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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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 Fifth 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 2011 and is laid out according to the requirements and headings contained in the IAEA Information Circular INFCIRC/604 Rev_3_Draft_3 of May 2014 (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 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.

As part of the Irish Public Sector Reform Plan, in 2012 the Government decided to merge the Radiological Protection Institute of Ireland (RPII) and the Environmental Protection Agency (EPA). The merger took effect from the 1st August 2014. In practice a fifth Office of Radiological Protection (ORP) within the EPA structure has been established.

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 Environmental Protection Agency (EPA) which is the national competent authority and regulatory body for regulating, *inter alia*, the custody, use and disposal of radioactive substances and irradiating apparatus. The day to day responsibility for regulation in this area is delegated to the Office of Radiological Protection (ORP). (See Section E Article 20 for functions of the ORP).

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 and in the intervening years, substantial progress has been made in Ireland on the basis of this policy. 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 the Main Developments during the Reporting Period

The main developments since the last national report include:

- Substantial progress on the implementation of the national policy on radioactive waste management adopted by Government in 2010 where the national waste inventory has been dramatically reduced since the last reporting cycle.
- The transposition into Irish law of the European Council Directive (2011/70/EURATOM) establishing a framework for the responsible and safe management of spent fuel and radioactive waste.
- Completion and publication of risk assessments of the closest nuclear facilities to Ireland which will be used to review the National Emergency Plan for Nuclear Accidents.
- Ratification of the Amendment to the Convention on the Physical Protection of Nuclear Materials and Nuclear Facilities (CPPNMNF) in September 2014.
- The development of a model of graded authorisation to be implemented in practice with the transposition of the new European Basic Safety Standards Directive.
- Significant progress in preparation for an IRRS review mission, planned for September 2015.
- The merger of the Radiological Protection Institute of Ireland (RPII) with the Environmental Protection Agency in 2014 and the creation of a new Office of Radiological Protection (ORP).
- Review of ORP's internal emergency plan in light of lessons identified from the response to the Fukushima accident.
- Successful re-accreditation of ORP for its inspection activities to ISO 17020 revised standard.
- The publication of a series of regulatory documents dealing with regulatory activities including waste management including:
    - Guidelines for reporting incidents – 2013
    - RPA Category 1 re-approval guidelines – 2014
    - Temporary Operation Protocol – 2013
- The annual reporting of inspection activities, including a summary of findings and the outline inspection programme for the coming year.

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

As reported in the last reporting cycle, in late 2010 the Government adopted a policy outlining principles and key 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, thereby requiring 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 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.

- The current inventory of disused radioactive sources 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 to 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 2011/70/Euratom, which states that 'radioactive waste' means radioactive material in gaseous, liquid or solid form for which no further use is foreseen or considered by the Member State or by a legal or natural person whose decision is accepted by the Member State, and which is regulated as radioactive waste by a competent regulatory authority under the legislative and regulatory framework of the Member State;

The waste categorisation scheme under the current categories applicable in Ireland are disused sealed sources in storage/custody and unsealed radioactive material arising from medical applications.

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),categorised by half-life (< 1 y, 1-5 y, 5-10 y, > 10 y) and summarised in Table 1.17.

The regulation by the ORP 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) and Radiological Protection Act 1991 (Responsible and Safe Management of Radioactive Waste) Order 2013 (S.I. No. 320 of 2013). 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 ORP 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 ORP 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 ORP 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

In 2011, the European Council 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 directive was transposed into Irish law as Radiological Protection Act 1991 (Responsible and Safe Management of Radioactive Waste) Order 2013 (S.I. No. 320 of 2013) and provides, inter alia, for a report to the Minister on the implementation of the directive.

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).

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 ORP. The ORP'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 ORP of any changes relating to any of the items for which they are licensed and the ORP's database is updated accordingly. Information held on the ORP's database is routinely audited by ORP inspectors during inspections of these licensees. The system of licensing and on-going developments is described in further detail below.

The ORP data base itself is reaching the end of its useful life and a project is in train to replace it with a more up to date information management system which will provide greater functionality and more flexible and versatile data management capabilities.

Using the licence records, the ORP 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 ORP data is shown in Appendix 1 (Table 1.1 – 1.17). Further details of the 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 waste inventory at that time 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.

Since that reporting cycle there has been a very significant reduction in the size of the disused source inventory and a fresh assessment of the capacity of interim storage needs will be an essential preliminary to establishing such a facility.

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 Office of Radiological Protection of the Environmental Protection Agency (ORP) 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 Radiological Protection (Miscellaneous Provisions) Act No 20 of 2014 provides for the merger of the Environmental Protection Agency (EPA) and the Radiological Protection Institute of Ireland (RPII) essentially establishing the EPA as the national regulatory body with the radiation protection functionality being exercised on a day to day basis by the Office of Radiological Protection (ORP).

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, 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 ORP. 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 as amended sets out the functions of the EPA 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 (Miscellaneous Provisions) Act (No 20) of 2014
- Radiological Protection Act 1991 (Responsible and Safe Management of Radioactive Waste) Order 2013 (S.I. No. 320 of 2013)
- 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).
- Environmental Protection Act (Number 7 of 1992), 1992

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

Article 20. Regulatory Body

The Regulatory Body is the Environmental Protection Agency which has a dedicated office devoted to radiation protection regulation – the Office of Radiological Protection (ORP). It was established by the Environmental Protection Act, 1992 taking on radiological functions through the Radiological Protection (Miscellaneous Provisions) Act, 2014.

Mission Statement:
To protect and improve the environment as a valuable asset for the people of Ireland. To protect our people and the environment from harmful effects of radiation and pollution.

The EPA is an independent public body that reports to Government and is partially funded by the exchequer. Radiation Protection Regulation in ORP is under the overall responsibility of the Director with responsibility for the ORP who reports to the Director General and Board of the EPA. The ORP has the following duties and responsibilities in respect of radiation protection, nuclear safety and waste management:

- 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.

- 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 control 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 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.

- Where appropriate, to provide, or oversee the provision of, specialist radiation protection services such as personal dosimetry, radioactivity measurement, instrument calibration, radon measurements and product certification.

The EPA 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.

Under the Radiological Protection Act of 1991, the ORP 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, which is a Ministerial Order made under Section 30 of the 1991 Act. In addition to providing for the licensing scheme, it also transposes Council Directive 96/29 Euratom of 13 May 1996, referred to earlier, into national legislation.

The ORP publishes a report each year of its regulatory activities including the focus of inspections and an outline inspection plan for the following year (Ref 5).

The Licensing System

The licensing system operated by the ORP according to the requirements of the Radiological Protection Act, 1991 as amended and of S.I. No. 125 of 2000 is central to the control of radioactive materials and radioactive waste in Ireland. As of 1st January 2014 there are currently 1698 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 ORP is designated as the Competent Authority for the purposes of the Legislation and the Directive.

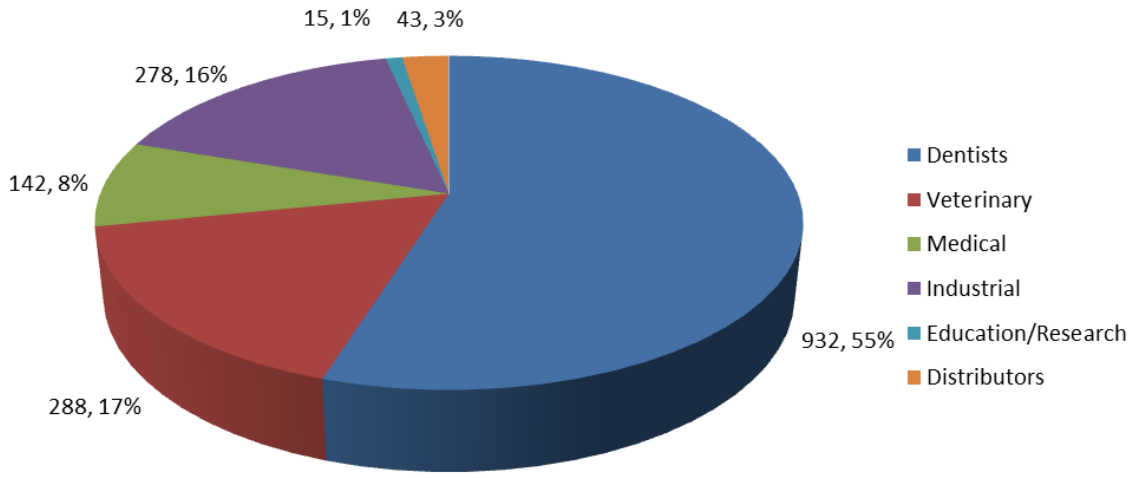

Figure 1: Licensees by Sector (1st January 2014)

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 ORP. 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 ORP.

- 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 ORP 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 ORP 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 ORP may consider important to impose. A specialised training course for those involved in the transport of relevant radioactive consignments was first approved by the ORP 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 ORP of any changes in the inventory of radioactive waste for which they are responsible and to have their licence amended accordingly.

- Inspectors from the ORP carry out inspections to assess compliance with the licence conditions (see below). Information on the number of inspections carried out in 2013 is presented in Appendix 3.

As part of the licensing process all licensees are obligated to carry out a risk assessment in relation to all sources in their custody and use including waste management at hospitals for example. Such licenses are also obligated to develop safety procedures to manage the risks identified and to keep doses as low as reasonably achievable. Such risk assessments and safety procedures have to be reviewed and updated periodically.

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 ORP 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 ORP 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 ORP 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 ORP has taken more than fifty prosecutions in the period between 1992 and 2014 (for offences ranging from a breach of licence conditions to unlicensed disposal of an irradiating apparatus and radon related issues). In addition, the ORP 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 ORP 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 ORP through the media, events, advertising, the ORP 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 ORP's major events and media interest in ORP activities is strong with staff participating in many television and radio programmes on an annual basis. The print media also have a keen interest in ORP activities. Feature articles have also been placed in publications which assist in highlighting the array of activities that the ORP is responsible for. The ORP 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 ORP hosts a number of events including report launches, seminars and presentations with the objective of disseminating information to targeted groups. The ORP's website, www.EPA.ie, is a valuable source of key information. Each year, the ORP 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.epa.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 (EPA).

