



# Annual Report & Accounts 2012



**Radiological Protection  
Institute of Ireland**

An Institiúid Éireannach um  
Chosaint Raideolaíoch

Radiological Protection Institute of Ireland

To the Minister for the Environment, Community and  
Local Government

In accordance with the requirements of the Radiological  
Protection Act, 1991, I have the honour to present  
the Annual Report and Statement of Accounts of the  
Radiological Protection Institute of Ireland for the year  
ended 31 December, 2012.



**Prof William Reville**  
*Chairman*

## **Mission Statement**

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

© 2013 Radiological Protection Institute of Ireland

Published by:  
Radiological Protection Institute of Ireland,  
3 Clonskeagh Square,  
Dublin 14.

Telephone: 01-2697766.  
[www.rpii.ie](http://www.rpii.ie)

This report is available in Irish at [www.rpii.ie](http://www.rpii.ie)

---

## Contents

Who we are and what we do	2
Strategic priorities for the RPII 2011-2013	3
Chairman's statement	4
Chief Executive's statement	6
Regulation and licensing	11
Exposure of the Irish population to radiation	21
Radiation measurement services	30
Emergency preparedness	34
National Radiation Monitoring Network	36
Safety of nuclear facilities abroad	38
Nuclear safety in the UK	40
Corporate Services	45
Our governance	52
Members of the board	54
Advisory Committees	56
Staff Structure	57
The RPII Team of 2012	58
Financial statements	59
Abbreviations and Acronyms	73

---

# 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 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, 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 focus on two important gaps in the 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.

# Chairman's statement



**I am pleased to introduce the Annual Report and Accounts of the Radiological Protection Institute of Ireland for 2012. During the year, RPII made substantial advances in each of the four priority areas set out in its strategic plan covering the period 2011 – 2013 and a number of highlights are recorded below. The most significant event for the organisation was the announcement by Government in early November that the RPII is to merge with the Environmental Protection Agency.**

The Minister has established a Merger Working Group to advance the merger of the RPII with the EPA. The Board welcomes the explicit inclusion in the Terms of Reference for this Group of the need *"to ensure that there is no diminution or perception of any diminution among stakeholders and the general public, as regards Ireland's commitment to either environmental or radiological protection, arising from the merger."* It is essential that steps are taken to ensure the concrete expression of this sentiment in the structures of the merged organisation so that the current high standards of radiological protection, high levels of public and stakeholder confidence and excellent international reputation enjoyed by the RPII is maintained.

In the transition to the merged organisation which is scheduled to come into being in mid-2014, the Board is committed to remaining focussed on RPII's core mission of *"ensuring that people in*

*Ireland are protected from the harmful effects of radiation"* and to advancing the effective integration of radiological protection into the merged organisation. In particular, the Board is working with the executive to ensure the establishment of an Office of Radiological Protection within the merged organisation.

Regulation of the safe and secure use of radioactive materials and X-ray equipment in medicine, industry and research is a core function of the RPII. As highlighted in RPII annual reports over many years, the lack of a national storage facility for disused radioactive sources has been a serious gap in the waste management infrastructure in Ireland. Following the endorsement by Government in 2010 of a national programme to reduce the number of unused and unwanted radioactive sources held by licensees, RPII in cooperation with other Government departments and agencies began implementation of a phased Inventory Reduction Programme. I am pleased to report that this programme has been extremely successful and that, by the end of 2012, the original inventory of over 3300 sources with half-lives greater than 10 years had been reduced to less than 300. Of particular note, and of satisfaction to me having been personally involved in the process, was the successful return of a shipment of 2.5 tonnes of natural uranium to the USA. This material had formed part of a sub-critical assembly used for

---

graduate and undergraduate training that had been donated to University College Cork by the USA in 1974/75 under the Atoms for Peace programme. Now that the inventory has been successfully reduced, the next step will be to establish a national radioactive waste store so that the remaining inventory can be held in safe storage pending final disposal.

A key objective for RPII is to enhance its regulatory system by taking a risk-based approach to authorisation. The adoption of such an approach will not only improve the effectiveness of the system but will also ensure that it is more sustainable against a background of reducing human and financial resources. During 2012 the model was developed and reviewed by a panel of international experts. The next phase before roll-out is the development of the IT infrastructure to support the system which is due to be progressed during 2013.

Radon is by far the greatest contributor to radiation exposure in Ireland, and is implicated in up to 200 of the 1500 lung cancers registered in Ireland each year. The realisation of a National Radon Control Strategy was brought closer during the year with the delivery in November of an interim report on its development to the Minister for the Environment, Community and Local Government. The report was prepared by an Interagency Group that includes all of the key government stakeholders with responsibility for elements of the radon issue and the recommendations contained therein are informed by extensive consultation with a broad range of stakeholders. Work on the finalisation of the Strategy was further advanced during 2013 and the Interagency Group is on schedule to present a final strategy for Government approval by the December 2013 deadline.

On my own behalf, and on behalf of the Board members, I wish to express my appreciation to all who have assisted us in reaching our goals this year. The partnership and cooperation is evident in the account

of the many activities published in this report. In particular I wish to thank all the staff of the RPII for their dedication and hard work, to acknowledge the positive response from staff to announcement of the merger with the EPA and their commitment to continuing the successful delivery of radiation safety nationally in the merged organisation. I also wish to thank the members of the Ionising Radiation Advisory Committee, the Audit Committee and the Communications Advisory Committee for giving of their time and expertise to assisting the RPII.

I wish to record the RPII's thanks to Ms Fionnuala Barker who retired from the Board during 2012. I welcome the re-appointment of Mr Paddy Gilligan, Ms Darina Muckian, Mr John O'Dea and Ms Adi Roche to June 2014 pending the merger.

Finally, I wish to record the RPII's appreciation for the support and encouragement received from the Minister for the Environment, Community and Local Government, Mr Phil Hogan, TD and Minister of State, Mr Fergus O'Dowd, TD. The RPII is also indebted to the officials of the Environmental Radiation Policy Section of the Department of the Environment, Community and Local Government and other officials in the Department for their cooperation at all times. The helpful collaboration of other government departments, third-level educational institutions, agencies and other external organisations with which the RPII has worked during 2012 is also gratefully acknowledged.



Prof William Reville  
Chairman



# Chief Executive's statement



**2012 was an important year for the RPII both in terms of advancing the protection of people living in Ireland from the harmful effects of ionising radiation and also for the future of the RPII itself.**

## Regulation and Licensing

Ensuring the safety and security of all sources of ionising radiation held throughout Ireland is a key objective for the RPII. For many years the RPII had identified the lack of a national policy on radioactive waste management, incorporating a national storage facility for disused radioactive sources, as a major risk to delivery of this objective. Following the adoption of a National Policy by Government in December 2010, the RPII together with other lead agencies and government departments, commenced a programme to reduce Ireland's inventory of disused radioactive sources and waste. The programme continued during 2012, and over the period, the inventory has been reduced from over 3300 disused sources to 282. The sources have been exported for disposal or recycling to authorised storage/disposal facilities in the UK, Germany and the USA. Ireland's progress in relation to this issue received a favourable review at the Fourth Review Meeting of the IAEA's Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management held in Vienna in May 2012.

At the end of 2012, 1707 licences were held across a range of sectors, including dental, medical, industrial, educational and veterinary. Forty new licences were issued during the year and 44 were closed, with most of this activity occurring in the dental sector. A new licence was issued to a private radiotherapy facility for the introduction of Cyberknife technology which allows more accurate targeting of radiotherapy treatments than standard radiotherapy.

Work continued during the year to develop a model that takes a risk-based approach to authorisation. As part of the validation process, a panel of international experts reviewed the new model over a two-day meeting in Dublin. The peer review panel deemed the model to be in line with current international recommendations and noted that it represented a major improvement on the existing arrangements in terms of long-term sustainability. A separate critical review of the regulatory business processes was also undertaken with the aim of improving their efficiency and effectiveness for licensees and staff alike. The improvements identified in this review will be implemented through the development of a new information management system and work on this will be advanced during 2013.

Some 165 inspections were completed during 2012, with inspection priorities focused on holders of radioactive waste and disused sources, holders of nuclear moisture density gauges, lightning preventors, underground show caves and non-destructive testing



---

companies. Licensees impacted by reduction from 150 mSv to 20 mSv in the dose limit to the lens of the eye for exposed workers recommended by the International Commission on Radiological Protection were also included. Three of the inspections were aimed at assessing the security provisions at licensees' premises and were undertaken jointly with officers of the National Crime Prevention Unit of An Garda Síochána. Four directions were issued to licensees during 2012 where the inspector considered there was a danger to persons arising from a source of ionising radiation. One direction related to improving the security aspects of the premises of a company in liquidation and the other three related to dental licensees where the equipment did not meet the criteria of acceptability set out in the RPII's Dental Code of Practice.

Overall the RPII was satisfied with the standards of radiation protection observed during inspections and full details are published annually in the series of reports entitled the *RPII Inspection and Licensing Activities and Annual Inspection Programme*.

Under national legislation, air operators are required to estimate the doses due to cosmic radiation to all their staff flying above 8000m. For 2012, the information received from 5 licensed air operators showed that 12,036 individual aircrew received estimated annual radiation doses above 1 mSv; an increase on previous years. Of these, 5315 received between 1 and 2 mSv, 6601 between 2 and 4 mSv and 120 received doses over 4 mSv. No aircrew received doses in excess of 6 mSv. While the total number of aircrew receiving doses is increasing year on year since 2003, the number receiving doses in excess of 2 mSv was lower in 2012 than in 2011.

During 2012 seven incidents of potential radiological consequence to workers or the public were reported by licensees to the RPII. The most significant concerned the inappropriate use of a DXA X-ray unit by a service engineer during routine servicing of the unit. The investigation identified that the engineer had routinely carried out scans on himself as part of the service in order to check the correct operation of the unit. While the doses were not significant, such exposure is not justified and a letter of censure was issued to the service company. All incidents were investigated by the licensee to the satisfaction of the RPII and none of these events resulted in any significant doses being received by either the operator or member of the public.

The EU is currently revising the 1996 Euratom Basic Safety Standards Directive. The proposed directive will incorporate and consolidate the provisions of five other items of European legislation that underpin the statutory framework for radiation protection in Europe. In 2012, the RPII completed an assessment of the draft directive and comments and suggestions were submitted as part of the EU Commission consultation process via the Department of the Environment, Community and Local Government.

## Exposure of the Irish population to radiation

On average a person in Ireland receives an annual dose of 3950  $\mu$ Sv from all sources of radiation, with the largest contribution of approximately 86% coming from natural sources, mainly from the accumulation of radon gas in homes.

During 2012 a key priority for the RPII was its work to support the inter-agency group established in November 2011 by the Minister for the Environment, Community and Local Government to develop a National Radon Control Strategy. As an input to the strategy, RPII conducted a comprehensive consultation process to gather the views of stakeholders that included the use of targeted qualitative questionnaires and a series of group workshops and one-to-one meetings. In all over 1000 comments were received from more than 160 individuals. In addition, RPII conducted a health economics evaluation of the different radon intervention strategies that might be applied in Ireland. An interim report was delivered to the Minister in November 2012 recommending measures in six policy areas including radon prevention in new buildings; use of property transactions to drive action on radon; raising awareness and encouraging action on radon; advice and information for individuals with high radon results; promoting confidence in radon services and reducing radon exposure in workplaces.

A second priority for the RPII on radon is to work in partnership with others to implement national initiatives on protecting people to exposure to radon. To this end, RPII worked with the Health and Safety Authority to assist their initiatives to address radon exposure in workplaces and with the Health Service Executive to raise awareness of radon as a public health issue. RPII also continued to support local authorities in implementing radon measurement and remediation programmes in social housing in

---

Galway and Castleblayney. By the end of 2012, radon measurements had been completed in approximately 54,000 homes with 7642 of these identified as having radon concentrations above the national reference level of 200 Bq/m<sup>3</sup>.

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 2012 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, excluding the short-term elevated levels arising in the aftermath of the nuclear accident at Fukushima in March 2011. 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 conducted targeted research programmes aimed at assessing the dose to the Irish population from natural radioactivity in food, from natural radioactivity in bottled water and from radioactivity in groundwater sources. Results from these projects are published on the RPII's website and will be included in the comprehensive report on Radiation Doses received by the Irish Population due to be published in late 2013.

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 directly monitored about 7000 individual workers. Of those monitored less than 2% recorded a dose above background level. In all cases the whole body doses were less than 6 mSv and the highest annual extremity dose was 38.1 mSv. These doses are considerably below the annual dose limits of 20mSv and 500 mSv for whole body and extremity exposure, respectively.

## Radiation Measurement Services

The RPII's laboratory provides dosimetry, 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 2012, the RPII's Dosimetry Service issued approximately 65,000 whole body dosimeters, 3200 extremity dosimeters and 330 neutron dosimeters. The number of wholebody dosimeters represented a decrease of 10,000 on the previous year, mainly due to a decrease in the dental sector due to a change in policy regarding the wearing of dosimeters by staff working in dental radiology. The Calibration Service tested 452 instruments for compliance with the relevant manufacturers' specification, an increase of 25% on the previous year. Radon measurements were completed in 2194 homes and 373 workplaces. While the number of workplace measurements is in line with previous years, there has been a falloff in the number of homes measured. In relation to analytical services, the RPII measured the radioactivity content in 1105 environmental samples and foodstuffs during the year. Certificates specifying the radioactivity content issued to exporters of Irish produce numbered 3874. This may be compared with 3893 in 2011 and 3198 in 2010, indicating that there has been little change in demand for this service in the last few years.

As already advised in RPII's 2011 Annual Report, from 2013 RPII will no longer be involved in the direct provision of dosimetry services but will take on a supervisory role in relation to other dosimetry services operating in Ireland. During 2012, customers were advised of the closure and were assisted throughout the year with the transfer to new services providers. In May, amending regulations were made establishing a new framework for the approval of dosimetry services operating in Ireland so as to ensure that they are appropriately quality-assured. RPII also developed the State's first National Dose Register to maintain information on dose distributions and trends for all occupationally exposed workers.

---

## Emergency Preparedness

The RPII's objective in this area is to strengthen its core emergency response capability while supporting national planning. During 2012, RPII completed a major upgrade of the ARGOS decision support system used to predict the potential health impact to the Irish population from nuclear accidents abroad as well as the consequences for the Irish food production and agriculture sector. Procedures for using the long-range air dispersion model were also updated. The existing international system for rapid notification and urgent exchange of information used by the EC was replaced during the year with a new web-based system – WebECURIE and RPII staff members were involved in three tests of the new system prior to launch.

RPII staff participated in four international emergency exercises organised by the International Atomic Energy Agency (ConvEx), four exercises organised by the European commission (ECURIE) and one test of the UK-Ireland Early Notification Agreement. RPII also participated in an emergency exercise of the national protocol for responding to CBRN incidents (malevolent Chemical-Biological-Radiological-Nuclear events).

In terms of support to the national emergency response capability, RPII staff provided training to Hazardous Material Fire Officers. They also contributed to an expert group established to prepare an Irish handbook aimed at providing assistance to the Irish public authorities 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.

## Safety of nuclear facilities abroad

Following the accident at the Fukushima Nuclear Power Plant in 2011, 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 focussed on the ability of the power plants to withstand extreme events such as those that occurred at Fukushima, i.e. initiating events such as earthquakes and tsunamis; 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 of the process and a staff member participated as a technical expert in the aspect of the review dealing with severe accident management and in the country peer review visits to the Netherlands and the UK. Overall the Stress Tests concluded that all countries have taken significant steps to improve the safety of their nuclear power plants and that significant measures to increase the robustness of plants had been decided or were being considered. Each country that participated in the Stress Test process prepared a National Action Plan showing the status of implementation of improvements and further follow-up is due to be undertaken during 2013. The individual country reports and National Action Plans, together with the ENSREG reports, are available on the ENSREG website, [www.ensreg.eu](http://www.ensreg.eu).

During 2012, 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. In late 2012, the DECLG published a summary of an assessment of the risks to Ireland from the Sellafield Site and the Low-level waste repository located near the site. The assessment was conducted by a team of independent, international nuclear experts. RPII provided technical support to the DECLG throughout the project and worked with the international experts to assess the environmental dispersion of radioactivity released from various accident scenarios. The assessment concluded that an accident at Sellafield or at the low-level waste repository would result in no observable health effects in Ireland, but that some severe incidents would have the potential to create significant socio-economic impacts.

---

Among the major developments in the UK's nuclear programme during 2012 was the closure of Magnox reactors at Oldbury in Gloucestershire and Wylfa in Wales. A second Magnox reactor at Wylfa is continuing in operation with an expected closure date of September 2014. 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. The final stage of decommissioning is site clearance which is expected to take about eight years.

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. Five sites earmarked for development are on the Irish Sea coast and RPII is undertaking an assessment of the likely impacts on the environment in Ireland which is to be published in 2013. A further development of interest to Ireland is the UK plan to develop a geological disposal facility by 2040 to accommodate high- and intermediate-level radioactive waste. The RPII will continue to monitor developments in relation to all aspects of the UK's nuclear programme and will provide information to the public and to Government on the potential impacts on Ireland.

## 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 2012, the RPII website received over 44,000 unique visitors with the most popular sections of the website being the aspects related to radon. In October RPII launched a mobile version of its website which proved to be popular with approximately 13% of all traffic to the website

accessed by this means. To improve awareness of radiation amongst school-children, RPII participated in a multimedia resource for second levels schools sponsoring a lesson on radioactivity. It also sponsored a segment on radon on the television programme Eco Eye which was broadcast in January 2013. Direct interaction with the public on radon was achieved through awareness campaigns carried out in two high radon areas, Kerry and Wexford. In all over 100,000 information packs were distributed to households and engagement with stakeholders including politicians, local authorities, media, community and business group and the public also formed part of the awareness activities.

