



Radiological Protection Institute of Ireland

An Institiúid Éireannach um Chosaint Raideolaíoch

Radiological Protection Institute of Ireland
Annual Report and Accounts 2005

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 2005.

Eugene T Kennedy

Chairman

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Mission Statement

“To protect people from the harmful effects of ionising radiation, both natural and man-made, through effective regulation, monitoring of the environment and the provision of accurate and timely advice to the public and to Government.”

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Chairman's Statement



I have pleasure in presenting to you the Annual Report and Accounts of the Radiological Protection Institute of Ireland for 2005. Having just been appointed Chairman of the RPII in August 2006, I wish to sincerely acknowledge the debt owed to my predecessor Dr Frank Mulligan for his leadership, commitment and considerable contribution both to the RPII and to radiation protection in Ireland.

Dr Mulligan was first appointed to the Board in 1997 and served as Chairman from October 1999 until February 2006. During the period of Dr Mulligan's chairmanship, the RPII consolidated its reputation, both nationally and internationally, as an independent, scientific organisation committed to the highest standards of radiological protection. This record is testimony to Dr Mulligan's strategic and leadership skills.

The development of a new Strategy Statement for the period 2005 to 2007 was an important milestone for the organisation. While the fundamental principles of radiation protection have not changed in recent years, the environment in which radiation protection issues must be considered has changed significantly. For example, while the safety and security of radiation sources has always been a cornerstone of the regulatory framework for radiation protection, the events of September 11th 2001 have brought a renewed focus on security concerns around radioactive sources and materials. Internationally, there have been a number of specific initiatives including the EU High-Activity Sealed Sources and Orphan Sources Directive which was transposed

into Irish law in December 2005. The aim of the Directive is to ensure a high level of control for the most hazardous sources. In anticipation of the requirements of the Directive, the RPII initiated a programme of inspections with a particular focus on security and this programme is likely to be expanded in the coming years. A key element of the national infrastructure to manage disused radioactive sources and so called orphan sources is consideration of a centralised waste storage facility. While acknowledging that the issues involved are complex, it is of growing concern to the RPII that progress on this issue has been slow.

A further consequence of the events of September 11th 2001 is the heightened concern amongst the public generally in relation to terrorist attacks, particularly those that might be directed at nuclear facilities. During 2005, the RPII participated in an exercise of the National Emergency Plan for Nuclear Accidents (NEPNA) which focussed on the implementation of agricultural countermeasures and food restrictions following a nuclear accident. The preparation for and participation in exercises of this type are extremely important as they help to highlight the real issues that might be encountered and the practical measures that can be taken to mitigate the consequences of an accident. The ability to provide sound scientifically based advice and technical support to the NEPNA remains a priority.

Since the licensing system was first established in the late 1970s, the RPII has worked to ensure that all activities involving the use of ionising radiation are carried out in a safe manner. The rapid development of radiotherapy and other diagnostic services involving ionising radiation in both the public and private sectors in recent years, presents a significant challenge and the RPII will continue to work with all the relevant agencies to ensure that the high standards already established continue to be upheld.

A very important area of the RPII's work since the early 1990s has been its programme to reduce exposure of the Irish population to radon both at home and in the workplace. During 2005, a comprehensive review of the situation in homes was undertaken which showed that while many thousands of measurements have been made, the number of high homes identified compared to the number predicted remains very low at less than 5%. Drawing on experience in other countries which indicates that a multi-agency approach is most likely to be effective, the RPII submitted a draft Action Plan to the Minister for the Environment, Heritage and Local Government setting out a number of initiatives aimed at increasing the rate at which high homes are identified. The need

for urgent action is re-enforced by the publication during 2005 of a European study which confirmed beyond doubt that exposure to radon in the home can cause lung cancer. The Minister's response to the draft Action Plan is eagerly awaited.

I wish to record my own thanks and that of my fellow Board members to Dr William Blunnie who retired from the Board in September after 5 years service. As a nominee of the Medical Council, Dr Blunnie made a valuable contribution to the work of the RPII. I welcome Dr Michael Hurley to the Board in his place.

I would also like to convey my thanks to the RPII's staff for their dedication and professionalism at all times and to acknowledge the valuable contributions of the members of the Advisory Committees who give their time voluntarily to assist the RPII in its work.

Finally, I wish to record the RPII's appreciation for the support and encouragement received from the Minister for the Environment, Heritage and Local Government, Mr Dick Roche, TD. The RPII is also indebted to the officials of the Nuclear Safety Section of the Department of the Environment, Heritage and Local Government and other officials in the Department for their wholehearted cooperation during the year. The helpful collaboration of other government Departments, third-level educational institutions and other external organisations with which the RPII has worked during 2005 is also gratefully acknowledged.



