewer. www.rpii.ie.

Ref 14 Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (1998 Aarhus Convention).

Ref 15 Socio-economic and other non-radiological impacts of the near surface disposal of radioactive waste. IAEA-TEC-DOC-1308.

Ref 16 Environmental Impact Assessment. Directive 85/337/EEC, as amended by Directive 97/11/EC. Assesses the effects of certain public and private projects on the environment, including the dismantling or decommissioning of specified nuclear power stations and nuclear reactors.

Ref 17 Council Directive 2003/122/Euratom on the control of high activity sealed radioactive sources and orphan sources (the HASS Directive).

Appendix 1: Data for Disused Sources in Ireland

DATA FOR DISUSED SOURCES IN IRELAND (Sorted by Half-life and Sector) FROM RPII DATABASE

Table 1.1: Medical Sector 'Custody Only' Sources – half-life > 10 y

Licensee Code	Nuclide	No of Sources (2008)	No of Sources (2011)
LM1	AM-241	1	1
	CS-137	1	1
	U-238		4
LM2	CS-137	1	0
	U-238		1
LM4	CS-137	1	1
	BA-133	1	1
	AM-241	1	1
	RA-226	1	1
LM5	PU-238	1	1
LM6	AM-241	1	1
LM8	CS-137	1	0
	RA-226	2	0
LM9	Sealed/unsealed (Misc)	109	105
	SR-90		1
	BA-133/CS-137		1
LM10	AM-241	2	3
	CS-137	10	2
	RA-226	2	2
LM12	CS-137	5	5
	NI-63	1	1
	SR-90	1	1
	Total	**142**	**134**

In addition it is estimated that there are approximately 7000 Tc-99m generator cores held by six licensees.

Table 1.2: Medical Sector 'Custody Only' Sources – half-life 5 - 10 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
- None			
	Total	**0**	**0**

Table 1.3: Medical Sector 'Custody Only' Sources – half-life 1 - 5 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
- None			
	Total	**0**	**0**

Table 1.4: Medical Sector 'Custody Only' Sources – half-life <1 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LM2	CO-57 IR192	3	0 1
LM4	CO-57		1
LM5	I-125	2200	2000
LM6	CO-57	10	10
LM7	CO-57	2	0
LM15	GD-153	1	0
LM16	CO-57	7	7
LM17	I-125 CO-57	1 1	0 0
LM8	CO-57	26	0
	GD-153	2	0
LM11	CO-57	1	0
LM12	CO-57 I-125	6	6 500
LM 100	CO-57	1	1
	Total	**61 (excluding I-125)**	**26 (excluding I-125)**

Table 1.5: Educational Sector 'Custody Only' Sources Half-Life >10 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LE1	AM-241	1	0
	RA-226	3	3
	SR-90	1	1
	NI-63		1
	Th-232	5	3
	U-238+	5	7
	Misc	2	3
LE2	CS-137	2	1
	Ra-226	2	0
	SR-90	5	5
	Th-232	8	8
	Misc	10	10
LE3	SR-90	1	1
	AM-241		1
	AM/BE		1
	Th-232	16	3
	TH-232NAT	1	0
	U-238+	3	3
LE4	RA-226	1	0
LE5	Am 241	16	8
	SR-90	14	0
	H3	10	14
	Cs137	12	4
	C-14	8	6
	TH 232	16	9
	U-238	53	36
	Ra-226	6	1
	PU-239	1	1
	I-129	3	0
	Ni-63		1
	CS-137/BA-137		1
	Misc	13	12
LE6	SR-90	7	3
	Thorium-232	9	8
	U-238+	14	13
LE7	Th-232	10	10
	U-238+	20	20
	Misc	3	3
LE8	RA-226	1	1
	RN-222+	1	1
	NI-63		2
	SR-90	2	2
	SR-90+	3	0
	TH-232NAT	3	3
	U-238+	7	7

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LE9	AM-241	2	2
	AM-241/BE	2	2
	CS-137	2	2
	RA-226	3	7
	KR-85		3
	U-238	1	1
	Th-232	1	1
	TH-232N	1	0
LE10	AM-241	3	0
	C-14	1	0
	RA-226	4	2
	SR-90	5	0
	TH-232NAT	4	0
	U-238	25	1
	Sealed/unsealed (Misc)	210	188
LE11	CS-137	3	3
	AM-241	1	1
	PU-238/Beryllium	1	1
	NI-63	2	2
	RA-226	2	2
	SM-151	3	3
	SR-90	2	2
	TH-232N	1	1
	U-238	1401	1401
LE12	Am-241	6	6
	Bi-207	1	1
	Pb-210	3	3
	Ra-226	10	10
	Cs-137	3	3
	C-14	2	2
	H-3	7	7
	Ni-63	3	3
	Sr-90	1	1
	Th-232	2	4
	MISC	9	5
	U-238	17	39
	Sealed/unsealed Misc	8	10
LE13	AM-241	4	4
	NI-63	1	1
	Th-232	3	1
	U-238	3	7
LE14	SR-90		4
	AM-241		2
	RA-226		3
	Th-232	4	4

