



Radiological Protection Institute of Ireland

An Institiúid Éireannach um Chosaint Raideolaíoch

Radiological Protection Institute of Ireland

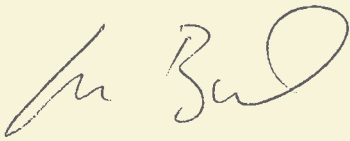
ANNUAL REPORT AND ACCOUNTS 2013



To the Minister for the Environment, Community and Local Government

The Radiological Protection Institute of Ireland was dissolved on the 1st of August 2014 under statutory instrument pursuant to the Radiological Protection (Miscellaneous Provisions) Act, 2014. On that day all of its functions together with its assets, liabilities and staff transferred to the Environmental Protection Agency.

In accordance with the requirements of the Radiological Protection (Miscellaneous Provisions) Act, 2014, I present the Annual Report and Statement of Accounts of the Radiological Protection Institute of Ireland for the year ended 31 December, 2013.



Director General (EPA)

Mission Statement

“To ensure that people in Ireland are protected from the harmful effects of radiation.”

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Who we are and what we do

The Radiological Protection Institute of Ireland (RPII) is the national organisation with responsibility for ensuring that people and the environment in Ireland are protected from the harmful effects of ionising radiation.

The RPII fulfils its remit by providing strong and effective regulation of all those who use radiation sources and by working in partnership with other regulatory authorities. The RPII monitors people's exposure to radiation. In addition, it provides advice to the public and the Government on radiation sources and on the corresponding risks and their management. The RPII has a central role in ensuring Ireland's emergency preparedness in the event of a nuclear accident abroad and is responsible for monitoring developments in relation to nuclear installations abroad. It has no role in the promotion or otherwise of nuclear power.

The RPII is committed to scientific excellence, and its advice is based on internationally agreed standards and on peer-reviewed research.

The RPII was established in 1992 under the Radiological Protection Act, 1991, and is financed by a grant from the Exchequer and by income from licence fees and radiation measurement services. The licence fees and charges for measurement services are approved by the Minister for the Environment, Community and Local Government.

The RPII is an independent regulatory authority.



Strategic priorities for the RPII 2011-2013

The RPII has developed a clear strategy to strengthen radiation protection in Ireland over the three-year period of 2011 to 2013. This is set out in full in the *RPII Strategic Plan 2011–2013*.

The RPII has developed four strategic priorities for the coming period, with specific objectives for each priority, underpinned in each case by the key themes of public value, transparency, communication and sustainability. The four strategic priorities are:

To provide the expertise, technical capability and information essential to the protection of the Irish population and the environment

This strategic priority encompasses a number of the key statutory functions of the RPII – monitoring radiation levels in the environment, informing people of our findings and advising the public and Government of the implications of all radiation exposures. The objectives under this priority reflect the central importance of these activities to radiation protection in Ireland. The RPII will undertake much of the work itself, but it will also seek to have information and services provided externally, where this represents better value for money without compromising overall quality.

To regulate the safe and secure use of ionising radiation in Ireland in a sustainable and transparent manner

This strategic priority is focused on the system of regulation, a key statutory function of the RPII. While acknowledging that the current regulatory system is effective, the objectives under this priority seek to enhance it by taking a risk-based approach to authorisation and by increasing transparency.

To work in partnership with others to implement national radiological protection initiatives

In the RPII's experience, high standards of radiation protection cannot be achieved by the RPII acting alone. This strategic priority recognises that others have responsibilities and that the RPII must work in partnership with them. The objectives in this area focus on two important gaps in national radiation protection infrastructure – a national radon strategy and a national strategy for the management of radioactive waste. They also deal with the new directives that are expected to be issued during the lifetime of the plan.

To deliver value to the public in everything we do

This strategic priority is focused on enhancing the overall public value of the RPII by optimising the use of resources within and external to the RPII. In supporting the Government's drive for reform in the public sector, the RPII will take a flexible approach to organisational arrangements, provided the needs of stakeholders are met. Internally, the RPII will build on its strengths and improve any areas of weakness. Externally, it will use its influence with partners to leverage greater value.

Highlights for 2013

- Completion and publication of the RPII's assessment of the potential implications for Ireland of the UK's proposed new nuclear power plants;
- Completion of a study on the levels of natural radioactivity in the Irish diet, which is being used in an update to the assessment of the radiation doses received by the Irish population;
- Development of a new customised prediction tool for response to emergencies by Met Éireann, which the RPII is supporting by establishing a users' group for other public sector users of the tool and organising a joint emergency exercise on its use;
- Completion and publication of a study on the levels of radioactivity in bottled waters produced in Ireland and
- Establishment of the National Dose Register
- Use of educational material and social media has expanded engagement with stakeholders.
- The population considers radon gas in the home less of a risk than nuclear power stations abroad and mobile phone masts.
- Public awareness campaigns on radon were carried out in nine county regions, including a major campaign in Co Louth.
- During the year, a licence was issued to a radiotherapy facility, for the custody and use of a linear accelerator incorporating CyberKnife technology.
- Some 176 inspections were completed in 2013
- INAB subsequently re-accredited the RPII to the new ISO 17020:2012 standard in September.
- Between 2011 and 2013, approximately 99% of all disused sources with half-lives greater than ten years were successfully exported out of Ireland to disposal and recycling facilities in Europe and the USA.
- In August 2013, Council Directive 2011/70/EURATOM, establishing a community framework for the responsible and safe management of spent fuel and radioactive waste, was enacted in Irish legislation by SI No. 320 of 2013.
- Over the weekend of 27 September, 2013, seven items described as "lightning preventers," which contained radioactive material were stolen from a premise in Swords, Co Dublin.
- The Director of Regulation and Information Management at the RPII, chaired the Council negotiations on the BSS during the Irish Presidency, which resulted in agreement in May 2013.
- Work to develop of a National Radon Control Strategy (NRCS) for Ireland was completed in October when the Minister was presented with a report containing some 48 recommendations. All the findings of the Inter-Agency Group were subsequently endorsed by Government, and the NRCS was launched in February 2014.
- The RPII collaborated with the HSE to update the number of lung cancer cases due to radon and with the GSI on a pilot project to better identify high-risk radon areas using past radon-in-air measurements, geology and airborne measurements.

Chief Executive's statement

During 2013, the RPII continued to focus its efforts on protecting people from the harmful effects of ionising radiation through effective regulation; monitoring of radiation levels in the environment and assessment of their implications for public health; and provision of accurate and timely advice to the public and to Government. Also during the year, considerable effort was devoted to preparing for the merger between the RPII and the EPA that was announced by Government in November 2012 with a completion date of mid-2014.

Regulation and Licensing

Ionising radiation plays an important role in the economic and social environment in Ireland through its use in the dental, medical, industrial, veterinary and educational sectors. The sources of ionising radiation used have to be managed safely and securely at all times, including when they are no longer needed. The safe management of radioactive materials is ensured through the RPII's regulatory programme of licensing, inspection, guidance and enforcement.

At the end of 2013, 1698 licences were in force in Ireland. Seventy one new licences were issued during the year, including 56 in the dental sector, while 72 were closed, 31 of which were in the dental sector. Overall, the total number of licensed activities has remained relatively constant since 2008. A major development during the year was the issue of a licence to a radiotherapy facility for a linear accelerator incorporating Cyberknife technology, the first such system to be used in Ireland. As with the introduction of all new uses of ionising radiation, the licensing process involved significant interaction between RPII inspectors and the licensee at each stage of the project from design to clinical use. During the year, the RPII also critically reviewed the business processes associated with its licensing and inspection activities, leading to the issue of an invitation to tender for the development of a new information management system (GAMIS) to improve efficiencies for the benefit of both the RPII and its licensees. The new system will also allow for the introduction of a graded approach to authorisation in due course.

One hundred and seventy six inspections were undertaken in 2013, with particular focus on medical procedures with the potential for high-doses including brachytherapy treatments in radiotherapy and interventional radiology; the use of hand-held and cone-beam dental X-ray units; activities involving the transport of radioactive materials and holders of radioactive waste and disused sources, including lightning preventers. The RPII's inspection activities have been accredited since 2008 and in 2013 the quality management system was revised to meet the requirements of the new ISO standard for inspection bodies (ISO 17020:2012). Following a successful reassessment visit by the Irish National Accreditation Board auditors in June, the RPII was accredited to the new standard in September.

Investigations of five reportable doses involving medical licensees were undertaken during the year. Two of them were not classified as a dose actually received by the wearer and a third was below the reporting level. The fourth case reported from a hospital cardiology department involved a cardiologist possibly receiving a dose to the lens of the eye of 12.5 millisieverts (mSv) in a four week period. The subsequent investigation concluded that since the cardiologist consistently wore lead-lined glasses, the real dose was estimated to be 6 mSv over the period and so was below the reportable dose. The fifth case involved a whole-body dose of 2.3 mSv to a radiographer. The incident was investigated by the hospital and its Radiation Protection Adviser (RPA) but the cause could not be established. The dose was below the relevant dose limit of 20 mSv. During 2013 also, in line with new guidelines on incident reporting published in 2009, RPII was notified of 4 incidents in the medical sector. All of these incidents concerned patients rather than staff, and were therefore outside the remit of the RPII. They were also reported to the appropriate body, the Health Service Executive (HSE).

Chief Executive's statement (continued)

As is required by law, the exposure of aircrew to ionising radiation is monitored to determine if measures to control exposure are required. During 2013, information received from 6 licensed air operators showed that 12,244 individuals were estimated to receive annual radiation doses above 1 mSv, with 107 of these in excess of 4 mSv and none over 6 mSv. Since monitoring of aircrew began in 2003 there has been a consistent yearly increase in the number of aircrew receiving doses in excess of 1 mSv, but doses have been maintained below 6 mSv. The year on year increase can be attributed to an increase in the number of aircrew required for the operation of new and existing routes as the demand for air travel increases.

In Ireland, radioactive waste comprises radioactive sources that are no longer in use, as well as contaminated clinical waste and discharges from hospital nuclear medicine departments. Ireland has no national facility for managing radioactive waste. Radioactive sources that are no longer required must be returned to the manufacturer/supplier in accordance with a take-back agreement required under the licence. Disused sources acquired prior to the introduction of take-back agreements are known as legacy sources. At the beginning of 2011, there were over 3300 disused sources with half-lives greater than 10 years at various locations across Ireland, the majority of which were held by 63 licensees. In accordance with the national policy on radioactive waste management for Ireland adopted by Government in 2010, an Inventory Reduction Programme was commenced to implement source disposal programmes across all sectors. Between 2011 and 2013, approximately 99% of all disused sources were successfully exported out of Ireland to disposal and recycling facilities in Europe and the USA. In addition, almost 5600 spent technetium-99m generator cores were disposed of between 2012 and 2013. Also during 2013, RPII met with officials from the Department of Education and Science to explore options for dealing with the estimated 500 disused sources held by post-primary schools.

These sources had been used for practical demonstrations as part of previous physics curricula but were no longer required due to changes in the curriculum. An online survey of all 743 post-primary schools was carried out in the second half of the year which showed that over 200 schools held such sources. A disposal programme will be arranged during 2014.

The importance of appropriate arrangements for the safe management of radioactive waste was highlighted during the year by an incident involving the theft of seven items described as "lightning preventers" from premises in Swords, Co. Dublin. The preventers contain radioactive material that 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 response to the incident involved the issue of public warnings by both the RPII and the Gardaí in an attempt to recover the sources. The RPII also worked closely with the Department of the Environment, Community and Local Government (DECLG), the HSE and the Gardaí to develop response and recovery protocols for the sources, should they be found. Despite the actions taken by all parties concerned, the sources remain missing and it appears unlikely that they will be recovered.



Exposure of the Irish population to radiation

One of the RPII's key roles is to assess the level of exposure of people in Ireland to radioactivity from both natural and artificial origin. The radiation dose received on average by people in Ireland from all major sources was re-assessed in a study completed between 2012 and 2013. The data were compiled into a comprehensive report on *Radiation Doses received by the Irish Population* to be published in 2014. The study found that, on average, a person in Ireland receives an annual dose of 4037 microsieverts (μSv) from all sources of radiation. There can be a large variability in the dose received by individual members of the population from any given source. By far the largest contribution of approximately 86% (3480 μSv) comes from natural sources, mainly from the accumulation of radon gas in homes. Man-made radiation contributes approximately 14% (557 μSv), dominated by the use of radiation in medical diagnostic procedures (546 μSv). Doses from other man-made sources account for less than 1% per cent (11 μSv).

Recognising the public health hazard presented by radon, in 2011 the Minister for the Environment, Community and Local Government established an inter-agency group to develop a National Radon Control Strategy (NRCS) within two years. The strategy was developed based on wide stakeholder consultation, with a targeted consultation with key stakeholders during 2012 and a public consultation on a draft strategy during 2013. The final report was delivered to the Minister in October 2013.

The NRCS sets out a comprehensive whole-of-government, whole-of-society approach to addressing radon. It specifically recognises the importance of primary prevention in new buildings and of activities to promote measurement in existing buildings. The strategy includes 48 recommendations in six thematic areas covering radon prevention in new buildings; use of property transactions to drive action on radon; raising awareness and encouraging individual householders and employers to take action on radon; provision of advice and support to

individuals with high radon results; promoting confidence in radon services (measurement and remediation) and reducing radon exposure in workplaces and public buildings.

While the key focus of the RPII's work on radon during the year was its support for the inter-agency group developing the NRCS, it also continued to work in partnership with other organisations to implement a range of initiatives to reduce exposure to radon. In particular, it continued to cooperate with the Health and Safety Authority with regard to exposure to radon in workplaces; with the HSE concerning the health effects of exposure to radon and with the Geological Survey of Ireland on a pilot project to better identify high-risk radon areas. During 2013, RPII continued to support the work of local authorities in implementing radon measurement and remediation programmes for social housing, with radon measurements completed in some 20,310 social housing units in 21 counties by the end of the year.

In addition to its work on radon, RPII also monitored radiation levels from a variety of other sources to estimate the radiation doses to people living in Ireland. The results of the 2013 monitoring programmes show that while the levels of artificial radioactivity in the Irish environment remain detectable, they are low and do not pose a significant risk to human health. The levels of radioactivity measured in air and terrestrial foodstuffs were very similar to those reported in previous years. The radiation doses due to artificial radioactivity in the marine environment were also very low and continue to be dominated by discharges from the Sellafield nuclear reprocessing plant. To complement the routine monitoring programmes, RPII also conducted targeted research aimed at assessing the dose to the Irish population from natural radioactivity in food, bottled water and groundwater sources. Results from these projects are published on the RPII's website and will be included in the report on *Radiation Doses received by the Irish Population* due to be published in 2014.

Chief Executive's statement (continued)

As well as estimating the radiation doses to the general population from radiation in the environment, RPII also compiles data on workers who are occupationally exposed to ionising radiation. During 2012, RPII developed Ireland's first National Dose Register (NDR), and, in 2013, the RPII imported the first data on occupational exposure from approved dosimetry services into the NDR. In future years, the NDR will be a source of statistical information on occupational exposure and will provide a means of evaluating the application of the system of radiological protection in Ireland.

Radiation Measurement Services

The RPII's laboratory provides calibration, radon measurement and analytical services to a range of customers including industry, the health sector, the education sector, other state agencies and the general public.

In 2013, the RPII's Calibration Service tested 461 instruments for compliance with the relevant manufacturers' specification. The Radon Measurement Laboratory issued 6784 detectors to customers in homes, workplaces and schools representing a slight decrease on the previous year. In relation to analytical services, the RPII measured the radioactivity content in 982 environmental samples and foodstuffs during the year and certificates specifying the radioactivity content were issued to 3292 exporters of Irish produce.

Emergency Preparedness

The RPII's objective in this area is to strengthen its core emergency response capability while supporting national planning. In 2013, RPII benefited from the work undertaken by Met Éireann to customise its HYSPLIT dispersion model for use during an emergency response in Ireland. For assessments of events in the vicinity of Ireland, the system now uses high-resolution meteorological data produced by Met Éireann's own weather forecast system, where previously lower resolution global data had to be used. This customisation allows greater precision in estimating the consequences for Ireland of a nuclear accident abroad.

The RPII, with the assistance of Met Éireann, the Defence Forces and a number of local authorities, operates a National Radiation Monitoring Network. During 2013, the ambient gamma dose rate was measured continuously at 15 stations, and radioactivity in air was measured at 11 stations. No increased levels of the ambient gamma dose rate above the normal fluctuations in background levels were observed during 2013.

The RPII runs an annual programme of emergency exercises to rehearse aspects of its emergency plans and to maintain staff expertise. In 2013, the RPII participated in seven international emergency exercises; five organised by the International Atomic Energy Agency (IAEA) and two organised by the European Commission. Two of these exercises focused on testing the IAEA's systems for reporting events and requesting specialised international assistance. The first of these, in June 2013, involved simulation of an accident at a nuclear power plant in Slovenia. Notification and a request for assistance were sent to all member states. The RPII's response included offering additional environmental sample analysis capabilities to Slovenia. In October 2013, a scenario was developed which centred on the hypothetical detonation of a radiological dispersal device in Dublin city centre. The exercise involved the RPII reporting the incident to the IAEA, carrying out an assessment of the incident using prediction models, transmitting the results of the assessment to the IAEA and requesting international assistance for medical support. A third exercise involved a number of international organisations, including both the IAEA and the EC. This exercise was based on a scenario simulating the detonation of a radiological dispersal device in Morocco with a number of foreign nationals, including Irish citizens, caught up in the blast. This exercise allowed the RPII to test international communication with both the IAEA and EC systems and, from a national perspective, to test communication links with the Department of Foreign Affairs. Press releases issuing advice to Irish citizens in Morocco were also generated as part of the exercise. In November, the RPII hosted a joint emergency exercise with Met Éireann. This exercise scenario considered an earthquake off the coast of Wales causing damage to Wylfa nuclear power plant and a subsequent release of

radioactivity. Atmospheric dispersion prediction modelling was carried out using both of the RPII's systems and the results were compared.

In fulfilment of its role to support emergency response planning at the national level, during 2013, RPII provided training for fire officers to deal safely with radioactive materials. It also contributed to the work of the Government Task Force on Emergency Planning and its subgroups on malign CBRN (Chemical, Biological, Radiological and Nuclear) incidents and the National Risk Assessment for Ireland.

During the year, RPII began working on the PREPARE research project funded under the EC's 7th Framework Programme. This is a collaborative project with 45 partners from around Europe that aims to address the issues in nuclear and radiological preparedness identified following the Fukushima nuclear accident in 2011. The particular focus of RPII's contribution is to the development of strategies, guidance and tools for the management of contaminated goods, taking account of the views of producers, the processing and retail industries and consumers.

Safety of Nuclear Facilities abroad

In 2011, the European Council initiated a process to review or "stress test" the ability of all European nuclear power plants to withstand extreme natural events, the impact of losing safety functions and severe accident management. As members of the European Nuclear Safety Regulators Group (ENSREG), RPII staff were involved in the design and execution of the peer review process. Each country was obliged to prepare an action plan describing the actions planned or implemented at the national level to improve the safety of its nuclear power plants. These national action plans were the subject of a regulatory peer review workshop held in April 2013 where the contents and status of implementation of the actions were considered. The RPII provided one of the vice-chairs of the workshop. A further workshop has been scheduled for April 2015.

During 2013, the RPII continued to closely monitor developments at Sellafield and other nuclear sites in the UK. In November, the UK's Office for Nuclear Regulation (UK-ONR) presented its view of safety and security standards across the UK nuclear industry in its first Chief Nuclear Inspector's Report. The report considered civil nuclear and defence sites, the transport of radioactive materials and emergency planning. The report noted that legacy radioactive waste facilities at Sellafield do not meet modern engineering standards for nuclear facilities and, as such, are vulnerable to the type of low-probability events that more modern plants are designed to avoid. These facilities were assigned a Regulatory Priority 1, meaning that they will be subject to a 'significantly enhanced level of regulatory attention' over the next five years.



Chief Executive's statement (continued)

Other Sellafield site operations were designated as a Regulatory Priority 2 and all the UK's civil nuclear power plants were assigned to Regulatory Priority 3, denoting a routine level of regulatory attention.

The main areas of focus for the RPII are developments relating to nuclear safety in the UK where there are potential risks of accidents that could impact on Ireland. Among the relevant developments of interest during 2013 were the proposals to extend the operational life of reactors at Wylfa in Wales and Hartlepool in England. Any such life extension must be approved the UK safety regulators. Also in 2013, the UK Government's site selection process to establish a geological disposal facility to accommodate high and intermediate-level radioactive waste was subjected to public consultation, following the withdrawal of an expression of interest from communities in Cumbria.

In order to replace the capacity of plants being closed, the UK has embarked on a programme to develop new nuclear power stations by 2025. At the end of 2012, the UK-ONR granted its first new nuclear power plant site licence for 25 years to EDF for a new plant at Hinkley Point. Planning permission was granted in March 2013. Plans for further applications by other power companies were also progressed during 2013.

In May 2013, the RPII completed and published its assessment of the likely effects on the environment in Ireland of the planned programme to build new nuclear power stations in the UK. The assessment involved a review of the reactor designs and an estimation of the discharges from routine operations and from potential accidental releases to air and sea. The assessment found that the routine operation of the proposed nuclear power plants will have no measurable radiological impact on Ireland or the Irish marine environment. Five severe accident scenarios were assessed as part of the study, ranging in likelihood of occurrence from one in 50,000 to one in 33 million per year. Food controls and agricultural protective measures would be required if any of these accidents occurred to ensure that food on sale in Ireland was safe to eat. In the case of the most severe accident scenario, short-term measures such as sheltering would also be required. The assessment also examined the

consequences of a large accidental release of radioactivity to the Irish Sea equivalent in size to that after the Fukushima accident. It found that the resulting radiation dose to people in Ireland who eat very large quantities of fish and shellfish would be less than the annual radiation dose limit for the public. The study shows that any radioactive contamination in the air, either from day-to-day operation of the proposed nuclear power plants or accidental releases, would be transported away from Ireland most of the time. This conclusion arises from an analysis of weather conditions prevailing in Ireland and the UK over the past 21 years.

In 2013, the RPII received notification from the UK nuclear safety regulators of just over 80 events that occurred at civil nuclear facilities in the UK. The majority of the events were categorised as being of 'no safety significance'. The more significant events included the discovery of clothing contaminated with radioactive material outside the appropriate disposal route in one of the facilities at Sellafield. While there was no spread of contamination outside of the change room area, the results of an assessment showed that the activity on the clothing was in excess of the authorised limit for the area. In November 2013, there was a temporary power loss on the Sellafield site. The fault affected one of the process lines in the Waste Vitrification Plant, and, following the power loss, there was evidence of contamination within three areas of this line but none detected external to the building. The loss of power caused little impact to other buildings on site. In all cases, the RPII remained satisfied that there were no radiological issues for Ireland.