Eugene T Kennedy
Chairman

The RPII has worked to ensure that all activities involving the use of ionising radiation are carried out in a safe manner.



Chief Executive's Statement



2005 was a very important year for the RPII both organisationally and in terms of its work programmes. At the beginning of the year, the organisation was restructured in line with the recommendations of the organisation review undertaken during 2004. The new structure, comprising four divisions each headed by a director, allows the RPII to provide better support for its statutory responsibilities going forward. Although relatively recent, the reorganisation has already presented opportunities to deliver services more efficiently and has allowed the flexibility to improve our response to external events.

At the beginning of the year, the RPII's Strategy Statement for the period 2005 to 2007 was finalised, in which four strategic priorities were identified. A key priority for the RPII is to provide protection to the Irish public from the harmful effects of exposure to ionising radiation through environmental monitoring, regulation and advice. In line with the public service modernisation agenda, the RPII also identified priorities relating to improved services for customers, better operational efficiency and effectiveness and a greater focus on staff development. The individual work programmes for each division were developed to fulfil the objectives associated with each of the strategic priorities.

2005 saw the beginning of the expansion in the provision of diagnostic radiology, nuclear medicine and radiotherapy services in the private health sector with the licensing of seven new bone density scanning facilities and two new state of the art Positron Emission Tomography (PET) facilities. As the number and sophistication of medical facilities increase, there is a corresponding increase in the requirement for expert advice in radiation protection. Towards the end of the year, in accordance with legislative requirements, the RPII launched a register for

Radiation Protection Advisers (RPA). Once approved, registered RPAs may provide advice to licensees in the medical, dental and veterinary sectors on a range of radiation protection related issues.

Inspections carried out during the year indicated that the level of compliance among licensees was good. Of the more than 8000 workers monitored, approximately 90% received no measurable radiation dose and in all cases the doses were well below the statutory dose limits. The highest annual dose in 2005 of 9.6 mSv was received by a tour guide working in a show cave and was due to exposure to radon.

In December 2005, a new statutory instrument was brought into force strengthening the licensing requirements in relation to hazardous high-activity sealed sources. The statutory instrument also provides for the RPII, as competent authority, to take control of orphan sources, that is sources whose owner can no longer be identified. The practical management of such sources, including their storage, is still an outstanding requirement and needs to be addressed.

In terms of radiation exposure of the Irish population, radon continues to be the dominant source. The application of the results of a European-wide study to Ireland confirmed previous estimates that radon is directly responsible for up to 200 lung cancers each year of which approximately 90% will be observed among smokers and ex-smokers. Conscious that only a very small percentage of the homes predicted to have radon concentrations above the Reference Level have so far been identified, a detailed study of radon related initiatives in other countries was undertaken to explore new ways of tackling the problem. The resulting draft Action Plan to Identify and Remedy Homes with High Radon Concentrations sets out a number of recommendations aimed at increasing both the rate at which homes with high radon concentrations are identified and the number which are subsequently remediated. The draft Action Plan was submitted to the Minister for the Environment, Heritage and Local Government for his consideration as it requires input from Government departments and agencies other than the RPII.

An evaluation was carried out during the year of the effectiveness of radon remediation works undertaken in schools. The results show that where initial radon concentrations were in the range 200-400 Bq/m³, the installation of wall vents brought about reductions of about 50%. For higher radon concentrations, the installation of radon sumps was found to be very effective giving average reductions in excess of 90%. Long term effectiveness was also very good. These results are significant in that they confirm that reliable and effective methods of radon remediation are available.

The organisation was restructured into four divisions, each headed by a director, which allows the RPII to provide better support for its statutory responsibilities going forward.

Towards the end of the year, under the chairmanship of the Department of the Environment, Heritage and Local Government and together with other Government departments and agencies, the RPII participated in the INEX 3 emergency exercise designed by the OECD's Nuclear Energy Agency. In contrast to earlier exercises which dealt with the immediate aftermath of an accident, the focus of this exercise was on the implementation of agricultural countermeasures and food restrictions while moving towards full recovery following a nuclear accident. From the point of view of the RPII, the exercise highlighted the high demand for detailed modelling and sampling that would be required in the event of a real emergency.

As has been the case over the last number of years, significant staff resource was devoted to providing advice to Government on matters relating to nuclear safety. To assist in providing up-to-date and comprehensive advice, RPII staff participated in over 20 international scientific and technical committees and working groups. Of the nuclear incidents abroad, the most serious event was the pipe failure in the THORP facility at Sellafield which was rated level 3 on the International Nuclear Event Scale. Although none of the incidents reported had radiological implications for Ireland, the demand for detailed information and advice on the nature of the incidents and their potential consequences was high.