As for all public sector organisation, continuing to deliver on the RPII's statutory functions against a background of reduced staff and financial resources remains challenging. Particular developments to address these challenges undertaken in 2012 include the development of a Workforce Plan and additional management development training.

Under the Government reform initiative aimed at reducing the number of state agencies, the merger of RPII with the EPA was announced in November 2012. The merger is due to take effect from June 2014 and work is underway to identify the actions needed to bring the two organisations together to create a strong scientific organisation that combines the expert resources and excellent reputations of both the RPII and the EPA.

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



## Regulation and licensing

**To ensure the safety and security of all sources of ionising radiation held throughout Ireland, the RPII operates a licensing system in accordance with its statutory obligations under the Radiological Protection Act, 1991. In addition to sources in everyday use, the RPII's licensing system applies to sources no longer in routine use and to radioactive waste.**

Since its establishment in 1992, the RPII has identified the lack of a national storage facility for disused radioactive sources as a serious gap in current waste management infrastructure. This has potential implications for safety and security, and the RPII has repeatedly called on successive governments to address this issue. In response to these concerns, in December 2010, the Government formally adopted a national policy on radioactive waste management for Ireland. One of its key initiatives is the reduction of Ireland's inventory of disused radioactive sources and waste, held by licensees at multiple locations throughout the country. This is to be achieved through a co-ordinated and phased Inventory Reduction Programme.

Radioactive sources can be categorised on the basis of their half-lives i.e., the time required for a source to decay to half of its current activity. The longer the half-life of a source, the longer it will take to decay to a level that is indistinguishable from natural background levels. At the beginning of 2011, the RPII estimated that there were over 3300 disused sources that had half-lives greater than ten years, and in some cases, up to billions of years. These were held by 63 licensees at various locations across Ireland. Under the Inventory Reduction Programme, lead agencies and government departments were identified to represent their various sectors, with the RPII leading the reduction programme in the private and state sectors.

During 2012, the RPII made four successful applications to the UK Environment Agency for transfrontier shipments of radioactive waste from licensees in Ireland to authorised storage/disposal facilities in the UK. This move allowed Irish licensees to send disused sources to the UK for final disposal. This was the first time that such applications had been granted by the UK to Ireland – a previous application in the mid-1990s had been unsuccessful. Disused radioactive sources were also sent to authorised facilities in Germany and the USA. Table 1 summarises the number of sealed and unsealed sources, including those with half-lives of less than ten years, which were exported from Ireland during 2011 and 2012.



**Table 1: Radioactive sources exported from Ireland during 2011 and 2012**

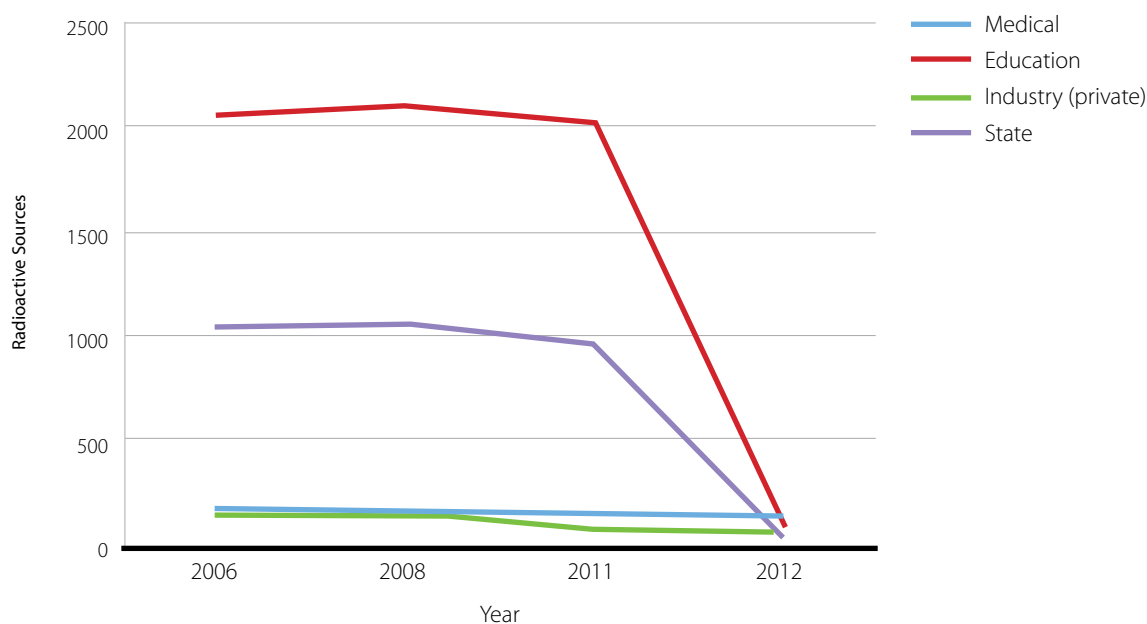
Sector	2011		2012	
	Sealed	Unsealed	Sealed	Unsealed
Education	8	98	1777	445
Medical	0	6	7	12
Industry	25	9	9	11
State	6	1	159	879
Total	39	114	1952	1347

The majority of sources exported during 2011 and 2012 originated in the third level educational sector. In 2011, the Department of Education and Skills announced that it would provide funding to third level institutions to meet the costs associated with the disposal of their disused radioactive sources and waste. This resulted in over 2200 sources being disposed of to authorised facilities overseas during 2012. The most significant source disposal involved the shipment of 2.5 tonnes of natural uranium, in the form of 1400 individual “slugs” (cylindrical rods of natural uranium encapsulated in an aluminium cladding). This material had formed part of a sub-critical assembly. It had been donated to a university by the USA in 1974/75 under the Atoms for Peace programme and had been used for graduate and undergraduate training until 1983, after which it was dismantled and put into secure storage.

Due to the nature of the material, it was subjected to regular inspection by inspectors from the RPII and from the International Atomic Energy Agency (IAEA) Safeguards Office. Several prior attempts were made to return the material to the USA during the intervening years without success. In 2012 a facility in the USA, authorised by the US Department of Energy, agreed to accept it and, during the summer, under the supervision of inspectors from the RPII and EU Safeguards Office, it was successfully returned to the USA.

In addition to the export of these 1400 natural uranium sources, almost 1000 disused sources held by a licensee in the state sector were shipped to the UK. Together, this represented a significant reduction in the national inventory of disused sources. Figure 1 clearly illustrates the substantial progress made on this initiative since 2008.

**Figure 1: Disused source inventory by sector (half-life > 10 yr)**



## IAEA Joint Convention

Ireland is a contracting party to the IAEA's Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management. The convention applies to spent fuel and radioactive waste, as well as to planned and controlled releases of radioactive material arising from civilian nuclear reactors. It also applies to the management of disused radioactive sources. In May 2012, the RPII participated in the Fourth Review Meeting of the Convention. At previous meetings, Ireland had been criticised by the IAEA for its failure to develop a national radioactive waste policy and for failing to establish a national storage facility for radioactive waste. At the 2012 meeting, Ireland was able to report that the Government had formally adopted a national radioactive waste management policy in 2010. In addition, the RPII provided a detailed overview of the inventory of disused sources in Ireland and the measures in place to ensure their safety and security. Ireland received a favourable review of its actions to deal with its waste problem. Moreover, the Irish Government's commitment to a national source reduction programme and the establishment of a national radioactive waste storage facility were cited as a model for other small, non-nuclear countries.

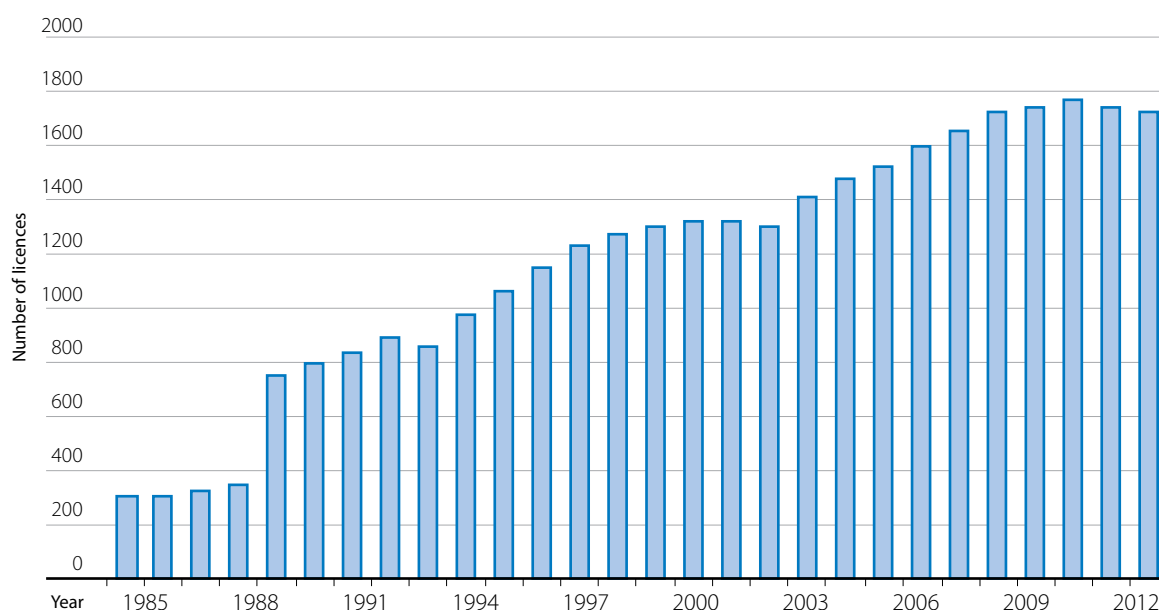
## Licensing

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 (the predecessor to the RPII), in 1977, the number of licences held has increased each year, though this has levelled off more recently (Figure 2). At the end of 2012, 1707 licences were held across a range of sectors, including dental, medical, industrial, educational and veterinary. Forty new licences were issued during the year— 24 of them to dental practices.

However, reflecting the continued downturn in the economy, 2012 also saw the closure of 44 licences, 30 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.

**A substantial reduction in Ireland's radioactive waste inventory was achieved, with particularly significant reductions in the education and state sectors.**

**Figure 2: The number of licences issued by the NEB/RPII 1985 - 2012**





The most notable licence application received during the year was from a private radiotherapy facility intending to introduce Cyberknife technology. This technology, the first of its type in Ireland, allows the targeting of radiotherapy treatments more accurately than standard radiotherapy. The radiation protection requirements of the bunker, in which the Cyberknife system would be located, posed significant design challenges for the facility, and the RPII liaised closely with the licensee to ensure that the RPII's design requirements would be met. It is expected that, following comprehensive commissioning and testing, the unit will commence clinical use in 2013.

During the year, the RPII undertook a critical review of its regulatory business processes with the aim of improving their efficiency and effectiveness for both licensees and its internal staff. This project was undertaken with the support of external business analysts. It identified improvements to the business processes, which, when implemented, will reduce the administrative workload for both licensees and RPII staff as well as improving the transparency of the RPII's regulatory activities. The implementation of these improved processes, which is consistent with the RPII's strategic priorities, will require the development of a new information management system, and work on this will progress in 2013.

## Risk-based authorisation

Work continued on a project to develop an authorisation model that takes a risk-based or graded approach to authorisation. The project looked at alternative licensing models, such as notification and registration, and their suitability for the applications of ionising radiation currently used in Ireland. Such a graded approach to authorisation would provide users with a more efficient and effective service. A project team produced proposals for a graded model to authorise the use of ionising radiation in Ireland, which would allow for the introduction of a tiered approach to regulation, commensurate with the risks and safety requirements.

As part of the validation process, a panel of international experts was invited to review the model over a two-day meeting in Dublin. The peer review panel deemed the model to be in line with current international recommendations in relation to a graded approach to authorisation, noting that such an approach is expected to become mandatory when

the revised Euratom Basic Safety Standards (BSS) Directive comes into force. Furthermore, the panel was of the view that the new model would be a major improvement on current arrangements in terms of long-term sustainability.

An overview of the model was presented at a meeting of HERCA (Heads of European Radiation Competent Authorities) in October. There it was noted that Ireland is ahead of most European countries in the development of such a model, with many countries seeking to share the RPII's experiences in this process.

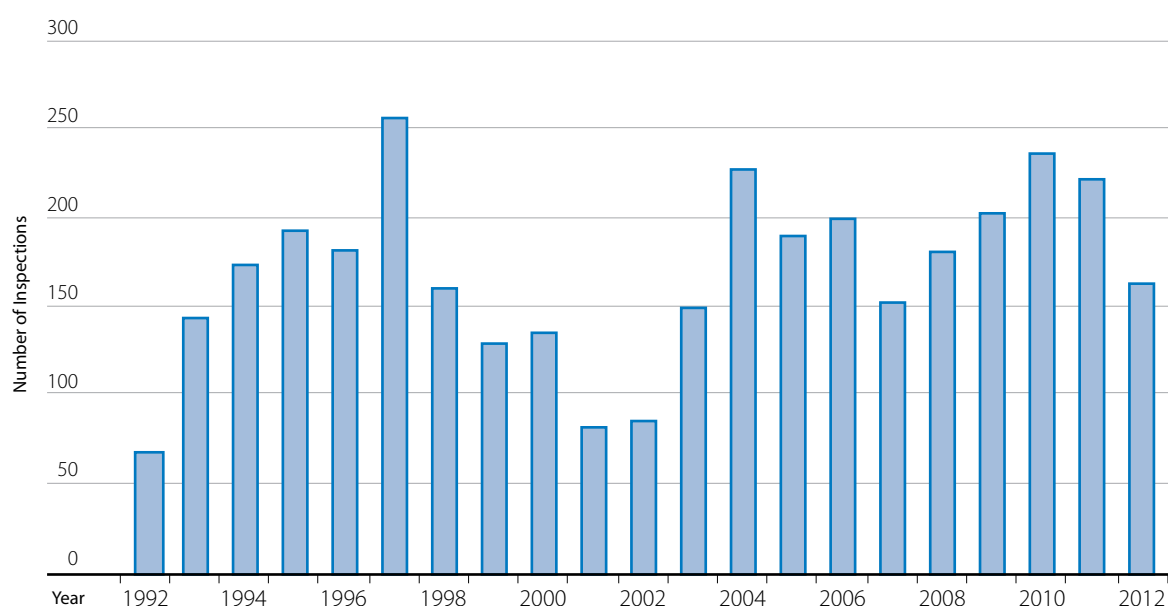
Ireland **led the way in Europe** by developing a risk-based approach to authorisation for the use of sources of ionising radiation. This graded approach, which received commendation at the October meeting of the **Heads of European Radiation Competent Authorities**, has potential to provide a more efficient and effective service for users.

## Inspection

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 165 inspections were completed in 2012. Figure 3 illustrates the number of inspections undertaken by the RPII each year from 1992 to 2012. Further details on the number of inspections undertaken in each licence category are provided in Table 2.

**Figure 3: Inspections undertaken by RPII (1992 to 2012)**



**Table 2: Inspections undertaken in 2012**

Licence Category	Number in Category	Number of completed inspections
Industrial	278	63
Medical	155	58
Distributors (sources & X-ray)	45	5
Dentists	946	12
Education/research	18	5
Vets	265	16
Security surveys (in conjunction with An Garda Síochána)	n/a	3
Others (aircrew, underground workplaces)	n/a	3
<b>TOTAL</b>	<b>1,707</b>	<b>165</b>

n/a = not applicable

The inspection programme priorities for 2012 focused on

- Holders of radioactive waste and disused sources;
- Holders of nuclear moisture density gauges;
- Lightning preventors;
- Underground show caves;
- Non-destructive testing companies; and
- Inspections intended to raise awareness of the new International Commission on Radiological Protection (ICRP) dose limits for the lens of the eye.

In 2011, the ICRP, on the basis of a review of epidemiological evidence, recommended that the annual dose limits for the lens of the eye should be reduced from 150 millisievert (mSv) to 20 mSv for exposed workers. This review had shown that there are some “tissue reaction effects” (cataract induction) with delayed onset (known as a “stochastic effect”) arising at doses lower than previously considered. However, until such time as national legislation is amended, compliance with this new dose limit cannot be enforced. Notwithstanding this, the RPII advocated a voluntary approach for compliance by its licensees and promoted the new dose limits during all relevant inspections of hospitals undertaking interventional and cardiac catheterisation work in diagnostic imaging

---

departments. The RPII was pleased to note that many hospitals had already commenced a dose reduction programme. These programmes encompass areas such as the views of stakeholders such as cardiologists and radiographers; dose awareness and education; the use of more accurate dosimeters to give a good insight into doses at the level of the eye; the provision of specific personal protective equipment and collaboration with national and international colleagues. In hospitals where such work had not commenced, the licensees were requested by inspectors to undertake a risk assessment to identify and quantify the number of workers and activities likely to be affected by the proposed new dose limit. The effectiveness of this approach and the lessons learned from it will be reviewed in mid-2013, by which time the final requirements of the revised BSS will likely be known.

## Directions

In the case of an inspector coming across a situation during an inspection where there is a danger to persons arising from a source of ionising radiation, they may issue a Direction to the licensee, ordering them to either cease carrying out an activity or alternatively, to put measures in place to prevent or alleviate the danger. During 2012, four occasions arose where a direction had to be issued. One Direction was given in the case of a company in liquidation, where, on the basis of advice provided by An Garda Síochána's National Crime Prevention Unit (NCPU), security aspects of the premises had to be strengthened to secure the storage location of seven radioactive sources. The remaining three Directions were given to three separate dental licensees, where equipment did not meet the criteria of acceptability set out in the RPII's Dental Code of Practice. One of these directions concerned a handheld dental X-ray unit, purchased via the internet. This unit was the subject of a report from the Health Protection Agency in the UK questioning its safety, as well as a Safety Notice from the Irish Medicines Board and a Medical Device Alert from the Medicines and Healthcare products Regulatory Agency (MHRA) in the UK. The licensee was directed to cease using the unit and to arrange for its disposal – the licensee immediately complied with the direction.

