



Radiological Protection Institute of Ireland Executive Summary 2009



Radiological Protection Institute of Ireland
An Institiúid Éireannach um Chosaint Raideolaíoch

Executive Summary 2009

Good progress was made towards the achievement of the RPII's strategic objectives during the year. However, the moratorium on recruitment and promotion announced early in the year meant that a number of staff with specialist skills who left could not be replaced necessitating the deferral of some projects. On-going review of priorities remains essential.

Regulation and Licensing

At the end of 2009, 1735 licences were in force across a range of sectors including medical, industrial, educational, dental and veterinary, representing an increase of around 30 on the previous year. Medical licences continue to increase, both in number and in the complexity of the applications. During 2009, a licence was issued for a second ablation suite for the treatment of thyroid cancer using iodine-131 and plans and shielding assessments for eight new linear accelerators at St James's and Beaumont Hospitals were submitted for review.

Two hundred and four inspections were carried out during the year. Particular areas of focus included the use of portable X-ray units for equine radiography, radiotherapy facilities, users of gauges, the non-destructive testing industry, sterilisation facilities and X-ray equipment for security screening purposes. A number of security surveys of licensees' premises were also undertaken with An Garda Síochána. Seven inspections were of dental practices that had failed to renew their licence in September 2008 and three of these enforcement visits resulted in the RPII taking prosecutions through the district Courts against the licensee. In one case the licensee was convicted and fined, while in the other two cases the licensee pleaded guilty; in one case the Probation Act was applied and in the other a charitable donation was ordered.

Investigations of reportable doses undertaken during the year found that five such doses had been received by staff in the medical and industrial radiography sectors. None of the doses exceeded the statutory dose limits. A comprehensive investigation of a missing lightning preventor containing a low activity radium source was unsuccessful in locating the source and a letter of censure was issued to the company involved. The RPII also followed up on a notification from the Norwegian Radiation Protection Authority of the unauthorised delivery of several thousand smoke detectors containing radiation sources to a company in Norway for disposal. The matter was resolved by the return of the smoke detectors to Ireland on the understanding that the company will find an alternative solution for their disposal. Thirteen investigations in the medical sector were carried out on foot of the notification of incidents to RPII. Five of the incidents involved patients and are therefore outside the remit of the RPII. The remainder resulted in the wrong patient receiving the treatment and consequent radiation dose. All were fully investigated and measures have been put in place to prevent recurrences insofar as is reasonably possible.

As is required by law, the exposure of aircrew to ionising radiation must be monitored to determine if measures to control exposure are required. During 2009, information received from seven licensed air operators showed that 9666 individuals were estimated to receive annual radiation doses above 1 mSv, with 714 of these in excess of 4 mSv and none over 6 mSv.

In general, good standards of radiation protection were observed across all sectors during inspection. Strict adherence to the regulations and licence conditions and care in the management of sources of ionising radiation will ensure that people are not exposed unnecessarily.

A new Code of Practice on the design of diagnostic medical facilities where ionising radiation is used was developed with the Haughton Institute, updating the 1988 Code and providing details of the legislative requirements and practical radiation protection guidance for the main types of radiological and nuclear medicine facilities. Guidance was also issued on the protection of the unborn child during diagnostic medical exposures in collaboration with the Medical Council, the Royal College of Surgeons in Ireland, the Irish Institute of Radiography and Radiation Therapy, the Irish Nuclear Medicine Association and the Association of Physical Scientists in Medicine and on a disposal protocol for decayed disused radioactive sources in conjunction with the Environmental Protection Agency.

Best practice in radiation protection was enhanced through the establishment of a register of Radiation Protection Advisors to provide advice to those working in the industrial and education sectors. The RPII's advice on best practice in relation to the provision of delay and decay holding tanks for iodine ablation treatment facilities was accepted as national policy, i.e. that the fitting of holding tanks in new facilities was advantageous but

that it should be assessed on a case-by-case basis and that the retrofitting of holding tanks to existing facilities was grossly disproportionate to the financial and logistical issues involved.

New legislation on the supervision and control of shipments of radioactive waste and spent fuel was implemented during the year, updating previous requirements and bringing them into line with the most recent EU Directives. There was some progress on the long-standing issue of Ireland's management of its own radioactive waste with the establishment of an inter-departmental High Level Group to advise Government. RPII also participated with the EPA on a project examining the wider issues of the storage of difficult wastes which will underpin the work of the High Level Group.

Exposure of the Irish Population to Radiation

The RPII continued its programme of monitoring radiation in the environment during the year with the aim of assessing the exposure of the population. The 2009 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 the most exposed groups (i.e. commercial fishermen and commercial oyster and mussel farmers) were 0.25 and 0.51 μSv , respectively, while those to typical consumers were 0.1 μSv . Levels of ambient gamma dose rate and radioactivity in air measured at 15 and 12 stations around the country, respectively, showed no abnormal readings and were consistent with measurements in previous 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 are low and do not constitute a risk to health.