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LE100	Th-232	1	0
LE101	U-238		8
	TH-232		6
	Misc	4	4
LE102	Ra-226	1	3
	Ni-63	1	1
	SR-90	1	9
	AM-241		4
	U-238	13	13
	TH-232	10	11
	Total	**2096**	**2021**

Table 1.6: Educational Sector 'Custody Only' Sources Half-Life 5 - 10 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LE1	CO-60	4	5
LE2	CO-60	3	3
LE3	CO-60	1	1
LE5	CO-60	9	0
LE9	CO-60	1	1
LE10	CO-60	3	0
LE11	CO-60	4	3
LE12	C0-60		4
	Total	**25**	**17**

Table 1.7: Educational Sector 'Custody Only' Sources Half-Life 1 -5 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LE14	CD-109	1	1
	FE-55	1	1
LE5	NA-22	3	1
	TL-204	4	2
	CS-134	2	0
LE12	FE-55		1
	TL-204		2
	CS-134/TL-204		1
	NA-22		1
	Total	**11**	**10**

Table 1.8: Educational Sector 'Custody Only' Sources Half-Life < 1 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LE9	C0-57	1	1
	CO/FE	0	2
	SN-119	6	6
LE15	CO-57	4	4
LE5	C0-58	1	1
	P-32	6	4
	P-33	2	1
	S-35	1	1
	I-131	0	1
	CR-51	1	1
	PO-210	1	0
LE11	CO-57	8	8
	FE-59	1	1
LE2	I-125	1	0
LE3	PO-210	1	1
	Total	**34**	**32**

Table 1.9: Industrial Sector 'Custody Only' Sources Half-Life > 10 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LI1	TH-232NAT	1	0
LI100	TH-232	1	0
LI2	AM-241/BE	1	0
	CS-137	1	0
	Cm-244	1	0
LI3	AM-241	3	2
	SR-90	1	1
LI4	AM-241	1	0
LI5	U-238+	1	0
	Ni-63	3	0
LI6			
	AM-241/BE	1	0
	NI-63	27	0
LI101	U-238	3	3
LI102	Am-241	1	0
LI7	CS-137	2	0
LI103	Cs137	1	0
LI11	RA-226	1	0
LI12	NI-63	3	1
LI104	U-238	1	1
LI13	AM-241	7	0
LI105	u-238	1	18
	TH-232		10
	MISC		3
LI16	CS-137	1	0
LI106	Am-241/Be	1	0
LI107	U-238	2	0
LI108	Am-241/Be	3	0
	Cs-137	3	0
LI109	KR-85	1	0
LI20	Am-241	3	3
	Ra-226	4	4
LI110	Ni-63	8	16
LI23	Am-241/Berylium	1	0
	Cs-137	1	0
LI24	NI-63	1	0
LI25	AM-241/BE	1	0
	CS-137	1	0
LI26	RA-226	1	0
LI28	AM-241/BE	2	0
LI30	CS-137	1	1
LI40	USN&A	1	1
LI41	CU-244	2	0
LI42	NI-63	1	0

LI43	RA-226 TH-232N U-238 URYLATE	1 1 1 2	1 1 1 1
LI111	U-238	1	0
LI44	AM-241	1	0
LI46	AM-241/BE CS-137	1 1	0 0
LI112	Am-241/Be Cs-137	1 1	0 0
LI48	CS-137	1	0
LI49	AM-241		0
LI113	AM-241	1	1
LI114	U-238	3	0
LI52	SR-90	6	6
LI53	CS-137	2	2
LI54	CS-137	1	0
LI115	Cs-137	1	0
LI55	RA-226	1	1
	Total	**128**	**78**

Table 1.10: Industrial Sector 'Custody Only' Sources Half-Life 5 - 10 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LI116	CO-60	1	1
	Total	**1**	**1**

Table 1.11: Industrial Sector 'Custody Only' Sources Half-Life 1 - 5 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LI117	Tl-204	1	0
LI118	TI-204	1	0
LI119	PM-147	1	1
LI120	CD-109	1	0
LI40	PM-147		0
	TI-204		0
LI113	PM-147	2	2
	TI-204	1	1
LI43	TI-204	7	7
	Total	**14**	**11**

