


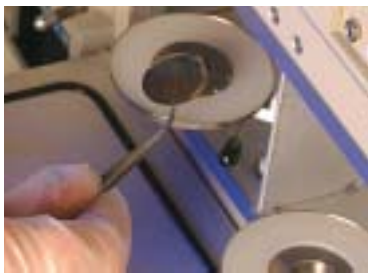

Annual Report

+ Accounts 2003

Radiological Protection Institute of Ireland
An Institiúid Éireannach um Chosaint Raideolaíoch

RADIOLOGICAL PROTECTION INSTITUTE OF IRELAND
AN INSTITIÚID ÉIREANNACH UM CHOSAINT RAIDEOLAÍOCH

ANNUAL REPORT AND ACCOUNTS 2003

To the Minister for the Environment, Heritage 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 31st December 2003.

Francis J. Mulligan, Chairman

Radiological Protection Institute of Ireland
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Chairman's Statement

I am pleased to introduce the Annual Report and Accounts of the Radiological Protection Institute of Ireland for 2003. During the year, two issues dominated public concern about radiological safety in Ireland. These were the potential for exposure to extremely high levels of radon in the home and the consequences for this country of the continuing activities at the Sellafield nuclear fuel reprocessing plant in Cumbria.

The identification of a house in Castleisland, Co Kerry, with radon concentrations of approximately 49,000 Bq/m^3 in July was a sad reminder to us all of the real hazard of exposure to high levels of radon in the home. This is by far the highest level ever measured in Ireland and is one of the highest recorded in Europe. At this radon concentration, the occupants of the house would have been subjected to an annual radiation dose of greater than 1 sievert, fifty times the permitted level for a radiographer or nuclear power plant worker. Following advice from the Institute, the householder contacted a remediation company to begin remedial work as soon as possible. The remedial effort resulted in a dramatic reduction in the radon concentration in the house within a period of about three months. It is reassuring that, even at these very high levels, radon concentrations can be substantially reduced by relatively simple means.

Since the house was identified, we have learned that the householder had recently been diagnosed with lung cancer at age 52. His wife had died a number of years earlier from lung cancer at age 41. The householder himself had never smoked, while his wife had given up twenty years before her death. While it is not possible to draw specific conclusions in a case such as this, it is clear that that the risk of contracting lung cancer associated with a lifetime exposure at such extreme radon concentrations is very high. The probability has been estimated to be of the order of 30 to 70% depending on whether the person exposed smoked or not.

The Institute is committed to continuing to raise awareness of the hazards associated with exposure to radon by all means available to it, and to encouraging those with high levels to undertake the work needed to reduce the level.

As has been the case every year since the 11th September 2001, public concern about the routine operations at Sellafield and the consequences of a terrorist attack at the plant remained high. The Institute's role in providing advice to Government on nuclear safety matters in general, and on Sellafield in particular, continued to be a priority during the year and significant effort was devoted to this work. The legal case taken by the Irish Government against the UK concerning the commissioning of the Mixed Oxide (MOX) Fuel Plant was heard by an International Tribunal of UNCLOS in June. The Tribunal affirmed an earlier provisional measure recommending that the Parties should seek to establish arrangements to improve co-operation and consultation between them. Since the hearing, the Institute has continued to work closely with officials of the Nuclear Safety Section in the Department of the Environment, Heritage and Local Government (DOEH&LG) to achieve this aim.

A significant development during the year was the announcement by British Nuclear Fuels plc (BNFL) that the Calder Hall reactors on the Sellafield site were to close in March 2003. The Institute has expressed concern on a number of occasions about the continued operation of the oldest Magnox reactors and the fact that the Calder Hall reactors have now ceased operation eliminates their potential to pose a significant risk to Ireland. In June 2004, BNFL announced that electricity generation at the Chapelcross nuclear power station in Scotland had ceased, four years ahead of the original closure date. The remaining BNFL-operated Magnox power stations are all scheduled to close by 2010 and the Institute will continue to monitor progress towards this target.

The work of international organisations concerned with safety in the use of ionising radiation and nuclear power, including the International Atomic Energy Agency (IAEA) and the European Union (EU) continued to focus on measures to address the safety and security of radioactive materials. In this regard, an important development was the coming into force at the end of the year of a new European Directive, the purpose of which is to ensure that all EU member states have the necessary systems in place to ensure the safety of high-activity and 'orphan' radioactive sources. This Directive must be implemented into national legislation by the end of 2005. Accordingly a facility for the centralised storage of sealed sources, in particular for those high-activity sources which can be extremely hazardous if not handled properly will have to be established. The Institute has consistently in its Annual Reports drawn attention to the inherent safety weakness in our national infrastructural provision arising from the lack of such a facility.

One important area of the Institute's work which does not attract the same level of media attention is its role in relation to the exposure of patients undergoing medical diagnosis or treatment. The remit of the Institute relates to the control of radioactive substances and irradiating apparatus used for diagnosis and treatment and to the protection of medical and technical personnel involved in the provision of these services. Since ionising radiation was first used for these purposes, there has been a recognition that, while the beneficial effects are very great, there are associated risks and these must be controlled.

Of the 1400 users of ionising radiation licensed by the Institute, over 900 involve use in the medical sector. In the last decade, there have been significant technological advances in the practice of radiology, nuclear medicine and radiotherapy, and the regulation of these activities requires significant expertise on the part of the regulator. In addition to the increased complexity of procedures, there has also been an increase in the number of centres offering such complex procedures. I am very pleased therefore, that during 2003, the Institute was successful in filling a newly-created post for a medical physicist in its Regulatory Service. The addition of this expertise will help the Institute to better control, through its licensing system, the regulation of the use of ionising radiation in medicine.

The work of the Institute has benefited greatly during the year from the assistance of its Advisory Committees on Environmental Radiation and Medical Radiation. I wish to express the deepest thanks of the Board to the members of these committees who give voluntarily of their time and expertise to make an invaluable contribution to the Institute's effectiveness.

I would like to thank all of the Institute's staff for the commitment and expertise that they bring at all times to the discharge of their responsibilities.

Finally, I wish to record the Institute's appreciation for the support and encouragement received from the Minister for the Environment, Heritage and Local Government, Mr Martin Cullen, TD and from the Minister of State at that Department, Mr Pat the Cope Gallagher. The Institute is also indebted to the officials of the Nuclear Safety Section and other officials in DOEH&LG for their wholehearted co-operation at all times. The helpful collaboration of other Government Departments, third-level educational institutions and other national organisations is also gratefully acknowledged.

Francis J. Mulligan
Chairman

Staff Structure

Board

Advisory Committees

Chief Executive
Ann McGarry

Commercial & Administration Manager
Caroline Somers

Principal Scientific Officer
Tony Colgan

Natural Radioactivity, Nuclear Safety

Principal Scientific Officer
Christopher Hone

Regulatory Service

Principal Scientific Officer
Barbara Rafferty

Environmental Laboratory, Information Service

Principal Scientific Officer
David Pollard

Emergency Planning, Dosimetry & Calibration Services, Information Technology

Functions of the Institute

The Institute's principal functions are:

- To provide advice to the Government, the Minister for the Environment, Heritage and Local Government and other Ministers on matters relating to radiological safety.
- To provide information to the public on matters relating to radiological safety.
- To maintain and develop a national laboratory for the measurement of levels of radioactivity in foodstuffs and the environment, and to assess the significance of these levels for the Irish population.
- To provide a personnel dosimetry and instrument calibration service for those who work with ionising radiation.
- To regulate by licence the custody, use, manufacture, importation, transportation, distribution, exportation and disposal of radioactive substances, irradiating apparatus and other sources of ionising radiation.
- To assist in the development of national plans for emergencies arising from nuclear accidents and to act in support of such plans.
- To monitor developments abroad relating to nuclear installations and radiological safety in general; and to keep the Government informed of their implications for Ireland.

Members of the Board

On 21st February 2003 the term of office of Ms Mary Coffey expired. Professor Kieran Byrne was appointed to the Board with effect from 24th February 2003.

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, in the case of the six members who were nominated for appointment to the Board by particular organisations, is the name of the respective nominating organisation.

Chairman	**Francis J. Mulligan**	8(8)
	William Blunnie *Medical Council*	5(8)
	Gregory Burke *Institute of Food Science and Technology of Ireland*	8(8)
	Kieran Byrne	5(7)
	Mary Coffey	1(1)
	Patrick Connellan *Dental Council*	6(8)
	Anita Dowling *Association of Physical Scientists in Medicine*	5(8)
	Edward Fitzgerald *Faculty of Radiologists RCSI*	4(8)
	James Fitzmaurice	7(8)
	Lesley Malone *Irish Nuclear Medicine Association*	6(8)
	Darina Muckian	7(8)
	Adi Roche	5(8)
	Francis J. Turvey	7(8)

Main Developments

RADON IN HOUSES

A very significant development during 2003 was the identification in July of a house near Castleisland, Co. Kerry with a radon concentration of approximately 49,000 Bq/m^3. This concentration of radon is almost 250 times the national Reference Level for radon of 200 Bq/m^3. It is the highest radon concentration ever measured in a house in Ireland and is one of the highest radon values ever recorded in Europe.

Exposure to radon at this level corresponds to an annual radiation dose to the occupants of the house of approximately 1200 millisieverts (mSv). To put this dose in context, the occupants of the house received a radiation dose of 3.4 mSv every day; essentially the same radiation dose that is received on average by people living in Ireland over a full year.

The Institute acted quickly to alert the householder to the extremely high radon level and, on the Institute's recommendation, he immediately engaged a specialist radon remediation company to reduce the radon concentration. Initial measurements following completion of the remediation work indicated that the radon concentration had been reduced below 1000 Bq/m^3 and this was further reduced to 600 Bq/m^3 by the end of the year.

In order to determine if other houses in the general area were also affected, the Institute wrote to approximately 2500 householders living within a 10 km radius of the "Castleisland house" advising them to have their houses tested for radon. Measurements were also undertaken in all local authority houses at the request of Kerry County Council.

A study was completed during the year to determine the impact of the 1997 revision to the Building Regulations on the radon levels in new houses. The 1997 revision requires that radon preventive measures be incorporated into all new buildings constructed since 1 July 1998.

The study showed that the average radon concentration is significantly lower in homes built since 1998 when compared with homes built prior to 1997. This finding supports the results of the earlier survey that the installation of radon preventive measures at the time of construction is having a positive effect on reducing radon concentrations.

REGULATION OF THE USES OF IONISING RADIATION

Radioactive sources are used for a variety of purposes notably in industry, medicine and research. The risks posed by such sources vary widely, depending on their activity, the particular radionuclides they contain, their construction, etc. In general the risks associated with the planned use of radioactive sources are well known and they are controlled by regulatory authorities in each country.