International standards and activities

An objective within the RPII's strategic priorities is to contribute internationally to the development of radiation protection and nuclear safety standards and to influence the implementation in Ireland of related Euratom directives. In this context, 2013 was a particularly active year with the RPII involved in supporting the technical and political discussions on the new Basic Safety Standards Directive and the new Drinking Water Directive, both of which were agreed during the Irish Presidency of the European Council. The RPII also provided nuclear safety



advice to Government in relation to a revision of the Nuclear Safety Directive, the preparations for the sixth review cycle of the Convention on Nuclear Safety and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OP SAR). It provided an expert to assist with the study of current arrangements and capabilities for off-site nuclear emergency preparedness commissioned by the EC in 2013 as well as providing information about arrangements in Ireland to the project.

Communications and Corporate Services

RPII's corporate services provide financial, human resources, communications, IT and other essential services in support of the core scientific and technical work of the RPII. Corporate services strive to provide efficient and effective supports that sustain quality service delivery and value for money across the whole organisations.

Provision of advice and information on radiation protection to Government and to the public is a priority of the RPII. Easy access to high-quality information through the RPII website and collaboration with others are important elements in raising awareness of radiation issues. In 2013, the RPII website was revamped to make information more accessible. During the year, the website received over 50,000 unique visitors with the most popular sections of the website being the aspects related to radon. There was also good media coverage of RPII activities during the year, in particular on radon issues. Eight press releases were issued to the national media and 11 press releases with specific local information on radon were issued to the

regional media. RPII staff undertook one television, 24 radio and 11 newspaper interviews at national and regional level. RPII also sponsored a segment on radon on the Eco Eye programme broadcast in January 2013.

In 2013, RPII commissioned market research to quantify the level of concern and understanding among the population in relation to radiation protection issues. The research found that the majority of people in Ireland have some degree of awareness about radon gas, with one in two claiming to know a little or more about it. Despite this apparent high awareness, only one in three claims to be concerned about it in their home. Approximately one in two people believe that a nuclear accident in the UK will have a significant or catastrophic impact on their health. Radon gas in the home is considered by the population to be less of a risk than Sellafield, nuclear power stations abroad or mobile phone masts. This is despite the fact that radon is linked to 250 lung cancer cases in Ireland every year, pointing to a widespread imbalance between the perceived risk and actual risk. The findings of this research have informed and will continue to inform radon awareness campaigns and communications on radiation exposure in Ireland in general.

Chief Executive's statement (continued)

Merger with the Environmental Protection Agency (EPA)

In November 2012, under the Government reform initiative aimed at rationalising state agencies, the Government announced that the RPII was to merge with the EPA. In January 2013, the Minister for Environment, Community and Local Government decided that the bodies should be merged by creating a fifth Office within the EPA structure, bringing the total number of Offices to five, each headed by a Director. The Minister established a Working Group (the Merger Working Group – MWG) comprising an independent Chair, the Chief Executive of the RPII, the Director General of the EPA and two representatives of the Department of the Environment, Community and Local Government (DECLG) to plan for and manage the merger to completion. The MWG was also explicitly tasked with ensuring that there is no diminution, or perception of any diminution, among stakeholders and the general public, with Ireland's commitment to either environmental or radiological protection, arising from the merger. During 2013, the MWG guided the development of an Action Plan by staff from both organisations and from the DECLG. The Plan was approved by the Minister in July 2013 and implementation commenced with the aim of having the merger completed by mid-2014.

Strategic Plan

Every three years, the RPII develops a new strategic plan setting out the actions it will take to deliver on its mission of protecting people from the harmful effects of ionising radiation. As the year 2014 marked the beginning of a new strategic planning period, a significant effort was devoted towards the end of 2013 to review progress against the Strategic Plan 2011–2013 and to develop a new plan, taking account of the fact that it was to be developed in the context of the merger. The plan addresses the delivery of radiological protection in the period spanning the transition from the RPII to the Office of Radiological Protection in the merged organisation. It focuses on four thematic areas that represent the core work of the RPII which is to provide the expertise, technical capability and information essential to the protection of the Irish population and the environment and to regulate the safe and secure use of ionising radiation in Ireland.

I wish to express my personal appreciation to all the staff of the RPII for their continued dedication and professionalism in effectively fulfilling RPII's mandate during the year. In particular, I wish to acknowledge the positive approach and strong engagement they have shown to preparations for the merger with EPA. I am also grateful to the staff of the Environmental Radiation Policy Section of the DECLG and other officials in the Department for their support for the work of the RPII.



Dr Ann McGarry
Chief Executive, RPII



Regulation and licensing

Ionising radiation plays an important role in the economic and social environment in Ireland. In particular, its use in hospitals is vital to the delivery of high-quality diagnostic and treatment services. Similarly, it is used extensively throughout industry with applications ranging from security screening and quality control testing to sterilisation of medical products and oil and gas exploration. However, the sources of ionising radiation used have to be managed safely and securely at all times, including when they are no longer needed. This is ensured through the RPII's regulatory programme of licensing, inspections, guidance and enforcement.

Licensing

Prior to any individual or organisation acquiring either a radioactive source or an irradiating apparatus, they must first obtain a licence from the RPII. Since the introduction of a licensing system by the Nuclear Energy Board (NEB) (the predecessor to the RPII), in 1977, the number of licences held has increased each year, though the total number has dropped off slightly in recent years (Figure 1). At the end of 2013, 1698 licences were held across a range of sectors, including dental, medical, industrial,

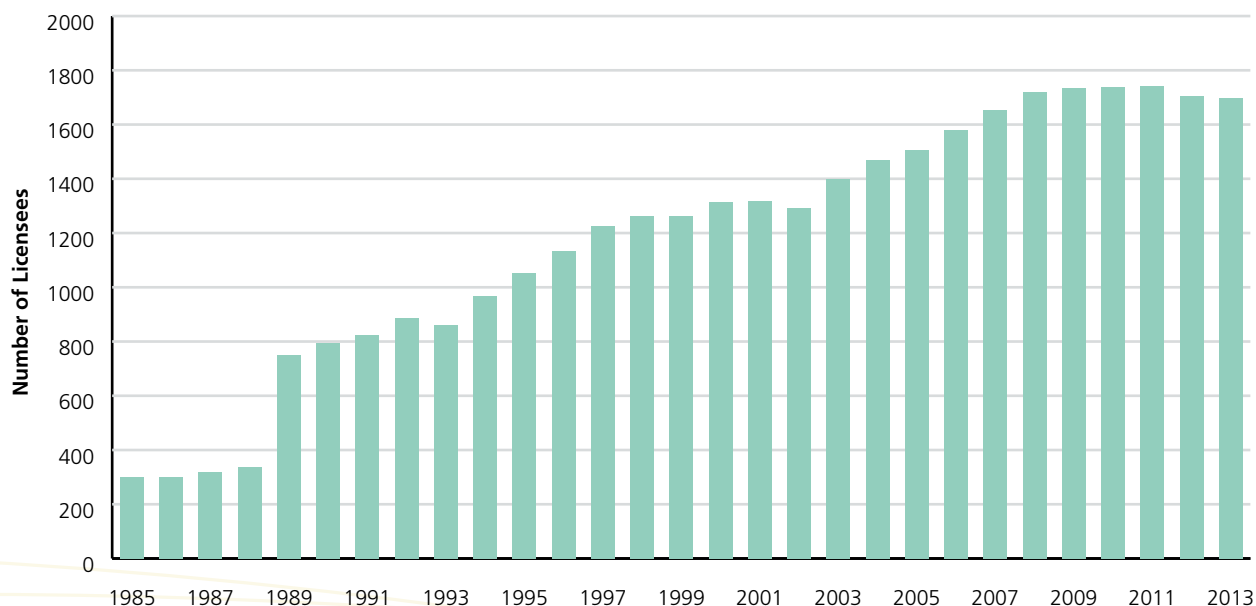
educational and veterinary. 71 new licences were issued during the year – 56 of them to dental practices.

2013 also saw the closure of 72 licences, 31 of which were in the dental sector. In all cases where a licence is closed, the licensee must ensure that the items for which the licence was held are either properly disposed of or returned to the manufacturer or supplier.

During the year, a licence was issued to a radiotherapy facility, for the custody and use of a linear accelerator incorporating CyberKnife technology. This system, the first in Ireland, presented significant design challenges for the licensee in order to meet the RPII's licensing requirements on radiation safety. During the construction phase of the project, inspectors visited the site on several occasions to observe the radiation protection measure being put in place. The licence was issued following extensive testing of both the CyberKnife system and the bunker shielding.

This involved an extensive review of the documentation submitted to the RPII by both inspectors and the RPII's external radiotherapy consultant.

Figure 1: The number of licences issued by the NEB/RPII 1985 – 2013



Regulation and licensing (continued)

In 2012, the RPII, with the assistance of external business analysts, undertook a project to critically review the business processes associated with its licensing and inspection activities. The project identified a need for the RPII to develop a new information management system to introduce improved efficiencies to the current regulatory business processes. These improved efficiencies will benefit both the RPII and licensees. In December 2013, the RPII issued an invitation to tender for the development of a new information management system to support its regulatory service. The proposed new system, GAMIS (Graded Authorisation Management Information System), will also allow for a graded approach to authorisation to be introduced and, when implemented, will reduce the administrative workload for licensees and RPII staff, as well as enhancing the transparency of the RPII's regulatory activities. The work on the development of GAMIS will continue into 2014.

Inspections

Each year, the RPII undertakes an annual inspection programme of licensees. These inspections provide an opportunity to assess both the standards of radiation protection across the various sectors and the level of compliance by licensees with both national legislation and licence conditions. The selection of licensees to be inspected each year is based on a number of criteria, including the radiological risk associated with the licensees' activities, the time elapsed since their last inspection and any incidents reported within their sector of operation.

Some 176 inspections were completed in 2013. Figure 2 illustrates the number of inspections undertaken by the RPII each year from 1992 to 2013. Further details on the number of inspections undertaken in each licence category during 2013 are provided in Table 1.

Figure 2: Inspections undertaken by the RPII (1992 to 2013)



Table 1: Inspections undertaken in 2013

Licence Category	Number in category	Number of completed inspections
Industrial	278	55
Medical	142	49
Distributors (sources & X-ray)	43	16
Dentists	932	19
Education/research	15	4
Vets	288	30
Security surveys (in conjunction with An Garda Síochána)	n/a	1
Others (aircrew, underground workplaces)	n/a	2
Total	1698	176

The inspection programme priorities for 2013 focused on:

- The use and application of radioactive sources for brachytherapy treatments within radiotherapy departments of hospital licensees;
- The use of complex X-ray systems for interventional procedures such as cardiac catheterisation and vascular procedures;
- Activities associated with the distribution and transport of radioactive sources;
- The use of hand held dental radiography units;
- The use of cone beam dental X-ray units;
- Holders of radioactive waste and disused sources;
- Holders of lightning preventers;
- The security and storage arrangements for nuclear moisture density gauges; and
- The continuing work of ensuring safety in underground workplaces.

Following on from the work of 2012, where the RPII promoted the proposed new International Commission on Radiological Protection (ICRP) dose limits for the lens of the eye, inspectors were reassured to note that during the year there had been an increased awareness of both the proposed new dose limits and the necessary protection measures needed to ensure that doses to the eye were kept as low as reasonably achievable. A review of the 2012 inspection programme was published in the RPII's annual inspection activities report in April.

Accreditation 2013

The RPII is committed to ensuring the quality of its services and activities. Since 2008, its inspection activities have been accredited by the Irish National Accreditation Board (INAB) to the ISO 17020:1998 international standard for inspection bodies. As part of the conditions to maintain this accreditation, each year the accreditation board conducts an annual surveillance visit to assess the RPII's compliance with the standard and INAB regulations. In 2013, the Regulatory Service revised its quality management system to meet the requirements of the new ISO 17020:2012 standard. Under the new standard, there is a greater emphasis on inspector competence rather than training as well as more detailed requirements for complaints and appeals processes.

In June, INAB performed a reassessment visit prior to the expiration of the five-year accreditation certification previously awarded to the regulatory service. As part of this reassessment visit, they assessed compliance to the new 2012 standard. The RPII inspectors were witnessed performing an inspection in a hospital radiology department. INAB auditors were satisfied that the RPII's quality management system and its inspection activities were in compliance with the new standard, noting that RPII inspectors had been observed to be both competent and professional during the witnessed inspections. INAB subsequently re-accredited the RPII to the new ISO 17020:2012 standard in September.

Regulation and licensing (continued)

Exposure to aircrew from cosmic radiation

Under S.I. No. 125 of 2000 the holder of an air operator's certificate is required to evaluate doses received by aircrew to determine if measures to control exposure to cosmic radiation are warranted. This requirement applies to those air operators whose aircrew is potentially liable to receive an annual dose greater than 1 mSv, which effectively applies only to those airlines flying above 8000 meters. Doses are estimated by the airlines using internationally recognised software programmes specifically designed for this purpose.

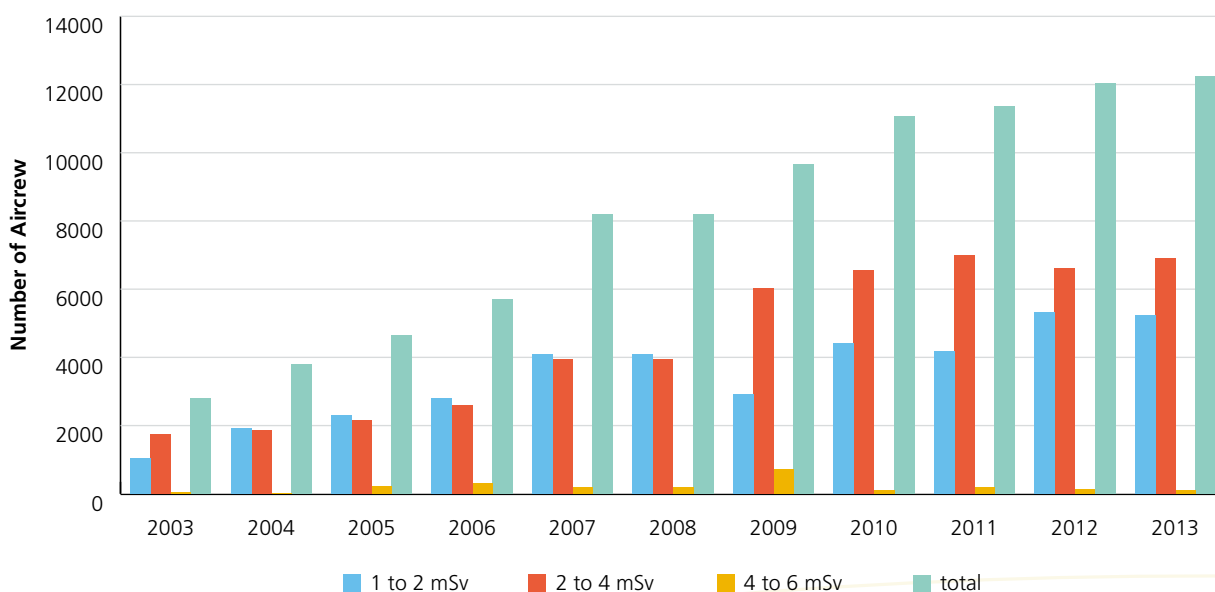
For 2013, the information received from 6 licensed air operators showed that 12,244 aircrew were estimated to have received an annual radiation dose above 1 mSv from exposure to cosmic radiation. Of these, 5222 received between 1 and 2 mSv, 6915 received doses between 2 and 4 mSv and 107 received doses over 4 mSv. No aircrew received a dose in excess of 6 mSv. Since monitoring of aircrew began in 2003 there has been a consistent yearly increase in the number of aircrew receiving doses in excess of 1 mSv (Figure 3). This can be attributed to an increase in

the number of aircrew required for the operation of new and existing routes as the demand for air travel increases.

Security of radioactive sources

The security arrangements for the storage of radioactive sources are assessed during all relevant inspections, particularly for those licensees holding high-activity sealed sources (HASS). The RPII's joint programme of work with An Garda Síochána's National Crime Prevention Unit (NCPU), which assesses security provisions at licensees' premises against best international security practice, continued in 2013. During the year, a security survey of a licensee holding a number of disused radioactive sources on their premises was undertaken jointly by officers of the NCPU and the RPII. This was a follow-up survey to one undertaken a number of years ago to ensure that appropriate measures were in place to prevent the theft of the sources. A number of recommendations were made to the licensee following the survey to further improve the existing security arrangements.

Figure 3: Number of aircrew receiving radiation doses greater than 1 mSv





Reportable doses

Under the conditions of all RPII licences, whenever an occupational dose exceeding a specified reporting level is recorded on a personal dosimeter, the licensee must carry out a full investigation. The reporting levels specified in the licence conditions are 2 mSv over a 16-week period for a whole-body dose, 15 mSv over a 16-week period for a dose to the lens of the eye and 50 mSv over a 16-week period for an extremity dose (dose to hands or feet).

The RPII was notified of five reportable doses during the year, all involving medical licensees. This figure compares with 11 cases in 2012 where reportable doses were recorded by both medical and industrial licensees. Three of the five cases were reported from hospital cardiology departments, where the doses were recorded during interventional radiology procedures. The subsequent investigations determined that in two of the three cases, whole-body dosimeters had been inadvertently worn by cardiologists on the outside of, rather than underneath, their lead protective aprons, and therefore were not real doses to the wearer. In these cases, the RPII recommended to the hospitals concerned that a programme of internal auditing and refresher training should be put in place for relevant staff. The third case reported from a hospital cardiology department involved a cardiologist possibly receiving a dose of 12.5 mSv to the lens of the eye as recorded by a collar TLD over a four-week period and thereby exceeding the reportable dose of 15 mSv over a 16-week period. The outcome of the investigation concluded that since the cardiologist consistently wore lead lined glasses, the real dose to the eye was an estimated 6 mSv over the four-week period, and the dose over the 16-week period never exceeded the reportable dose.

The remaining two cases reported during the year involved a finger dose of 7 mSv to a radiographer, and a whole-body dose of 2.3 mSv to another radiographer, both within four-week periods. In the case of the 7 mSv finger dose, the dose did not exceed the reporting level of 50 mSv and was therefore not reportable to the RPII. In the case of dose received by the radiographer, the incident was investigated by the hospital and its Radiation Protection Adviser (RPA), but the cause of the incident was

not established. The RPII reviews all doses recorded on dosimeters during its inspections, regardless of whether they are reportable.

Incidents and investigations

In accordance with national legislation and the RPII guidelines for reporting radiological incidents, all incidents of radiological consequence must be reported to the RPII. Furthermore, all reportable incidents must be investigated by the licensee in order to:

- Establish the sequence of events leading to the incident;
- Identify the cause of the incident;
- Decide upon and implement remedial action to prevent a recurrence; and
- Estimate the dose received by all persons involved in the incident.

During 2013, four incidents involving medical licensees were reported to the RPII. All of these incidents concerned patients rather than staff, and were therefore outside the remit of the RPII. The hospitals also reported the incidents to the appropriate body, the Health Service Executive (HSE). The investigations, undertaken by the hospitals in conjunction with their RPAs, concluded that they had occurred as a result of either prescriber or practitioner (as defined in Statutory Instrument (SI) No. 478 of 2002) errors in nuclear medicine (wrong injection type), and diagnostic imaging (patients referred in error for computed tomography (CT) and general exams).

Radioactive waste

Radioactive sources that are no longer required are referred to as “disused sources” and are considered to be a type of radioactive waste. Other types of radioactive waste include contaminated clinical waste and discharges from facilities such as hospital nuclear medicine departments. The vast majority of radioactive waste in Ireland is comprised of disused radioactive sources. While the disused sources consist of a wide variety of radionuclides with a corresponding range of half-lives, in practice those sources with half-lives greater than ten years provide the greatest challenges in terms of their long-term

Regulation and licensing (continued)

management. Sources with shorter half-lives can be managed by storing them until they have decayed to background levels.

Ireland currently does not have a national storage facility for managing radioactive waste. In the absence of such a facility, radioactive sources that are no longer required must be returned to the manufacturer/supplier in accordance with a take-back agreement, which is a mandatory licensing requirement. However, many of the disused sources in Ireland were acquired prior to the introduction of this licensing requirement and have had to be stored under licence on the premises where they were originally used, pending the identification of a suitable disposal solution for them. These waste products/streams are known as *legacy sources*.

At the beginning of 2011, the RPII estimated that across Ireland, there were over 3300 disused sources with half-lives greater than ten years. The vast majority of these were legacy sources and were held by 63 licensees at various locations across Ireland. In order to ensure that appropriate security arrangements are in place for these disused sources, the RPII, with the assistance of An Garda Síochána, has carried out security audits of many of these premises in recent years.

National Inventory Reduction Programme

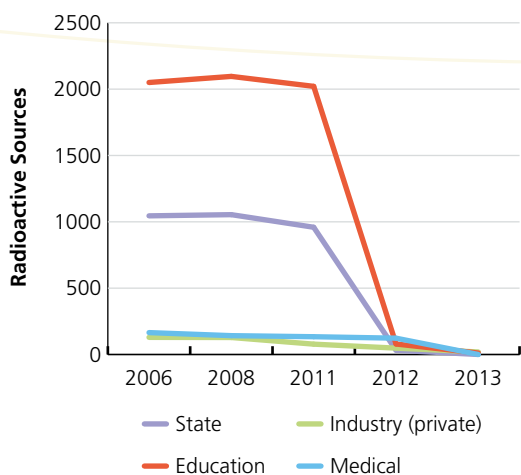
In December 2010, the Government formally adopted a national policy on radioactive waste management for Ireland. One of the key initiatives under this policy is the reduction of Ireland's inventory of radioactive waste through a coordinated and phased Inventory Reduction Programme. This programme commenced in 2011 with lead agencies and government departments tasked with driving source disposal programmes within their respective sectors, and the RPII leading the reduction programme in both the private and state agency sectors. Between 2011 and 2013, approximately 99% of all disused sources with half-lives greater than ten years were successfully exported out of Ireland to disposal and recycling facilities in Europe and the USA. Table 2 summarises the total number of sealed and unsealed sources, including those with half-lives of less than ten years, which were exported from Ireland during this period. With the successful implementation of the national Inventory Reduction Programme, there remain just a handful of disused sources in Ireland.