The RPII also received a licence application from a dentist based in the USA, looking to use an identical X-ray unit to provide a pop-up dental clinical on an island off the west coast of Ireland. This licence application was refused, and the dentist was advised to consider acquiring an alternative model of X-ray unit. Subsequently, the RPII wrote to all stakeholders in the dental sector, including all dental licensees, to

warn of the dangers of these types of units and to advise that it would not issue a licence for their use.

Overall, the RPII was satisfied with the standards of radiation protection observed during inspections. In March, the RPII published the RPII Inspection and Licensing Activities and *Annual Inspection Programme for 2012*. This report provided details of the functions and practices of the RPII's Regulatory Service, in line with a commitment in the Strategic Plan to enhance the transparency of the RPII's regulatory processes. This publication aimed to promote a better understanding of the processes and priorities associated with licensing and inspection that may impact on licensees and other interested parties.

## Accreditation 2012

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 international standard for inspection bodies. As part of the conditions to maintain this accreditation, each year INAB conducts an annual surveillance visit to assess the RPII's compliance with the standard and INAB regulations. In 2012, INAB witnessed RPII inspectors performing inspections in a nuclear medicine hospital department and in a facility that performs industrial radiography. INAB auditors noted that RPII inspectors were competent and professional and that the RPII continues to comply with the requirements of the standard, and they recommended that its accreditation should be retained for a further year.

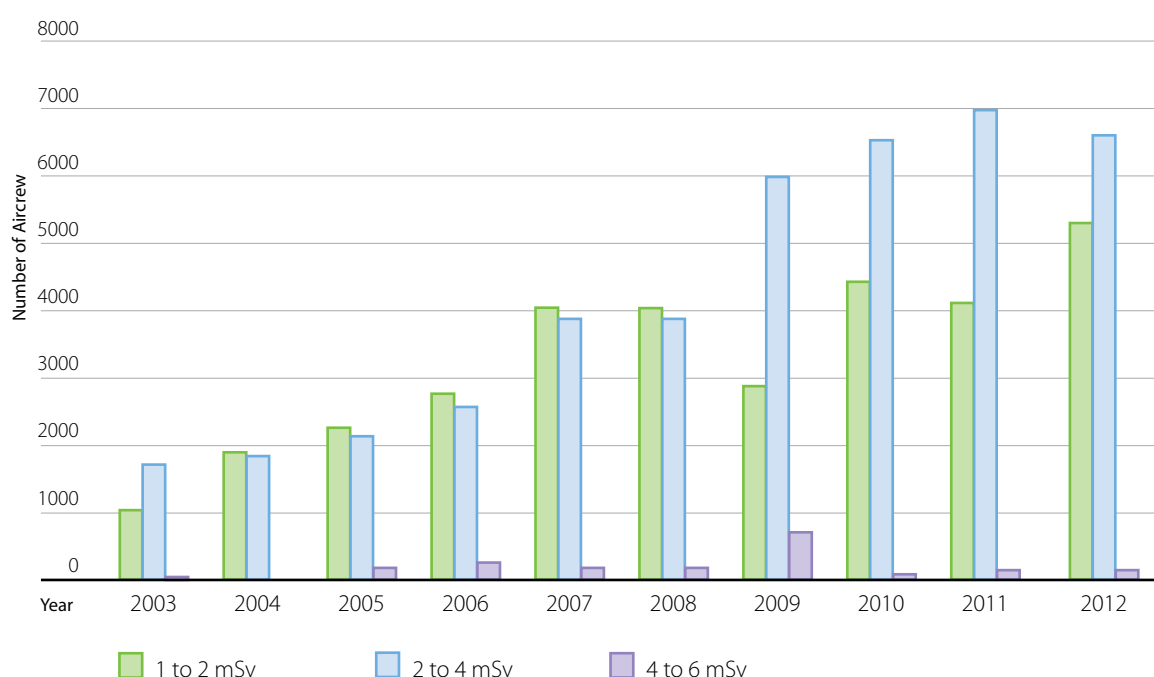
## Exposure to aircrew from cosmic radiation

The 1996 Euratom Basic Safety Standards Directive recognises aircrew as occupationally exposed workers due to their exposure to cosmic radiation while flying at altitude. S.I. No. 125 of 2000 requires the holder of an Irish air operator's certificate to evaluate cosmic radiation 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. Given the variation of the cosmic radiation dose with altitude above sea level, this effectively applies only to those air operators flying above 8000 m.

Cosmic radiation doses are estimated by the air operators using internationally recognised software models. For 2012, the information received from 5 licensed air operators showed that 12,036 individual aircrew received estimated annual radiation doses above 1 mSv. Of these, 5315 received between 1 and 2 mSv, while 6601 received doses between 2 and 4 mSv and 120 received doses over 4 mSv. No aircrew received doses in excess of 6 mSv.

There have been consistent yearly increases in the number of aircrew receiving cosmic radiation doses in excess of 1 mSv since reporting to the RPII commenced in 2003, as shown in Figure 4. This is attributed to an increasing public demand for air travel, resulting in new routes becoming available, more frequent flights on established routes and the associated increase in aircrew numbers required to operate these services.

**Figure 4: Number of aircrew receiving radiation doses greater than 1 mSv**



## 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 continued in 2012, assessing the security provisions at licensees' premises with a view to raising the standards to best international security practice. During the year, two specific security surveys of licensees were

undertaken jointly by officers of the NCPU and the RPII. In addition, three further security surveys of licensees holding disused sources were undertaken by the NCPU, in conjunction with locally based crime prevention officers. As a result of these inspections, a number of recommendations were made as to further improving the existing security arrangements. Officers from the NCPU also carried out some follow-up visits with licensees who had been the subject of security surveys in previous years to confirm the status of current security arrangements.

---

## 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 and 50 mSv over a 16-week period for a whole body dose and an extremity dose, respectively.

The RPII was notified of 11 such cases during the year, covering medical and industrial licensees. This figure compares with 14 in 2011. Seven of the 11 cases were reported from hospital cardiology departments (interventional radiology). The outcome of the investigations indicated that in all seven of these cases, whole body dosimeters were inadvertently worn by staff on the outside of a lead protective apron rather than underneath the apron, as required by the RPII. The RPII followed up on this finding during routine inspections and, where necessary, recommended a programme of internal auditing and refresher training.

Two industrial non-destructive testing companies also had reportable doses. Following investigations into each of the reported 11 cases, none was classified as a dose actually received by the wearer.

contaminated tissue removed from a patient during a surgical procedure. The most significant incident reported during the year concerned the inappropriate use of a DXA X-ray unit by a service engineer during a routine servicing of the unit. The investigation identified that the engineer had been routinely carrying out scans on himself, effectively self-prescribing, as part of the service in order to check the correct operation of the unit. While the doses received by the engineer were not significant, this was clearly an unjustified use of an X-ray unit, and a letter of censure was sent to the service company. The RPII subsequently brought this incident to the attention of all parties associated with installation, testing and use of this item and to Radiation Protection Advisers (RPA), advising them that this was not a justified activity.

Each incident was investigated by the licensee to the satisfaction of the RPII. While the investigation outcomes in all cases indicated that none of these events resulted in any significant doses being received by either the operator or members of the public, measures such as the introduction of refresher and on-going training for relevant staff in all aspects of radiation protection were put in place to prevent recurrences.

## 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 2012, six incidents were reported to the RPII. These included a minor spill of an unsealed radioactive substance in a laboratory; superficial damage to the outer casing of a nuclear medicine sealed calibration source; incorrect completion of transport documents for the return of a used brachytherapy source to a supplier and a failure to properly label radioactive

## Incidents in the medical sector

During the course of the year, the RPII was notified of a further five incidents in the medical sector. However, as four of these incidents concerned patients rather than staff, they were 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 S.I. No. 478 of 2002) errors in nuclear medicine (wrong injection type), radiotherapy (wrong treatment plan) and diagnostic imaging (patients referred in error for CT exams).

The one event that was reportable to the RPII concerned a fault in a bone densitometer X-ray system, where an unexpected exposure was detected during routine testing by medical physics staff. No patients were involved, and the estimated dose to the medical physicist was less than 1 microsievert ( $\mu$ Sv). The engineer's report indicated that it was most likely a single event occurrence due to localised cable damage, which was subsequently replaced.

The RPII highlighted safety concerns associated with a **handheld X-ray unit** in use in one existing dental practice and referenced in an application for another proposed dental facility. In both cases, the **RPII refused to grant a licence**. In addition, the RPII wrote to all stakeholders in the sector to warn of the dangers of these types of units.

## RPA Register

S.I. No. 125 of 2000 requires the RPII to establish and maintain a register of approved RPAs. During the year, two new applications were successfully approved. In March, the RPII began re-approving the first of the RPAs originally approved in 2007. The re-approval process requires an RPA to demonstrate to the RPII's assessment committee that they have kept their knowledge of the principles and practices of radiation protection up to date. Twenty-one applications for re-approval from the Category I register (medical, dental and veterinary) were received during the year. Seventeen applicants successfully met the requirements, while one applicant was not successful in renewing. The remaining three were requested to submit additional information and are under review. Three re-approval applications from the Category II (industrial and educational) register were also received, and all were successfully re-approved. At the end of 2012, there were 35 individuals on the RPII RPA register.

In March 2012, all approved RPAs were invited to attend the second 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. Topical issues discussed at the meeting included the development of the EU Basic Safety Standards and the newly proposed ICRP eye dose limit.

## Development of EU Basic Safety Standard

The European Commission is currently revising the 1996 Euratom Basic Safety Standards Directive. The proposed directive will incorporate and consolidate the provisions of five other items of European legislation that underpin the statutory framework for radiation protection in Europe. It will streamline the existing legislation and bring coherence to regulatory and protection measures for the public, workers and patients. The proposed directive will also bring European legislation into line with current scientific understanding, in particular with the main recommendations of the ICRP, and it will expand provisions for dealing with natural radiation sources.

This development provides Member States with an opportunity to reflect on the best ways to optimise radiation protection practice in Europe. However, a number of the new provisions will present a challenge to Member States in terms of implementation. In 2012, the RPII completed an assessment of the draft directive, which had been put out for consultation by the European Commission. Comments and suggestions were submitted via the Department of the Environment, Community and Local Government (DECLG) and tracked in subsequent drafts.

A stated ambition of Ireland's Presidency of the Council of the European Union from January to June 2013 is to work with Member States to reach political agreement in relation to the Euratom Basic Safety Standards Directive. In the latter half of 2012, the RPII worked with the DECLG in preparing for these negotiations and led technical discussions on specific issues where it was anticipated that reaching an agreement would not be straightforward.





---

## European ALARA Network Workshop

The European ALARA Network (EAN) was established in 1996 by the European Commission to further European research on topics dealing with the optimisation of all types of occupational exposure, as well as to facilitate the dissemination of good ALARA (as low as reasonably achievable) practices within all sectors of European industry and research. In September, the RPII hosted the 14th EAN Workshop in Dublin Castle. The workshop, which was held over two-and-a-half days, brought together 66 participants from 17 countries to consider how the ALARA principle can be applied to the whole range of existing exposure situations such as radon in homes; aircrew exposure to cosmic radiation; remediation of historically contaminated land and post-emergency situations. The workshop was officially opened by Mr Fergus O'Dowd TD, Minister of State at the Department of Communications, Energy and Natural Resources and the Environment, Community and Local Government. There were presentations from 24 speakers, including representatives from the ICRP; the International Atomic Energy Agency (IAEA); the European Commission and the OECD Nuclear Energy Agency. During the event, participants split into four working groups to discuss the practical application of ALARA to existing exposure situations. The recommendations from the workshop were approved by the Steering Committee of the EAN in December and have been published on its website ([www.eu-alara.net](http://www.eu-alara.net)).

## Inter-agency Co-operation

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, and during 2012, the RPII worked with the Department of Education and Skills, the Veterinary Council of Ireland, the Environmental Protection Agency, An Garda Síochána (National Crime Prevention Unit), the Revenue Commissioners (Customs), Dublin Port Authority, the Health and Safety Authority (HSA), the Northern Ireland Environment Agency (NIEA), the Irish Medicines Board, the Health Information Quality Authority, the Irish Dental Council, the Health Service Executive (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 impact the protection of people in Ireland. 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 Network, the European Radiation Protection Authorities Network and the Heads of Radiation Control Authority Network and the Atomic Questions Part of the European Commission. Staff from the Regulatory Service also participated in an IAEA expert mission to Rwanda. In addition, the RPII also hosted the Chief Radiation Protection Officer from the Mauritian regulatory authority for a one-week IAEA scientific placement.







## 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.

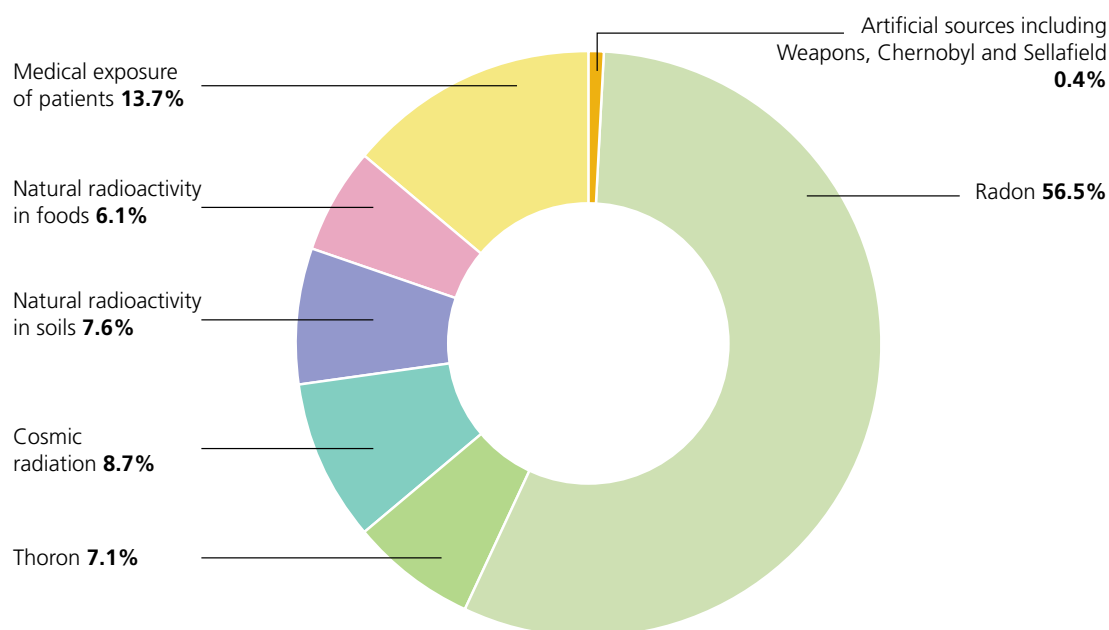
On average, a person in Ireland receives an annual dose of 3950  $\mu\text{Sv}$  from all sources of radiation. There can be a large variability in the dose received by individual members of the population from any given source. By far the largest contribution of approximately 86 per cent (3400  $\mu\text{Sv}$ ) comes from natural sources, mainly from the accumulation of radon gas in homes. Man-made radiation contributes approximately 14 per cent (550  $\mu\text{Sv}$ ), dominated by the beneficial use of radiation in medicine (540  $\mu\text{Sv}$ ). Doses from other man-made sources account for less than 1 per cent (15  $\mu\text{Sv}$ ). 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



## Radon measurement and awareness programme

Radon is the main source of radiation exposure to the Irish population, accounting for 56.5% of the total dose from all sources. It is a naturally occurring, radioactive gas that originates from the uranium present in all rocks and soils. Radon is linked to some 250 lung cancer cases each year, so it is a significant public health hazard.

The RPII's strategic objectives in relation to radon, as set out in its strategic plan 2011 – 2013, include

- Driving the development of a National Radon Control Strategy (NRCS) to reduce radon exposure in Irish homes and workplaces and
- Working in partnership with others to implement national initiatives on protecting people from exposure to radon.

To date, some **17,700 local authority homes have been measured for radon**. This continued work by local authorities is to be commended, as it addresses the risk to local authority tenants associated with high radon levels.

## National Radon Control Strategy

A key priority for RPII during the year was its work to support the inter-agency group established in November 2011 by Mr Phil Hogan, TD, Minister for the Environment, Community & Local Government, to develop the National Radon Control Strategy (NRCS). The inter-agency group continued its work during 2012 and delivered an interim report to the Minister according to schedule in November. The interim report sets out a draft national strategy, which recommends measures in the following six policy areas:

- Radon prevention in new buildings;
- Use of property transactions to drive action on radon;
- Raising awareness and encouraging action on radon;
- Advice and information for individuals with high radon results;
- Promoting confidence in radon services; and
- Reducing radon exposure in workplaces.

The RPII and HSE jointly **published an information leaflet on radon and health** for distribution to **all GPs by the Health Services Executive**.