However, in recent years, regulatory authorities world-wide have been faced with dealing with the problem of sources that for various reasons are not under control. Such "orphan" sources could potentially be encountered by people who are unaware of the risks. This has led to serious radiation injuries and in some cases to death. In other cases, significant contamination has resulted requiring very extensive and expensive clean-up operations.

In Ireland, for example, in 1990 a caesium-137 radioactive source concealed in a consignment of scrap metal was inadvertently melted down at the Irish Steel plant in Haulbowline, Co. Cork. Fortunately, in this case, the resulting investigation concluded that no one had been exposed and that there had been no contamination of the environment. However, a large quantity of contaminated dust was generated which was subsequently shipped to the original consignor.

In order to address the issue of "orphan" sources, a new European Directive came into force at the end of the year, the purpose of which is to ensure that all EU members states have a regulatory structure and appropriate financial management and surveillance systems in place to ensure the safety of high activity and orphan radioactive sources. The Directive must be implemented into national legislation by the end of 2005. Many of the requirements of the Directive will be met by our existing licensing system which regulates the use radioactive substances and irradiating apparatus. However, there are a number of measures which may require additional regulations and/or administrative measures. One aspect of particular concern in Ireland is the requirement to establish a dedicated radioactive storage facility for disused radioactive sources.

NUCLEAR SAFETY

Much of the work of senior staff during the year was focussed on nuclear safety in general and on provision of advice to Government. In particular three events required significant input from the Institute's senior staff. These were the hearing of the legal case taken by Ireland under the United Nations Convention on the Law of the Sea (UNCLOS) in relation to the operation of the MOX Plant at Sellafield; the Ministerial Meeting of the OSPAR convention on the Protection of the Marine Environment of the North East Atlantic, and the first review meeting of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management held in November in Vienna.

The Institute's role in the legal case is as scientific advisor to the Government. During the course of preparation for the hearing, Institute staff provided technical advice on all aspects of the current and historic levels of radioactive discharges from Sellafield to the Irish Sea, as well as on the resulting level of radioactive contamination of the marine environment and radiation doses to man. Institute staff also coordinated the preparation of a series of independent evaluations of specific scientific issues relevant to Ireland's case.

At the Ministerial meeting of the OSPAR Convention held in Bremen in June 2003, Environment Ministers from the Contracting Parties agreed on the method of determining the baseline value for discharges of radioactive substances into the marine environment. The establishment of baselines is of particular importance in the context of the routine discharges from Sellafield as the agreed levels will be used to evaluate the extent to which contracting parties, including the UK, effect progressive and substantial reductions in discharges in accordance with the OSPAR strategy with regard to Radioactive Substances which was adopted at the OSPAR Commission Ministerial meeting in 1998.

Institute staff also represented Ireland at the first review meeting of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management which was held in November. The purpose of this Convention is to ensure that countries manage their spent nuclear fuel and radioactive waste safely. Each contracting party is obliged to present a report on the status of its national programmes. While the quantities of radioactive waste produced in Ireland are relatively small, concerns were expressed that a waste storage facility has yet to be established in Ireland.

Staff and Resources

STAFF

The Institute's approved staff complement at the end of 2003 was 45. A significant development towards the end of the year was the recruitment of an experienced medical physicist to join the Regulatory Service.

As a consequence of the additional requirements for technical and scientific advice in support of the Government's legal actions against Sellafield, the Institute sought sanction early in the year for the establishment of a temporary Principal Scientific Officer post. Sanction was received in May 2003 and consequential vacancies at Senior Scientific Officer and Scientific Officer grades were also filled.

During the year, a Project Team was established to assist the implementation of a Performance Management and Development System within the Institute. Tenders were issued for the provision of training and a contract was awarded towards the end of the year. Training is scheduled for early 2004.

EQUALITY

The Institute is committed to a policy of equal opportunity in all aspects of its activities. Particular attention is given to equality in recruitment, conditions of employment and access to promotion, training and career development. The Institute recognises that flexible working arrangements are an important component of equality policies and operates such schemes as flexitime, study leave, career breaks and work-sharing.

PARTNERSHIP AND PARTICIPATION

The Institute's Participation Forum, established under the terms of the Worker Participation (State Enterprises) Act, 1988, provides a sub-Board mechanism for consultation with staff at all levels in the organisation about matters affecting the operation and effectiveness of the Institute. The Participation Forum meets regularly throughout the year, and in 2003, it played an important role in meeting the requirements of the Modernisation Programme, which is provided for under Sustaining Progress.

CUSTOMER SERVICE

The Institute is committed to the provision of high quality services to all its customers across the full range of its activities. A Customer Service Charter is in place which sets out our commitments to our customers. All of the Institute's measurement services are accredited by the National Accreditation Board.

SAFETY HEALTH AND WELFARE

The Institute is committed to complying fully with the requirements of the legislation relating to safety, health and welfare at work. In accordance with the provisions of the Safety, Health and Welfare Act, 1989, a safety committee is in place and a Safety Officer is elected by staff members. A safety statement has been prepared and is kept under continuing review.

FINANCE

The Institute's income in 2003 was €4.1 million made up of grant-in-aid of €3.068 million and €1.032 million in earnings from dosimetry, product certification and other services, licence charges, research and consultancy contracts. Capital expenditure was €360,514. Income for the year exceeded expenditure by €81,968.

The Institute complies with all procurement regulations and it has procedures in place to ensure that all invoices received are paid within the time limits specified on the invoices or the statutory time limit if no period is specified.

ENERGY AND EFFICIENCY

The recommendations of the staff working group established in 2001 in accordance with a Government decision that State bodies report annually on measures to save energy, have generally been implemented. In particular energy saving lighting systems are now in use throughout the building and staff are reminded to turn off office lights and computers when not in use.

The remit of the working group has now been expanded to include waste management and recycling and staff are being asked for suggestions on ways to reduce the amount of office and other waste, such as laboratory materials, generated by the Institute.

INFORMATION TECHNOLOGY

In common with most modern organisations, information technology (IT) continues to become increasingly central to the way in which the Institute conducts its business. Staff, during the course of their daily work, make use of a wide variety of electronic communications, database applications, scientific software and office tools. The role played by IT support staff is, therefore, more crucial to the work of the Institute than ever before.

With the increased prevalence of computer viruses, malicious intrusion and spam, network security has become an extremely important issue for IT departments everywhere and security now accounts for a significant part of the workload of the Institute's IT department. During the year independent consultants were employed to conduct a security audit of the Institute's systems. While the review did not identify any major security problems, the consultants made a number of recommendations for improvement, which have been implemented.

During 2003 the Institute introduced a web-based Flexi Time recording system. This system, which replaces the old clock card based system, allows users to clock in, submit adjustments and make leave applications from any PC. The system provides detailed information on time worked, flexi entitlements and annual leave to users, supervisors and administrators and has resulted in significant gains in efficiency throughout the organisation.

Other significant developments during the year included the linking of the dosimetry database and accounts systems, the upgrade of the Institute's mail server and the implementation of enhancements to the regulatory and dosimetry databases. A development of particular importance during 2003 was the introduction of IT usage policies covering the Institute's computer network and telephone system.

Environmental Monitoring and Research

The primary objectives of the Environmental Laboratory are to measure the levels of radioactivity in both the terrestrial and marine environment and to estimate their impact on the Irish public. A number of comprehensive monitoring programmes are carried out in order to achieve these objectives. The numbers and types of samples tested during 2003 are given in Table 1.

The results of these analyses are published biennially in the reports: Radioactivity Monitoring of the Irish Marine Environment and the Environmental Radioactivity Surveillance Programme, which are available on the Institute's website: www.rpii.ie.

The Environmental Laboratory places a strong emphasis on quality control and quality assurance and is the nominated national centre for the measurement of radioactivity in foodstuffs. Best practice is ensured as procedures used by the laboratory for testing foodstuffs are accredited by the Irish National Accreditation Board to International Standard ISO 17025.

Table 1: Radioactivity Testing of Environmental Samples and Foodstuffs, 2003

Sample Type	Number
Air	497
Beef	50
Lamb	64
Pork/Poultry	55
Drinking water	434
Fish and shellfish	228
Seawater, seaweed & sediment	200
Milk and dairy products	458
Other foodstuffs	195
Food additives & pharmaceuticals	225
Miscellaneous	72
Total	**2478**

MARINE ENVIRONMENT

While natural sources contribute most of the radioactivity in the marine environment, Irish coastal waters have also been influenced by a number of artificial sources of radioactive contamination. The most significant of these sources is the discharge of low-level radioactive waste from the British Nuclear Fuels plc (BNFL) nuclear fuel reprocessing plant situated at Sellafield in Cumbria in the north-west of England.

The marine monitoring programme is carried out by Institute staff with the assistance of Fishery Quality Officers of the Department of Communications, Marine and Natural Resources. During 2003, samples of a wide range of fish and shellfish species were collected from major landing ports and aquaculture areas. Seawater, seaweed and sediment were also collected from coastline locations and from the western Irish Sea using the Marine Institute's Research Vessel the *Celtic Voyager*.

The most important exposure pathway for the Irish public continues to be the consumption of seafood. The dose to consumers who eat substantial quantities of seafood (20 g of shellfish and 200 g of fish per day) was estimated to be less than 2 microsieverts (μSv) for 2003 which is similar to that in both 2001 and 2002. This dose may be compared with that arising from the presence of the naturally occurring radionuclide, polonium-210, in seafood which is estimated to be 148 μSv; and to the average annual dose of 3620 μSv to a member of the Irish public from all sources of radiation. Activities such as boating, swimming, spending time on beaches and fishing incur a small additional dose.

In 2003, a UK study commissioned by Greenpeace and carried out by Southampton University found traces of technetium-99 discharged from Sellafield in fresh and smoked salmon farmed in Scotland. In light of public concern in Ireland over these findings, samples of Irish and Scottish smoked salmon, smoked mackerel and fresh salmon were sourced from Irish supermarkets and analysed for their technetium-99 content. Technetium-99 was detected in one of the samples analysed (smoked Scottish mackerel) and the level measured was comparable to those measured in seafood samples analysed routinely as part of the marine monitoring programme. Since the dose per unit activity is significantly lower for technetium-99 than for caesium-137, the former accounts for less than 30% of the artificial radionuclide dose to an Irish seafood consumer, while approximately 60-70 % of this dose is due to Sellafield-sourced caesium-137.