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

In addition to the Office of the Director General (ODG), the EPA is divided into five offices: the Office of Communications and Corporate Services (OCCS); the Office of Environmental Enforcement (OEE); the Office of Climate, Licensing, Resources and Research (OCLRR); the Office of Environmental Assessment (OEA) and the Office of Radiological Protection (ORP). The later office has functional responsibility to the Board and Director General of the EPA for, inter alia, radiation protection regulation, radioactive waste regulation and emergency preparedness.

At the beginning of 2014 the RPII had 46 staff (42.8 whole-time equivalent), with the scientific/technical role dominating the workforce at 66%, supported by 34% of the staff in administrative roles. Eighty-one percent of scientific/technical staff hold a primary degree or higher, with 39% holding a Masters degrees and 25% a PhD. Following the merger of the RPII and EPA in August 2014, a new organisational structure for ORP has been established (Figure 2). Figure 3 illustrates the structure of the Radiation Protection Regulation Function within ORP.

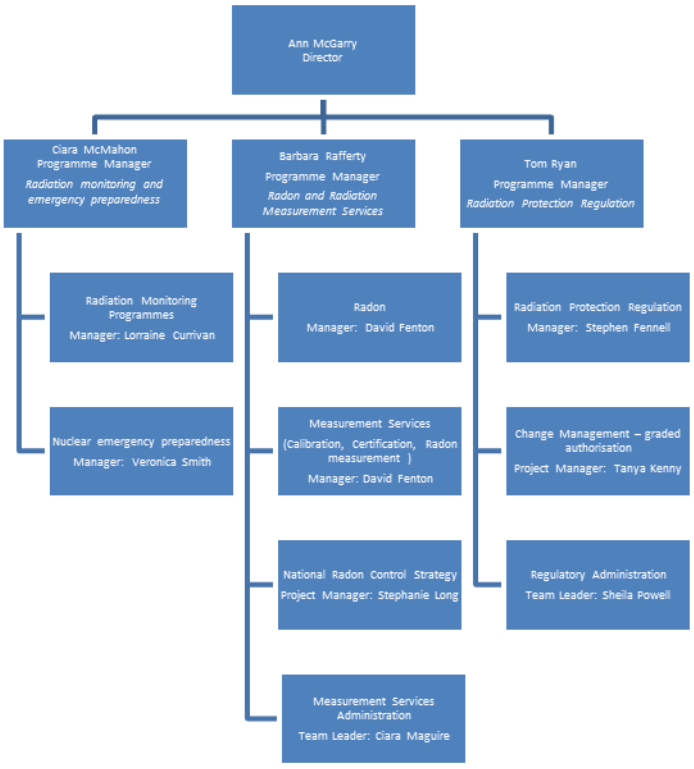

Figure 2: Organisational Structure of ORP

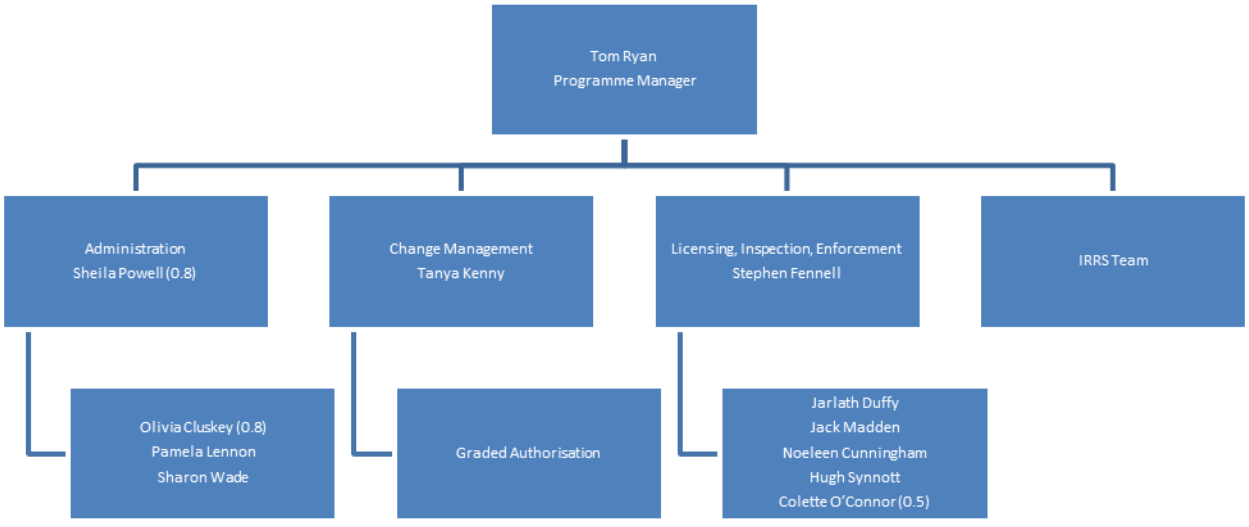

Figure 3: Organisational Structure of Radiation Protection Regulation within ORP

Staff numbers for the years 2005 to 2013 are given in Figure 4.

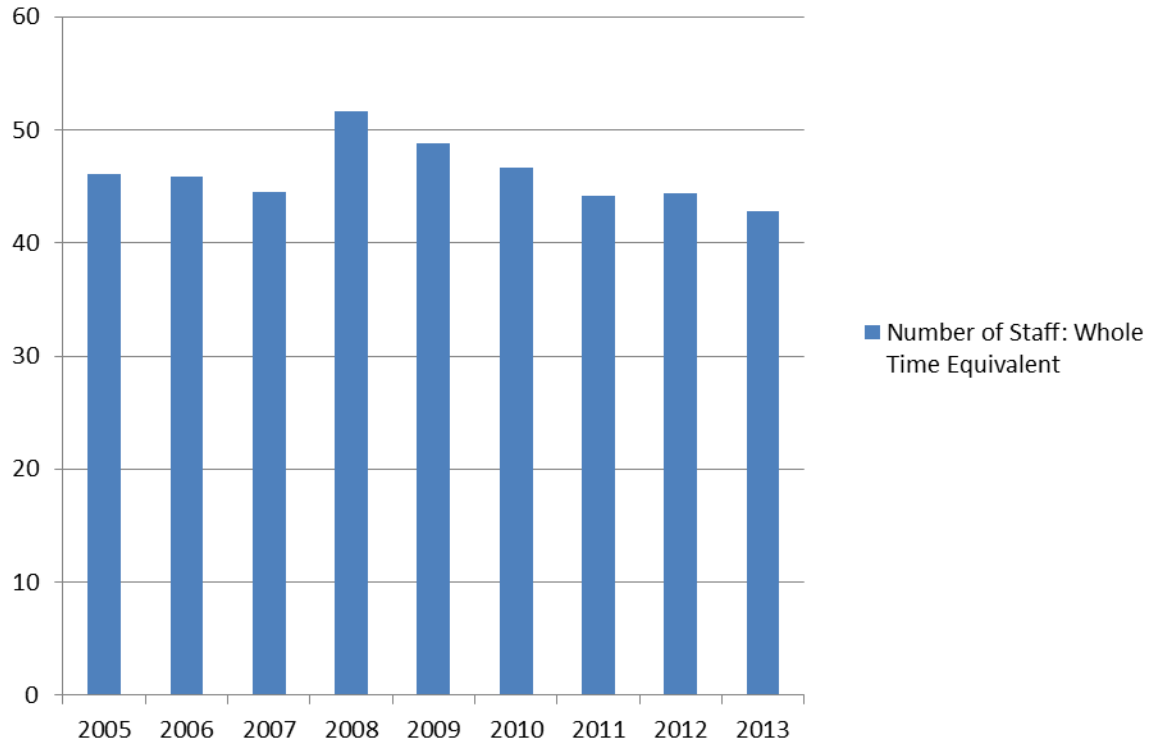

Figure 4: Staff numbers for ORP (RPII) 2005 to 2013

Development and maintenance of competence

A reported in previous cycles, in 2000, the IAEA carried out a Peer review mission of the regulatory authority's licensing system. The IAEA review covered all areas of the work of the regulatory authority, with the exception of the regulation of the transport of radioactive materials. In summary, the review team was of the opinion that the essential legal infrastructure for radiation protection is well established in Ireland and that the regulatory programme is effective. The team, however, felt that the regulatory authority would benefit from a thorough review of work priorities in licensing inspection and policy and guidance, to ensure that the activities of the Service remain well focussed.

In the intervening period a number of targeted peer reviews were undertaken encompassing the licensing and inspection arrangements for Radiotherapy, Non Destructive Testing, and Industrial Sterilisation and the off-shore oil and gas sectors. Implementation of the recommendations arising from these reviews constitutes

continuing work the regulatory authority. Most issues have been addressed such as augmenting existing expertise in the medical sector, implementing a focused training programme for inspectors and taking a more safety focused approach to inspections.

Significant progress has been made in relation to Radiation Protection Advisor (RPA) registers with one operational in the medical sector (Category I) and a similar register to provide services in the industrial sector (Category II). In 2008 the regulatory authority finalised arrangements for the establishment of a protocol and criteria for approval of RPAs for the industrial and third level educational sectors. The approval scheme also included work activities involving natural radiation. This Category II RPA approval scheme is broadly similar to that already in place for Category I RPAs (Medical and Dental) and is based on a formal approval of core competence by the RPII. The register of RPAs (individual and corporate) for the industrial and third level educational sectors has since been established and a register of all approved RPAs is maintained on the EPA website.

The ORP has 5.5 WTE 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. Currently reports prepared by inspectors on licensees operations are not generally made public but, as of 2011 a summary of inspection findings is being published on an annual basis.

The inspection schedule in 2013 is set out in Appendix 3. A recent history of inspection activities is provided in Figure 5.

Ensuring the availability of sufficient radiation protection professionals is a challenge both for the competent authority and for the regulated community. In particular, Ireland has established a formal competence based system of recognition for radiation protection advisors and the current register of RPAs is well populated. RPAs have an important role in terms of advising on the management of the small inventory of radioactive material in Ireland.

