



Annual Report & Accounts 2011



**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 2011.



Prof William Reville
Chairman

Mission Statement

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

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Who we are and what we do

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

The RPII fulfils its remit by 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 and provides advice to the public and the Government on radiation sources, and on the corresponding risks and their management. The RPII is central to Ireland's emergency preparedness in the event of a nuclear accident abroad and also monitors 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 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 have pleasure in presenting to you the Annual Report and Accounts of the Radiological Protection Institute of Ireland for 2011. I was appointed Chairman of the RPII in January 2012. I wish to sincerely acknowledge the contribution to the RPII of my predecessor, Professor Eugene Kennedy. During the period of Professor Kennedy's chairmanship, significant progress was made on the development of a national strategy for addressing high radon levels in homes and on the development of a national policy on radioactive waste management, two key areas of risk that needed to be addressed to improve radiation protection in Ireland. The RPII is grateful to Professor Kennedy for his leadership and dedication and for his part in the ongoing development of the RPII as a trusted, independent, scientific organisation committed to the highest standards of radiological protection.

This report details the RPII's activities in 2011, demonstrating its role in ensuring that the 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. RPII monitors peoples' exposure to radiation and provides advice to the public and the Government on radiation sources, and on the corresponding risks and their management. RPII's activities are underpinned by a commitment to scientific excellence, and to ensuring that RPII advice is based on internationally agreed standards and on peer-reviewed research.

Radon is by far the major contributor to the exposure to radiation of people living in Ireland contributing, on average, about 60 % of the radiation dose. Although radon is "natural" in the sense that it emanates from the rocks in the ground and is present everywhere in the environment, it can be extremely hazardous at the elevated concentrations found in an estimated 7% of homes in Ireland. In terms of health detriment, exposure to radon is implicated in up to 200 of the approximately 1500 lung cancer deaths registered in Ireland each year. Exposure to radon can be controlled by relatively simple measures once the hazard is identified. The RPII, therefore, warmly welcomes the Government decision in September 2011 to establish an inter-agency group comprising representatives from relevant public authorities to develop a National Radon Control Strategy for Ireland. The group held its first meeting in November 2011 and established an ambitious work programme aimed at developing a strategy to reduce both the overall population risk and the individual risk for people living with high radon concentrations. An interim report will be prepared by the end of 2012 and a draft National Radon Control Strategy is due to be presented to the Minister late in 2013. The RPII is grateful for the commitment made by other public authorities in support of this important public health initiative and is determined to play its part in delivering an effective strategy to reduce peoples' exposure to radon.

As noted in the 2010 annual report, the endorsement by the Government of a national source reduction programme to reduce the number of unused and unwanted radioactive sources held by licensees is a very concrete step forward in the management of legacy radioactive waste in Ireland. The Government also agreed to the recommendations to establish a national radioactive waste storage facility and to the development of a temporary operational protocol to clarify the roles and responsibilities of agencies in relation to radioactive sources without clear ownership. I am pleased to note that good progress was made during 2011 in pursuit of these important initiatives. While it is clear that there are potentially contentious issues still to be resolved, particularly in relation to the establishment of a national radioactive waste storage facility, the RPII is committed to ensuring that Ireland meets the standards set internationally with regard to the safe management of radioactive waste.

The response to the damage at the Fukushima Nuclear Plant in Japan caused by the earthquake/tsunami in March 2011 was a major challenge for the RPII in 2011. As part of the overall response at national level, RPII's role was to provide information on the evolving situation at Fukushima, on the protective actions being applied in Japan and the results of its environmental monitoring being carried out in Ireland. Since the Chernobyl accident in 1986, RPII has developed its emergency response capabilities in line with best practice internationally. RPII's unique capabilities, both in terms of expertise and facilities, were fully utilised in ensuring that the public was kept informed of the likely impact of the Fukushima accident in Ireland. The RPII's response was widely acknowledged as positive and proactive, reinforcing its reputation as a trusted and expert organisation. Nonetheless, RPII itself recognises that a similar event in Europe or even the United States would bring far greater pressure to bear on RPII's expert emergency response resources. During 2011, as a follow up in this area, RPII has engaged further with national partners to arrange for the sharing of resources, where possible, to improve the overall sustainability of the national emergency response to nuclear accidents. RPII has also devoted significant effort to supporting initiatives at the international level aimed at improving the resilience of European nuclear power plants and other nuclear facilities against the type of extreme events that occurred at Fukushima.

As for all public sector bodies, RPII's activities during 2011 were undertaken against a background of decreasing staff numbers. I am pleased to report that RPII management and staff have engaged proactively with the challenging environment. However, it has not been possible for the RPII to maintain all of its existing services, and following substantial review, the Board took the decision that the RPII should withdraw from direct provision of dosimetry services as there are now other service providers available in Ireland. The RPII is grateful to its many customers for their support over many years and will work with customers to ensure a seamless transition to new suppliers.

On my own behalf, and on behalf of the Board members, I wish to thank all of the staff of the RPII for their continuing professionalism, dedication and hard work during the year. I wish to record the RPII's thanks to Ms Nuala Ahern and Dr Éamann Breatnach who retired from the Board during 2011. In their place, I welcome Dr Paraic James and Dr Patricia Cunningham, the nominee of the Medical Council, who were appointed to the RPII Board early in 2012. I wish to thank also 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.

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. 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 for other officials in the Department for their cooperation. The positive engagement and helpful collaboration of other agencies, government departments, third-level educational institutions and other external organisations with which the RPII has worked during 2011 is also gratefully acknowledged.



Prof William Reville
Chairman

Chief Executive's statement



During 2011, the RPII continued to focus its efforts on protecting people from the harmful effects of ionising radiation through effective regulation, monitoring of the environment and provision of accurate and timely advice to the public and to Government. The RPII's emergency response arrangements and the wider capability within the Irish public service to respond to a nuclear accident abroad was tested during the response to the Fukushima accident which occurred in Japan on 11 March 2011.

Fukushima accident

The Fukushima accident was the first large-scale nuclear emergency since Ireland's *National Emergency Plan for Nuclear Accidents* was first established after the Chernobyl accident in 1986. Immediately on receipt of notification by the International Atomic Energy Agency (IAEA) of the developing situation at the Fukushima Dai-ichi nuclear power plant on 11 March, a meeting of the National Co-ordination Group (NCG) was called. The role of the Group was to co-ordinate the provision of information and advice to Irish citizens in Japan and to the Irish public and media, and to make arrangements for monitoring food imports from Japan. The RPII's role within the Group was to provide information on the evolving situation at Fukushima, on the protective actions being applied in Japan and the results of environmental monitoring being carried out in North America and Europe, including Ireland.

The RPII's emergency response arrangements rely on atmospheric dispersion modelling and actual on-the-ground monitoring to determine the likelihood and quantity of radioactivity reaching Ireland. Throughout the period from 11 March to mid-May, the RPII mobilised its resources to ensure that the Government and public were kept informed of the likely impact of the Fukushima accident in Ireland. Although the releases from the nuclear plant were substantial, the transit time and significant dilution across the large distance from Japan to Ireland meant that increases in levels of radioactivity here were expected to be extremely small and not of concern from a public health point of view. The monitoring conducted by the RPII confirmed that this was the case. Based on the peak concentrations in air and milk and assuming these concentrations persisted until mid-May, the estimated maximum radiation dose that an adult in Ireland might expect to receive arising from the Fukushima accident was calculated to be a tiny fraction of the typical annual average dose a person in Ireland might receive from all sources of radiation. The doses resulting from Fukushima were therefore deemed to be of no significance from a public health or food safety point of view.

Towards the end of 2011, in line with best practice, the RPII conducted a formal review of its response to the Fukushima accident. While it was felt that the RPII generally responded well to the demands put on it in dealing with the situation, a number of areas for improvement were identified, including internal communications, resource allocation and training of additional staff. These areas will be followed up in 2012 and 2013.

Regulation and licensing

Every business or organisation which is involved – or may become involved – in storing, using, transporting, or disposing of radioactive materials, irradiation apparatus or other sources of ionising radiation, must apply to the RPII for a licence. At the end of 2011, licences were held by 1743 licensees across a range of sectors, including dental, medical, industrial, educational and veterinary. The RPII issued 59 new licences during the year, 29 of them to dental practices. The most notable licence application received during the year was for a hand-held dental X ray unit. Units of this type had not previously been licensed in Ireland and consequently required a comprehensive assessment in order to ensure that they could be used safely. Seventy-one licences were terminated during the year, 40 of which were in industry, reflecting the continuing downturn in the economy.

The RPII carried out 224 inspections during the year, with particular focus on holders of radioactive waste and disused sources, holders of nuclear moisture density gauges, non-destructive testing companies and dental licensees in the public sector. The inspection of non-destructive testing companies included both announced and unannounced inspections. As a follow-up to the 50 inspections undertaken in private dental practices during 2010, the RPII carried out 34 inspections of public dental clinics and a further 23 inspections of private dental practices in 2011. Overall, the RPII was satisfied with the standards of radiation protection observed during inspection.

The incidents reported and investigated during the year also contribute to the overall assessment of radiation protection among licensees. In 2011, nine incidents were reported to the RPII. One of these involved the theft of a portable veterinary X-ray unit and the remaining eight were in the medical sector. Two of the incidents involved patients and, as such, were outside the remit of the RPII. A further five involved individuals who were subjected to radiological procedures in error, because hospital staff failed to implement the correct patient ID protocol. The final incident involved a software malfunction in a CT unit which gave rise to an unintended exposure to the medical physicist setting up the equipment. In all cases the associated exposures were low and the incidents were fully investigated to the satisfaction of the RPII. As part of the follow-up, all reasonable measures to prevent such an incident happening were put in place by the licensee concerned.

In addition to the incidents highlighted above, the RPII was also notified during the year of 14 cases where the dose recorded on a personal dosimeter worn by staff working with ionising radiation exceeded the reporting levels specified in the licence. Six of the 14 cases were reported from cardiology departments where the dosimeters were inadvertently worn by staff on the outside of lead aprons. Following investigations into each of the reported cases, none of them was classified as a dose actually received by the wearer.

Under the joint programme of work with An Garda Síochána, one security survey of an industrial licensee was undertaken by the National Crime Prevention Unit, as well as follow-up visits to licensees surveyed in previous years.

In July 2011, in line with a commitment in the Strategic Plan to enhance the transparency of the RPII's regulatory process, the RPII published the RPII Inspection and Licensing Activities and Annual Inspection Programme for 2011, which provides details of the processes and priorities associated with licensing and inspection. Also, in 2011, the RPII Board approved an enforcement policy that sets out the principles guiding enforcement action, the procedures to be followed in cases that might lead to a prosecution and the criteria to be taken into account in deciding the action to be taken. This enforcement policy will be published in 2012.

Each year, in addition to its ongoing licensing and enforcement activities, the RPII seeks to improve the overall framework for the safe use of ionising radiation in Ireland. During 2011, two new policies affecting the dental sector were developed following extensive review of existing practice. Under the first policy, a personal dosimetry programme is no longer mandatory for staff working in dental radiology – instead, dentists may undertake a risk assessment, in conjunction with their Radiation Protection Adviser, to determine whether or not such a programme is required. The second policy, developed jointly with the Health Service Executive (HSE), advises that staff using x-ray equipment are not required to wear lead aprons, except in very particular circumstances which are set out in the policy, and there is no need for patients to wear lead aprons.

The requirement for the RPII to establish and maintain a register of Radiation Protection Advisers (RPAs) was introduced in S.I. No. 125 of 2000. Radiation Protection Advisers are recognised as experts in radiation protection and can advise both applicants and existing licensees on radiation safety issues.

Two registers have been established: the medical/dental register (set up in 2005) and the industrial/educational register (set up in 2009). A total of 59 applications for membership of the registers have been received, of which 44 have been successful. Approval to act as an RPA is granted for a five-year period, after which an RPA can apply for re-approval for a further five years. The first RPA approvals were due to expire in March 2011, but were automatically extended for a further 12 months as a re-approval fee had not been set. Ministerial approval for the fee was granted in November 2011, and the re-approval process commenced in March 2012.

In the development of its *Strategic Plan* covering the period 2011–2013, the RPII carried out an in-depth evaluation of all its work programmes, including its regulatory activities. With the ever-increasing demands on staff resource, the RPII recognised that the current ‘one size fits all’ licensing system is not sustainable into the future. Towards the end of 2011, work began on a new project to develop an authorisation model that would take a risk-based or graded approach to authorisation. Such an approach will provide users with a more efficient and effective service and will also require less administration. In this way, it will allow more resources to be allocated to inspection activities and to the development of guidance documents for users where they are needed.

The RPII has repeatedly emphasised the need for a broad-based government policy on the management of radioactive waste, and in particular, the need for a central storage facility for radioactive waste and orphan sources so that these can be effectively managed. In December 2010, the Government agreed to recommendations to establish a national storage facility, to endorse a national source reduction programme to be co-ordinated by sector and to the development of a temporary operational protocol to clarify the roles and responsibilities of agencies in the event of a source being seized or an orphan source being discovered. Progress was made in each of these areas during 2011, and while there is clearly a long way to go, the agreement of a national policy is a significant milestone and a clear endorsement of the RPII’s long-standing advice.

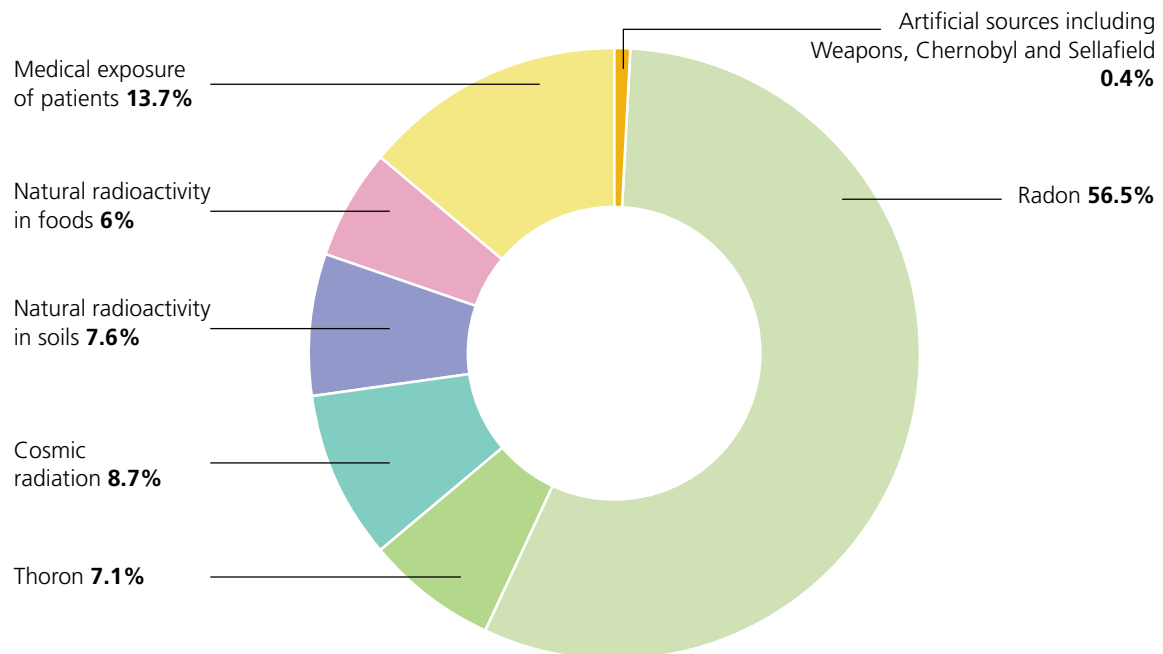
There were a number of developments in EU legislation during the year which impacted on the regulation of radioactive materials in Ireland. In July, a new Council directive establishing a community framework for the responsible and safe management of spent fuel and radioactive waste was finalised following intensive negotiations. The directive deals with the management of radioactive waste from generation to disposal and sets out requirements for a national waste management framework, including the role of the competent regulatory authority as well as the responsibilities of licence holders. The RPII provided advice to Government during the negotiations and will provide further advice on the transposition of the directive into national legislation which is due by August 2013.

Also during the year, negotiations commenced on a revision of the Euratom Basic Safety Standards Directive, which consolidates the provisions of the five existing directives that underpin the statutory framework for radiation protection in Europe. The directive sets out measures for the protection of the public, workers and patients from the harmful effects from both man-made and natural sources of radiation and, as such, is the key basis for national legislation on radiation protection.

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. By far the largest contribution (approximately 86 per cent – 3400 μSv) comes from natural sources, mainly from the accumulation of radon gas in homes. Man-made radiation contributes approximately 14 per cent (550 μSv), which is accounted for almost entirely by the beneficial use of radiation in medicine (540 μSv). Doses from other man-made sources account for less than 1 per cent (15 μSv). The contribution from all sources of radiation to the average annual dose to a person in Ireland is shown in the figure below.

Contribution from all sources of radiation



Radon

The RPII's strategic objectives relating to radon are to 'drive the implementation of a national control strategy to reduce radon exposure in Irish homes and workplaces' and 'to provide advice to stakeholders on ways to protect the public from exposure to ionising radiation'.

A key milestone was reached in September 2011, with the Government decision to establish an inter-agency group to develop a National Radon Control Strategy for Ireland. The inter-agency group is chaired by the Department of the Environment, Community & Local Government and includes a broad range of Government departments, local authorities and agencies with remits covering health and housing. The task of the inter-agency group is to develop a strategy that will reduce both the overall population risk and the individual risk for people living with high radon concentrations. The RPII is centrally involved in the group, providing technical input as well as administrative support. The group has been asked by the Minister to provide an interim report by the end of 2012 and to report to Government with a draft National Radon Control Strategy by November 2013.

During the year the RPII continued to work to increase public awareness of radon through working in partnership with local authorities and state agencies as well as engaging directly with the public. The RPII worked with 13 local authorities during the year to implement radon measurement and remediation programmes. To date radon levels have been measured in almost 10,000 local authority homes. All houses found to be above the reference level have been or are in the process of being remediated by the local authority. Under a Memorandum of Understanding between the RPII and the Health and Safety Authority (HSA), measurement of radon was included by the HSA in 79 workplace inspections it carried out during the year. A further initiative to highlight the issue of radon in the workplace is the inclusion of radon measurement in the HSA's online health and safety assessment tool, BeSmart. The RPII also worked closely with the HSE to raise awareness of radon among health professionals – this included conducting a training course on radon and placing articles on radon in medical and nursing periodicals.

A key stakeholder event hosted by the RPII each year is the National Radon Forum. The 2011 Forum was opened by Minister Phil Hogan and was the largest to date, with over 100 people attending. The theme of the Forum was 'An effective response to the radon problem in Ireland'.

Integrated local radon information campaigns were held in South Tipperary and Galway. These two campaigns incorporated multiple communication channels, including radio advertising, billboard information, public relations activities, leafleting, public meetings and social media campaigns.

By the end of the year, the RPII's radon database included measurements for over 50,000 homes. Of these 6392 have radon concentrations above 200 Bq/m³ with 747 having levels above 800 Bq/m³. During the year, 17 homes with radon levels of more than 10 times the reference level were identified. The highest level of 37,000 Bq/m³, almost 200 times the reference level, was found in a home in Castleisland, Co. Kerry. (This house is close to the house with the highest ever reading measured for a house in Ireland – 49,000 Bq/m³, measured in 2003.) In these cases the RPII provided the householders with information to assist them to reduce the radon levels in their homes.

Two surveys of householders conducted by the RPII in 2011 provided useful information on a range of issues connected with remediation. The surveys identified active radon sumps as the most common remediation method in Ireland. Typically, these cost €1100 to install. Of the houses found to have high radon levels, however, only 25 per cent were subsequently remediated.

Monitoring of the environment

The RPII continued its programme of monitoring radiation in the environment with the aim of assessing the exposure of the population. The 2011 programme showed that liquid discharges from the nuclear fuel reprocessing plant at Sellafield remain the dominant source of artificial radioactivity in the Irish Sea and that the consumption of seafood continues to be the main way in which the public is exposed to this radiation source. The radiation doses to typical consumers of seafood were below 1 microsievert (µSv), and this represents only a small fraction of the average annual dose (3950 µSv) to a person in Ireland from all sources of radioactivity.