The RPII completed two significant pieces of work in support of the development of the NRCS during 2012: a consultation process to gather the views of stakeholders on what needs to be done to address the radon problem and a health economics evaluation of different radon intervention options. Targeted qualitative questionnaires were issued to a wide range of individuals and organisations involved in healthcare, construction radon services, Government and academia. Over 1000 comments were received from more than 160 individuals, which were then classified into topic areas and analysed. This was followed by a series of group workshops and one-to-one meetings to further develop issues and recommendations coming from the questionnaires. The outputs from the public consultation were reported to the inter-agency group at different stages throughout the development of the draft strategy. Stakeholders suggested a wide range of actions to improve the implementation of preventive measures in new buildings and to encourage householders and employers to take action to address radon in existing buildings.

A health economics evaluation, exploring different radon intervention strategies that might be applied in Ireland, was undertaken using cost-effectiveness analysis. This is a tool widely used by health economists for evaluating a wide range of public health interventions. The cost-effectiveness model used was based on that described by the World Health Organisation. The work was undertaken with the assistance of the HSE and the Health Economics Unit at the University of Oxford, and the results of the evaluation were reported to the inter-agency group in September. Among the findings were that prevention in new buildings is the most cost-effective approach to dealing with radon; that prevention is justified in all parts of the country and that the cost-effectiveness of campaigns to address radon in existing buildings can be substantially improved by targeting high-risk areas.

## Engagement with other public bodies and local authorities

Under the Memorandum of Understanding between the RPII and the HSA, a joint working group was established to ensure a coordinated approach between the two organisations in dealing with radon in workplaces. Radon was raised in 160 HSA workplace inspections during 2012. To support the work of HSA inspectors, the RPII gave a presentation to the annual meeting of its Compliance Division in January. In addition, the RPII and HSA jointly met with IBEC and the ICTU to explain what was required under regulations governing radon in workplaces and to update them on the development of the NRCS. The HSA is represented on the inter-agency group developing the NRCS. A joint working group on radon has also been established with the HSE under the Memorandum of Understanding with that organisation.

Key outputs of the HSE/RPII radon working group during 2012 included:

- The involvement of health professionals as stakeholders in the development of a national radon control strategy (NRCS);
- The publication of a joint RPII/HSE information pamphlet on Radon and your Health and
- A mail-shot from the HSE to GPs on the public health risk from radon in Ireland.

The HSE also sits on the inter-agency group, tasked by Government to develop the NRCS.

The RPII addressed the Irish Building Control Institute (IBCI) on the development of the NRCS and used the occasion to encourage individual building control officers to input to the stakeholder consultation process. 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 that radon preventive measures in new buildings are implemented effectively.

The RPII continued to support local authorities in implementing radon measurement and remediation programmes in social housing, and, during 2012, the RPII worked with Galway County Council and Castleblayney Town Council to address radon in these areas. To date, approximately 17,700 radon measurements in local authority homes located throughout the country have been reported to the

RPII. Of these, just over 1050 or 6% of homes were found to be above the national reference level of 200 Bq/m<sup>3</sup>. All of these homes have been remediated or are in the process of being remediated by the local authority. This action by local authorities ensures that the risk to local authority tenants from high radon levels is eliminated. Furthermore, the local authority measurement programmes have provided the RPII with a range of valuable information on the radon problem in Ireland, including issues such as the success of remediation and the impact of building standards on indoor radon levels. This important information will feed directly into and support the development of the national radon strategy.

## Research and international activities on radon

The RPII continued its involvement in the European Commission-funded RADPAR (Radon Prevention and Remediation) project, which finished its work in 2012. One important output from this project was the development of a model to assess the cost-effectiveness of radon control strategies. The RADPAR model was used to compare the cost-effectiveness of the strategic options considered in developing the national radon control strategy for Ireland.

Under the IAEA's Technical Cooperation Programme, the RPII hosted a scientist from the National Centre of Radiology and Radiation Protection (NCRRP), Sofia, Bulgaria, for a one-week training programme on radon. This programme 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 NCRRP in the ongoing development of a national radon programme for Bulgaria.

During 2012, the RPII conducted a case study in collaboration with the UK Building Research Establishment (UK-BRE) on remediation of a house located in a karst limestone area, which had consistently recorded elevated radon levels despite a number of previous attempts to remediate. The house in question, which was built around the turn of the 20th century and was substantially renovated in the seventies, had suspended timber floors overlaying bare earth. It is generally recognised that houses of this type in karst areas are often difficult to remediate. This study demonstrated two important principles: firstly, in cases similar to this, subfloor pressurisation

is often the best remediation option, and, secondly, effective reduction can often be achieved with relatively low wattage fans. In this case, reduction was achieved with a 26-watt (W) fan. Previously, a 70 W fan was most commonly used in remediation.

The reduced power consumption has obvious benefits in energy conservation and cost reduction for householders.

The draft **National Radon Control Strategy for Ireland** was delivered to the **Minister in November 2012** and opened for public consultation in January 2013. Supporting this inter-agency exercise in 2012, the RPII undertook a consultation process to gather the views of stakeholders on solutions to the radon problem. In addition, the institute carried out a **health economics evaluation** of different radon intervention options.

## Radon measurement statistics

Table 3 summarises by county the radon measurements undertaken by the RPII since the early 1990s. Of the approximately 54,000 measurements completed by the end of 2012, some 11,300 were made as part of the National Radon Survey; the bulk of the remainder were fee-paying measurements. During 2012, a further 436 homes measured by the RPII were found to be have radon concentrations above the national reference level of 200 Bq/m<sup>3</sup>, and, of these, 67 had radon concentrations above 800 Bq/m<sup>3</sup>. The counties with the highest percentage of homes identified above the reference level were Sligo, Galway, Waterford and Carlow.

The National Radon Survey estimated that radon levels in 7% of the national housing stock have radon concentrations above 200 Bq/m<sup>3</sup>, which, when applied to the current housing stock, equates to approximately 110,000 houses. To date, only 7642 of these homes 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.

**Table 3: Distribution of radon measurement results by county  
(based on measurements completed by the RPII up to 31st December 2012)**

County	Number of houses measured	Number of houses in categories of radon concentration			Max (Bq/m <sup>3</sup> )
		0-199 Bq/m <sup>3</sup>	200-799 Bq/m <sup>3</sup>	> 800 Bq/m <sup>3</sup>	
Carlow	1199	965	222	12	2300
Cavan	452	438	14	0	800
Clare	4151	3641	422	88	3500
Cork	5636	4944	641	51	4500
Donegal	1471	1391	78	2	3400
Dublin	3658	3438	218	2	1400
Galway	7704	6092	1415	197	3800
Kerry	4124	3455	538	131	49000
Kildare	1355	1298	54	3	1100
Kilkenny	1359	1167	177	15	2400
Laois	568	544	24	0	600
Leitrim	404	376	27	1	1600
Limerick	1397	1288	106	3	1900
Longford	329	295	33	1	900
Louth	851	751	100	0	800
Mayo	4245	3501	681	63	6200
Meath	986	908	76	2	900
Monaghan	299	281	18	0	800
Offaly	786	768	18	0	800
Roscommon	729	651	74	4	1400
Sligo	2383	1788	499	96	5600
Tipperary	2593	2272	295	26	3400
Waterford	2488	1992	431	65	9700
Westmeath	752	686	65	1	1100
Wexford	1787	1503	260	24	2900
Wicklow	2164	1795	342	27	16400
<b>Total</b>	<b>53870</b>	<b>46228</b>	<b>6828</b>	<b>814</b>	



**1105 food and environmental samples** were tested for radioactivity levels as part of the RPII's environmental monitoring programme.

## 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 2012

As in previous years, the 2012 monitoring programme comprised an assessment of the following key elements:

- Ambient radioactivity based on measurements of radioactivity in the air and of the external gamma dose rate from a network of permanent monitoring stations located throughout the country – These systems aim 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 Commission recommendations on the application of Articles 35/36 of the Euratom Treaty and is focused primarily on milk and mixed diet.
- 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 year. During 2012, major water supplies were sampled from Carlow, Cavan, Clare, Cork, Donegal and Dublin.
- 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 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 Irish National Accreditation Board, to International Standard ISO/IEC 17025. In 2012, the RPII's laboratories successfully passed the five-yearly reassessment of accreditation.

In keeping with our strategic priorities, completion of the RPII's environmental monitoring programme is achieved through co-operation with other agencies, namely, the Northern Ireland Environment Agency (NIEA), the Environmental Protection Agency (EPA), local authorities, the Defence Forces, the Department of Agriculture, Food and the Marine, Met Éireann, University College Dublin (UCD) and the Food Safety Authority of Ireland (FSAI). Arrangements for off-shore sampling of seawater are also currently being tested with the Naval Service.

## Results of monitoring in 2012

The results of the monitoring 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 2012 are very similar to those reported in recent years, excluding the short-term elevated levels of radioactivity arising from the nuclear accident at Fukushima during the period March to May 2011. 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 northeast coast. Concentrations measured south of Dublin are lower, while those measured along the south and west coasts are generally consistent with global fallout levels.

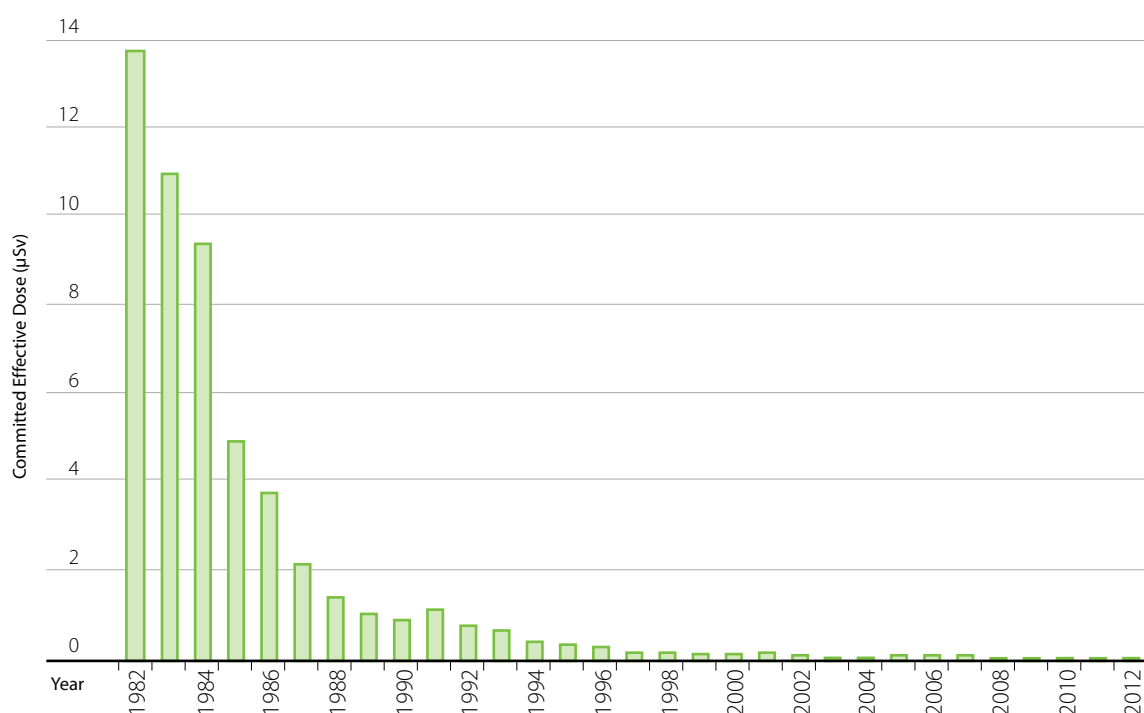
Figure 6 illustrates the doses to typical seafood consumers between 1982 and 2012 due to caesium-137, which accounts for the majority of the dose from this pathway. The doses incurred by the Irish public as a result of artificial radioactivity in the marine environment are small when compared with the average annual dose to a person in Ireland from all sources of radioactivity. In 2012, the dose to the typical seafood consumer from caesium-137 was estimated at 0.05  $\mu$ Sv as compared to the total annual average dose of 3950  $\mu$ Sv.

From the RPII's monitoring of radioactivity in milk, drinking water and mixed diet, consisting of complete meals sampled from university canteens, 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 were below the detectable limits. All drinking waters tested were found to be in compliance with the total indicative dose defined in EU legislation. Radiation 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.





Figure 6: Committed effective doses to typical seafood consumers due to caesium-137, 1982-2012



## Research to support environmental monitoring programme

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

Current projects include:

- *An assessment of the dose to the Irish population from natural radioactivity in food.*

In the RPII's 2008 report *Radiation Doses Received by the Irish Population*, there was scant Irish information on the levels of natural radioactivity in foods. To address this gap, a project has been launched to determine the levels of potassium-40; polonium-210; lead-210; carbon-14; radium-226 and radium-228 in the Irish diet. The doses arising from these radionuclides will be calculated, based on consumption data from the Irish Universities Nutrition Alliance (IUNA) adult nutrition survey, and used to update the population dose figures.

- *Carlingford Lough study*

A collaborative project is underway with UCD and the NIEA to assess radioactivity levels in Carlingford Lough. This is a follow-up to previous studies completed in the 1990s, and the objective is to allow an assessment of changes to measured environmental concentrations in the lough. As well as supplementing the data on artificial radioactivity levels in this north-east coastal inlet, this project is valuable in maintaining links between RPII and NIEA and UCD.

- *A survey of natural radioactivity in bottled water*

A survey of natural radioactivity in Irish bottled water has been undertaken in collaboration with the HSE and FSAI. The findings of the survey will be included in the 2013 update of the study of *Radiation Doses Received by the Irish Population*. The data from the study will also be used in support of meeting Ireland's obligations under the forthcoming Euratom Directive on radioactivity in drinking water sources, which is to be extended to include bottled water supplies.

---

- *Radioactivity in groundwater sources*

The national study of radioactivity in groundwater supplies was completed in 2012. Carried out in co-operation with the EPA, it constitutes the first comprehensive study of radioactivity levels in groundwater drinking supplies in Ireland. All the supplies tested were found to comply with the requirements under the Drinking Water Directive. A full report on the findings was due to be published in 2012 but was delayed until 2013.

## Other activities in 2012

A report on the results of the environmental monitoring programme for 2010 and 2011 was published in December 2012. In addition, a report specifically covering the results of the RPII's environmental monitoring and assessment response to the Fukushima accident was published in March 2012 to coincide with the first anniversary of the Great East Japan Earthquake and Tsunami.

RPII staff presented work related to the monitoring programme at a range of forums in 2012.

These included:

- The 13th International Congress of the International Radiation Protection Association in Glasgow – RPII staff presented work on assessment of the impact on Ireland from projected discharges from the proposed nuclear power plants in the UK and the response to the accident in Fukushima.
- The Irish Radiation Research Society annual meeting in Dublin – RPII staff presented research activities relating to the population dose report. RPII also awarded a prize for the best student presentation to Gordon Sands, NUIG, for his presentation on “A novel method to examine risk in Brachytherapy Mammosite using IDEFØ diagrams”.

In 2012, the RPII commenced development of a new IT system for storage of RPII monitoring data. The main objectives of this system are to archive all measurements of environmental radioactivity in Ireland in a single location and to make them easily accessible for use in research activities. In 2012, a prototype database and geographic information system (GIS) was developed. Work on importing historical measurements also began.



## Occupational exposure from dosimetry measurements

During 2012, the RPII's Dosimetry Service monitored occupational exposure to ionising radiation for approximately 7000 individual workers. Of those monitored, 126 or 1.8% recorded a whole body dose at some point in the year exceeding the minimum reporting level of 0.1 mSv. Of these, 25 workers in medical, veterinary or industrial sectors had annual doses exceeding the dose limit for members of the public of 1 mSv. Some 216 individual workers were monitored using extremity dosimeters, of which 104 received measurable extremity doses. The highest annual extremity dose of 38.1 mSv was recorded to the right hand of a medical physicist.

For all workers monitored during 2012, the annual whole body effective doses were less than 6 mSv per person, which is the dose level set down in S.I. No. 125 of 2000 for the classification of Category A workers. The measured doses were in all cases considerably below the annual dose limit of 20 and 500 mSv for whole body and extremity exposure, respectively.



## Radiation measurement services

The RPII's laboratory provides specialist radiation measurement services, including analytical services, personal dosimetry, 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 National Accreditation Board (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. In October 2012, the RPII hosted the annual meeting of the Personal Radiation Monitoring Group (PRMG), which is a peer network of independent, personal dosimetry laboratories operating across the UK and Ireland.

A very significant development for RPII during 2012 was the closure of its personal dosimetry service and the allocation of new responsibilities to the RPII with regard to the approval of dosimetry services operating in Ireland. This change is in line with the commitment given in the *RPII Strategic Plan 2011-2013* under strategic priority 4 that RPII should only provide services, where this represents best public value. It was recognised that personal dosimetry is now widely available from the private sector and, therefore, was no longer a core competency for RPII. The move also acknowledged that there was a need to establish a more formal mechanism for the approval of dosimetry services operating in Ireland.