In addition to the sources included in the table, almost 5600 spent technetium-99m generator cores, which were used in hospitals, were disposed of during 2012 and 2013. These cores had been accumulated by hospital nuclear medicine departments during the 1970s and 1980s when no return route for the generators existed. Figure 4, which shows the number of disused sources held within the various sectors, clearly illustrates the substantial progress made on this initiative since 2008.

Table 2: Radioactive sources exported from Ireland during the period 2011 – 2013

Sector	2011		2012		2013		Total
	Sealed	Unsealed	Sealed	Unsealed	Sealed	Unsealed	
Education	8	98	1777	445	105	162	2595
Medical	0	6	7	12	145	121	291
Industry	25	9	9	11	48	7	109
State	6	1	159	879	1587	10	2642
Total	39	114	1952	1347	1885	300	5637

Figure 4: Disused source inventory by sector (half-life >10 yr)



Radioactive waste in schools

For many years, the RPII has been concerned by disused radioactive sources continuing to be held by schools in the post-primary sector in the absence of any programme to dispose of them. A survey carried out by the RPII between 2001 and 2002, in conjunction with the Department of Education and Science (DES), had estimated that there could be up to 500 disused sources and approximately 9.5 kg of unsealed sources held by schools in this sector. These sources had been used for practical demonstrations as part of previous physics curricula; however, with changes in the curriculum, they are no longer required. During the year, the RPII met with officials from DES to explore options for dealing with these unwanted sources. Following these discussions, the DES agreed to fund a disposal programme for schools to be administered by the City of Dublin Education Training Board (CDETb), which was also overseeing the schools' chemical disposal programmes. An online survey of all 743 post-primary schools was carried out by CDETb in the second half of the year to estimate the scale of the problem. Initial responses to the survey suggested that over 200 schools would require source collections. During the first half of 2014, a specialist firm will collect and export the sources out of Ireland for reuse or recycling.

Euratom waste directive

In August 2013, Council Directive 2011/70/EURATOM, establishing a community framework for the responsible and safe management of spent fuel and radioactive waste, was enacted in Irish legislation by SI No. 320 of 2013. The Directive applies to all radioactive waste management activities, from the time it is generated up until when it is eventually disposed of. The Directive requires all European member states to establish national policies and programmes on radioactive waste management, setting out certain criteria that should be used in developing such policies and procedures. Ireland's national policy on radioactive waste was adopted by Government in December 2010. The Directive strongly encourages member states to make arrangements for the disposal of radioactive waste in the member state in which it was produced. However, it does allow for international arrangements with the approval of the European Commission (EC).

In 2012, new disposal routes to the UK were established when UK-EA approved a number of transfrontier shipment agreements, which had been submitted by the RPII. These new disposal routes were successfully used between November 2012 and August 2013 when over 3500 disused sources were exported to the UK. However, with the enactment of the Euratom Waste Directive in August, these routes could no longer be used due to the fact that the waste was being sent for disposal, which is not permitted under the Directive. Instead, only radioactive waste that was being sent for recycling or reuse could be exported out of Ireland. Fortunately, a number of facilities in Europe and the USA accept sources for recycling, and these routes continue to be used by Irish licensees. The Directive does not affect the operation of take-back agreements provided by manufacturers/suppliers, and these continue to be a fundamental part of Ireland's waste management programme.

Regulation and licensing (continued)

Theft of radioactive material

Over the weekend of 27 September, 2013, seven items described as “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 immediately contacted An Garda Síochána to inform them of the gravity of the incident and the potential dangers involved. A line of communication was established with the Garda units at Swords and Coolock who were dealing with the incident and, following discussions with them concerning 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 in the RPII, 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 per week as activity decreased. It was acknowledged that, as a number of different agencies would be involved in any recovery operation, significant inter-agency coordination was required and this was facilitated by DECLG.

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 social media was remarkable.

The RPII prepared risk assessments 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 modeled 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.

There are two independent international systems in place for rapid notification and urgent exchange of information in the event of a radiological emergency with potential cross-border impacts. The EMERCON system is operated by the UN body, the International Atomic Energy Agency in Vienna, while the ECURIE system is operated by the EC in Luxembourg. The messages communicated via these systems have different levels of urgency from an “information” message to the most urgent - an “alert”.

The RPII, as the national competent authority for reporting to both these international notification systems, notified the international community of the missing sources by submitting an “information” message to both 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 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. It was very well attended by representatives of all groups on the ERCC and proved to be central to the effective coordination of the incident response management.

While a response and recovery protocol for the sources, should they be found, had been developed between the RPII, DECLG and An Garda Síochána, the vexed question of where they would be stored remained outstanding. The RPII argued for invoking the Temporary Operational Protocol, which had been approved by Government in 2011, and it was agreed that this would be appropriate, which was a very significant breakthrough, ensuring that all elements of a response and recovery plan were in place.

Despite the actions taken by all parties concerned, the sources remain missing. It would appear now to be unlikely that the sources will be recovered. However, the RPII will remain vigilant and will also act on any relevant information that it might receive. As in all such cases, there is an opportunity to learn from what has happened, and it is the RPII's intention to review the incident and its management and identify all lessons arising.

Radiation Protection Adviser (RPA) register

SI No. 125 of 2000 requires the RPII to establish and maintain a register of approved RPAs. There were no new applications for RPA approval received during the year. However, five applications for re-approval from the Category I register (medical, dental and veterinary) were received. Three of the re-approval applications were successful, with the remaining two requested to submit additional information in order that the reassessment could be completed. At the end of 2013, there were 37 individuals on the RPII's RPA register.

In April, all approved RPAs were invited to attend the third annual RPII-RPA liaison meeting. The aim of this meeting was to provide updates to the RPAs on recent developments and to give them an opportunity to raise any topical issues with the regulator. For the first time, the meeting included presentations from RPAs on the new International Commission on Radiological Protection eye dose limit, design challenges in new build developments in the medical sector and operational RPA feedback from the industrial sector. Presentations were also made by RPII staff on issues such as the development of the EU Basic Safety Standards, radioactive waste, transport issues and inspection findings during 2012.



Exposure of the Irish population to radiation

Radioactivity from both natural and artificial origins exists throughout the environment. People in Ireland are exposed to this radioactivity through being bombarded by gamma rays from space (cosmic radiation) and from the soil beneath their feet; by radon and thoron in the air they breathe; natural and artificial radioactivity in the food and water they drink and through certain medical tests and procedures. One of the RPII's key roles is to assess the level of this exposure and provide advice to stakeholders on ways to protect the public from unnecessary exposure to ionising radiation. The radiation dose received on average by people in Ireland was recently re-assessed in a study of current levels of exposure to radiation. The study found that, on average, a person in Ireland receives an annual dose of 4037 microsieverts (μSv) from all sources of radiation. There can be a large variability in the dose received by individual members of the population from any given source. By far the largest contribution of approximately 86 per cent (3480 μSv) comes from natural sources, mainly from the accumulation of radon gas in homes. Man-made radiation contributes approximately 14% (557 μSv), dominated by the beneficial use of radiation in medicine (546 μSv). Doses from other man-made sources account for less than 1% per cent (11 μSv). The contribution from all sources of radiation, expressed as the average annual dose to a person in Ireland, is shown in Figure 5.

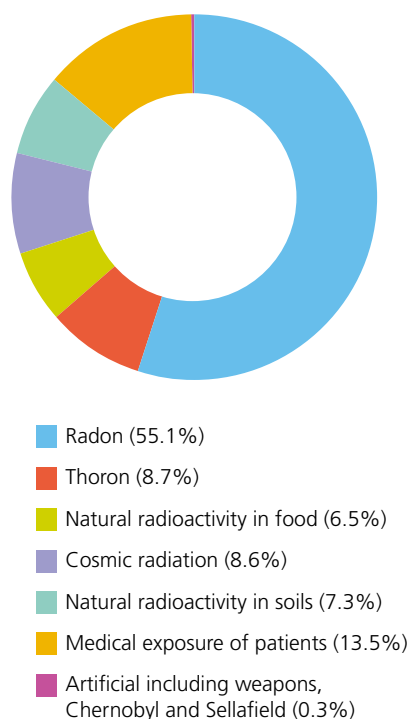
The RPII's strategic priorities in this area include providing the expertise, technical capability and information essential to protect the Irish population and the environment and, working in partnership with others, to implement national radiological protection initiatives.

The RPII addresses these priorities by:

- Raising awareness of the risks that radon exposure poses to people's health,
- Driving the implementation of a national control strategy to reduce this radon exposure in Irish homes and workplaces,
- Carrying out a targeted environmental monitoring programme,

- Carrying out research to assess the sources of radiation exposure to the public and environment, and
- Maintaining the capability to assess radiological impact when new sources of radiation dose are identified.

Figure 5: Contribution from all sources of radiation



The radon programme

Radon is a naturally occurring radioactive gas formed in the ground by the radioactive decay of uranium, which is present in varying quantities in all rocks and soils. Radon is the principal source of radiation exposure to the general population and is linked to some 250 lung cancer cases each year.

The National Radon Control Strategy

Recognising the public health hazard presented by radon, Mr Phil Hogan TD, Minister for the Environment, Community and Local Government, established an inter-agency group in November 2011 to develop a National Radon Control Strategy (NRCS), tasked with reporting back to him within two years.

The inter-agency group delivered its final report to the Minister in October 2013. The group's recommendations were subsequently endorsed by Government, and the NRCS was formally launched by the Minister in February 2014. The RPII, which had been calling for the adoption of such a strategy for many years, sees this development as a very significant milestone towards comprehensively addressing the radon problem in Ireland.

The NRCS was developed based on wide stakeholder consultation. This included a targeted consultation process with key stakeholders during 2012 and a public consultation on a draft strategy during 2013. In January, a draft radon control strategy was made available online with a six-week public consultation period. The publicity around the National Radon Forum was used to highlight the consultation process. In addition, all stakeholders who had participated in the earlier targeted consultation process were individually sent letters, alerting them to the consultation document. Comments were received from a total of 25 individuals and organisations, including radon measurement and remediation companies, professional bodies, architects, local authorities and academics. Some respondents focused on specific recommended measures, whilst others returned more broad-ranging comments. A total of 235 individual comments were received, which were addressed and reflected in the final version of the strategy as appropriate.

The NRCS recognises that no one agency or public body can deal effectively with the radon problem in Ireland but rather that a range of measures are necessary, which are the responsibility of a broad group of stakeholders, including Government, industry and private individuals. The NRCS, therefore, sets out a comprehensive whole-of-government, whole-of-society approach to addressing radon. The strategy specifically recognises the importance of primary prevention in new buildings and of measures to promote measurement in existing buildings. The strategy includes 48 recommendations in six thematic areas as follows:

- Radon prevention in new buildings;
- Use of property transactions to drive action on radon;

- Raising awareness and encouraging individual householders and employers to take action on radon;
- Provision of advice and support to individuals with high radon results;
- Promoting confidence in radon services (measurement and remediation); and
- Reducing radon exposure in workplaces and public buildings.

Engagement on Radon with other public bodies and local authorities

During 2013, the RPII continued to work in partnership with others on a range of initiatives to protect people from exposure to radon.

- Under the Memorandum of Understanding between the RPII and the Health and Safety Authority (HSA), a joint working group was established to ensure a coordinated approach between the two organisations in dealing with radon in workplaces. During the year, the working group continued to provide important input into the development of the NRCS. The group noted that some revision to national regulations would be necessary to fully implement the NRCS recommendations concerning workplaces and concluded that these revisions should be made within the context of the implementation of the new EU Basic Safety Standards Directive. At inspection level, the two organisations continued to work effectively together, with radon included in 124 HSA workplace inspections over the course of 2013.
- The joint working group on radon established under the Memorandum of Understanding with the HSE continued its work. During the year, the working group updated its estimate of the number of radon related lung cancer cases in Ireland that are attributable to radon from 200 to 250 cases per year. This change is due primarily to demographic reasons. The working group also kept up to date with the development of the NRCS and made several contributions to the drafting process.

Exposure of the Irish population to radiation (continued)

- During 2013, the RPII collaborated with the Geological Survey of Ireland (GSI) on a pilot project to better identify high-risk radon areas using past radon-in-air measurements, geology and airborne measurements. This work, which will continue in 2014, was carried out in the context of the GSI's TELLUS border pilot.
- The RPII continued to support local authorities in implementing radon measurement and remediation programmes for social housing. At the end of 2013, radon had been measured in some 20,310 local authority social housing units in 21 counties. In April, the RPII made a joint presentation with the GSI to Louth County Council, covering both radon and the Tellus project. Following this, campaigns to measure and remediate radon in social housing were initiated by Dundalk Town Council and Louth County Council.
- The RPII continued to support a range of other stakeholders in addressing radon and, during the year, made presentations to the Irish Building Control Institute's (IBCI's) annual conference in March and to the Kerry Environment Conference in September. The IBCI, which is the professional body for those with responsibility for building control, is seen as a particularly important stakeholder, given that building control is critical to ensuring radon preventive measures in new buildings are implemented effectively.

National Radon Forum

In January 2013, Mr Fergus O'Dowd, TD Minister of State at the DECLG and the Department of Energy, Communications and Natural Resources opened the tenth National Radon Forum in Dublin. The forum was used to launch public consultation on the draft NRCS. A number of elements of the draft strategy were discussed at the forum, which included papers on tackling radon in the workplace from the HSA and radon prevention in new buildings from the DECLG. The forum also heard from Dr Trevor Boal of the International Atomic Energy Agency, Vienna, about the international requirements for the control of radon. The meeting was attended by over 100 people, representing government departments and agencies, local authorities, industry and universities as well as members of the public.

Research and international activities on radon

Under the International Atomic Energy Agency's (IAEA) Technical Cooperation Programme, the RPII hosted a scientist from the Environmental Protection Agency (EPA) in Montenegro for a one-week training programme on radon. This programme addressed topics that included the technical aspects of managing an accredited radon measurement laboratory; the provision of advice to the public and Government and communicating radon risk to the public. It was aimed at supporting the work of the EPA in Montenegro in the on-going development of a national radon programme.

The RPII also hosted a technical visitor from the Radiation Protection Division of the Austrian Agency for Health and Food Safety (AGES). The eight-week visit was arranged at the request of AGES to help develop proficiency in technical English and to learn more about Ireland's radon control programme. As well as strengthening ties with Austrian colleagues, the visit was an opportunity to compare the cost effectiveness of the radon programmes in the two countries.

During 2013, an international conference 'Radon and Society: from Knowledge to Action' was jointly organised by the World Health Organization, the Norwegian Radiation Protection Authority and the French Institute for Radiological Protection and Nuclear Safety. This conference brought together those working on the ground, such as remediation companies and architects, to share their experience in tackling radon. With the support of the RPII, an Irish perspective was given by Wexford County Council on its on-going programme to address radon in social housing and by an Irish remediation contractor on issues affecting the remediation industry in Ireland.

Research carried out by the RPII on the use of health economics in the development of a national radon control strategy was presented at the 7th Conference on Protection against Radon at Home and at Work, which was held in Prague, Czech Republic during the year. This study evaluated different radon intervention strategies, including the incorporation of preventive measures into new buildings, the incorporation of potential remedial measures into new buildings and remediation of existing buildings from a health economics perspective.

Radon measurement statistics

Table 3 summarises, by county, the radon measurements undertaken by the RPII since the early 1990s. During 2013, a further 299 homes measured by the RPII were found to have radon concentrations above the national reference

level of 200 Bq/m³ and, of these, 35 had radon concentrations above 800 Bq/m³. The counties with the highest percentage of homes identified above the reference level were Sligo, Galway, Waterford and Carlow.

Table 3: Radon measurement results by county (based on measurements completed by the RPII up to 31 December, 2013)

County	Total number of houses measured	Number of houses in categories of radon concentration			Max (Bq/m ³)
		0-199 Bq/m ³	200-799 Bq/m ³	> 800 Bq/m ³	
Carlow	1218	982	224	12	2278
Cavan	461	447	14	0	780
Clare	4216	3694	433	89	3541
Cork	5770	5057	661	52	4516
Donegal	1504	1423	79	2	3402
Dublin	3778	3554	222	2	1410
Galway	7919	6255	1456	208	4189
Kerry	4196	3507	555	134	49,000
Kildare	1404	1345	56	3	1114
Kilkenny	1398	1199	184	15	2444
Laois	582	558	24	0	565
Leitrim	411	383	27	1	1630
Limerick	1428	1315	109	4	1857
Longford	334	296	37	1	876
Louth	1172	1050	120	2	869
Mayo	4283	3532	687	64	6203
Meath	1066	985	79	2	932
Monaghan	309	290	19	0	794
Offaly	795	777	18	0	771
Roscommon	750	667	79	4	1400
Sligo	2439	1828	511	100	5619
Tipperary	2634	2310	297	27	3364
Waterford	2551	2045	440	66	9714
Wexford	2345	1969	345	31	2926
Westmeath	767	698	68	1	1066
Wicklow	2214	1837	348	29	16,438
Total	55,944	48,003	7092	849	

Exposure of the Irish population to radiation (continued)

The National Radon Survey estimated that radon levels in 7% of the national housing stock had radon concentrations above 200 Bq/m³, which, when applied to the current housing stock, equates to approximately 110,000 homes. To date, only 7,941 of these dwellings have been measured by the RPII, and it is clear, therefore, that the vast bulk of houses with a radon problem have yet to be identified.

Environmental monitoring programme

As mentioned, both naturally occurring and artificial radioactivity are present in the Irish environment. Artificial sources of radioactivity include the fallout from atmospheric nuclear weapons testing; the Chernobyl nuclear accident and the routine discharge of radionuclides from nuclear installations. Liquid discharges from the Sellafield nuclear fuel reprocessing plant in the north-west of England remain the dominant source of artificial radioactivity affecting the Irish Sea. Once present in the environment, radionuclides are available for uptake by fish; shellfish; crops and animals and so make their way into the food chain.

Monitoring of radioactivity in the environment is a core activity of the RPII. The aims and objectives of the RPII monitoring programme are to:

- Assess doses to individuals and the population from radionuclides in the environment;
 - Assess the temporal and geographical distributions of concentrations of artificial and natural radionuclides in the environment;
 - Maintain the systems, procedures and expertise necessary to facilitate a rapid assessment of environmental contamination in the event of a nuclear or radiological incident so that effective countermeasures to protect the Irish public can be implemented;
 - Provide up-to-date and accurate information on radiation levels in the environment to Government and the public;
- Support the RPII's role to provide high-quality scientifically based advice as an input to Government policy, in particular to assist in identifying measures necessary for the protection of individuals; and
 - Support the Irish food and agriculture industry through the rigorous assessment of the radioactivity status of Irish foodstuffs. This assessment provides the basis for certification of radioactivity in produce for export.

The monitoring programme in 2013

As in previous years, the 2013 monitoring programme comprised the assessment of the following key elements:

- Ambient radioactivity based on measurements of radioactivity in air and of the external gamma dose rate from a network of permanent monitoring stations located throughout the country. These systems are designed to measure background levels of radiation in the atmosphere and to give a rapid indication of environmental contamination in the event of a major accident.
- Radioactivity in a variety of food products to assess the level of artificial radioactivity generally in the Irish food chain and to determine the resulting radiation dose to the Irish population. The programme design is based on the EC recommendations on the application of Articles 35/36 of the Euratom Treaty and is focused primarily on milk and mixed diet, consisting of complete meals sampled from a university canteen.
- Radioactivity in drinking water, which is monitored in accordance with the Articles 35/36 recommendations. Major water supplies are sampled from all counties in rotation so that each county is sampled approximately every four years. During 2013, major water supplies were sampled in Dublin, Galway, Kerry, Kilkenny, Laois, Leitrim, Limerick, Longford, Waterford and Kildare.



- Radioactivity in the Irish marine environment based on sampling and measurement of seawater, sediment, seaweed, fish and shellfish from coastal locations. Monitoring is focused primarily on the Irish Sea and is intended to assess the impact of the discharge of low-level liquid waste into the north-east Irish Sea from the Sellafield nuclear site and provide up-to-date data to address the associated Government and public concerns.

The programme combines round-the-clock measurements from the permanent monitoring network and a programme of sampling followed by laboratory testing. A range of radionuclides is assessed as part of the monitoring programme. Those routinely assessed are caesium-137, caesium-134, potassium-40, beryllium-7, iodine-131, tritium, strontium-90, gross alpha and gross beta, gamma dose rate, technetium-99, plutonium-238 and plutonium-239,240 and americium 241. Analytical techniques include gamma spectrometry, alpha spectrometry, gas proportional counting and liquid scintillation counting. In some cases, radiochemical separation is required.

A strong emphasis continues to be placed on quality assurance and reliability of data. Best practice is ensured by accreditation, through the INAB, to International Standard ISO/IEC 17025.

Completion of the monitoring programme is achieved through cooperation with other agencies, namely, the NIEA, the EPA, local authorities, the Defence Forces, the Department of Agriculture, Food and the Marine (DAFM), Met Éireann, University College Dublin (UCD) and the Food Safety Authority of Ireland (FSAI).

During 2013, arrangements for offshore sampling of seawater were tested with the Naval Service. As this proved successful, an arrangement has been established whereby the Irish Naval Service will undertake any offshore seawater sampling required by the RPII for both its ongoing monitoring programme and in the event of an emergency leading to releases of radioactivity to Irish marine waters.

Results of monitoring in 2013

The monitoring results show that, while the levels of artificial radioactivity in the Irish environment remain detectable, they are low and do not pose a significant risk to human health. The levels of radioactivity measured in air and terrestrial foodstuffs in 2013 are very similar to those reported in recent years. This is to be expected since the levels are influenced primarily by residual global fallout, which changes very slowly.

Although resulting in tiny doses, the consumption of seafood remains the main pathway contributing to public exposure arising from discharges of artificial radioactivity. The highest concentrations of Sellafield-derived radioactivity in the Irish marine environment are found along the north-east coast. Concentrations measured south of Dublin are lower while those measured along the south and west coasts are generally consistent with global fallout levels.