Table 1.12: Industrial Sector 'Custody Only' Sources Half-Life < 1 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LI48	Co-57	5	0
LI121	Po-210	1	0
	Total	**6**	**0**

Table 1.13: State (other) Sector 'Custody Only' Sources Half-Life > 10 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LSO1	AM-241	2	2
	CS-137+	3	3
LSO100	Th-232	1	1
LSO101	TH-232	1	1
	U-238	1	1
LSO2	CL-36	1	0
	NI-63	1	0
	Ra-226	1	0
LSO4	H-3	1	0
	NI-63	3	0
LSO6	Am-241	1	0
	H-3	33	0
	Misc	3	0
	U-238+	3	0
LSO7	Am-241/Beryl	1	0
	Cs-137	1	0
LSO8	AM-241/BE	2	0
	CS-137	2	0
LSO10	C-14	65	40
	Cs-137	1	0
	Sr-90	1	0
	Ra-226	877	877
LSO102	Ni-63	1	1
LSO12	Am-241	2	0
	CS-137	7	5
	Sr-90	7	5
	Th-232	1	1
	U-232/Th-232	1	1
	U-238+	7	0
	Ra-226	8	8
LSO103	Ni-63	4	4
	U-238	2	4
LSO13	AM-241/BE	2	2
	CS-137	3	1
	NI-63	2	0
	U-238	2	2
	Total	**1054**	**959**

Table 1.14: State (Other) Sector 'Custody Only' Sources Half-Life 5 – 10 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LSO12	CO-60	1	1
LSO2	BA-133	1	0
	Total	**2**	**1**

Table 1.15: State (Other) Sector 'Custody Only' Sources Half-Life 1 - 5 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LSO6	Cd-109 Fe-55		0 0
LSO4	TI-204 PM-147	1 2	0 0
	Total	**3**	**0**

Table 1.16: State (Other) Sector 'Custody Only' Sources Half-Life <1 y

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)
LSO12	Co-57	1	1
LSO13	I-125	2	2
	Total	**3**	**3**

Appendix 2: Relevant national laws, regulations, requirements and guides.

Radiological Protection Act, 1991 (Number 9 of 1991) as amended by the Energy (Miscellaneous Provisions) Act, 1995; the Food Safety Authority Act of 1998; the Electricity Regulation Act of 1999 and the Radiological Protection Amendment Act of 2002 (This Act, as amended, established the Radiological Protection Institute of Ireland (RPII) and, inter alia, sets out the appointment and powers of inspectors (Articles 28 and 29 of the 1991Act) and the framework for the RPII licensing system (Article 30 of the 1991 Act as amended).)

Radiological Protection Act, 1991 (Ionising Radiation) Order, 2000 (S.I. No. 125 of 2000) (This statutory instrument gives effect to Council Directive 96/29/Euratom (Basic Safety Standards Directive) and to Council Directive 90/641/Euratom (Outside Workers Directive.)

European Communities (Radiological Emergency Warning to Public) Regulations, 1993 (S.I. No. 209 of 1993) (This statutory instrument gives effect to Council Directive 89/618/Euratom on informing the general public about the health protection measures to be applied and the steps to be taken in the event of a radiological emergency.)

European Communities (Medical Ionising Radiation Protection) Regulations, 2002 (S.I. No. 478 of 2002) (This statutory instrument gives effect to Council Directive 97/43/ Euratom on the health protection of individuals against the dangers of ionising radiation in relation to medical exposures.)

European Communities (Supervision and Control of Certain Shipments of Radioactive Waste) Regulations, 1994 (S.I. No. 276 of 1994) (This statutory instrument gives effect to Council Directive 92/3/Euratom on the shipment of radioactive waste.)

Carriage of Dangerous Goods by Road Act, 1998 (Number 43 of 1998) (This Act enables effect to be given to the ADR agreement).

Carriage of Dangerous Goods by Road Regulations, 2001 (S.I. No. 492 of 2001) (This statutory instrument gives effect to Council Directives 94/55/EC as amended by Directive 2000/61/EC and Directives 96/86/EC and Directive 1999/47/EC and Directive 95/50/EC as amended by Directive 2001/26/EC on the carriage of dangerous goods by road; including the loading and unloading of the dangerous goods in relation to their carriage.)

European Communities (Safety Advisors for the transport of Dangerous Goods by Road and Rail) Regulations, 2001. (S.I. No 6 of 2001)
This statutory instrument gives effect to Directive No. 96/35/EC and Directive 2001/18/EC.