In conclusion, I would like to record my personal appreciation to the staff of the RPII for their exceptional commitment to the implementation of the new organisation structure during the year and for their continuing hard work. I am also indebted to the officials of the Nuclear Safety Section of the Department of the Environment, Heritage and Local Government and other officials in the Department for their continued wholehearted support.



Ann McGarry
Chief Executive

Strategic Priorities for the RPII

Towards the end of 2004, the development of a new Strategy Statement for the period 2005-2007 commenced. The Board, the staff of the RPII and a number key external customers were involved in the process. The Statement, which was finalised early in 2005, identifies four Strategic Priorities that outline the overall direction for the RPII over the years 2005-2007. These are to

- Provide protection to the Irish public from the harmful effects of exposure to ionising radiation through regulation and advice;
- Proactively identify and meet changing customer needs;
- Implement a development programme for staff which recognises their input and value and facilitates the delivery of the RPII's Strategic Priorities;
- Improve operational efficiencies and effectiveness.

For each strategic priority a number of objectives and actions were identified which indicate how the RPII will address each of the priorities. Key performance indicators to assess the performance against each action are also included.

In January, a business plan for 2005 setting out the particular tasks to be undertaken during the year to address the objectives identified was developed and approved by the Board. The following sections of this report set out the work undertaken in each of the RPII's four divisions during the year.



Regulatory Services

Introduction

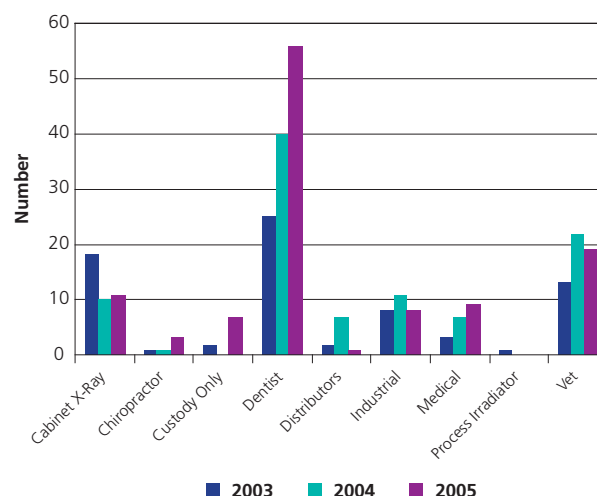
Following the recommendations of the organisation review of the RPII, the Regulatory Services Division was divided into two sections: the Medical, Dental and Veterinary (MDV) section and the Industrial section. The MDV section is responsible for regulating the use of ionising radiation by licensees in the medical sector including dentists, hospitals, and chiropractors as well as licensees using X-ray equipment and radioactive sources in the veterinary sector. The Industrial section regulates companies and third level educational establishments that use X-ray systems or radioactive sources for quality control, production processes and research. This section is also responsible for regulating aircrew exposure to cosmic radiation and work activities involving 'Naturally Occurring Radioactive Materials' (NORM), including radon, that fall within the scope of the legislation (Radiological Protection Act, 1991 (Ionising Radiation) Order, 2000 (S.I. No. 125 of 2000)). One of the benefits of the reorganisation and the allocation of dedicated staff to each section was a more focused approach to regulating practices within the various sectors.

Licensing

In 2005, the RPII carried out a comprehensive legal review of its licence conditions in conjunction with its legal adviser. The objective of the review was to ensure that the conditions accurately reflect the requirements of all relevant national legislation as well as the administrative, safety and security requirements of best radiological protection practice.

During the year, 114 licences were issued to new licensees with almost 50% (56) of these in the dental sector. A comparison of these new licences with those issued in the preceding two years is illustrated in Figure 1. There was also a noticeable increase in the number of licences issued for Dual Energy X-ray Absorptiometry (DEXA) bone density scanning services in the private sector – prior to 2005 there were only 12 licensed DEXA scanning facilities in the private sector whereas an additional seven new licences were issued during the year. 2005 also saw the introduction of two new Positron Emission Tomography (PET) scanners into private medical facilities, bringing the total number of such units in Ireland to three.

Figure 1: New Licences Issued



During the year, the RPII received 600 requests for amendments to existing licences. An analysis of the amendment process showed that 93% of amendments were dealt with and the amended licences issued within 28 days of the receipt of the completed documentation. In addition, over 1100 existing licences were renewed.

Inspections

During the year, staff carried out 192 inspections across all licensing categories. While the RPII generally gives prior notice to its licensees of inspections, a number of unannounced inspections were carried out. The number of inspections per type of licensee in 2005 is presented in Table 1.