Exposure of the Irish population to radiation (continued)

Figure 6: Committed effective dose to typical seafood consumer due to caesium-137, 1983 - 2013

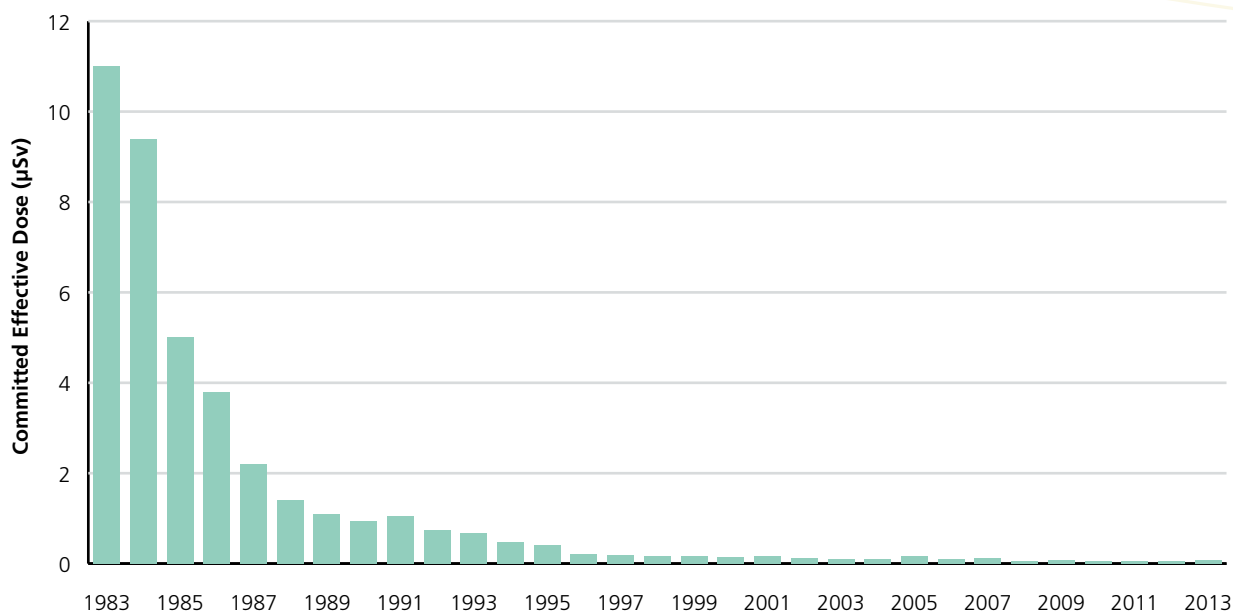


Figure 6 illustrates the doses to typical seafood consumers between 1983 and 2013 due to caesium-137, which accounts for the majority of the dose from this pathway. The doses incurred by the Irish public as a result of artificial radioactivity in the marine environment are small when compared with the average annual dose to a person in Ireland from all sources of radioactivity. In 2013, the dose to the typical seafood consumer from caesium-137 was estimated at 0.053 µSv as compared to the total annual average dose of 4037 µSv.

From the RPII's monitoring of radioactivity in milk, drinking water and mixed diet samples and the regular testing of a wide range of other food types, it is clear that levels of radioactivity in foodstuffs continue to be very low. Indeed levels of artificial radioactivity in the majority of samples tested were below the detectable limits. All drinking waters tested were found to be in compliance with the total indicative dose level (100 µSv) defined in EU legislation. Radioactive doses incurred by the Irish public as a result of artificial radioactivity in the environment do not constitute a health risk and are very small compared with the dose received as a result of background (natural) radiation.

Research to support the environmental monitoring programme

The monitoring programme is complemented by specific projects that investigate particular aspects of terrestrial and marine radioactivity. Current projects include:

- **A survey of natural radioactivity in bottled water**

This project was completed and a report entitled 'Radioactivity in Bottled Water Produced in Ireland' was published in December 2013. All of the 21 bottled water samples surveyed complied with the radiological quality requirements of SI 225 of 2007, the World Health Organization(WHO) recommendations and the new Euratom Drinking Water directive. The samples that gave rise to the highest doses of radioactivity would not add significantly to the average annual dose received by people living in Ireland

■ Carlingford Lough Study

A collaborative project was undertaken with UCD and the NIEA to assess radioactivity levels in Carlingford Lough. This was a follow-up to previous studies completed in the 1990s and will allow an assessment of changes to the measured environmental concentrations in the lough. As well as supplementing the data on artificial radioactivity levels in this north-east coast sea inlet, this project is valuable in maintaining links between the RPII, the NIEA and UCD. In addition, it has led to the adoption of a new laboratory method for testing environmental samples for plutonium and americium. This new method is substantially faster than its predecessor, so will help to reduce the staff time required for analyses.

■ Caesium-137 in a variety of seaweed from around the Irish coast

A collaboration was established in 2013 between the National University of Ireland, Galway (NUIG) and the RPII to assess the levels of caesium-137 in commercially important seaweeds from Ireland. The aim of this research is to provide a concise overview of the presence of anthropogenic radioactivity in commercially important seaweeds from the west coast of Ireland, including harvesting locations and to allow a direct comparison with locations on the south and east coasts. Some of the species being studied are used in foods, nutritional supplements and fertilisers. The study is due to be completed in 2014, and a joint scientific article will be prepared for submission to a peer-reviewed journal.

■ An assessment of the dose to the Irish population from natural radioactivity in food

This project determined the dose to the Irish population arising from natural radioactivity in foodstuffs and was undertaken due to the lack of available data on the levels of Polonium-210, Lead-210, Carbon-14, Radium-226 and Radium-228 in the Irish diet. An analysis of complete meals served over a period of five days in a large Dublin university restaurant was conducted to provide a representative figure for the average levels of natural radioactivity in the Irish diet. The doses arising from the radionuclide activity concentrations determined were calculated using consumption data from the Irish Universities Nutrition Alliance (IUNA) adult nutrition survey (2011) and are presented in Table 4.

Table 4: Annual radiation doses received from the main naturally occurring radionuclides in food (µSv)

Radionuclide	Dose (µSv per annum)
Carbon-14	8
Potassium-40	175
Rubidium-87	2
Radium-228 (from thorium-232)	7
Radium-226 (from uranium-238)	4
Polonium-210	47
Lead-210	26

These results are in line with those found in other European countries. The results from this study have been used in the updated assessment of the typical radiation doses received by the Irish population. This study is due to be published in 2014.



Exposure of the Irish population to radiation (continued)

During 2013, the RPII made a successful application to become a member of the European Radioecology Alliance. Members of the alliance bring together their respective research expertise, which helps maintain and enhance radio-ecological competencies and experimental infrastructures in Europe. The group also addresses scientific and educational challenges by assessing the impact of radioactive substances on humans and the environment.

During 2013, the RPII continued to support the activities of the Irish Radiation Research Society, including sponsoring two sessions at the 40th Annual Meeting of the European Radiation Research Society (ERR), which was held in Dublin. The titles of these sessions were Radiation Protection of the Environment/Radioecology and Nuclear Power and Radiation Accidents. At this meeting, the RPII staff also presented work on the following areas:

- The potential radiological implications for Ireland of the proposed new nuclear power plants in the UK;
- The potential implications of the new recommendations proposed by the ICRP in assessing the impact of radioactive contaminants in the environment;
- An assessment of the radiological impacts on Ireland of a hypothetical severe nuclear accident in Europe; and
- Natural radioactivity in groundwater sources in Ireland.

National Dose Register

In 2012, the RPII developed the State's first National Dose Register (NDR), and, in 2013, the RPII imported the first data on occupational exposure from Approved Dosimetry Services (ADSs) into the NDR. These data relate to measurements made by the ADSs in 2012. The criteria for approval of dosimetry services include a requirement that ADSs shall provide personal monitoring data in an electronic format to the NDR annually. Data must be submitted by July of the year after that in which the measurements were made.

The NDR will be a source of statistical information on dose distributions and trends for occupationally exposed workers as a function of work practice, activity, etc., so as to give feedback on the impact of the system of radiological protection in Ireland. The NDR will also provide a mechanism for compilation of national reports to international organisations such as the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the EC.

Approval of dosimetry services

All providers offering dosimetry services in operation in Ireland pursuant to SI 125 of 2000 must be approved by the RPII. The purpose of this approval is intended to provide confidence that dosimetry services operating in Ireland are technically competent and deliver an appropriate service. Services applying for approval in Ireland must provide the RPII with evidence of compliance with the relevant technical criteria. Currently six dosimetry services are approved to provide services in Ireland, the details of which are listed on the RPII's website.



Radiation measurement services

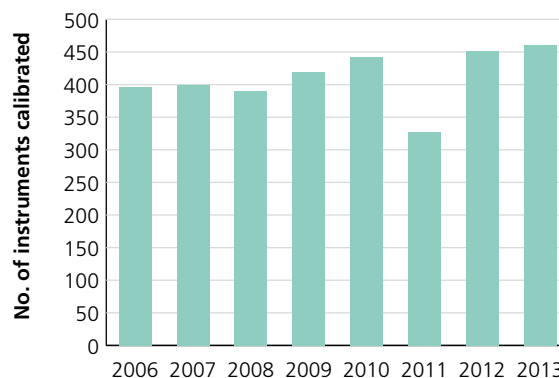
The RPII's laboratory provides specialist radiation measurement services, including analytical services, instrument calibration, radon measurement and product certification. These services are provided to a wide range of customers, including industry, the health sector, the education sector, other state agencies and the general public. The RPII's analytical laboratory acts as the national centre for the measurement of radioactivity in environmental and foodstuff samples. Given the laboratory's range of specialist analytical capabilities, it is seen as a crucial component of the national emergency response arrangements.

The RPII is committed to maintaining high quality in all of its services, consistent with customer requirements and international best practice. The laboratory is accredited to the ISO 17025 standard by the INAB and takes part in a wide range of proficiency testing and measurement inter-comparison schemes, covering all of its services. The laboratory also participates in international technical expert groups and networks relevant to its work, so as to ensure that the methods used are up to date and in line with internationally accepted good practice.

Calibration service

The RPII provides a calibration service for a range of radiation protection instruments, including survey meters, contamination monitors and electronic personal dosimeters. In 2013, 461 instruments were tested for compliance with the relevant manufacturer's specifications. This was in line with the number of instruments tested in 2012 at 452. Figure 7 shows the number of instruments tested between 2006 and 2013.

Figure 7: Number of radiation protection instruments tested between 2009 and 2013.



In order to maintain high standards and keep abreast of best practice, the RPII's Calibration Service participates in the Ionising Radiation Metrology Forum (IRMF) and in a UK group of instrument calibration laboratories that arranges inter-comparisons and meets annually to discuss calibration issues.





Radon measurement

The RPII provides a radon-in-air measurement service for homes, workplaces and schools. In 2013, the radon measurement laboratory issued 6,784 detectors to customers in homes, workplaces and schools. The figure is somewhat down from 2012 when 7,100 detectors were issued. Figure 8 shows the numbers of detectors issued each year since 2007. It is believed that the fall in sales since the peak in 2010 is a reflection of the economic difficulties facing many householders over that time.

Figure 8: Number of radon detectors issued to homes and workplaces 2007 to 2013



Analytical services

The RPII measures radioactivity in a wide range of foodstuffs and environmental samples. This work is undertaken both in support of the RPII's environmental radioactivity monitoring programme and on a contract basis on behalf of external clients. The contract analytical services provided during 2013 included testing of Irish

produce for compliance with the requirements of importing countries, testing of drinking water for compliance with the requirements of EC regulations, testing of wipe tests for radioactive sources, testing of dredging samples for compliance with the requirements of the Dumping at Sea Act, 1996, and measurement of radon in drinking water. As shown in Table 5, during 2013, 982 samples were tested, 518 as part of the monitoring programme and 464 on a contract basis.

The RPII provides a certification service to exporters of Irish foodstuffs and other produce. The number of product certificates issued in 2013 was 3292. This compares with 3874 in 2012 and 3893 in 2011 and indicates that there has been little change in demand for this service over the last few years.

Table 5: Number of samples analysed and product certificates issued 2009-2013

Year	Samples analysed as part of monitoring programme	Samples analysed under contract	Product certificates issued
2009	661	627	3301
2010	934 ¹	688	3198
2011	701	594	3893
2012	531 ²	574	3874
2013	518 ²	464	3292

¹ Samples analysed in 2010 included over 200 samples collected as part of the groundwater assessment project.

² Some samples have multiple analyses carried on them. Due to changes in the management of the monitoring programme, fewer samples are now collected but more analyses are performed on each sample.

National arrangements for emergencies

In line with the strategic priority of providing the expertise, technical capability and information essential to the protection of the Irish population and the environment, one of the RPII's objectives is to strengthen its core emergency response capability, while supporting national planning activities. The RPII's response capability is maintained and strengthened by maintenance of international response systems, staff training, participation in emergency exercises, and review of its response to emergencies.

The RPII's role in National Emergency Plans

The National Emergency Plan for Nuclear Accidents (NEPNA) provides the framework for coordinating the emergency response to large-scale nuclear incidents with the potential to contaminate a wide area in Ireland.

The roles assigned to the RPII under the NEPNA are to:

- Maintain arrangements for early warning and operation of an on-call duty officer system and act as national competent authority for the EC and IAEA early notification and assistance conventions;
- Maintain the national radiation monitoring network;
- Develop and maintain the capabilities necessary to make technical assessments of potential accidents and their radiological consequences for Ireland;
- Maintain a national laboratory for the measurement of levels of radioactivity in the environment;
- Liaise with other organisations to establish arrangements for the collection of environmental, foodstuff and other samples and coordinate the collection of samples in an emergency;
- Provide for the certification of radioactivity levels in foodstuffs and other products in the event of an emergency;
- Assist the Government information service and the national coordination group in the preparation of information to be provided to the public and media; and
- Provide advice to the national coordination group and government departments on possible protective actions to minimise radiation doses to the Irish population.

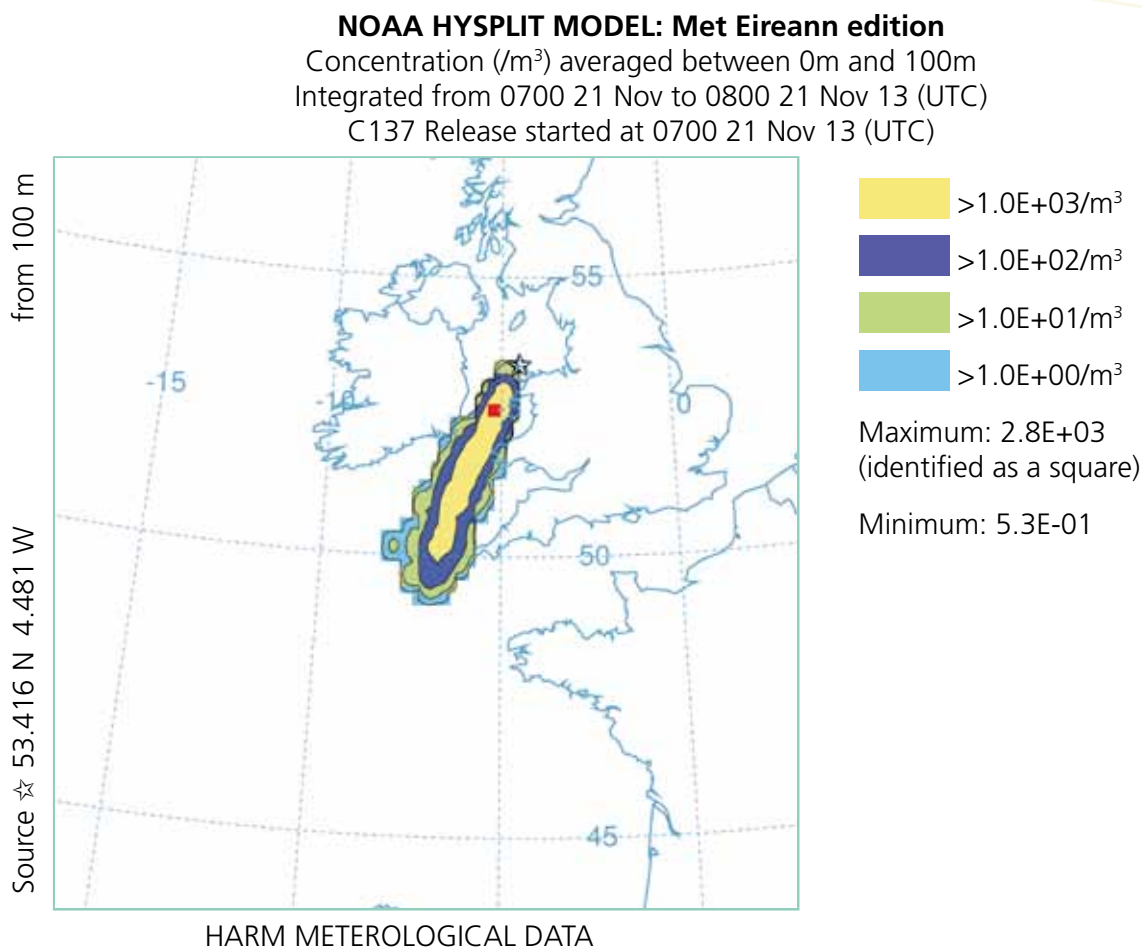
Under the NEPNA, the RPII is responsible for making a technical assessment of the consequences of any nuclear accident with the potential to impact on Ireland. The advice provided in the early phase of a nuclear accident relies primarily on the use of modeling tools and computer simulations of the transfer of radioactivity in the environment. This is because both information and data are very scarce in the early phase of an accident. As the situation progresses, analysis of samples collected in the field as well as real-time monitoring data are used to refine the initial assessment and advice. Two different modeling tools are currently used by the RPII:

- ARGOS (Accident Reporting and Guiding Operational System). This system has been used by the RPII since 2001 and is well adapted to the RPII's needs. It can be used to model the geographical extent of the radioactive fallout and contamination levels in the food chain in order to predict the potential health impact to the Irish population as well as the consequences for Irish food production and the agricultural sector following a nuclear accident;
- The US National Oceanic and Atmospheric Administration's (NOAA's) Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model. This model allows long-range dispersion modeling, i.e. on a global scale, of chemicals and particles in air.

In 2013, the RPII benefited from a major development with regard to the HYSPLIT modeling tool. Met Éireann customised the model for use during an emergency response in Ireland. For the assessments of events in the vicinity of Ireland, the system now uses high-resolution meteorological data (2.5 km) produced by Met Éireann's operational numerical weather forecast system HARMONIE (Figure 9), where previously lower resolution global data had to be used. The system is run at the Irish Centre for High-End Computing (ICHEC). With these new arrangements, meteorological data are automatically available for the previous 30 days to provide information on the past evolution of a radioactive plume, while the latest forecasts provide information on the future movement up to 48 hours ahead. Tracking the movement of radioactive material in the atmosphere over the global scale is likewise supported through use of the latest European Centre for Medium-Range Weather Forecasts

National arrangements for emergencies (continued)

Figure 9: Example of HYSPLIT model dispersion output used during an exercise in November 2013



(ECMWF) global analyses/forecasts on a slightly larger grid resolution (15km) compared to the HARMONIE model.

Since the new HYSPLIT system was designed to provide service to a range of users in Ireland, the RPII established and is chairing a HYSPLIT User Group with members from the RPII, the EPA, the DAFM, UCD and the HSE. The first meeting of the group was in July 2013.

Emergency alerting systems

There are two independent international systems in place for rapid notification and urgent exchange of information in the event of a radiological emergency with potential cross-border impacts. The EMERCON/USIE system is operated by the IAEA in Vienna, while the ECURIE system is operated by the EC in Luxembourg. They operate continuously and are regularly tested and updated. The messages communicated via these systems have different levels of urgency from "information" to the most urgent "alert". RPII staff are trained on both the EMERCON/USIE and ECURIE web-based systems.



National Radiation Monitoring Network

The RPII, with the assistance of Met Éireann, the Defence Forces and a number of local authorities, operates a National Radiation Monitoring Network (Figure 10). This network provides continuous measurement of the ambient gamma dose rate; conducts airborne particulate sampling for the assessment of radioactivity in air and collects rainwater samples. During 2013, the ambient gamma dose rate was measured at 15 stations, and radioactivity in air was measured at 11 stations. As described in the section of this report dealing with exposure of the Irish population to radiation (see page 22), no increased levels of the ambient gamma dose rate above the normal fluctuations in background levels were observed during 2013.

Figure 10: National radiation monitoring network



Emergency exercises

The RPII runs an annual programme of emergency exercises to test procedures and maintain staff expertise. These exercises include rehearsing aspects of the RPII's emergency plans, such as initial notification of the RPII's duty officer; assessment of a simulated nuclear accident using computer prediction tools; use of the dedicated communication links with the National Emergency Coordination Centre and the use of international notification and information exchange systems. As part of this annual programme, in 2013, the RPII participated in seven international emergency exercises; five organised by the IAEA (ConvEx exercises) and two organised by the EC (ECURIE exercises).

In 2013, two of these exercises focused on testing the IAEA's systems for reporting events and requesting specialised international assistance. The first of these, in June 2013, involved simulation of an accident at a nuclear power plant in Slovenia. Notification and a request for assistance were sent to all member states. The RPII's response included offering additional environmental sample analysis capabilities to Slovenia. In October 2013, a scenario was developed which centred on the hypothetical detonation of a radiological dispersal device in Dublin city centre. The exercise involved the RPII reporting the incident to the IAEA, carrying out an assessment of the incident using prediction models and the scenario given, transmitting the results of the assessment to the IAEA and requesting international assistance for medical support.

National arrangements for emergencies (continued)

Another exercise of note was conducted in November, which involved a number of international organisations, including both the IAEA and the EC, and to which as many as 57 different countries took part. This exercise was also based on a scenario simulating the detonation of a radiological dispersal device in Morocco with a number of foreign nationals, including Irish citizens, caught up in the blast. This exercise allowed the RPII to test international communication with both the IAEA and EC systems and, from a national perspective, to test communication links with the Department of Foreign Affairs. Press releases issuing advice to Irish citizens in Morocco were also generated as part of the exercise.

Also in November, the RPII hosted a joint emergency exercise with Met Éireann. The exercise scenario considered an earthquake off the coast of Wales causing damage to Wylfa nuclear power plant and a subsequent release of radioactivity. Atmospheric dispersion prediction modeling was carried out using the RPII's two different systems and the results were compared. The exercise was a useful test of the RPII-Met Éireann joint procedures and the collaboration between the two organisations.

National and international activities

The RPII provides training on radiation and radiological emergencies to other national organisations such as the Civil Defence and the Fire Services. This enables these organisations to respond safely and effectively to incidents involving radioactivity. In 2013, this training was provided as part of an annual training course for fire officers to deal safely with hazardous materials. In addition, the RPII provided CBRN (Chemical, Biological, Radiological and Nuclear) specialists from the Defence Forces with an overview of the RPII's role in Ireland's emergency plans for radiation incidents.