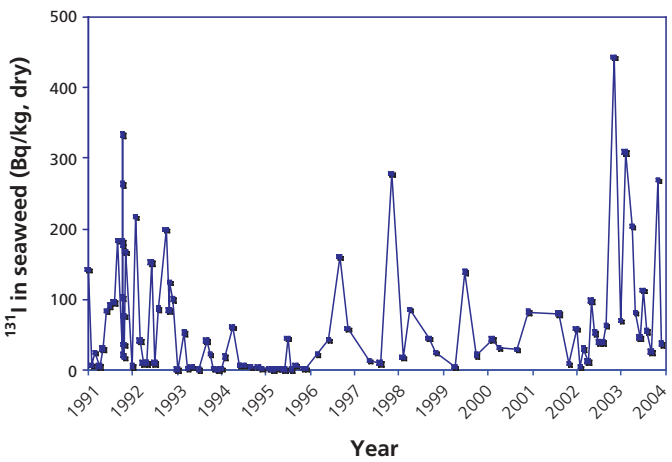
In 2003, the Institute participated in a multi-agency review of existing and proposed environmental monitoring in Ireland's estuarine, coastal and marine waters carried out by the Environmental Protection Agency (EPA) in association with the Marine Institute, National Parks and Wildlife and Met Éireann. *'The National Environmental Monitoring Programme for Transitional, Coastal and Marine Waters'* was published as a discussion document. This document outlines the existing and future monitoring and reporting roles of national, regional and local bodies, in order to guide the protection of the Irish marine environment and safeguard its quality for human use. The requirements of EU Directives and of other commitments, such as those arising from the OSPAR Convention are taken in to account in the programme and, once implemented, it will ensure increased efficiency, communication and collaboration in marine monitoring in Ireland.

Dredging is essential to maintain navigation in ports, harbours and inland waterways and for the development of port facilities, with much of the material removed being disposed of at sea. The greater proportion of the total amount of material dredged world-wide is, by its nature, similar to undisturbed sediments in inland and coastal waters. A smaller portion of dredged material is contaminated by human

activity, including radioactivity, and environmental constraints need to be applied when disposing of these sediments. Control of the disposal of waste at sea was instigated on a global basis under the London Dumping Convention (1972). During 2003 the Environmental Laboratory continued to carry out radioactivity testing on dredged material on behalf of companies undertaking dredging work in order to ensure compliance with this convention.

A range of short-lived radionuclides used in the treatment and diagnosis of patients are subsequently released to Irish coastal waters via the sewage systems. Of these, iodine-131 is the only radionuclide that has been detected in Irish coastal waters. Since this radionuclide is known to concentrate in seaweed, the Environmental Laboratory collects and analyses seaweed samples on a monthly basis. The results of this monitoring since 1991 are summarised in Figure 1. Iodine-131 has a relatively short half-life (8 days) and its use in medical procedures is intermittent, so the observed large variations in the data are expected. As part of its commitments under OSPAR, Ireland must carry out environmental impact assessments for marine discharges. This work was started in 2003 with analysis of samples retrieved at various stages in Dublin's new waste water treatment plant following administration of a significant amount of iodine-131 in a Dublin hospital. Preliminary results show that the concentrations in the wastewater peaked the day after the administration of the iodine-131. Further work is underway and a decision on the justification for the installation of holding tanks to reduce iodine-131 discharges from certain hospitals will be made at the end of 2005.

Figure 1. Iodine-131 Activity Concentrations in *Fucus vesiculosis* from Bull Island (Bq/kg, dry), 1991-2003



In summary, the doses incurred by people living in Ireland today as a result of radioactivity in the marine environment continue to be very small and do not constitute a significant health risk. The Institute therefore advises that from a radiological perspective it is safe to eat seafood landed at Irish fishing ports and that no modification of marine-based work or leisure activities is warranted.

TERRESTRIAL ENVIRONMENT

The terrestrial monitoring programme assesses the levels of radioactivity in this environment and their impact on man. Both artificial and naturally occurring radionuclides are present in the terrestrial environment. Sources of artificial radioactivity include: authorised discharges from nuclear installations, fall-out from the Chernobyl accident in 1986 and atmospheric nuclear weapons testing during the 1950s and 1960s.

Monitoring of radioactivity in airborne particulates, foodstuffs and upland sheep is carried out with the assistance of the Department of Agriculture and Food, Met Éireann, the Food Safety Authority of Ireland, Local Authorities, Health Boards and commercial producers.

During 2003 total beta airborne radioactivity monitoring continued at nine stations throughout the country, while gamma emitters were monitored at one high volume air sampling station. Towards the end the year, the Institute purchased a new high volume air sampling system, which was installed at the Department of Experimental Physics at University College Dublin. The airflow rate of this unit is typically between 2000 and 2500 cubic metres per hour (m^3/h), compared to a typical flow rate of 30 to 60 m^3/h achieved by the high volume system currently in use. When fully commissioned, this system will allow a significant increase in the sensitivity of measurements of gamma emitting radionuclides such as caesium-137.

The level of krypton-85 in air was measured on a fortnightly basis at Clonskeagh, Dublin. Krypton-85 is released into the atmosphere as a result of nuclear fuel reprocessing. Because of its low capacity to react with other materials, it distributes uniformly throughout the earth's atmosphere within a few years of release. The mean concentration in 2003 was 1.4 Bq/m^3, similar to that measured in 2002 (1.2 Bq/m^3) and 2001 (1.3 Bq/m^3) and the resulting doses are very small.

In collaboration with the Food Safety Authority of Ireland (FSAI), a Total Diet Study was commenced during 2003. The aim of the study is to assess the exposure of the population to a range of possible contaminants in foodstuffs. To this end the Environmental Laboratory is measuring the radioactivity content of approximately 100 samples of foodstuffs including grains, dairy products, vegetables, fruit, meat, seafood, beverages, preserves, oils and takeaway foods. This study is due to be completed in 2004.

Monitoring of foodstuffs consumed by the Irish public at large catering outlets continued in 2003. Levels of gamma emitting radionuclides were measured in samples from Dublin and Dundalk to further assess the significance of the food chain as an exposure pathway to the public. Results indicate that the levels of radioactivity in foodstuffs are of no cause for concern.

Approximately sixty samples of barley, wheat and oats from the principal grain growing regions of the country were analysed for gamma emitting radionuclides during the year. Milk was collected on a monthly basis at 10 milk-processing plants and analysed for strontium-90 and caesium-137.

Fall-out of caesium-137 from the Chernobyl accident still persists in certain upland areas and monitoring of upland sheep during the months of summer grazing and at slaughter was continued during 2003. A total of 1108 sheep were monitored by officers of the Department of Agriculture and Food at slaughterhouses around the country, and by Institute staff at an established upland research site in Co. Cavan. None of the sheep monitored showed levels of caesium-137 in excess of 600 Bq/kg and 95% had levels less than 200 Bq/kg. Samples of lamb from upland areas were also analysed for caesium-137.

The results of the terrestrial monitoring programme indicate that during 2003, levels of radioactivity in the terrestrial environment continue to be very low, in most cases below the limit of detection and consequently are of no radiological significance to the Irish public.

RADIOACTIVITY IN EXPORTED PRODUCE

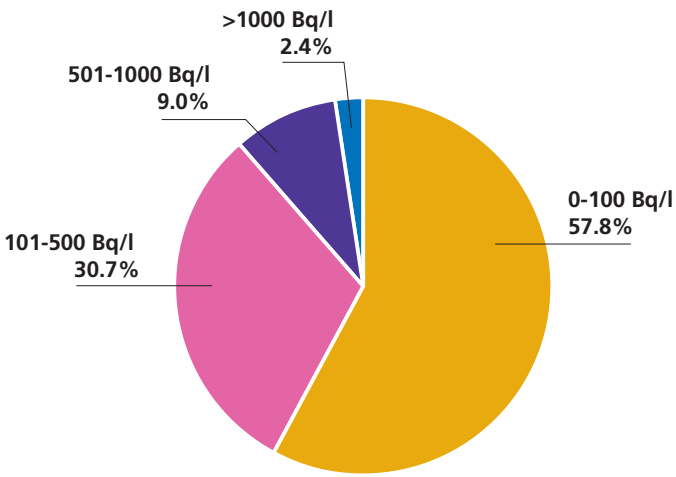
During 2003 the Environmental Laboratory continued its testing and certification services to Irish exporters of foodstuffs and other goods. The number of certificates issued by the Laboratory was 4581, compared to 4587 issued in 2002 and 4273 in 2001, indicating a steady demand for this service.

RADIOACTIVITY IN DRINKING WATER

Radioactivity in public drinking water supplies is monitored routinely in each county at least once every four years. Counties monitored in 2003 were Cork, Dublin, Galway, Kerry, Limerick, Tipperary, Waterford, Wexford and Wicklow. Samples were measured for their total alpha activity, total beta activity and tritium concentrations. Results indicate that the levels of radioactivity in these supplies comply with international guidelines and are of no cause for concern.

During 2003 the Institute published the results of a pilot study of radon in drinking water: *Radon in Drinking Water in Co. Wicklow – a Pilot Study.* Wicklow was chosen primarily on the basis that parts of the county are known to have high instances of radon in air in homes and many residents use private supplies for their drinking water. Radon activity concentrations were measured in the private drinking water supplies of 166 houses in the county. Four houses had activity concentrations in excess of the recommended European Commission reference level of 1000 Bq/l. The Institute advised remedial action to reduce the radon levels in these supplies. The overall results of the survey are illustrated in Figure 2. Dose estimates based on the measurements made in this study demonstrate that radon in drinking water may pose a significant additional health risk, in the longer term, to some consumers who depend on the supplies as their primary source of water.

Figure 2. Radon levels in 166 Private Drinking Water Supplies, Co. Wicklow



MARINE RADIOECOLOGY RESEARCH

Although discharges of radiocaesium and plutonium from Sellafield have decreased significantly since the peak discharges in the 1970s, the concentrations in the water of the Irish Sea have not dropped as quickly. This is as a result of a significant proportion of the radionuclides which had accumulated on seabed sediments being slowly released back into the water. The processes involved in such remobilisation were the focus of a four year international research project entitled REMOTRANS in which the Institute participated. The project, which was partially funded by the European Union and involved 12 laboratories in eight countries, concluded at the end of 2003.

A fundamental step in understanding the potential impact on Irish coastal waters of this 'source' of radionuclides is to determine the total amount of radionuclides deposited in western Irish Sea sediments. To achieve this 23 sediment cores were collected from the western Irish Sea and analysed for radiocaesium and plutonium content. From the results of the analysis, it has been estimated that in the order of 120 terabecquerels (TBq) of caesium-137 and 20 TBq of plutonium-239,240 are deposited in the sediments of the western Irish Sea. The results show the highest concentrations of radioactivity in the mud banks off the north east coast and are consistent with previous studies in the Irish Sea.

Also as part of the REMOTRANS project, transit times of radionuclides from the point of discharge to different locations on the Irish Coast were estimated from direct measurements. Using these data, it has been estimated that a pulse of soluble radionuclides leaving Sellafield will be first measurable on the east coast of Ireland after approximately six months, and in about four years will be detected on the west coast.