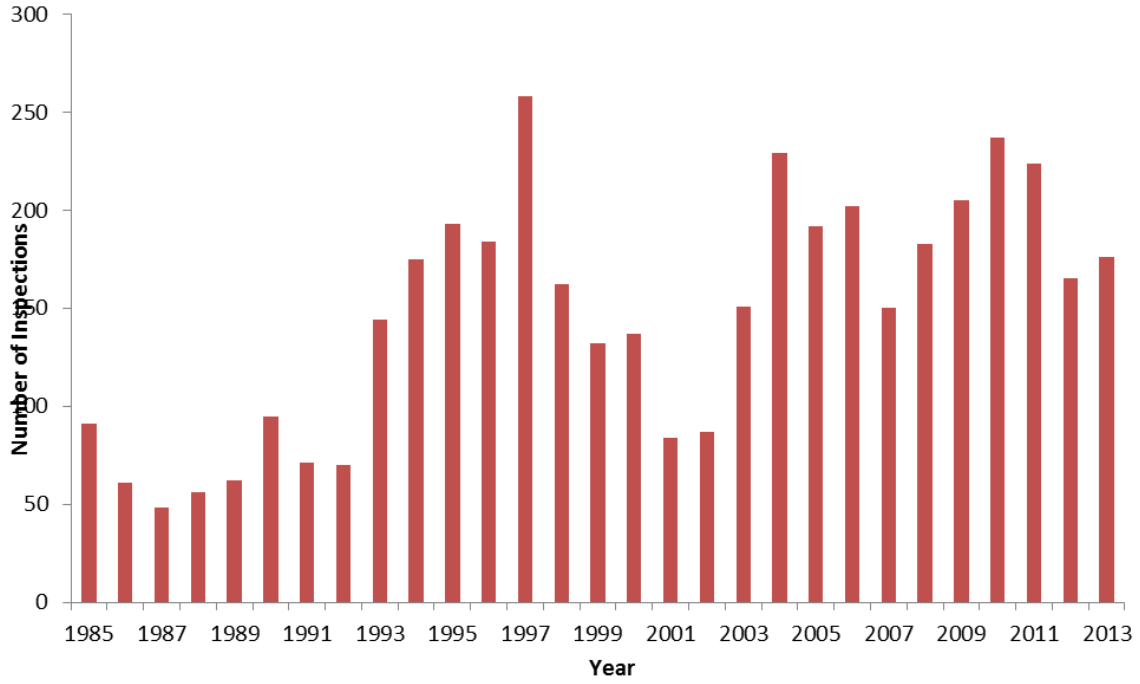

Figure 5: Inspections Undertaken by the Competent Authority (1985 – 2013)

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

Prior to the merger of the RPII with the EPA, the ORP's income was made up of a grant from the Exchequer and earnings from licence charges and commercial measurement services. In 2012, the RPII's income was made up of a grant of €3.499m from the Exchequer and earnings of €1.679m from licence charges and dosimetry, product certification, radon measurement and other services. From 2015 the ORP will be allocated a budget within the EPA.

In 2005 the regulatory authority, with the assistance of an external accounting and consultancy firm, carried out a comprehensive review of all its licence fees. The revised schedule of fees, which provide for full cost recovery of the costs associated with running the Regulatory Service, was approved by the Minister of the Environment, Community & Local Government in 2007 and introduced by way of Regulations (Radiological Protection Act, 1991 (Licensing Application and Fees) Regulations, 2007(S.I. No. 654 of 2007). The Regulations provide for a once-off application fee for new licence

applications and an annual licence fee. Licensees fall into one of three fee categories depending upon:

- the number of practices to be licensed and the level of complexity of the practice(s)
- the type, size, number and complexity of the radioactive source or irradiating apparatus
- the security and safety measures
- the complexity of radiation protective measures required
- potential for doses arising to workers and members of the public
- consequences of an accident.

Licence fees are as set out in the Radiological Protection Act, 1991 (Licensing Application and Fees) Regulations, 2007.

Article 23. Quality Assurance

The ORP 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 the conditions to maintain this accreditation INAB conducts an annual surveillance visit to assess the RPII's compliance with the standard and INAB regulations. In 2013 the RPII revised its quality management system to meet the requirements of the new ISO 17020:2012 standard. The new standard is an amalgamation of ISO 17020:1998 Standard with the IAF/ILAC-A4:2004 Guidance on the Application of ISO/IEC 17020. Under the new standard there is a greater emphasis on inspector competence rather than training, as well as more detailed requirements for complaints and appeal processes. In June 2013 INAB performed a re-assessment visit prior to the expiration of the five year accreditation certification previously awarded to the ORP. As part of the re-assessment visit they assessed compliance to the new 2012 standard. The RPII was successful in maintaining its accreditation for its existing scope and was awarded the transition to the new ISO17020:2012 standard in September 2013.

As part of its programme of continuous improvement, the ORP 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 ORP are accredited to ISO 17025 Standard and also participate in national and international inter laboratory comparison studies.

A team from the European Commission most recently visited Ireland in September 2014. 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. A formal report is awaited and the outcome will be reported orally during the Convention meeting in 2015.

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.

- 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

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 EPA. 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. The Ionising Radiation Order requires that undertakings submit the plans to the EPA. It also requires that undertakings immediately notify the EPA 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 6).

Licensees are obliged to report incidents within 24 hours to the EPA. 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), the Health Service Executive and the Coast Guard. 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, the current Framework for Major Emergency Management was launched by Government and following from this all Major Emergency Plans were updated. As part of the Major Emergency Development Programme, a series of inter-

agency protocols to underpin the multi-agency response to different categories of emergency was developed, including a Protocol for Multi-Agency Response to Radiological/Nuclear Emergencies. This protocol was prepared under the aegis of the National Steering Group on Major Emergencies, with the assistance and co-operation of the DECLG and the RPII.

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 and to assist them in working, if necessary, with the EPA and others to successfully manage emergencies that may have a radiological/nuclear dimension. The protocol was 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, it uses the advice given in the IAEA's "Manual for First Responders to a Radiological Emergency". 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).

A national protocol for responding to CBRN incidents (malevolent Chemical-Biological-Radiological-Nuclear events) was completed by the Government Taskforce on Emergency Planning in 2011. The protocol covers acute incidents where the location of the potential contamination is known and contained. A subgroup of the Government Taskforce on Emergency Planning has been set up to review the protocol and expand it where necessary. EPA is participating in this subgroup and current activities being undertaken include the development of additional modules dealing with:

- Decontamination
- Medical support
- Communications/Public information
- Sampling and laboratory testing
- Shipping and transportation of samples/devices

Each Department and Agency involved in the sub-group is also formalising arrangements for contacting additional international experts within their areas of responsibility in the event of a CBRN incident.

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

In accordance with the Ionising Radiation Order, 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 to act as a National Coordination Group. The ERCC comprises officials from key Government Departments and other public authorities and is chaired by DECLG. This ERCC is responsible, inter alia, for providing advice on countermeasures and for co-ordinating their implementation. The EPA 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.

Comprehensive up-to-date information about the NEPNA is available from DECLG's website (www.environ.ie) and that of the EPA (www.epa.ie).

In 2014, DECLG began a review of NEPNA in order to update it with lessons learned from key developments in emergency preparedness and response since it was last updated in 2005. These include

- The response to the Fukushima accident in 2011.
- Lessons learned by the National Coordination Group (NCG) in dealing with other emergencies such as severe weather, flooding and the Icelandic ash cloud event.
- The recently published review of current off-site nuclear emergency preparedness and response arrangements in EU member states and neighbouring countries undertaken by the EU.
- The two key hazard assessments which considered the risks to Ireland from nuclear accidents at the Sellafield nuclear reprocessing site and at the eight proposed nuclear power plants in the UK.

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

Risk Assessments

One of the principal elements of the systems approach to emergency management is a risk or hazard assessment. Recently two key threat assessments have been completed which considered the risks to Ireland from nuclear accidents at the Sellafield Nuclear Reprocessing Site and at one of the proposed nuclear power plants in the UK.

Sellafield Probabilistic Risk Assessment: At the end of 2012, the Department of the Environment, Community and Local Government (DECLG), in cooperation with the UK, published a summary of a Probabilistic Risk Assessment (PRA) of the Sellafield Site and the Low-Level Waste Repository, located near the site[1]. This assessment was conducted by a team of independent, international nuclear experts commissioned by the Minister for the Environment, Community and Local Government. The EPA is currently using the output from this report to do a more detailed assessment of the impacts on Ireland from the postulated accidental release of radioactivity to the air from the Sellafield site. Following on from this, the DECLG is also considering commissioning an economic analysis of the impact of a nuclear accident on Ireland.

Proposed Nuclear Power Plants in the UK: The UK Government has announced plans to build new nuclear power plants at up to eight sites in the UK before 2025. The RPII was requested by the Minister for the Environment, Community and Local Government to undertake an assessment of the potential radiological impacts on Ireland from this New

[1]http://www.environ.ie/en/Environment/EnvironmentalRadiation/PublicationsDocuments/FileDownLoad,31607,en.pdf

Build Programme. This report, which was published in May 2013, presents the findings of the potential radiological impact on Ireland from both the day-to-day operations of each proposed plant and in the event of various postulated severe accidents taking place at one of the proposed nuclear power plants.

Response to Theft of Radioactive Material

Over the weekend of 27 September 2013, seven lightning preventers which contained radioactive material were stolen from a premise in Swords, Co Dublin. The items were being stored pending a resolution of the arrangements for their final disposal. On receiving notification of the theft, the RPII (now ORP) immediately contacted An Garda Síochána (the national police force) to inform them of the gravity of the incident and the potential dangers involved. It was decided to coordinate and issue public warnings and appeals in an attempt to recover the sources. Press releases were issued by both the RPII and the Gardaí on 2 October.

An incident team was established, which brought together staff expertise in regulatory, emergency preparedness, laboratory, nuclear safety and communications. The team met twice daily in the initial stages to review information and actions, with the frequency reducing to once daily and then to once weekly as activity decreased. It was decided that, as a number of different agencies would be involved in any recovery operation, it was appropriate to manage the incident along the lines of the National Emergency Plan for Nuclear Accidents (NEPNA), using those facilities and procedures as far as practicable.