Levels of ambient gamma dose rate were measured at 15 stations and levels of radioactivity in air were measured at 11 stations around the country. Even when the contamination from the nuclear accident at Fukushima that was detected in Ireland during March and April 2012 is taken into account, overall levels of artificial radioactivity in the Irish environment during 2011 were broadly in line with levels reported in recent years. The levels of radioactivity in milk, drinking water and mixed diet were also low and consistent with levels measured in previous years, and provide confirmation that the levels of artificial radioactivity in the environment do not constitute a risk to health and are very small when compared with the dose received as a result of natural background radiation.

The study of radioactivity in groundwater supplies, commenced in 2008, involved the analysis of samples collected from the EPA's network of 220 groundwater monitoring stations. The final results of the study found that all samples complied with the radioactivity parameters set out in the EU Drinking Water Directive and all had radon activity concentrations less than 500 Bq/l, which is the recommended maximum level of radon activity concentration in public drinking water supplies set by the RPII. A report of the completed study is planned for publication in 2012.

Specific projects such as that described above on groundwater are essential to complement and inform the ongoing monitoring programmes. During 2011, a research strategy was developed with the objectives of maintaining core technical skills, of updating the national dose assessment due to be published in 2013 and of underpinning the RPII's capacity to advise the Government and the public. A project to assess radioactivity levels in Carlingford Lough was commenced in collaboration with UCD and the Northern Ireland Environment Agency. In addition to the scientific results, the project provides an opportunity to strengthen links with partner organisations.

During 2009, a specially constituted group of five independent experts carried out a comprehensive review of the RPII's monitoring programme with a view to ensuring that the programme meets its stated aims and to make recommendations for improvement, if required. The review group broadly endorsed the RPII's monitoring programme and made some specific recommendations concerning sampling and skills maintenance for consideration in future programmes. The most significant changes implemented in 2011

were enhancements of the marine monitoring programme (which now includes greater use of bio-indicators such as seaweed), an increase in the number of measurements of plutonium and americium, and improvements in the efficiency and representativeness of sampling. In addition to these changes, the sample preparation area of the RPII's environmental monitoring laboratory was completely refurbished to enhance the RPII's capacity to handle the large volume of samples that would need to be processed in the event of a nuclear accident or crisis.

Radiation measurement services

In total, the RPII measured the radioactivity content in 1663 environmental samples and foodstuffs during the year. Certificates specifying the radioactivity content issued to exporters of Irish produce numbered 3893, compared with 3211 in 2010 and 3198 in 2009. The increase in 2011 can be attributed to increased demand for the service following the Fukushima Accident. The RPII's Dosimetry Service supplied approximately 74,000 dosimeters to clients during the year. These dosimeters were used to monitor the radiation exposure of over 8000 individuals. The Calibration Service tested 327 instruments for compliance with the relevant manufacturers' specifications. Radon measurements were completed in 5504 homes and 364 workplaces.

A major development during the year was the approval by the Board in October of a detailed plan setting out the steps the RPII will take to move from being a direct provider of dosimetry services to

taking on a supervisory role in relation to dosimetry services operating in Ireland. The steps include the establishment of an approval process for dosimetry services and a National Dose Register.

During the year, the RPII maintained accreditation to the ISO 17025 standard for its key measurement services. Development work on a new Laboratory Information Management System (LIMS) for the RPII's Calibration Service was also completed, greatly enhancing the administrative efficiency of the service, including the logging of instruments, recording of calibration data and the issuing of calibration certificates.

Emergency preparedness

As indicated above, the RPII's response to the Fukushima accident dominated the Institute's activities in the early part of the year, most especially for the small number of staff routinely involved in emergency preparedness work. However, there were a number of other noteworthy developments in this area during the year.

One of the challenges that the RPII faces when responding to an emergency is that of access to the appropriate expertise and data. In this context, the commissioning in 2011 of a microwave link between the RPII and Met Éireann is significant, as it will allow the Met Éireann forecaster assigned to the RPII's Technical Assessment Team to have direct access to a suite of forecasting tools run from Met Éireann headquarters in Glasnevin, Dublin.



In all, the RPII participated in six international emergency exercises organised by the IAEA and the European Commission. Of particular note was the exercise held in February which was designed to test the information exchange arrangements that would follow a simulated accident that had the potential to affect citizens in a number of countries. The lessons identified for Ireland from the exercise included the need to improve notification arrangements between An Garda Síochána and the RPII, and the need to document the procedures for the operation of the atmospheric dispersion model used during the exercise. These actions were completed by the end of 2011.

In November 2011, the RPII was notified through the international alerting arrangements that trace levels of radioactive iodine-131 had been detected in a number of countries across Europe, with a medical isotope manufacturing facility in Hungary identified as the most probable source. No iodine was detected on the RPII systems; but this was not unexpected, as the pattern of dispersion indicated that the concentrations in air were already close to the limit of detection by the time the plume reached France.

Safety of nuclear facilities abroad

Following the events at Fukushima, the European Council requested a review of safety at all European nuclear power plants. The European Nuclear Safety Regulators Group (ENSREG) produced criteria and a plan for the so called 'stress tests', which required plant operators to reassess the safety of nuclear plants against the type of extreme events that occurred at Fukushima. All EU member states with operating nuclear power plants, together with Switzerland and Ukraine participated in the process. Each country's nuclear safety regulator then reviewed the operators' reports and commented on their findings, identifying areas for further work and/or plant improvements. The plan includes a peer review element in 2012, and this involves the assessment of the 17 national reports by teams set up by ENSREG. As a member of ENSREG, the RPII is contributing to this peer review process. All relevant documents are published on the ENSREG website www.ensreg.eu.

The RPII continued to monitor developments at Sellafield and other UK nuclear sites closely. During the year, the RPII was briefed by UK authorities on developments in relation to activities at Sellafield. One briefing covered the new Sellafield Performance Plan, which describes the work that will be performed on the Sellafield site over its lifetime until closure in 2120. The progress being made by Sellafield against key safety-related targets will be monitored by the RPII into the future. Other noteworthy developments relating to Sellafield include the announcement that the Sellafield MOX (mixed oxide fuel) Production Plant would close at 'the earliest practical opportunity' and that the UK Government's preferred option for dealing with the UK's stock of plutonium is to incorporate it into MOX rather than disposing of it as waste or storing it indefinitely.

A number of incidents at Sellafield and other UK nuclear sites were brought to the attention of the RPII during the year. All of these incidents were rated as Level 1 or lower on the seven-point International Nuclear and Radiological Event Scale and had no radiological implications for Ireland.

In 2010, the UK Government announced plans to develop new nuclear power stations on eight sites in England and Wales, five of them on the Irish Sea coast. During 2011, the RPII advanced a study to assess the likely effects on Ireland of these new power stations. The assessment considers radioactive discharges to air and sea from the proposed stations, both under normal operating conditions and in the event of an accident. The work was originally scheduled to be completed in 2011, but was delayed to 2012 as a result of the RPII's Fukushima response.

During the year, the RPII continued to provide scientific and technical advice to the Department of the Environment, Community & Local Government on a range of nuclear-related issues. In particular, the RPII assisted with the preparation and follow-up of Ireland's national report to the IAEA Convention on Nuclear Safety submitted to the IAEA in September 2010 and presented orally during the fifth review meeting held in Vienna in April 2011. The RPII also acts as a scientific adviser to the Irish Government on the implementation of the OSPAR Strategy, which requires contracting parties to take all possible steps to prevent and eliminate pollution of the marine environment of the North East Atlantic by 2020.

Corporate services

The Corporate Services Division supports the scientific and technical work of the RPII and its good governance through the provision of services in the areas of Finance, Human Resources, Communications and other essential services. It aims to ensure that conditions are created that promote efficiency and effectiveness and a positive organisational culture, as well as a strong governance and compliance infrastructure.

Provision of advice

The RPII plays a key role in the provision of advice on radiation protection matters to the Government and to the public. Easy access to high-quality information on the RPII website and interaction with the media are key elements in improving awareness of radiation protection.

The RPII website performed consistently well throughout the year with over 82,000 visits by over 60,000 unique visitors. In particular, over 18,000 unique visitors to the website were recorded in June on foot of a press release about radon and over 7500 visitors were recorded in March surrounding media activity in relation to the Fukushima accident.

During the year the RPII continued to communicate with the public through the media by participating in 6 television and 38 radio programmes at national and regional level. Print media coverage was also strong with 250 published articles referring to the RPII, relating predominantly to radon gas and the Fukushima accident.

To ensure that the information provided meets public needs, the RPII undertook focus group research and some face-to-face interviews with key stakeholders to determine public attitudes towards radiation in the environment. The research found the two greatest public concerns relate to the low-level pollution of the Irish Sea from Sellafield and the possibility of a major accident as a result of terrorist attack on Sellafield. The research also highlighted the importance of openness and transparency for organisations such as the RPII in their dealings with the public.

Looking forward

Continuing to deliver the RPII's statutory functions against a background of reducing staff numbers remains challenging. The RPII remains focused on seeking efficiencies and improved customer service where possible and details of initiatives are provided in the RPII's Action Plan under the Croke Park Agreement. Particular developments during 2011 included individual skills appraisal and career planning in the management and administrative functions of the RPII in preparation for future staff losses through retirements. Specific initiatives to improve energy efficiency, IT security and records management were also advanced during the year.

In the context of public sector reform, and in light of the focus on merging agencies, the Department of the Environment, Community & Local Government requested the RPII and the EPA to consider what savings could be made if the two organisations were to merge. The two organisations collaborated on a joint preliminary assessment of a potential merger and compiled a report for submission to the Department. In November, the Government indicated that a critical review of the proposal to merge the RPII and the EPA was to be conducted and reported on by mid-2012. The RPII is participating in this process.

I wish to express my personal appreciation to all the staff of the RPII for their continued dedication and professionalism during the year. In particular, I wish to acknowledge the major contribution made by those staff directly involved in responding to the Fukushima accident. I am also grateful to the staff of the Environmental Radiation Policy Section of the Department of the Environment, Community & Local Government and other officials in the Department for their support for the work of the RPII.



Dr Ann McGarry

Chief Executive

Regulation and licensing



Ionising radiation plays an important role in Ireland's economic and social environment. Its use in hospitals is vital to the delivery of high-quality diagnostic and treatment services; it is used extensively in industry, with applications ranging from security screening and quality control testing to sterilisation of medical products and oil and gas exploration. However, the sources of such ionising radiation have to be managed safely and securely at all times – this is the purpose of the RPII's regulatory programme of licensing, inspection, guidance and enforcement.

Licensing

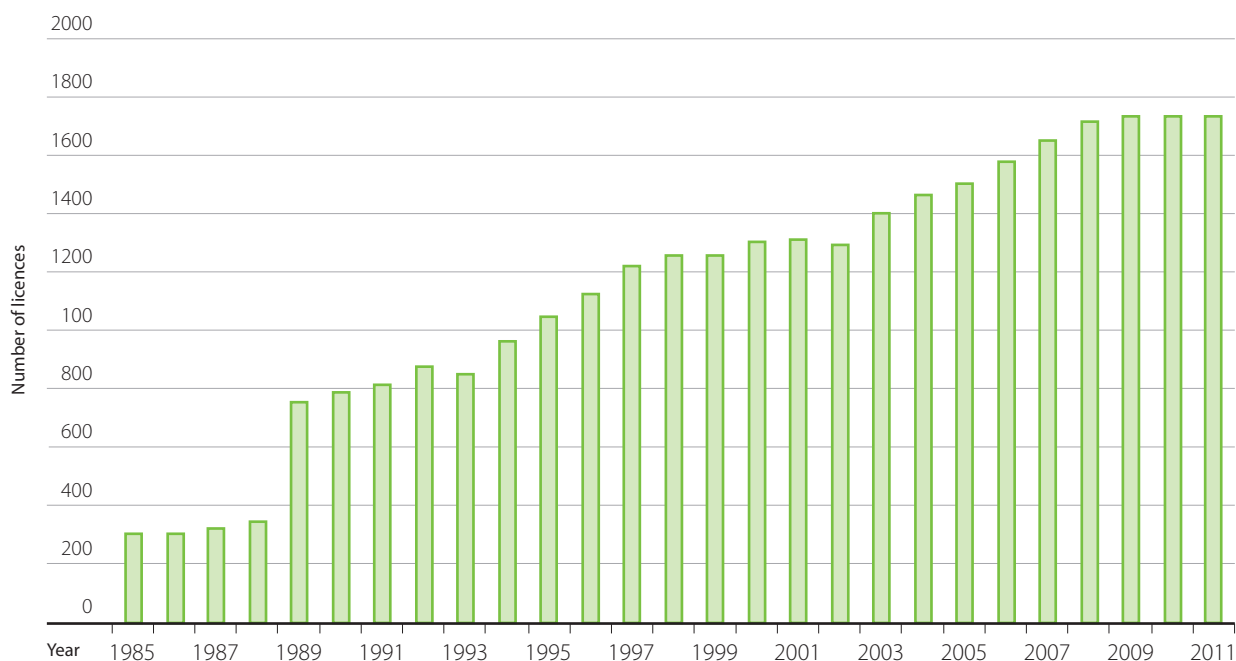
The RPII is required by the Radiological Protection Act, 1991 to operate a licensing system for all users of sources of ionising radiation. Any individual or organisation intending to use a radioactive source or irradiating apparatus is required to obtain a licence from the RPII prior to acquiring the item. There has been a steady increase in the number of new licences issued each year over the past three decades, although the total number of active licences has levelled off more recently (Figure 1). At the end of 2011, licences were held by 1743 licensees across a range of sectors, including dental, medical, industrial, educational and veterinary. 59 new licences were issued during the year, 29 of them to dental practices. However, reflecting the continued downturn in the economy, 2011 also saw the termination of 71 licences, 40 of which were in industry. In all cases where a licence is terminated, 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.

The RPII developed two new policies on licensing during the year. In the first, following an extensive review, the RPII set out revised requirements for personal dosimetry in dental radiology. The review included an examination of the RPII's dosimetry records over the past ten years, a survey of current practices in other European countries, and an acknowledgement of the standard of dental X-ray units in Ireland today. Whereas previously a personal dosimetry programme had been mandatory, the new policy allows dentists to undertake a risk assessment, in conjunction with their Radiation Protection Adviser (RPA), to determine whether such a programme is required. The second policy, developed jointly with the Health Service Executive (HSE), dealt with the requirement for operatives to wear lead aprons when taking dental X-rays. The new policy, which brought much-needed clarity on this issue, advised that there was no need for staff using X-ray equipment to wear lead aprons once they adhered to safe working practices and that there was no justification for aprons to be routinely worn by patients.

The most notable licence application received during the year was from an existing dental licensee who requested authorisation from the RPII to purchase a hand-held dental X-ray unit. While these types of units are routinely used in the United States and in other European countries, they had never been previously marketed in Ireland. Following a comprehensive assessment of the application, together with detailed

Figure 1: The number of medical, industrial, education, dental and veterinary licences 1985 to 2011



discussions with the manufacturer of the unit, the RPII determined that licences could be issued for these units provided the applicant worked closely with their RPA to develop appropriate radiation safety procedures. Based upon enquiries received from dentists, it is expected that the use of these types of units will increase in the coming years.

Graded authorisation

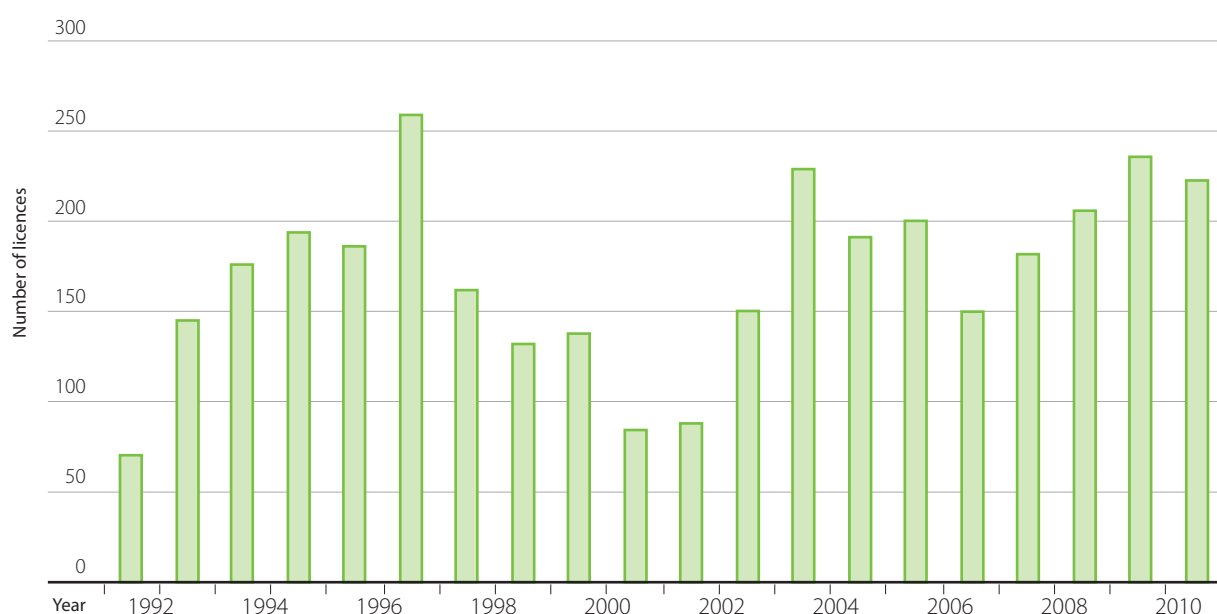
One of the RPII's strategic priorities is to regulate the safe and secure use of ionising radiation in Ireland in a sustainable and transparent manner. With ever-increasing demands on staff resources, the current 'one size fits all' licensing system is not sustainable into the future. Towards the end of the year, work began on a new 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. It would also require less administrative resources, and so allow more resources to be allocated to inspection activities

and the development of guidance documents for users, where more resources are needed. It would thus ensure the sustainability of the Regulatory Service, in line with the strategic priorities of the RPII.

Inspections

The annual inspection programme continues to be one of the main work priorities for the RPII's Regulatory Service, allowing it to directly assess the standards of radiation protection throughout Ireland. While inspections are undertaken primarily to assess compliance with legislation and licence conditions, the scope of the inspection also ensures that all workers and members of the public are protected against the harmful effects of ionising radiation. The selection of licensees to be inspected each year is based on a number of criteria, including the radiological risk associated with the licensee's activities, the date of their last inspection, and any incidents reported within their sector of operation. The total number of inspections undertaken broadly reflects the priorities identified at any given time and the staff resources available. Figure 2 illustrates the number of inspections undertaken each year from 1992 to 2011.

Figure 2: Inspections carried out 1992 to 2011



During 2011, 224 inspections were carried out (see Table 1). The inspection programme focused particularly on:

- Holders of radioactive waste and disused sources
- Holders of nuclear moisture density gauges
- Non-destructive testing companies
- Dental licensees in the public sector

There was a significant downturn in work in the non-destructive testing sector during 2011. This resulted in fewer advance notifications of intended site radiography work. However, based upon those received, the RPII was able to carry out three unannounced site radiography inspections during the year.

As a follow up to the 50 inspections undertaken in private dental practices during 2010, the RPII carried out 34 inspections of public dental clinics and a further 23 inspections of private practices in 2011. The findings of these 107 inspections, along with the findings of inspections carried out in other sectors, will be taken into account in the development of a new graded approach to authorisation.

Overall, the RPII was satisfied with the standards of radiation protection observed; many of the areas of non-compliance related to administrative aspects of the licence rather than to serious issues of radiation protection.

Table 1: Inspections undertaken in 2011

Licence Category	Number in Category	Inspections Undertaken in 2011
Industrial users	276	67
Education & research	19	10
Government Departments and State-run services	5	0
Hospitals/Medical	168	56
Distributors	44	6
Veterinary surgeons	284	27
Dentists	947	57
Security surveys	-	1
TOTAL	1743	224

In July, the RPII published the *RPII Inspection and Licensing Activities and Annual Inspection Programme for 2011*. This report provided, for the first time, 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. The publication of this report on an annual basis will promote a better understanding of the processes and priorities associated with licensing and inspection which may impact on licensees and other interested parties.