Table 1: General Licence Categories and Inspections

Licence Category	Number in Category	Inspections Undertaken in 2005
Industrial users	300	93
Industrial Distributors	29	6
Education & Research	20	6
Government Departments and State Run Services	5	3
Hospitals/Medical	136	42
Medical Distributors	24	8
Veterinary Surgeons	177	14
Dentists	802	17
Chiropractors	13	3
TOTAL	1506	192

The format of inspections carried out in hospitals was revised during the year to require representatives of hospital senior management to meet with the inspection team at the beginning and end of each inspection. The new requirement ensures that recommendations or directions issued during an inspection are prioritised and addressed in a timely manner. The medical inspection programme for the year concentrated on radiology departments in hospitals that had not been inspected within the past six years. Inspections were also carried out in three new radiotherapy departments that opened during the year.

The inspection team noted the expanded use of hospital X-ray equipment outside the main radiology department in areas such as theatres, A&E resuscitation and intensive care units. It is important that adequate training in radiation protection is provided for the staff in these areas and this issue will be addressed in future inspection programmes.

In addition to the administrative aspects of inspections, particular emphasis was placed on the safe use, storage and transportation of radioactive materials. As in previous years, a number of site inspections were undertaken in the areas of industrial radiography and the use of portable nuclear moisture density gauges.

An effective programme of joint inspections was undertaken with the National Crime Prevention Office of An Garda Síochána to enhance the security aspects of the storage, use and transport of radioactive material of relevant licensees.

The level of compliance among licensees was found to be good. However, there were a number of areas of non-compliance that the inspections identified during the year. These relate mainly to administrative aspects of the licence. For example, not notifying the Chief Fire Officer of the local authority of the presence and location of licensed items, failing to revise radiation safety procedures and risk assessments, failing to notify the RPII of changes to licence details, monitoring instruments not being calibrated, warning signs not being displayed and ensuring that all relevant workers wear personal dosimeters at all times.

Enforcement

In September 2005, the RPII took legal action against one licensee following the loss of a low activity disused sealed source from its premises. The company was successfully prosecuted for failure to comply with specific licence conditions aimed at preventing such an occurrence. The source was not recovered. However, the subsequent investigation demonstrated there would not be any health consequences arising from any of the likely disposal routes.

The RPII is empowered to direct employers to measure radon and to take prosecutions against those failing to comply with

a direction. During the year, the RPII took prosecutions against eight employers, four in Tralee and four in Ennis who had failed to comply with a direction to carry out radon measurements. The cases came before the District Courts in Tralee and Ennis during 2006. In Tralee, three defendants pleaded guilty; however, the cases were dismissed on the undertaking that each defendant paid €500 to the Court Poor Box. The fourth defendant pleaded not guilty and the case was deferred. In Ennis, one case was dismissed as the prosecution case could not proceed on the day. In the remaining three cases, defendants were convicted, fined and ordered to pay costs.

Reportable Incidents

It is a condition of each licence that whenever a dose, exceeding a specified reporting level, is recorded on a personal dosimeter, a full investigation of the incident must be carried out by the licensee and a report submitted to the RPII for consideration. The reporting levels for whole body and extremity doses – received over a 16 week period – are 2 millisievert (mSv) and 50 mSv respectively.

The RPII was notified of 19 such reportable doses during the year. Following investigations into each reported dose, only four were classified as a real dose received by the wearer: two to industrial radiographers working with radiography equipment (2.3 and 2.0 mSv – wholebody), one to a user of a nuclear moisture density gauge (2.1 mSv – wholebody) and the fourth to a person working with unsealed radioactive sources in an equine nuclear medicine facility (122 mSv – extremity).

In the case of the worker in the equine facility, the dose recorded was an extremity dose to the person's finger. While it was not possible to categorically identify a single cause for this particular high exposure, the licensee was advised to review its work practices and to introduce additional safety procedures. Following implementation of the RPII's recommendations, no further doses were recorded on dosimeters assigned to this individual during 2005.

Following investigations, the three other doses received by workers were deemed to be as a result of high workloads associated with their jobs. While these work practices appear to be optimised, this is an issue that the RPII keeps under constant review.

During the year, the RPII also investigated an incident in which a plumber, working on pipe-work leading from an iodine ablation therapy suite to an externally located storage tank, received an estimated dose of a few microsieverts. The plumber was unaware of the presence of radioactivity in the pipe-work. Following consultation with the RPII, the hospital carried out work to modify the pipe-work and introduced improved safety procedures for patients, physics staff and maintenance staff with the aim of avoiding a recurrence of the incident.