All of the normal regulatory channels were alerted, including known scrap merchant facilities, landfill sites and port authorities. The RPII liaised closely with An Garda Síochána throughout the course of the incident, participating in parallel public appeals for information and issuing public warnings about the dangers of the sources, culminating in significant coverage in print, television and social media. The resulting activity, particularly on Twitter, was remarkable, with the RPII's message reaching an estimated one million people (one fifth of the Irish population) as a consequence of the pattern of tweets that emerged.

Risk assessments were prepared to estimate the potential radiation dose to an individual resulting from a number of scenarios, including someone remaining in close proximity to the items, handling them, or cutting them up, or them being dumped in a drinking water reservoir or put on a bonfire. These assessments were circulated to all relevant departments and agencies. As each lightning preventer contained nine radioactive sources, which could pose a health risk to anyone either remaining in close proximity to them for a prolonged period of time, or through contamination if they handled them

inappropriately, the associated increase in the person's lifetime risk of cancer was calculated. While the risk increases with higher exposure to the radiation, none of the scenarios modelled would result in any observable health effects. However, if these items were mixed with other scrap material then that could create a different level of complexity and challenge in terms of contamination and recovery.

The RPII, as the then national competent authority for reporting radiological emergencies to international notification systems, notified the international community of the missing sources by submitting an "information" message to both the EMERCON (IAEA) and ECURIE (EC) systems on 3 October, 2013. Following this, the RPII was contacted by representatives from the UK Home Office, the French Nuclear Safety Authority and the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety with requests for further technical information on the nature of the radioactive sources. In addition, the RPII liaised directly with its counterparts in the Northern Ireland Environment Agency (NIEA).

In the early stages of the response, the RPII liaised with the National Director for Fire and Emergency Management at the Department of the Environment, Community and Local Government, (DECLG), which re-issued the RPII's public appeals through the communication channels open to the Major Emergency Framework, including the local authorities and their fire services. In the meantime, the RPII continued to engage in bilateral discussions with key actors such as the Health Service Executive (HSE) and An Garda Síochána to develop the necessary response protocols. While the incident was not considered of a scale to merit a formal meeting of the Emergency Response Coordination Committee (ERCC), it was agreed that a coordination meeting was required to ensure a shared understanding of what had happened and to ensure that the activities of key players were aligned. This meeting took place on 10 October in the Custom House, Dublin and proved to be central to the effective coordination of the incident response management. Despite the actions taken by all parties concerned, the sources remain missing.

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 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:

- Ireland has been a key driver of non-proliferation since the 1960s. The then Minister for External Affairs, Frank Aiken, was the first minister to sign the Nuclear Non-Proliferation Treaty. 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 7), 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 8) 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) and Radiological Protection Act 1991 (Responsible and Safe Management of Radioactive Waste) Order 2013 (S.I. No. 320 of 2013). These are enforced by the ORP. 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 9).

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 ORP 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 radioactive 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 ORP 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.

Following a review of iodine ablation therapy practices in Ireland, particularly in relation to the possible use of holding tanks for the decay of Iodine-131, the following regulatory position was adopted and remains valid in 2014:

- 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.

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 ORP may see fit to impose and to inspection by the ORP.

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

Article 14. Design and Construction of Facilities

It should be noted that if the building of a new radioactive waste storage facility is considered appropriate, 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 10 & Ref 11); an Environmental Impact Assessment, where required (Ref 12), 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 ORP would assess any application for facilities for the short or long term storage or the disposal of sealed sources in Ireland. The ORP

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 ORP. 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.

- Radiological Protection Act 1991 (Responsible and Safe Management of Radioactive Waste) Order 2013 (S.I. No. 320 of 2013)

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 for reuse or recycling purposes.

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 September 2014. The following Sections give further details of the main groups.

Inventory of Sealed Sources

It is clear that very significant progress has been made in reducing the inventory of disused sealed sources to a very small fraction of the inventory that existed during the last reporting cycle in line with Government policy (Figure 6).

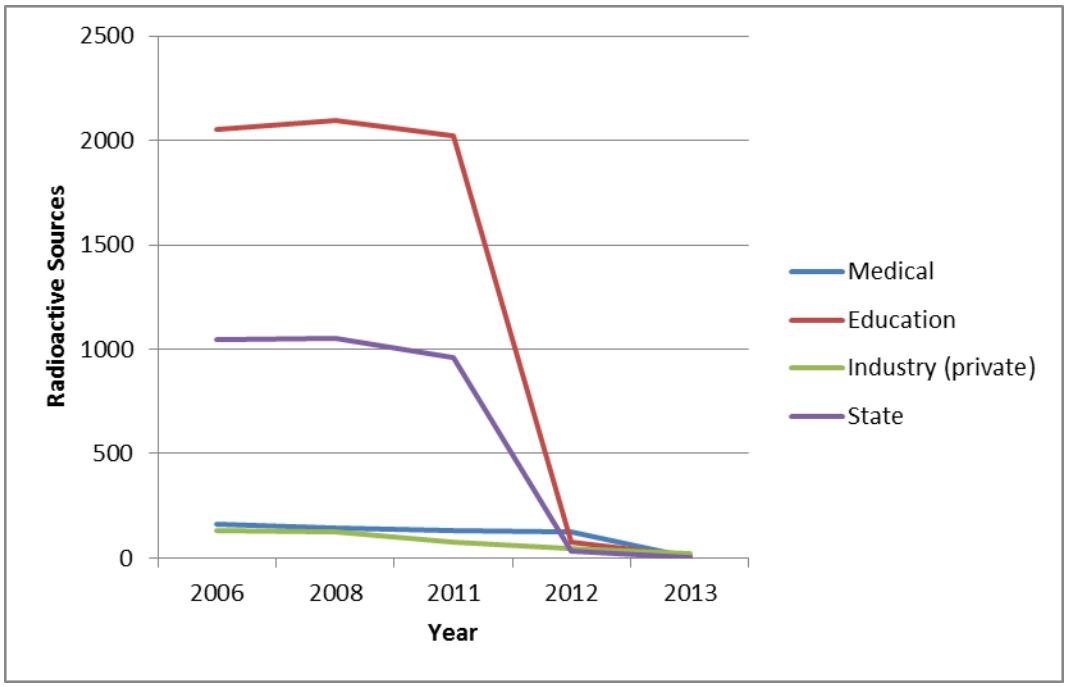

Figure 6: Disused source inventory reduction in all sectors (half-life >10 years)

The few 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, Am-241 and Sr-90. These are detailed in Appendix 1.

Natural Uranium Rods in a Sub-critical Assembly

At the time of the last reporting cycle, Ireland had 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 was considered negligible. The rods were stored in boxes (Figure 7) and had been declared as radioactive waste for the purposes of the Convention, pursuant to Article 3(2). They were maintained in 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).

Figure 7: Uranium Rods from the Sub-critical Assembly

The sub-critical assembly essentially consisted of a water-filled steel tank in which fission reactions were initiated by neutrons from an appropriate source. Given its sub-critical nature, a neutron source was required to initiate fission and also to maintain a measurable neutron flux. To that end, a neutron source, made of a quarter gram of Plutonium and Beryllium, was also supplied to the university under the Atoms for Peace Program.

The safe repatriation of all nuclear material was achieved thanks to the financial support of the Education Authorities in Ireland and the facility was officially decommissioned by the IAEA as a storage facility for nuclear materials.

Iodine-125 Sources

In previous reporting cycles, I-125 seeds for use in brachytherapy were recorded as waste for the purposes of the Convention. However, there is now a procedure in place for the return of seeds to the supplier. On occasion issues can arise with the return of individual seeds, and currently one hospital holds a small number of biologically contaminated seeds. These issues are dealt with on a case by case basis.

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. All legacy disused radium sources previously reported have now been disposed of abroad as part of the source reduction programme in line with Government policy.

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 ORP does not allow their importation. During the reporting period there was a concerted effort in particular to have these removed from buildings and disposed of and this proved to be very successful. However, at the time of reporting six remain and there is on-going work to ensure they are maintained safety pending disposal (Figure 8).

In 2013 there was an incident involving the theft of seven of these items and the details are provided in Section F.

Figure 8: Disused Lightening Preventors

Technetium 99 (Tc-99)

At the time of last reporting there was an estimated 7000 older Tc-99m (t ½ ~6 hours) generators, which were acquired prior to the introduction of the practice of requiring take-back agreements, held in storage. While, strictly speaking, they were not sealed sources they were included under this heading for the purposes of this Report. The generator cores contained the very long-lived and hence low specific activity Tc-99 daughter. All legacy disused Technetium-99 generator cores previously reported have now been disposed of abroad as part of the source reduction programme in line with Government policy.

Disused Educational Sources

At the time of last reporting there was an estimated 475 small teaching sources held by post primary schools that were no longer in use and were awaiting disposal. In addition, there was an estimated 9 kg of thorium and uranium components (unsealed) also awaiting disposal.

In terms of the disposal programme for disused sources held by secondary schools, a tender seeking specialist waste disposal contractors to dispose of all unwanted schools sources was issued in 2013. Following a successful tender process, a source disposal programme commenced in June 2013with an initial survey of 55 schools to estimate the scale of the problem. The source removal phase of the project commenced in December 2013 and at the time of reporting is nearing completion. An update will be provided in the oral presentation at the Convention meeting in 2015. It is anticipated that all legacy disused school sources previously reported will be recycled abroad as part of the source reduction programme in line with Government policy.

Implementation in Ireland of the HASS Directive

The purpose of the HASS Directive (2003/122/EURATOM) (Ref 13) 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 ORP 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. At the last reporting cycle six of these were held as disused sources and could be considered waste. All legacy HASS sources previously reported have now been disposed of abroad as part of the source reduction programme in line with Government policy.

Progress on Inventory Reduction

As can be seen from Appendix 1 (Table 1.1 – 1.17), initiatives taken by the ORP and other actors in line with Government policy during the reporting period have resulted in almost the elimination of the legacy sources in all categories. These initiatives included encouraging holders through the inspection process to pursue disposal options available from specialist waste management companies. A particularly successful initiative in the educational sector saw monies made available for the disposal of sources in that sector. 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

At the last time of reporting in 2011 there were 50 holders of sources across a range of half-lives and management requirements. At the time of reporting in 2014 this number had reduced to 15 but holding only 43 sources (Table 1.17). In addition to this, one licensee has accumulated a substantial number of domestic smoke detectors containing Am-241 and is in the process of securing a disposal solution within its own industrial grouping.