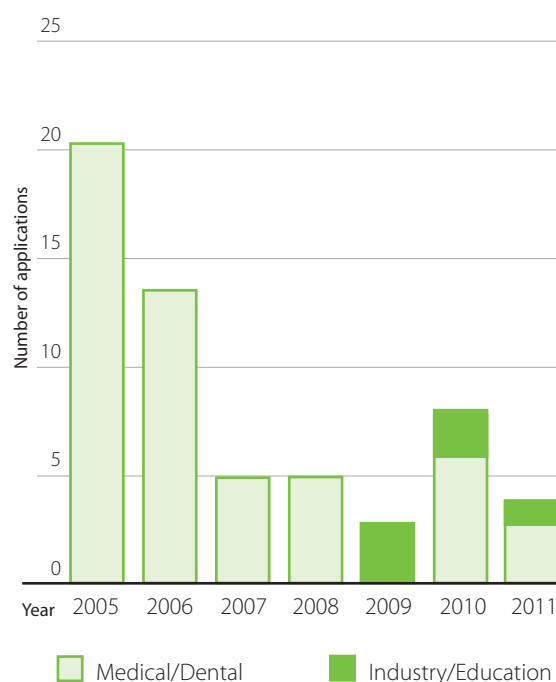
Security of radioactive sources

The RPII's joint programme of work with An Garda Síochána was maintained during 2011. This programme assesses the current security provisions at licensees' premises with a view to raising the standards to best international security practice. During the year, one security survey of an industrial licensee was undertaken by the National Crime Prevention Unit (NCPU), and a number of measures were recommended to improve the security arrangements. Officers from the NCPU also carried out follow-up visits to licensees who had been the subject of security surveys in previous years to confirm the current status of their security arrangements.

Register of Radiation Protection Advisers

Article 19 of S.I. No. 125 of 2000 requires the RPII to establish and maintain a register of approved Radiation Protection Advisers (RPA). These individuals are recognised as experts in radiation protection who can advise both applicants and existing licensees on radiation safety issues, including how to comply with the RPII's licensing requirements and the provisions of S.I. No. 125 of 2000. The RPII has established criteria for individuals wishing to be included in the register of RPAs, in both the medical/dental sector and the industrial/education sector, and has set up two assessment committees – one to consider applications from each sector. During the year, applications were received from four individuals, two of which were successful. Since the establishment of the medical/dental register in 2005, and the industrial/educational register in 2009, 59 applications have been received (Figure 3), of which 44 have been successful.

Figure 3: Number of RPA applications received 2005 to 2011



Approval to act as an RPA is granted for a five-year period, after which an RPA can apply for re-approval for a further five years. Before re-approval, an RPA must demonstrate to the assessment committee that they have kept their knowledge of the principles and practices of radiation protection up to date. While the first RPA approvals were due to expire in March 2011, the re-approval process was delayed, as a re-approval fee had not been set. Accordingly, the approval of all RPAs was automatically extended for an additional 12 months while the RPII sought approval for the associated fee. Ministerial approval for this fee was granted in November, and the re-approval process will commence in March 2012.

In February, all approved RPAs were invited to attend the first RPII-RPA Liaison Meeting. The purpose of this meeting was to provide the RPAs with updates on relevant developments and to give them an opportunity to raise any topical issues with the regulator. Topics discussed at the meeting included inspection priority setting and recent inspection findings, QA standards in the medical sector, incident reporting, and new policies in dental radiology. The meeting was extremely successful, and it is intended to hold similar meetings on an annual basis.

Reportable doses

RPII licences require that a full investigation be carried out by the licensee whenever a dose is recorded on a personal dosimeter that exceeds a specified reporting level. The reporting levels specified in the licence are 2 millisievert (mSv) for a whole-body dose over a 16-week period and 50 mSv for an extremity dose over a 16-week period.

The RPII was notified of 14 such events during the year, covering radiotherapy, cardiology, radiography, and industrial non-destructive testing. This figure compares with nine in 2010. Six of the 14 cases were reported from cardiology departments (interventional radiology), where whole-body badges were inadvertently worn by staff on the outside of lead aprons. Following investigations into each of the reported cases, none of them were classified as a dose actually received by the wearer.

Enforcement activities

While the RPII has worked with internal enforcement procedures for many years, an overall policy for regulatory enforcement activities was developed and approved by the Board in 2011. This policy sets out the principles guiding enforcement action, the procedures to be used leading to a possible prosecution, and a decision architecture which takes a tiered approach to the decision process and sets out the criteria that should be taken into account at each level.

The objective of the enforcement policy is to establish a shared understanding of the principles that must be applied in deciding to take enforcement actions, and of the procedures that must be followed in such cases. In taking such decisions, the RPII must ensure that there is proportionality of action, consistency of approach, and transparency of process – and this must not only be done, it must also be seen to be done. The policy provides an agreed framework for managing the regulatory discretion that is exercised on a daily basis by inspectors as they deliver on the strategic priority of regulating the safe and secure use of ionising radiation in Ireland.

Incidents and investigations

In November, the RPII was informed by a veterinary licensee that his portable veterinary X-ray unit, along with his lead apron and thyroid collar, had been stolen from his pickup truck, which had been parked outside his home overnight. He reported the matter to the local Garda station. The RPII notified NCPU, the Veterinary Council of Ireland and Veterinary Ireland of the theft. However the unit was not recovered.

Incidents in the medical sector

During the year, the RPII was notified of eight incidents in the medical sector. Two of these incidents were not, in fact, reportable to the RPII, as they involved patients – such incidents are outside the remit of the RPII, and these were subsequently reported to the HSE. Five of the incidents involved individuals who were subjected to radiological procedures in error, due to hospital staff failing to implement the correct patient ID protocol. Doses received by these individuals ranged from 1.1 to 5 mSv. As these individuals did not receive exposures which were to their benefit they are not classified as patients in the context of S.I. No. 125 of 2000 and accordingly can only be considered as members of the public. The final incident was from a hospital that reported a software malfunction with a SPECT/CT unit which gave rise to an unintended exposure during set up for QA testing. Fortunately the dose to the medical physicist was negligible and the fault was rectified by the service engineer. In this case the RPII alerted the Irish Medicines Board to the incident. In all cases the incidents were fully investigated to the satisfaction of the RPII and all reasonable measures to prevent the incident reoccurring were put in place by the hospitals concerned.

Accreditation 2011

For over three years the RPII's Regulatory Service has successfully implemented and maintained its quality management system for its inspectorate function. This system is accredited to the ISO 17020 standard by the Irish National Accreditation Board (INAB).

As part of the quality management system, all inspectors must be witnessed performing an inspection by the technical manager each year. The programme of inspection witnessing is used to assess each inspector's practical competencies and technical

knowledge; it also ensures that there is a consistent approach between inspections and inspectors. During 2011, six inspections were witnessed by the Technical Managers in the Regulatory Service. In addition to the inspection witnessing programme, a schedule of internal audits was followed during 2011 to verify conformance to the requirements of the ISO 17020 standard.

In September 2011, following an INAB surveillance visit, the Regulatory Service retained its accreditation to the ISO 17020 standard. During this surveillance visit, INAB assessors witnessed inspections of a diagnostic X-ray department in a hospital and an industrial manufacturing facility using sealed sources for level gauging and non-destructive testing.

Radioactive waste

The RPII has repeatedly emphasised the need for a broad-based government policy on the management of radioactive waste, and in particular the need for a central storage facility for radioactive waste and orphan sources, so that these can be effectively managed. In December 2010, the Government agreed to a series of recommendations from a high-level interdepartmental group, including the recommendation to establish a national storage facility. A technical group was mandated to draw up detailed specifications for the facility. While there is clearly a long way to go, this is a very significant milestone in national policy, and is a clear endorsement of the RPII's long-standing advice.

The Government also endorsed a national source reduction programme to be co-ordinated by sector, although funding of the programme remains a matter for the individual government departments involved. The RPII will act as co-ordinator for the private sector. The objective of this programme is to combine the State's resources to reduce the radioactive waste inventory as much as possible by exploiting existing disposal routes. A national facility can then be designed to deal with residual waste for which no other disposal route can be found and for the management of seized or orphaned sources.

The development of a national waste store is a long-term goal. In the meantime, a temporary operational protocol, mandated by Government, agreed by the interdepartmental group and subsequently noted by Government, clarifies the roles and responsibilities of agencies and departments in the event of a source

being seized or an orphan source being discovered, and sets out the principles governing temporary access to currently available storage facilities.

Following intensive negotiations during the year, in which the RPII provided advice to the DECLG and the Permanent Representative in Brussels, a new Council directive (2011/70/EURATOM) establishing a community framework for the responsible and safe management of spent fuel and radioactive waste was finalised on 19 July. The directive deals with the management of radioactive waste, from generation to disposal, when that waste results from civilian activities. It provides for the establishment of national policies and programmes on radioactive waste management and sets out criteria to be used in developing such policies and procedures. In particular, it strongly encourages member states to make arrangements for the disposal of waste in the member state in which it was produced, although it does allow for international arrangements. It sets out the requirements for a national waste management framework, including the role of the competent regulatory authority as well as the responsibilities of licence holders. It has provisions on transparency and reporting, and specifically provides for peer review of national arrangements every 10 years. The end date for transposition of the directive into national legislation is 23 August 2013.

Inter-agency co-operation

The RPII has continued to engage with both national and international agencies to promote high standards in radiation protection in Ireland, and to enhance its own effectiveness. This is particularly important in the regulatory environment, and during 2011 the RPII met a number of agencies to discuss areas of mutual interest, including the Department of Education & Skills, the Veterinary Council, Veterinary Ireland, the Irish Veterinary Nurses Association, the Environmental Protection Agency, the Irish Lamp Industry, the Fire Engineering Systems Association, the Irish Aviation Authority, An Garda Síochána (National Crime Prevention Unit), the Customs Division of the Revenue Commissioners, Dublin Port Authority, the Health and Safety Authority, the Northern Ireland Environment Agency, the Irish Medicines Board, the Health Information & Quality Authority, the Dental Council, the Health Service Executive, the Department of Health & Children, the Department of Defence, and the Commission for Energy Regulation.

The RPII also participated in a number of international groups in 2011 and as a result has enhanced its ability to influence decisions that impact the protection of people in Ireland. These included 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 Authorities. Staff from the Regulatory Service also participated in IAEA expert missions to Romania and Mauritius.

Exposure to Aircrew from Cosmic Radiation

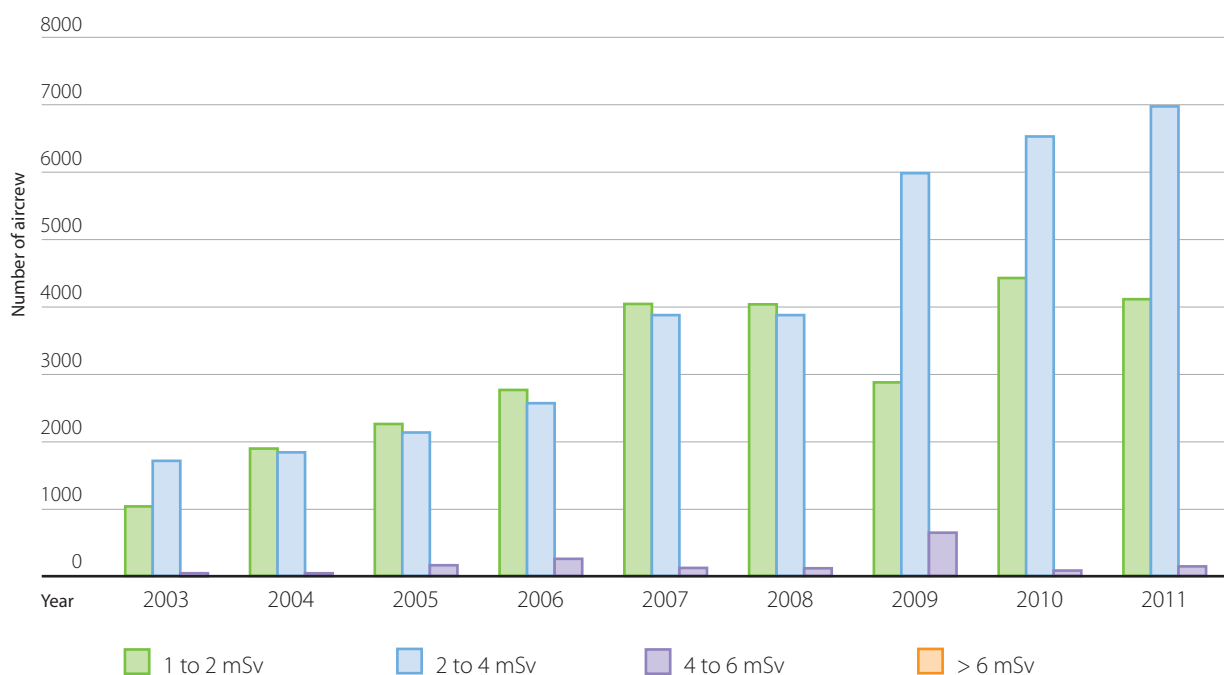
Under S.I. No. 125 of 2000 the holder of an air operator's certificate is required to evaluate doses received by aircrew to determine if measures to control exposure to cosmic radiation are warranted. This requirement applies to those air operators whose aircrew is potentially liable to receive an annual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

are estimated by the airlines using internationally recognised software models. For 2011, the information received from 6 licensed air operators showed that 11,362 individuals were estimated to receive annual radiation doses above 1 mSv. Of these, 4175 received between 1 and 2 mSv, while 7001 received doses between 2 and 4 mSv and 186 received doses over 4 mSv. No doses over 6 mSv were reported. Since monitoring of aircrew began in 2003 there has been a consistent yearly increase in the number of aircrew receiving doses in excess of 1 mSv (Figure 4). This can be attributed to an increase in the number of aircrew required for the operation of new and existing routes as the demand for air travel increases.

The Joint Convention

The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was adopted on the 5 September 1997; Ireland is a Contracting Party (CP). The Convention applies to spent fuel and radioactive waste arising from civilian nuclear reactors and, in certain circumstances, from military facilities. The Convention

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





also applies to planned and controlled releases into the environment of liquid or gaseous radioactive materials from regulated nuclear facilities. It also applies to the management of disused sealed sources.

The main objectives of the Convention are to:

- Ensure and maintain a high level of safety worldwide in spent fuel and radioactive waste management
- Ensure that there are effective defences against potential hazards during all stages of spent fuel and radioactive waste management
- Prevent accidents that have radiological consequences

Implementation of the Convention is monitored through a review process. Every three years Contracting Parties submit reports detailing their national arrangements for waste management to demonstrate compliance with the Convention. There is a written question-and-answer peer review process on these national reports and they are then formally presented and defended during a two-week Convention meeting. This is an incentive Convention; there are no formal enforcement provisions.

The Fourth Review Meeting of the Joint Convention will take place in May 2012; Ireland submitted its national report in October 2011.

Euratom Basic Safety Standards Directive

The proposed Euratom Basic Safety Standards Directive consolidates the provisions of five existing directives that underpin the statutory framework for radiation protection in Europe. The proposed directive will streamline the existing legislation and bring coherence to regulatory and protection measures for the public, workers and patients. It will also bring European legislation into line with current scientific understanding, and in particular with the main recommendations of the International Commission on Radiological Protection (ICRP). It will also expand provisions for dealing with natural radiation sources and the protection of the environment.

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. The RPII is working with DECLG in the negotiation of this important directive in the Council of the EU, and these negotiations are expected to continue into 2013.



Exposure of the Irish population to radiation

One of the RPII's four strategic priorities is to provide the expertise, technical capability and information essential to the protection of the Irish population and the environment. The RPII addresses this priority by targeted environmental monitoring, by research to assess the sources of radiation exposure to the public and environment, and by maintaining the capability to assess radiological impact when new sources of radiation dose are identified.

Radioactivity from both natural and artificial origins exists throughout the environment. Natural radioactivity has been present since the formation of the Earth and is also formed in the Earth's atmosphere as a result of interactions with cosmic radiation. 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 northwest 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.

On average, a person in Ireland receives an annual dose of 3950 μSv from all sources of radiation. By far the largest contribution of approximately 86 per cent (3400 μSv) comes from natural sources, mainly from the accumulation of radon gas in homes. Man-made radiation contributes approximately 14 per cent (550 μSv): dominated by the beneficial use of radiation in medicine (540 μSv). Doses from other man-made

sources account for less than 1 per cent (15 μSv). The contribution from all sources of radiation, to the average annual dose to a person in Ireland, is shown in Figure 5.

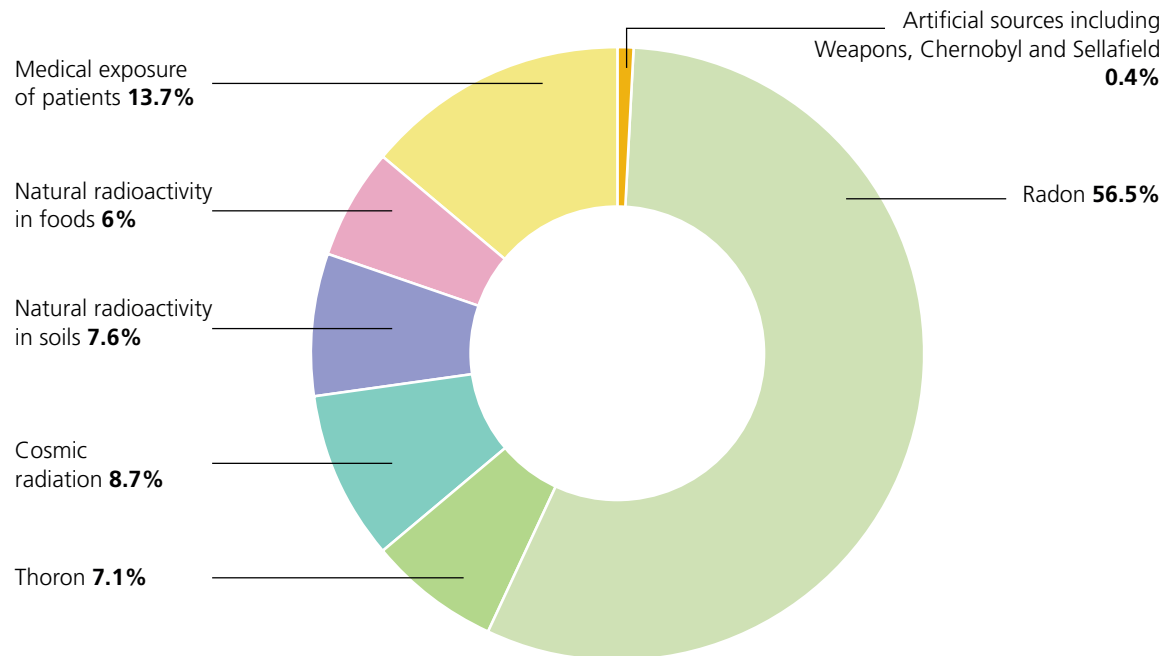
As radon is the principal source of radiation exposure for the Irish population, information on the RPII's work in this area is provided separately in the Chapter on Radon (see page 27).

Environmental monitoring

The 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 distribution of artificial and natural radionuclides in the environment
- Maintain the systems, procedures and expertise needed for rapid assessment of environmental contamination in the event of a nuclear or radiological incident, so that effective countermeasures can be implemented to protect the Irish public
- Provide up-to-date and accurate information on radiation levels in the environment to Government and the public
- Support the RPII's role in providing high-quality

Figure 5: Contribution from all sources of radiation



science-based advice to Government, in particular to assist in identifying measures to protect the population

- Support the Irish food and agriculture industry through rigorous assessment of the radioactivity status of Irish foodstuffs. This assessment provides the basis for certifying radioactivity levels in produce for export.