Natural Radioactivity

The Natural Radioactivity Section of the Institute is responsible for monitoring of natural radiation sources in homes and workplaces, including schools. Radon gas is the principal source of interest as it gives rise to over 60% of the total radiation dose to the Irish population. The Institute's radon laboratory provides a radon measurement service to employers and the public. The radon laboratory is accredited to ISO 17025 and the Institute is committed to maintaining a high quality of service to all its customers.

The Natural Radioactivity Section discharges the Institute's regulatory function under Part 6 of the Radiological Protection Act, 1991, (Ionising Radiation) Order, 2000 Statutory Instrument Number 125 of 2000 (S.I. No. 125 of 2000), which governs exposure to natural radiation sources in workplaces. In addition to radon gas, exposure from other natural radiation sources may sometimes be of concern in specific workplaces, such as the gas industry and electricity production by peat and coal burning. The exposure of aircrew to cosmic radiation is also subject to regulation under S.I. No. 125 of 2000, which requires that the air operator keep records of such doses.

RADON IN HOMES

During 2003 the Institute's radon measurement service completed 1160 measurements in homes at the request of householders. Of these, 181 had radon concentrations above the national Reference Level for homes of 200 becquerels per cubic metre (Bq/m^3). Since the commencement of its radon programme the Institute has identified approximately 2750 homes with annual average radon concentrations above the national Reference Level of 200 becquerels per cubic metre (Bq/m^3). This corresponds to 3% of the estimated 91,000 dwellings predicted to have average annual radon concentrations above the Reference Level on the basis of the National Radon Survey.

In July 2003 a routine radon measurement carried out in a house near Castleisland in Co. Kerry found radon concentrations of approximately 49,000 Bq/m^3, the highest radon concentration ever recorded in a house in Ireland. Even by international standards, a radon concentration of this magnitude is most unusual, being almost 250 times higher than the national Reference Level for radon in homes. The corresponding radiation dose to the occupants is approximately 1200 millisevert (mSv), which is typically 300 times higher than the average dose in Ireland from all sources of ionising radiation.

Two staff members travelled to Castleisland to discuss the implications of the results with the householder and to arrange for radon measurements to be made in neighbouring houses. The Institute subsequently wrote to all 2500 householders in the Castleisland area advising them of the high reading and recommending that they have their house checked for radon. In addition the Institute worked closely with Kerry County Council to arrange for the measurement of radon in all local authority houses in the area and with the local media in efforts to promote awareness of the hazards associated with radon.

On the Institute's recommendation, the householder took immediate steps to reduce the radon concentration in his home by engaging a specialist radon remediation company. The Institute conducted post remediation measurements, which indicated a substantial reduction in the long-term radon concentrations to less than 600 Bq/m^3. The Institute has recommended that the householder considers carrying out additional remediation work to further reduce the radon concentration.

The 1997 revision to the "Building Regulations – Part C (Site Preparation)" requires that radon preventive measures be incorporated into all new buildings constructed since 1 July 1998. Technical Guidance Document C provides guidance on how to comply with the requirements of Part C. A previous survey in Ennis had compared radon concentrations in homes built after July 1998 with data generated from the National Radon Survey. It was felt that a comparison of radon concentrations in homes built in the years immediately before and after July 1998 might be a better indicator of the impact of the new Building Regulations on reducing indoor radon concentrations. During 2003 the Institute completed such a survey in the Tralee area, the results of which are summarised in Table 2.

Table 2: Radon Concentration in Houses Built Before and After the Introduction of the 1997 Building Regulations

Date of Construction	Sample Size	Homes over 200 Bq/m^3	Average
1992-1997	37	12 (35%)	219 Bq/m^3
post July 1998	69	13 (16%)	127 Bq/m^3

Both the percentage of homes with radon concentrations above the Reference Level and the average radon concentration are significantly lower in homes built since the introduction of the 1997 Building Regulations. This finding supports the evidence from the earlier survey in Ennis that the installation of radon preventive measures at the time of construction is having a positive effect on reducing radon concentrations.

A similar survey was initiated in Kilkenny city towards the end of 2003 where, with the assistance of Kilkenny County Council, radon detectors were issued to 106 homes.

RADON IN SCHOOLS

Between 1998 and 2002 the Institute, on behalf of the Department of Education and Science (DES), conducted a national survey of radon in primary and post primary schools. A total of 3444 of the approximately 4000 schools completed the survey. This is believed to be one of the most comprehensive surveys of radon levels in schools carried out anywhere in the world.

In October 2003, invitations were issued to the 565 schools that did not complete the original survey. By the end of 2003, 451 schools had requested radon measurements while in 78 schools a radon survey was not necessary as the school had closed.

During the year the DES continued its programme of remediation in schools. Remediation was undertaken in all classrooms with radon concentrations greater than 200 Bq/m^3, based on the advice of the Institute. Since the schools measurement programme commenced, a mandatory Reference Level of 400 Bq/m^3 has been sent out in S.I. No.125 of 2000 for all workplaces.

During 2003, post remediation measurements were completed in 122 schools, the majority of which had previously had radon sump systems installed. Of these, thirty schools were found to still have one or more

rooms with radon concentrations between 200 and 400 Bq/m^3 while a further eight had rooms with radon concentrations above 400 Bq/m^3. Additional remediation work is being undertaken where the radon concentration exceeds 400 Bq/m^3. For schools with rooms between 200 and 400 Bq/m^3 further remediation is not considered to be justified at this time and the situation is being kept under review. Post-remediation radon measurements, which take between three and nine months to complete, commenced in a further 95 schools.

RADON IN WORKPLACES

Above Ground Workplaces

During 2003 the Institute worked closely with the Health and Safety Authority (HSA) in developing policy on the regulation of radon in the workplace. Resulting from this initiative the HSA has advised that there is a general duty, under health and safety legislation, for all indoor workplaces in High Radon Areas to be tested for radon. In addition, all employers must refer to radon in their safety statements. Other initiatives on exposure to radon in the workplace undertaken during the year included the publication of the Institute's revised guidance notes on the planning of radon surveys and the launch of a newspaper advertising campaign in 10 of the counties most affected by radon.

Below Ground Workplaces

During 2003 the Institute continued to require certain underground workplaces, such as mines and show caves, to carry out monitoring of radiation doses to staff. The numbers of workers monitored in 2003 was 59, compared with 33 workers monitored the previous year. The increase in the number of staff monitored was a result of an Institute recommendation to extend monitoring to all workers who might visit a work area with known high radon concentrations, in addition to those staff who work continuously in the area.

Results to the end of 2003 indicated that no worker received a radiation dose in excess of 20 millisieverts (mSv), the annual dose limit for workers. Of the 59 staff monitored, 3 were identified as receiving annual radiation doses in excess of 6 mSv, with a further 39 between 1 and 6 mSv.

ERRICCA CONCERTED ACTION

During 2003 the Institute continued to work with its partners under the European Radon Research and Industrial Collaboration Concerted Action (ERRICCA), a 3-year project involving 20 European countries operating under the aegis of the European Commission's 5th Framework Programme. ERRICCA provides a platform for scientific and industrial bodies with an interest in radon to interact through European and National forums. In May the Institute hosted the third European forum in Dublin. It also gave presentations at the fourth European forum in Copenhagen in November. ERRICCA also requires participating countries to organise an annual National Radon Forum. The second Irish National Radon Forum, jointly organised by the Institute and Remedia Ltd., was used to highlight the Institute's Radon in Workplaces strategy and provided the opportunity for open discussion on radon measurement programmes both in Ireland and the UK, radon mitigation of existing buildings and recent experience in the installation of radon preventive measures in new buildings. The Forum was well attended by representatives from the HSA, Government Departments and other national agencies from Ireland and the UK, researchers as well as the building construction and radon remediation industries.

MATERIALS CONTAINING ENHANCED LEVELS OF NATURAL RADIOACTIVITY

Some industries work with materials not generally regarded as radioactive but which in certain circumstances have the potential to give rise to doses greater than 1 mSv, the annual dose limit for a member of the public. For this reason work with such material falls within the scope of S.I. No. 125 of 2000. These Naturally Occurring Radioactive Materials (NORM) include materials such as scale that may build up in pipes and valves of plants processing gas or coal, and ash from the burning of coal and peat for electricity production.

A collaborative study between the Institute, Trinity College Dublin and the ESB to assess exposures from NORM in the largest Irish peat-fired power station was concluded in 2003. The results indicate that the plant workers are unlikely to receive a radiation dose above 0.3 mSv per annum. The potential use of peat fly ash as a by-product in the building industry was also

investigated. Gamma spectrometric analysis was carried out on representative samples of fly-ash material used for building purposes. The results indicate that the use of such material is unlikely to result in radiation doses greater than 0.3 mSv to the occupiers of buildings constructed with such materials. Use of such material therefore does not fall within the scope of S.I. No. 125 of 2000.

During the year a programme was put in place to measure radon gas concentrations in the natural gas stream before it enters the national gas network. Results to the end of 2003 showed radon concentrations between 400 and 900 Bq/m^3. Because of the relatively short half-life of radon, these concentrations will be considerably reduced by the time the gas reaches the point of use. A radon concentration of approximately 50,000 Bq/m^3 at the point of distribution would be required in order for the dose to the gas user to approach 1 mSv. The radon concentrations in the natural gas stream so far measured are therefore not radiologically significant.

Staff of the Institute also visited an offshore gas platform during a routine maintenance shutdown of part of the operation. Samples of sludge, a common waste material produced during normal operations, were taken for analysis. Gamma spectrometric analysis showed concentrations of radium-226 and radium-228 of less than 10 Bq/kg. The resulting waste material is properly managed and the radiation doses to workers and the public are not radiologically significant.

During 2003 a measurement programme was put in place in the largest coal-fired power station in the country. A site visit took place to discuss operations such as the handling and recycling of coal-ash as a component of cement, disposal of ash in landfill sites and the potential occurrence of boiler scales enriched in lead-210. A radon survey of the plant was also commenced. During the next boiler outage measurements and samples will be collected to assess the potential exposures from NORM to workers involved in cleaning and maintenance work.

EXPOSURE OF AIRCREW TO COSMIC RADIATION

The exposure of aircrew to cosmic radiation is subject to regulation under S.I. No. 125 of 2000. The holder of an air operator's certificate is required to evaluate the doses received by aircrew to determine if measures to control exposure to cosmic radiation are warranted. The legislation applies to those air operators whose crew are potentially liable to receive an annual dose greater than 1 millisievert (mSv), which effectively applies only to those airlines flying above 8000 metres. An evaluation of doses to aircrew must be submitted to the Institute within three months of the end of the calendar year. Doses are estimated using software produced by the Civil Aeromedical Institute in the United States. This information is combined with details of an individual's flying hours in order to assess radiation doses.