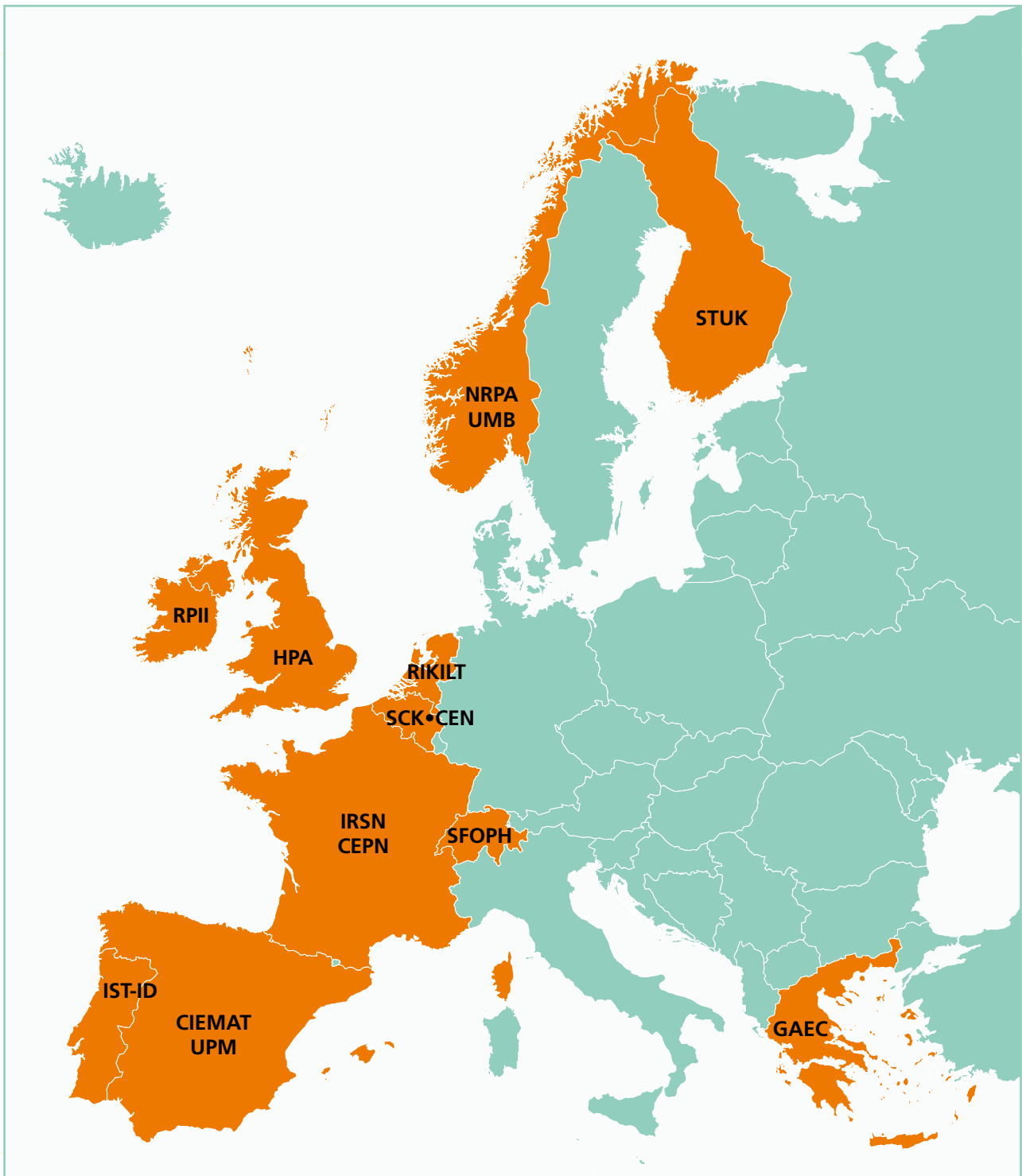
The RPII continues to be represented on the Government Task Force on Emergency Planning and its subgroups on malign CBRN incidents and the National Risk Assessment for Ireland. The role of the CBRN subgroup is to review and further develop Ireland's national protocol for responding to a malign CBRN incident. In 2013, the RPII contributed to five modules (decontamination, medical support, communications/public information, sampling/laboratory

testing and transportation) to further enhance the national protocol. The RPII also participated in the development of an aide memoire on performing a joint risk assessment to be used by first responders in CBRN incidents and also in the development of a list of experts that can be called upon when needed.

In 2013, the RPII began working on the PREPARE research project which comes under the EC's 7th Framework Programme, EURATOM for Nuclear Research and Training Activities. This project, the full title of which is "Innovative integrative tools and platforms to be prepared for radiological emergencies and post-accident response in Europe" aims to address issues in nuclear and radiological preparedness that were identified following the Fukushima nuclear accident in 2011. It is a collaborative project with 45 partners from around Europe. The project has been divided into seven work packages, and the RPII is involved in work package three (WP3), which is concerned with consumer goods. The overall objective of WP3 is to contribute to the development of strategies, guidance and tools for the management of contaminated goods, taking into account the views of producers, the processing and retail industries and consumers. This will build on work carried out previously by the RPII, DAFM, the FSAI, the DECLG, the EPA and the Sea Fisheries Protection Authority to develop a handbook for managing the impact of potential nuclear or radiological accidents (abroad) on the Irish agricultural sector, on Irish production of safe food and on the safe disposal of contaminated matter. The other European organisations involved in WP3 are shown in Figure 11. The outputs from this work will feed into the Ireland's National Emergency Plan for Nuclear Accidents.

The RPII also represents Ireland on a number of international groups related to nuclear and radiological emergency preparedness. In 2013, these included the NEA Working Party on Nuclear Emergency Matters (NEA-WPNEM) and the ECURIE Competent Authorities. These groups share good practice and develop international guidance and arrangements for nuclear emergencies. During 2013, an RPII staff member was re-elected as Deputy Chair of the NEA-WPNEM.

Figure 11: Organisations across Europe involved in WP3 of the PREPARE Project



Safety of nuclear facilities abroad

The RPII has a responsibility to monitor developments abroad in relation to nuclear installations and radiological safety and to advise Government on their implications for Ireland. The RPII's strategic objective in this area is to contribute to the development of radiological protection and nuclear safety standards internationally. As part of this role and in order to ensure that Ireland's views and concerns are taken into account, the RPII represents Ireland on European and other international fora on issues relating to nuclear safety. In particular, the RPII continues to be actively involved in the work of the European Nuclear Safety Regulators Group (ENSREG), in particular its work on nuclear safety (including legislation in this area) and initiatives to improve transparency arrangements in the nuclear safety area.

Follow up of stress tests of nuclear power plants

In 2011, as a consequence of the accident at the Fukushima Nuclear Power Plant, the European Council initiated a process to review the safety of all European nuclear power plants across 17 countries. The reviews, known as stress tests, were focused on the ability of the power plants to withstand extreme natural events such as those that occurred at Fukushima, the impact of losing safety functions and severe accident management. As members of ENSREG, RPII staff members were involved in the design and execution of the peer review process.

Each country that participated in the stress test process prepared a national action plan. The national action plans describe the actions planned or implemented at the national level after the Fukushima accident to improve the safety of nuclear power plants and provide the corresponding schedule for these actions. These national action plans were the subject of a regulatory peer review workshop held in April 2013. The workshop discussed the contents and status of implementation of the national action plans. Many actions, in particular analyses and reviews, have been completed or are scheduled for completion by 2014. This work will identify further safety improvements to be introduced with the resulting modifications expected to be implemented mainly in

2015-2018. The RPII provided one of the vice-chairs of the workshop.

A second workshop has been scheduled for April 2015. This workshop will review progress made towards addressing all actions from the stress test process.

Nuclear safety in the UK

During 2013, the RPII continued to closely monitor developments at Sellafield and other nuclear sites in the UK. The RPII's key areas of interest are around any developments that relate to the nuclear safety of the site, in particular where there are potential risks of accidents that could have impacts for Ireland.

UK Chief Nuclear Inspector's report

In November, the UK's Office for Nuclear Regulation (UK-ONR) presented its view of safety and security standards across the UK nuclear industry in its first Chief Nuclear Inspector's Report. The report considered civil nuclear and defence sites, the transport of radioactive materials and emergency planning. It also presented UK-ONR's judgement of how the UK is meeting its international responsibilities on nuclear safeguards and lessons learned from Fukushima.

The report notes that legacy radioactive waste facilities at Sellafield do not meet modern engineering standards for nuclear facilities. These facilities are thus vulnerable to the type of low-probability events that more modern plants are designed to avoid. Consequently, the UK-ONR has assigned the legacy waste facilities a Regulatory Priority 1. This means that they will be subject to a 'significantly enhanced level of regulatory attention' over the next five years as the issues present are not easily resolved. Other Sellafield site operations (e.g. reprocessing, vitrification, etc.) as well as the Dounreay site, the Atomic Weapons Establishment (AWE) (defence) sites at Aldermaston and Burghfield and the Devonport Royal dockyard are designated as a Regulatory Priority 2. This means they will receive 'enhanced level of regulatory attention' over the next two years. All the UK's civil nuclear power plants were assigned to Regulatory Priority 3. (This designates a routine level of regulatory attention.



The RPII participated in a pre-launch briefing by the UK-ONR in October, which allowed attendees to seek clarification on the report's findings.

Life extensions for nuclear power plants

The UK's oldest operating nuclear power plant is located in Wylfa, North Wales. The 490-megawatt reactor started generating electricity in 1971, and it currently has permission to continue operation until September 2014. However, in October 2013, the plant operators, Magnox Ltd, submitted a ten-yearly periodic safety review for the Wylfa site to the UK-ONR, which included a proposal to extend electricity generation to December 2015 if approved by the safety inspectors. The Wylfa Nuclear Plant is the reactor located closest to Ireland at just over 100 km from the east coast.

Once the reactors are shut down, the nuclear fuel will be progressively removed from the reactors and sent to Sellafield for reprocessing. Over the next ten years, the closed reactors will undergo decommissioning, which involves the removal of the nuclear fuel to Sellafield for reprocessing and the demolition of the existing plant and buildings. After this period, the site will enter the 100 year "care and maintenance" stage of decommissioning, after which the site is cleared from regulatory control.

In November 2013, the UK energy company EDF Energy announced its intention to extend the operational life of two of its advanced gas-cooled reactors (AGRs). The reactors at Hartlepool in the north-east of England were expected to close in 2019. The UK-ONR will allow the reactors to continue to operate until 2024 if EDF Energy can demonstrate that they will remain fit to do so. The RPII will continue to monitor developments on all nuclear sites in the UK.

New nuclear power plants in the UK and their potential radiological impact on Ireland

At the end of 2012, the UK-ONR granted its first new nuclear power plant site licence in 25 years. This licence was granted to EDF Energy for its planned new European Power Reactor (EPR) design nuclear plant at Hinkley Point in the south-west of England. On 19 March, 2013,

planning permission was granted for construction of the new nuclear power plant.

EDF Energy has secured Design Acceptance Confirmation for the Areva EPR reactor design, three permits from the UK Environment Agency (UK-EA), a nuclear site licence and planning permission. The company now holds the majority of consents it needs to build and operate the plant.

In September 2013, Rosatom (the Russian Federation national nuclear corporation), Rolls Royce and Fortum (a Finnish energy company) agreed to prepare an application for submission to the UK's regulatory Generic Design Assessment (GDA) process for a VVER-TOI (pressurised water design) reactor, possibly in 2015.

In 2012, Hitachi Ltd bought Horizon Nuclear Power, which is planning to build nuclear power stations at Wylfa in Anglesey and Oldbury in South Gloucestershire. Early in 2013, Hitachi submitted its Advanced Boiling Water Reactor (ABWR) design to the GDA process, and this is expected to be completed by about the end of 2017. Site works will begin 12-18 months before this, with full construction beginning in around 2019. In December 2013, Hitachi said it plans to build two ABWR units at each site.

In May 2013, the RPII completed and published its assessment of the likely effects on the environment in Ireland of the planned programme to build new nuclear power stations at eight sites in the UK (see Figure 12). The assessment included a review of the programme, including a description of the reactor designs and an assessment of potential impacts on Ireland due to the day-to-day discharges to the environment and from a range of potential accidental releases to air and sea. Modeling and an assessment of radioactive releases to the Irish Sea were undertaken with the support of marine modeling researchers at the NUIG, while modeling of the releases to the atmosphere was completed with the support of Met Éireann and the US's NOAA. The postulated accident scenarios included those described in the recently published state-of-the-art assessment of severe nuclear accident from the US-Nuclear Regulatory Commission.

Safety of nuclear facilities abroad (continued)

Figure 12: Proposed sites for new nuclear power plants in the UK



The assessment found that the routine operation of the proposed nuclear power plants will have no measurable radiological impact on Ireland or the Irish marine environment.

Five severe accident scenarios were assessed as part of the study, which ranged in likelihood of occurrence from one in 50,000 to one in 33 million per year. In general, the less likely the accident, the greater the potential radiological impact on Ireland. Food controls and agricultural protective measures would be required if any of these accidents occurred to ensure that food on sale in Ireland was safe to eat. In the case of the most severe accident scenario examined in the study, short-term measures such as sheltering would also be required. In none of the scenarios evaluated was evacuation found to be an appropriate response. The assessment also examined the consequences of a large accidental release of radioactivity to the Irish Sea equivalent in size to that after the Fukushima accident. It found that the resulting radiation dose to people in Ireland

who eat very large quantities of fish and shellfish would be less than the annual radiation dose limit for the public.

The study shows that any radioactive contamination in the air, either from day-to-day operation of the proposed nuclear power plants or accidental releases, would be transported away from Ireland most of the time. This conclusion arises from an analysis of weather conditions prevailing in Ireland and the UK over the past 21 years.

Geological disposal facility

In 2008, the UK Government invited communities to volunteer to host a geological disposal facility (GDF) that would accommodate high- and intermediate-level radioactive wastes. Three communities in two areas of Cumbria submitted an expression of interest to host the facility. In January 2013, Cumbria County Council, Copeland Borough Council and Allerdale Borough Council voted to withdraw from the site selection process. The agreement of both the borough council and the county council was required in order for the area to formally enter the siting process.

Following this, from September to December, the UK Government held a public consultation on how it will organise the process that will lead to selection of a site for a geologic repository for high-level radioactive waste. The purpose of the consultation was to gather views on how aspects of the siting process for a GDF for higher activity radioactive waste could be revised and improved. The UK's Department of Energy and Climate Change (UK-DECC) is reviewing the responses to the consultation and will re-launch the site selection process in 2014. The RPII will continue to follow developments on this issue.

Sellafield

The RPII continues to monitor developments at the Sellafield site. Regular contact is maintained with the UK-ONR and Environment Agency (UK-EA), both of which provide information directly to the RPII. In addition, the RPII continued to monitor progress being made by Sellafield against key safety-related targets identified in the Sellafield Performance Plan. This plan describes the work that will be performed on the Sellafield site over its lifetime until closure in 2120.



Sellafield contains the world's largest stockpile of plutonium. Early in 2013, the plutonium stockpile was reported as 121 tonnes. This could increase to 140 tonnes when reprocessing operations are completed around 2016. In March 2011, the Nuclear Decommissioning Authority (UK-NDA) outlined options for using or otherwise dealing with the UK's stock of civil plutonium. The UK Government later announced that its preferred option was incorporating plutonium into mixed oxide (MOX) fuel for use in nuclear power plants rather than disposing of it as waste or continuing indefinite storage at the Sellafield site. A cost-benefit analysis of a new MOX production plant has been commissioned by the UK-DECC. In addition, the UK-NDA is considering alternative approaches for disposing of the plutonium, such as the feasibility of building a nuclear reactor at Sellafield that could use the plutonium. The UK-NDA has commissioned a feasibility study on this proposal. In August, the UK-NDA completed its review of the options on how the UK Government should deal with this plutonium. UK-DECC is currently considering this work. The RPII will follow closely any developments on this topic.

In October, the UK-NDA announced its intention to extend the Sellafield nuclear decommissioning contract with Nuclear Management Partners (a consortium comprising three companies) into a second five-year period. The first five-year period of the 17-year contract comes to an end in March 2014. The consortium has been heavily criticised for delays to decommissioning projects and increasing costs. The RPII has discussed this issue with the UK regulators.

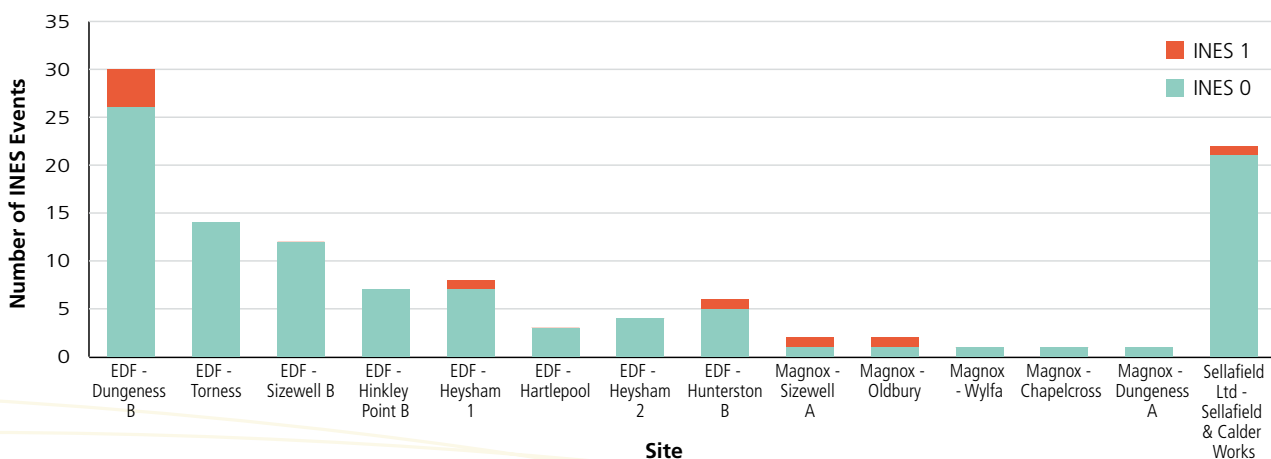
Reported nuclear/radiological events

The UK-ONR and UK-EA continue to provide notifications of events at nuclear facilities in the UK, as well as comprehensive responses to any follow-up questions posed by the RPII. In 2013, the RPII received notification from the UK-ONR and UK-EA of just over 80 events that occurred at civil nuclear facilities in the UK (see Figure 13). The majority of the events have been categorised as being of 'no safety significance', or Level 0 on the seven-point International Nuclear Event Scale (INES). In addition, there were a small number of INES Level 1 'Anomaly' events.

The Level 1 events included the discovery of clothing contaminated with radioactive material outside the appropriate disposal route in the High Active Liquor Evaporation and Storage facility at Sellafield. While there was no spread of contamination outside of the change room area where the clothing was found, the results of an assessment showed that the activity on the clothing was in excess of the authorised limit for the area. In November 2013, there was a temporary power loss on the Sellafield site. The fault affected one of the process lines in the Waste Vitrification Plant, and, following the power loss, there was evidence of contamination within three areas of this line but none detected external to the building. The loss of power caused little impact to other buildings on site.

In all cases, the RPII remained satisfied that there were no radiological issues for Ireland.

Figure 13: INES rated events at UK civil nuclear installations



International standards and activities

An objective within the RPII's strategic priorities is to contribute internationally to the development of radiation protection and nuclear safety standards and to influence the implementation in Ireland of related Euratom directives. In this context, 2013 was a particularly active year with the RPII involved in supporting the technical and political discussions on the new Basic Safety Standards Directive and the new Drinking Water Directive both of which were agreed during the Irish Presidency of the European Council. The RPII was very active in relation to nuclear safety, advising Government in relation to a revision of the Nuclear Safety Directive as well as in preparing for the sixth review cycle of the Nuclear Safety Convention. The RPII continued to support Government at the scientific level in relation the Convention for the Protection of the Marine Environment and was involved in an EU review of nuclear emergency preparedness. All of these activities are focused on driving radiation and nuclear safety standards in line with key organisational strategic priorities.

Basic Safety Standards Directive

The EC introduced a proposal for a new consolidated Basic Safety Standards Directive (BSS) to the European Council in October 2011 for negotiation at the Atomic Questions Working Party (AQWP). Negotiations on the BSS continued throughout 2012 when a technical working group was established under the Cyprus Presidency to resolve the considerable technical issues that had been identified. Ireland was invited to chair the technical working group. The Director of Regulation and Information Management at the RPII, chaired the group between July 2012 and May

2013 when it concluded its work. In addition, he chaired the negotiations on the BSS during the Irish Presidency, which resulted in agreement in May. In support of the presidency team, a team of experts within the RPII had been established to analyse the draft proposals and continued their analysis of the evolving text. An expert was also appointed by the Department of Health to advise on patient protection aspects.

The new BSS consolidates the provisions of five other pieces of European legislation that underpin the statutory framework for radiation protection in Europe. It streamlines existing legislation and brings coherence to regulatory and protection measures for the public, workers and patients. Moreover, it brings European legislation into line with current scientific understanding, in particular with the main recommendations of the ICRP. It is a complex piece of legislation, which includes important provisions on the graded approach to regulatory control; patient protection; emergency preparedness and radon, with new provisions in relation to environmental protection. It represents a very significant step forward in the protection of European workers, members of the public and patients from the harmful effects of exposure to ionising radiation; member states have four years to transpose its provisions into national legislation. In welcoming the agreement, the Minister for Environment, Community and Local Government Phil Hogan said "Developing safety standards through the BSS directive was a key priority for the Irish Presidency of the Council of the European Union."



Atomic Questions Working Party - Brussels 2013

Integrated Regulatory Review Service Mission 2015

Under binding legal requirements in both the Euratom Nuclear Safety and Radioactive Waste directives, the national regulatory framework, including the regulatory body, is the subject of a periodic international peer review. In practice, these peer reviews are organised by the IAEA through an agreement with the EU. They comprise a detailed examination of national provisions against the IAEA's Safety Standards.

The IAEA's peer review process is called an 'Integrated Regulatory Review Service' (IRRS) and 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 its aim through consideration of both technical and policy issues of a regulatory nature against IAEA safety standards and, where appropriate, good practice elsewhere.

The review process directly draws upon the wide-ranging international experience and expertise of the IRRS review team members. Peer exchange on technical and policy issues are designed to provide 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. 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.

Ireland applied for its peer review mission on the 28 September, 2010, and, in an exchange of letters between the IAEA and Government, 2015 was agreed as the year for the mission, with a follow-up mission foreseen for 2018. The timing is in line with the requirements of both the Nuclear Safety Directive and the Radioactive Waste Directive. The review has three phases: the preparatory or

self-assessment phase, the peer review and the implementation of an action plan of improvement based on the findings of previous phase. 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 review mission will assess and verify in 2015. The IRRS Team would typically comprise 14 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 provided as a summary during a press conference. Once finalised, the report is made public.