The RPII monitoring programme assesses:

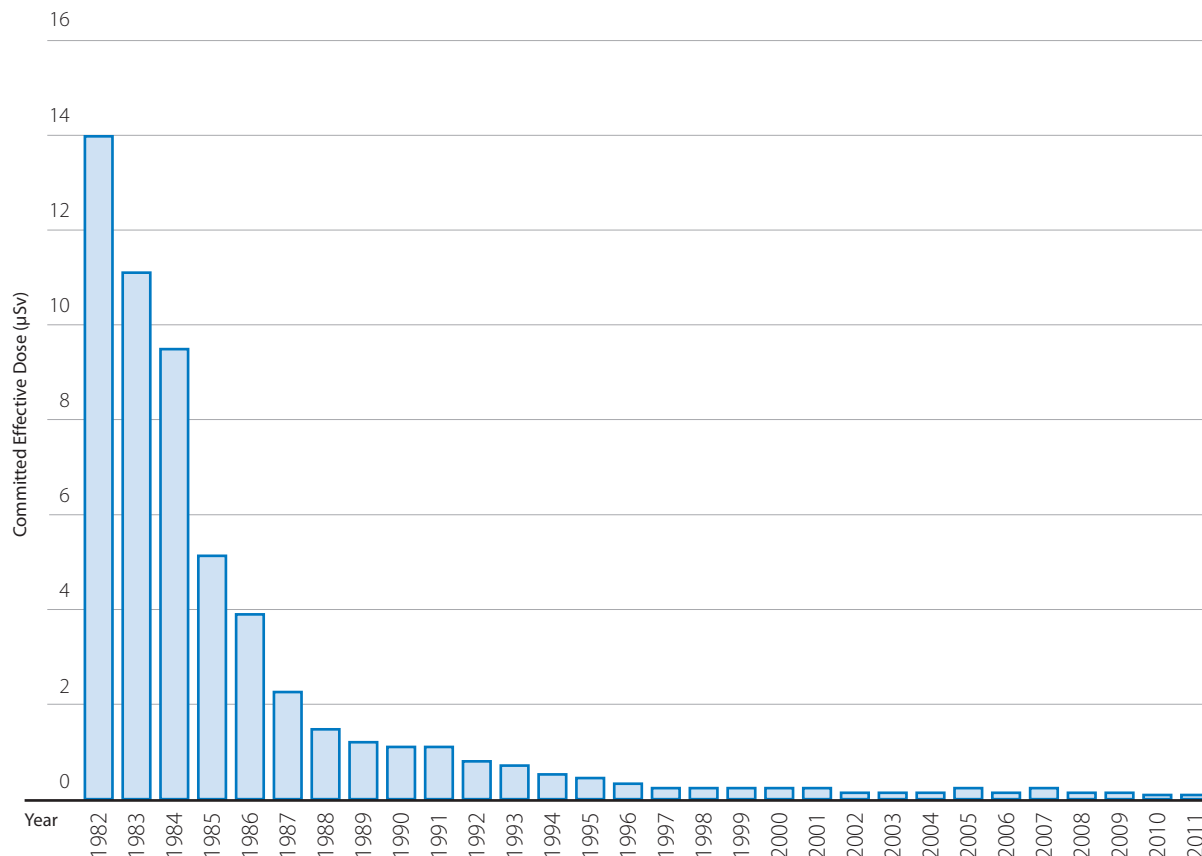
- Ambient radioactivity based on measurements of radioactivity in air and of external gamma dose rate from a network of permanent monitoring stations located throughout the country
- Levels of radioactivity in a variety of food products and drinking water
- Levels of radioactivity in the Irish marine environment based on sampling and measurement of seawater, sediment, seaweed, fish and shellfish.

The programme includes round-the-clock measurements from the permanent monitoring network and a programme of sampling followed by laboratory testing. Further information on the network

of permanent monitoring stations is provided in the Emergency Preparedness section of this report (see page 35). 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. Overall, levels of artificial radioactivity in the Irish environment during 2011 were broadly in line with levels reported in recent years, despite the contamination from the nuclear accident at Fukushima that was detected in Ireland during March and April 2012.

The marine monitoring results show that public exposure to discharges of artificial radioactivity arises principally from the consumption of seafood. Figure 6 illustrates the doses to typical seafood consumers between 1982 and 2011 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 2011, the dose to the typical seafood consumer from caesium-137 was estimated at 0.05 microsieverts (μSv), compared with the average total annual dose of 3950 μSv .

Figure 6: Committed effective doses to typical seafood consumers due to caesium-137, 1982-2011



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. Radioactive doses incurred by the Irish public as a result of artificial radioactivity in the environment do not constitute a health risk and are very small compared with the dose received as a result of background (natural) radiation.

The results of the RPII's environmental monitoring are published in a series of reports, all of which are available on the RPII's Website, www.rpii.ie.

Changes to the monitoring programme in 2011

The monitoring programme was revised in 2011, based on a review of its scope and effectiveness by an international peer group and a number of internal workshops to consider in detail the peer group's technical recommendations. The most significant changes implemented in 2011 related to the marine element of the programme:

- Greater use was made of bioindicators such as seaweed (*Fucus*) rather than directly measuring radionuclides in seawater. Given the current levels in the environment, the additional effort required for direct water measurement is no longer justified.

- The number of actinide measurements (plutonium and americium) was increased. Given the long-term presence of these radionuclides in the Irish Sea, their relative contribution to marine critical group doses will continue to increase. In light of the recent reduction in concentrations of technetium-99, the number of measurements made for this radionuclide was reduced.
- The number of coastal sampling points was reduced but sampling frequency was increased, as this was seen as a more efficient approach to marine sampling.
- Minor changes were made to the seafood sampling, including some changes to the species sampled to ensure that the programme continues to reflect current Irish seafood landing and consumption patterns. Some rationalisation of sampling locations was also undertaken to improve the efficiency of the programme.

Changes to other elements of the programme were relatively minor. It was decided to sample mixed diet at only one location (rather than three) but at a higher sampling frequency, and annual sampling from one large surface-water reservoir was added to the drinking water programme to more explicitly meet European Commission recommendations.

Radioactivity in groundwater sources

The final phase of sampling and analysis for a national study of radioactivity in groundwater supplies was completed in 2011. In co-operation with the Environmental Protection Agency (EPA), samples were collected from the EPA's network of 220 groundwater monitoring points and analysed for radon activity concentrations. The EPA's network has been designed to ensure that it is representative of the variations in hydrogeology and anthropogenic pressures across a groundwater body. In an earlier phase of the project, samples from the same monitoring points had been analysed and assessed for compliance with the radioactivity parameters set out in the Drinking Water Directive (DWD).

Following the publication of the European Commission's recommendation that surveys be undertaken in member states to determine the scale and nature of exposures caused by radon in

domestic water supplies, the RPII set recommended maximum levels for radon activity concentrations in public and private drinking water supplies at 500 becquerels per litre (Bq/l) and 1000 Bq/l respectively. For all groundwater sources tested, radon activity concentrations were found to be less than 500 Bq/l.

A report of the complete study is planned for publication in 2012.

Tritium in seawater project 2008-2010

Because of the low radiotoxicity of tritium, to date it has not been included as a radionuclide of interest in the RPII's routine environmental monitoring programme. However, between 2008 and 2010, the RPII undertook a project to measure tritium in seawater around the Irish coast. This was done in order to fulfil Ireland's commitments to the OSPAR Convention for the protection of the marine environment of the north-east Atlantic, as described in the Safety of Nuclear Facilities Abroad section of this report (see page 38), and to provide a baseline for future measurements, given the possibility of increased discharges of tritium into the marine environment as nuclear power production increases in Europe. A report on this work is due to be published by the RPII in 2012.

While the study confirmed that concentrations of tritium in seawater around the Irish coast are low, with negligible radiation doses to the Irish population, the RPII intends to monitor this radionuclide at the seawater sampling locations from 2012. This is on the basis of indications from the UK that discharges of tritium from Sellafield may increase temporarily during the next five years as a result of decommissioning work.

Upgrade of RPII laboratory

In 2011, the RPII completely refurbished the sample preparation area of its environmental monitoring laboratory in Clonskeagh, Dublin. The sample preparation area is fundamental to the operation of the laboratory, as it is where the initial processing of all samples is carried out. In the event of an accident or crisis, the efficient management and handling of incoming samples would be crucial to the laboratory's ability to respond effectively.

Prior to the refurbishment, the sample preparation area had not been reorganised or updated since the laboratory was originally laid out in 1987. The layout did not allow for optimisation of workflows and did not make best use of the available space. The accumulation of wear and tear over more than 20 years was very evident. The laboratory refurbishment was completed in December 2011, on time and within budget, and the refurbished area provides for a much more functional, flexible and efficient laboratory.

Research to support environmental monitoring programme

The monitoring programme is complemented by specific projects that investigate particular aspects of terrestrial and marine radioactivity, such as the studies of natural radioactivity in groundwater supplies and of tritium levels in seawater described above.

The RPII is an independent knowledge-based organisation, and stakeholder confidence in its work is crucial. The RPII recognises that, if it is to be a trusted and respected source of expertise on radiation protection in Ireland, scientific excellence must underpin all aspects of its work. With this in mind, a research strategy was developed in 2011, within the framework of the *RPII Strategic Plan 2011-2013*. The research strategy for the period 2011 to 2013 identifies a number of priorities and objectives for research in the area of environmental monitoring. These include:

- The need to maintain core technical skills: Research is seen as playing an important role in this regard. While the 2009 peer review of the monitoring programme was not specifically concerned with research, it did highlight the role of research in developing and maintaining core skills and made some suggestions for useful future research work.
- Updating the national Dose Assessment Report in 2013: This will drive a number of research projects, including the measurement of natural radioactivity in foodstuffs and drinking water.
- The need for research to inform the RPII's advice to Government and the public on the radiological implications of UK plans to build new nuclear reactors and to decommission existing reactors.

In 2011, in collaboration with UCD and the NIEA, the RPII started a project to assess radioactivity levels in Carlingford Lough. This is a follow-up to a study completed in the 1990s, and will facilitate an assessment of changes in measured environmental concentrations. As well as supplementing the data on artificial radioactivity levels in this north-east coast sea inlet, the project will strengthen the linkages between the RPII and the NIEA and UCD. Sampling and analysis for this project are planned for 2012, with publication of a report in 2013.

Planning for an assessment of the dose to the Irish population from natural radioactivity in food was also started in 2011. A further collaboration with UCD, in the area of Monte Carlo modelling of high-resolution gamma spectrometers, was also completed in 2011.

In keeping with the RPII's commitment to subject its work to peer review, RPII staff presented work at the International Conference on Radioecology and Environmental Radioactivity in 2011 and contributed to international networks such as the IAEA ALMERA (Analytical Laboratories for the Measurement of Environmental Radioactivity), the Analysts Informal Working Group in the UK, and the annual conference of the Irish Radiation Research Society.



Radon

Radon is a naturally occurring radioactive gas that originates from the decay of uranium in rocks and soils. It is the principal source of radiation exposure for the Irish population. Radon is the second largest cause of lung cancer after smoking and accounts for approximately 200 lung cancer deaths in Ireland every year. While exposure to radon increases the lung cancer risk for everyone, it should be noted than radon poses a particular risk for smokers because of the synergistic interaction between the radon and smoking.

The RPII's strategic objectives relating to radon, as set out in the *RPII Strategic Plan 2011–2013*, include:

- Driving the implementation of a national control strategy to reduce radon exposure in Irish homes and workplaces
- Providing advice to stakeholders on ways to protect the public from exposure to ionising radiation.

Since 2006, the RPII has consistently advocated a Government-led co-ordinated national approach to reducing exposure to radon. In September 2011, a key milestone was reached with the Government decision to establish an inter-agency group to develop a National Radon Control Strategy for Ireland. This important decision implements the recommendation of the *Joint Position Statement on Radon Gas in Ireland* published by the RPII and HSE in 2010. The decision is also in line with the recommendations of the World Health Organisation and of the *Draft Euratom Revised Basic Safety Standards Directive*, which calls on member states to establish national strategies for dealing with radon.

During 2011, the RPII implemented a range of measures aimed at protecting the public from radon exposure through the provision of information and advice. This included targeted radon information campaigns, which aimed to provide advice directly to the public, and work with key stakeholders such as the HSA, the HSE and local authorities on a range of initiatives to increase awareness of the radon problem.

Development of a National Radon Control Strategy

The inter-agency group charged with developing a National Radon Control Strategy for Ireland was established in November by Mr Phil Hogan, TD, Minister for the Environment, Community & Local Government. The inter-agency group is made up of representatives from:

- The Department of the Environment, Community & Local Government
- The Department of Health
- The Department of Communications, Energy & Natural Resources
- The Department of Jobs, Enterprise & Innovation
- The Health Service Executive
- The Health and Safety Authority
- The City and County Managers Association
- The Sustainable Energy Authority of Ireland

- The Geological Survey of Ireland
- The RPII.

The task of the inter-agency group, as set out in the Government decision, is to develop a National Radon Control Strategy that will reduce both the overall population risk and the individual risk for people living with high radon concentrations. The Government decision charged RPII with providing technical and secretarial support to the inter-agency group.

The first meeting of the Group was held in late November, following which a detailed work programme was agreed. The work programme aims to:

- Develop recommendations for actions to reduce radon risk
- Develop recommendations for implementation issues, such as reporting, co-ordination, metrics and review
- Conduct analysis to underpin the group's recommendations, including stakeholder engagement and economic analysis.

The inter-agency group has been asked by the Minister to provide an interim report by the end of 2012 and to report to Government with a draft National Radon Control Strategy by November 2013.

Engagement with other public bodies and local authorities

A strategic priority for the RPII is to work in partnership with others to implement national radiological protection initiatives. In this context, the RPII continued to work with local authorities and state agencies on a range of radon initiatives.

The RPII continued to support local authorities in implementing radon measurement and remediation programmes in social housing. During 2011, the RPII collaborated with 13 local authorities to support their work on radon in social housing. To date, approximately 12,000 local authority homes in 19 counties have been measured for radon by the RPII and other radon measurement companies. All houses found to be above the 200 Bq/m³ reference level have been, or are in the process of being, remediated by the local authority.

In addition to minimising the radon risk to local authority tenants, the local authority measurement programmes have provided the RPII with valuable information on the extent of the radon problem in Ireland, on the success of remediation, and on the relationship between build date and indoor radon levels. To the end of December 2011, 12 local authorities had supplied details of all radon measurement in social housing completed by them

Table 2: Radon measurements undertaken by local authorities on social housing (as reported to RPII as of 31 December 2011)

County	Local Authority*	No. of measurements	No. of homes above 200 Bq/m ³	Max. Radon Conc. measured (Bq/m ³)
Carlow	Carlow County Council	1260	109	4050
Cork	Cork County Council	4196	234	3300
Galway	Galway City Council	246	81	1866
Kerry	Kerry County Council	457	6	393
	Killarney Town Council	335	35	751
	Tralee Town Council	190	93	4542
Leitrim	Leitrim County Council	136	5	595
Meath	Meath County Council	376	9	477
Sligo	Sligo Borough Council	48	1	490
	Sligo County Council	100	5	1012
Wicklow	Wicklow County Council	1860	23	588
	Arklow Town Council	378	2	288
TOTAL		9582	603	

Note * Including: County councils, city councils, borough councils and town councils

to RPII as summarised in Table 2. This information will feed directly into and support the development of the national radon strategy.

Under the Memorandum of Understanding between the RPII and the HSA, a joint working group on radon was established, and during the year this group discussed a range of issues, including the development of the National Radon Control Strategy, workplace inspections, a joint protocol for dealing with individual workplaces and householders with high radon levels, raising the awareness of radon in the medical profession, and the inclusion of radon in the HSA's online health and safety assessment tool, BeSmart.

During 2011, the HSA included radon in some 79 workplace inspections. To support this effort, RPII gave presentations on radon in workplaces at regional seminars organised by the HSA, the Institute of Occupational Health and Safety, and HSE Principal Dental Surgeons.

A number of initiatives were taken during the year to raise awareness of radon among health professionals, including RPII participation in a training course in December for public health doctors on public health responses to radon, and the placement of articles on radon in medical and nursing periodicals.

National Radon Forum

In November, Minister Phil Hogan, TD, opened the ninth National Radon Forum in Dublin. The theme of the 2011 Forum was 'An effective response to the radon problem in Ireland'. Mr William Strandling of the Norwegian Radiation Protection Authority spoke about the development of Norway's national radon strategy. The Forum also heard speakers from the HSE, who spoke about radon as a manageable public health risk, and from the RPII, who presented the results of surveys on remediation rates and costs, and outlined the proposed framework for stakeholder consultation in the development of Ireland's National Radon Control Strategy.

The Forum was the largest to date, with over 100 people attending from Government departments, local authorities, the HSE, HSA, radon measurement and remediation companies, insurance companies and universities, as well as members of the public.

Public awareness of radon

The RPII continued its efforts in 2011 to raise awareness of the measures that householders need to take to protect themselves and their families from exposure to radon gas. This included integrated local radon information campaigns in two high-radon areas (South Tipperary and Galway). In these integrated campaigns, multiple channels are used to communicate with the public, including radio advertising, billboard information, public relations activities, leafleting, public meetings and social media. Almost 150,000 information packs were distributed to households in the areas, with posters and information packs also distributed among community groups, health centres and health professionals. Engagement with key stakeholders, such as politicians, local authorities, community and business groups and the general public, formed part of the awareness raising activities.

During 2011, the RPII became aware of 17 houses with extremely high radon levels above 2000 Bq/m³. The highest level was found in a home in the Castleisland area of north Kerry, which was notified to the RPII by one of the private measurement companies. The radon measurement for this house indicated an average radon concentration of 37,000 Bq/m³ or almost 200 times the reference level of 200 Bq/m³. This home is located only a few kilometres away from a house found in 2003 to have the highest ever reading for an Irish house of 49,000 Bq/m³. When it was informed of this measurement, the RPII engaged with the householder, the local authority and the HSE, issued a press release to the local media, and wrote directly to householders in neighbouring townlands. This was followed up by advertisements in local newspapers aimed at encouraging householders to test for radon. The other 16 homes identified with radon levels above 2000 Bq/m³ are located in Sligo (1), Tipperary (1), Galway (3), Cork (2), Wexford (1), Carlow (3), Donegal (1), Kerry (3), and Waterford (1).

Research

Focus group research carried out by the RPII in 2010 identified a public need for up-to-date information on the cost of radon remediation in Ireland. In addition, it was recognised that, in the context of the development of the radon strategy, more Irish data was needed on a range of issues connected with remediation. Consequently, two surveys were conducted in 2011 – the first looking at remediation costs, remediation methods and householder experience of remediation, and the second looking at remediation rates and householder reasons for carrying out remediation.

These surveys identified active radon sumps as the most common remediation method in Ireland. The typical cost of installation of an active sump was €1100. The rate of radon remediation – that is, the proportion of houses found to have high radon levels that are subsequently remediated – was 25%. While this latter figure is similar to that found in studies in other countries, it demonstrates that there is room for improvement in getting people to remediate.

Radon measurement statistics

Table 3 summarises by county the radon measurements undertaken by the RPII since it commenced radon measurements in the early 1990s. Of the approximately 50,000 measurements completed by the end of 2011, some 11,300 were made as part of the National Radon Survey, while the bulk of remainder were fee-paying measurements. 7139 of the houses measured by the RPII to December 2011 were found to have radon concentrations above the national reference level of 200 Bq/m³ and of these, 747 had radon concentrations above 800 Bq/m³. The counties with the highest percentage of homes identified above the reference level are Sligo, Waterford and Galway.

The National Radon Survey estimated that radon levels in 7% of the national housing stock have radon concentrations above 200 Bq/m³, which when applied to the current housing stock equates to approximately 110,000 houses. Taking into account both measurements completed by the RPII and a best estimate of the houses measured by other measurement services, it is estimated that less than 5% of houses nationally have so far been measured. It is clear, therefore, that the vast bulk of houses with a radon problem have yet to be identified.