The RPII's role changed from that of dosimetry service provider to the regulator for dosimetry services operating in Ireland. As part of that transition, the RPII introduced **a dosimetry service approval mechanism, and six dosimetry services were approved in 2012.**

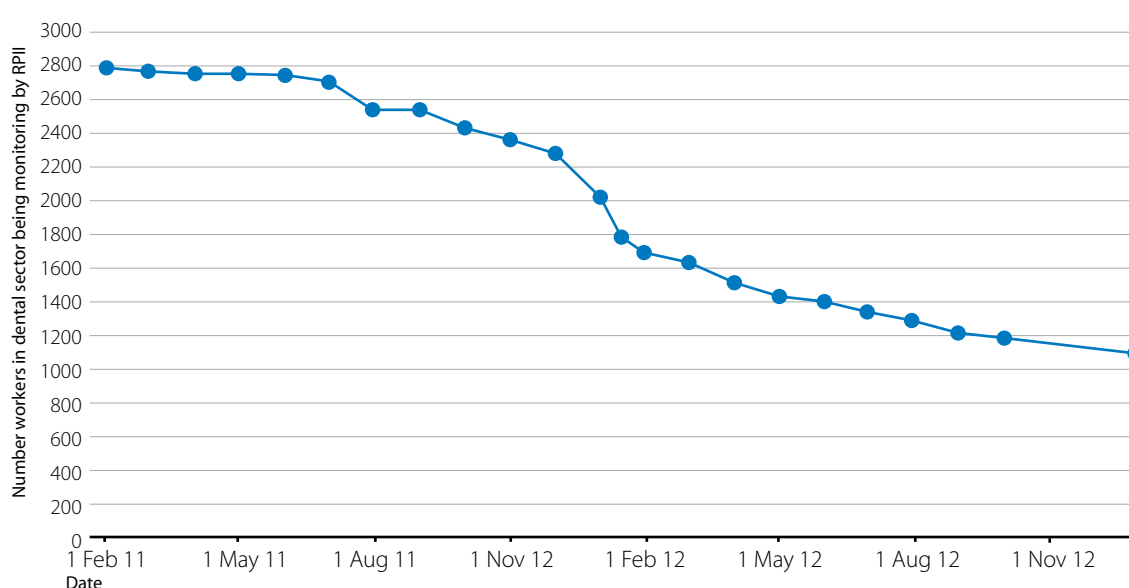
## Personal Dosimetry

The RPII's Dosimetry Service issued approximately 65,000 whole body dosimeters during 2012, which represented a reduction of almost 10,000 on the number issued in 2011. Approximately, 3200 extremity dosimeters and 330 neutron dosimeters were issued in 2012, which was similar to the number issued in 2011 (3100 and 330, respectively).

The reduction in the number of whole body dosimeters issued was due mainly to a fall off in the number of workers in the dental sector being

monitored. In 2011, the RPII's Regulatory Service published an updated position statement on the use of personal dosimetry in dental radiology. In accordance with this new policy, which took effect from 1 June, personal dosimetry is no longer mandatory in dental radiology, in cases where a risk assessment carried out by a Radiation Protection Adviser (RPA) indicates that any individual staff member is unlikely to be exposed to a dose exceeding 1 mSv in any 12-month period. The effect of this change on the number of dental workers being monitored can clearly be seen in Figure 7.

**Figure 7: Number of workers in dental sector being monitored by RPII Dosimetry Service**



## New national arrangements for the provision of dosimetry services

In line with the *RPII Strategic Plan 2011-2013*, the role of the RPII with regard to the provision of dosimetry services changed significantly from that of direct service provider to the regulator of dosimetry services operating in Ireland. The specific changes were as follows:

- The RPII would close its dosimetry service at the end of 2012;
- The system of approval for dosimetry services operating in Ireland would be significantly strengthened and the RPII would become the approval body for such services; and
- The RPII would establish a National Dose Register.

## Closure of RPII Dosimetry Service

After four decades in business, the Dosimetry Service issued its last dosimeters to customers in December 2012. A key consideration for the RPII in managing the closure was to minimise the inconvenience and disruption to its customers. Therefore, a range of measures were put in place to ensure that the transition to new service providers was as seamless as possible. Customers were first informed of the closure in April 2012, and this was followed by regular updates to keep them informed of the closure process throughout the year. Where requested by the customer, user-requirements data were transferred electronically to the new service providers. The RPII also provided a technical help desk to support customers while making arrangements with new providers.

## Strengthening the system for approval of dosimetry service operating in Ireland

In May 2012, the Minister for the Environment, Community and Local Government signed amending regulations (S.I. No. 152 of 2012) establishing a new framework for the approval of dosimetry service operating in Ireland. Under this new framework, dosimetry services operating in Ireland must, from 2013 onwards, be approved by the RPII, and the RPII must, in turn, maintain a register of approved services. These new arrangements are intended to ensure that all users of ionising radiation in Ireland can avail of appropriately quality-assured dosimetry services.

In June, the RPII published technical criteria for Approved Dosimetry Services (ADS) together with guidelines for applicants. These technical criteria are based on the European Commission technical recommendations for monitoring of individuals occupationally exposed to external radiation. The guidelines set out the conditions for approval and describe the mechanism for assessing compliance with those criteria. During 2012, six dosimetry services were approved under the new arrangements.

A **National Dose Register** was developed to record **occupational radiation doses** received by Irish workers.

## National Dose Register

In 2012, the RPII developed the State's first National Dose Register (NDR), which is intended to be a source of statistical information on dose distributions and trends for occupationally exposed workers as a function of work practice, activity, etc. The register, therefore, will provide important 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 European Commission.

The criterion for approval of dosimetry services includes a requirement that ADS shall provide personal monitoring data in an electronic format to the NDR annually. Dose data recorded by ADS in 2012 will be transferred to the NDR by July 2013 and, thereafter, annually each July.

## Calibration Service

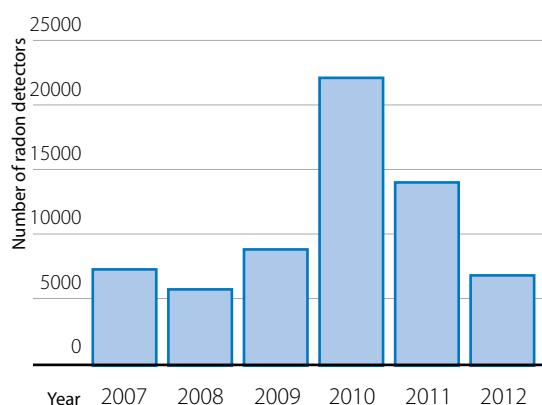
The Calibration Service provides a calibration service for a range of radiation protection instruments, including survey meters, contamination meters and electronic personal dosimeters. During 2012, 452 instruments were tested by the RPII's Calibration Service for compliance with the relevant manufacturer's specifications.

In January 2012, a number of service improvements were introduced, including a Laboratory Information Management System (LIMS) for logging instruments, recording calibration data and issuing calibration certificates. The use of the LIMS streamlines the recording of data and enhances the administrative aspects of the service. In June 2012, the Calibration Service issued an updated guidance document for customers, setting out streamlined procedures, covering scheduling of calibrations and transportation of instruments to and from the RPII.

## Radon measurement

In 2012, approximately 7100 radon detectors were issued to 2194 homes and 373 workplaces. It can be seen from Figure 8 that the number issued in 2012 had fallen back significantly from the peak level, seen in 2010, to more typical annual average values. The reduction in the sales of radon detectors over the last two years is believed to be a reflection of the current economic difficulties facing many householders. The peak values seen in 2010 also reflect the unusually high levels of national media attention given to radon that year.

**Figure 8: Number of radon detectors issued to homes and workplaces 2007 to 2012**



## 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 2012 included testing of Irish produce for compliance with the requirements of importing countries; testing of drinking water for compliance with the requirements of the European Commission 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. In total, 1105 samples were tested during the year, 531 as part of the monitoring programme and 574 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 2012 was 3874. This may be compared with 3893 in 2011 and 3198 in 2010, indicating that there has been little change in demand for this service in the last few years. The number of product certificates issued per year since 2009 is shown in Table 4.

A survey of **natural radioactivity levels in Irish bottled water** was completed, providing a baseline of radioactivity levels in Irish bottled waters for comparison with recommended maximum levels for drinking water.

**3874 products were certified** for Irish companies exporting food and pharmaceuticals outside the EU, enabling them to prove compliance with import requirements.

**Table 4: Number of samples analysed and product certificates issued 2009-2012**

Year	Samples analysed as part of monitoring programme	Samples analysed under contract	Product certificates issued
2009	661	627	3301
2010	934 <sup>1</sup>	688	3198
2011	701	594	3893
2012	531 <sup>2</sup>	574	3874

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

<sup>2</sup> 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.





## Emergency preparedness

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 maintaining response systems; by staff training; by participation in emergency exercises and by reviewing its response to emergencies.

The **RPII's report** on its environmental monitoring and assessment response to the **Fukushima accident** was published.

### The RPII's role in National Emergency Plans

The national response to a widespread radiological emergency or crisis involves mobilisation of the resources and expertise of a broad range of public authorities and agencies within the State. Ireland's response to a nuclear accident is co-ordinated by the National Coordination Group for the National Emergency Plan for Nuclear Accidents (NEPNA), for which the DECLG is the lead government department and the RPII is one of the key technical advisory agencies.

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 co-ordinate 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. To this end, the RPII maintains two independent atmospheric dispersion models in order to be able to predict the movement and deposition of radionuclides in the environment. Modelling work is of particular benefit before field measurements are available in the case of an unplanned atmospheric release of radionuclides.

A major upgrade of one of the two modelling tools used by the RPII took place in 2012. The ARGOS Decision Support System (Accident Reporting and Guiding Operational System) is a simulation instrument, which has been used by the RPII since 2001. It is adapted to Ireland's emergency response needs and, amongst other things, can be used in various phases of an accident to:

- Predict the potential health impact to the Irish population, as well as the consequences for the Irish food production and agricultural sector (amount of radioactive fallout and contamination levels in the food chain);
- 
- Support the RPII's advice to the Irish Government on the implementation of various protective actions options;
- 
- Share information and data; and
- 



- 
- Train the RPII's staff in responding efficiently to an emergency.
- 

Procedures for using the long-range air dispersion model were also updated in 2012, based on the experience of using them in responding to the Fukushima accident in 2011.

## 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. These systems are operated by the IAEA in Vienna (EMERCON) and the EC in Luxembourg (ECURIE). 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". In December 2012, the EC replaced its fax-based radiological emergency reporting system with a new web-based system (WebECURIE). During 2012, RPII staff members were involved in testing this system before it went live. This included participation in three EC tests of WebECURIE and provision of feedback to the Commission. Key RPII personnel are now trained on both the EMERCON and ECURIE web-based systems.

## National Radiation Monitoring Network

The RPII, with the assistance of Met Éireann and a number of local authorities, operates a National Radiation Monitoring Network (Figure 9). 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 2012, 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 24), no increased levels of ambient gamma dose rate above the normal fluctuations in background levels were observed during 2012.

The RPII participated in **12 international emergency exercises** and **one national exercise**.

**Figure 9: National Radiation Monitoring Network**



---

## Emergency exercises

The RPII runs an annual programme of emergency exercises to 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. The RPII participated in four international emergency exercises organised by the International Atomic Energy Agency (ConvEx exercises); four exercises organised by the European Commission (ECURIE exercises); three exercises to test the new EC notification system prior to its launch and one test of the UK-Ireland Early Notification Agreement.

Two of the exercises focussed on testing the reporting and request for assistance procedures of the IAEA system. The first, in July 2012, 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 September 2012, a scenario was developed which involved the discovery of a truck with a damaged contaminated scrap metal container at Dublin Port. The exercise included reporting this incident to the IAEA and requesting assistance with bio-dosimetry of the blood sample of the exposed truck driver. The exercises were useful as they allowed RPII staff to practise using the system, both as a responding state and as a reporting state.

A national protocol for responding to CBRN incidents (malevolent Chemical-Biological-Radiological-Nuclear events) was completed in 2011. In 2012, the RPII participated in an emergency exercise of the protocol. The RPII's role was to provide expert advice on radiation issues to the responders on the scene.



The **RPII's emergency decision support system**, which includes its atmospheric and food-chain transfer prediction models, was updated as part of ongoing maintenance to ensure that the RPII has the necessary **tools to respond in the event of a nuclear emergency**.

## Other 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 2012, training was provided to Hazardous Material Fire Officers.

Since 2009, the RPII has contributed to an expert group chaired by the Department of Agriculture, Food and Marine to prepare an Irish handbook on a food and agriculture response for a nuclear emergency. Other contributors to this expert group include the FSAI, the DECLG, the EPA and the Sea Fisheries Protection Authority. In 2012, the food/agriculture nuclear emergency response handbook was finalised. The aim of this handbook, which comes under the National Emergency Plan for Nuclear Accidents (NEPNA), is to provide assistance to the Irish public authorities 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 RPII also provided a refresher training course to the members of the expert group on the transfer of radioactivity in the Irish food chain following a nuclear accident.

The RPII participates in a number of international groups related to nuclear and radiological emergency preparedness. In 2012, these included the NEA Working Party on Nuclear Emergency Matters (NEA-WPNEM) and the ECURIE Competent Authorities. These groups aim to share good practice and develop international guidance and arrangements for nuclear emergencies. During 2012, an RPII staff member was Acting Chair of the NEA-WPNEM.



## 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 international forums 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) and its work on nuclear safety (including legislation in this area) and initiatives to improve transparency arrangements.

### Stress tests peer review

Following the events at Fukushima in March 2011, the European Council initiated a process (Stress Tests) to review the safety of all European nuclear power plants across 17 countries. The European Commission, supported by the European Nuclear Safety Regulatory Group (ENSREG), produced criteria and a plan for this work. The process required nuclear power plant (NPP) operators to re-assess the safety of their nuclear plants if subjected to extreme events such as those that occurred at Fukushima and to report on the work. Specifically, the process considered the following three topics: initiating events (earthquake and tsunami); the impact of losing safety functions (losing electrical power, losing ability to cool core and fuel ponds) and severe accident management. The national nuclear regulator then reviewed each report and commented on the findings and identified areas for further work and/or improvement in the plant's safety features. The regulator then submitted a summary of this work in the form of a "national report" to the European Commission. During 2012, each of the 17 national reports was then subjected to a peer review process.

The peer review process was completed in two phases. In the first phase, the reports underwent a “topical review”, whereby review teams examined each of the three “topical issues”; and, in the second phase, the national reports were reviewed in their entirety by international experts. During the reviews of national reports, the peer reviewers had the opportunity to discuss issues with plant operators and nuclear regulators in the country. There was also an opportunity to visit relevant nuclear power plants to observe and confirm some of the issues covered in the national reports. As a member of ENSREG, the RPII has been actively involved in the Stress Test process. An RPII staff member participated as a technical expert on the topical peer review dealing with accident management and also in the country peer review visits to the Netherlands and the UK.

ENSREG and the European Commission adopted a report on the results of the stress tests. The report concluded that:

- All countries have taken significant steps to improve the safety of their nuclear power plants.
- Significant measures to increase robustness of plants have already been decided or are being considered. Such measures include the provision of additional mobile equipment to prevent or mitigate severe accidents, installation of additional fixed safety equipment and the improvement of severe accident management together with associated staff training measures.

The report identified four main areas of improvement to be considered at the European level, including the lack of consistency in the assessment of natural hazards; the need for regular safety assessments and the implementation of known safety measures. It also identified the need for an improvement in ancillary protective measures such as the protection of mobile equipment and emergency response centres against extreme natural hazards and the availability of rescue teams and equipment to rapidly support local operators.

In addition, ENSREG published an action plan on the follow-up of the peer review of the stress tests performed on European nuclear power plants. The purpose of the ENSREG action plan was to ensure that the recommendations and suggestions from the stress test peer review are addressed by national regulators and ENSREG in a consistent manner. All Member States that participated in the Stress Test

process have prepared a National Action Plan that identifies lessons learned following the Fukushima accident and on the status of implementation of the Stress Test recommendations. All National Action Plans were completed by the end of 2012 and are publicly available on the ENSREG website. The National Action Plans will be the subject of a regulatory peer review workshop to be held in April 2013. The workshop will discuss the contents and status of implementation of the National Action Plans, and an RPII staff member will be one of the vice-chairs of the workshop.



## Review of expected radioactive discharges from new designs of nuclear reactors

Over the past few years, construction or planning of new nuclear power plants has commenced in a number of countries around the globe. This follows a long period, post Chernobyl, with little new build of nuclear power plants. In addition, there has been some consolidation of nuclear power plant designers and vendors, which has led to a number of predominant nuclear plant designs. For these reasons, the OECD-Nuclear Energy Agency's (NEA) Committee on Radiation Protection and Public Health (CRPPH) agreed in 2006 that a study on the expected levels of radioactive discharge to the environment from new nuclear power plants should be carried out. This study looked at how new technologies and operating practices are used to minimise the radioactive discharges from the various nuclear reactors designs currently operating worldwide.



---

In January 2012, this study was completed, and a workshop brought together nuclear regulatory bodies, nuclear power plant vendors and nuclear power plant operators to further discuss and clarify the various issues associated with radioactive discharges from new nuclear plants. The Chief Executive, as Chair of the CRPPH, addressed the workshop, and the RPII also provided a chair for one of the sessions. The findings from the study have now been published as an NEA report. This work has provided the RPII with a valuable insight into the level of radioactive discharges that can be expected from any new nuclear plants that may be built in the future.

## Nuclear safety in the UK

During 2012, 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.

### Nuclear power plant closures

The world's oldest operating nuclear power reactor, unit 1 at Oldbury in Gloucestershire, ceased operating in February 2012. The Magnox reactor had been in operation for 44 years. The plant operators (Magnox Ltd) permanently shut down the plant 10 months earlier than expected. The decision was taken as the owners believed it was no longer economically viable to continue its operation. One of the two Magnox reactors at the Wylfa Nuclear Power plant in Wales also ceased generating electricity in 2012. The remaining reactor will continue operating until September 2014, almost four years beyond the original planned plant closure date. The UK nuclear safety regulator had previously briefed the RPII on the Magnox closure plans.

The closed reactors will now undergo decommissioning. Over the next 10 years, spent nuclear fuel will be removed and sent to Sellafield for reprocessing, and existing plant and buildings, with the exception of the reactor building, will be demolished and removed. Following this, the site will then enter the 100 year "care and maintenance"

stage of decommissioning. During this period, no significant dismantling will be carried out. The site will be managed, monitored and maintained in a safe state. The need to delay final site clearance is governed by the need to allow the more hazardous radioactive materials, in particular cobalt-60 (which has a half-life of five years), to decay and so limit radiation doses received by workers. The final stage of decommissioning, site clearance, is expected to take about eight years. This involves the dismantling of the remaining structures on the site, including the reactors, and the clearance of any residual radioactivity to the applicable standards.