Council Regulation (Euratom) No 1493/93 on shipments of radioactive substances between Member States.
This regulation sets out the procedure to be followed when shipping sealed sources to Member States of the European Union.

Containment of Nuclear Weapons Act 2003 (No. 35 of 2003)
This Act provides the legislative basis for the implementation of Ireland's obligations under the 1998 Protocol to the 1973 Agreement between the European Atomic Energy Community (EURATOM); the non-nuclear weapons States of EURATOM and the International Atomic Energy Agency.

The Containment of Nuclear Weapons Act, 2003 Regulations, 2004 (S.I. 123 of 2004). This Regulation provides the regulatory basis to enable Ireland to implement its obligations under the Protocol Additional to the 1973 Agreement referred to above.

Radiological Protection Act 1991 (Control of high-activity sealed radioactive sources) Order 2005 (S.I. No. 875 of 2005). This statutory instrument gives effect to Directive No. 2003/122/EURATOM and sets out some of the specific requirements of authorisation to hold and use the types of sources that come within the scope of the Directive.

Radiological Protection Act, 1991 (Licensing Application and Fees) Regulations, 2007 (S.I. No. 654 of 2007). This statutory instrument sets out the information to be supplied in a licence application, licence categories and fees as well as the criteria applied by the RPII in determining the category of licence required.

Nuclear Test Ban Act 2008 (No. 16 of 2008). This Act provides the legislation needed to enable Ireland to implement its obligations under the Comprehensive Nuclear Test Ban Treaty.

European Communities (Supervision and Control of Certain Shipments of Radioactive Waste and Spent Fuel) Order, 2009(S.I. No 86 of 2009). This statutory instrument gives effect to Directive No. 2006/17/EURATOM laying down conditions for the supervision and control of shipments of radioactive waste and spent fuel.

Appendix 3: Summary of inspections carried out by RPII in 2010

Table 2: SUMMARY OF INSPECTIONS CARRIED OUT BY THE RPII IN 2010

Licence Category	Number in Category	Inspections Undertaken in 2010
Industrial Users	296	73
Industrial Distributors	25	4
Education & Research	22	8
Government Departments and State Run Services	5	3
Hospitals/Medical	173	55
Medical Distributors	21	7
Veterinary Surgeons	262	22
Dentists	933	50
TOTAL	1737	222

Appendix 4: The National Emergency Plan for Nuclear Accidents (NEPNA)

Notification of a Nuclear Incident

Early formal notification of a nuclear accident abroad would be received through either or both of the following:

- The European Community Urgent Radiological Exchange system (ECURIE) arrangements which have been set up with the EU to implement Council Decision 87/600/Euratom, providing for the early exchange of information in the event of a radiological emergency.

- The IAEA EMERCON arrangements, which are based on the 1986 Early Notification Convention.

The Irish National Contact Point (NCP) for both ECURIE and EMERCON is operated by the national police service, An Garda Síochána. The RPII is the national competent authority for both sets of arrangements and to support this the RPII operates an on-call duty officer system whereby a senior member of the RPII staff is available 24 hours a day, 7 days a week to assess any alert and where necessary activate the emergency response.
On receipt of an alert notification, the NCP will immediately contact the RPII duty officer who will make an initial assessment of the situation. Where appropriate, the duty officer together with other key staff from the RPII and the Department of the Environment, Community and Local Government will consider whether the NCG should be convened. In the event that the decision is taken to convene the NCG, arrangements are in place for the police to rapidly notify the appropriate key staff in the relevant Government Departments and public authorities.

In the event of an incident occurring at nuclear installations in the UK, arrangements have operated since 1992 whereby the UK Department of Energy and Climate Change (DECC) informs Ireland's DECLG and the RPII when it is notified of an incident on UK territory involving a release of radioactivity into the environment. This is regardless of whether the incident has any radiological significance for Ireland. A bilateral agreement covering information exchange is also in place between the RPII and the UK Health and Safety Executive's Office for Nuclear Regulation. This agreement covers both routine bilateral meetings between the two regulatory agencies and arrangements for rapid exchange of information in the event of an incident or accident.

Emergency Monitoring Systems

As part of Ireland's emergency preparedness, the RPII operates 3 monitoring systems for the detection and measurement of radioactivity in the air and deposits on the ground.

- A continuous gamma dose rate monitoring system operated at 14 strategic sites. These are carried out 24 hours a day and continuously fed back to the RPII with an alarm system. An additional 27 non-automated gamma sites can be activated if required.