During 2009, a comprehensive review of the RPII's monitoring programme was undertaken by a specially constituted group of five independent experts to ensure that the programme meets its stated aims and to make recommendations for improvement, if required. The review panel broadly endorsed the RPII's monitoring programme and considered that the current programme was both adequate and justified. The panel also made some specific recommendations concerning sampling and skills maintenance for consideration in future programmes.

The study of radioactivity in groundwater supplies commenced in conjunction with the EPA in 2008 continued during the year. Samples were collected from 98 locations and analysed for their total alpha and total beta activity levels. In all cases the measured beta activities were below the World Health Organisation screening level while in 16 cases the alpha screening level was exceeded requiring further investigation during 2010.

The study of thoron levels in Ireland undertaken in collaboration with University College Dublin (UCD) and the National Institute of Radiological Sciences in Japan was completed in 2009. The study found that the average dose due to thoron decay products in Ireland was estimated to be 0.38 mSv/year, representing approximately 10% of the total average dose from all sources. The maximum dose estimated was 5 mSv/year, and is equivalent to the dose from the indoor radon concentration at which remediation is recommended.

Radon

During 2009, addressing the problem of exposure to radon remained a key priority for the RPII. By the end of the year, RPII's radon database contained measurements for over 37,000 homes. Of these 4921 have radon concentrations above 200 Bq/m³ with 491 having levels above 800 Bq/m³. Eight homes with levels well in excess of 2000 Bq/m³ were identified during the year. There were two homes each in counties Kerry and Sligo with the remaining four in Co. Mayo, Co. Clare, Co. Waterford and Co. Tipperary. Counties Sligo, Waterford and Mayo are already known to be among those counties with the highest percentage of homes above 200 Bq/m³ with 24%, 22% and 16% respectively, and the number of homes above 800 Bq/m³ in these counties is 56, 34 and 33. In counties Kerry, Clare and Tipperary, the percentage of homes above 200 Bq/m³ is slightly lower at 14%, 11% and 11%, respectively, but the number above 800 Bq/m³ is comparable if not higher at 94, 59 and 14.

The RPII's strategic objective on radon is to work to increase awareness among all key stakeholders of the RPII's advice on radon with the ultimate aim of the adoption and implementation of a National Radon Control Strategy by Government. During 2009, the RPII worked with the Health Service Executive to develop a joint position statement on radon which recognises radon as an important public health hazard requiring a coordinated national response. It also engaged with the Health and Safety Authority to provide information on radon to HSA inspectors to support the inclusion of radon in their inspections. Local authorities are important partners for RPII and, during the year, the RPII published a guide on the implementation of radon measurement programmes in social housing targeted at local authorities. The publication was complemented by an extensive programme to raise awareness of the issues, particularly in counties with high radon levels.

The National Radon Forum is a key focal point for the RPII's radon programme each year. In 2009, the theme was "Towards the development of a radon control strategy for Ireland" and the Forum was opened by Mr Michael Finneran, TD, Minister of State at the Department of the Environment, Heritage and Local Government. Also, during the year, the RPII reviewed how the inclusion of radon disclosure in the conveyancing process could be used to increase the rate at which homes with high radon levels are found. The review highlighted the effectiveness of the measure in other countries and estimated that if similar measures

were introduced in Ireland the time needed to measure the national housing stock could be reduced from 400 years at the current rate of measurement to 40 years. The review also identified the value of a shorter screening measurement technique to support a conveyancing initiative and research on this topic was carried out in cooperation with University College Dublin.

Radiation Measurement Services

In total the RPII measured the radioactivity content in 1282 environmental samples and foodstuffs during the year. Certificates specifying the radioactivity content issued to exporters of Irish produce numbered 3198, a small decrease on the previous year. The RPII's Dosimetry Service supplied approximately 78,000 dosimeters to clients during the year. These dosimeters were used to monitor the radiation exposure of over 8000 individuals. The Calibration Service tested 419 instruments for compliance with the relevant manufacturers' specifications. Radon measurements were completed in 2550 homes. Of these, 1910 were routine home measurements undertaken at the request of the householder while the remaining 640 were measured as part of research work undertaken by the RPII. During the year, 302 workplaces were measured for radon of which 39 were schools.

Emergency Preparedness

During the year, the revision of the RPII's sub-plan under the National Emergency Plan for Nuclear Accidents (NEPNA) was finalised and approved for adoption. The technological requirements for the RPII's duty officers were reviewed and a series of recommendations were prepared for implementation in 2010. In addition to its internal emergency exercises in support of its role under NEPNA, the RPII participated in eight international emergency exercises organised by the International Atomic Energy Agency and the European Commission. An important development during the year was the establishment by the Department of Agriculture, Fisheries and Food of an expert group to produce a customised Irish version of the more general "Generic Handbook for Assisting in the Management of Contaminated Food Production systems in Europe following a Radiological Emergency". RPII participated in the expert group providing advice on countermeasures and the handling of contaminated food products.