**Table 3: Radon measurement results by county
(based on measurements completed by the RPII up to 31 December 2011)**

County	Total number of houses measured	Number of houses in categories of radon concentration			Max (Bq/m ³)
		0-199 Bq/m ³	200-799 Bq/m ³	> 800 Bq/m ³	
Carlow	1159	933	214	12	2300
Cavan	444	430	14	0	780
Clare	4065	3570	410	85	3500
Cork	5484	4816	620	48	4500
Donegal	1432	1354	76	2	3400
Dublin	3539	3321	216	2	1400
Galway	5894	4582	1160	152	3700
Kerry	3694	3099	473	122	49,000
Kildare	1279	1223	53	3	1100
Kilkenny	1333	1142	176	15	2400
Laois	565	541	24	0	570
Leitrim	392	365	26	1	1600
Limerick	1360	1254	103	3	1900
Longford	322	289	32	1	880
Louth	822	723	99	0	750
Mayo	4121	3395	663	63	6200
Meath	966	888	76	2	930
Monaghan	295	277	18	0	790
Offaly	770	753	17	0	770
Roscommon	703	627	72	4	1400
Sligo	2320	1734	491	95	5600
Tipperary	2433	2134	277	22	3400
Waterford	2410	1923	422	65	9700
Wexford	1749	1469	258	22	2900
Westmeath	689	626	62	1	1100
Wicklow	2112	1745	340	27	16,000
Total	50,352	43,213	6392	747	



Radiation measurement services

The RPII's laboratory provides radiation measurement services on a commercial basis to industry, the health sector, the education sector and other State agencies. Services are currently provided in the areas of personal dosimetry, instrument calibration, radon measurement, analytical services and product certification. The RPII is committed to maintaining high quality in all of its services consistent with customer requirements and international best practice.

The RPII adopts a three stranded approach to maintaining and developing quality:

- **Intercomparison exercises:** The laboratory takes part in a wide range of measurement intercomparison exercises organised by the IAEA, the European Commission and others. During 2011, it took part in a total of twelve such exercises: two in relation to dosimetry, one radon and nine radiochemistry.
- **Accreditation:** The laboratory's quality system is externally audited and accredited to the ISO 17025 standard.
- **International best practice:** RPII actively participates in international technical expert groups and networks so as to ensure that the methods used are up to date and in line with internationally accepted good practice.

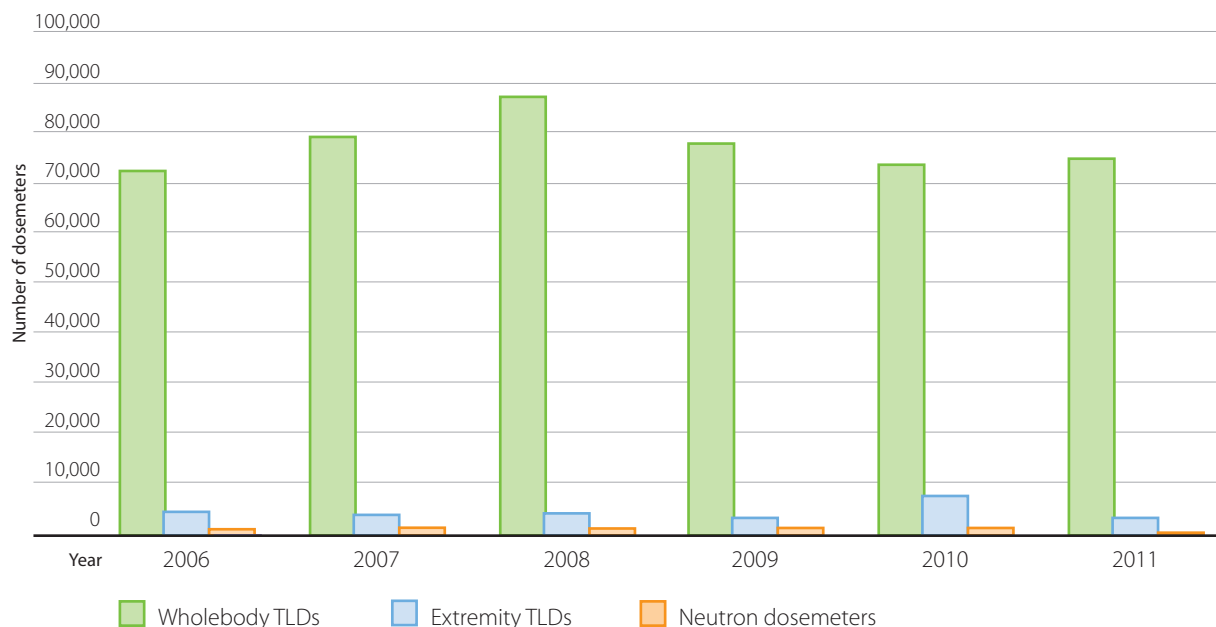
Personal dosimetry

In 2011, the RPII's Dosimetry Service issued approximately 74,000 whole body dosimeters for over 8000 workers in Ireland. This is similar to the number of whole body dosimeters issued in 2010. Approximately 3100 extremity dosimeters were issued in 2011, which is also similar to the number issued in 2010 (3300). Approximately, 330 neutron dosimeters were issued in 2011. This was the second year in a row in which the number of neutron dosimeters issued decreased – 890 were issued in 2009 and 570 in 2010 (see Figure 7). This decrease may be attributed to a reduction in the number of personnel requiring monitoring due to the downturn in activity in the construction sector.

In accordance with the *RPII Strategic Plan 2011-2013*, the RPII will move from being a direct provider of dosimetry services to take on a more supervisory role in relation to dosimetry services operating in Ireland. In October, the Board approved a detailed plan to establish an approval process for dosimetry services, to establish a National Dose Register, and to withdraw the RPII from the dosimetry market.

Participation in international dosimetry groups is vital to maintaining a high quality of service to customers, and the RPII's Dosimetry Service staff continued to participate in the European Radiation Dosimetry Group (EURADOS) and in the UK Personal Radiation Monitoring Group (PRMG).

Figure 7: Number of dosemeters issued 2006 to 2011



Calibration Service

In 2011, 327 instruments were tested by the RPII's Calibration Service for compliance with the relevant manufacturer's specifications.

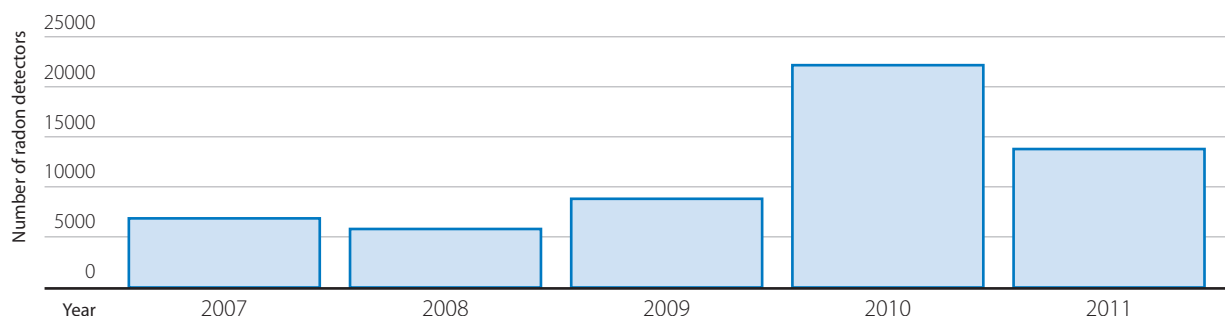
Development work on a new Laboratory Information Management System (LIMS) for the RPII's Calibration Service was completed in 2011. This new system is designed for logging instruments, recording calibration data and issuing calibration certificates. It greatly enhances the administrative aspects of the service.

In 2011, Calibration Service staff continued to represent the RPII in the International Atomic Energy Agency's Secondary Standard Dosimetry Laboratories Network (IAEA SSDL) and the UK Ionising Radiation Metrology Forum (IRMF).

Radon measurement

The RPII provides a radon-in-air measurement service for homes, workplaces and schools. In 2011, approximately 14,000 radon detectors were issued to 5504 homes and 364 workplaces. The number of radon detectors issued annually between 2007 and 2011 is shown in Figure 8. While the number issued in 2011 is down on 2010, it is almost double the annual average for the years 2007 to 2009. 2010 was an exceptional year, probably due to the high level of publicity relating to radon in the national media throughout that year.

Figure 8: Number of radon detectors issued to homes and workplaces 2007 to 2011



Occupational exposure from dosimetry measurements

The RPII's Dosimetry Service provides a personal monitoring service to determine occupational exposure to ionising radiation. In 2011, of over 8000 individuals monitored by the Dosimetry Service, 122, or 1.5%, had annual doses exceeding the minimum reporting level of 0.1 mSv. Of these, 21 workers in medical, veterinary and industrial sectors had annual doses exceeding the dose limit for members of the public of 1 mSv. All whole-body doses measured in 2011 were below 6 mSv.

In accordance with S.I. No 125 of 2000 exposed workers liable to receive an effective dose greater than 6 mSv per year must be classified as Category A and as such be subject to additional control measures.

Ninety-eight individuals working in industrial, medical, veterinary and research fields received measurable extremity doses. The highest annual dose was 96.3 mSv, to the right hand of a medical physicist.

The measured doses were in all cases considerably below the annual limits for whole-body and extremity doses for workers exposed to ionising radiation of 20 mSv and 500 mSv respectively.

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 2011 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 Communities Regulations
- Testing of wipe tests for radioactive sources
- Testing of dredging samples for compliance with the requirements of the Dumping at Sea Act, 1996
- Measurement of radon in drinking water

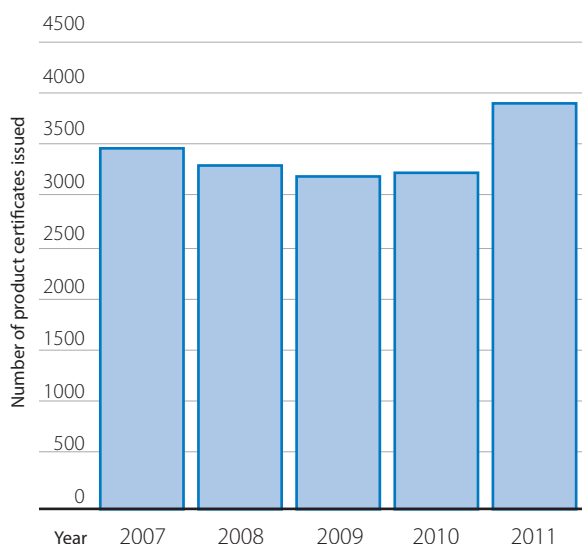
In total, 1678 samples were tested during the year (see Table 4).

Table 4: Radioactivity testing on environmental samples and foodstuffs, 2011

Sample Type	Numbers
Air filter samples	229
Environmental samples - terrestrial and marine	477
Wipe test samples	378
Contract samples	594
Total	1678

The RPII provides a certification service to exporters of Irish foodstuffs and other produce. The number of product certificates issued in 2011 was 3893, compared with 3211 in 2010 and 3198 in 2009. The increase in 2011 can be attributed to increased demand for the service following the Fukushima accident. The number of product certificates issued per year since 2007 is shown in Figure 9.

Figure 9: Number of product certificates issued 2006 to 2011





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 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 Department of the Environment, Community & Local Government (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
- 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 routinely tests and exercises atmospheric dispersion models in order to predict the movement and deposition of radionuclides in the environment. Modelling work is of particular benefit in the case of an unplanned atmospheric release of radionuclides and before field measurements are available.

Preparedness arrangements

In the event of a nuclear accident, arrangements are in place for one of Met Éireann's forecasters to join the RPII's Technical Assessment Team to provide expertise on meteorological issues. The commissioning in 2011 of a microwave link between the RPII and Met Éireann (via the National Emergency Coordination Centre) provided a welcome addition to national emergency preparedness and response capabilities. This link will allow the Met Éireann forecaster to have direct access to a suite of forecasting tools run from Met Éireann headquarters in Glasnevin.

The RPII, with the assistance of Met Éireann and a number of local authorities, operates a National Radiation Monitoring Network (Figure 10). This network provides continuous measurement of ambient gamma dose rate, conducts airborne particulate sampling for assessment of radioactivity in air, and collects rainwater samples. During 2011, 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 RPII's response to the accident at Fukushima (see page 41), no increased levels of ambient gamma dose rate

above the normal fluctuations in background levels were observed during 2011, including during the period of the Fukushima emergency in Japan. Trace levels of iodine and caesium were detected in aerosol samples across the Irish network for a number of weeks, but the levels were so low as to pose no risk to health.

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 and use of the dedicated communication links with the National Emergency Coordination Centre.

In addition to responding to the Fukushima nuclear accident, the RPII participated in six international emergency exercises organised by the International Atomic Energy Agency (ConvEx exercises) and the European Commission (ECURIE exercises). Of particular

Figure 10: National Radiation Monitoring Network



note was the ECURIE Level-3 exercise in February 2011. This exercise was designed to test the procedures of the European Community Urgent Radiological Information Exchange (ECURIE) in a situation where there was a potential for radioactive release to atmosphere following a simulated accident at the Oskarshamn nuclear power plant in Sweden. The two-day exercise was a very useful test of information sharing on national responses to an incident that could affect citizens of a number of countries. The RPII's response focused on use of the notification systems, long-range atmospheric dispersion modelling, and guidance to be issued to Irish citizens in or travelling to the affected area. The lessons identified for Ireland from the exercise included the need to improve notification arrangements between the An Garda Síochána and the RPII, and to document procedures for the operation of the atmospheric dispersion model used during the exercise. These actions were completed by the end of 2011.

Emergency alerting systems

There are two independent international systems in place for rapid notification of any radiological emergencies with potential cross-border impacts. These are operated by the IAEA in Vienna (EMERCON) and the EC in Luxembourg (ECURIE). These systems operate continuously and are regularly tested and updated. (For example, communications channels for the EC system are automatically tested daily.) The messages communicated via these systems have different levels of urgency from 'information' to the most urgent 'alert'. In June 2011, the IAEA upgraded its nuclear emergency reporting website to the Unified System for Information Exchange in Incidents and Emergencies (USIE); key RPII personnel were trained in the use of this system before changeover.

Other notifications

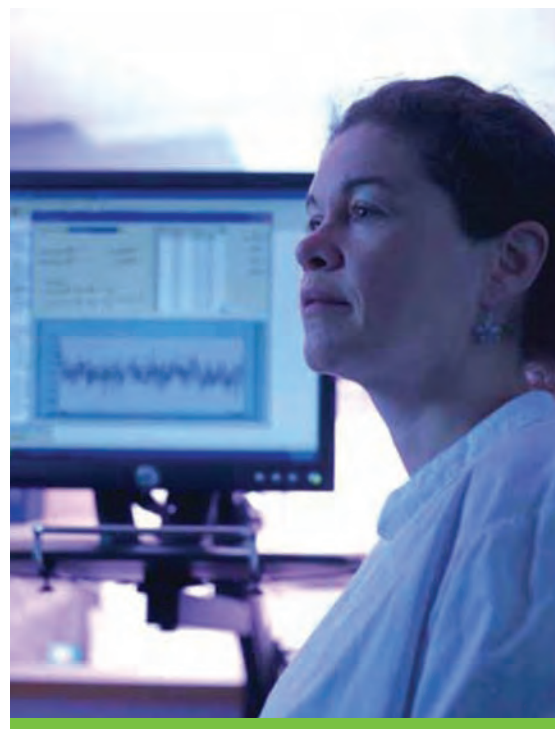
In November 2011, the RPII was notified through the IAEA and EC that trace levels of radioactive iodine-131 had been detected in a number of countries across Europe. A Hungarian facility manufacturing medical isotopes, the Izotop facility near to the Budapest Research Reactor, was identified as the most probable source. No iodine-131 was detected on the RPII systems, but this is not unexpected as, by the time the plume had reached France, concentrations in air had already decreased to the point where they were close to the detectable limit.

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 2011, training was provided to Hazardous Material Fire Officers.

A national protocol on response to CBRN incidents (malevolent Chemical-Biological-Radiological-Nuclear events) was completed in 2011. The RPII contributed to this work through the CBRN sub-group of the Interdepartmental Working Group on Emergency Planning, which is chaired by the Department of Defence's Office for Emergency Planning.

The RPII is represented on a number of international groups related to nuclear and radiological emergency preparedness. In 2011, 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. In 2011, an RPII staff member was elected deputy 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. 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.

Nuclear stress tests

Following the events at Fukushima, the European Council requested a review of safety at all European nuclear power plants. The European Nuclear Safety Regulators Group (ENSREG) produced criteria and a plan for this work, now known as the 'stress tests'. All EU member states with operational nuclear power plants (NPP) plus Lithuania (all NPPs shut down), Switzerland, and Ukraine are participating in this process.

The stress tests required plant operators to reassess the safety of a nuclear plant in the event that it was subjected to the extreme events that occurred at Fukushima (and to report on the work to the national nuclear safety regulator). Specifically, the stress tests considered three topics: (i) external initiating events (such as earthquake, tsunami, flooding or severe weather), (ii) the impact of losing safety functions

(such as loss of electrical power or the ability to cool the reactor core and fuel ponds), and (iii) severe accident management (i.e., how the nuclear plant systems and operators protect against and manage severe accidents). Each country's nuclear safety regulator then reviewed the operators' reports and commented on the findings, identifying areas for further work and/or plant improvements. The national nuclear safety regulators submitted summaries of all this work in the form of 'national reports' to the EC at the end of 2011. Each of the 17 national reports will undergo a peer review by teams set up by ENSREG, and the RPII will contribute to this peer review process in early 2012. The national reports and other relevant documents are available on the ENSREG website www.ensreg.eu.

Convention on nuclear safety

The IAEA's Convention on Nuclear Safety is the international convention which obliges all signatory countries to maintain a high level of nuclear safety in power reactors and to report on measures taken in this respect. The Convention includes obligations relating to the national regulatory framework, safety of nuclear installations and emergency planning arrangements. All contracting parties to the international Convention on Nuclear Safety (CNS), including Ireland, must demonstrate compliance with the Convention and undergo a peer review by the other contracting parties.

There is a three-year review cycle, whereby in each cycle all contracting parties must: prepare a national report on the status of compliance with the articles of the Convention; review national reports of other countries and submit written questions and comments on these; respond in writing to questions asked by other countries; attend the review meetings at the IAEA to present their case for compliance with the Convention and respond to verbal peer review from other countries; and implement any actions identified during the peer review, both generic and country specific (these actions are reviewed at the following Convention meeting).

The RPII assisted the DECLG in preparing Ireland's national report, which was submitted to the IAEA in September 2010. RPII staff subsequently reviewed national reports from other countries, responded to questions on Ireland's report and presented Ireland's national report at the Fifth Review Meeting of the Convention on Nuclear Safety in April 2011. Dr Tom Ryan, Director of RPII's Regulation and Information Management division, was one of the officers of the Review Meeting, as Vice-Chairman of one of the Country Groups.

Nuclear safety in the UK

The RPII continues to monitor developments at Sellafield and other UK nuclear sites closely. One of the key areas of interest to the RPII is the progress in emptying the Highly Active Storage Tanks (HASTs) at Sellafield. The volume of highly active liquor (HAL), that is produced during reprocessing, which can be stored on site is controlled by a legally binding condition (or specification) issued by the UK Office for Nuclear Regulation (ONR). In July 2011, the ONR issued a new HAL specification, based on the tonnes of Uranium (teU) present in the un-reprocessed fuel from which the HAL was derived. The DECLG and the RPII received a briefing on the new specification by video conference in July 2011. The RPII is kept fully informed on progress in reducing the volume of liquid waste stored in the HASTs and the levels remain well below the specified limit.

In conjunction with the UK-Ireland Contact Group on Radiological Matters, the DECLG and the RPII were briefed in September 2011 on the new Sellafield Performance Plan. The Plan describes work that will be performed on the Sellafield site over its lifetime (to 2120). It will show a four-year detailed programme of work and then an outline programme for the remainder of the 17-year (potential) contract period for the Parent Body Organisation (which represents the

senior management team for Sellafield). The progress being made against the key safety-related targets will be monitored by the RPII over the next number of years.