## Life extensions for nuclear power plants

In December 2012, UK nuclear utility EDF Energy announced its intention to extend the operational life of four of its Advanced Gas-cooled Reactors (AGRs). The reactors, two at Hinkley Point in the south-west of England and two at Hunterston in Scotland, were expected to close in 2016. The UK's Office for Nuclear Regulation (UK-ONR) will allow the reactors to continue to operate until 2023 if EDF Energy can demonstrate that they will remain fit to do so. The RPII continues to monitor developments at all nuclear facilities in the UK.

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

In 2010, the UK Government announced plans to develop new nuclear power stations at eight sites in England and Wales (see Figure 10). Five of the sites earmarked for potential development by 2025 are on the Irish Sea coast. The UK's current plans aim to see the power plants becoming operational before 2025. Plans to build new nuclear power plants in the UK progressed during 2012. Given the proximity to Ireland, the RPII has monitored these developments closely. The RPII has been providing technical support to the DECLG on this issue, including undertaking an assessment of the likely impacts on the environment in Ireland. The assessment considered radioactive discharges to air and sea from the proposed power plants, both under normal operating conditions and in the event of an accident. It included an overview



**Figure 10: Location of sites identified for possible new nuclear build and the reactor designs currently planned (where known)**



of proposed new build plans in the context of the reactor designs under consideration, the principles of nuclear safety and radiation protection, as well as the regulatory regime in place in the UK. The modelling of radioactive releases was completed with the support of colleagues in Met Éireann, the National University of Ireland, Galway, and the US National Oceanic and Atmospheric Administration.

The RPII meets the UK nuclear regulators on an annual basis, and new nuclear power plants are among the issues discussed. The UK-ONR and the UK Environment Agency (UK-EA) jointly issued design acceptance confirmations and statements on design acceptability for the UK EPR design in December 2012. This followed the completion of the Generic Design Assessment (GDA) process. The GDA process, which took place over three years, evaluated the reactor design for conformance with the UK regulatory regime.

---

In November 2012, the UK-ONR granted its first new nuclear power plant site licence in 25 years to EDF Energy for its planned new (EPR design) nuclear power plant at Hinkley Point in the south-west of England. Additional permission is required from the UK-ONR. In addition, permits from the Environment Agency and formal planning consent will be needed before construction of any nuclear plant can commence. EDF Energy is expected to announce its final investment decision in the Hinkley Point project in 2013.

Under Article 37 of the Euratom Treaty, Member States are required to report radioactive waste disposal plans to the EC for any new facility that could lead to radioactive contamination in another EU Member State. Until the opinion of the Commission has been received, an authorisation to carry out the work cannot be given. In February 2012, EDF Energy's twin Areva EPR reactors, planned for construction at Hinkley Point in Somerset, received Article 37 approval from the European Commission.

An RPII expert participated in the peer review of European **"Stress Tests"** of nuclear power plants, as part of the RPII's responsibilities to monitor and contribute to nuclear safety developments abroad.

## Geological disposal facility

In 2008, the UK Government invited communities to volunteer to host a geological disposal facility (GDF) that will accommodate high- and intermediate-level radioactive wastes. Three communities in two areas of Cumbria submitted an expression of interest to host the facility. An area can withdraw from the process at any stage until work commences on constructing the facility, and, in January 2013, Cumbria County Council decided to withdraw from the site selection process. Even when a volunteer community is confirmed and a suitable geology found in the area, it could take up to 15 years before construction commences on the facility. The UK Government hopes to have a geological disposal facility operational by 2040. The RPII will continue to monitor progress on this issue.

## Sellafield

The RPII continues to monitor developments at the Sellafield site. Regular contact is maintained with the Office for Nuclear Regulation (UK-ONR) and the UK's Environment Agency (UK-EA), both of whom provide information directly to the RPII and deal with enquiries from 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.

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 it preferred incorporating plutonium into MOX fuel rather than disposing of it as waste or continuing indefinite storage at the Sellafield site. A cost-benefit analysis of a new MOX plant has been commissioned by the UK's Department of Energy and Climate Change (UK-DECC). In addition, the UK-NDA is considering alternative approaches for disposing of the plutonium, such as the feasibility of building a (fast) nuclear reactor at Sellafield that could use the plutonium. The UK-NDA has commissioned a feasibility study on this proposal. The RPII will closely follow any developments on this topic.

At the end of 2012, the DECLG published a summary of a Probabilistic Risk Assessment (PRA) of the Sellafield Site and the Low-Level Waste Repository, located near the site. This assessment was conducted by a team of independent, international nuclear experts commissioned by the Minister for the Environment, Community and Local Government. The completion of the assessment was facilitated by the establishment, in 2008, of a joint confidential technical information exchange project by the Irish and British Governments. The objective of the project was to provide an established co-operative process for detailed technical information about the Sellafield site and the activities carried out there. Possible scenarios, or combinations thereof, considered by the PRA team included natural phenomena (e.g. earthquakes, meteorite strikes), and incidents such as airplane crashes, terrorist attacks, explosions, fires and human error.

---

Based on the results of the PRA, an incident at Sellafield or the nearby Low-Level Waste Repository (LLWR), causing the release of radioactive material, would result in no observable health effects in Ireland. However, the PRA also found that some severe incidents at Sellafield or at the LLWR would have the potential to create significant socio-economic impacts in Ireland. This could include loss of tourism and markets for Irish seafood and farm products, because of concerns that radioactive materials may be present, even if monitoring data confirmed that all food for sale or export complied with the limits set to protect consumer health.

The RPII gave technical support to the DECLG throughout the project and also worked with the PRA team to assess the environmental dispersion of radioactivity released from the various accident scenarios.

### 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 2012, the RPII received notification from the UK-ONR and UK-EA of just over 80 events that occurred at nuclear facilities in the UK. 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. These included a temporary loss of electrical power to parts of the Sellafield site in May, resulting in a loss of power to fans used to ventilate part of the Magnox Swarf Storage Silos (MSSS) facility. In this situation, radioactive material was not fully removed from the air. As a consequence, the daily beta discharges from the stack of were higher than normal, but still significantly below the annual plant discharge limits for the plant.

In 2012, Belgium's Federal Agency for Nuclear Control (FANC) identified a number of defects in the reactor pressure vessels that contain the nuclear reactor core in two of Belgium's nuclear reactors. The discovery was made during planned maintenance in July and August at the Tihange and Doel nuclear power plants. FANC reported that it had identified flaws that could result in cracks in the reactor pressure. FANC currently believes that the flaws did not arise as a result of plant operation but occurred during the fabrication of the steel reactor vessel. The reactors have remained shut

down while additional safety tests are performed. A number of countries in Europe, with similar reactor designs, are investigating whether manufacturing defects have occurred in their reactors. Sizewell B in Suffolk is the only operating reactor in the UK with a steel reactor pressure vessel similar to those in Belgium. The UK-ONR is currently assessing the plant operators review of the site's manufacturing and inspection records. The UK-ONR is satisfied that any flaws would have been identified in previous inspections. The RPII has continued to monitor developments on this issue.

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

### OSPAR

The RPII is the scientific advisor to the Irish Government on matters related to the implementation of the OSPAR (Oslo-Paris Convention) Radioactive Substances Strategy. Through OSPAR, Ireland has, over the years, been able to influence the progress achieved to date towards reducing the radioactive discharges from the Sellafield site. OSPAR has also been 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 in the UK) and the end to MAGNOX fuel reprocessing (the single largest radioactive source of pollution of the Irish Sea) by the year 2020.

One of the key areas monitored by the RPII in 2012 was proposals on how to characterise radioactive discharges arising from decommissioning activities and treatment of legacy waste. The RPII continued to collate Ireland's radioactive discharges for submission annually to the OSPAR Secretariat. Data from the RPII's national marine monitoring programme are also supplied on an annual basis, and, together with data supplied by the other signatory countries, they are used to assess the impact of radioactive discharges on human and non-human populations around the North-East Atlantic.

---

## Community Framework for Nuclear Safety – the Nuclear Safety Directive

The 2009 Nuclear Safety Directive requires Member States to report, on a three yearly cycle, how they have implemented the obligations of the directive and to encourage the continuous improvement of nuclear safety and its regulation. The first report is due in 2014. ENSREG has drafted guidelines on information and material that may be useful to include in the reports. In May 2012, the RPII, along with the German and the UK nuclear safety regulators participated in a trial-run of the reporting guidelines. The RPII provided feedback to ENSREG on the process and identified areas where the guidelines required further elaboration.

Following the nuclear accident at Fukushima, the European Commission 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. The RPII will continue to monitor this issue and consider the implications of any proposed amendments to the legislation.

## Convention on Nuclear Safety

An extraordinary meeting of the Convention on Nuclear Safety took place in August 2012. The extraordinary meeting was convened to discuss the lessons learned from the Fukushima Daiichi nuclear accident. In advance of the meeting, all contracting parties, including Ireland, prepared and submitted national reports that outlined actions, responses and new developments that had been initiated or influenced by the accident. Ireland's report was drafted by the RPII.

The extraordinary meeting drew together more than 600 participants from 64 contracting parties to discuss long-term nuclear safety in light of the Fukushima Daiichi accident. The topics included external events; design issues; severe accident management and recovery (on-site); national organisations (regulator, operator, government); emergency preparedness and response and post-accident management (off-site) and international cooperation. Each of these topics was discussed by the contracting parties in a number of working groups. In addition, the meeting discussed the effectiveness and the continued suitability of the provisions of the Convention on Nuclear Safety. An RPII staff member acted as vice-chair to the "Severe Accident Management and Recovery (on-site)" working group.



## Corporate Services

### Introduction

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

The RPII identified key strategic priorities in this area for the period 2011-2013. Our strategic priority to “Deliver value to the public in everything we do” means that efficiency and cost-effectiveness are emphasised across the whole of the RPII’s operations. In the area of communications, our priority to *“Focus on the needs of our stakeholders and enhance our engagement with them”* ensures that our communications strategy is guided by feedback from our stakeholders.

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

### Communications

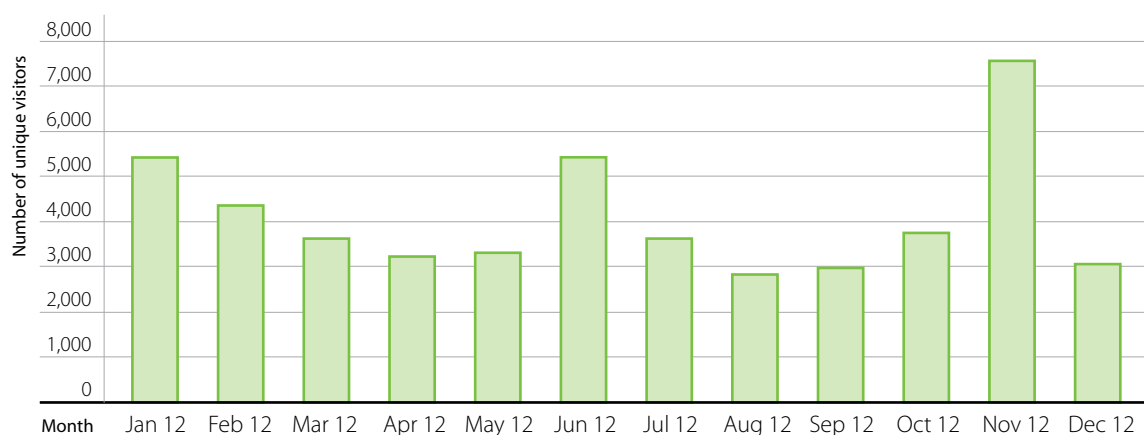
Provision of advice and information on radiation protection to Government and to the public is a priority of the RPII. Easy access to high-quality information through the RPII website and collaboration with others are important elements in raising awareness. Staff engaged with stakeholders at a range of national and local events during the year, for example at conferences, presentations and exhibitions. In 2012, 10 national press releases were issued, and additional press releases, tailored to suit individual counties and containing specific local information on radon, were issued to the regional media. Staff participated in 36 television and radio programmes, and print media coverage was also strong, with over 70 published articles referring to the RPII. The media coverage obtained during the year is an important and effective means of raising public awareness of radiation protection issues, particularly in relation to radon gas.

The RPII expanded its provision of information through educational materials and social media channels. In addition, its **website was adapted for access through mobile devices.**

### Website developments

The RPII website ([www.rpii.ie](http://www.rpii.ie)) provides a wide variety of both national and international audiences with information on its activities and up-dates on a range of radiological protection issues. There is an ongoing commitment to the continued development of this resource, and a content review was undertaken during the year to ensure the information is relevant and up-to-date.

Figure 11: Unique visitors per month to the RPII website during 2012



In 2012, the website received over 44,000 unique visitors (Figure 11), who viewed, on average, more than four pages per visit. The most popular sections of the website are the radon map; radon measurement; information on radon; licensing; the dosimetry service; environmental monitoring; publications and the radiation-dose calculator. In order to facilitate easier access to the website through mobile devices, the RPII undertook the development of a mobile version of the website. Following its launch in October, approximately 13% of traffic to the website accessed the mobile version of the website. The RPII also introduced social media tools to its home page, which will enable the organisation to interact with a wider audience.

## Raising awareness through education and television

In order to raise awareness of radiation amongst school-children, the RPII participated in 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.

As focus-group research previously carried out recommended that television is the medium through which people want to learn about radon, the RPII sponsored a segment on the television programme Eco Eye. The RPII worked with the production company during 2012 to help develop and research the piece. The programme, which was broadcast in January 2013, included an interview with the Chief Executive, Dr Ann McGarry, on how to test for radon. In addition, a consultant in respiratory medicine provided an insight into the damage caused by exposure to radon.

## Public awareness campaigns on radon

An awareness campaign on radon was carried out in two high radon areas, Kerry and Wexford. This initiative included radio, print and billboard advertising, promotional activity, a digital strategy and public relations activities. Over 100,000 information packs were distributed to households in the areas. 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.

Awareness activities on radon have been carried out by the RPII since 2010, and, during the year, an external expert was engaged to examine and evaluate the campaigns carried out to date (2010 to 2012 – six local areas). The review demonstrated that the campaigns were well executed and effective in raising awareness of radon gas and its link to cancer. However, it was recognised that the RPII campaigns will require a national drive if the agency is to achieve the market penetration it needs to achieve its goal of raising radon awareness nationally.

Regional radon awareness campaigns were carried out in **Kerry and Wexford**.



---

## Publications

In 2012, the RPII principally used electronic distribution methods for its publications, all of which are available free-of-charge from the website. New titles included the following:

### RPII reports

*Assessment of the impact on Ireland of the 2011 Fukushima nuclear accident.* March 2012.

*RPII inspection and licensing activities and annual inspection programme for 2012.* April 2012.

*Radioactivity monitoring of the Irish environment 2010-2011.* December 2012



### Guidance Notes/leaflets

Guidance notes on re-approval criteria for Category I Radiation Protection Advisers. February 2012.

Approval of Dosimetry Services in Ireland - Guidelines for Applicants June 2012.

Radon and your health. October 2012. (RPII & HSE).

### General articles

Long, S., Breatnach, É., Health threats from radon radiation. *Irish Medical Times*. November 2, 2011.

McMahon, C.A., McGinnity, P. Detection of radioactivity from the Fukushima nuclear accident. *Irish Chemical News*. Issue 1, 2012.

## Journal articles, conference papers and posters

(RPII personnel are indicated in bold in this list.)

**Currihan, L., McGinnity, P., Kelleher, K., Somerville, S., Hanley, O., O'Colmáin, M., Wong, J., León Vintró, L., McMahon, C.A.** RPII radiation monitoring section response to the Fukushima accident. In: *Proceedings of the 13th International Congress on Radiation Protection*, 13-18 May 2012, Glasgow. <http://www.irpa13glasgow.com/information/downloads/>

**Kelleher, K., Currihan, L., Organo, C., Olbert, I.** Assessment of the impact on the Irish public and marine environment arising from liquid discharges from potential new build power plants in the United Kingdom. In: *Proceedings of the 13th International Congress on Radiation Protection*, 13-18 May 2012. <http://www.irpa13glasgow.com/information/downloads/>

**Long, S., Fenton, D.** An overview of Ireland's national radon policy. *Radiation Protection Dosimetry*. 145, No 2-3, pp. 96-100.

**Long, S., Fenton, D.** The effectiveness of radon preventive and remedial measures in Irish housing. In: *Proceedings of the 13th International Congress on Radiation Protection*, 13-18 May 2012, Glasgow. <http://www.irpa13glasgow.com/information/downloads/>

**Long, S., Fenton, D., Dowdall, A.** Local authority radon measurement programmes in Irish social housing. In: *Proceedings of the 13th International Congress on Radiation Protection*, 13-18 May 2012, Glasgow. <http://www.irpa13glasgow.com/information/downloads/>

**McGinnity, P., McGrath, R.** Dispersion modelling of routine atmospheric discharges from proposed UK new nuclear build site locations. In: *Proceedings of the 13th International Congress on Radiation Protection*, 13-18 May 2012, Glasgow. <http://www.irpa13glasgow.com/information/downloads/>

**Smith, K., Organo, C., Somerville, S., Hanley, O., McMahon, C.A.** Comparison of atmospheric dispersion model outputs and radioactivity measurements made in Ireland following the Fukushima nuclear emergency. In: *Proceedings of the 13th International Congress on Radiation Protection*, 13-18 May 2012, Glasgow. <http://www.irpa13glasgow.com/information/downloads/>



## Partnership

Through the Partnership committee, staff, management and trade union representation share in the analysis and resolution of issues facing the RPII. In 2012, the Government's announcement that the RPII is to merge with the EPA was a most significant development. Through Partnership, the resulting concerns and expectations of staff are being addressed, and information is being shared on progress towards the merger.