Information relating to 2003 showed 2809 individuals were estimated to receive annual radiation doses above 1 mSv. Of these, 1029 received less than 2 mSv while 1736 received doses between 2 and 4 mSv. Forty-four crew received radiation doses over 4 mSv: however, no doses over 6 mSv were recorded.

Emergency Planning

The Institute plays a key role under the National Emergency Plan for Nuclear Accidents (NEPNA), which deals with the consequences of contamination reaching Ireland from an accident at an overseas nuclear facility. The Plan covers arrangements for emergency notification, responsibilities of the relevant State bodies, interagency coordination, implementation of countermeasures and communication with the public. In accordance with S.I. No. 125 of 2000, lead responsibility for the Plan lies with the Minister for the Environment, Heritage and Local Government. Under the Plan the Institute has been assigned a number of specific responsibilities covering: early warning, technical assessment of the incident, technical advice on countermeasures and monitoring of the environment and the food chain.

An important development during the year was the development of an in-house Emergency Response Management Information System (ERMIS). This web-based software system is designed to facilitate the efficient sharing of critical information within the Institute during an emergency or crisis and complements existing emergency response systems such as the Emergency Decision Support tool ARGOS (Accident Reporting and Guiding Operational System) and database systems for managing environmental monitoring data. The ERMIS includes a range of functions designed to:

- facilitate efficient communication between groups tasked with different aspects of the emergency response via an electronic bulletin board;
- record the evolution of an exercise or emergency response;

- provide access to environmental monitoring data and the output from prognostic models;
- provide access to a range of internal and external databases relevant to emergency response including databases covering nuclear facilities, incidents and contact information;
- provide indexed retrieval of all emergency operating procedures and supporting technical documentation;
- facilitate good management of emergency response data and efficient implementation of quality assurance measures.

The successful implementation of this new system during 2003 has greatly enhanced the Institute's ability to manage critical information and to control the flow of information during an emergency.

The Institute has since 2000 operated the emergency decision support tool ARGOS as a key part of its emergency response strategy. In the event of a widespread radiological emergency, the Institute would be required to assess the situation based on a variety of information types such as environmental monitoring data, atmospheric dispersion predictions, meteorology and land use. The ARGOS system allows such different types of information to be overlaid and assessed. The Institute continues to play an active role in an international consortium which manages the on-going development and enhancement of this system. The ARGOS system is updated regularly so that any lessons learnt from exercises or emergency use can quickly be incorporated into operational systems. During 2003 the Swedish Radiation Protection Authority joined this consortium, which also includes national authorities from Denmark, Norway and Canada.

During the year a major reappraisal of the Institute's existing emergency response operating procedures and documentation was undertaken. This review considered the adequacy of existing procedures, document control and the availability of documentation. This resulted in the introduction of a new framework for all emergency response manuals covering document hierarchy, format and document management procedures. In addition a number of procedural changes were implemented including: the issue of a revised Duty Officer Manual, the introduction of Quality Assurance procedures and additions to the RPII Sub-Plan to NEPNA.

The Institute plays a crucial role in the national alerting arrangements for nuclear or radiological accidents through its on-call duty officer system and its role as the National Competent Authority for the purposes of the EU ECURIE and IAEA EMERCON early notification arrangements. Five tests of these arrangements took place during 2003, which demonstrated their ongoing successful operation. Additionally the Institute is responsible for the operation and management of the national network of Permanent Monitoring Stations, which is designed to ensure early detection of any contamination reaching Ireland.

The Institute actively participates in a number of standing groups concerned with enhancing cooperation on emergency planning and improving the state of emergency preparedness. At a national level, these include the Government Task Force on Emergency Planning and the Interdepartmental Working Group on Emergency Planning, while at an international level the Institute participates in the NEA Working Party on Nuclear Emergency Matters, the ECURIE Member States Representatives Group and meetings of National Competent Authorities set up under the IAEA Conventions on early notification and assistance.

In September the Institute conducted an exercise to test arrangements for transport of air filters from monitoring stations to Clonskeagh. The monitoring stations received a simulated call for return of air filters and the filters were transported according to the arrangements in place at each station. This test showed that air filters could be returned to the Institute within 3 hours for some stations and that the majority were returned in under 8 hours. Also in September the Institute participated in a Europe wide test of the EURDEP system for exchange of radiological monitoring data. The test successfully made available monitoring data from all other EU countries on a two-hourly basis.

Regulatory Service

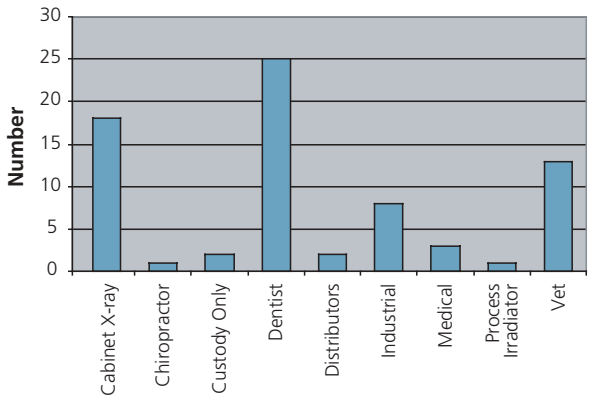
The Institute's Regulatory Service is responsible for regulating all practices involving sources of ionising radiation through a system of licensing and inspection. A comprehensive database of all sources of ionising radiation in Ireland is maintained which includes information about the holder of each source, details of the source and the applications for which the source is used.

LICENSING AND INSPECTION

During the year 73 new licences were issued bringing the total number of licensees in Ireland to 1400. Figure 3 illustrates the breakdown of these new licences. It is interesting to note that almost 25% of the new licences issued were to users of cabinet X-ray units, ten of which are used for security screening purposes. In 2002 and 2001, seven and two new licenses respectively were issued for cabinet X-ray units for use in security screening. This increase in new licences for security screening X-ray units reflects the worldwide increase in baggage and postal screening since the events of 11th September 2001.

The Regulatory Service also issued a licence for the first electron-beam irradiator facility to be installed in Ireland. This facility is to be used for the sterilisation of medical equipment. Unlike the four existing industrial irradiation facilities, it does not utilise large radioactive sources, but instead uses a beam of high energy electrons to sterilise the product. The main advantages of this technique are that the source of radiation can simply be switched off to terminate the exposure and the security and safety issues are relatively more straightforward.

Figure 3. New Licences



As well as issuing and renewing licences the Regulatory Service regularly receives requests from licensees to amend existing licences to cover additional radiation sources, changes in practice, etc. During the year amendments were made to approximately 600 licences. In addition to these amendments, 400 licences were renewed during the year.

Table 3 details the 151 inspections undertaken throughout the year. Twenty of these inspections were of licensees holding disused sources. The Regulatory Service attaches particular importance to ensuring that disused sources are stored safely and securely prior to arrangements being made to move them to a suitable final destination. Previous experience would indicate that while, in general, sources are well accounted for when in use; there can be a risk of inadvertent disposal once the sources become redundant. In situations where companies go into liquidation it is often the liquidator who is faced with the problem of dealing with these sources.

Following the reporting in 2002 of a significant radiation dose (15.9 mSv) to a stud farm employee while assisting a veterinary surgeon, and the conclusion of the subsequent investigation that some of the requirements of the Institute's Code of Practice for Veterinary Radiography had not been upheld, it was decided that the inspection programme for 2003 should include observation of veterinary X-ray examinations in practice. To this end inspectors from the Regulatory Service visited a stud farm and a large horse sale when X-ray examinations were being performed. These inspections found that all of the requirements were being complied with at both venues.

Table 3: Licence Categories and Inspections

Licence Category	Number in Category	Inspections Undertaken in 2003
Process Irradiators and Cyclotron	5	5
Industrial Radiography	20	11
Lightning Preventors	7	1
Manufactures of Devices	2	1
Industrial Users	222	47
Education & Research	18	5
Government Departments & State-Run Services	7	4
Hospitals/Medical	124	24
Custody Only	33	20
Distributors	50	9
Veterinary Surgeons	137	13
Dentists	764	7
Chiropractors	9	3
Contaminated Scrap Metal	2	1
TOTAL	**1400**	**151**

During the course of the year, the Regulatory Service investigated a number of high doses recorded on personal dosimeters worn by employees of an industrial radiography company. A comprehensive investigation was undertaken to determine the circumstances surrounding the occurrences of these high doses and whether the doses recorded on the personal dosimeters were actually received by the workers. The investigation involved meetings with senior management representatives of the company, measurements of background radiation levels in company vehicles used for transporting sources, dose reconstructions, site inspections at times when radiography was being undertaken and audits of compliance with licence conditions. It was concluded that the majority of the doses recorded were actually received by the workers during the course of their work; some of the doses were attributed to the difficult environments in which these radiographers carried out their examinations. It was further concluded that two workers received annual doses of 9.4 and 7.9 mSv respectively, i.e. greater than 6 mSv, being the dose above which categorisation as a Category A Worker is required. The Institute has directed the company to categorise these two

radiographers as Category A workers and will continue to liaise with the company throughout 2004 in order to ensure that it is taking all practicable steps to reduce the occupational doses received by its employees.

INCIDENTS ARISING IN 2003

In May the Regulatory Service was notified by a licensee involved in the beverage industry, that it had inadvertently disposed of a gas chromatograph incorporating an electron capture device containing a nickel-63 source. The incident involved a source which was no longer in use and arose due to the licensee's failure to ensure that the licence conditions relating to disused sources were upheld. An investigation of this incident concluded that it was highly likely that the source had ended up in a municipal land fill facility. Due to the size and nature of this source there is no risk to any employees at the land fill facility or to any members of the public. The company involved in this incident was subsequently successfully prosecuted in January 2004 for the unlicensed disposal of a radioactive source.

In July an industrial licensee notified the Regulatory Service of an incident involving a nuclear density gauge containing a caesium-137 source of activity 1.85 gigabecquerels. The gauge, which was located along a process line, had fallen off the pipe on which it was located while routine maintenance was being performed in its vicinity. The shutter on the gauge had not been closed prior to the maintenance work but fortunately the gauge landed on the ground with the shutter mechanism, and hence the radiation beam, facing into the ground. The staff involved were not aware of the risks and continued working in the vicinity for over an hour. An investigation carried out by the Regulatory Service concluded that the doses received by the workers were insignificant. The licensee was directed to inspect all other such gauges on-site to determine if there were any defects in the mounting brackets caused by the hostile environment in which the units operate. The licensee was also directed to amend its radiation safety procedures and put in place a training programme to inform all staff of the risks associated with working along side these gauges.