Radiation Protection Adviser Register

In October, the RPII launched a register for Radiation Protection Advisers (RPA). Once approved, the RPAs on the register may provide services to licensees in the medical, dental and veterinary sectors, in accordance with legislative requirements. The RPII invited applications from suitably qualified individuals. An Assessment Committee was formed comprising three senior staff of the RPII and two external experts. The Assessment Committee considered the first applications in December 2005.

Transportation

The RPII continued to work with those involved in the transport of radioactive material by road, air and sea – radioactive material is not currently carried by rail within Ireland. The RPII took the opportunity to comment on draft legislation on the carriage of dangerous goods by road, which implements the current UN International Agreement on the Carriage of Dangerous Goods by Road (ADR). The RPII also contributed to an examination by the Department of the Environment, Heritage and Local Government of matters associated with the International Civil Aviation Organisation's Technical Instructions for the Safe Transport of Dangerous Goods by Air. The RPII continued to act as the national point of contact for the Events in the Transport of Radioactive Material (EVTRAM) Database and the Illicit Trafficking Database Programme of the International Atomic Energy Agency (IAEA).

High Activity Sealed Radioactive Sources and Orphan Sources (HASS) Directive

The HASS Directive was transposed into Irish law in December 2005 in the form of the Radiological Protection Act 1991 (Control of high-activity sealed radioactive sources) Order 2005 (Statutory Instrument No. 875 of 2005). The RPII is designated as the Competent Authority for the purposes of the Legislation and the Directive. The Legislation sets out some of the specific requirements of authorisation to hold and use the types of sources that come within the scope of the Directive. These include provisions on record keeping, reporting, source identification as well as training and information including safety requirements. The Directive also requires national authorities to make provision for the handling of so-called orphan sources that may have escaped from regulatory control and that can appear from time to time, for example, in consignments of scrap metal. Because of the small number of such sources that have been discovered historically, it is intended that the RPII will deal with them in consultation with the Department of the Environment, Heritage and Local Government on a case-by-case basis. However, the practical management of orphan sources including their storage, particularly where no legal entity can be identified to take custody of them, remains a serious issue to be addressed and continues to be a weakness in the overall regulatory structure infrastructure in Ireland.



Radiation Monitoring and Measurement Services

Introduction

The monitoring and measurement division fulfils two key roles within the RPII. These are firstly to monitor radioactivity in the environment so as to assess the levels of exposure to the Irish population and secondly to maintain a national laboratory capable of providing a broad range of testing services essential to effective radiation protection. The RPII's environmental monitoring programme includes the regular sampling and analysis of a range of environmental samples such as air, water and foodstuffs. The laboratory provides state of the art measurement and calibration services in the areas of radiochemical measurement, personal dosimetry, instrument calibration, product certification and radon testing.

The implementation of the Organisation Review in 2005 brought together the RPII's laboratory services into a single division. This reorganisation has presented a number of opportunities to deliver services more efficiently.

It is the policy of the RPII to achieve and maintain a high standard of quality, consistent with client and regulatory requirements in all aspects of monitoring and measurement. The laboratory implements a quality management system, which conforms to the ISO Standard 17025 and which is externally accredited by the Irish National Accreditation Board (INAB). Furthermore, the laboratory participates regularly in international inter-laboratory comparison programmes in all of the areas in which it operates. The laboratory also contributes to a number of international measurement and metrology fora such as the Ionising Radiation Metrology Forum, the International Atomic Energy Agency Secondary Standard Dosimetry Network, the Personal Radiation Monitoring Group and the European Dosimetry Group (EURADOS).

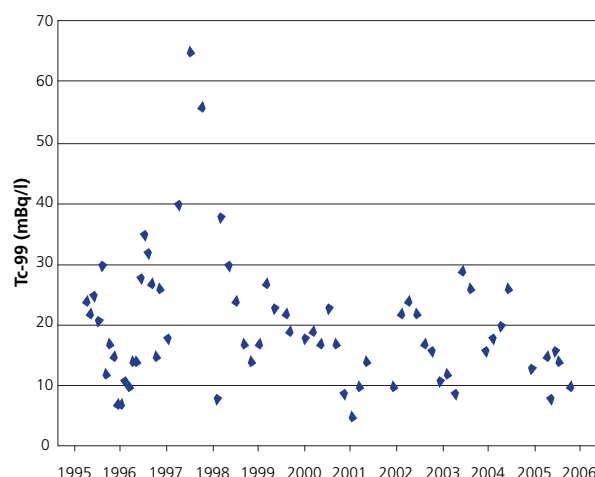
During 2005, a number of important steps were taken to rationalise the quality management system including the appointment of a single quality manager with responsibility across the division and the introduction of a divisional internal audit programme. During the year, the laboratory achieved INAB accreditation for its extremity dosimetry service based on Panasonic ring dosimeters, which had been introduced in 2004.