Safety of Nuclear Facilities Abroad

An important development during the year was the adoption by the European Council of a Directive establishing a Community framework for the safety of nuclear installations. The Directive aims to maintain and promote the continuous improvement of nuclear safety and its regulation and to ensure that EU Member States provide appropriate national arrangements to protect workers and the general public against the dangers arising from nuclear installations.

The RPII continued to closely monitor developments at Sellafield and other UK nuclear sites. At Sellafield, technical problems with the Highly Active Liquor and Evaporation Storage (HALES) facility resulted in lower than expected throughput, which taken together with other factors, meant that the volume of highly-active liquid radioactive waste remained relatively constant throughout the year. There was a gradual increase in the discharge of the radionuclide antimony-125 to air due to the reprocessing of spent fuel with higher radioactivity content than usual. Operations were suspended to allow an evaluation by the UK Environment Agency (UK-EA) which concluded that the radiological impact on people and the environment of the increased discharge was small compared with the consequences of further delaying the reprocessing of the fuel. RPII modelled the anticipated peak discharges and confirmed that the resulting air concentrations would be of negligible radiological consequence in Ireland.

The RPII continued to track the UK plans to build new nuclear power stations to replace those that are scheduled to close over the next twenty years. The UK process includes a project to evaluate reactor designs which is scheduled to be completed by June 2011 and the identification of potential sites for the deployment of the new designs.

During the year, at the invitation of the UK-EA, RPII participated in an Environment Agency Team inspection of the aqueous waste management arrangements at Sellafield. RPII also participated in a two-day workshop held as part of the UK's Health and Safety Executive Nuclear Directorate (UK-HSE-ND) self assessment of its nuclear regulatory infrastructure. A number of incidents at Sellafield and other UK nuclear sites were advised to the RPII by the UK-EA and the UK-HSE-ND during the year. Two of the events were rated as Level 2 (an incident) on the International Nuclear Event Scale (INES). One of the incidents was the detection of a radioactive leak causing ground contamination in the Magnox facilities at Sellafield. The second occurred at Dungeness B nuclear power plant and demonstrated degradation of the safety in-depth at the site. A third event was the loss of cooling water supplies to the HALES plant. The event was provisionally rated as Level 1 (an anomaly) but final rating is still pending the completion of an investigation by UK-HSE-ND. None of these incidents had offsite consequences and, therefore, had no radiological impact on Ireland.

The RPII was also informed of six other INES Level 2 events in Switzerland, France, Belgium and Hungary. None of the incidents had a radiological impact on Ireland. RPII participated in the Third Review Meeting of the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management in Vienna in May. The review process involves the written review by peers of national reports submitted earlier by participating countries. The process culminates in a two week meeting at which each participating country presents a summary of its national report and responds to questions by other participating countries. The aim of the Convention is to maintain



a high level of safety in spent fuel and radioactive waste management. The peer review of Ireland's report noted that Ireland has not yet developed a long-term waste management policy. Also during 2009, RPII assisted the DEHLG in the necessary review and updating of "Ireland's National Plan for the Implementation of the OSPAR Convention" (Oslo-Paris Convention for the Protection of the Marine Environment of the North East Atlantic).

Corporate Services

The Corporate Services Division supports all aspects of the RPII's work and 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. To this end, a significant development during the year was the launch of the RPII's redeveloped website with many new features including an interactive radon map and radiation dose calculator. Statistics for recording visitor behaviour show that the site compares well with other sites of similar size. A range of communication activities was also undertaken during the year with the aim of improving access to information about radiation protection and monitoring data.

The moratorium on recruitment and promotion impacted negatively with the loss of five staff. Despite this, work continued

on the development of a new performance management system which is due to be implemented in 2010. The RPII's Partnership Committee was active during the year, particularly in support of flu pandemic planning initiatives and the implementation of recommendations from an external audit of internal communications. Improvements in the RPII information technology infrastructure implemented during the year included real time back up for critical servers to improve disaster recovery and the installation of RPII's first virtual server.

I wish to express my personal appreciation to all the staff of the RPII for their continued dedication and professionalism during the year. 2009 was a very difficult year due to the on-going uncertainty about future budgets and staff numbers, and all staff responded very positively to the additional demands made on them. I am also grateful to the staff of the Environmental Radiation Policy Section of the DEHLG and other officials in the Department for their support for the work of the RPII.

2009 Highlights

The RPII's Dosimetry Service issued approximately 78,000 dosimeters for over 8,000 individuals in 2009

1,894 samples were tested for radioactivity in 2009

The RPII participated in 8 international emergency exercises during the year

Over 10,000 unique visitors to the RPII website were recorded in October 2009 on the issue of radon in homes

Figure 1: The number of medical, industrial, educational, dental and veterinary licences from 1993-2009

In 2009, an additional 102 new licences were issued bringing the number of licensees to 1,735

In 2009, the committed effective dose to typical seafood consumers was 0.1 μ Sv

Radon measurements were made in 2,550 homes and 302 workplaces during the year