From time to time the Regulatory Service investigates reports from members of the public that they have come across materials or equipment which they believe may be radioactive or contaminated with radioactive material. An example of this occurred in November when a member of the public contacted the Regulatory Service and informed it that he had come across several stainless steel containers on sale in an army surplus store which had labelling on them indicating that they had originated from a UK Ministry of Defence (MoD) installation. The Regulatory Service immediately carried out an inspection and was able to determine that while the containers had originated from a UK MoD installation they were not contaminated with any radioactive material. The containers were subsequently returned to the UK facility where an investigation was undertaken to establish how they left that facility without the labels having being first removed or defaced.

Four minor incidents were reported during the year. These included the delivery of a package containing a small radioactive source to an incorrect address on two separate occasions, incorrect declaration on a package prior to its transport and the finding of some very small unsealed radioactive sources in a disused refrigerator that had been sent for disposal.

LEGAL MATTERS

During the year the Regulatory Service successfully prosecuted two licensees. A dentist was convicted for the unlicensed custody of four dental X-ray units and a veterinary surgeon was convicted for the unlicensed custody of a veterinary X-ray unit.

In May the Regulatory Service was involved in High Court proceedings in relation to disused radioactive sources held by a licensee who had gone into liquidation. The Institute became involved in an action taken to prevent the liquidator from vacating the site, when the Judge in the case requested the views of the Institute in relation to a number of disused radioactive sources held at the site and in respect of which the company held a custody licence.

As the Institute was concerned to ensure that its views on the licensing and radiological safety issues arising in the proceedings were properly presented to the Court, the Institute was joined as a Notice Party allowing it to participate in the proceedings. The Institute facilitated and oversaw an interim solution involving the transfer of the sources to an alternative storage site and, in March 2004, the sources were sent to the US for recycling. The High Court proceedings against the

liquidator have continued in relation to matters not directly involving the Institute, save that a determination on legal costs remains to be made.

IAEA ACTIVITIES

In February the Regulatory Service hosted a week-long IAEA-sponsored visit for a senior staff member of the Philippine Nuclear Research Institute to study Ireland's radiation protection infrastructure.

In May a staff member took part in an IAEA peer review mission to the Republic of Cyprus. The mission was undertaken as part of the IAEA's Regional Model Project on *National Regulatory Control and Occupational Radiation Protection Programmes* and focused on the assessment of the existing infrastructure for radiation protection and safety of sources.

HIGH-ACTIVITY SEALED SOURCE DIRECTIVE

The purpose of this Directive, which came into force at the end of 2003, is to ensure that all EU Member States have a regulatory structure and appropriate financial management and surveillance systems in place to ensure the safety of high activity and orphan radioactive sources. Orphan sources are sources which have escaped from regulatory control and include, for example, sources which may be found in consignments of imported scrap. Member States have until the 31st December 2005 to transpose this Directive into national legislation. While the existing regulatory structure in Ireland should meet the requirements of the Directive in this regard, the other requirements of the Directive may need additional regulations and/or administrative measures. During 2004, the Regulatory Service will evaluate the detailed requirements of the Directive and advise Government accordingly. As reported previously, the implementation of the Directive will, in effect require the establishment of a dedicated radioactive source storage facility for disused sources.

Dosimetry and Calibration Service

Ionising radiation sources are widely used throughout industry and the health services. The safe use of such sources depends on the ability to reliably measure ionising radiation levels in workplaces and accurately assess doses to individuals. The Dosimetry and Calibration Service offers a wide range of instrument calibration and personnel monitoring services, which are accredited to the international standard ISO 17025 by the National Accreditation Board.

PERSONNEL DOSIMETRY

During 2003 approximately 80,000 dosemeters were supplied by the Service to nearly 1000 different customer sites around Ireland. Some 8000 individuals were monitored.

The highest monthly whole-body dose recorded in 2003 was 9.4 mSv. This dose was received by an industrial radiographer and was a result of his workload. This may be compared with the annual whole-body dose limit of 20 mSv for radiation workers.

Measurable extremity doses (doses to the hands, forearms, feet and ankles) were recorded by personnel working in industry, research and in the cardiology, radiotherapy and nuclear medicine departments of hospitals. A radio pharmacist received the highest annual extremity dose of 66.3 mSv to his hands. This value may be compared with the annual extremity dose limit of 500 mSv for radiation workers.

During 2003, the Service purchased and calibrated an additional stock of 10,000 whole-body dosemeters to replace dosemeters that had been lost by customers during the previous years and supplement the base stock. In addition a major review of the services accounting procedures was undertaken. This has resulted in several enhancements including Direct Debit as a method of payment and improved invoicing procedures.

INSTRUMENT CALIBRATION

Instruments are checked in accordance with the customer requirements for compliance with the relevant manufacturers' specification by exposing them to radiation of different energies and/or dose-rates. A calibration certificate containing the test data is issued to the client. In 2003, a total of 496 instruments were tested, of which 13 failed to meet the manufacturer's specification.

Licensees holding sealed radioactive sources are required to have them tested every two years for leakage. Testing is carried out by wiping the source or source housing and analysing the radioactivity content of the wipe. In 2003, a total of 658 sources were checked. None of the wipes contained greater than the allowable quantity of radioactivity specified in licence conditions.

Accurate measurement using calibrated instruments traceable to International Standards is essential to ensuring the safe and effective use of ionising radiation. Calibrations carried out by the Instrument Calibration Service are traceable to the National Physical Laboratory (NPL) primary laboratory in the UK.

The Service continues to be a member of the International Atomic Energy Agency (IAEA) Secondary Standard Dosimetry Laboratory Network and holds the internationally recognised Secondary Standard status.

EXTERNAL LIAISON

Staff of the Service continued to participate in two international groups, the European Radiation Dosimetry Group EURADOS and the Personal Radiation Monitoring Group PRMG, which stimulate collaboration on dosimetry issues. In 2003, the Service also became members of the Ionising Radiation Metrology Forum (IRMF). The activities of the IRMF include encouraging good practice in ionising radiation measurements, organising comparison exercises in appropriate areas of ionising radiation measurement and promoting the production of measurement good practice guides, codes of practice and other guidance material.

Nuclear Safety & International Liaison

During 2003 Institute staff continued to play an active role in the key international organisations that develop standards and guidance on safety in the use of ionising radiation and nuclear safety. These organisations include the European Union, the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA) of the Organisation for Economic Co-operation and Development (OECD).

The Institute continued its formal exchange of information on nuclear licensing and safety issues in the United Kingdom with the Nuclear Installations Inspectorate of the Health and Safety Executive. In addition, formal contacts were established with the Environment Agency, which regulates discharges of radioactivity to the environment from nuclear and other sites. The Institute also joined the Department of the Environment, Heritage and Local Government in formal meetings with representatives of UK Government departments and agencies to exchange information on nuclear safety issues. Meetings for the exchange of information also took place with the Northern Ireland Office and with the Environment and Heritage Service, Northern Ireland.

One of the key functions of the Institute in the area of nuclear safety is as scientific advisor to the Government. During 2003, significant staff resources were assigned to three nuclear safety issues that came to the fore during the year. These were the Ministerial Meeting of the OSPAR Convention on the Protection of the Marine Environment of the North East Atlantic; the hearing of the legal case taken by Ireland under the United Nations Convention on the Law of the Sea (UNCLOS) against the United Kingdom in relation to the operation of the MOX Plant at Sellafield; and meetings of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management held under the auspices of the IAEA.

OSPAR CONVENTION ON THE PROTECTION OF THE MARINE ENVIRONMENT OF THE NORTH EAST ATLANTIC

One element of the OSPAR Convention is the OSPAR Strategy with regard to Radioactive Substances which was signed by all Contracting Parties in 1998. The Strategy requires progressive and substantial reductions in discharges of radioactive substances, with specific targets for both naturally-occurring and artificial radionuclides which must be met by 2020.

Members of the Institute's staff sit on the Radioactive Substances Committee (RSC) of OSPAR and are also represented on one of the Working Groups of the Committee. During 2003 the RSC, in the context of the OSPAR Strategy further developed the concept of baselines for radioactive discharges, concentrations of radioactivity in the environment and radiation dose attributable to the nuclear industry. The RSC initiated discussion on discharges of naturally-occurring radioactive materials, principally from the off-shore oil and gas industries, and considered ways in which these might be monitored within the framework of the OSPAR Strategy. Discharges of radioactive materials used in hospitals for the diagnosis and treatment of illness and in research and teaching were also discussed.

At the Ministerial meeting of the OSPAR Convention held in Bremen in June 2003, Environment Ministers from the Contracting Parties agreed that the baseline value for discharges of total alpha and total beta radioactivity would be the mean of annual discharges for the individual years from 1995 to 2001 inclusive. These baselines will now be used to evaluate the extent to which Contracting Parties effect progressive and substantial reductions in discharges in accordance with the OSPAR Strategy.

Through its monitoring of radioactivity in the Irish marine environment, the Institute provides the RSC with annual data on concentrations of specific radionuclides in seawater, seaweeds, fish and shellfish. The Institute's Regulatory Service plays a key role in controlling the discharges of radioactivity from the medical and research sectors and ensuring that Ireland's commitments, published in the "National Plan for the Implementation of the OSPAR Strategy with regard to Radioactive Substances", are met in full.

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA (UNCLOS)

Ireland's legal case against the United Kingdom in the dispute concerning the MOX Plant, International Movements of Radioactive Materials and the Protection of the Marine Environment of the Irish Sea opened before an International Tribunal of UNCLOS at the Permanent Court of Arbitration in The Hague on 10th June 2003.

During the months leading up to the hearings and throughout the hearings themselves, staff of the Institute acted as scientific advisers to Ireland's legal team. Technical advice was provided on all aspects of the current and historic levels of radioactive discharges from Sellafield to the Irish Sea, the resulting levels of radioactive contamination of the marine environment and the resultant radiation doses to man. As part of this process, the scientific arguments put forward by the United Kingdom were critically evaluated. The Institute also co-ordinated the preparation of a series of independent evaluations of specific scientific issues relevant to Ireland's case.

JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

The purpose of this Convention is to ensure that countries manage their spent nuclear fuel and radioactive waste safely. Ireland, as a contracting party to this Convention, participated in the first review meeting in November in Vienna at which all contracting parties presented their reports on the status of their spent fuel and radioactive waste management programmes. While Ireland produces only small quantities of radioactive waste compared with countries with nuclear reactors, it was clear from the discussions at the meeting that Ireland needs to pursue best options for its waste management programme, in particular in relation to the establishment of a storage facility for disused radioactive sources.

NUCLEAR AND RADIATION SAFETY ABROAD

During the year the Institute was informed, through the IAEA Information Service, of 23 incidents abroad. Eight of these incidents involved nuclear power plants.