Environmental Monitoring

The primary focus of the RPII's marine monitoring programme continues to be contamination in the Irish marine environment arising from marine discharges from the Sellafield nuclear fuel reprocessing plant situated on the north-west coast of England. During 2005, samples of fish and shellfish from major landing ports were collected and analysed, while samples of seawater and seaweed were sampled from coastline locations and seawater and sediments were sampled from the western Irish Sea using the Marine Institute's Research Vessel, the Celtic Voyager.

In recent years, the radionuclide technetium-99 has been of particular interest and has been monitored extensively in fish, shellfish, water and seaweed. Discharges of this radionuclide from the Sellafield plant rose sharply in the mid '90s following the commissioning of the Enhanced Actinide Removal Plant (EARP). Throughout the remainder of the '90s and up until 2004 these discharges remained high, but since then have fallen significantly due to the introduction of new waste treatment processes. Figure 2 shows the technetium-99 concentration in seawater at Balbriggan from 1995 to 2005. A reduction in concentrations measured at this site can be observed for 2005, which is consistent with the pattern of discharge from Sellafield, taking into account a time lag of approximately two years from the time of release until the radioactivity reaches Ireland's east coast.

Figure 2: Technetium-99 Concentration in Seawater (mBq/l) at Balbriggan, 1995 to 2005



The primary pathway leading to exposure of the Irish population from man-made radioactivity in the Irish marine environment continues to be the consumption of fish and shellfish caught in the Irish Sea. Based on the measurement of radioactivity in fish and shellfish, the dose to a notional "heavy consumer" who eats substantial quantities of seafood was estimated to be less than 2 microsieverts (μSv). This figure may be compared to the dose limit for members of the public of 1000 μSv from artificial sources of radiation or the total annual average dose to a member of the Irish public from all sources of radiation, (including radiation of natural origin), of 3620 μSv . Radiation doses from this source have remained relatively constant over recent years. This is to be expected since the concentrations of man-made radioactivity in the western Irish Sea are now determined principally by remobilisation of historic discharges from sediments rather than from current discharges.

Monitoring of radioactivity in terrestrial foodstuffs is carried out with the assistance of the Department of Agriculture and Food, the Food Safety Authority of Ireland, local authorities, the Health Service Executive and commercial producers. In 2005, this involved the collection and analysis of samples of milk, dairy produce, beef, grains, lamb, pork, poultry and drinking water. Monitoring of radioactivity levels in air is carried out with the assistance of Met Éireann. Regular sampling and measurement of airborne particulates was carried out at eleven stations throughout the country, while gaseous krypton-85 was measured at Clonskeagh in Dublin.

During 2005, testing of a new high volume sampling station located on the University College Dublin campus was completed and the station was brought into full operation. With an air sampling rate of greater than 2000 cubic metres per hour this station is significantly more sensitive than the existing high volume station at Beggar's Bush in Dublin. This is an important addition to the RPII's monitoring network and will allow accurate determination of low concentrations of radioactivity in the air.

The results of the RPII's environmental monitoring programme continue to show that the levels of radioactivity in the Irish environment remain very low and do not pose a significant risk to human health. All environmental monitoring results are published in the RPII's environmental monitoring reports, which are available on the website. In addition, data are submitted annually to the European Commission's database at the Joint Research Centre in Ispra, Italy. The Commission periodically publishes compilations of these data.

Radiochemistry Measurement

The radiochemistry section of the laboratory measures radionuclide concentrations in a wide range of samples both in support of the RPII's monitoring programmes and on behalf of external clients such as industry, other government bodies and members of the public. The range of radiochemical measurement services provided by the laboratory during 2005 included: testing of Irish produce for compliance with the requirements of importing countries, testing of drinking water for compliance with the requirements of the Drinking Water Directive (98/83/EC), analysis of wipe tests of radioactive sources, testing and certification of dredging samples for compliance with the Dumping at Sea Act, 1996, and measurement of radon in drinking water. In total 2183 samples were tested during the year and Table 2 presents the breakdown of this number by sample type. The number of product certificates issued in 2005 to exporters of Irish produce was 4422, which may be compared with 4242 and 4581 in 2004 and 2003 respectively. These figures confirm a steady demand for this service.