In August 2011, the UK Nuclear Decommissioning Authority (NDA) announced that it had reassessed the prospects for the MOX (mixed oxide fuel) Production Plant at Sellafield following the Fukushima accident and would close it 'at the earliest practical opportunity'. The UK Government later announced that its preferred option for dealing with the UK's stock of civil separated plutonium is to incorporate it into MOX rather than disposing of it as waste or continuing indefinite storage. A cost-benefit analysis of a new MOX plant has been commissioned by the UK Department of Energy and Climate Change and a decision based on the analysis is expected before the end of 2012.

In October 2011, Magnox Ltd announced that the Oldbury Power Plant in Gloucestershire will be permanently shut down in February 2012, ten months earlier than expected. The decision was taken as the owners believed it was no longer economically viable to continue its operation. The Wylfa Nuclear Power Station in Wales received its final delivery of fuel in December 2011. The two Magnox reactors at Wylfa are currently scheduled to shut down at the end of 2012. However, subject to safety case approval, it is planned to operate one of the units until 2014 in order to fully utilise existing stocks of fuel.

A number of incidents at Sellafield and other UK nuclear sites were brought to the attention of the RPII during the course of the year. All of these incidents were rated as Level 1 or lower on the seven-point International Nuclear and Radiological Event Scale (INES) and had no radiological implications for Ireland. The reporting of these incidents to the RPII fell under the Memorandum of Understanding that the RPII has with the UK's Office for Nuclear Regulation (and which was re-signed in 2011) and the ongoing liaison the RPII has with the UK's Environment Agency.

Plans for new nuclear power plants in the UK

In 2010, the UK Government announced plans to develop new nuclear power stations on to eight sites in England and Wales (see Figure 11). Five of the sites earmarked for potential development by 2025 are on the Irish Sea Coast. The UK's current plans aim to see construction begin on the first of the new nuclear plants in early 2012, with the power plants becoming

operational before 2025, and possibly as early as 2017. The RPII has been providing technical support to the DECLG on this issue, including undertaking an assessment of the likely effects on the environment in Ireland of the planned programme to build new nuclear power stations in the UK. The assessment is considering radioactive discharges to air and sea from the proposed power plants, both under normal operating conditions and in the event of an accident, and it includes an overview 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 has been completed with the support of colleagues in Met Éireann, the National University of Ireland, Galway and the US National Oceanic and Atmospheric Administration. An independent peer review panel has been established to provide comment on the project as it progresses. This was originally due to be completed in 2011, but was delayed as a result of the RPII's Fukushima response and is now due to be completed in 2012.

Figure 11: Location of sites identified for possible new nuclear build and the reactor designs currently planned (where known).



Oslo-Paris Convention (OSPAR)

The 1992 OSPAR Convention for the Protection of the Marine Environment of the North East Atlantic (www.ospar.org) requires contracting parties to take all possible steps to prevent and eliminate pollution of the marine environment by the year 2020. The RPII acts as scientific adviser to the Irish Government on the implementation of the OSPAR Radioactive Substances Strategy which was signed by all contracting parties in 1998. This requires progressive and substantial reductions in discharges of radioactive substances with specific targets for both naturally-occurring and artificial radionuclides to be met by the year 2020. The Strategy is managed by the Radioactive Substances Committee (RSC) which meets once a year.

At the 2011 RSC meeting, terms of reference were agreed for an Intersessional Correspondence Group (ICG) on particular key outstanding issues. As a key member of this ICG, Ireland (represented by RPII and the DECLG) took an active part in the work of the Group by preparing a questionnaire on exceptional discharges (i.e. discharges arising from decommissioning activities and treatment of legacy waste) and variability of operational discharges, followed by the analysis of the responses from all Contracting Parties. The ICG reported at the 2012 RSC meeting and a number of decisions were made based on the conclusions reached by the ICG. One decision was the abandonment of a proposal whereby the assessment of progress towards achieving the objectives of the Radioactive Substances Strategy should be normalised based on the amount of electricity produced or nuclear fuel reprocessed. This decision was consistent with Ireland's view that the total discharges should be considered when assessing compliance with national obligations under OSPAR.

Ireland continues to report its radioactive discharges annually to the OSPAR Secretariat. Data from its national marine monitoring programme is also supplied on an annual basis and, together with data supplied by all contracting parties, this is prepared by the RSC and used to assess the impact of radioactive discharges on biota and humans in the North East Atlantic. The last such periodic review was completed in 2010 and is available on www.ospar.org. The next review is due to be prepared by 2013.



RPII response to Fukushima

On Friday 11 March 2011, the east coast of Japan suffered a severe earthquake and subsequent tsunamis. On receipt of notification of a developing situation at the Fukushima Dai-ichi nuclear power plant (NPP) and of the evacuation of local residents from around the site, the RPII duty officer contacted the Department of the Environment, Community & Local Government and Department of Foreign Affairs & Trade duty officers. On 12 March the RPII duty officer was notified of the first explosion at Fukushima and the potential radiological implications of these events via the IAEA emergency notification system (EMERCON) and the EC equivalent (ECURIE). A meeting of the National Co-ordination Group (NCG) meeting was called; this was the first of a series of meetings over the next few weeks to co-ordinate a national response on the provision of advice to Irish citizens in Japan, information to be given to the Irish public and media, and arrangements for monitoring of food imports from Japan. Between NCG meetings, the RPII provided daily updates by email to the key Government departments and agencies (including the Department of Foreign Affairs & Trade, Department of the Environment, Community & Local Government, Met Éireann, the Food Safety Authority of Ireland (FSAI), the Department of Agriculture, Food & Marine, the Health Service Executive and the Department of Enterprise, Jobs & Innovation) on the evolving situation at Fukushima, protective actions being applied in Japan and results of environmental monitoring being carried out in North America and Europe, including Ireland.

International information exchange

The Fukushima accident* was the first large-scale nuclear emergency since the international emergency notification and communications procedures were established after the Chernobyl accident in 1986. The experience of responding to Fukushima highlighted the fact (for the international organisations and national authorities, including the RPII) that while the information exchange arrangements were generally robust, updates to those arrangements are required to streamline the processes for the exchange of the large volumes of data that were generated and also to keep pace with increasing demands for timely information by the authorities, the media and the public worldwide.

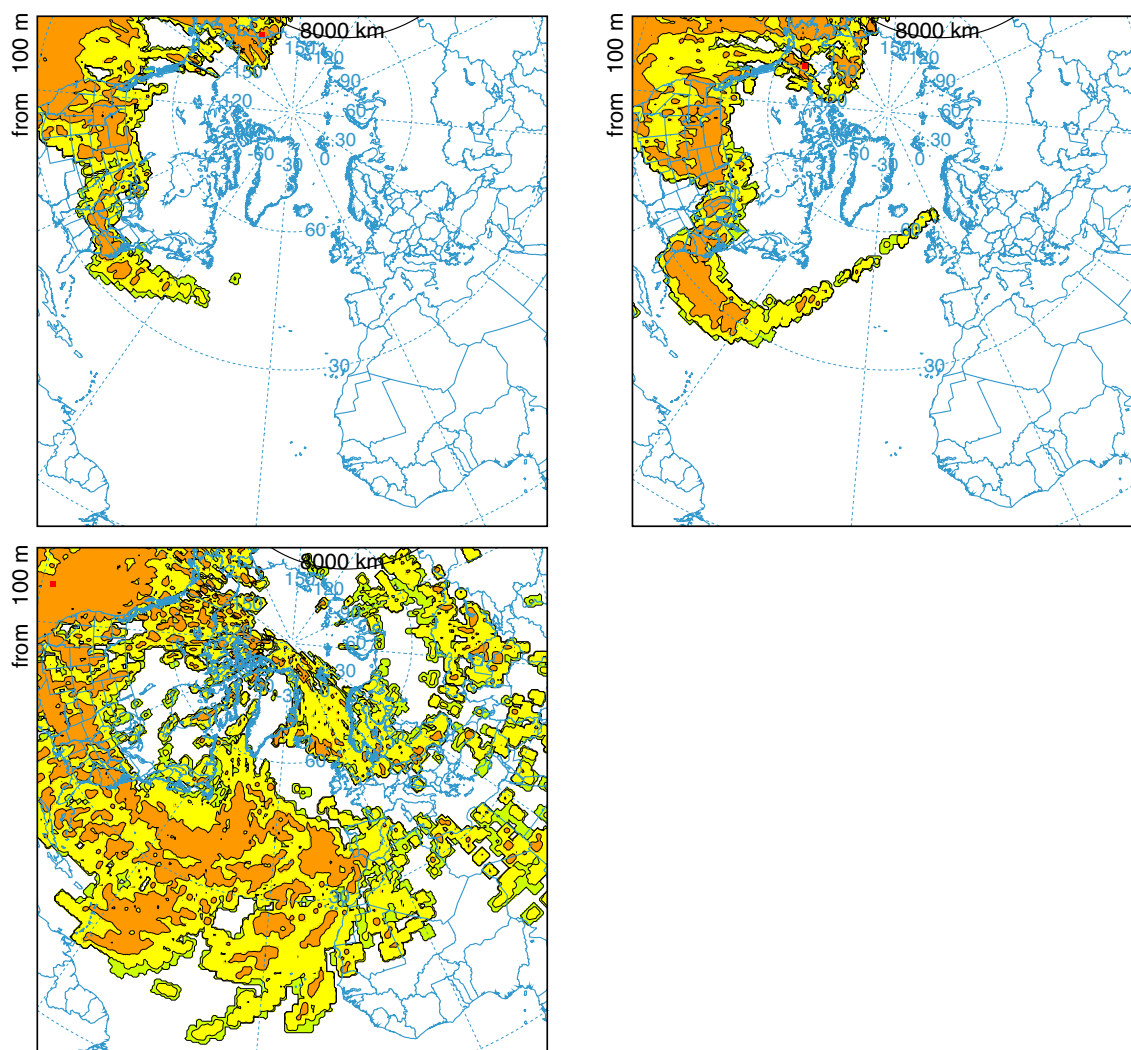
* The Fukushima accident was rated as 7 (or major accident) on the International Nuclear and Radiological Event Scale (INES). The Scale is a worldwide tool for communicating to the public in a consistent way the safety significance of nuclear and radiological events. Events are classified on the scale at seven levels: Levels 1–3 are called “incidents” and Levels 4–7 “accidents”. Events without safety significance are called “deviations” or “anomalies” and are classified Below Scale / Level 0.

Atmospheric dispersion modelling

Of the two operational atmospheric dispersion models used by the RPII to predict the path of radioactive plume, the HYSPLIT model was the one used in response to the Fukushima nuclear accident – for the reason that it allows the assessment of the long range dispersion of radionuclides. The model was run using estimates of the quantities of radioactivity released from the Fukushima Dai-ichi plant, that were available at the time, and using global meteorological data. The dispersion model was used to predict the arrival

time in Ireland of the Fukushima radioactive plume, as well as air concentrations and duration of the radioactive plume over Ireland. From the predictions of atmospheric dispersion modelling and from information received from Japan through official channels, the RPII expected that the levels of radioactivity reaching Ireland would be extremely low. This was confirmed by the measurements made in air, rainwater and milk. Figure 12 shows the dispersion of radioactivity arising from Fukushima in the air across the Northern Hemisphere.

Figure 12: Model predictions of dispersion of radioactivity from Fukushima across the Northern Hemisphere. Showing model outputs for 19th, 21st and 27th March 2011



Although the releases from Fukushima were significant, the transit time and significant dilution of the radioactivity in the atmosphere as it was transported across the large distance between Japan and Ireland meant that increases in levels of radioactivity here were expected to be extremely small and not of concern from a public health point of view. However, on reports of the deteriorating situation at the Fukushima Dai-ichi NPP the RPII increased the frequency of its sampling and analysis of air, rainwater and milk in Ireland in anticipation of the arrival of the radioactive plume in Europe. The aims of the monitoring were to assess the levels of radioactivity reaching Ireland and to provide data on which to base the RPII's advice to Government. The frequency of monitoring was increased on 22 March and was stepped down to the usual frequency for the routine monitoring programme at the end of May 2011. Similar steps were taken by national authorities across Europe and the world.

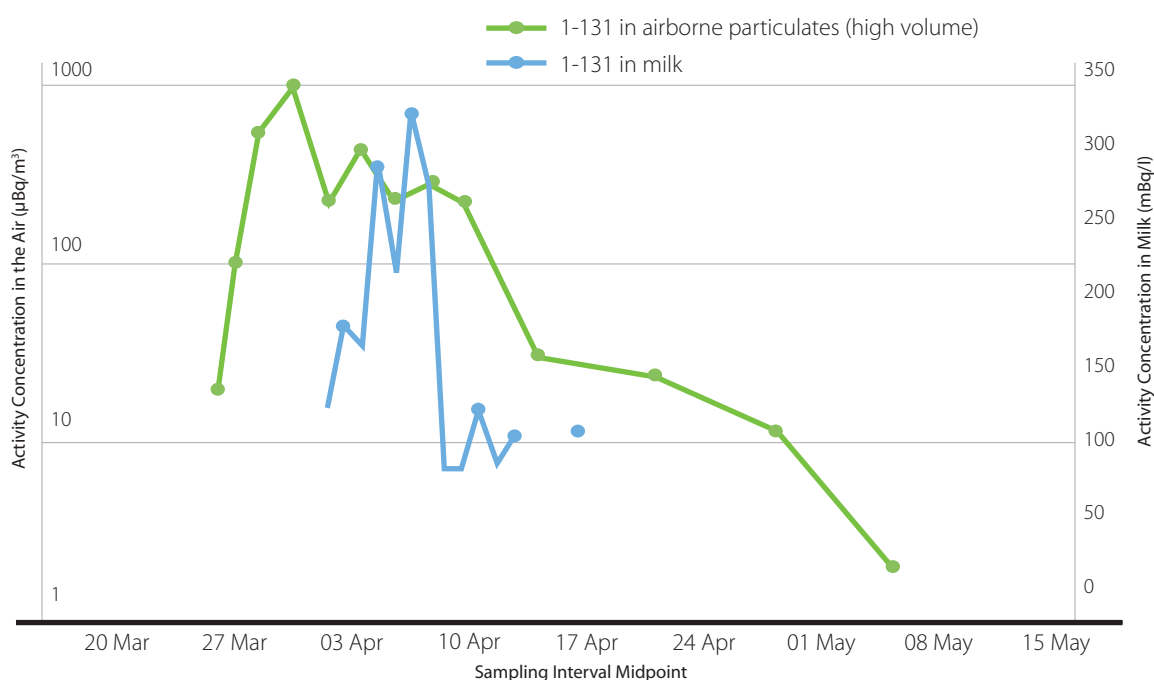
As expected, the most useful information was gained from the analysis of particulate filters from the RPII's high volume air sampler located in Belfield, Dublin. This instrument samples particulates from the air onto filters with a flow rate of between 2000 and 2500 cubic metres per hour (m^3/h), and so over a 24-hour period will collect airborne particulates from around 50,000 m^3 of air (equivalent to over 2000 days' worth of breaths for a typical adult).

The main radionuclides detected on the filters were iodine-131, caesium-134 and caesium-137. Activities of these radionuclides were also detectable in low volume airborne particulate samples from stations across the country, and, in the case of iodine-131, in charcoal filters, rainwater, and milk. Lower activities of the short-lived radionuclides tellurium-132, caesium-136 and iodine-132 were also detected for a short period in March in filters from the high volume air sampler.

The highest recorded iodine-131 activity on airborne particulates was 1000 microbecquerels per cubic metre ($\mu\text{Bq}/\text{m}^3$) in the sampling period 30 March to 1 April. Caesium-134 and caesium-137 levels in air peaked at 128 $\mu\text{Bq}/\text{m}^3$ and 138 $\mu\text{Bq}/\text{m}^3$ respectively during the sampling period 3 – 5 April. For comparison, following the Chernobyl accident in 1986, the highest activities of these radionuclides measured in Ireland were over 100 times higher (Cunningham, et al., 1987). Before the Fukushima accident, caesium-137 from the nuclear weapons tests of the 1950s/60s and the Chernobyl accident was routinely detected in Ireland with typical concentrations of around 0.3 $\mu\text{Bq}/\text{m}^3$ on airborne particulates, while iodine-131 and caesium-134, with their much shorter half-lives, were not routinely detected.

Within seven days of the first detection of radioactivity resulting from Fukushima in airborne particulates, trace levels of iodine-131 were detected in milk.

Figure 13: Concentrations of radioactive iodine in Irish air particulates and milk, 2011



The highest level measured was 327 milibecquerels per litre (mBq/l). Elevated levels of caesium-134 and caesium-137 were also found in some samples. The levels found were of no health concern, and even drinking tens of thousands of litres of this milk would not have given rise to radiation doses above the allowable radiation dose limits for an individual member of the public. By 23 April, levels in milk had decreased to below the level at which they can be detected. Figure 13 shows the results of the Irish measurements for iodine-131 made on airborne particulates and in milk. The results of RPII's environmental monitoring was reported on its website on a regular basis following the Fukushima accident and was also shared with the international community via the IAEA's Incident and Emergency Centre and the European Commission's ECURIE system.

As expected, no elevated results were expected or detected on the gamma dose rate monitoring network. This was anticipated as the ambient gamma dose rate network measures total radioactivity, rather than individual radionuclides, and the increase from trace amounts of radioactivity added to the Irish environment from Fukushima was well within the normal fluctuations in background radiation levels.

Although significant releases of radioactivity into the sea also took place at Fukushima, no specific monitoring of the marine environment was required in Ireland. As a result of the volume of water in the sea (the Pacific Ocean), aquatic releases were dispersed and diluted to much lower levels. For short-lived radionuclides, an additional factor was the much slower transport of radionuclides discharged into the sea compared to that discharged into the atmosphere. For instance, iodine-131, with a half-life of just eight days, decays rapidly and would not be expected to be transported over long distances by ocean currents.

Using the peak concentrations in air and milk and assuming that these levels persisted until mid-May, the estimated maximum radiation dose that an adult in Ireland might expect to receive arising from the Fukushima accident was calculated to be 0.26 μ Sv. Such an adult would need to spend all of their time out of doors, to have average breathing rates and to have typical food consumption patterns. By comparison, the typical annual average dose a person in Ireland might receive from all sources of radioactivity is 3950 μ Sv (Colgan et al., 2008) and the dose of cosmic radiation that a person might receive on a return flight from Ireland to New York is 106 μ Sv. The doses resulting from Fukushima were therefore deemed to be of no significance from a public health or food safety point of view.

Testing of Japanese food imports

A number of samples of food and pharmaceutical ingredients imported from Japan were tested by the RPII, in line with the European Council Regulations. To date no measurable activities of iodine-131, caesium-134 or caesium-137 have been detected.

Communication with the media and public

Following the Fukushima accident, the RPII took a lead role in communicating with the Irish public and the media, and issued daily press releases during the initial, rapidly evolving, phase of the accident. Communication with the public and the media was given the highest priority and the availability of up-to-date monitoring data on RPII's website, including real-time access to gamma dose rate data, provided the public with information on the consequences of the accident for Ireland.

Review of the RPII's response to Fukushima

The response to the Fukushima accident proved a good test of the RPII's capacity to respond to a nuclear emergency. It also demonstrated that a comprehensive monitoring network capable of measuring even trace levels of radioactivity in the environment is in place. However, the monitoring effort that would be required to respond to an accident closer to Ireland would be significantly higher.

Towards the end of the year, a review of the RPII's response to the Fukushima accident was initiated, covering areas of technical assessment and environmental monitoring; advice to Government, the public and industry; media engagement; and liaison with other bodies, in Ireland and abroad. The review was carried out by RPII staff using the recently adopted national template for review of responses to emergencies, under the guidance of an independent emergency planning expert from Dublin City University.

While, it was felt that RPII generally responded well to the demands put on it in dealing with the Fukushima accident, a number of areas for improvement were identified. These included internal communications, resource allocation and training of additional staff to enable them to take on response roles. This review was complete at the end of 2011, and in 2012 an action plan will be drawn up based on the findings of the review, for delivery in 2012 and 2013.

Corporate support services



The Corporate Development Division supports the scientific and technical work of the RPII and its good governance through the provision of Financial, Human resources, Communications and other essential services. The RPII identified key strategic priorities in these areas for the period 2011–2013.