Two involved overexposure of workers to radiation sources and the remainder loss, theft or mishandling of radiation sources. One of the two incidents reported by the UK to the IAEA involved the unplanned shutdown of both reactors at Dungeness Nuclear Power Station as a result of a fault in the cooling system. The other was the theft, during transport, of a radioactive source incorporated in a density gauge.

The most serious reported incident occurred at the Paks nuclear power plant in Hungary in April 2003. It involved severe damage to a number of nuclear fuel rods during a cleaning operation and resulted in the release of some radioactivity from the reactor building. A combination of inadequate regulatory surveillance, poor equipment design and operational failures were identified as the main causative factors. Neither this incident nor any of the others reported had consequences directly affecting Ireland.

There were also a number of minor incidents which did not meet the IAEA criteria for reporting but which came to the Institute's attention during the course of the year. In the case of the UK, some 16 such incidents were brought to Institute's attention mainly through direct contact by the Nuclear Installations Inspectorate or the UK Environment Agency. Five of these incidents were reported at Sellafield, the most serious from an Irish viewpoint being the detection of slightly increased radioactivity in the cooling jacket on one of the tanks used to store liquid high level radioactive waste. While the incident in itself had no radiological significance, it serves to emphasise the importance of converting this waste into a passive form through solidification into glass blocks (vitrification), as discussed in the Institute's report of its examination, in February 2000, of BNFL's safety documentation relating to the storage tanks (RPII-00/3, 2000).

Towards the end of 2003 there were a number of reports in the media of sections of a redundant discharge pipeline from Sellafield being washed up on the coast in number of UK locations, including the Isle of Man. The pipeline in question had been cut up in-situ and sections placed in temporary storage in skillets on the seabed, from which they broke loose. The pipeline had been used to discharge site surface water run-off and was very slightly contaminated. The Institute received regular reports on the matter from the UK Environment Agency and was, as a result, in a position to provide accurate and timely information to Government and the Irish media on the matter.

CLOSURE OF CALDER HALL REACTORS

The four Calder Hall reactors on the Sellafield site, which were the oldest electricity-generating nuclear reactors in the world, were closed down in March 2003 for commercial reasons. The Institute welcomes this development, having expressed concerns over many years with regard to their age and vulnerability to terrorist attacks.

Library and Information Service

The Institute provides a library and information service as a source of information on radiological protection and issues relevant to the Institute's activities. The library at the Institute houses a specialised collection of books, technical reports and journals which is open to outside readers and provides a reference service to researchers, students and members of the public, in addition to serving the needs of the staff of the Institute.

The Institute has a responsibility to disseminate objective and factual information on radiological protection and associated issues and to increase access to and understanding of the Institute and its activities. One of the principal ways the Institute does this is through its website at www.rpii.ie. The internet is coming to the fore as the communications medium of choice and the Institute aims to maximise the use of its website to provide information in a timely and efficient manner. In 2003 the website attracted an increasing number of visitors with an average of over 3600 visitors per month and a high of over 10,000 in December coinciding with the launch of the Institute's Annual Report for 2002.

The Institute is conscious of the role played by the media in disseminating information and it actively encourages reporting on radiological protection issues of public concern. In 2003 the Institute responded to over 120 media requests for information and participated in around 40 television and radio programmes.

Staff regularly participated in conferences, seminars and exhibitions both nationally and internationally and when requested provided speakers for public meetings, and for specialist courses at third-level institutions, hospitals and elsewhere. Tours of the Institute's facilities and laboratories were also given to interested groups of visitors.

The Institute provides the Irish Liaison Officer for the IAEA's International Nuclear Information System (INIS) which provides a database of publications related to nuclear science and its peaceful applications. Items relevant to the database and published in Ireland are input to the system using software supplied by the IAEA and the data is sent using electronic mail.

During the year, the Institute continued with its programme of publishing scientific reports, which are widely distributed to interested groups and available to download free of charge from the website.

Publications

RPII Reports

Radon in Drinking Water in Co. Wicklow - A Pilot Study. RPII-03/1.

Radon levels in domestic dwellings built since the introduction of the 1997 Building Regulations. RPII-03/02.

Radioactivity monitoring of the Irish marine environment 2000 and 2001. RPII-03/3.

Scientific Papers

Duffy, J.T., O'Grady, J., Hone, C.P., Fennell, S.G., McGarry, A.T., 2003. Experience in the Application and Implementation of European and International Regulations on the Transport of Radioactive Material in Ireland. In: **International Conference on the Safety of Transport of Radioactive Material, Vienna, Austria, 7-11 July 2003.** Contributed Papers, International Atomic Energy Agency, pp. 332-336.

Hone, C.P., Fennell, S., McGarry, A.T., 2003. The Development of Regulatory Procedures in Ireland. In: **International conference on national infrastructures for radiation safety: Towards effective and sustainable systems, Rabat (Morocco) 1-5 Sep 2003.** Contributed Papers, International Atomic Energy Agency, pp. 439-441.

Inn, K.G.W., Lin, Z., Schultz, M., Wu, Z., McMahon, C.*, Outola, I., Kurosaki, H., Nour, S., Selvig, L., Karam, L., Hutchinson, J.M.R., 2003. Interface of Environmental, Bioassay and Radioanalytical Standard Reference Materials and Traceability Evaluations, In: **Radioanalytical Methods in Interdisciplinary Research,** Special Publication of the American Chemical Society, pp. 38-49.

Lopez, M.A., Currivan, L.*, et al., 2003. Harmonisation (Legal, Dosimetric, Quality Aspects) of Individual Monitoring, and Integration of Monitoring for External and Internal Exposures (EURADOS Working Group). **Radiation Protection Dosimetry,** Vol. 105, Nos. 1-4.

Sequeira, S., McKittrick, L., Ryan, T.P., Colgan, P.A., 2003. Investigation of a method for measuring radon in Irish domestic groundwater supplies. In: **Environmental Radiochemical Analysis II.** (Peter Warwick ed.). Proceedings of the 9th International Symposium on Environmental Radiochemical Analysis, 18-20 September 2002, Maidstone, Kent, UK, Royal Society of Chemistry.

General Articles

Fegan, M., 2003. Radioactivity monitoring for foodstuffs. **The Irish Scientist 2003 Yearbook,** (11), p. 33.

Fegan, M., 2003. RPII foodstuffs monitoring programme. **FSAI News,** March/April Vol. 5 Issue 2, p. 10.

*RPII staff in conjunction with other authors

Advisory Committees

ENVIRONMENTAL RADIATION

This Committee provides advice on radioactivity in the environment and on the co-ordination with other bodies of joint work programmes in this area.

Chairman	Gregory Burke
	Tony Colgan
	David Fenton
	Dermot Howett
	Ian R. McAulay
	Ann McGarry
	James P. McLaughlin
	Peter I. Mitchell
	Darina Muckian
	Geraldine O'Reilly
	David Pollard
	Wil van der Putten
	Barbara Rafferty
	William Reville
	Adi Roche
	Philip Walton
Scientific Secretary	Stephanie Long

MEDICAL RADIATION

This Committee advises the Board on the uses of ionising radiation in medicine and dentistry.

Chairman	George Duffy
	Fionnuala Barker
	David Clarke
	Mary Coffey
	Louise Diamond
	Stephen Fennell
	David Fenton
	Edward Fitzgerald
	Christopher Hone
	Lynn Johnston
	Pat Kenny
	Brendan McClean
	Ann McGarry
	Lesley Malone
	James Masterson
	Kate Matthews
	Michael Moriarty
	Dan Murphy (retired 2004)
	Liam Murray (retired 2003)
	Geraldine O'Reilly
	Wil van der Putten
	Stephanie Ryan
Scientific Secretary	Tanya Kenny (appointed 2004)

Financial Statements

REPORT OF THE COMPTROLLER AND AUDITOR GENERAL

Report of the Comptroller and Auditor General for presentation to the Houses of the Oireachtas.

I have audited the financial statements on pages 37 to 45 under Section 16 of the Radiological Protection Act, 1991.

Respective Responsibilities of the Members of the Institute and the Comptroller and Auditor General

The accounting responsibilities of the Members of the Institute are set out on page 38 It is my responsibility, based on my audit, to form an independent opinion on the financial statements presented to me and to report on them.

I review whether the statement on the system of internal financial control on page 37 reflects the Institute's compliance with applicable guidance on corporate governance and report any material instance where it does not do so, or if the statement is misleading or inconsistent with other information of which I am aware from my audit of the financial statements.

Basis of Audit Opinion

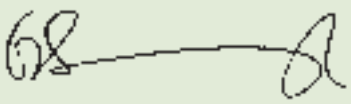
In the exercise of my function as Comptroller and Auditor General, I conducted my audit of the financial statements in accordance with auditing standards issued by the Auditing Practices Board and by reference to the special considerations which attach to State bodies in relation to their management and operation.

An audit includes examination, on a test basis, of evidence relevant to the amounts and disclosures in the financial statements. It also includes an assessment of the significant estimates and judgements made in the preparation of the financial statements, and of whether the accounting policies are appropriate to the Institute's circumstances, consistently applied and adequately disclosed.

I planned and performed my audit so as to obtain all the information and explanations that I considered necessary to provide me with sufficient evidence to give reasonable assurance that the financial statements are free from material misstatement whether caused by fraud or other irregularity or error. In forming my opinion I also evaluated the overall adequacy of the presentation of information in the financial statements.

Opinion

In my opinion, proper books of account have been kept by the Institute and the financial statements, which are in agreement with them, give a true and fair view of the state of affairs of the Radiological Protection Institute of Ireland at 31 December 2003 and of its income and expenditure for the year then ended.



Gerard Smyth
For and on behalf of the
Comptroller and Auditor General

7 August 2004

STATEMENT ON THE SYSTEM OF INTERNAL FINANCIAL CONTROL

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 control is maintained and operated.

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

Key Control Procedures

The Board has taken steps to ensure an appropriate control environment by

- clearly defining management responsibilities;
- establishing formal procedures for reporting significant control failures and ensuring appropriate corrective action.

In 2003, the Board established formal processes to identify and evaluate business risks by

- identifying the nature, extent and financial implication of risks facing the body including the extent and categories which it regards as acceptable;
- assessing the likelihood of identified risks occurring;
- assessing the body's ability to manage and mitigate the risks that do occur.

The system of internal financial control is based on a framework of regular management information, administrative procedures including segregation of duties, and a system of delegation and accountability. In particular it includes:

- a comprehensive budgeting system with an annual budget which is reviewed and agreed by the Board;
- regular reviews by the Board of bi-monthly management accounts and annual financial reports which indicate financial performance against forecasts;
- clearly defined capital investment control guidelines.