Section K: Planned Activities To Improve Safety

The ORP 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 National Radioactive Waste Storage Facility for disused radioactive sources is to be established. A National Implementation Committee, comprising of the 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.

- Further consideration will be given to options for the final disposal of Ireland's small inventory of 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
- Ireland has requested an Integrated Regulatory Review Service (IRRS) mission from the IAEA which is scheduled to take place in September 2015.

A new Radiation Protection Advisory Committee will be established to advise the EPA.

In addition the ORP 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. To date the pressure has been in the form of focusing on waste disposal during inspection and through sectoral pressure in the health and education sectors by respective Ministries. Ultimately, where routes are identified and there are no compelling reasons for not exercising them particularly where there are existing 'take back' agreements in place then licences can be revoked and prosecutions can be contemplated though this has not been tested to date. The current strategy is to strongly encourage compliance and there is some evidence that this is working.
- 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.
- Establish the regulatory licensing criteria for the design, construction and operation of a National Waste Management Storage facility.
- 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
- The Introduction of a modern information management system to replace the current system to provide a greater degree of functionality and data management.

IRRS Mission to Ireland 2015

The IAEA Integrated Regulatory Review Service (IRRS) was established to strengthen and enhance the effectiveness of national regulatory infrastructure for nuclear safety, radiation safety, radioactive waste and transport safety, and the security of radioactive sources, while recognising the ultimate responsibility of each Member State to ensure safety in these areas. The IRRS process sets out to accomplish this expressed purpose through consideration of both technical and policy issues of a regulatory nature against IAEA safety standards and, where appropriate, good practice elsewhere.

The regulatory review process directly draws upon the wide-ranging international experience and expertise of IRRS review team members. Peer exchange on technical and policy issues gives insight into the efficiency and effectiveness of the legal and governmental framework and regulatory infrastructure for safety. Through this process, opportunities for improvement are explored and potential improvement strategies identified which may be shared with other States.

IRRS missions provide an opportunity for sharing regulatory experiences, harmonising regulatory approaches among States, and creating mutual learning opportunities among regulators. IRRS discussions focus on issues arising from the State's self-assessment and the evaluation of technical areas and policy issues.
There are binding legal requirements in both the Euratom Nuclear Safety and Radioactive Waste Directives that the national regulatory framework, including the regulatory body, is subject to a periodic international peer review. In practice these peer reviews are organised by the IAEA through an agreement with the EU and comprise a detailed examination of national provisions against the IAEA's Safety Standards.

Ireland applied for its peer review mission on the 28th September 2010 and in an exchange of letters, 2015 was agreed between the IAEA and Ireland with a follow up mission foreseen for 2018. This time is in line with the requirements of both the Nuclear Safety Directive and the Radioactive Waste Directive.

The IRRS is a review of Ireland's radiation protection regulatory framework against the IAEA standards and not just the ORP, though clearly ORP will have a very important driving role.

The IRRS project will have a number of different phases including raising awareness, training, stakeholder engagement, self-assessment, a series of pre-meetings with the IAEA and then the actual mission itself. The self-assessment is a critical and intensive part of the project where Ireland assesses itself against the international standards using an extensive computer-based questionnaire supported by the IAEA. The output of the

self-assessment forms the core of the evidence that the actual mission will assess and verify in 2015.

The IRRS Team will be comprised of typically fourteen regulatory experts drawn from around the world. They will carry out a structured audit over 10-12 days including discussions with Government officials and site visits. They will produce a draft report which will be presented on the final day and provide a summary during a press conference. Once finalised, the report is made public.

Irish IRRS Project Objective

The objective of the project is to prepare for and host a successful IRRS project in 2015 that will fulfil Ireland's legislative requirements and deliver value to Ireland in terms of a continual improvement of the regulatory infrastructure and regulatory effectives.

Project Management

The IRRS is a review of Ireland's radiation protection regulatory infrastructure and will involve a number of different agencies. However, the ORP will be central to the project and the core project planning will be done within ORP in conjunction with the Department of Environment, Community and Local Government (DECLG) and other counterparts such as the Department of Health (DoH). To this end the project management structure will include a Core Project Team (CPR), with an Oversight Committee chaired by DECLG and including the main participating agencies including ORP and the DoH. The Core Project Team will liaise with both the internal and external counterparts and the IAEA Liaison Officer will liaise between the IAEA and the project management.

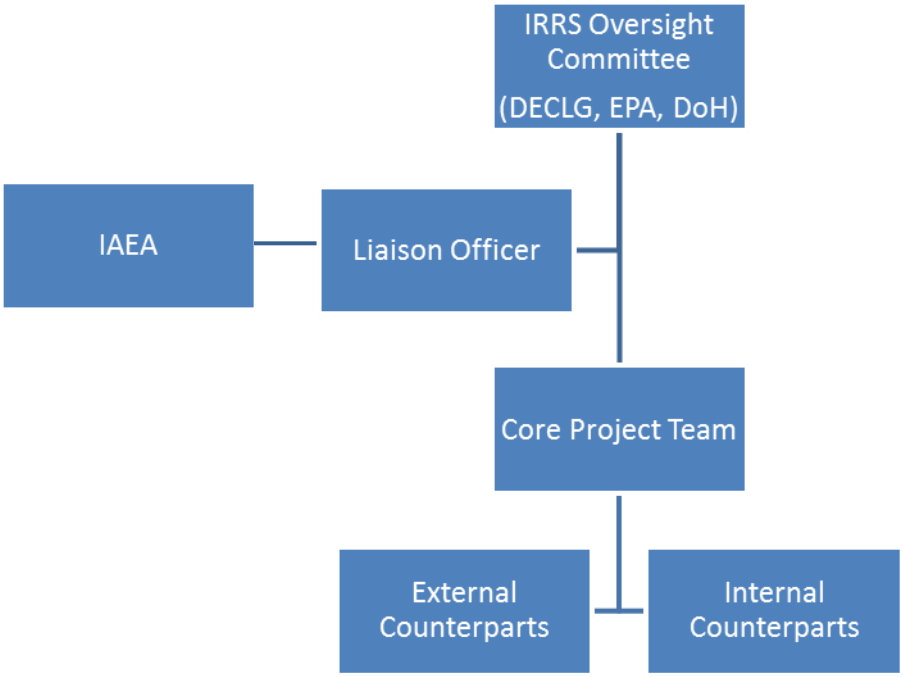

Figure 9: Project management structure

IRRS Oversight Committee

The IRRS Oversight Committee will be comprised of representatives from DECLG, EPA, DoH and the IAEA Liaison Officer. Its role is to ensure coordination between the main agencies and to review the progress of the project implementation plan. It will meet periodically and as often as the chair deems appropriate.

Liaison Officer

The IAEA Liaison officer has a defined role within the IRRS and includes being responsible for:

- Arranging logistics, administration, scheduling and documentation
- Being the main contact and focal point with the IRRS Team Leader and IAEA Coordinator in the preparatory phase during the mission
- Being the conduit between the IRRS team and the regulatory body
- Assisting in staff appreciation of what the mission entails
- Attending team meetings throughout the mission and
- Being available throughout the mission

The Liaison Officer for the 2015 IRRS mission to Ireland is Dr Tom Ryan, Director, Regulation and Information Management at ORP.

Core Project Team

As the ORP is the central competent authority for the mission, it is appropriate to appoint a Core Project Team from within ORP to define and drive the project and to draw in other agencies that will be involved or interested in the mission. The main functions of the Core Project Team will be:

- to project plan the IRRS mission
- to engage with relevant counterparts and stakeholders
- to take leadership roles in the implementation of the project plan
- to be the key decision making group for the project implementation
- to periodically report progress to the IRRS Oversight Committee

Within ORP:

The Project Sponsor will be Dr Ann McGarry, Director of ORP, who will liaise with the Core Project Team to ensure that objectives and milestones are being met and to help resolve issues that might arise in the course of the project.

The Project Manager will be Dr Tom Ryan, Programme Manager, Radiation Protection Regulation, who will lead the project team to deliver a successful mission for Ireland.

The Core Project Team members will include:

- Mr Jarlath Duffy, Senior Scientific Officer (Radiation Protection Regulation), who has special responsibility for the project logistics and, in terms of the reviewing process, the transport thematic area
- Dr Stephen Fennell, Manager (Radiation Protection Regulation) will have special responsibility for the Advanced Reference Material and, in terms of the review, will share responsibility for Module 3 dealing with the responsibilities and functions of the regulatory body
- Dr Ciara McMahon, Director (Environmental Monitoring and Assessment), will have special responsibility for Module 10 dealing with Emergency preparedness and response
- Ms Tanya Kenny, Senior Scientific Officer (Radiation Protection Regulation), will have special responsibility for the medical thematic area and will have responsibility for Module 5 dealing with Authorisation
- Dr Kilian Smith, Scientific Officer (Nuclear Safety), will have special responsibility for project communications and, in terms of the review, will have responsibility for Module 2 dealing with the global nuclear safety regime
- Ms Sharon Wade, (Business Support), will have special responsibility for liaison with Corporate Services including project administration and budgeting

Internal Counterparts

Internal counterparts are colleagues within ORP who have been identified as having a role in the reviewing process as set out in Section 5. The range of counterparts may expand as the project need's require. The primary roles of the internal counterpart will be

- to undergoing training as a reviewer,

- to be assigned a specific module for the self-assessment
- to take responsibility to ensure completion of the self-assessment of assigned modules;
- to participate in any necessary quality control of the self-assessment;
- to participate in the validation of the action plan arising from the self-assessment
- to act as a counterpart for the assigned module during the mission

External Counterparts

The main external counterparts are those organisations outside of the ORP that will have an active role both in the preparation of the mission and during the mission. While these have yet to be determined the obvious ones are DECLG (who has a leadership role in the project) and the DoH and its agencies. The main role will be in project coordination and, where appropriate, to assist RPII in terms of the review process and to be available to the IRRS Team during the mission. It will be desirable that each counterpart would appoint a lead person for liaison with the Core Project Team.