While the RPII will have a central role in delivering the project with DECLG, a broad number of agencies will be either directly involved or will have an interest in the outcome. Preparations, including training, commenced in late 2013.

OSPAR

The 1992 Oslo-Paris (OSPAR) Convention for the Protection of the Marine Environment of the North-East Atlantic requires contracting parties to take all possible steps to prevent and eliminate pollution of the marine environment by the year 2020.

The RPII acts as scientific adviser to the Irish Government on the implementation of the Radioactive Substances Strategy (RSS), which was signed by all contracting parties in 1998. The RSS requires progressive and substantial reductions in discharges of radioactive substances with specific targets for both naturally occurring and artificial radionuclides to be met by the year 2020. The RSS is managed by the Radioactive Substances Committee (RSC), which meets once a year.

Through OSPAR, Ireland has been able to influence the progress achieved to date towards reducing radioactive discharges from the Sellafield site. OSPAR is also a key driver in influencing the UK's decision to end its Magnox programme, including the closure of its Magnox nuclear power plants (the oldest nuclear power plants in the UK)

International standards and activities (continued)

and plans to end the reprocessing of Magnox fuel (the single largest radioactive source of pollution of the Irish Sea) by 2020.

At its 2013 meeting, the group noted progress made in a number of areas, including: the definition of a baseline for the non-nuclear sector; how to handle uncertainties and measurement values below the limits of detection; and a new OSPAR information system. RSC also made the necessary arrangements for progress in two additional areas, as follows:

- To test the definition of 'historic and legacy waste' in the context of OSPAR, a two-year trial was agreed, which will involve assessing discharge data against a set of waste production scenarios; and
- To determine whether 'additional concentrations in the marine environment above historic levels are close to zero', various options will be investigated, including different statistical tests, a dose-based approach and a multiple criteria/attributes type of approach.

It was also decided to postpone the next milestone RSC publication, the Fourth Periodic Evaluation, until 2016, to allow for further progress in the areas of agreeing statistical methods for assessing discharges and concentrations, assessment methodologies and data management.

As a contracting party to the OSPAR Convention, Ireland reports its radioactive discharges annually to the OSPAR Commission. This includes discharges from the medical sector and from the oil and gas sector. Data on environmental measurements made as part of the RPII's marine monitoring programme are also supplied each year. These data are then combined with similar ones supplied by the other signatory countries to assess the impact of radioactive discharges on human and non-human populations in the North-East Atlantic.

Community Framework for Nuclear Safety – the Nuclear Safety Directive

Following the nuclear accident at Fukushima in 2011, the EC was directed by the European Council to review the existing legal and regulatory framework for the safety of

nuclear installations in the EU in order to assess areas where the existing EURATOM nuclear safety legislative framework could be further reinforced. In December 2012, the EC prepared a draft revision of the 2009 Nuclear Safety Directive (NSD). ENSREG established an ad-hoc working group in January 2013 to consider the technical issues contained in this draft directive. The RPII participated in this work, which formed the basis of ENSREG's technical input to the revised directive.

The RPII has been actively involved in the discussions on the draft directive at the EC's AQWP, providing comments on the draft directive, in particular on strengthening requirements on transparency and peer reviews. The RPII will continue to monitor this issue and participate in discussions until it is finalised in mid-2014.

Convention on Nuclear Safety

The IAEA's Convention on Nuclear Safety is the international Convention that obliges all signatory countries to maintain a high level of nuclear safety in power reactors and report on measures taken in this respect. The convention includes obligations relating to the national regulatory framework, safety of nuclear installations and emergency planning arrangements. It came into force in 1996 and every three years, contracting parties, including Ireland, must submit a national report that sets out measures adopted by that country to implement the relevant obligations of the convention. These national reports are peer-reviewed by other contracting parties, and questions are put to the countries on their reports and nuclear safety programmes.

In 2013, the RPII assisted the DECLG in preparing for the sixth review cycle by contributing to the compilation of Ireland's national report and by reviewing and posing questions on other national reports. The RPII will present Ireland's report at the review meeting in 2014.

Inter-agency cooperation

The RPII has continued its engagement with both national and international agencies in an effort to ensure the continued promotion of high standards in radiation protection, and also to enhance its effectiveness.



This is particularly important in the regulatory environment. During 2013, the RPII worked or liaised with the EC, the IAEA, the Department of Education and Skills, the Veterinary Council of Ireland, the EPA, An Garda Síochána, OSPAR, the Revenue Commissioners (Customs), Dublin Port Authority, the HSA, the NIEA, the Irish Medicines Board, the Health Information Quality Authority, the Department of Health, the HSE (Medical Exposures Radiation Unit), the Department of Defence, the Commission for Energy Regulation, the Canadian Nuclear Safety Commission and the French Nuclear Safety Authority (ASN), as appropriate, on areas of mutual interest.

The RPII also participated in a number of international groups and, as a result, has enhanced its ability to influence decisions that affect the protection of people in Ireland from the harmful effects of ionising radiation. These groups include the IAEA Transport Safety Standards Committee, the European Association of Competent Authorities for the Safe Transport of Radioactive Materials, the European ALARA (as low as reasonably achievable) network, the European Radiation Protection Authorities Network, the Heads of Radiation Control Authority Network and the AQWP of the European Council. Staff from the Regulatory Service also participated as technical experts on IAEA IRRS missions to the Czech Republic and Belgium.

Drinking water directive

For a number of years, the RPII has provided technical advice on the topic of radioactivity in drinking water to Ireland's Permanent Representative to the European Union in support of discussions on a new EU Drinking Water Directive. In October 2013, the European Council adopted this new directive, which lays down requirements for the protection of the public with regard to radioactive substances in water intended for human consumption. This directive must be transposed into national law in all EU member states, including Ireland, by 28 November 2015.

EU review of nuclear emergency preparedness

In 2013, the EC commissioned a study of current arrangements and capabilities for off-site nuclear emergency preparedness and response in Europe. The objectives of this study were to:

- Assess the status of the existing arrangements and capabilities for off-site emergency preparedness and response within and between the EU member states and neighbouring countries in respect of their coherence and completeness;
- Identify best practice, gaps and inconsistencies, in particular, in relation to cross-border arrangements;
- Assess how current arrangements and capabilities could be made more effective (in particular, optimised to make better use of available resources and avoid duplication, both nationally and across borders) and
- Make recommendations on potential areas for improvement.

The review consisted of a number of questionnaires to be completed by all member states and a number of neighbouring countries together with a series of meetings to discuss the findings. National arrangements were being benchmarked against requirements set out in the international safety standards and relevant EU directives. An RPII staff member was a member of the project's Core Group as a representative of ENSREG. The role of the Core Group was to act as a "sounding board" for the project team, undertaking the review and provide views on the draft findings and recommendations at an early stage of their development. The final report of the review is due to be presented to the European Parliament in 2014. The RPII will consider its findings in providing advice to the DECLG on the NEPNA.

Corporate services

Corporate Services provides the support functions essential to running an organisation. It includes financial, human resources, communications, IT and other back-office services that support the core scientific and technical work of the RPII.

The decision to merge the RPII with the EPA gave rise to a number of projects aimed at transitioning the corporate functions in both agencies to support the new larger organisation. This was the focus of significant resource commitments in the corporate area during 2013.

Notable achievements for the year are listed below under the various section headings.

RPII-EPA Merger

In November 2012, under the Government reform initiative aimed at rationalising state agencies, the Government announced that the RPII was to merge with the EPA. In January 2013, the Minister for Environment, Community and Local Government decided that the bodies should be merged by creating a fifth Office within the EPA structure, bringing the total number of Offices to five, each headed by a Director. In addition, he decided that an Advisory Committee for radiation issues would be established to provide expert input to the merged organisation.

The Minister established a Working Group (the Merger Working Group – MWG) comprising an independent Chair, the Chief Executive of the RPII, the Director General of the EPA and two representatives of the Department of the Environment, Community and Local Government to plan for and manage the merger to completion. The MWG was also explicitly tasked with ensuring that there is no diminution, or perception of any diminution, among stakeholders and the general public, with Ireland's commitment to either environmental or radiological protection, arising from the merger.

The MWG met on ten occasions during 2013. An Action Plan, setting out the steps necessary to give effect to the merger, was approved by the Minister in July 2013 and implementation commenced with the aim of having the merger completed by mid-2014. The Terms of Reference

for the MWG and the minutes of its meetings are available on the RPII and EPA websites.

The vision for the merger is that it will bring together the committed and dedicated staff of both organisations to create a strong scientific organisation that combines the expert resources and the excellent reputations of both the EPA and the RPII and continues to place the same high value on both environmental and radiological protection.

Strategic Plan

Every three years, the RPII develops a new strategic plan, taking the opportunity to review developments in radiological protection in Ireland and setting out the actions it will take to deliver on its mission of protecting people from the harmful effects of ionising radiation.

As the year 2014 marked the beginning of a new strategic planning period, a significant effort was devoted towards the end of 2013 to review progress against the Strategic Plan 2011–2013 and to develop a new plan. The fact that the strategy was to be developed in the context of the merger was taken into account and the plan addresses the delivery of radiological protection in the period spanning the transition from the RPII to the Office of Radiological Protection in the merged organisation. The strategy also took account of the external and internal environment and the views of key stakeholders. The plan focuses on four thematic areas that represent the core work of the RPII which is to provide the expertise, technical capability and information essential to the protection of the Irish population and the environment and to regulate the safe and secure use of ionising radiation in Ireland.

Communications

The RPII provides advice and information on radiation protection to Government, the public and stakeholders. To meet this objective, the RPII provides high-quality information on its website, publishes scientific findings in reports and elsewhere, engages with stakeholders at a range of national and local events and uses both traditional media and new/social media to disseminate important information to the public.

There was significant media coverage of RPII activities during the year and in particular the radon issue. Eight press releases were issued to the national media, and 11 press releases with specific local information on radon were issued to the regional media. RPII staff undertook one television, 24 radio and 11 newspaper interviews at national and regional level. Newspaper coverage, both at national and regional level, was effective in raising public awareness of radiation protection issues; some 110 articles referred to the RPII. For the first time, a video press release was syndicated to news media, published on YouTube and the RPII's website. The video shows an interview with the Chief Executive and principal author of the report: *Proposed nuclear power plants in the UK – potential radiological implications for Ireland.*

Market research findings

In addition to communicating information, the RPII carries out market research from time to time to quantify the level of concern and understanding among the population in relation to radiation protection issues. In 2013, the market research was undertaken by a market research company through face-to-face interviews with a nationally representative sample of 1000 adults.

The research found that awareness of the body/agency responsible for radiation protection in Ireland was relatively low, with approximately five percent spontaneously mentioning the RPII and an additional five percent mentioning Radiation Institute or Radon/Radiation Agency. The majority of people in Ireland have some degree of awareness about radon gas, with one in two claiming to know a little or more about it. Despite this apparent high awareness, only one in three claims to be concerned about it in their home. The majority of those who have not tested for radon in their home are unlikely to have their home tested in the future. The two main reasons cited for not getting their home tested, among those concerned about radon gas, were: 'not a priority at the moment' or 'lack of knowledge'. Approximately one in two people believe that a nuclear accident in the UK will have a significant or catastrophic impact on their health. Radon gas in the home is considered by the population to be less of a risk than any of the following: Sellafield, nuclear power stations abroad and mobile phone masts.

This is despite the fact that radon is linked to 250 lung cancer cases in Ireland every year, pointing to a widespread imbalance between the perceived risk and actual risk. The findings of this research have informed and will continue to inform radon awareness campaigns and communications on radiation exposure in Ireland in general.

Website

The RPII website, www.rpii.ie, is the primary source of information on the organisation for the public and stakeholders. During the year, the website was revamped, with particular emphasis on the homepage, intended to make information on radiation protection, news and information about RPII activities more accessible. Content on the website is updated and monitored on a daily basis. Features on the website include an interactive radon map where visitors can enter their home address to determine if they live in a High Radon Area. This facility also allows users to apply and pay online for a radon measurement, estimate their own radiation dose using the online dose calculator, see the RPII's radiation monitoring network and access the results of the environmental monitoring programme. Visitors can also keep up to date with developments in radiation protection by signing up to alerts, providing notice of new publications, press releases and news.

During 2013, the RPII's website received more than 69,000 visits by nearly 50,000 unique visitors. Visitors spent, on average, just over three minutes on each session, visiting approximately four pages. This suggests that most visitors find what they are seeking and are engaged by the content. Approximately 78% of visitors came to the website via a search engine; 13% came directly to the website and 9% were referred from other sites. Popular areas of the website included the radon map, information on radon, radon measurement, publications, the radiation dose calculator, licensing information, monitoring stations, publications, emergency planning information, news alerts and press releases.

Corporate services (continued)

Peaks in traffic to the website coincided with media activity (Figure 14):

- In January, nearly 9000 visits followed a radon piece on the Eco Eye Television programme;
- In April, over 6000 visits followed the publication of the RPII report *Proposed nuclear power plants in the UK – potential radiological implications for Ireland*;
- In October, over 6000 visits followed the incident of the stolen radioactive lightning preventers; and
- In November, over 12,000 visits followed a national press release and regional campaign on the issue of radon in homes.

On average, 24 per cent of traffic to the website originates from mobile devices (mobile phones and tablet PCs) but this percentage increases when the RPII is in the media (up to 45 percent in November, Figure 14). The RPII, since 2012, has provided a mobile-friendly version of its website.

Education and television

In order to raise awareness of radiation among school-children, the RPII contributed to a multimedia resource for second level schools by sponsoring a lesson on radioactivity. This resource, which provides teaching materials for use in the classroom, is designed to support

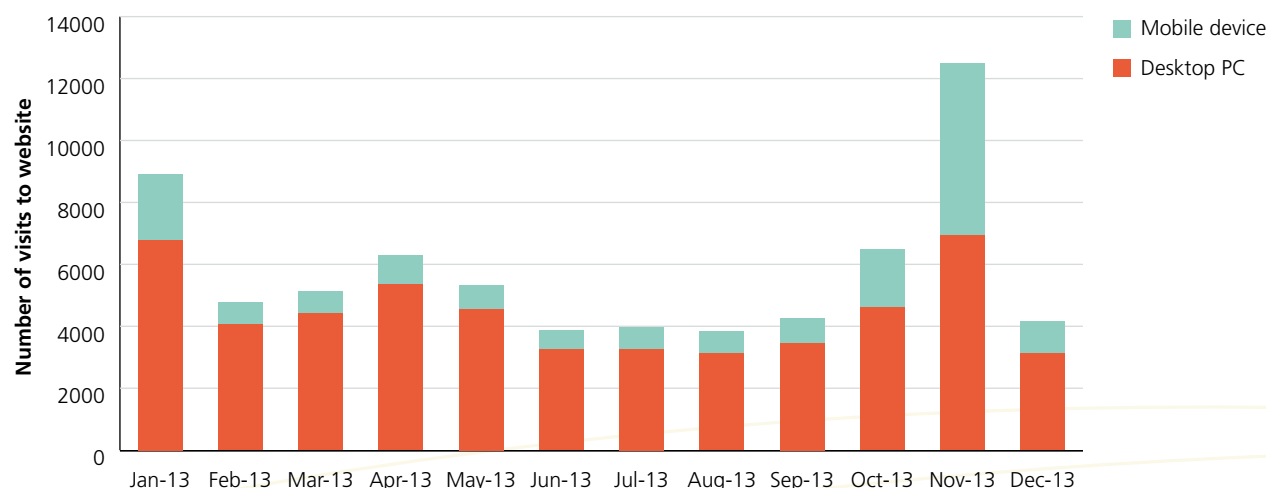
the science and technology curriculum and is used in second level schools countrywide.

The RPII sponsored a segment on the television programme Eco Eye, which was broadcast in January 2013 and included an interview with the Chief Executive, Dr Ann McGarry, and a consultant in respiratory medicine, who provided an insight into the damage caused by exposure to radon. The coverage also demonstrated how an active radon sump is installed into a family home to reduce radon levels.

Public awareness campaigns on radon

An intensive awareness campaign on radon was carried out in Co Louth in April. This initiative included radio and print advertising, promotional activity, a digital strategy and public relations activities. Over 63,000 information packs were distributed to households in the county. Posters and information packs were also distributed among community groups, health centres and health professionals. Engagement with key stakeholders, such as politicians, local authorities, media, community and business groups and the public, formed part of the awareness activities.

Figure 14: Number of visitors to the RPII website in 2013 from desktop PC or mobile device





In November 2013, national and regional press releases highlighting the issue of high radon levels in homes focused on counties where intensive campaigns had been carried out previously, namely Sligo, Carlow, Waterford, South Tipperary, Galway, Kerry, Wexford and Louth. A tailored information message, urging people to test their home for radon, was broadcast on the local radio station in each county. Promotional giveaways of free radon tests were run on mid-morning current affairs programmes together with interviews with experts on radon from the RPII. Social media, in particular Twitter was used throughout the campaign week to amplify the message, draw users to the website and to engage directly with the public and media.

Publications

The RPII principally uses electronic distribution of publications with only limited printed publications. All publications are available for download from the website. New titles this year included the following:

RPII Reports

Natural radioactivity in bottled water produced in Ireland, December 2013.

Proposals for a graded authorisation model for the use of ionising radiation in Ireland, September 2013.

Radioactivity levels in groundwater sources in Ireland, August 2013.

A survey of tritium in Irish seawater, July 2013.

Proposed nuclear power plants in the UK – potential radiological implications for Ireland, May 2013.

RPII Inspection and licensing activities and annual inspection programme for 2013, March 2013.

Guidance notes/leaflets

Guidelines for reporting radiological incidents to the Radiological Protection Institute of Ireland, August 2013.

Temporary operational protocol for making safe and managing orphaned or seized radioactive sources, August 2013.

Journal articles, conferences papers and posters

(RPII personnel are indicated with an asterisk in this list.)

Connan, O., Smith, K.* , Organo, C.* , Solier, L., Maro, D., Hébert, D., (2013). Comparison of RIMPUFF, HYSPLIT, ADMS atmospheric dispersion model outputs, using emergency response procedures, with ⁸⁵Kr measurements made in the vicinity of nuclear reprocessing plant. *Journal of Environmental Radioactivity*. 124, (Oct.2013) pp. 266-277.

Casey, M., Smith, K.* , (2013). Assessment of the Radiological Impacts on Ireland of a Hypothetical Severe Nuclear Accident in Europe. Submitted to the *ERR 2013 Conference, Dublin, September 2013*.

Partnership

Staff, management and trade union representation share in the analysis and resolution of issues facing the RPII through the Partnership Committee.

During 2013, two key areas came to Partnership:

- Delivery of the merger action plan for the merger of the RPII with the EPA, and
- Consultation on the implementation of the Haddington Road Agreement.

The committee met 11 times in 2013, with additional meetings required to deal with the two main areas above. One such meeting involved a joint meeting between Partnership and its equivalent, Meitheal, in the EPA in December 2013.

Other issues dealt with by Partnership during 2013 included:

- Review of its terms of reference (Partnership Representation Review);
- Review of the training requirements for the Partnership members and
- Performance Management and Development System Working-Sharing Review.

Corporate services (continued)

Finance

The RPII's income in 2013 was €5.884m, made up of a grant of €3.084m for current purposes, a grant receivable of €1.167m for pension purposes, as required under FRS 17, and earnings of €1.241m from licence charges and dosimetry, product certification, radon measurement and other services. From the capital grant, €0.393m was amortised in the year. The RPII also received a capital grant of €0.200m for the upgrading and maintenance of its equipment. Expenditure for the year exceeded income by €0.063m

Prompt payments of accounts

The RPII comes under the remit of the Prompt Payment of Accounts Act, 1997, which came into effect on 2 January, 1998, and the European Communities (Late Payment in Commercial Transactions) Regulations 2002. The following is a report on the payment practices of the RPII for the year ended 31st December 2013.

It is the policy of the RPII to ensure that all invoices are paid promptly. The organisation's system of internal controls include accounting and computer controls to ensure the identification of invoices and contracts for payment are made within the 30 days as prescribed under the act. The Accounts Department produces a report that identifies the payments made, and this report is reviewed regularly. There were three late payments that exceeded the due payment date by an average of 170 days. The total value of these late payments was €1089. The penalty interest payments associated with these late payments amounted to €10.59 and the compensation fee totalled €120. The late payments represented 0.62% of total payments to suppliers in 2013.

Since July 2011, and in accordance with the terms of the National Recovery Plan 2011–2014 and the EU/IMF Programme of Support to Ireland, the RPII is required to put in place arrangements to pay all valid invoices within 15 days of receipt. Progress against this requirement is reported on a quarterly basis to the DECLG and is published on the RPII website. During the year 2013, 86% of all valid invoices were paid within 15 days.

Advisers and consultants

Advisor	Nature of service provided
AG Services	Development of educational material for schools
Arekibo	Web design and development
Astron Consulting	Business process review and system design
Deloitte	Internal audit services
Fabrik Creative Media	Design and print services
Forfas	Accreditation services
Gareth Thomas	RPA assessments
Dr Keith Faulkner	RPA Assessments
Public Health England	Review of licensing and inspection systems
Dr Christopher Hone	RPA assessments
Prof Pat Horton	RPA assessments and inspections
Public Authority Pension Services	Pension Liability Calculation
Institute of Public Administration	Staff development programme
Integrity Solutions	IT Security
Metrology Systems	Audit Planning
Mooney O'Sullivan and Associates	Legal advice
Murray Consultants	Communications support
Norton and Associates	Accountancy
System Action	IT support
The SIA Management Group	Strategic Planning
Willis Risk Services	Pension related advice

Human Resources and Staffing

A major challenge in 2013 was the implementation of the Public Service Stability Agreement 2013-2016 or the Haddington Road Agreement (HRA) as it is generally known. Some of the measures brought in by the HRA were an increase in the standard working hours; a pay reduction for salaries over €65,000 and a deferral in the awarding of increments. As the measures were complex and applied differently to different staff members, HR provided each staff member with a personal statement outlining how they were affected by the measures.

As part of the Public Sector Reform Plan, in November 2012, the Government decided to merge the RPII with the EPA. An action plan was developed setting out the actions required to achieve that merger across a wide range of themes, including human resources. In 2013, work commenced towards integrating the two organisations in terms of grading structures, roles and responsibilities as well as salaries, leave allowances and other terms and conditions of employment.

Before the announcement of the merger, the EPA had embarked on a project to introduce an integrated HR database that covers personnel records, pensions, pay roll, time and attendance, travel and subsistence and training and development. In preparation for the merger, the RPII has joined the implementation team for this project.