- An air sampling system operates at 12 sites. Samplers are equipped with aerosol and gaseous iodine systems.

- A rainwater collection system operates at 12 sites.

- In the event of an incident, further monitoring of environmental media and foodstuffs would be carried out (in addition to routine environmental monitoring).

Ireland and the UK share the data from their national gamma dose rate monitoring stations, with data automatically exchanged on an hourly basis. In addition, the gamma dose rate data from the Irish national monitoring network are published on the RPII's website for public access.

Arrangements for Assessing the Potential Impact of a Nuclear Accident/Incident

Since 2000, the RPII has implemented the ARGOS (Accident Report and Guiding Operational System) decision support tool as its primary platform for handling environmental data in an emergency. The Danish Emergency Management Agency (DEMA) in association with Prolog Development Centre Inc. originally developed ARGOS. An international consortium consisting of representative agencies from Australia, Brazil, Canada, Ireland, Denmark, Sweden, Norway, Poland, Estonia, Lithuania and Montenegro now manages the ongoing development and maintenance of the system. The RPII is Ireland's member of the ARGOS Consortium. The ARGOS system allows prognostic, measurement, agricultural and meteorological data to be viewed and overlaid in a geographic information system. The system is updated regularly so that any lessons learnt from exercise or emergency use can quickly be incorporated into operational systems.

Public Information in Support of the NEPNA

Measures to keep the public informed about a nuclear accident or emergency are addressed in the NEPNA. Arrangements are in place to inform the public of the accident, its consequences and of any countermeasures that are to be implemented to reduce doses to the population. This information would be issued through media channels: radio, TV including teletext, internet, press statements and press conferences. Regular updates of the situation would be given.

In Ireland, the EU Council Directive (89/618/Euratom) on informing the general public about the health protection measures to be applied and the steps to be taken in the event of a radiological emergency, is implemented by means of the European Communities

(Radiological Emergency Warning to Public) Regulations, 1993. The RPII is the Competent Authority for the purpose of these Regulations.

Measures are in place to keep the public informed about emergency planning Measures are in place to keep the public informed about emergency planning arrangements. A detailed information booklet on the NEPNA was published in 2002 and updated in 2005. An information leaflet on the NEPNA was distributed to libraries and citizen information centres in 2006. This leaflet and other information on nuclear emergency preparedness are available on the websites of the Department of the Environment, Community and Local Government and the RPII. Public opinion is an important part of emergency preparedness and comments received from the public are taken into consideration as part of the planning process. Emergency planning developments are addressed and arrangements are published in the Annual Reports of the RPII and other statutory agencies such as local authorities update their emergency planning procedures including for nuclear emergencies on a regular basis.

In 2008 a general public information and awareness campaign on emergency planning was launched by the Government. As part of the public information campaign on emergency planning a handbook was sent to all households in Ireland. The handbook gave basic information on what individual householders can do to improve their own emergency preparedness as well as information on emergency plans in place (including the National Emergency Plan for Nuclear Accidents). The handbook also gave guidance on where more detailed information can be obtained. It was printed in a bilingual format (English and Irish) and is available in CD format, in large print, in braille and an easy to read version. It is also available electronically in Polish, Chinese and Russian. The handbook can be downloaded from www.emergencyplanning.ie.

Testing of the Emergency Plan

Regular national exercises have taken place such as a national-level exercise in 2007 which concentrated on the development of a handbook for food and agriculture countermeasures following a nuclear accident and the 2008 ConvEx3 exercise where the Irish response focused on provision of advice to Irish citizens abroad. Experience from the response to real events, such as the response to the Fukushima Accident in 2011, is also reviewed to ensure that the plans remain fit for purpose and are continually improved. Communication systems and arrangements for exchange of early notifications are tested regularly. A detailed programme of testing of the ECURIE arrangements is coordinated by the European Commission. This includes daily tests of the physical communication lines, tests of the National Contact Point, tests of the duty officer contact arrangements and the exchange of simulated radiological data between Member States. Equivalent arrangements are in place to test the EMERCON notification system coordinated by the IAEA. It is recognised that international cooperation on exercises is essential. Irish authorities regularly participate in international exercises such as those in the INEX series and those coordinated by the IAEA.

In addition to participation in major national exercises, individual public authorities and agencies which have been assigned responsibilities under the NEPNA are required to routinely test their emergency arrangements. The RPII, for example, routinely tests its arrangements including: communications arrangements, duty officer arrangements, emergency laboratory procedures and technical assessment; and the Reserve Defence Forces and Civil Defence regularly test their arrangements for monitoring and sample collection.