The committee met six times in 2012, and issues dealt with included

- Health and safety matters;
- The action plan under the Croke Park Agreement;
- Reform of performance management system;
- Changes to time and attendance system and
- The merger of the RPII and the EPA.

## Finance

The RPII's income in 2012 was €6.403m, made up of a grant of €3.299m for current purposes, a grant receivable of €0.962m for pension purposes, as required under FRS 17, and earnings of €1.679m from licence charges and dosimetry, product certification, radon measurement and other services. From the capital grant, €0.572m 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 €0.199m.

## 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, which came into effect on 7 August, 2002. The following is a report on the payment practices of the RPII for the year ended 31st December 2012.

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 2

late payments that exceeded the due payment date by an average of 119 days. The total value of these late payments was €9675 and the penalty interest payments associated with these late payments amounted to €38.18. The late payments represented 0.33% of total payments to suppliers in 2012.

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 2012, 86% of all valid invoices were paid within 15 days.

## Advisors and consultants

In 2012, the RPII engaged a number of advisers to support key development projects and to provide expertise in specific areas. Table 5 lists the main contracts and the nature of the services provided.

## Human Resources and Staffing

In 2012, an operational review of the human resources function, processes and procedures was carried out by external auditors with reference to good practice principles. The report concluded that the HR function was consistent with good practice principles across the standard range of HR activities for an agency of its size.

The RPII registered with JobBridge, the National Internship Scheme. This is a Government initiative designed to offer jobseekers who are on the live register the opportunity to enhance their current skills and develop new ones. As a result, a laboratory chemist was engaged on a nine month internship with the RPII, working on radioactivity monitoring in the environment.

A management development programme was delivered, which focussed on decision-making and clarification of roles for middle managers, senior managers and senior staff. This programme highlighted the merits of one-to-one coaching as a means of development and supporting delegation.

**Table 5: Main contracts in 2012 with external advisors and the nature of the work undertaken**

Advisor	Nature of work undertaken
AG Services	Development of educational material for schools
AMAS	Development of web monitoring tools
Astron Consulting	Business process review and system design
Brightwater recruitment	Specialist recruitment services
Deloitte	Internal audit services
Dublin City University	Stakeholder engagement project
Earth Horizon Productions	Production of TV material on Radon
Fabrik Creative Media	Design and print services
Forfas	Accreditation services
Dr Keith Faulkener	RPA Assessments
Health Protection Agency	Review of licensing and inspection systems
Hewitt Associates	Pension liabilities calculation
Dr Christopher Hone	RPA assessments
Prof Pat Horton	RPA assessments and inspections
Institute of Public Administration	Staff development programme
Integrity Solutions	IT Security
Jones Lang Lasalle	Project management
Mooney O'Sullivan and Associates	Legal advice
Murray Consultants	Communications support
Norton and Associates	Accountancy
System Action	IT support
X-Communications Ltd.	Web design and development

---

A Workforce Plan was developed in response to the 2012 initiative by the Department of Public Expenditure and Reform to introduce sectoral workforce planning across government departments and their agencies. As required, the plan makes analysis and projections for the periods 2013, 2014-2017 and 2018+. It identified a number of key challenges facing RPII over this timescale, namely

- Loss of income – The suspension of RPII commercial Dosimetry services presented an opportunity to focus reduced staff resources on essential statutory functions, but it also resulted in a loss of earned income.
- Staff numbers – The 2012 staff complement is already below optimum. Retirements in the short-term will result in a further loss of experienced administrative staff. Where administrative staff numbers decline, it falls to the technical and scientific staff to perform administrative functions. This is inefficient and represents poor value for money for the State. Longer-term projections show that there will be significant loss of highly specialised scientific staff. As the scientific staff require several years of in-house development, a long succession period is required.
- Staff skills – Some key skills in the area of environmental behaviour of radioactive elements and assessment of radiation doses are at risk of being lost. These skills were previously developed and maintained through participation in EU-funded projects on radioecology, which are now very limited. Other means of maintaining skills must be identified and supported by adequate resourcing.
- Risk growth – diminishing staff numbers requires decisions to be made on which functions to continue to support and which to deprioritise. While every effort is made to deprioritise non-core areas, RPII has reached the point at which critical areas are weakened, which in turn increases risk. As staff numbers decrease, analysis of risk must be the basis for the application of limited staff resources.
- Staff motivation – an appropriate staff structure is required for an effective supervisory regime. A proper structure also motivates staff to achieve more, by creating opportunity for advancement and career development. A blockage in the administrative grade structure is forecast, which must be addressed.
- Increased demand for specialist services – European legislation, higher technical standards and greater customer demand, all increase demand for RPII

services. RPII is a uniquely skilled in Ireland and, as such, cannot delegate or share its responsibilities with third parties. Additional roles and responsibilities require additional resources.

While the loss of a further four staff in 2012, through retirements and resignations, continued to be a challenge for the RPII, in the short-term the additional workload arising was managed through staff flexibility and reallocation of duties. As the posts were critical to effective services delivery, the Department of Public Expenditure and Reform gave sanction for these vacancies to be replaced, on the basis that they would be funded from existing RPII resources. One of these posts was filled through redeployment, and all posts were filled by the year end.

## RPII–EPA Merger

In November 2012, under the Government reform initiative aimed at reducing the number of state agencies, the Government announced that the RPII was to merge with the EPA. The merger will take effect from June 2014, and the deadline for developing an action plan to implement the merger is June 2013.

Prior to this decision, the RPII and the EPA undertook an analysis of the opportunities and risks of such a merger. There are already many areas of collaboration between the two organisations. Now that the decision has been taken, both bodies have undertaken to work together to create a merged organisation that 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. It is the stated intention that the formation of the new organisation will result in no diminution, or perception of any diminution, among stakeholders and the general public, of Ireland's commitment to either environmental or radiological protection.

## Non-ionising radiation

In March 2007, on foot of a Memorandum to Government tabled by the then Minister for Communications, Marine and Natural Resources, the Government agreed that the RPII's mandate and resources should be extended to include aspects of non-ionising radiation. Since 2008, progress towards the handover of responsibilities to the RPII has slowed and a commencement date is not currently available.

---

## Health and safety

The 2012 Health and Safety programme established under the RPII Safety Management System (SMS) focussed on enhancing the supports to health and safety in the RPII. The work of the Safety Co-ordination committee was reviewed, and opportunities for improvements were identified.

As part of a review of fire security systems, a state-of-the-art fire alarm system was installed, detection systems were upgraded and emergency exit signage was improved. These developments brought fire safety to current standards in all parts of the RPII accommodation.

There were no reportable accidents or dangerous occurrences in 2012.

## Equality

The RPII is committed to a policy of equal opportunity. This is reflected in relation to staff in terms of equality in recruitment; conditions of employment and access to promotion, training and career development. The RPII also supports flexible working arrangements, as they are vital to making the workplace accessible to people juggling work and other commitments. In relation to the customer, the RPII strives to make its work accessible to all.

## Accommodation and energy usage

In 2012 RPII consolidated its office accommodation from three locations to two. As part of this move some office space refurbishments were required. The refurbishment work provided an opportunity to improve efficiency of heating and lighting systems as well as fire and security.

Energy usage in 2012 was roughly 50% electricity and 50% natural gas. Heating accounts for the majority of the gas consumption and electricity is used for lighting, some water heating and powering IT and lab equipment. Consumption of 419MWh of energy was recorded, consisting of 224MWh of natural Gas and 195MWh of electricity.

## Information Technology

In 2012, work was undertaken to improve the RPII's network infrastructure to ensure that it continued to operate effectively. Domain controllers were refreshed, and data storage requirements were reviewed and reorganised. Critical applications were migrated onto a new purpose-built application server. Server-room equipment was also re-organised into a more logical arrangement, and uninterruptable power supplies in both server rooms were upgraded.

Other improvements in 2012 included the introduction of a new remote access solution and the upgrading of the endpoint security to provide a more flexible solution while ensuring that data was protected. Improvements were also made in printing, with the transfer of large-volume print jobs from standalone printers to more economical multi-functional devices.

## Records management

In 2012, the RPII continued with its programme to develop good records management practices across the institute. During the year, the focus on records management training moved away from global training initiatives to more local training programmes within business units, and this has resulted in an increase in the number of records created throughout the RPII. The pilot programme of electronic record keeping, introduced in 2011, was extended to include the nuclear safety section, and it will be rolled out to more business areas within the RPII during 2013.

## Customer service

The RPII is committed to providing an excellent service to all of its customers, with 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 RPII. The RPII includes actions in its business plan that are aimed at continuously improving customer service, and the institute reviews the effectiveness of these annually. During 2012, training in customer care was provided for all staff based on the updated customer service charter and complaints procedure.





## 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. During 2012, the internal auditors, Deloitte, undertook audits in the areas of human resources management and risk management. No significant findings were identified, but some improvements in process resulted.

### Ionising Radiation Advisory Committee

The Ionising Radiation Advisory Committee (IRAC) provides high-level scientific advice on any matter concerning ionising radiation referred to it by the board or by the executive of the RPII. The 16 members of the committee include both national and overseas experts and cover a wide range of disciplines, including radiation protection; public health; epidemiology; emergency response and medical physics. During 2012, the committee met twice to focus discussions on two topics of strategic importance to the RPII: the development of the National Radon Control Strategy, and the proposed new model for the graded approach to the authorisation process for the use of ionising radiation.

### Audit Committee

The Audit Committee met four times in 2012. 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.



---

## Communications Advisory Committee

The Communications Advisory Committee (CAC) met on three occasions in 2012, and amongst its programme of work was an external review of the RPII radon awareness programmes. The review concluded that the campaigns had been well executed and represented good value for money. They were effective in raising awareness within the constraints of the available budget. It was suggested that to extend the reach of the radon message, a national campaign would be required.

## Public Service Agreement

The publication by Government of the Public Service Agreement, and the associated Action Plan 2010-2014, placed obligations on public bodies to develop their own action plans, setting out their commitments to delivering on the Croke Park Agreement. The RPII Action Plan was submitted to the institute's parent department as required and is available on its website. In addition, the RPII has reported progress against the actions to the National Implementation Body, which is responsible for the implementation of the Public Service Agreement.

In 2012, the RPII was required to specify where costs savings were achieved. Through a variety of measures, costs savings totalling approximately €87k were achieved.

Actions completed during 2012 include

- Development, with DECLG, of a Draft National Radon Control Strategy, which will be finalised in Q4 2013;
- Agreement on the operational protocol for the management of orphan radioactive sources and progress on the management of radioactive waste in Ireland;
- Progress towards greater transparency and sustainability of the system of regulation of the use of ionising radiation;

- Improvements in response capability to a nuclear accident abroad;
- Implementation of an enhanced PMDS model to include competency related goals as well as task performance goals;
- Enhanced cooperation with a range of agencies, including the HSE, HSA, EPA, FSAI, Met Éireann, Veterinary Council, UCD and the Northern Ireland Environment Agency, leading to greater efficiency and improved customer service;
- Preparation of joint standard operating procedures for response to CBRN events;
- Reorganisation of staff offices to make an OPW-owned office property available for an alternative use;
- Development of a mobile version of the RPII website;
- Implementation of a comprehensive radon awareness programme – During the reporting period, the programme focused on householders in high radon areas, healthcare professionals and schools.
- Direct engagement with secondary schools to raise awareness of radon;
- Use of TV to spread the radon message to a wide public audience;
- Revision of the RPII's publications policy to use electronic distribution methods, thereby making direct savings on print and postage; and
- A redefinition of the organisation's role in relation to the provision of personal dosimetry services in Ireland – This included the establishment of a mechanism for approval of dosimetry services operating in Ireland and the establishment of a national dose register.

## Members of the Board

The board met eight 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 name of the nominating person/organisation and the date of first appointment.



Name	Nominated by	Date of First Appointment	Meetings attended 2012
Prof William Reville, Chairman	Minister for the Environment, Community & Local Government	January 2012	8(8)
Ms Fionnuala Barker	Irish Nuclear Medicine Association	May 2007	6(6)
Dr Patricia Cunningham	Medical Council	February 2012	6(7)
Dr Maurice Fitzgerald	Dental Council	July 2008	6(8)
Mr James Fitzmaurice	Minister for the Environment, Community & Local Government	April 2002	8(8)
Mr Patrick Gilligan	Association of Physical, Scientists in Medicine	August 2006	8(8)
Dr Paraic James	Minister for the Environment, Community & Local Government	January 2012	4(8)
Dr Kevin Kelleher	Health Service Executive	September 2007	6(8)
Ms Darina Muckian	Minister for the Environment, Community & Local Government	April 1997	8(8)
Mr John O'Dea	Minister for the Environment, Community & Local Government	November 2009	8(8)
Ms Adi Roche	Minister for the Environment, Community & Local Government	June 1997	5(8)
Dr Stephanie Ryan	Faculty of Radiologists RCSI	July 2010	7(8)

---

#### **Prof William Reville (Chairman)**

Prof Reville was appointed RPII Board Chairman in 2011. Prof 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 Dublin Institute for Advanced Studies.

Prof 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 the Public Awareness of Science Officer at UCC and organises the Annual Science Public Lecture Series.

#### **Ms Fionnuala Barker**

Ms Barker was appointed to the RPII Board in 2007. As Principal Physicist in St Luke's Hospital, Dublin, she has extensive expertise in the field of medical physics, notably in nuclear medicine and radiation protection. Ms Barker is a past Secretary of the Irish Nuclear Medicine Association, and a past Chairman of the Association of Physical Scientists in Medicine.

#### **Dr Patricia Cunningham**

Dr Cunningham is a Consultant Radiologist in Our Lady's Hospital, Navan, and Our Lady of Lourdes Hospital, Drogheda. She is a member of the Board of the Faculty of Radiologists in Ireland and chairs their Radiation Protection Committee. Dr. Cunningham is also a member of the National Radiation Safety Committee.

#### **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 is the Managing Director of the Bradán Group, which publishes the *Public Sector Times* and local newspapers in Kildare and Wicklow. 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 and Centres of Excellence. He has served on many small business task forces and committees and was a long-time 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 Chairman of the Audit Committee. He 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. He is currently a member of the National Radiation Safety Committee of the HSE and the Faculty of Radiology Radiation Safety 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 National University of Ireland, Galway NUIG, where he received BSc and PhD degrees.

#### **Dr Kevin Kelleher**

Appointed to the Board in 2007, Dr Kelleher is Assistant National Director ISD – Health Protection Health Promotion and Child Health, 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, with more than 10 years' engineering experience in the electronics and software industries, and she has campaigned on environmental issues.

#### **Mr John O'Dea**

Mr 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 Chairman of Sligo CND, Sligo Arts Festival and The Model Arts Centre.

---

### **Ms Adi Roche**

Appointed to the Board in 1997, Ms Roche is Founder & CEO of Chernobyl Children International (CCI), the leading international children's organisation with United Nations NGO status in Belarus, Ukraine and Western Russia. Ms Roche has campaigned on peace and social justice issues for over 30 years, is a prolific author and has researched and produced several 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 is a committee member of the Faculty's Radiation Protection Committee.

## **Advisory Committees**

### **Audit Committee**

This committee advises the board on finance, governance and organisational risk. The committee met four times during 2012.

Chairman: Mr Patrick Gilligan  
Ms Darina Muckian

Mr James Fitzmaurice  
Prof Ciarán Ó hÓgartaigh

Secretary: Ms Glenda Griffin

### **Communications Advisory Committee**

This committee provides advice relating to communication with the public. The committee met three times during 2012.

Chairman: Mr James Fitzmaurice  
Mr John O'Dea

Ms Fionnuala Barker  
Mr Brian Trench

Secretary: Ms Lucy Doody

### **Ionising Radiation Advice Committee**

The RPII's Ionising Radiation Advisory Committee is a high-level scientific advisory body and provides guidance to both the board and the RPII on any matters concerning ionising radiation referred to it by the board or the RPII, with particular emphasis on public health matters. The committee met twice during 2012.

Chairman: Dr Paraic James

Dr Michael Casey

Dr Harry Comber

Dr Peter Finnegan

Dr Maurice Fitzgerald

Dr Jean Luc Godet

Mr Seán Hogan

Dr Paraic James

Prof Ian McAulay

Prof Brendan McClean

Dr James McLaughlin

Dr Jill Meara

Prof Peter Mitchell

Dr Neil O'Donovan

Dr Geraldine O'Reilly

Dr Jane Renehan

Prof Wil Van Der Putten

Scientific Secretary: Ms Stephanie Long

## Staff Structure





## The RPII Team of 2012



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





# Financial statements

Comptroller and Auditor General Report for presentation to the Houses of the Oireachtas	60
Statement on Internal Financial Controls	61
Statement of Responsibilities of the Institute	62
Statement of Accounting Policies	63
Income and Expenditure Account	64
Statement of Total Recognised Gains and Losses	65
Balance Sheet	66
Notes to the Financial Statements	67

---

## Comptroller and Auditor General

### Report for presentation to the Houses of the Oireachtas

#### Radiological Protection Institute of Ireland

I have audited the financial statements of the Radiological Protection Institute of Ireland for the year ended 31 December 2012 under the Radiological Protection Act 1991. The financial statements, which have been prepared under the 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 50 of the Act, and in accordance with generally accepted accounting practice in Ireland.