Table 2: Radioactivity Testing on Environmental Samples and Foodstuffs, 2005

Air	444
Beef	36
Lamb	36
Pork/Poultry	13
Drinking water	117
Fish and shellfish	114
Seawater, sediments and seaweed	88
Milk and dairy products	513
Pharmaceuticals & additives (concentrates, ingredients)	274
Food Other (grains, alcohol)	56
Miscellaneous (wipes, canteen food)	492
Total	2183

Assessment of Radiation Doses

The RPII collates information on radiation doses received by occupationally exposed workers in three ways:

- the RPII Dosimetry Service uses thermoluminescent dosimeters (TLDs) to assess radiation doses received by workers using ionising radiation in the medical, industrial and educational sectors;
- the RPII provides track-etch dosimeters to assess radiation doses received by underground workers exposed to radon;
- all airlines holding an Air Operator's Certificate issued by the Irish Aviation Authority and whose aircrew are liable to receive an annual dose from cosmic radiation greater than 1 mSv are required to evaluate such doses and report annually to the RPII.

During 2005, approximately 82,000 TLDs were supplied to more than 8000 individuals. Approximately 90% of those monitored received no measurable whole-body dose. A total of 58 staff employed in four show caves and one commercial mine were also monitored.

The highest annual whole-body dose recorded in 2005 was 9.6 mSv received by a tour guide in a show cave as a result of exposure to radon. In the industrial sector, the highest annual dose was 4.2 mSv received by a technician using a moisture density gauge and was as a result of an increased workload in the first six months of the year.

Data submitted by eight airlines showed that 4655 aircrew received estimated annual radiation doses above 1 mSv: 2295 between 1 and 2 mSv, 2149 between 2 and 4 mSv and 211 over 4 mSv. No doses over 6 mSv were reported and the average dose to aircrew from cosmic radiation was approximately 2 mSv. Because of the large numbers of exposed workers, the airline industry represents a collective radiation dose that is larger than any of the other worker groups considered.

Measurable extremity doses were recorded by personnel working in industry, research and hospitals. The highest annual dose was to a worker at an equine facility who received an extremity dose of 124.8 mSv to the hand. No single cause for this high exposure has been identified.

The doses reported above may be compared with the annual whole-body dose limit of 20 mSv and the annual extremity dose limit of 500 mSv for workers, as set in national legislation.

Instrument Calibration

The accurate measurement of ionising radiation is essential to ensuring its safe and effective use and therefore the instruments used for this surveillance need to be regularly calibrated. In 2005, some 339 instruments were calibrated by the Service.

In 2005, the Service became actively involved with the European Metrology Group, whose objective is to promote the coordination of metrological activities and services with the purpose of achieving higher efficiency.

Radon Measurement

During 2005, there was a significant increase in radon measurements completed by householders with the number rising from 2948 in 2004 to 3550 in 2005. Of these, 574 were found to exceed the national Reference Level of 200 Bq/m³. The Service undertook radon measurements in some 203 workplaces in 2005 with 17 exceeding the national Reference Level of 400 Bq/m³ in one or more work areas.

Also in 2005, the Department of Education and Science (DES) continued its programme of monitoring schools for radon. A total of 122 schools completed measurements for the first time and 56 carried out post-remediation measurements.



Advisory Services

Introduction

The Advisory Services Division is responsible for the provision of information and advice to Government and to the public. The principal work areas covered are nuclear safety, emergency preparedness and radon. The Division also manages the RPII website and all contacts with the media. The Division co-ordinates dose assessment studies and all international consultancy work by RPII staff.

Radon Advice

Action Plan to Identify and Remedy Homes with High Radon Concentrations

From the results of the National Radon Survey carried out by the RPII in the 1990s, some 91,000 homes in Ireland are predicted to have radon concentrations above the national Reference Level of 200 Bq/m³. However, to date, less than 4000 of these homes have been identified by the RPII. Recognising that the problem of identifying homes with high radon concentrations is not unique to Ireland, in 2005 the RPII undertook a detailed review of the radon situation in Ireland together with a survey of the radon programmes in other countries and the advice in relation to radon issued by international organisations. Following this review, a draft Action Plan was prepared, the aim of which is to increase the rate at which homes with high radon concentrations are identified and to increase the number which are subsequently remediated. The plan makes six main recommendations:

- introduce a targeted and high-profile media campaign to heighten public awareness of radon;
- commission a study to examine the feasibility of including radon measurement and remediation in the conveyancing process;
- enforcement of radon preventive measures in new buildings required by Building Regulations;
- extend the Homebond scheme to include the installation of radon barriers and sumps;
- introduce a programme of free radon measurements in all High Radon Areas; and
- introduce financial assistance for householders to reduce radon concentrations above the Reference Level.

The draft Action Plan was submitted to the Minister for the Environment, Heritage and Local Government for his consideration in September.

