
# Annual Report Executive Summary 2012

Radiological Protection Institute of Ireland

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An Institiúid Éireannach um Chosaint Raideolaíoch

# Executive Summary

**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' premised 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 µSv 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$^3$.

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 does 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 dosemeters, 3200 extremity dosemeters and 330 neutron dosemeters. The number of wholebody dosemeters 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 dosemeters 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.

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.

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