#### Responsibilities of the Institute

The Institute is 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.

#### Responsibilities of the Comptroller and Auditor General

My responsibility is to audit the financial statements and report on 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.

In addition, I read the Agency's annual report to identify material inconsistencies with the audited financial statements. If I become aware of any apparent material misstatements or inconsistencies, I consider the implications for my report.

#### 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 2012 and of its income and expenditure for 2012.

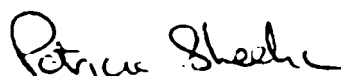
In my opinion, proper books of account have been kept by the Institute. The financial statements are in agreement with the books of account.

#### 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 information given in the Institute's Annual Report for the year for which the financial statements are prepared is not consistent with the financial statements, 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  
30 September 2013

---

## Statement on Internal Financial Controls

On behalf of the Board of the Radiological Protection Institute of Ireland, I acknowledge our responsibility for ensuring that an effective system of internal financial controls is maintained and operated, for preparing the accounts of the RPII and for complying with all statutory obligations applicable to the RPII.

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 RPII has taken steps to ensure an appropriate control environment within the RPII 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 ongoing 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 2012 the RPII Risk Registers were reviewed in accordance with the RPII 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 is 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 RPII monies and applying limits to the amounts authorised.
- 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 have been considered through the formal business risk assessment process and in the preparation of the RPII Internal Audit Plans.

Procedures have been issued to control the significant financial elements of the RPII's business, and authorisation limits have been set by the Board for purchasing.

### v) The RPII's Audit Committee is comprised of three members of the Board and an external person with financial and audit expertise.

In 2010 the firm Deloitte was appointed to fulfil the RPII internal audit function and report to the Audit Committee. In February 2013 Deloitte conducted a review of Internal Financial Controls with respect to 2012. There were no critical findings identified in this audit.

## Annual Review of Controls

I confirm that for the year ended 31 December 2012 the Board reviewed the effectiveness of the system of internal financial controls in March 2013.

Signed on behalf of the Board



Prof William Reville  
Chairman

---

## Statement of Responsibilities of The Institute

Section 16(1) of the Radiological Protection Act, 1991, requires the Institute to prepare financial statements in such form as may be approved by the Minister for the Environment, Community and Local Government with the concurrence of the Minister for Public Expenditure and Reform. In preparing these financial statements, the Institute is required to:

- Select suitable accounting policies and then apply them consistently.
- Make Judgements and estimates that are reasonable and prudent.
- Prepare financial statements on the going concern basis unless it is inappropriate to presume that the Institute will continue in operation.
- State whether applicable accounting standards have been followed, subject to any material departures disclosed and explained in the financial statements.

The Board confirm that they have complied with the above requirements in preparing the financial statements. The Institute is responsible for keeping proper books of accounts which disclose with reasonable accuracy at any time the financial position of the Institute and which enable it to ensure the financial statements comply with Section 16(1) of the Act. The Institute is also responsible for safeguarding the assets of the Radiological Protection Institute of Ireland and for taking reasonable steps for the prevention and detection of fraud and other irregularities.

*William J. Keefe*

Chairman:



Board Member:

---

## Statement of Accounting Policies

### 1. Basis of Accounting

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.

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 grants 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 operates 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.

### 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 holds a number of sources, some of which will be held for several years. It makes a provision for the cost of the disposal of the material in the year in which it receives new sources.



## Income and Expenditure Account

for the year ended 31st December 2012

2011 €		2012 €
	<b>Income</b>	
3,398,000	State Grant (Note 1a)	3,499,000
1,133,812	Net Deferred Funding for Pensions (Note 9b)	961,512
134,486	Transfer from/(to) Capital Account (Note 3)	263,301
4,666,268		4,723,813
462,024	Dosimetry & Calibration Service (Note 1c)	401,880
260,537	Radon Measurement Service	145,317
355,493	Radiation Monitoring Service	337,497
778,458	Regulatory Service	768,640
16,670	Miscellaneous/Contract Income	25,506
1,873,182		1,678,840
6,539,480		6,402,653
	<b>Expenditure</b>	
3,040,093	Salaries (Note 5)	2,964,059
1,326,458	Pension (Note 9c)	1,389,422
82,007	Dosimetry & Calibration Service (Note 1c)	36,877
45,288	Radon Measurement Service	55,432
104,226	Radiation Monitoring Service	117,384
74,386	Regulatory Service	77,613
263,786	Public Information & Communications	188,703
51,770	Nuclear Safety	51,335
79,462	Library & Document Management	66,162
558,884	Accommodation & Insurance	600,210
133,830	Travel & Subsistence	116,137
68,786	Recruitment & Training	73,319
60,143	MIS, IT & Customer Service	58,914
76,282	Postage, Phone & Office Supplies	57,863
11,515	Audit Fees	11,515
52,943	Professional Fees & Miscellaneous	49,010
824,870	Depreciation	571,768
6,968	Bad Debts	15,112
	(Profit) on Disposal of Fixed Assets	(850)
0	Provision for the disposal of radioactive sources (Note 12)	102,000
6,861,696		6,601,983
(322,216)	<b>Surplus/(Deficit) For Year (Note 4)</b>	<b>(199,330)</b>
1,013,591	Balance as at 1st January	691,375
691,375	Balance as at 31st December	492,045

The Statement of Accounting Policies and notes 1 to 13 form part of these Financial Statements

*William J. Reville*

Chairman

Date: 30.9.13

*[Signature]*

Board Member

**Statement of Total Recognised Gains and Losses**  
for the year ended 31st December 2012

2011 €			2012 €
(322,216)	Surplus/Deficit for year		(199,330)
(768,000)	Experience / Gains on pension scheme liabilities		(635,000)
771,000	Change in assumptions underlying the present value of pension scheme liabilities		3,475,000
3,000	Actuarial (Gain)/Losses on Pension Liabilities	9f	2,840,000
(3,000)	Adjustments to Deferred Pension Funding		(2,840,000)
(322,216)	Total recognised gain/(loss) for the year		(199,330)

The Statement of Accounting Policies and notes 1 to 13 form part of these Financial Statements

*William J. Revell*

Chairman

Date: 30.9.13

*[Signature]*

Board Member

## Balance Sheet

for the year ended 31st December 2012

2011 €		Notes	2012 €
1,286,163	<b>Fixed Assets</b>	2	1,025,862
	<b>Current Assets</b>		
1,507,822	Cash on Hand & at Bank		1,080,021
217,689	Debtors	10	351,208
1,725,511			1,431,229
	<b>Creditors - amounts falling due within one year</b>		
307,043	Creditors	11	258,138
23,556	Provision for Disposal of Radioactive Sources	12	125,556
703,538	Income in Advance	1(b)	555,490
1,034,136			939,184
691,375	<b>Net Current Assets</b>		492,045
1,980,538	<b>Total Assets Less Current Liabilities</b>		1,517,907
19,274,091	Deferred Pension Funding	9(d)	23,075,603
(19,274,091)	Pension Liability	9(e)	(23,075,603)
1,980,538	<b>Net Assets</b>		1,517,907
	<b>Financed by:</b>		
691,375	Income and Expenditure Account	4	492,045
1,289,163	Capital Account	3	1,025,862
1,980,538			1,517,907

The Statement of Accounting Policies and notes 1 to 13 form part of these Financial Statements

*William J. Revell*

Chairman

Date: 30.9.13

*[Signature]*

Board Member

---

## Notes to the Financial Statements

for the year ended 31st December 2012

### 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 €2,421,000 (2100 €3,398,000).

An amount of €1,078,000 (2011 nil) was received from the Environment Fund.

#### (b) Income in Advance

Income in advance represents 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 at year end will be brought to account in the years 2013-2016 as shown below.

	€
2013	376,979
2014	99,102
2015	47,707
2016	31,702
	<hr/> 555,490 <hr/>

#### (c) Dosimetry and Calibration Service

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

**Notes to the Financial Statements**  
for the year ended 31st December 2012

**2. FIXED ASSETS**

	Leasehold Improvements €	Office and Laboratory Furniture and Equipment €	Total €
<b>Cost:</b>			
€			
At 1st January 2012	788,301	7,511,258	8,299,559
Additions	-	308,467	308,467
Disposals	-	(12,033)	(12,033)
At 31st December 2012	788,301	7,807,692	8,595,993

**Depreciation:**

At 1st January 2012	609,016	6,401,380	7,010,396
Charge for year	25,612	546,156	571,768
On disposals	-	(12,033)	(12,033)
At 31st December 2012	634,628	6,935,503	7,570,131

**Net Book Value at**

31st December 2012	153,673	872,189	1,025,862
--------------------	---------	---------	-----------

**Net Book Value at**

31st December 2011	179,285	1,109,878	1,289,163
--------------------	---------	-----------	-----------

**3. CAPITAL ACCOUNT**

	2012 €	2012 €	2011 €	2011 €
Balance at 1st January 2012		1,289,163		1,423,649
Allocated to acquire fixed assets	308,467		690,384	
Amortised in line with depreciation	(571,768)		(824,870)	
Transfer (to) Income & Expenditure Account		(263,301)		(134,486)
Transfer from/(to) Capital Grant in Advance		0		0
		1,025,862		1,289,163

**4. ACCUMULATED SURPLUS**

	2012 €	2011 €
Balance at 1st January 2012	691,375	1,013,591
Surplus/(Deficit) for the Year	(199,330)	(322,216)
Balance at 31st December 2012	492,045	691,375

The Board approved essential expenditure during 2012 which resulted in a planned deficit for 2012.



## Notes to the Financial Statements

for the year ended 31st December 2012

### 5. SALARIES AND PENSIONS

	2012 €	2011 €
Gross Salaries	2,820,644	2,893,095
Employers P.R.S.I.	143,415	146,998
	2,964,059	3,040,093

The CEO received salary payments of €145,952 in 2012. Delegates allowance of €1,560 was made to the CEO.

The CEO received recoupment of travel and subsistence expenses of €12,537 in 2012. 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.

€181,543 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 (2011 - 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 1st October 2018. The rental is subject to review at five-yearly intervals. The last such review was 1st October 2008. The next review is in October 2013.

#### 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 31st December 2012 amounted to €0.

### 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 2012 is as follows:

	€		€
Professor W. Reville (Chairman)	11,517	Dr S Ryan	7,695
Ms F Barker	5,547	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	7,695		

Travel and subsistence expenses incurred by Board Members during 2012 amounted to €10,209

## Notes to the Financial Statements

for the year ended 31st December 2012

### 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 31st December 2011. 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 31/12/2012	At year-end 31/12/2011	At year-end 31/12/2010
	€	€	€
Discount rate	3.75%	5.30%	5.50%
Inflation assumption	2.00%	2.00%	2.00%
Future Salary Increases	3.00%	3.25%	3.25%
Future State Pension Increases	2.00%	3.25%	3.25%

#### (b) Net Deferred Funding for Pensions in Year

	Year to 31/12/2012 €'000s	Year to 31/12/2011 €'000s	Year to 31/12/2010 €'000s
	€	€	€
Funding Recoverable in respect of Current Year Pension Costs	1,574	1,523	1,667
State Grant Applied to Pay Pensions and Gratuities	(612)	(389)	(337)
	962	1,134	1,330

#### (c) Analysis of Total Pension Costs Charged to Expenditure

	Year to 31/12/2012 €'000s	Year to 31/12/2011 €'000s	Year to 31/12/2010 €'000s
	€	€	€
Current Service Cost	547	522	618
Interest Cost	1,027	1,001	1,049
Employee Contributions	(185)	(197)	(197)
Total Cost	1,389	1,326	1,470

## Notes to the Financial Statements

for the year ended 31st December 2012

### (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 31st December 2012 amount to €23.076 million (2011 : €19.274 million).

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

	Year to 31/12/2012 €'000s	Year to 31/12/2011 €'000s	Year to 31/12/2010 €'000s
Net Pension Liability at 1st January	19,274	18,137	18,938
Current Service Cost	547	522	618
Interest Cost	1,027	1,001	1,049
Benefits paid in year, net of staff contributions	(612)	(389)	(337)
Actuarial (gains)/losses on liabilities *	2,840	3	(2,131)
Past Service Costs			
Curtailments			
Settlements			
Net Pension Liability at 31st December	23,076	19,274	18,137

\*includes impact of changes to the assumptions

### (f) History of Experience Gains and Losses

	Year to 31/12/2012 €'000s €	Year to 31/12/2011 €'000s €	Year to 31/12/2010 €'000s €
Experience (gains)/losses on scheme liabilities amount:	(635)	(768)	(1,181)
As a percentage of the present value of scheme liabilities	(2.75%)	(4.00%)	(6.50%)
Total actuarial gains/(losses) recognised in STRGL	(2,840)	(3)	2,131
As a percentage of the present value of scheme liabilities	(12.30%)	(0.00%)	(11.80%)
Cumulative amount of gains/(losses) recognised in STRGL <sup>^</sup>	(3,797)	(957)	(954)

<sup>^</sup> represents cumulative gains/losses from 31/12/2002 inclusive

## Notes to the Financial Statements

for the year ended 31st December 2011

### 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 shows the life expectancy for members attaining age 65 in 2012.

Year attaining age 65	2012	2032
	€	€
Life expectancy - Male	87.3	89.9
Life expectancy - Female	88.7	90.9

### 10. DEBTORS

	2012	2011
	€	€
Debtors for Services	138,108	90,424
Bad Debts Provision	(15,112)	0
Prepayments	228,212	127,264
	351,208	217,689

### 11. CREDITORS

	2012	2011
	€	€
Accruals	219,817	236,825
Revenue Commissioners	38,321	70,218
	258,138	307,043

### 12. PROVISION FOR DISPOSAL OF RADIOACTIVE SOURCES

	2012	2011
	€	€
Opening Provision	23,556	58,892
Utilised		(35,336)
Provided in year	102,000	-
Closing Provision	125,556	23,556

### 13. APPROVAL OF FINANCIAL STATEMENTS

The financial statements were approved by the Board on the 26th of March 2013.

# Abbreviations and acronyms

ADS: Approved Dosimetry System	HSA: Health and Safety Authority	OECD: Organisation for Economic and Corporate Development
AGR: Advanced Gas-cooled Reactors	HSE: Health Service Executive	OPW: Office of Public Works
ALARA: As low as reasonably achievable	IAEA: International Atomic Energy Agency	OSPAR: Oslo-Paris Convention
ARGOS: Accident Reporting and Guiding Operational System	IBCI: Irish Building Control Institute	PMDS: Performance Management and Development System
Bq/l: becquerels per litre	IBEC: Irish Business and Employers Confederation	PRA: Probabilistic Risk Assessment
Bq/m3: becquerels per cubic metre	ICRP: International Commission on Radiological Protection	PRMG: Personal Radiation Monitoring Group
BSS: EURATOM Basic Safety Standard	ICTU: Irish Congress of Trade Unions	RADPAR: Radon Prevention and Remediation
C&AG: Comptroller and Auditor General	INAB: Irish National Accreditation Board	RPA: Radiation Protection Adviser
CAC: Communications Advisory Committee	IRAC: Ionising Radiation Advisory Committee	RPII: Radiological Protection Institute of Ireland
CBRN: Chemical-Biological-Radiological-Nuclear	IUNI: Irish Universities Nutrition Alliance	SI: Statutory Instrument
ConvEx: Conventions (on International Notification and Assistance in the event of a nuclear accident) Exercise	LIMS: Laboratory Information Management System	SMS: Safety Management System
CRPPH: Committee on Radiation Protection and Public Health	LLWR: Low Level Waste Repository	UCD: University College Dublin
DECLG: Department of the Environment, Community & Local Government	MHRA: Medical and Healthcare products Regulatory Agency	UK-BRE: UK Building Research Establishment
EAN: European ALARA Network	MoU: Memorandum of Understanding	UK-DECC: UK Department of Energy and Climate Change
ECURIE: European Community Urgent Radiological Information Exchange	mSv: millisievert	UK-EA: UK Environment Agency
EMERCON: Emergency Convention (IAEA emergency notification system)	NCPU: National Crime Prevention Unit	UK-NDA: UK Nuclear Decommissioning Authority
ENSREG: European Nuclear Safety Regulators Group	NCRRP: National Centre of Radiology and Radiation Protection – Bulgaria	UK-ONR: UK Office for Nuclear Regulation
EPA: Environmental Protection Agency	NDR: National Dose Register	UNSCEAR: UN Scientific Committee on the effects of Atomic Radiation
FANC: Federal Agency for Nuclear Control – Belgium	NEA: Nuclear Energy Agency	
FSAI: Food Safety Authority of Ireland	NEA-WPNEM: NEA Working Party on Nuclear Emergency Matters	
GDA: Generic Design Assessment	NEPNA: National Emergency Plan for Nuclear Accidents	
GIS: Geographic Information System	NIEA: Northern Ireland Environment Agency	
HASS: High Activity Sealed Sources	NPP: Nuclear Power Plant	
HERCA: Heads of European Radiation Competent Authorities	NRCS: National Radon Control Strategy	
	NUIG: National University of Ireland Galway	

## 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/m<sup>3</sup>.

The reference level for radon in workplaces is 400 Bq/m<sup>3</sup>.

The reference level for radon in schools is 200 Bq/m<sup>3</sup>.





**Radiological Protection  
Institute of Ireland**

An Institiúid Éireannach um  
Chosaint Raideolaíoch

**Contact Us**

Radiological Protection Institute of Ireland  
3 Clonskeagh Square  
Dublin 14  
Ireland

Tel: 01 2697766

Fax: 01 2697437

Email: [rpil@rpil.ie](mailto:rpil@rpil.ie)

Web: [www.rpil.ie](http://www.rpil.ie)

Opening hours: 9:00am to 5:00pm



Printed on recycled paper