There will also be other counterparts that might be described as interested parties such as the Radiation Protection Advisors (RPAs) and licensees and it will be important to keep them informed of the progress of the project and to include them as appropriate in project information meetings.

Review Team Assignments

Colleagues have been assigned to lead in each of the modules and thematic areas and are supported by a reviewer. It is the responsibility of the 'lead' to ensure that all actions related to the assigned module are completed including the self-assessment, quality control and interaction with the IRRS Team. The lead is supported in all these roles by a reviewer.

Project Time Line and Key Milestones

There will be several phases to the planning and Mission including staff briefing and orientation; project design; self-assessment; pre-mission preparation and then the mission itself. These key milestones are set out in the Figure 10 below with explanatory text in the following table.

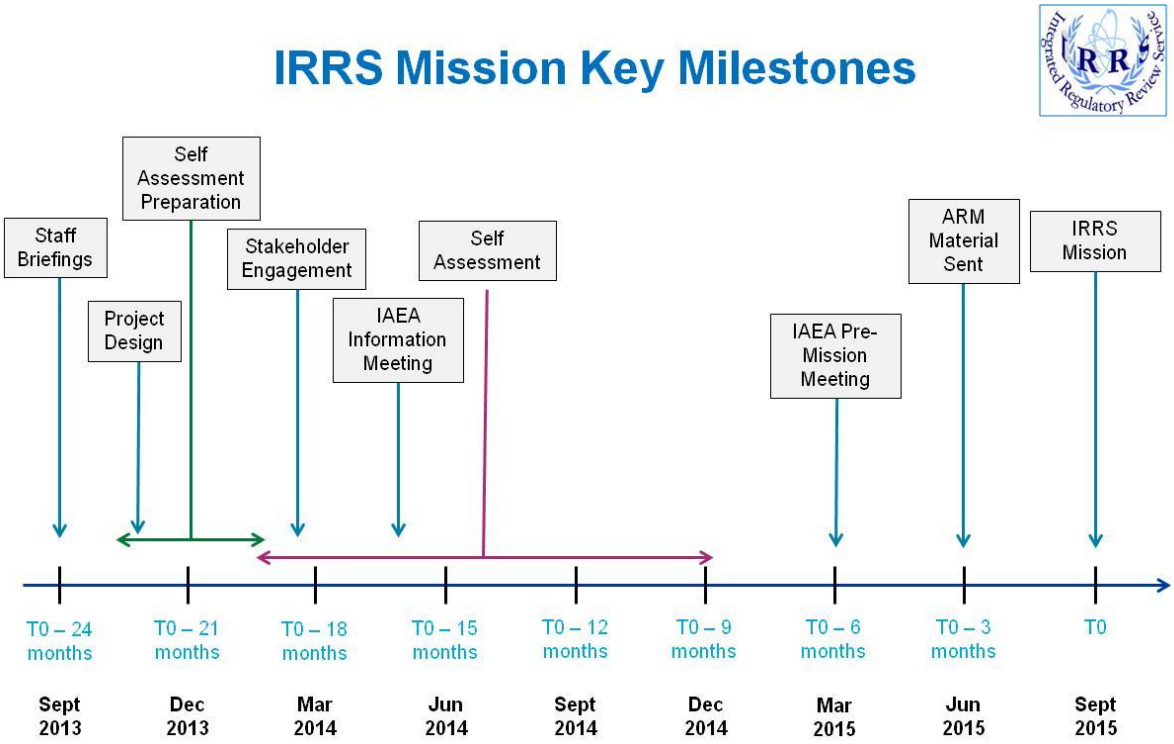

Figure 10: Key Milestones in Ireland's 2015 IRRS Mission

Key Mile Stones

This section identifies the key project milestones with some explanatory text.

Proposed Timing	Action	Comment
2013 Q1	RPII Staff Briefings on IRRS	This should be an initial briefing introducing ORP staff to the IRRS concept and what the expectations will be over the following 2 years This will be done by staff with experience in IRRS missions – so will be a mixture of process and experience This is an important exercise as it will serve to underline the importance of the mission and also the scale of what is about to be undertaken. Briefings should be an on-going feature of activities to build momentum and maintain

		enthusiasm – this is a marathon!
2013 Q1	Appointment of liaison officer	The liaison officer will have responsibility for the overall coordination with the IAEA and Ireland.
	Initial formation of organising committee	It will be the function of the committee to carry out a detailed project scoping exercise. It will be useful to talk to people that were involved in IRRS planning as a host to inform the ORP planning process
2014 Q1	Initial identification of other national stakeholders/counter parts	There will include the HSE, DoH, HSA etc.
	Organisation of a meeting with national stakeholders	The idea here would be to brief them on the IRRS process and expectations of them over the following 2 years including appointment of points of contact. This may be done as a group or in bilateral.
2014 Q1	IAEA Information meeting	IAEA to present IRRS process to Ireland. It will be a repeat of the initial staff briefing but from the 'horse's mouth' and should bring ORP staff and external counter parts together
2013 Q4	Arrange training for staff on the Self-Assessment Tool (SARIS) from IAEA	This training will need to be provided to all colleagues involved in preparing the self-assessment (SA) IT issues will need to be addressed with IT Section including forward planning about an external accessible file share for uploading SA results and supporting documentation. Early planning will be important.
2013 Q4	Assign staff members to SARIS modules and commence practicing answering the questionnaire	At this stage it will be important to build competence with the SARIS as the questioning style is difficult. This will involve a substantial number of staff.

		There will be limited involvement of external counter parts in dealing directly with the self-assessment questionnaire. Significant quality control efforts will be required here in terms of answering the SA and coordinated approach is advised with overall reviewers appointed
2014 Q4	Ensure that IT requirements are fully assessed with a view to the share file being in place and tested in early 2015	
2014 Q1	Commence identifying and assembling the advanced reference material and upload on share file	This may involve having to digitise a substantial amount of documentation. This will be an on-going process as the SA is being completed.
2015 Q1	Finalise dates for the IRRS with the IAEA in 2015	There will be a pre-mission meeting which lasts for a day and a half which will take place about six months prior to the main mission and tentative dates should be scheduled with IAEA also. Once the mission dates are set then this time should be block booked for all foreseeable involved in the mission
2014 Q2	The full scope of the mission should be agreed internally and with relevant counterparts including the thematic areas to be covered and policy areas to be discussed	
2014 Q3	Scope out the logistical issues and put a plan in place	This will include consideration of transport, hotels meals, Wi-Fi, meeting rooms, information pack, identity badges for all, social programme, staff availability. The number and type of site visits needed during

		the mission will need to be considered and the associated logistical issues but this will only be possible after the pre-meeting with the IAEA.
2014 Q2	Develop a communications strategy for the mission	Generally there is a press conference and an IAEA director will attend IAEA will issue their own press release
2014 Q4	Complete Self-Assessment Develop action plan Complete the assembly of advanced reference material	The self-assessment should be finished 6 weeks before the mission but it is no harm to have a stretch goal and get it done early – there will be a lot to do!
2015 Q1	Logistical considerations will need to be finalised when the team is known	The team should be in the same hotel with good meeting facilities and Wi-Fi. Visas may be an issue depending on the team composition
2015 Q2	Pre-mission meeting with IAEA	A draft mission programme will have been developed in advance
2015 Q2	Detailed Mission programme finalised with IAEA	This will be very detailed and will account for all activities and logistical issues during the mission It will involve the agreement of a substantial number of people in the ORP and external counterparts.
2015 Q3	IRRS Mission takes place	This will be an intensive 10 days for the organisation!
2015 Q4	IRRS Mission report is finalised and published	

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.

Achievements since the Fourth Review Meeting include:

- Substantial progress on the implementation of the national policy on radioactive waste management adopted by Government in 2010 where the national waste inventory has been dramatically reduced since the last reporting cycle.
- The transposition into Irish law of the European Council Directive (2011/70/EURATOM) establishing a framework for the responsible and safe management of spent fuel and radioactive waste.
- Completion and publication of risk assessments of the closest nuclear facilities to Ireland which will be used to review the National Emergency Plan for Nuclear Accidents.
- Ratification of the Amendment to the Convention on the Physical Protection of Nuclear Materials and Nuclear Facilities (CPPNMNF) in September 2014.

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.

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

References

Ref 1 IAEA Information Circular INFCIRC/604/Rev. 3_Draft_3 of May 2014 - 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 (As agreed at the Second Extraordinary Meeting).

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 RPII Inspection and Licensing Activities and Annual Inspection Programme for 2014, April 2014

Ref 6 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 7 Statement by Minister Phil Hogan, Minister for Environment, Community & Local Government, to the 55th Session of the IAEA General Conference, 19th September 2011.

Ref 8 Department of Communications, Marine and Natural Resources Energy White Paper. Delivering a Sustainable Energy Future for Ireland. March 2007.

Ref 9 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 10 Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (1998 Aarhus Convention).

Ref 11 Socio-economic and other non-radiological impacts of the near surface disposal of radioactive waste. IAEA-TEC-DOC-1308.