A further two members of staff were lost through retirements. These retirements brought the staff compliment to 42, down from 52 in 2010.

Health and safety

The 2013 Health and Safety programme established under the RPII Safety Management System (SMS) reviewed fire safety and, in particular, the emergency response protocol for the offices. New appointments were made to the role of fire warden, and our fire evacuation plan was reviewed and updated.

The Safety Coordination Committee purchased a defibrillator unit and arranged for staff to be trained in its use.

There were no "reportable accidents" or dangerous occurrences in 2013.

Equality

The RPII is committed to a policy of equal opportunity. While recruitment is limited at the moment, the RPII provides equal access for all staff to opportunities for advancement and career development. The RPII supports family friendly initiatives such as flexible working and work-sharing as they are vital to a practical work life balance.

Accommodation and energy usage

In 2013, the RPII's energy use consisted of roughly 50% electricity and 50% natural gas. Heating accounts for the majority of the gas consumption, while electricity is used for lighting, some water heating and powering IT and lab equipment. Consumption of 465MWh of energy was recorded, consisting of 229MWh of natural Gas and 236MWh of electricity.

Information Technology (IT)

In 2013, work continued on delivering improvements to the RPII's network infrastructure. Information shares were assessed and reorganised, external communication links were upgraded to deliver more capacity and a revised set of information security policies were drafted. The announcement of the RPII and EPA merger resulted in a reprioritisation of work activities and in a significant focus on developing the IT elements of the RPII/EPA merger action plan.

Records management

In 2013, the RPII continued its programme to develop good records management practices across the institute. The initiative to deliver localised training to all staff, which began in 2012, was successfully completed in 2013. The success of which was highlighted by a further improvement in the level of record keeping. Electronic record keeping was also extended to include all staff, with the project being successfully completed in 2013.

Customer service

The RPII is committed to providing an excellent service to all of its customers and aims to provide a helpful, courteous and effective service to everyone who contacts the organisation. The RPII's customer service charter, which is published on its website, describes the standard of service that customers can expect from the RPII. The RPII includes actions in its business plan aimed at continuously improving customer service and the institute reviews the effectiveness of these annually. During 2013, the RPII, along with many other public bodies, came under the remit of the Office of the Ombudsman.

Our governance

The RPII governance framework is based primarily on the requirements of the Radiological Protection Act (1991), under which the RPII was established, and the 2009 Code of Practice for the Governance of State Bodies. The RPII follows the Department of Finance lead on rules and procedures in relation to the financial functions of payroll, pensions, purchasing and budgeting.

The RPII reports to a board that is supported by three advisory committees: the Audit Committee, which advises on finance, governance and organisational risk; the Ionising Radiation Advisory Committee, which is a high-level advisory body on all matters pertaining to ionising radiation, and the Communications Advisory Committee, which advises on communications strategy. Membership of the board and the committees is detailed in following sections.

The RPII is subject to an annual audit by the Comptroller and Auditor General as well as an internal audit.

Audit Committee

The committee met four times during 2013. The scope of its reviews included management accounts and financial statements; budgets; risk; health and safety; travel and subsistence; sick leave; invitations to tender and the Croke Park Action Plans.

This committee advises the board on finance, governance and organisational risk.

Chairman: Mr Patrick Gilligan

Ms Darina Muckian

Mr James Fitzmaurice

Professor Ciarán Ó hÓgartaigh

Secretary: Ms Glenda Griffin

Communications Advisory Committee

Membership of the Communications Advisory Committee (CAC) includes RPII board members and external members with an interest in and expertise in communications matters. The CAC provides advice to the executive relating to planning and implementation of communication

programmes and engagement with the public and other stakeholders. Ms Annette Cahalane, Programme Officer in charge of Communications and Media in the Environmental Protection Agency, joined the CAC to support the integration of the communications function of the EPA and RPII in the context of the planned merger of the two organisations. The committee met three times during 2013.

Chairman: Mr James Fitzmaurice

Ms Annette Cahalane

Ms Darina Muckian

Mr John O'Dea

Mr Brian Trench

Secretary: Ms Linda Coyne

Ionising Radiation Advisory Committee

The RPII's Ionising Radiation Advisory Committee is a high-level scientific advisory body and provides guidance to both the board and the executive of the RPII on any matters concerning ionising radiation referred to it by the board or by the executive of the RPII, with particular emphasis on public health matters. The 16 members of the committee include both national and overseas experts, covering a wide range of disciplines, including radiation protection; public health; epidemiology; emergency response and medical physics. During 2013, the committee met twice to discuss a range of topics of strategic importance, including the assessment of the impact of UK new build and Sellafield; research to support the implementation of the NRCS; radiation protection of the environment and the RPII's strategic plan covering the transition from the RPII to the Office of Radiological Protection in the EPA (2014 to 2015).

Chairman: Dr Paraic James

Dr Michael Casey

Dr James McLaughlin

Dr Harry Comber

Dr Jill Meara

Dr Peter Finnegan



Prof Peter Mitchell

Dr Maurice Fitzgerald

Dr Neil O'Donovan

Dr Jean Luc Godet

Dr Geraldine O'Reilly

Mr Seán Hogan

Dr Jane Renehan

Prof Ian McAulay

Prof Wil Van Der Putten

Prof Brendan McClean

Scientific Secretary: Ms Stephanie Long

Public sector reform

A significant level of reform has taken place across the public service under the Public Service Agreement 2010-2014, and, over these years, the RPII has played its part in reducing costs and sharing resources to achieve better value for money. However, the Government decided that further measures were required to underpin the delivery of a more integrated, efficient and effective public service. To this end, 2013 saw the publication of the Public Service Stability Agreement 2013-2016 commonly known as the Haddington Road Agreement. (HRA).

Under this agreement, further sustainable reform measures were outlined for implementation in the following areas: cuts in annual leave and pay arrangements, redeployment, performance management, flexible working arrangements, work-sharing arrangements and workforce restructuring.

RPII union members voted to accept the terms of the HRA, and the agreement was implemented as appropriate in the RPII for all staff.

As a result of the agreement, changes were introduced by the RPII's HR team in each of the areas outlined above.

- Staff pay was cut and annual leave reduced. The extent of these cuts varied depending on payscales and leave allowances.

- Where a vacancy at Clerical Officer arose, the redeployment process was adopted, thereby providing the opportunity to transfer an existing civil servant to the RPII staff. This saved in recruitment costs and contributed to the alleviation of staff numbers in the civil service.
- The performance management system, already functioning well in the RPII, was amended to allow for a formalised annual review of work-sharing arrangements. This provides additional management information that underpins the tight staff resource allocation in the RPII.
- Arrangements were put in place to extend the working day and introduce limits on flexible working arrangements. This means that staff now work a longer day, and where they work extra hours in order to meet demands, they are more limited in the extent to which they can "claim back" that time as leave. This has the effect of staff delivering more hours of work every week.
- Work-sharing arrangements were already consistent with the requirements of the HRA so no changes were required.
- No specific workforce restructuring was undertaken in 2013. The reason for this was that the RPII is in the middle of a merger with the EPA, which of itself will result in workforce restructuring. It is envisaged that a new workforce plan for the merged organisation will take account of the HRA requirements.

The RPII submitted an Integrated Reform Delivery Plan to the Department of Public Expenditure and Reform, setting out plans and progress towards achieving the reform agenda across a range of thematic areas. Significant in this is the contribution that the merger with EPA will make to reducing duplicated costs, availing of synergies arising and sharing knowledge and expertise to deliver more as a merged organisation than that achievable by our separate organisations.

Our governance (continued)

The measures outlined above have resulted in staff delivering more for less and a consequent reduction in resource costs; however, in a small agency, it is difficult to observe the increased outputs that are generated by these changes. This is particularly the case in the RPII as the workforce was already under significant pressure to deliver on its functions, following the cuts to staff numbers that arose from the moratorium on recruitment that had been in place since 2010.

Members of the Board

The board met seven times during the year. The number of meetings attended by each board member is shown below, with the number in brackets indicating the number of meetings the member in question was eligible to attend. Also shown are the names of the nominating person/organisation and the dates of first appointment.

Name	Nominated by	Date of first appointment	Meetings attended 2013
Professor Willie Reville, <i>Chairman</i>	Minister for the Environment, Community & Local Government	January 2012	7(7)
Dr. Patricia Cunningham	Medical Council	February 2012	7(7)
Dr Maurice Fitzgerald	Dental Council	July 2008	5(7)
Mr James Fitzmaurice	Minister for the Environment, Community & Local Government	April 2002	6(7)
Mr Patrick Gilligan	Association of Physical Scientists in Medicine	August 2006	6(7)
Dr Paraic James	Minister for the Environment, Community & Local Government	January 2012	1(7)
Dr Kevin Kelleher	HSE	September 2007	7(7)
Ms Darina Muckian	Minister for the Environment, Community & Local Government	April 1997	6(7)
Mr John O'Dea	Minister for the Environment, Community & Local Government	November 2009	5(7)
Ms Adi Roche	Minister for the Environment, Community & Local Government	June 1997	4(7)
Dr Stephanie Ryan	Faculty of Radiologists RCSI	July 2010	4(7)



Professor Willie Reville (Chairman)

Professor Reville was appointed RPII Board Chairman in 2011. Professor Reville was a founding board member of the RPII in 1991 and served on the board for seven years. He is Emeritus Professor of Biochemistry at University College Cork (UCC), where he has worked since 1975. He was the University Radiation Protection Officer at UCC from 1978 to 2011. He has served on two other national boards: The Irish Council for Science, Technology and Innovation and the board of the Dublin Institute for Advanced Studies.

Professor Reville's research work on muscle biochemistry and electron microscopy has been widely published. He is well known as a science columnist with The Irish Times. He also is Public Awareness of Science Officer at UCC, where he organises the annual Science Public Lecture Series.

Dr Patricia Cunningham

Dr Cunningham is a consultant radiologist in Our Lady's Hospital, Navan, and Our Lady of Lourdes Hospital, Drogheda.

Dr Maurice Fitzgerald

Dr FitzGerald qualified from UCC in 1989 and works as a general dental practitioner in Sligo. He received an MSc in Dental Radiology in 2000 from the University of London, and he serves on the board of the RPII as the nominee of the Dental Council.

Mr James Fitzmaurice

Appointed to the board in 2002, Mr Fitzmaurice is Chairman of the RPII's Communications Advisory Committee. He also serves on the Audit Committee. He is the Managing Director of the Bradan Publishing Group, which publishes Public Sector Times and various local newspapers. He is a member of the Chartered Institute of Journalists and holds a degree in management, BA (Mgmt), and an MBA. Positions he has previously held include Chairman of the Irish Small and Medium Enterprises Association (ISME); President of Bray Chamber of Commerce and Chairman of the Irish e-Government Awards. He has served on many small business taskforces and committees, as well as being a long-term member of the Wicklow County Council's Strategic Policy Committee on Environment and Waste.

Mr Patrick Gilligan

Appointed to the board in 2006, Mr Gilligan is a principal physicist providing radiation protection services and medical physics expertise to the Mater Private Hospital. He is a past chairman of the Association of Physical Sciences in Medicine and is a member of the Medical Council's Medical Ionising Radiation Committee.

Dr Paraic James

Dr James is a senior lecturer in the School of Chemical Sciences at Dublin City University. He is a graduate of NUIG where he received his BSc and PhD degrees.

Dr Kevin Kelleher

Appointed to the board in 2007, Dr Kelleher is Assistant National Director Population Health-Health Protection, managing the public health services for the HSE. He has a strong interest in environmental impacts on human health.

Ms Darina Muckian

Appointed to the board in 1997, Ms Muckian is a physics graduate, She has more than ten years' engineering experience in electronics and software industries and has campaigned on environmental issues.

Mr John O'Dea

Mr John O'Dea was appointed to the board in 2009 having worked as a teacher/lecturer of Physics, Environmental Science and Education. He has published in the areas of radiation both academically and for the general public. He has had a long involvement in social and cultural activities including periods as Chairperson of Sligo Campaign for Nuclear Disarmament (CND), Sligo Arts Festival and The Model Arts Centre.

Ms Adi Roche

Appointed to the board in 1997, Ms Roche is the Founder/CEO, Chernobyl Children International, the leading international children's organisation with UN NGO status, providing medical, humanitarian, social and educational programmes across the Chernobyl regions. She holds many prestigious international humanitarian awards and honorary doctorates, is a prolific author, and has produced several television documentaries on Chernobyl.

Dr Stephanie Ryan

Dr Stephanie Ryan was appointed to the board in 2010. Dr Ryan is a radiologist in the Children's University Hospital, Temple Street, Dublin. She is also a member of the Faculty of Radiologists, and she is a committee member of the Medical Ionising Radiation Committee of the Medical Council.

Staff Structure



Ann McGarry
CHIEF EXECUTIVE



Tom Ryan
Director
Regulation and Information
Management



David Pollard
Director
Radon and Finance



Ciara McMahon
Director
Environmental Surveillance
and Assessment



Barbara Rafferty
Director
Corporate Development



The RPII team of 2013

Sarah Baker	Eileen Hayden	Máirín O'Colmain
Bella Bolger	Kevin Kelleher	Catherine Organo
Olivia Cluskey	Marie Kelly	David Pollard
Linda Coyne	Tanya Kenny	Sheila Powell
Noeleen Cunningham	Pamela Lennon	Barbara Rafferty
Ashley Curran	Stephanie Long	Tom Ryan
Lorraine Currivan	Ann Lyng	Catherine Scully
David Dawson	Jack Madden	Amy Sheridan
Lucy Doody	Ciara Maguire	Veronica Smith
Jarlath Duffy	Ann McGarry	Killian Smith
Stephen Fennell	Paul McGinnity	Stephen Somerville
David Fenton	Alison Dowdall	David Spain
Paul Fitzgerald	Leo McKittrick	Hugh Synnott
Rachel Flynn	Ciara McMahon	Rose Timmins
Glenda Griffin	Michael Murray	Sharon Wade
Olwyn Hanley	Collette O'Connor	Jennie Wong

Comptroller and Auditor General

Report for presentation to the Houses of the Oireachtas

I have audited the financial statements of the Radiological Protection Institute of Ireland (now dissolved) for the year ended 31 December 2013 under the Radiological Protection (Miscellaneous Provisions) Act 2014. The financial statements which have been prepared under accounting policies set out therein, comprise the statement of accounting policies, the income and expenditure account, the statement of total recognised gains and losses, the balance sheet and the related notes. The financial statements have been prepared in the form prescribed under Section 16 of the Radiological Protection Act 1991 and in accordance with generally accepted accounting practice in Ireland.

Responsibilities of the Institute and of the Environmental Protection Agency

The Institute was responsible for the preparation of the financial statements, for ensuring that they give a true and fair view of the state of the Institute's affairs and of its income and expenditure, and for ensuring the regularity of transactions.

The Institute was dissolved on 1 August 2014 and its assets and liabilities transferred to the Environmental Protection Agency, as outlined in the statement of accounting policies.

Following dissolution of the Institute, the Environmental Protection Agency is responsible for the preparation of the financial statements in accordance with Section 11 of the Radiological Protection (Miscellaneous Provisions) Act 2014.

Responsibilities of the Comptroller and Auditor General

My responsibility is to audit the financial statements and report them in accordance with applicable law.

My audit is conducted by reference to the special considerations which attach to State bodies in relation to their management and operation.

My audit is carried out in accordance with the International Standards on Auditing (UK and Ireland) and in compliance with the Auditing Practices Board's ethical Standards for Auditors.

Scope of audit of the financial statements

An audit involves obtaining evidence about the amounts and disclosures in the financial statements, sufficient to give reasonable assurance that the financial statements are

free from material misstatement, whether caused by fraud or error. This includes an assessment of

- whether the accounting policies are appropriate to the Institute's circumstances, and have been consistently applied and adequately disclosed
- the reasonableness of significant accounting estimates made in the preparation of the financial statements, and
- the overall presentation of the financial statements.

I also seek to obtain evidence about the regularity of financial transactions in the course of audit.

Opinion on the financial statements

In my opinion, the financial statements, which have been properly prepared in accordance with generally accepted accounting practice in Ireland, give a true and fair view of the state of the Institute's affairs at 31 December 2013 and of its income and expenditure for 2013.


In my opinion, proper books of account have been kept by the Institute. The financial statements are in agreement with the books of account.

Matters on which I report by exception

I report by exception if

- I have not received all the information and explanations I required for my audit, or
- my audit noted any material instance where money has not been applied for the purposes intended or where the transactions did not conform to the authorities governing them, or
- the statement on internal financial control does not reflect the Institute's compliance with the Code of Practice for the Governance of State Bodies, or
- I find there are other material matters relating to the manner in which public business has been conducted.

I have nothing to report in regard to those matters upon which reporting is by exception.



Patricia Sheehan

For and on behalf of the Comptroller and Auditor General

22 December 2014

Statement on Internal Financial Controls

As provided by the Radiological Protection (Miscellaneous Provisions) Act 2014 the Radiological Protection Institute of Ireland was dissolved on the 1 August 2014 and all assets, liabilities and staff transferred to the Environmental Protection Agency. Up to the date of dissolution the Radiological Protection Institute of Ireland was responsible for reviewing and ensuring the effectiveness of the Radiological Protection Institute of Ireland's system of internal Finance control.

I as Director General of the Environmental Protection Agency make the following statements based on the work of both the Chairperson and the former Chief Executive of the Radiological Protection Institute of Ireland, who is now a member of the Environmental Protection Agency Board.

During the period 1 January 2013 to 31 December 2013 the Board of the Radiological Protection Institute of Ireland was responsible for reviewing and ensuring the effectiveness of the organisations system of internal financial control.

The system of internal financial controls can provide only reasonable and not absolute assurance that assets are safeguarded, transactions are authorised and properly recorded, and that material errors or irregularities are either prevented or would be detected and rectified in a timely manner.

Key Procedures to Provide Effective Internal Financial Control

i) The Board of the Radiological Protection Institute of Ireland had taken steps to ensure an appropriate control environment within the Radiological Protection Institute of Ireland by:

- Publishing the RPII Strategy Statement 2011-2013. This Strategy covers the period to 2013 and sets out the RPII's organisational goals. Implementation of the Strategy is monitored and reported to the Board of the RPII on a periodic basis.
- Agreeing a detailed work programme for each year and monitoring and evaluating progress against the work programme on a regular basis.
- Holding regular Board meetings and monthly management meetings where the agenda includes strategic issues such as Corporate Governance and Financial Management.

- Adopting a set of financial procedures to control the significant financial elements of the RPII's business and publishing these in the Employee Handbook.
 - Maintaining a comprehensive schedule of insurances to protect the RPII's interests.
 - Establishing an Internal Audit Committee, and appointment of an internal auditor as part of the on-going systematic review of the control environment and governance procedures within the RPII.
 - Establishing and operating a Risk Management Policy and Framework.
 - Clearly defining management responsibilities, delegating appropriate functions, and reviewing and approving key RPII policies and procedures.
 - Adopting a Code of Business Conduct for Directors and Staff in accordance with the requirements of the Code of Practice for the Governance of State Bodies.
 - Ensuring compliance with the Ethics in Public Office Acts requirements and Paragraph 21 of the First Schedule of the RPII Act 1991 relating to the Declaration and Disclosure of Interests.
- ii) During the period to the 31 December 2013 the Radiological Protection Institute of Ireland's Risk Registers were reviewed in accordance with the Radiological Protection Institute of Ireland's Risk Management Policy and a Corporate Risk Register was prepared.
- iii) The system on internal financial controls is based on a framework of regular management information, a system of delegation and accountability, a set of financial procedures, administrative procedures including segregation of duties. In particular it includes:
- A comprehensive budgeting system with an annual budget, which was reviewed and approved by the Board.
 - The assignment of budgets and budgetary authority and responsibility for specific functions to selected senior managers.
 - Restricting authority for authorising all payments of Radiological Protection Institute of Ireland's monies and applying limits to the amounts authorised.

Statement on Internal Financial Controls (continued)

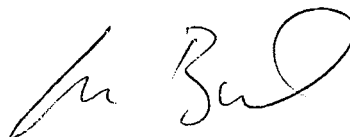
- Regular reviews by the Board of periodic and annual financial information and reports (including management accounts), which indicate financial performance against budgets.
 - A system of control on the overall approval of capital and consultancy contracts.
- iv) The financial implications of business risks were considered through the formal business risk assessment process and in the preparation of the Radiological Protection Institute of Ireland's Internal Audit Plans.
- Procedures were issued to control the significant financial elements of the Radiological Protection Institute of Ireland's business, and authorisation limits have been set by the Board for purchasing.
- v) The Radiological Protection Institute of Ireland's Audit Committee was comprised of three members of the Board and an external person with financial and audit expertise.

In November 2013 Deloitte conducted a review of the Internal Financial Controls with respect to the financial year 2013. There were no critical findings identified in this audit. This report was reviewed by the Radiological Protection Institute of Ireland's Audit Committee in February 2014 and subsequently approved by the Radiological Protection Institute of Ireland's Board.

Annual Review of Controls

The Radiological Protection Institute of Ireland conducted a review of the effectiveness of the system of internal controls in respect of the year ended 31 December 2013

Signed on behalf of the Board



Laura Burke
Director General (EPA)

16 December 2014

Statement of responsibilities of the Environmental Protection Agency

The Radiological Protection Institute of Ireland was established in 1992 in accordance with the Radiological Protection Act, 1991. The Radiological Protection Institute of Ireland was the national organisation with responsibility for ensuring that people and the environment in Ireland are protected from the harmful effects of ionising radiation. The Radiological Protection Institute of Ireland fulfilled its remit by providing strong and effective regulation of all those who use radiation sources and by working in partnership with other regulatory authorities. The Radiological Protection Institute of Ireland monitored people's exposure in Ireland to radiation from occupational and environmental sources. In addition, it provided advice to the public and the Government on radiation sources and on the corresponding risks and their management. The Radiological Protection Institute of Ireland had a central role in ensuring Ireland's emergency preparedness in the event of a nuclear accident abroad and was responsible for monitoring developments in relation to nuclear installations abroad.

The functions of the Radiological Protection Institute of Ireland included:

- 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 and 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 relevant to radiological safety.
- 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.

Responsibilities of the Environmental Protection Agency

The Radiological Protection Institute of Ireland was dissolved on the 1st of August 2014 under statutory instrument pursuant to the Radiological Protection (Miscellaneous Provisions) Act, 2014. On that day all of its functions together with its assets, liabilities and staff transferred to the Environmental Protection Agency.