The Board's monitoring and review of the effectiveness of the system of internal financial control is informed by the work of the internal auditor, the Audit Committee which oversees the work of the internal auditor, the executive managers within the Radiological Protection Institute of Ireland who have responsibility for the development and maintenance of the financial control framework, and comments made by the Comptroller and Auditor General in his management letter or other reports.

In 2003 the Radiological Protection Institute of Ireland established an internal audit function which operates in accordance with the Framework Code of Best Practice set out in the Code of Practice on the Governance of State Bodies. The work of internal audit is informed by analysis of the risk to which the body is exposed, and annual internal audit plans are based on this analysis. The analysis of risk and the internal audit plans are endorsed by the Audit Committee and approved by the Board. With effect from 2004, a feature of this will be the provision to the Board of an annual report of internal audit activity by the Internal Auditor. The report will include the Internal Auditor's opinion on the adequacy and effectiveness of the system of internal financial control.

Review of Controls

I confirm that in the year ended 31 December 2002 the Board conducted a review of the effectiveness of the system of internal financial controls. No review was undertaken in 2003, and the next review will be undertaken by the Board in 2004.

Signed on behalf of the Board:

F.J. Mulligan
Chairman

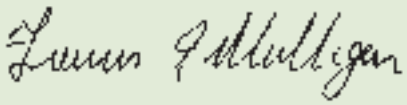
4 August 2004

STATEMENT OF RESPONSIBILITIES OF THE INSTITUTE

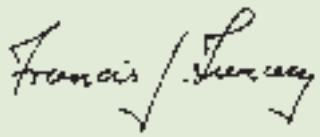
Section 16(1) of the Radiological Protection Act, 1991, requires the Institute to prepare financial statements in such form as may be approved by the Minister for the Environment, Heritage and Local Government, with the concurrence of the Minister for Finance. In preparing these financial statements,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

- Select suitable accounting policies and then apply them consistently
- Make judgments 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 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 that 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. Depreciation is calculated on a straight line basis by reference to the expected useful lives of the assets concerned. The rates used are as follows:

Office & Laboratory, Furniture & Equipment:	20%
Motor Vehicles:	20%

Leasehold Improvements are depreciated over the life of the lease.

4. Superannuation

A Superannuation Scheme under Section 14 of the Nuclear Energy (An Bord Fuinnimh Nuicleigh) Act 1971 was in operation up to March 1992. A new scheme has been drawn up in accordance with the provisions of Section 13 of the Radiological Protection Act, 1991 and is awaiting final approval. Contributions were credited against salaries. No provision has been made in the Financial Statements in respect of future superannuation liability. Superannuation benefits are met from revenue as they arise.

5. Capital Account

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

6. Contract Income

Contract Income included amounts received from the European Community under contracts for fixed periods. Amounts received under these contracts have been treated as deferred credits, and released as income proportionately over the lives of the related contracts.

7. Income in Advance

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

INCOME AND EXPENDITURE ACCOUNT

FOR THE YEAR ENDED 31 DECEMBER 2003

2002 Euro		2003 Euro
	INCOME	
2,715,000	Oireachtas Grant in Aid	3,068,000
(13,976)	Transfer to Capital Account (Note 2)	(33,544)
2,701,024		3,034,456
266,721	Dosimetry	396,959
171,106	Product Certification	253,968
134,345	Contract Income	93,261
128,713	Licence Fees	135,768
192,055	Other Income	151,557
892,940		1,031,513
3,593,964		4,065,969
	EXPENDITURE	
2,215,883	Salaries and Pensions (Note 3)	2,333,716
178,073	Dosimetry & Regulatory Service	171,937
54,194	Library and Information Service	74,104
28,056	Radon	47,207
47,948	Emergency Plan	55,309
109,235	Environmental Monitoring	105,778
408,645	Accommodation and Insurance (Note 4)	451,943
137,317	Travel and Subsistence	134,635
134,097	Telephone, Postage, Office Supplies & IT	156,572
65,820	Recruitment and Training	72,221
40,721	Miscellaneous including Professional Fees	40,659
10,950	Audit Fees	12,950
320,552	Depreciation (Note 1)	326,970
3,751,493		3,984,001
(157,529)	**SURPLUS/(DEFICIT) FOR YEAR**	81,968
489,492	Balance at 1 January	331,963
331,963	Balance at 31 December	413,931

The Institute has no gains or losses in the financial year or the preceding financial year other than those dealt with in the Income and Expenditure Account. The results of the year relate to continuing operations.

The Statement of Account Policies and notes 1 to 7 form part of these Financial Statements.

Chairman: Date: 4 August 2004

Board Member: Date: 4 Aug 2004

BALANCE SHEET

AS AT 31 DECEMBER 2003

2002 Euro		Notes	2003 Euro
1,019,531	**FIXED ASSETS**	1	1,053,075
	CURRENT ASSETS		
389,773	Cash on Hand & at Bank		510,318
172,217	Debtors and Prepayments		272,645
	Stocks		0
561,990			782,963
	CREDITORS – amounts falling due within one year		
(115,035)	Creditors & Accruals		(256,336)
(114,992)	Income in Advance		(112,696)
(230,027)			(369,032)
331,963	**NET CURRENT ASSETS**		413,931
1,351,494	**NET ASSETS**		1,467,006
	Financed by:		
331,963	**INCOME & EXPENDITURE ACCOUNT**		413,931
1,019,531	**CAPITAL ACCOUNT**	2	1,053,075
1,351,494			1,467,006

The Statement of Accounting Policies and Principles and notes 1 to 7 form part of these Financial Statements.

Chairman: Date: 4 August 2004

Board Member: Date: 4 Aug 2004

NOTES TO THE FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 DECEMBER 2003

1. TANGIBLE FIXED ASSETS

	Leasehold Improvements Euro	Office and Laboratory Furniture and Equipment Euro	Total Euro
Cost:			
At 1 January 2003	788,301	4,758,396	5,546,697
Additions	-	360,514	360,514
Disposals	-	(986,119)	(986,119)
At 31 December 2003	788,301	4,132,791	4,921,092
Depreciation:			
At 1 January 2003	378,462	4,148,704	4,527,166
Charge for year	25,617	301,353	326,970
On disposals	-	(986,119)	(986,119)
At 31 December 2003	404,079	3,463,938	3,868,017
NET BOOK VALUE AT			
31 December 2002	409,839	609,692	1,019,531
NET BOOK VALUE AT			
31 December 2003	384,222	668,853	1,053,075

During 2003, the Institute reviewed its Register of Fixed Assets and removed items originally costing Euro 986,119 which were no longer in use.

2. CAPITAL ACCOUNT

		2003 Euro
Balance at 1 January 2003		1,019,531
Transfer from Income and Expenditure Account:		
Grants allocated for Capital Purposes	360,514	
Grants amortised in year	(326,970)	
		33,544
Balance at 31 December 2003		1,053,075

NOTES TO THE FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 DECEMBER 2003

3. SALARIES AND PENSIONS	2003	2002
	Euro	Euro
Gross Salaries	2,367,980	2,254,718
Employers P.R.S.I.	94,065	75,628
Pension Deductions	(128,329)	(114,463)
	2,333,716	2,215,883
Breakdown of Salaries and Pensions		
Administration	446,212	558,262
Regulation/Dosimetry/Licensing	615,747	553,693
Environmental Monitoring	516,872	406,475
Information/Radon/Radioecology	452,265	440,125
Emergency Plan	252,219	185,526
Nuclear Safety	50,401	71,802
Charged to Income & Expenditure Account	2,333,716	2,215,883

The average number of full-time persons employed, excluding Board members, in the financial year was 45 (2002 - 45).

Pension payments amounted to €136,502 (2002 - €265,625).

4. COMMITMENTS & LEASE OBLIGATIONS – Operating Leases 3 Clonskeagh Square

Lease commitments payable in the next twelve months amount to €247,599 on the basis of current rental rates and comprise rental payments on a leasehold interest, the term of which expires on 1 October 2018. The rental is subject to review at five-yearly intervals. The last such review was 1 October 1998.

Floor 1, Block 1, 1 Clonskeagh Square

Lease commitments payable in the next twelve months amount to €17,500 on the basis of current rental rates and comprise rental payments on a leasehold interest, the term of which expires on 16 February 2007.

5. 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 Board's activities in which the Board members had any beneficial interest.

6. FRS 17 RETIREMENT BENEFITS

For the accounting periods on or after 1 January 2005 Financial Reporting Standard 17 (FRS 17) will require financial statements to reflect at fair value, the assets and liabilities arising from an employer's superannuation obligations and any related funding, and to recognise the costs of providing superannuation benefits in the accounting periods in which they are earned by employees. As a transitional measure for accounting periods ending on or after 22 June 2001, the Standard requires that the present value of scheme liabilities be disclosed as a note to the accounts.

The valuation of the defined benefit schemes used for the purposes of FRS 17 disclosures has been based on participant data supplied by the Radiological Protection Institute.

The financial assumptions used to calculate the retirement liabilities under FRS 17 at 31 December 2003, were as follows:

Valuation Method:	**Projected Unit:**
Discount Rate	5.25%
Inflation Rate	4.00%
Salary Increases	4.00%
Pension Increases	4.00%

The pension Plan is unfunded and thus does not hold any assets.

	Market Value at December 31, 2003 €000
Total market value of assets	0
Present value of pension scheme liabilities	9,174
Net surplus in pension scheme	(9,174)

The financial assumptions used to calculate the components of the defined benefit cost for the year ended 31 December 2003, were as follows:

Valuation Method:	**Projected Unit:**
Discount Rate	5.50%
Inflation Rate	4.00%
Salary Increases	4.00%
Pension Increases	4.00%

Analysis of the amount charged to operating profit is as follows:	
Current Service Cost	333
Past Service Cost	0
Analysis of the amount credited to other finance income is as follows:	
Interest on scheme liabilities	459
Expected return on scheme assets	0
Analysis of the amount recognised in statement of total recognised gains and (losses) is as follows:	
Actual return less expected return on scheme assets	0
Experience gains and losses	279
Changes in assumptions	(477)
Actuarial gain recognised in STRGL	(198)
Analysis of the movement in surplus during the year is as follows:	
Surplus at beginning of year	(8,204)
Current service cost	(333)
Contributions	20
Past service costs	0
Other finance income	(459)
Actuarial gain	(198)
Surplus at end of year	(9,174)

7. APPROVAL OF FINANCIAL STATEMENTS

The financial statements were approved by the Board on 4 August 2004.

Radiological Protection Institute of Ireland

An Institiúid Éireannach um Chosaint Raideolaíoch

Radiological Protection Institute of Ireland,
3 Clonskeagh Square, Clonskeagh Road, Dublin 14.
Telephone: 01-2697766 Fax: 01-2697437 Website: www.rpii.ie