The RPII engaged with stakeholders to determine public attitudes towards radiation in the environment, ensuring progress on the strategic objective to *'focus on the needs of our stakeholders and enhance our engagement with them'*.

One of the RPII's strategic priorities is to *'...deliver value to the public in everything we do'* and this has implications across all areas of the RPII's operations, where efficiency and cost effectiveness is emphasised. In the area of Finance, key actions included a streamlining of credit control arrangements and ongoing measures to reduce costs; while in Human Resources, targeted staff development was initiated in a programme aimed at sustaining service delivery in the context of declining staff numbers.

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

Communications

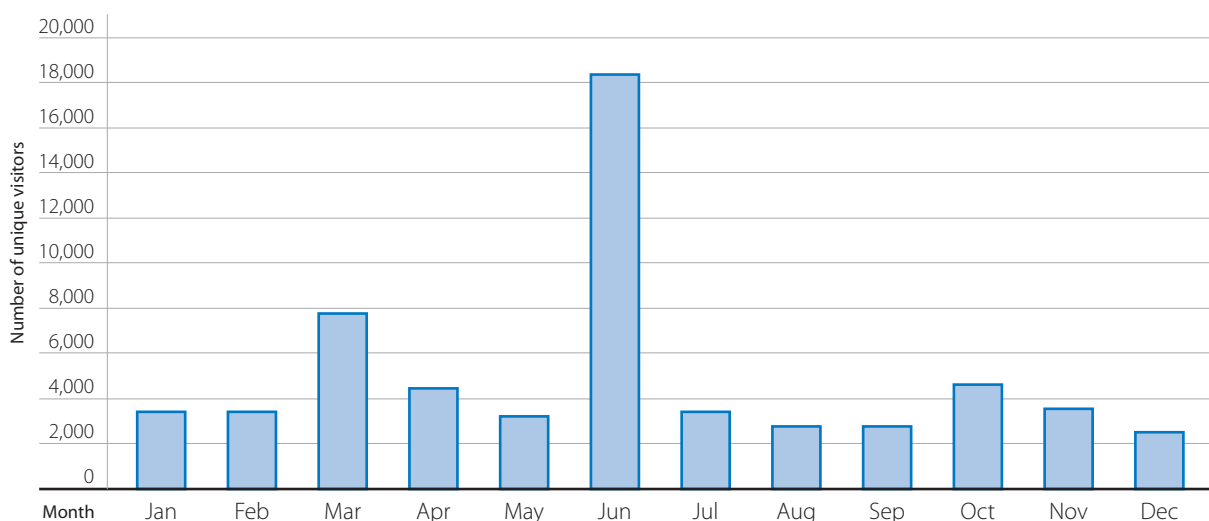
The RPII plays a key role in the provision of advice on radiation protection matters to Government and to the public. Easy access to high-quality information through the RPII website and collaboration with others, including the media, are important elements in raising awareness of ionising radiation.

In 2011 the RPII issued 23 press releases to communicate with the public through the media. RPII staff participated in 6 television and 38 radio programmes at national and regional level. Print media coverage was also strong and effective in raising awareness of RPII activities, with 250 published articles referring to the RPII, relating predominantly to radon gas and the Fukushima accident. RPII staff regularly participates in meetings and conferences and in 2011, 34 presentations were made to groups in Ireland and 17 abroad.

Understanding public concerns about radiation and providing information to the public are very important to the RPII, and throughout 2011, focus group research and some face-to-face interviews with key stakeholders were carried out to determine public attitudes towards radiation in the environment. The research found that the two greatest public concerns on radiation related to low-level pollution into the Irish Sea from Sellafield and the possibility of a major accident or terrorist attack on Sellafield. The research also highlighted the importance of openness and transparency for organisations such as the RPII in their dealings with the public. The results of the research will inform RPII programmes and communications.

The website www.rpii.ie is the RPII's primary means of communicating. It provides information on radiation protection and news and information about the RPII. The website performed consistently well throughout the year with over 82,000 visits by over 60,000 unique visitors. The most popular topics were the radon map, radon measurement, information on radon, monitoring stations, the radiation dose calculator, information on licensing, publications and information

Figure 14: Unique visitors per month to the RPII website during 2011



on the nuclear accident in Japan. Peaks in traffic to the website coincided with media activity. In particular, over 18,000 unique visitors to the website were recorded in June on foot of a press release on radon in homes and the finding of very high radon levels in a home in Kerry (Figure 14). Over 7500 visitors were recorded in March surrounding media activity in relation to the Fukushima accident in Japan.

An awareness initiative relating to radon and involving many channels of communication was carried out in two high radon areas (South Tipperary and Galway). This initiative included advertising, promotional activity, a digital strategy and public relations activities. Almost 150,000 information packs were distributed to households in the areas, and posters and information packs also distributed among community groups, health centres and health professionals. Engagement with key stakeholders such as politicians, local authorities, community and business groups and the public formed part of the awareness activities.

Publications

New publications from the RPII in 2011 included guidance documents, reports, information leaflets and posters. All of these publications are available free of charge from the RPII Website, www.rpii.ie,

RPII reports

Radiological Protection Institute of Ireland Strategic Plan 2011–2013. June 2011.

RPII Inspection and Licensing Activities and Annual Inspection Programme for 2011. July 2011.

Guidance notes

Personal Dosimetry in Dental Radiology.

The Use of Lead Aprons in Dental Radiology. Joint position by the RPII and HSE.

Disposal companies for radioactive sources and X-ray equipment.

Guidance note on Import and Export of Sealed Sources.

Journal articles, conference papers and posters

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

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Partnership

The RPII's Partnership Committee brings together Staff, Management and Trade Union to exchange information, discuss challenges and share in the resolution of issues. During 2011, the Committee continued to focus on the implementation of reform in the public sector as well, as on improvements on specific operational issues.

The Committee met five times during the year and the July meeting was attended by the RPII Chairman, Professor Eugene Kennedy. In light of the rapidly changing external environment, the Committee continued to include updates from the Chief Executive and issues referred by staff as regular agenda items. Discussion under these items provided an opportunity for staff to be updated directly on developments concerning the Employment Control Framework and Budget for RPII and to identify challenges for further consideration by the Committee. In particular, the issues considered by the Committee included:

- Public Service Agreement 2010 - 2014
- Health and Safety issues
- Maintaining staff morale and focus in a challenging environment.

Finance

RPII Income

The RPII's income in 2011 was €6.539m, made up of a grant of €3.156m for current purposes, a grant receivable of €1.134m for pension purposes as required under FRS 17, and earnings of €1.873m from licence charges and dosimetry, product certification, radon measurement and other services. From the capital grant, €0.825m was amortised in the year. In 2010, we were advised by our parent Department that in the light of our financial surplus a one-off deduction of €300,000 would be taken from our grant for 2011.

The RPII also received a capital grant of €0.242m for the upgrading and maintenance of its equipment. Expenditure for the year exceeded income by €0.322m.

Prompt payments of accounts

The RPII comes under the ambit 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 31 December 2011.

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.

All valid payment demands made during 2011 were met within the prescribed timeframe of 30 days. There were no late payments and therefore no penalties arose.

In July 2011, in accordance with the terms of the National Recovery Plan 2011–2014 and the EU/IMF Programme of Support to Ireland, the RPII was 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 DECLG and is published on the RPII Website. During the period July to December 2011, 95% of all valid invoices were paid within 15 days.

Advisers and consultants

In 2011, 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.

Table 5: Main contracts in 2011 with external advisers and the nature of the work undertaken

Advisor	Nature of work undertaken
Eneclann Limited	Archive and records management
Forfás	Accreditation services
First Impressions	Design and print services
Mooney O'Sullivan Solicitors	Legal advice
Murray Consultants Ltd	Communications and media advice
Norton and Associates	Accountancy services
Prof Pat Horton	RPA assessments and inspections
Public Authority Pension Services Ltd	Pensions advice and administration
Edward Delany and Associates	Strategic planning and development
RKD Architects	Laboratory design and project management
Fabrik Creative Media	Design and print services
Cove Environmental	Graded authorisation support
Kiltealy Associates Ltd	Organisation development
Hewitt Associates Ltd	Actuarial services
Deloitte and Touche	Internal audit

Human resources and staffing

Maintaining key skills in the context of a moratorium on recruitment and promotion is a challenge for the RPII. The year 2011 saw a further reduction in staff numbers and has necessitated a re-evaluation of work priorities and organisational capacity.

In 2011, the need to ensure that the available human resources are devoted on activities of high public value was achieved by tight business planning, strong alignment of actions and strategic priorities, and the key role of the RPII Performance Management and Development System (PMDS) in the delivery of the business plan.

This year, in preparation for future staff losses through retirements, the RPII focused on individual skills appraisal and career planning in the management and administrative functions of the RPII. The information obtained will inform a planned review of the structure and operation of the organisation to ensure it is fit for purpose now and in the future.

Potential for a merger between RPII–EPA

In line with the Government's overall objective of reducing the number of state agencies, in May 2011, the RPII and EPA were asked by their parent department (DECLG) to explore the potential for merging the two organisations. The two organisations agreed that the review should consider the high-level strategic, governance and organisational arrangements with a view to identifying areas of compatibility and/or difference. It should also review in detail the core areas of work of each organisation and the corporate resources necessary to support service delivery, with a view to identifying potential synergies, savings, costs, risks and customer service impacts. To meet the DECLG timescale, a preliminary report was prepared and submitted in June 2011. In November 2011, the Government requested that a further critical review of a merger between RPII and EPA be undertaken by end June 2012. RPII is engaging fully with this process.

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 2011 Health and Safety programme established under the RPII Safety Management System (SMS) focused on safe access for maintenance personnel and contractors. In the course of this work extensive refurbishment of attic space was undertaken to provide safe access to personnel servicing air handling and IT equipment.

There were no reportable accidents or dangerous occurrences in 2011.

Equality

The RPII is committed to a policy of equal opportunity. This is reflected in staff recruitment, conditions of employment, and in 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 constantly strives to make its work accessible to all. Publications and documents are screened for plain English and training in disability awareness was delivered to all staff in 2011.

Accommodation and energy usage

In 2011, a major refurbishment project was undertaken to improve the RPII's main laboratory. This project enhanced the layout of the workspace to match the workflow of various processes carried out, and upgraded workbenches and general equipment.

Reconfiguring the area created more workspace and better storage arrangements. A segregated area for use in emergencies was established and extraction systems were improved to enhance the working environment.

Energy usage in the RPII offices is roughly 25% electricity and 75% natural gas. Heating accounts for all of the gas consumption. In 2011, the RPII consumed 203 MWhr of energy, consisting of 150 MWh of natural gas and 53 MWh of electricity. During 2011 the RPII availed of a DECLG lead framework agreement on the purchase of energy and switched providers to get the best available prices under this framework.

In 2011, the IT section undertook a project to virtualise servers. Thirteen physical servers were moved into three physical servers, which will result in a significant long-term reduction in energy requirements for running server hardware and cooling server rooms, and will save on future maintenance and upgrade costs.

During the refit of the laboratories in 2011 every opportunity was taken to improve energy efficiency. For example, the use of low energy lighting was prioritised. Passive infrared controlled lighting was fitted in low traffic areas and integral daylight sensors were used to achieve variable light outputs in response to natural fluctuations in daylight. Other areas for improved energy efficiency were the installation of high efficiency freezers, fridges and drying cabinets, improved insulation and enhancements in air handling.

Customer service

The RPII is committed to a high level of customer service in all of its activities. The aim of the RPII is to provide to all persons who contact the organisation, a helpful, courteous and effective service. Customer service is included in the Strategic Plan 2011–2013, ensuring that it is integrated into all business processes.

The RPII's Quality Customer Services Working Group (QCSWG) supports the provision of high quality customer service to both internal and external customers. Key outputs of the Group included the adoption of a new internal complaints procedure and the revision of the Customer Service Charter. Although the QCSWG continues to monitor complaints twice-yearly, no complaints were received by the accredited services in 2011.

Information communications technology

In 2011, a key focus was on the rationalisation of server hardware with a view to achieving savings. A virtual system was successfully installed which now hosts a total of 17 servers (13 existing servers and 4 additional new servers). Savings have been achieved in both energy and maintenance costs. However, more significant benefits have been achieved with the introduction of the four additional servers through rapid deployment and with no additional cost. The new virtual environment system has also brought significant improvements in the area of disaster recovery planning with the introduction of improved off-site server replication and the ability to rebuild failed servers remotely.

Other achievements in 2011 included improvements to IT security following the recommendations of the 2010 IT security review and the introduction of a solution for online sharing of files to support external working groups. Online file sharing was successfully rolled out to support the RPII Board in early 2011 and then extended to include a number of other external working groups. This system is also used to provide critical information to RPII duty officers in support of an emergency situation.

Records Management

External experts were employed to conduct a review of the RPII's records management system in 2011. This review has led to improved policies and procedures and subsequent training for all staff.

An annual records assessment process was introduced in 2011. This provides for assessment of all records for closing and disposition. This process has proved to be a useful tool for auditing the status of all records and has helped to emphasise the importance of good records management throughout the organisation.



Our governance

The Radiological Protection Act (1991) under which the RPII was established and the 2009 Code of Practice for the Governance of State Bodies (the Code) form the basis of our governance. In relation to conditions of employment and finance matters, including payroll, pensions and purchasing, the RPII follows the Department of Finance rules and procedures. The RPII has its own Corporate Governance Manual that draws together the various obligations and procedures into one document. This Manual serves as a governance handbook for staff and Board members.

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 are detailed in following sections.

Strategic planning

The year 2011 marked the beginning of a new strategic planning period. A significant effort was devoted towards the end of 2010 to a review of progress against the Strategic Plan 2008–2010 and development of the new Strategic Plan. In April 2011 the Strategic Plan 2011–2013 was approved by the RPII Board. The

strategy was developed taking account of the external and internal environment and of stakeholders' views and focuses on four strategic priorities. The priorities address the core work of the RPII which is to provide the expertise, technical capability and information essential to the protection of the Irish population and the environment and to regulate the safe and secure use of ionising radiation in Ireland.

The Strategic Plan 2011–2013 emphasises pro-active stakeholder engagement; listening as well as informing. It reflects the current economic climate in its focus on the efficiency of delivery and sustainability of core functions, and it highlights the need for the RPII to work in partnership with others to achieve its goals.

Key themes underpinning all four strategic priorities are public value, transparency, communication and sustainability.

Audit Committee

In 2011, the Audit Committee finalised a full review of the RPII Corporate Governance Manual bringing it up to date with new arrangements and obligations. The RPII internal auditors (Deloitte) undertook two audits in the areas of income generation and licensing. No significant findings were identified but some improvements in process resulted.

Ionising Radiation Advisory Committee

The RPII's Ionising Radiation Advisory Committee is a high-level scientific advisory body that provides guidance both to the Board and to the Executive of the RPII on any matters concerning ionising radiation. The 16 members of the committee include both national and overseas experts from a wide range of disciplines including radiation protection, public health, epidemiology, emergency response and medical physics. During 2011, the topics discussed included a review of the RPII's response to Fukushima, the 2011–2013 research strategy, assessment of the radiation dose to the Irish population and the national radioactive waste strategy.

Communications Advisory Committee

Following a review of the terms of reference of the Communications Advisory Committee (CAC) in 2010 it was agreed to broaden the membership to include external participants. During 2011, the CAC was delighted to welcome Mr Brian Trench (School of Communications, Dublin City University) who brought a new perspective to the discussions.

The work of the Committee included a review of the RPII's role in the response to the Fukushima accident, ongoing RPII publicity campaigns in the area of radon and the benefit of such campaigns in spreading the radon message, research into stakeholder concerns and information needs on environmental radiation, and the RPII's work to raise awareness of radiological protection issues in second level schools.

Board Sub-committee on Radon

The greatest source of exposure for the Irish population to ionising radiation is the presence of radon in homes and workplaces. Because of its concern about this issue, the Board set up a sub-committee to examine a range of strategic and ethical issues connected with the RPII's radon programme. These issues included the relative health risks posed by radon to smokers and non-smokers, the application of established health promotion principles to radon programmes, effective strategies for communicating information about the radon risk

and the responsibilities of the RPII to homeowners and employers whose homes and workplaces have high radon levels. The sub-committee held its first meeting in November.

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. The RPII Action Plan was submitted to our parent department as required and is available on our website. In addition, we have reported progress against the actions to the National Implementation Body, which is responsible for the implementation of the Public Service Agreement.

The key achievements in 2011 include:

- Full implementation of a revised PMDS model, which is enhanced to address soft skills and behaviours as well as technical competencies.
 - Analysis of potential benefits and costs of a merger of the RPII with the EPA.
 - Preparation of detailed inputs for shared services and comprehensive spending reviews.
 - Integration of new debt management software with a manpower saving of about one day per month.
 - Completion of a project to centralise and therefore improve efficiency of management of licensee accounts.
 - Virtualisation of 13 computer servers onto 3 physical servers, with associated saving of direct costs as well as energy, maintenance and update costs.
 - Implementation of HR software to bring efficiencies in training and development planning.
 - Regular use of video conferencing as an alternative to travelling to meetings nationally and internationally.
 - Further enhancement of the Laboratory Management and Information System (LIMS), the benefits of which include reduced maintenance and development costs, increased sustainability and consolidation of expertise.
-

-
- Completion and testing of an agreed protocol with An Garda Síochána for conduct of assessment of security arrangements regarding radioactive sources held by licensees.
-
- Preparation of joint standard operating procedures for response to Chemical, Biological, Radiological and Nuclear (CBRN) events.
-
- Establishment, with DECLG, of national expert group to oversee the development of a National Radon Control Strategy.
-
- Agreement obtained between relevant agencies on a protocol for the management of orphan radioactive sources (where the owner is unknown).
-
- Collaboration with Health Service Executive to assist it in meeting its legal obligations in relation to radiological protection of patients.
-
- Collaboration with Environment Protection Agency on the collection of environmental samples
-
- of shared interest, and on the preparation of guidance documents on issues of interest to both organisations, and sharing expertise on waste management matters of common concern.
-
- Collaboration with the Sustainable Energy Authority of Ireland on matters of common interest to do with radon and home insulation.
-
- Collaboration with local authorities in their radon measurement initiatives in social housing. The data gathered is very valuable to the RPII for radon research in Ireland.
-
- Progress on a review of the potential impacts on Ireland of the construction of new nuclear power plants in the UK.
-
- Flexibility and resourcefulness demonstrated by RPII staff in the RPII response to the Fukushima nuclear emergency.
-

Members of the Board

The Board met eight times during the year. The number of meetings attended by each Board member is shown below, the number in brackets indicating the number of meetings the member in question was eligible to attend. Also shown is the name of the nominating person/organisation and the date of first appointment.

Name	Nominated by	Date of First Appointment	Meetings attended during 2011
Professor Eugene Kennedy, Chairman	Minister for the Environment, Community & Local Government	August 2006	5(5)
Ms Nuala Ahern	Minister for the Environment, Community & Local Government	May 2008	3(4)
Ms Fionnuala Barker	Irish Nuclear Medicine Association	May 2007	4(8)
Dr Éamann Breatnach	Medical Council	November 2008	3(7)
Dr Maurice Fitzgerald	Dental Council	July 2008	5(7)
Mr James Fitzmaurice	Minister for the Environment, Community & Local Government	April 2002	7(8)
Mr Patrick Gilligan	Association of Physical Scientists in Medicine	August 2006	7(8)
Dr Kevin Kelleher	Health Service Executive	September 2007	8(8)
Ms Darina Muckian	Minister for the Environment, Community & Local Government	April 1997	7(8)
Mr John O'Dea	Minister for the Environment, Community & Local Government	November 2009	7(8)
Ms Adi Roche	Minister for the Environment, Community & Local Government	June 1997	7(8)
Dr Stephanie Ryan	Faculty of Radiologists RCSI	July 2010	7(8)

Professor Eugene Kennedy (Chairman)

Professor Kennedy was appointed RPII Board Chairman in 2006. He has been Professor of Physics at Dublin City University (DCU) for more than 20 years, and is currently Vice-President for Research.