Ref 12 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 13 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)	No of Sources (2014)
LM1	AM-241	1	1	0
	CS-137	1	1	0
	U-238		4	0
LM2	CS-137	1	0	1
	U-238		1	0
LM4	CS-137	1	1	0
	BA-133	1	1	0
	AM-241	1	1	0
	RA-226	1	1	0
LM5	PU-238	1	1	0
LM6	AM-241	1	1	0
LM8	CS-137	1	0	0
	RA-226	2	0	0
LM9	Sealed/unsealed (Misc)	109	105	0
	SR-90		1	0
	BA-133/CS-137		1	0
LM10	AM-241	2	3	0
	CS-137	10	2	0
	RA-226	2	2	0
LM12	CS-137	5	5	4
	NI-63	1	1	0
	SR-90	1	1	1
	Total	**142**	**134**	**6**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
None				
	Total	**0**	**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)	No of Sources (2014)
None				
	Total	**0**	**0**	**0**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LM2	CO-57 IR192 Ge-68	3	0 1	0 0 1
LM4	CO-57		1	0
LM6	CO-57	10	10	0
LM7	CO-57	2	0	0
LM15	GD-153	1	0	0
LM16	CO-57	7	7	0
LM17	I-125 CO-57	1 1	0 0	0 0
LM8	CO-57	26	0	0
	GD-153	2	0	0
LM11	CO-57	1	0	0
LM12	CO-57	6	6	6
LM 100	CO-57	1	1	0
	Total	**61**	**26)**	**7**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014
LE1	AM-241	1	0	0
	RA-226	3	3	0
	SR-90	1	1	0
	NI-63		1	1
	Th-232	5	3	0
	U-238+	5	7	0
	Misc	2	3	0
LE2	CS-137	2	1	0
	Ra-226	2	0	0
	SR-90	5	5	0
	Th-232	8	8	0
	Misc	10	10	0
LE3	SR-90	1	1	1
	AM-241		1	0
	AM/BE		1	0
	Th-232	16	3	0
	TH-232NAT	1	0	0
	U-238+	3	3	0
LE4	RA-226	1	0	0
LE5	Am 241	16	8	0
	SR-90	14	0	0
	H3	10	14	0
	Cs137	12	4	0
	C-14	8	6	0
	TH 232	16	9	0
	U-238	53	36	0
	Ra-226	6	1	0
	PU-239	1	1	0
	I-129	3	0	0
	Ni-63		1	0
	CS-137/BA-137		1	0
	Misc	13	12	0
LE6	SR-90	7	3	0
	Thorium-232	9	8	0
	U-238+	14	13	0
LE7	Th-232	10	10	0
	U-238+	20	20	0
	Misc	3	3	0
LE8	RA-226	1	1	0
	RN-222+	1	1	0
	NI-63		2	0
	SR-90	2	2	0
	SR-90+	3	0	0
	TH-232NAT	3	3	0
	U-238+	7	7	0

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014
LE9	AM-241	2	2	0
	AM-241/BE	2	2	0
	CS-137	2	2	0
	RA-226	3	7	0
	KR-85		3	0
	U-238	1	1	0
	Th-232	1	1	0
	TH-232N	1	0	0
LE10	AM-241	3	0	0
	C-14	1	0	1
	RA-226	4	2	0
	SR-90	5	0	0
	TH-232NAT	4	0	0
	U-238	25	1	0
	Sealed/unsealed (Misc)	210	188	0
LE11	CS-137	3	3	4
	AM-241	1	1	0
	PU-238/Beryllium	1	1	0
	NI-63	2	2	0
	RA-226	2	2	0
	SM-151	3	3	0
	SR-90	2	2	0
	TH-232N	1	1	0
	U-238	1401	1401	0
LE12	Am-241	6	6	0
	Bi-207	1	1	0
	Pb-210	3	3	0
	Ra-226	10	10	0
	Cs-137	3	3	0
	C-14	2	2	0
	H-3	7	7	0
	Ni-63	3	3	0
	Sr-90	1	1	0
	Th-232	2	4	0
	MISC	9	5	0
	U-238	17	39	0
	Sealed/unsealed Misc	8	10	0
LE13	AM-241	4	4	0
	NI-63	1	1	0
	Th-232	3	1	0
	U-238	3	7	0
				0
LE14	SR-90		4	0
	AM-241		2	0
	RA-226		3	0
	Th-232	4	4	0

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014
LE100	Th-232	1	0	0
LE101	U-238		8	0
	TH-232		6	0
	Misc	4	4	0
LE102	Ra-226	1	3	1
	Ni-63	1	1	0
	SR-90	1	9	0
	AM-241		4	0
	U-238	13	13	0
	TH-232	10	11	0
LE500	Cs-137/Ba-137			4
	U/TH			2
	Total	**2096**	**2021**	**14**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LE1	CO-60	4	5	0
LE2	CO-60	3	3	0
LE3	CO-60	1	1	1
LE5	CO-60	9	0	0
LE9	CO-60	1	1	1
LE10	CO-60	3	0	0
LE11	CO-60	4	3	0
LE12	C0-60		4	0
	Total	**25**	**17**	**2**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LE14	CD-109	1	1	0
	FE-55	1	1	0
LE5	NA-22	3	1	0
	TL-204	4	2	0
	CS-134	2	0	0
LE12	FE-55		1	0
	TL-204		2	0
	CS-134/TL-204		1	0
	NA-22		1	0

	Total	**11**	**10**	**0**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LE9	C0-57	1	1	0
	CO/FE	0	2	0
	SN-119	6	6	0
LE15	CO-57	4	4	
LE5	C0-58	1	1	0
	P-32	6	4	0
	P-33	2	1	0
	S-35	1	1	0
	I-131	0	1	0
	CR-51	1	1	0
	PO-210	1	0	0
LE11	CO-57	8	8	0
	FE-59	1	1	0
LE2	I-125	1	0	0
LE3	PO-210	1	1	1
	Total	**34**	**32**	**1**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LI1	TH-232NAT	1	0	0
LI100	TH-232	1	0	0
LI2	AM-241/BE	1	0	0
	CS-137	1	0	0
	Cm-244	1	0	0
LI3	AM-241	3	2	2
	SR-90	1	1	1
LI4	AM-241	1	0	0
LI5	U-238+	1	0	0
	Ni-63	3	0	0
LI6				0
	AM-241/BE	1	0	0
	NI-63	27	0	0
LI101	U-238	3	3	0
LI102	Am-241	1	0	0
LI7	CS-137	2	0	0
LI103	Cs137	1	0	0
LI11	RA-226	1	0	0
LI12	NI-63	3	1	0
LI104	U-238	1	1	0
LI13	AM-241	7	0	0
LI105	u-238	1	18	0
	TH-232		10	0
	MISC		3	0
LI16	CS-137	1	0	0
LI106	Am-241/Be	1	0	0
LI107	U-238	2	0	0
LI108	Am-241/Be	3	0	0
	Cs-137	3	0	0
LI109	KR-85	1	0	0
LI20	Am-241	3	3	0
	Ra-226	4	4	0
LI110	Ni-63	8	16	0
LI23	Am-241/Berylium	1	0	0
	Cs-137	1	0	0
LI24	NI-63	1	0	0
LI25	AM-241/BE	1	0	0
	CS-137	1	0	0
LI26	RA-226	1	0	0
LI28	AM-241/BE	2	0	0
LI30	CS-137	1	1	0
LI40	USN&A	1	1	0
LI41	CU-244	2	0	0
LI42	NI-63	1	0	0

LI43	RA-226	1	1	0
	TH-232N	1	1	0
	U-238	1	1	0
	URYLATE	2	1	0
LI111	U-238	1	0	0
LI44	AM-241	1	0	0
LI46	AM-241/BE	1	0	0
	CS-137	1	0	0
LI112	Am-241/Be	1	0	0
	Cs-137	1	0	0
LI48	CS-137	1	0	0
LI49	AM-241		0	0
LI113	AM-241	1	1	0
LI114	U-238	3	0	0
LI52	SR-90	6	6	0
LI53	CS-137	2	2	0
LI54	CS-137	1	0	0
LI115	Cs-137	1	0	0
LI55	RA-226	1	1	0
	Am-241/Be	0	0	3
LI600	Cs-137	0	0	3
LI601	NI-63	0	0	1
LI602	AM-241	0	0	1
LI603	AM-241	0	0	1
LI604	NI-63	0	0	1
	Total	**128**	**78**	**13**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LI116	CO-60	1	1	0
	Total	**1**	**1**	**0**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LI117	Tl-204	1	0	0
LI118	TI-204	1	0	0
LI119	PM-147	1	1	0
LI120	CD-109	1	0	0
LI40	PM-147		0	0
	TI-204		0	0
LI113	PM-147	2	2	0
	TI-204	1	1	0
LI43	TI-204	7	7	0
	Total	**14**	**11**	**0**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LI48	Co-57	5	0	0
LI121	Po-210	1	0	0
	Total	**6**	**0**	**0**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LSO1	AM-241	2	2	0
	CS-137+	3	3	0
LSO100	Th-232	1	1	0
LSO101	TH-232	1	1	0
	U-238	1	1	0
LSO2	CL-36	1	0	0
	NI-63	1	0	0
	Ra-226	1	0	0
LSO4	H-3	1	0	0
	NI-63	3	0	0
LSO6	Am-241	1	0	0
	H-3	33	0	0
	Misc	3	0	0
	U-238+	3	0	0
LSO7	Am-241/Beryl	1	0	0
	Cs-137	1	0	0
LSO8	AM-241/BE	2	0	0
	CS-137	2	0	0
LSO10	C-14	65	40	0
	Cs-137	1	0	0
	Sr-90	1	0	0
	Ra-226	877	877	0
LSO102	Ni-63	1	1	0
LSO12	Am-241	2	0	0
	CS-137	7	5	0
	Sr-90	7	5	0
	Th-232	1	1	0
	U-232/Th-232	1	1	0
	U-238+	7	0	0
	Ra-226	8	8	0
LSO103	Ni-63	4	4	0
	U-238	2	4	0
LSO13	AM-241/BE	2	2	0
	CS-137	3	1	0
	NI-63	2	0	0
	U-238	2	2	0
				0
	Total	**1054**	**959**	**0**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LSO12	CO-60	1	1	0
LSO2	BA-133	1	0	0
	Total	**2**	**1**	**0**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LSO6	Cd-109		0	0
	Fe-55		0	0
LSO4	TI-204	1	0	0
	PM-147	2	0	0
	Total	**3**	**0**	**0**

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

Licensee	Nuclide	No of Sources (2008)	No of Sources (2011)	No of Sources (2014)
LSO12	Co-57	1	1	0
LSO13	I-125	2	2	0
	Total	**3**	**3**	**0**

Table 1.17: Summary 'Custody Only' sources September 2014

	No of Licensees	No of sources half-life >10 yrs	No of Sources half-life <10 yrs	Total no Sources
Medical	*2*	6	7	13
Industry	*6*	13	0	13
Education	*7*	14	3	17
State/Other	*0*	0	0	0
	15	33	10	**43**

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 (ORP) and, inter alia, sets out the appointment and powers of inspectors (Articles 28 and 29 of the 1991Act) and the framework for the ORP 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 ORP 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.