The Environmental Protection Agency is required under Section 11 of the Radiological Protection (Miscellaneous Provisions) Act 2014 to prepare final accounts, which give a true and fair view of the Radiological Protection Institute of Ireland (now dissolved) and of its income and expenditure for the period. As a result, the Environmental Protection Agency is required to prepare accounts for the period 1 January 2013 to 31 December 2013 and the cessation accounts covering the period 1 January 2014 to 1 August 2014. The Environmental Protection Agency did not have any governance or operational responsibility for the Radiological Protection Institute of Ireland during the period of account.

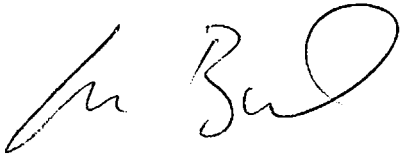
In preparing those financial statements the Environmental Protection Agency is required to:

- Select suitable accounting policies and then apply them consistently.
- Make judgements and estimates that are reasonable and prudent.
- Prepare the financial statements on the going concern basis.
- Disclose any material departures from applicable accounting standards.

Statement of responsibilities of the Environmental Protection Agency (continued)

The Environmental Protection Agency has complied with the above requirements in preparing the financial statements.

The Board of the Environmental Protection Agency approved the financial statements on 16 December 2014.



Laura Burke
Director General (EPA)



Dara Lynott
Board Member

16 December 2014

Statement of accounting policies

1. Basis of Accounting

Dissolution of the Radiological Protection Institute of Ireland

The Radiological Protection (Miscellaneous Provisions) Act 2014 provided for the dissolution of the Radiological Protection Institute of Ireland. As all the functions, operations, assets and liabilities of the Institute transferred to the Environmental Protection Agency on a going concern basis, the accounts have been prepared on a going concern basis.

The Financial Statements are prepared on an accruals basis, except as stated below, and under the historical cost convention, in accordance with generally accepted practice. Financial reporting standards recommended by the recognised accountancy bodies are adopted as they become applicable. The unit of currency in which the financial statements are denominated is the Euro.

Up to the date of dissolution the Environmental Protection Agency did not have any governance or operational responsibility for the Radiological Protection Institute of Ireland.

The Financial Statements are in the format approved by the Minister for the Environment, Community and Local Government with the consent of the Minister for Public Expenditure and Reform.

2. Income

Income shown in the Financial Statements under State grant represents actual cash receipts in the year.

Licence fees are recognised as income in line with the licence terms. Fees received in advance are recognised as income in advance.

3. Fixed Assets

Fixed Assets are stated at cost less accumulated depreciation. Cost includes the estimated cost of disposal of radioactive sources. Depreciation is calculated on a straight line basis by reference to the expected useful lives of the assets concerned. The rates are used as follows:

Office & Laboratory Furniture & Equipment: 20%

Leasehold Improvements are depreciated over the life of the lease.

4. Superannuation

The Radiological Protection Institute of Ireland operated a defined benefit pension scheme which is funded annually on a 'pay-as-you-go' basis from monies provided by the Minister for the Environment, Community and Local Government and from contributions deducted from staff salaries.

Pension costs reflect pension benefits earned by employees in the period and are shown net of staff pension contributions which are retained by the Institute. An amount corresponding to the pension charge is recognised as income to the extent that is recoverable, and offset by grants received in the year to discharge pension payments.

Actuarial gains or losses arising on scheme liabilities are reflected in the Statement of Total Recognised Gains and Losses and a corresponding adjustment is recognised in the amount recoverable from the Department of the Environment, Community and Local Government.

Pension liabilities represent the present value of future pension payments earned by staff to date. Deferred pension funding represents the corresponding asset to be recovered in future periods from the Department of the Environment, Community and Local Government.

All pension benefits, costs and liabilities arising and accruing from the Radiological Protection Institute of Ireland Pension Scheme transferred to the Environmental Protection Agency with effect from the 1st August 2014 in accordance with the transfer of members of staff of dissolved body provision of the Radiological Protection (Miscellaneous Provisions) Act 2014.

5. Capital Account

The Capital Account represents the unamortised amount of income used to purchase fixed assets.

6. Provision for Disposal of Radioactive Sources

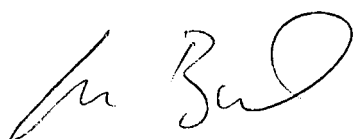
The Institute held a number of sources, some of which will be held for several years. It made a provision for the cost of the disposal of the material in the year in which it received new sources.

Income and Expenditure Account

for the year ended 31st December 2013

2012 €		Notes	2013 €
	INCOME		
3,499,000	State Grant	1a	3,283,859
961,512	Net Deferred Funding for Pensions	9b	1,166,538
263,301	Transfer from/(to) Capital Account	3	192,736
4,723,813			4,643,133
401,880	Dosimetry & Calibration Service	1c	49,286
145,317	Radon Measurement Service		130,815
337,497	Radiation Monitoring Service		275,018
768,640	Regulatory Service		769,419
25,506	Miscellaneous/Contract Income		16,496
1,678,840			1,241,034
6,402,653			5,884,167
	EXPENDITURE		
2,964,059	Salaries	5	2,860,403
1,389,422	Pension	9c	1,397,018
36,877	Dosimetry & Calibration Service	1c	5,145
55,432	Radon Measurement Service		30,567
117,382	Radiation Monitoring Service		119,646
77,613	Regulatory Service		57,579
188,703	Public Information & Communications		176,125
51,335	Nuclear Safety & Emergency Planning		31,267
66,162	Library & Document Management		48,825
600,210	Accommodation & Insurance		591,106
116,137	Travel & Subsistence		111,697
73,319	Recruitment & Training		44,202
58,914	MIS, IT & Customer Service		70,161
57,863	Postage, Phone & Office Supplies		49,071
11,515	Audit Fees		11,515
49,010	Professional Fees & Miscellaneous		32,023
571,768	Depreciation		392,736
15,112	Bad Debts		(3,503)
(850)	(Profit) on Disposal of Fixed Assets	1c	(45,490)
102,000	Provision for the disposal of radioactive sources	12	(33,343)
6,601,983			5,946,750
(199,330)	SURPLUS/(DEFICIT) FOR YEAR (Note 4)		(62,583)
691,375	Balance as at 1st January		492,045
492,045	Balance as at 31st December		429,462

The Statement of Accounting Policies and Notes 1 to 15 form part of these Financial Statements



Laura Burke
Director General (EPA)



Dara Lynott
Board Member

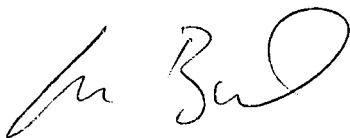
16 December 2014

Statement of Total Recognised Gains and Losses

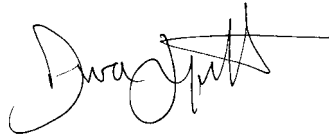
for the year ended 31st December 2013

2012 €		Notes	2013 €
(199,330)	Surplus/Deficit for year		(62,583)
(635,000)	Experience/Gains on pension scheme liabilities		(675,000)
3,475,000	Change in assumptions underlying the present value of pension scheme liabilities		(763,000)
2,840,000	Actuarial (Gain)/Losses on Pension Liabilities	9(f)	(1,438,000)
(2,840,000)	Adjustments to Deferred Pension Funding		1,438,000
(199,330)	Total recognised gain/(loss) for the year		(62,583)

The Statement of Accounting Policies and Notes 1 to 15 form part of these Financial Statements



Laura Burke
Director General (EPA)



Dara Lynott
Board Member

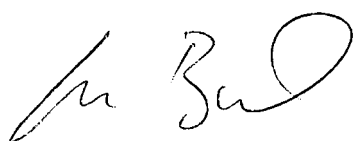
16 December 2014

Balance Sheet

as at 31st December 2013

2012 €		Notes	2013 €
1,025,862	FIXED ASSETS	2	766,255
	CURRENT ASSETS		
1,080,021	Cash on Hand & at Bank		1,280,988
351,208	Debtors	10	156,518
1,431,229			1,437,506
	CREDITORS - amounts falling due within one year		
258,138	Creditors	11	155,001
125,556	Provision for Disposal of Radioactive Sources	12	24,600
555,490	Income in advance	1(b)	761,572
-	Capital Grant in advance	13	66,871
939,184			1,008,044
492,045	NET CURRENT ASSETS		429,462
1,517,907	TOTAL ASSETS LESS CURRENT LIABILITIES		1,195,717
23,075,603	Deferred Pension Funding	9(d)	22,805,141
(23,075,603)	Pension Liability	9(e)	(22,805,141)
1,517,907	NET ASSETS		1,195,717
	Financed by:		
492,045	Income and Expenditure Account	4	429,462
1,025,862	Capital Account	3	766,255
1,517,907			1,195,717

The Statement of Accounting Policies and Notes 1 to 15 form part of these Financial Statements



Laura Burke
Director General (EPA)



Dara Lynott
Board Member

16 December 2014

Notes to the Financial Statements

for the year ended 31st December 2013

1. Income

(a) State Grant

The Oireachtas Grant is provided under section 15 of the Radiological Protection Act, 1991. The amount of the grant received for administration from the Department of Environment, Community and Local Government under subhead C.4 was €2,205,859 (2012 €2,421,000).

An amount of €1,078,000 (2012 €1,078,000) was received from the Environment Fund.

(b) Income in Advance

Income in advance includes the portion of licence fees received that relates to the unexpired term of the licences at year-end. The licence fees are brought to income on a monthly basis as the licence term expires. Income in advance will be brought to account in the years 2014-2016 as shown below.

	€
2014	541,676
2015	151,199
2016	51,112
	<hr/> 743,987

It also includes income in relation to an EU funded project called PREPARE of which RPII is a participant. The income is being recognised over the life of the project which runs to January 2016.

	€
2014	8,441
2015	8,441
2016	703
	<hr/> 17,585

(c) Dosimetry and Calibration Service

The RPII closed its dosimetry service in December 2012. Final invoices for this service were issued in January 2013.

The profit on disposal of €45,490 disclosed in the Income and Expenditure Account arose from the sale of the dosimetry equipment.

Notes to the Financial Statements (continued)

2. Fixed Assets

	Leasehold Improvements €	Office and Laboratory Furniture and Equipment €	Total €
Cost:			
At 1 January 2013	788,301	7,807,692	8,595,993
Additions	-	133,129	133,129
Disposals *	-	(2,560,058)	(2,560,058)
At 31 December 2013	788,301	5,380,763	6,169,064
Depreciation:			
At 1 January 2013	634,628	6,935,503	7,570,131
Charge for year	25,617	367,119	392,736
On disposals		(2,560,058)	(2,560,058)
At 31 December 2013	660,245	4,742,564	5,402,809
Net Book Value at			
31 December 2013	128,056	638,199	766,255
Net Book Value at			
31 December 2012	153,673	872,189	1,025,862

A stocktake was undertaken in 2013 which has resulted in all obsolete items being removed from the Fixed Asset Register. These Fixed Assets had a zero net book value.

3. Capital Account

	2013 €	2013 €	2012 €	2012 €
Balance at 1 January 2013		1,025,862		1,289,163
Allocated to acquire fixed assets	200,000		308,467	
Amortised in line with depreciation	(392,736)		(571,768)	
Transfer (to) Income & Expenditure Account		(192,736)		(263,301)
Transfer from/(to) Capital Grant in Advance (Note 13)		(66,871)		-
		766,255		1,025,862

4. Accumulated Surplus

	2013 €	2012 €
Balance at 1 January 2013	492,045	691,375
Surplus/(Deficit) for the Year	(62,583)	(199,330)
Balance at 31 December 2013	429,462	492,045

The Board approved essential expenditure during 2013 which resulted in a planned deficit for 2013.

5. Salaries and Pensions

	2013 €	2012 €
Gross Salaries	2,715,440	2,820,644
Employers P.R.S.I.	144,963	143,415
	2,860,403	2,964,059

The CEO received salary payments of €141,114 in 2013 (2012 - €145,952). The CEO received recoupment of travel and subsistence expenses of €11,268 in 2013. The CEO is a member of an unfunded defined benefit public sector scheme and her pension entitlements do not extend beyond the standard entitlements in the public sector defined benefit superannuation scheme.

€180,970 was deducted from staff by way of pension levy and was paid over to the Department of the Environment, Community and Local Government.

The average number of full-time persons employed, excluding Board members, in the financial year was 46 (2012 - 46).

6. Commitments & Lease Obligations - operating leases

3 Clonskeagh Square

Lease commitments payable in the next twelve months amount to €300,000 on the basis of current rental rates and comprise rental payments on a leasehold interest, the term of which expires on 1 October 2018. The rental is subject to review at five-yearly intervals. The next review is 1 October 2018.

1 Clonskeagh Square

Lease commitments payable in the next twelve months amount to €140,000 on the basis of current rental rates and comprise rental payments on a 20 year leasehold interest. The rent is subject to review at five-yearly intervals. The next review is in 2018.

7. Capital Commitments

The value of capital commitments authorised at 31 December 2013 amounted to €0.

Notes to the Financial Statements (continued)

8. Board Members' Interests

The Board adopted procedures in accordance with guidelines issued by the Department of Public Expenditure and Reform in relation to the disclosure of interests by Board members and these procedures have been adhered to in the year. There were no transactions of any significance in the year in relation to the Institute's activities in which the Board members had any beneficial interest. A breakdown of Board members' fees paid during 2013 is as follows:

	€		€
Professor W. Reville (Chairman)	11,970	Ms D Muckian	7,695
Mr M Fitzgerald	7,695	Ms A Roche	7,695
Mr J Fitzmaurice	7,695	Mr P Gilligan	7,695
Mr J O'Dea	5,771		
Dr S Ryan	6,525		

Travel and subsistence expenses incurred by Board Members during 2013 amounted to €8,602.

9. Pensions

(a) Pension Scheme

The disclosures below have been prepared for the Radiological Protection Institute of Ireland (RPII) in relation to benefits payable from the Radiological Protection Institute of Ireland Superannuation Scheme ("the Scheme").

The Scheme is a defined benefit type, providing retirement benefits based on final salary, in accordance with the Public Sector model rules. The Scheme is funded annually on a pay as you go basis from monies provided by the Minister for the Environment, Community and Local Government and from contributions deducted from staff salaries.

The valuation used for FRS17 disclosures has been based on a full assessment of the liabilities of the Scheme as at 31 December 2013. The present values of the defined benefit obligation, the related service costs and any past service costs were measured using the projected unit credit method.

The principal assumptions used by independent qualified actuaries to calculate the liabilities under FRS17 are set out below:

	At year-end 31/12/13	At year-end 31/12/12	At year-end 31/12/11
Discount rate	3.75%	3.75%	5.30%
Inflation assumption	2.00%	2.00%	2.00%
Future Salary Increases	3.00%	3.00%	3.25%
Future Pension Increases	2.50%	2.75%	3.25%

(b) Net Deferred Funding for Pensions in Year

	Year to 31/12/13 €'000s	Year to 31/12/12 €'000s	Year to 31/12/11 €'000s
Funding Recoverable in respect of Current Year			
Pension Costs	1,588	1,574	1,523
State Grant Applied to Pay Pensions and Gratuities	(421)	(612)	(389)
	1,167	962	1,134

9. Pensions (continued)

(c) Analysis of Total Pension Costs Charged to Expenditure

	Year to 31/12/13 €'000s	Year to 31/12/12 €'000s	Year to 31/12/11 €'000s
Current Service Cost	704	547	522
Interest Cost	884	1,027	1,001
Employee Contributions	(191)	(185)	(197)
Total Cost	1,397	1,389	1,326

(d) Deferred Funding Asset for Pensions

The RPII recognises amounts owing from the State for the unfunded deferred liability for pensions on the basis of a number of past events. These events include the statutory backing for the superannuation scheme, and the policy and practice in relation to funding public service pensions including the annual estimates process. While there is no formal agreement and therefore no guarantee regarding these specific amounts with the Department of Environment, Community and Local Government, the RPII has no evidence that this funding policy will not continue to progressively meet this amount in accordance with current practice. The deferred funding asset for pensions as at 31 December 2013 amount to €22,805 million (2012: €23,076 million).

(e) Movement in Net Pension Liability During the Financial Year

	Year to 31/12/13 €'000s	Year to 31/12/12 €'000s	Year to 31/12/11 €'000s
Net Pension Liability at 1st January	23,076	19,274	18,137
Current Service Cost	704	547	522
Interest Cost	884	1,027	1,001
Benefits paid in year,	(421)	(612)	(389)
Actuarial (gains)/losses on liabilities*	(1,438)	2,840	3
Past Service Costs			
Curtailments			
Settlements			
Net Pension Liability at 31 December	22,805	23,076	19,274

*includes impact of changes to the assumptions

(f) History of Experience Gains and Losses

	Year to 31/12/13 €'000s	Year to 31/12/12 €'000s	Year to 31/12/11 €'000s
Experience (gains)/losses on scheme liabilities amount:	(675)	(635)	(768)
As a percentage of the present value of scheme liabilities	(2.95%)	(2.75%)	(4.00%)
Total actuarial gains/(losses) recognised in STRGL	1,438	(2,840)	(3)
As a percentage of the present value of scheme liabilities	6.30%	(12.30%)	(0.00%)
Cumulative amount of gains/(losses) recognised in STRGL[^]	(2,359)	(3,797)	(957)

[^] represents cumulative gains/losses from 31/12/2002 inclusive

Notes to the Financial Statements (continued)

9. Pensions (continued)

The mortality assumptions are based on standard mortality tables which allow for future mortality improvements. The mortality basis explicitly allows for improvements in life expectancy over time, so that life expectancy at retirement will depend on the year in which a member attains retirement age (age 65 years). The table below show the life expectancy for members attaining age 65 in 2013 and 2033.

Year attaining age 65	2013	2033
Life expectancy - Male	87.5	90.0
Life expectancy - Female	88.9	91.0

10. Debtors

	2013 €	2012 €
Debtors for Services	48,092	138,108
Bad Debts Provision	(4,345)	(15,112)
Prepayments	112,771	228,212
	156,518	351,208

11. Creditors

	2013 €	2012 €
Creditors and Accruals	123,735	219,817
Revenue Commissioners	31,266	38,321
	155,001	258,138

12. Provision for disposal of radioactive sources

	2013 €	2012 €
Opening Provision	125,556	23,556
Utilised	(67,613)	
Provided		102,000
Over provision in Prior year	(33,343)	
Closing Provision	24,600	125,556

13. Capital grant in advance

This represents Capital Grants received in respect of projects that were not completed during the year:

	2013	2012
	€	€
Opening Balance at 1 January	-	-
Transfer (to)/from Capital Account	66,871	-
	66,871	-
This figure comprises:		
Capital Expenditure for the Year	(133,129)	-
Grant Received	200,000	-
	66,871	-

14. Merger of RPII and EPA

On the 1 August 2014 the Radiological Protection Institute of Ireland was dissolved and all assets, liabilities and functions of the RPII were transferred to the Environmental Protection Agency from that date in accordance with the legislation.

15. Approval of Financial Statements

The financial statements were approved by the Board on the 16 December 2014.

Abbreviations and acronyms

ADS	Approved Dosimetry System
AGR	Advanced Gas-cooled Reactors
ALARA	As low as reasonably achievable
ARGOS	Accident Reporting and Guiding Operational System
Bq/l	Becquerels per litre
Bq/m³	Becquerels per cubic metre
BSS	Euratom Basic Safety Standard
C&AG	Comptroller and Auditor General
CAC	Communications Advisory Committee
CBRN	Chemical-Biological-Radiological-Nuclear
ConvEx	Conventions (on International Notification and Assistance in the event of a nuclear accident) Exercise
CRPPH	Committee on Radiation Protection and Public Health
DECLG	Department of the Environment, Community & Local Government
EAN	European ALARA Network
ECURIE	European Community Urgent Radiological Information Exchange
EMERCON	Emergency Convention (IAEA emergency notification system)
ENSREG	European Nuclear Safety Regulators Group
EPA	Environmental Protection Agency
FANC	Federal Agency for Nuclear Control – Belgium
FSAI	Food Safety Authority of Ireland
GDA	Generic Design Assessment
GIS	Geographic Information System
HASS	High-Activity Sealed Sources
HERCA	Heads of European Radiation Competent Authorities
HSA	Health and Safety Authority
HSE	Health Service Executive
IAEA	International Atomic Energy Agency
IBCI	Irish Building Control Institute
IBEC	Irish Business and Employers Confederation
ICRP	International Commission on Radiological Protection
ICTU	Irish Congress of Trade Unions
INAB	Irish National Accreditation Board
IRAC	Ionising Radiation Advisory Committee
IUNI	Irish Universities Nutrition Alliance
LIMS	Laboratory Information Management System
LLWR	Low Level Waste Repository
MHRA	Medical and Healthcare products Regulatory Agency
MoU	Memorandum of Understanding
mSv	Millisievert
NCPU	National Crime Prevention Unit
NCRRP	National Centre of Radiology and Radiation Protection – Bulgaria
NDR	National Dose Register

NEA	Nuclear Energy Agency
NEA-WPNEM	NEA Working Party on Nuclear Emergency Matters
NEPNA	National Emergency Plan for Nuclear Accidents
NIEA	Northern Ireland Environment Agency
NPP	Nuclear Power Plant
NRCS	National Radon Control Strategy
NUIG	National University of Ireland, Galway
OECD	Organisation for Economic and Corporate Development
OECD	Organisation for Economic Cooperation and Development
OPW	Office of Public Works
OSPAR	Oslo-Paris Convention
PRA	Probabilistic Risk Assessment
PRMG	Personal Radiation Monitoring Group
RADPAR	Radon Prevention and Remediation
RPA	Radiation Protection Adviser
RPII	Radiological Protection Institute of Ireland
SI	Statutory Instrument
SMS	Safety Management System
UCD	University College Dublin
UK-BRE	UK Building Research Establishment
UK-DECC	UK Department of Energy and Climate Change
UK-EA	UK Environment Agency
UK-NDA	UK Nuclear Decommissioning Authority
UK-ONR	UK Office for Nuclear Regulation
UK-ONR	UK Office for Nuclear Regulation
UNSCEAR	UN Scientific Committee on the effects of Atomic Radiation

Dose limits and reference levels

The dose limit for a member of the public is 1 mSv in any 12-month period

The dose limit for radiation workers is 20 mSv in any 12-month period. Additional limits apply to exposure to specific parts of the body

The reference level for radon in homes is 200 Bq/m³

The reference level for radon in workplaces is 400 Bq/m³

The reference level for radon in schools is 200 Bq/m³



Radiological Protection Institute of Ireland

An Institiúid Éireannach um Chosaint Raideolaíoch

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