Well-known internationally for his research in atomic and plasma physics, his work has been published widely. Elected a Fellow of the Institute of Physics in 1987, and a member of the Royal Irish Academy in 2004, Professor Kennedy has served on many national and international boards.

Ms Nuala Ahern

Appointed to the Board in 2008, Ms Ahern is an environmental policy analyst and writer on ecology and psychology. She is a former member of the European Parliament (Green Party) representing Leinster for 10 years from 1994 to 2004.

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 Chair of the Association of Physical Scientists in Medicine

Dr Éamann Breatnach

Appointed to the Board in 2008, Dr Breatnach is a consultant radiologist at the Mater Hospital and past Dean of the Faculty of Radiologists, Royal College of Surgeons in Ireland. He is Chairman of the Education Committee of the European Society of Radiology and a member of the Society's governing executive.

Dr Maurice Fitzgerald

Appointed to the Board in 2008, Dr FitzGerald qualified from UCC in 1989 and works as a general dental practitioner in Sligo. He received an M.Sc. in Dental Radiology in 2000 from the University of London and serves on the board of the RPII as the nominee of the Dental Council, of which he is an elected member.

Mr James Fitzmaurice

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

Mr Patrick Gilligan

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

Dr Kevin Kelleher

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

Ms Darina Muckian

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

Mr John O'Dea

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

Ms Adi Roche

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

Dr Stephanie Ryan

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

Advisory Committees

Audit Committee

This Committee advises the Board on finance, governance and organisational risk. The Committee met four times during 2011.

Chairman: Mr Patrick Gilligan

Mr James Fitzmaurice

Ms Darina Muckian

Professor Ciarán O hÓgartaigh

Secretary: Ms Glenda Griffin

Communications Advisory Committee

This Committee provides advice relating to communication with the public. The Committee met three times during 2011.

Chairman: Mr James Fitzmaurice

Ms Fionnuala Barker

Mr John O'Dea

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 Executive of the RPII on any matters concerning ionising radiation referred to it by the Board or by the Executive of the RPII, with particular emphasis on public health matters. The Committee met twice during 2011.

Chairman: Dr Éamann Breatnach

Ms Nuala Ahern

Dr Michael Casey

Dr Harry Comber

Dr Peter Finnegan

Dr Jean-Luc Godet

Mr Sean Hogan

Professor Ian McAulay

Professor Brendan McClean

Dr Jim McLaughlin

Dr Jill Meara

Professor Peter I Mitchell

Dr Neil O'Donovan

Dr Geraldine O'Reilly

Dr Jane Renehan

Professor Wil van der Putten

Scientific Secretary: Ms Stephanie Long

Board Sub-Committee on Radon

This Sub-Committee was set up by the Board in 2011 to examine a range of strategic and ethical issues connected with the RPII's radon programme. The Committee met once in 2011.

Chairman: Dr Éamann Breatnach

Mr James Fitzmaurice

Mr Patrick Gilligan

Dr Kevin Kelleher

Mr John O'Dea

Ms Adi Roche

Secretary: Ms Lucy Doody

Staff Structure



The RPII Team of 2011

Alison Dowdall
Ann McGarry
AnnMarie O'Keeffe
Ashley Curran
Barbara Rafferty
Catherine Organo
Catherine Scully
Ciara Maguire
Ciara McMahon
David Dawson
David Fenton

David Pollard
David Spain
Dermot Howett
Eileen Hayden
Emily Clarke
Glenda Griffin
Hugh Synnott
Isabella Bolger
Jack Madden
Jarlath Duffy
Jennie Wong

Kevin Kelleher
Kilian Smith
Leo McKittrick
Linda Coyne
Lorraine Currivan
Lucy Doody
Marie Kelly
Máirín Ó Colmáin
Mary Fegan
Michael Murray
Noeleen

Cunningham
Olivia Cluskey
Olwyn Hanley
Pamela Lennon
Paul Fitzgerald
Paul McGinnity
Rachel Flynn
Rose Timmins
Sarah Baker
Sharon Wade
Sheila Powell

Stephen Fennell
Stephanie Long
Stephen Somerville
Tanya Kenny
Teresa Grant
Tom Ryan
Veronica Smith



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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 2011 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 reporting framework that has been applied in their preparation is applicable law and 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 all the financial and non-financial information in the 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 2011 and of its income and expenditure for the year then ended.

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 moneys have 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.



Andrew Harkness

For and on behalf of the Comptroller and Auditor General
31 October 2012

Statement on Internal and 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 2011 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 2011 Deloitte conducted a review of income generation and licensing practices. There were no critical findings identified in these audits.

Annual Review of Controls

I confirm that in the year ended 31 December 2011 the Board reviewed the effectiveness of the system of internal financial controls.

Signed on behalf of the Board



Prof William Reville
Chairman
4th July 2012

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, Heritage and Local Government with the concurrence of the Minister for Finance. 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.



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, Heritage and Local Government with the consent of the Minister for Finance.

2. Income

Income shown in the Financial Statements under Oireachtas grants represent actual cash receipts in the year.

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, Heritage 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 or Losses and a corresponding adjustment is recognised in the amount recoverable from the Department of the Environment, Heritage 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, Heritage and Local Government.

5. Capital Account

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

6. Income in Advance

Income in advance relates to licence fee income paid in advance by licensees in respect of future periods.

Income and Expenditure Account

for the year ended 31st December 2011

2010 €		2011 €
	Income	
3,685,000	Oireachtas Grant	3,398,000
1,329,822	Net Deferred Funding for Pensions (Note 8 b)	1,133,812
329,643	Transfer from/(to) Capital Account (Note 2)	134,486
5,344,465		4,666,298
489,570	Dosimetry & Calibration Service	462,024
529,893	Radon Measurement Service	260,537
288,857	Radiation Monitoring Service	355,493
698,465	Regulatory Service	778,458
1,794	Miscellaneous/Contract Income	16,670
2,008,579		1,873,182
7,353,044		6,539,480
	Expenditure	
3,068,984	Salaries (Note 4)	3,040,093
1,469,884	Pension (Note 8c)	1,326,458
123,187	Dosimetry & Calibration Service	82,007
57,358	Radon Measurement Service	45,288
114,153	Radiation Monitoring Service	104,226
50,166	Regulatory Service	74,386
303,337	Public Information & Communications	263,786
60,273	Nuclear Safety	51,770
129,370	Library & Document Management	79,462
559,776	Accommodation & Insurance	558,884
143,532	Travel & Subsistence	133,830
107,010	Recruitment & Training	68,786
73,202	MIS, IT & Customer Service	60,143
85,043	Postage, Phone & Office Supplies	76,282
11,515	Audit Fees	11,515
51,857	Professional Fees & Miscellaneous	52,943
649,611	Depreciation	824,870
	Bad Debts	6,968
40,492	Provision for the disposal of radioactive sources	0
7,098,750		6,861,696
254,294	Surplus/(Deficit) For Year (Note 3)	(322,216)
759,297	Balance as at 1st January	1,013,591
1,013,591	Balance as at 31st December	691,375

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

William J. Revell

Chairman

Date: 16.10.2012

Board Member

Statement of Total Recognised Gains and Losses

for the year ended 31st December 2011

2010 €			2011 €
254,294	Surplus/Deficit for year		(322,216)
(1,181,000)	Experience / Gains on pension scheme liabilities		(768,000)
(950,000)	Change in assumptions underlying the present value of pension scheme liabilities		771,000
(2,131,000)	Actuarial Gain on Pension Liabilities	8f	3,000
2,131,000	Adjustments to Deferred Pension Funding		(3,000)
254,294	Total recognised gain/(loss) for the year		(322,216)

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

William J. Renick

Chairman

Date: 16.10.2012



Board Member

Balance Sheet

for the year ended 31st December 2011

2010 €		Notes	2011 €
1,423,649	Fixed Assets	1	1,289,163
	Current Assets		
1,886,901	Cash on Hand & at Bank		1,507,822
169,630	Debtors	9	217,689
2,056,531			1,725,511
	Creditors - amounts falling due within one year		
337,420	Creditors	10	307,043
0	Capital Grant in Advance	11	
58,892	Provision for Disposal of Radioactive Sources	12	23,556
646,629	Income in Advance		703,538
1,042,941			1,034,136
1,013,590	Net Current Assets		691,375
2,437,239	Total Assets Less Current Liabilities		1,980,538
18,137,279	Deferred Pension Funding	8d	19,274,091
(18,137,279)	Pension Liability	8e	(19,274,091)
2,437,239	Net Assets		1,980,538
	Financed by:		
1,013,591	Income and Expenditure Account	3	691,375
1,423,649	Capital Account	2	1,289,163
2,437,240			1,980,538

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

William J. Revell

Chairman

Date: 16.10.2012

[Signature]

Board Member

Notes to the Financial Statements
for the year ended 31st December 2011

1. FIXED ASSETS

	Leasehold Improvements €	Office and Laboratory Furniture and Equipment €	Total €
Cost:			
€			
At 1st January 2011	788,301	6,942,391	7,730,692
Additions	-	690,384	690,384
Disposals	-	(121,517)	(121,517)
At 31st December 2011	788,301	7,511,258	8,299,559

Depreciation:

At 1st January 2011	583,399	5,723,644	6,307,043
Charge for year	25,617	714,681	740,298
Adjustment *		84,572	84,572
On disposals	-	(121,517)	(121,517)
At 31st December 2011	609,016	6,401,380	7,010,396

Net Book Value at

31st December 2011	179,285	1,109,878	1,289,163
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Net Book Value at

31st December 2010	204,902	1,218,747	1,423,649
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* An adjustment has been made in 2011 due to an under-depreciation in the years 2008 and 2009.

2. CAPITAL ACCOUNT

	2011 €	2011 €	2010 €	2010 €
Balance at 1st January 2011		1,423,649		1,721,158
Allocated to acquire fixed assets	690,384		319,968	
Amortised in line with depreciation	(824,870)		(649,611)	
Transfer (to) Income & Expenditure Account		(134,486)		(329,643)
Transfer from/(to) Capital Grant in Advance		0		32,134
		1,289,163		1,423,649

Notes to the Financial Statements

for the year ended 31st December 2011

3. ACCUMULATED SURPLUS

€	2011 €	2010 €
Balance at 1st January 2011	1,013,591	759,297
Surplus/(Deficit) for the Year	(322,216)	254,294
Balance at 31st December 2011	691,375	1,013,591

The Board approved an essential refurbishment of the RPII's laboratory during 2011 which resulted in a planned deficit for 2011.

4. SALARIES AND PENSIONS

€	2011 €	2010 €
Gross Salaries	2,893,095	2,928,974
Employers P.R.S.I.	146,998	140,010
	3,040,093	3,068,984

The CEO received salary payments of €145,952 in 2011. Delegates allowance of €2,249 was made to the CEO. The CEO received recoupment of travel and subsistence expenses of €10,547 in 2011. 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. €

€194,354 was deducted from staff by way of pension levy and was paid over to the Department of the Environment, Heritage and Local Government.

The average number of full-time persons employed, excluding Board members, in the financial year was 46 (2010 - 50).

5. 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.

1 Clonskeagh Square

Lease commitments payable in the next twelve months amount to €140,000 (in respect of two floors) on the basis of current rental rates and comprise rental payments on a 20 year leasehold interest with a break clause on 1st October 2018. The rent is subject to review at five-yearly intervals. The ground floor is occupied by the Institute since 2008. The first floor was leased in 2009 to provide accommodation in respect of additional responsibilities which were due to be assigned to the RPII by Government. Pending this, the first floor was sub-let for twelve months during 2011 at an annual rent of €45,000

6. CAPITAL COMMITMENTS

The value of capital commitments authorised at 31st December 2011 amounted to €0.

Notes to the Financial Statements

for the year ended 31st December 2011

7. BOARD MEMBERS' INTERESTS

The Board adopted procedures in accordance with guidelines issued by the Department of Finance 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 member's fees paid during 2011 is as follows:

	€		€
Professor E Kennedy (Chairman)	7,373	Dr E Breatnach	6,529
Ms F Barker	7,695	Dr S Ryan	7,695
Ms N Ahern	3,206	Ms D Muckian	7,695
Mr M Fitzgerald	5,612	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 during 2011 amounted to €13,295.

8. 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 31/12/2011 €	At year-end 31/12/2010 €	At year-end 31/12/2009 €
Discount rate	5.30%	5.50%	5.50%
Inflation assumption	2.00%	2.00%	2.25%
Rate of increase in pensionable salaries	3.25%	3.25%	3.50%
Rate of increase of pensions in payment	3.25%	3.25%	3.50%

(b) Net Deferred Funding for Pensions in Year

	Year to 31/12/2011 €'000s €	Year to 31/12/2010 €'000s €	Year to 31/12/2009 €'000s €
Funding Recoverable in respect of Current Year Pension Costs	1,523	1,667	1,548
State Grant Applied to Pay Pensions and Gratuities	(389)	(337)	(509)
	1,134	1,330	1,039

Notes to the Financial Statements

for the year ended 31st December 2011

(c) Analysis of Total Pension Costs Charged to Expenditure

	Year to 31/12/2011 €'000s	Year to 31/12/2010 €'000s	Year to 31/12/2009 €'000s
	€	€	€
Current Service Cost	522	618	583
Interest Cost	1,001	1,049	965
Employee Contributions	(197)	(197)	(208)
Total Cost	1,326	1,470	1,340

(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 2011 amount to €19.274 million (2010 : €18.137 million).

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

	Year to 31/12/2011 €'000s	Year to 31/12/2010 €'000s	Year to 31/12/2009 €'000s
	€	€	€
Net Pension Liability at 1st January	18,137	18,938	17,191
Current Service Cost	522	618	583
Interest Cost	1,001	1,049	965
Benefits paid in year, net of staff contributions	(389)	(337)	(509)
Actuarial (gains)/losses on liabilities *	3	(2,131)	708
Past Service Costs			
Curtailments			
Settlements			
Net Pension Liability at 31st December	19,274	18,137	18,938

*includes impact of changes to the assumptions

(f) History of Experience Gains and Losses

	Year to 31/12/2011 €'000s	Year to 31/12/2010 €'000s	Year to 31/12/2009 €'000s
	€	€	€
Experience (gains)/losses on scheme liabilities amount:	(768)	(1,181)	266
As a percentage of the present value of scheme liabilities	(4.00%)	(6.50%)	1.40%
Total actuarial (gains)/losses recognised in STRGL	3	(2,131)	708
As a percentage of the present value of scheme liabilities	(0.00%)	(11.80%)	3.75%
Cumulative amount of (gains)/losses recognised in STRGL [^]	957	954	3,085

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

Notes to the Financial Statements

for the year ended 31st December 2011

8. 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, 2032 and 2052.

Year attaining age 65	2012	2032	2052
	€	€	€
Life expectancy - Male	88.3	91.7	93.7
Life expectancy - Female	89.7	92.8	94.6

9. DEBTORS

	2011	2010
€	€	€
Debtors for Services	90,424	61,707
Bad Debts Provision	0	(1,299)
Prepayments	127,264	109,222
	217,689	169,630

10. CREDITORS

	2011	2010
€	€	€
Accruals	236,825	313,046
Collector General	70,218	24,374
	307,043	337,420

11. CAPITAL GRANT IN ADVANCE

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

	2011	2010
€	€	€
Opening Balance at 1st January	0	32,134
Transfer (to)/from Capital Account	0	(32,134)
Balance at 31st December	0	0
This figure comprises		
Capital Expenditure for the Year	0	(352,102)
Grant Received	0	304,000
Assets funded from Accumulated Surplus	0	15,968
	0	(32,134)

12. PROVISION FOR DISPOSAL OF RADIOACTIVE SOURCES

The Institute holds a number of radioactive 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.

	€	2011 €	2010 €
Opening Provision		58,892	43,400
Utilised		(35,336)	(25,000)
Provided in year		-	40,492
Closing Provision		23,556	58,892

13. APPROVAL OF FINANCIAL STATEMENTS

The financial statements were approved by the Board on the 11.10.2012

Abbreviations and acronyms

ALARA: As low as reasonably achievable	IAEA: International Atomic Energy Agency	Working Group
ALMERA: Analytical Laboratories for the Measurement of Environmental Radioactivity	ICG: IAEA emergency notification system (OSPAR)	RASSC: Radiation Safety Standards Committee
AWIG: Analysts Informal Working Group	ICRP: International Commission on Radiological Protection	RCSI: Royal College of Surgeons in Ireland
BAT: Best Available Techniques	ICSD: Ionisation chamber smoke detectors	RPA: Radiation Protection Adviser
Bq/l: becquerels per litre	ICT: Information Communications Technology	RPII: Radiological Protection Institute of Ireland
Bq/m3: becquerels per cubic metre	INAB: Irish National Accreditation Board	RSC: Radioactive Substances Committee (OSPAR)
CBRN: Chemical-Biological-Radiological-Nuclear	INES: International Nuclear and radiological Event Scale	SEAI: Sustainable Energy Authority of Ireland
ConvEx: Conventions (on International Notification and Assistance in the event of a nuclear accident) Exercise	IRAC: Ionising Radiation Advisory Committee	SI: Statutory Instrument
C&AG: Comptroller and Auditor General	IRMF: Ionising Radiation Metrology Forum	SSDL: IAEA's Secondary Standard Dosimetry Network
CAC: Communications Advisory Committee	IRRS: Integrated Regulatory Review Service	UCD: University College Dublin
CNS: Convention on Nuclear Safety	LIMS: Laboratory Information Management System	UK-EA: UK Environment Agency
CSN: Consejo de Seguridad Nuclear	mSv: millisievert	UK-HPA: UK Health Protection Agency
DAFF: Department of Agriculture, Fisheries and Forestry	MoU: Memorandum of Understanding	UK-HSE-ND: UK Health and Safety Executive-Nuclear Directorate
DCENR: Department of Communications, Energy and Natural Resources	MOX: Mixed Oxide Fuel	UK-NPL: UK National Physical Laboratory
DCU: Dublin City University	NCG: National Co-ordination Group	UK-NDA: UK Nuclear Decommissioning Authority
DECLG: Department of the Environment, Community & Local Government	NCCP: National Cancer Control Programme	USIE: Unified System for Information Exchange in Incidents and Emergencies
ECURIE: European Community Urgent Radiological Information Exchange	NDA: Nuclear Decommissioning Authority (UK)	WHO: World Health Organisation
EGIR: Expert Group on Ionising Radiation	NEA: Nuclear Energy Agency	
EMERCON: Emergency Convention (IAEA emergency notification system)	NEA-WPNEM: NEA Working Party on Nuclear Emergency Matters	
ENSREG: European Nuclear Safety Regulators Group	NEPNA: National Emergency Plan for Nuclear Accidents	
EPA: Environmental Protection Agency	NEWS: Nuclear Events Web Based System	
EPR: European Pressurised Reactor	NIEA: Northern Ireland Environment Agency	
ERPAN: European Radiation Protection Authorities Network	NORM: Naturally Occurring Radioactive Materials	
EURADOS: European External Dosimetry Group	NPP: Nuclear Power Plant	
EURNMET: European Metrology Group	NRPA: Norwegian Radiation Protection Authority	
FSAI: Food Safety Authority of Ireland	ONR: Office for Nuclear Regulation (UK)	
GDA: Generic Design Assessment	OSPAR: Oslo-Paris Convention	
HAL: Highly Active Liquor	PMDS: Performance Management and Development System	
HALES: Highly Active Liquor Evaporation and Storage	PRMG: Personal Radiation Monitoring Group	
HASS: High Activity Sealed Sources	QCS: Quality Customer Services	
HASTS: Highly Active Storage Tanks	QCSWG: Quality Customer Services	
HLG: High Level Group		
HSA: Health and Safety Authority		
HSE: Health Service Executive		

Dose limits and reference levels

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

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

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

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

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



**Radiological Protection
Institute of Ireland**

An Institiúid Éireannach um
Chosaint Raideolaíoch

Contact Us

Radiological Protection Institute of Ireland
3 Clonskeagh Square
Dublin 14
Ireland

Tel: 01 2697766

Fax: 01 2697437

Email: rpil@rpil.ie

Web: www.rpil.ie

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



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