Radiological Protection (Miscellaneous Provisions) Act, No 20 of 2014

Radiological Protection Act 1991 (Responsible and Safe Management of Radioactive Waste) Order 2013 (S.I. No. 320 of 2013)

The Environmental Protection Agency Act, No 7 of 1992

Appendix 3: Summary of inspections carried out by ORP in 2013

Table 2: SUMMARY OF INSPECTIONS CARRIED OUT BY THE RPII IN 2013

Licence Category	No. in Category	Number of completed inspections
❑ Chiropractors	❑ 16	❑ 8
❑ Dentists	❑ 946	❑ 19
❑ Distributors (sources & X-ray)	❑ 45	❑ 16
❑ Hospital Level 1 (1 X-ray unit)	❑ 20	❑ 3
❑ Hospital Level 1 (bone densitometer)	❑ 28	❑ 3
❑ Hospital Level 2 (>1 X-ray unit)	❑ 56	❑ 18
❑ Hospital Level 3 (as level 2 + unsealed sources for in-vitro)	❑ 4	❑ 0
❑ Hospital Level 4 (nuclear medicine)	❑ 17	❑ 9
❑ Hospital Level 5 (radiotherapy)	❑ 14	❑ 8
❑ Education and Research	❑ 18	❑ 4
❑ Industrial level 1 [cabinet style X-ray unit]	❑ 138	❑ 9
❑ Industrial level 2 [electron capture devices, custody only]	❑ 11	❑ 3
❑ Industrial level 3 [sources, transport]	❑ 66	❑ 17
❑ Industrial level 4 [> 6 sources]	❑ 10	❑ 3
❑ Industrial level 5 [> 20 sources]	❑ 3	❑ 2
❑ Industrial level 6 [fixed X-ray, sources, transport, ICSD assembly]	❑ 20	❑ 11
❑ Industrial level 7 [irradiation, e-beam, cyclotron and mobile container scanner]	❑ 7	❑ 2
❑ Others [e.g. scrap, lightning preventors]	❑ 23	❑ 8
❑ Vets	❑ 265	❑ 30

❑	Non-licensees (e.g. air operators and underground workplaces)	❑	19	❑	2
❑	Security surveys (in conjunction with An Garda Siochána)	❑	-	❑	1
❑	Total excluding non-licensees	❑	1707	❑	174
❑	**Total**	❑	1726	❑	176

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 EPA is the national competent authority for both sets of arrangements and to support this the EPA operates an on-call duty officer system whereby a senior member of the EPA 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 EPA duty officer who will make an initial assessment of the situation. Where appropriate, the duty officer together with other key staff from the EPA 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 EPA 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 EPA and the UK'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. On 10th December 2004, Ireland and the Government of the United Kingdom and Northern Ireland signed a Bilateral Agreement on Notification in the Case of a Nuclear Accident or Radiological Emergency. This Agreement was designed to formalise the above-mentioned existing arrangements by ensuring that exchanges of information happen on agreed basis through specified channels.

Emergency Monitoring Systems

As part of Ireland's emergency preparedness, the Office of Radiological Protection (ORP) within the EPA operates three monitoring systems for the detection and measurement of radioactivity in the air and deposits on the ground (see Figure 11).

- A continuous gamma dose rate monitoring system operated at 15 strategic sites. These are carried out 24 hours a day and continuously fed back to the EPA with an alarm system. An additional 27 non-automated gamma sites can be activated if required.

- An air sampling system operates at 11 sites. Samplers are equipped with aerosol and gaseous iodine systems.

- A rainwater collection system operates at 6 sites.

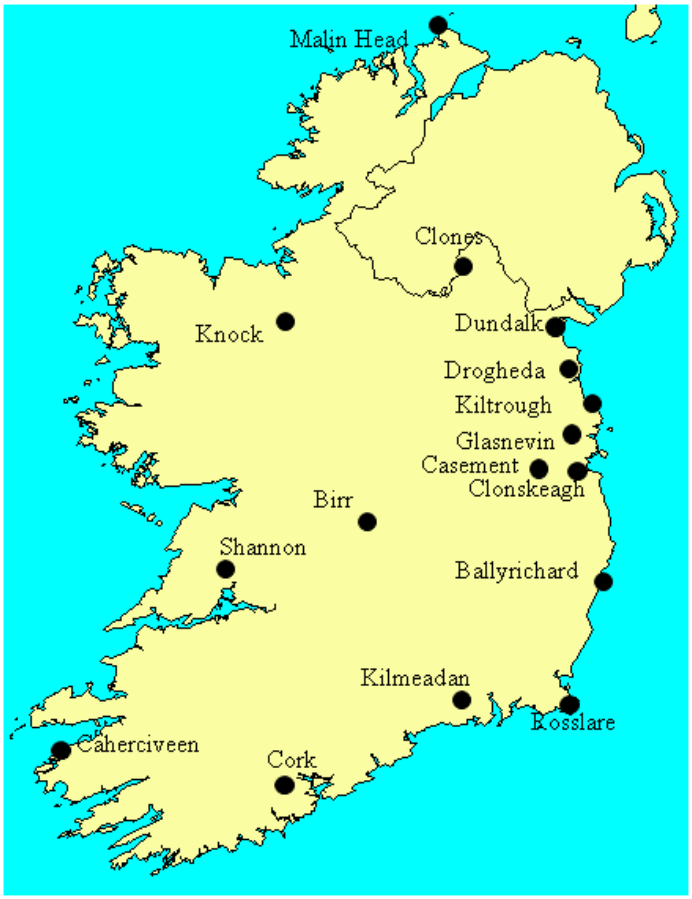

Figure 11: Map of permanent monitoring stations operated by the EPA

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

the national monitoring network has been updated to increase reliability, range of measurements and geographic coverage.

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 EPA'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, Denmark, Estonia, Faroe Islands, Ireland, Lithuania, Montenegro, Norway, Poland, Sweden and Turkey now manages the on-going development and maintenance of the system. The EPA 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 exercises or emergency use can quickly be incorporated into operational systems.

The EPA also maintains the HYSPLIT atmospheric dispersion model (HYbrid Single-Particle Lagrangian Integrated Trajectory: HYSPLIT). This model does not include the capability to calculate radiation doses but it does allow long-range dispersion modelling i.e. on a global scale of chemicals and particles in air. In 2013, a move towards a more centralised, national capability for atmospheric dispersion modelling in Ireland was led by the Irish Meteorological Service (Met Éireann), with the EPA, the Department of Agriculture, Food and the Marine and the Health Service Executive (HSE) as users. This new infrastructure allows each organisation to run the HySplit model using the most up-to-date and high quality meteorological data which is available at the Irish Centre for High-End Computing (ICHEC) and the European Centre for Met and Weather Forecast (ECMWF). To support the process, the EPA established a user group comprising the main organisations that use the resource to share experience and resources.

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, internet including social media, press statements, press conferences and via the national weather forecast broadcasts on television and radio. 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 EPA is the Competent Authority for the purpose of these Regulations.

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 EPA. 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/EPA and other statutory agencies such as local authorities update and publish their emergency planning procedures including those 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

Communication systems and arrangements for exchange of early notifications are tested regularly. A programme of testing of the ECURIE arrangements is coordinated by the European Commission. This includes 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 (USIE) coordinated by the IAEA.

Regular national exercises have also taken place. 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 the ConvEx exercises coordinated by the IAEA. RPII also participates in the annual ECURIE Level 3 exercises coordinated by the European Commission. The national level and main international

exercises (routine notification exercises are not included) in which RPII participated since 2008 are listed in Table X.

Table X Main national and international exercises RPII has participated in since 2008

Year	Exercise (main focus)	National/International
2008	ECURIE3/ConvEx3 (data exchange arrangements and advice to citizens abroad) ConvEx2b (advice on transport accident) CD2008 (sampling and laboratory analysis)	International (IAEA) International (IAEA) National (Civil Defence, RPII)
2009	ConvEx2b (advice and sampling strategies for nuclear accident) ECURIE3 (data exchange arrangements and advice to citizens abroad)	International (IAEA) International (EC)
2010	ECURIE3 (data exchange arrangements and prognosis modelling)	International (EC)
2011	ECURIE3 (data exchange arrangements and prognosis modelling) Response to Fukushima Nuclear Accident (data exchange arrangements, advice to citizens abroad, environmental monitoring, atmospheric dispersion modelling, public and media information and NCG)	International (EC) Real event
2012	CBRN exercise (test of national protocol, conducted in conjunction with local field exercise)	National (Office of Emergency Planning, HSE, Gardaí (police), DECLG, EPA)
2013	ConvEx2b (response to request for assistance following nuclear accident) ConvEx3 (use of USIE, preparation of press releases) Technical assessment exercise (test arrangements for atmospheric dispersion modelling) Response to stolen sources (communication to public, coordination with other national organisations) Table-top exercise on monitoring large scale cross border contamination in the aftermath of a nuclear accident	International (IAEA) International (IAEA) National (EPA, Met Éireann) Real event International (PREPARE project)
2014	Food & agriculture table top exercise (test use of the Irish Food and Agriculture Handbook)	National (DAFM, EPA)

In November 2013 an exercise was undertaken with Met Éireann to coincide with the IAEA ConvEx3 exercise. The exercise scenario involved an earthquake off the coast of Wales causing damage to the Wylfa nuclear power plant and a subsequent release of radioactivity. Members of the HYSPLIT user group and EPA's NEPNA sub-plan

Technical Assessment Team were also invited to attend as observers. The exercise allowed the EPA-Met Éireann joint procedures and the microwave data link between the two organisations to be tested. During the exercise the HYSPLIT and RIMPUFF (ARGOS) atmospheric dispersion models were used to assess the impact on Ireland of the theoretical accidental releases.

In 2009 a multidisciplinary group was established to customise the EURANOS handbook for Irish conditions. This Irish Food Handbook is a living document and it is maintained by DAFM. In November 2013 the RPII brought together a team of representatives from a number of sectors in DAFM (corporate affairs, veterinary health, livestock breeding, meat, dairy and crops) to refresh their knowledge of this Handbook. Following on from this, RPII organised a table top exercise to test the handbook. This exercise was held in February 2014 and involved staff from both RPII and DAFM. A number of different scenarios involving radioactive contamination in Ireland during different seasons of the year were tested. This identified a number of areas in which updates to the Irish Food Handbook were required. The RPII and DAFM met in April 2014 to review the list of updates and decide on timelines for their completion.

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 EPA, 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.