Radon Remediation in Schools

An evaluation of the effectiveness of different radon remediation techniques installed in school rooms with radon concentrations above the Reference Level of 200 Bq/m³ showed that radon sumps and wall vents are effective in reducing radon concentrations. Wall vents, which are usually installed in rooms with moderately elevated radon concentrations in the range 200-400 Bq/m³, reduced radon concentrations by an average of approximately 50%. Radon sumps, which are usually installed in rooms that require a greater reduction in radon concentrations, gave average reductions in excess of 90%. A study of the long-term effectiveness of radon sumps showed that all sumps evaluated were still operating correctly three years after their installation and their effectiveness in reducing indoor radon increased with time.

Radon Road Shows

In 2005, the RPII initiated a series of radon road shows whose main objective was to heighten the awareness of the dangers of radon exposure amongst employers and the public. The areas visited were Ballina, Sligo, Kilkenny, Waterford and Tralee, all of which are situated in High Radon Areas. Each road show included presentations to local schools and employer groups. These road shows were highly successful, receiving significant local and national media coverage and increasing the number of radon measurements made.

National Radon Forum

In November, the RPII hosted the fourth National Radon Forum in Tralee. The forum discussed options for increasing the number of radon measurements made in workplaces, radon health effects and public awareness of radon. An industrial theme was also included that brought together the different components of the radon measurement and remediation industries in Ireland. The forum was the largest to date with over 70 participants from a broad range of interest groups.

Health Risks due to Exposure to Radon in Homes in Ireland

During the year, the RPII issued a joint statement with the National Cancer Registry of Ireland (NCRI) on the health risks of exposure to radon in homes in Ireland. This collaboration reviewed a study of over 7000 lung cancer cases in Europe, which found that smokers are 25 times more likely than non-smokers to develop lung cancer due to radon gas. When applied to Ireland, the results confirm previous estimates that radon is directly responsible for up to 200 lung cancers of which approximately 90% will be observed among smokers and ex-smokers.

The RPII/NCRI review considered the need to modify the national Reference Level of 200 Bq/m³ for radon exposure in the home. It found no justification to revise the national Reference Level as it represented a level of risk, to the population as a whole, comparable to other everyday hazards.

Materials Containing Naturally Occurring Radioactive Materials (NORM)

In 2005, the RPII published its study into radiation exposures to NORM at the ESB's peat-fired power station in Shannonbridge. The study, which was a collaborative study between the RPII, Trinity College Dublin and the ESB, showed that the doses to workers at the plant were below 150 µSv.

The radiological assessment of the extraction and use of natural gas was also completed during 2005 in cooperation with Marathon Petroleum Ltd, the main natural gas producer currently operating in Ireland. The results found that work activities associated with natural gas extraction in Ireland give rise to doses likely to be around a few tens of microsieverts per year.

A radiological assessment of the bauxite industry in Ireland was also completed during the year. The investigation involved taking on-site measurements and the measurement of radioactivity levels in scale, mud, sand and water at the plant.

All investigations showed that radiation doses were well below the statutory limit of 1000 µSv and therefore the industries in question are exempt from regulation.

Assessment of Doses to the Irish Population

In 2005, the RPII commenced a three-year project to assess the average radiation dose received by the Irish population. When completed, the assessment will provide valuable information on the various natural and artificial sources of radiation to which the Irish population are exposed, the variability in the radiation doses, as well as an estimate of the doses to those most highly exposed.

Emergency Preparedness

Gamma Dose Rate Monitoring Network

In 2005, the RPII completed its upgrade of the national network of radiation monitoring stations and additional stations were added along the east and south coasts. The network continuously monitors the level of background radiation across Ireland and in the event that elevated radiation levels are detected, automatically alerts the RPII's duty officer. The data from this network is available on the redesigned Emergency Planning web-pages of the RPII's website along with information on the National Emergency Plan for Nuclear Accidents and past nuclear accidents.

Emergency exercises

The RPII was one of a number of government departments and agencies that participated in the INEX 3 emergency exercise in November. This exercise was part of a series of exercises designed by the OECD's Nuclear Energy Agency (NEA) to test the decision-making processes after serious radiation contamination has taken place. The focus of the exercise was on the implementation of agricultural countermeasures and food restrictions while moving towards full recovery following a nuclear incident.

The Irish exercise was based on a simulated accident at the Wylfa nuclear power plant in Wales. The resulting contamination was modelled using the ARGOS (Accident Reporting and Guiding Operational System) computer programme. Earlier in the year, the RPII had added a Food and Dose Model (FDM) to ARGOS. The FDM was customised to Irish agricultural practices using data provided by the Central Statistics Office, the Department of Agriculture and Food, the Food Safety Authority of Ireland and Teagasc. During the exercise, the FDM was used to predict radioactivity concentrations in foodstuffs and animal feeds so that appropriate countermeasures could be considered.

In addition to the national INEX 3 exercise, the RPII participated in a number of communications and incident reporting exercises with the IAEA and the EC. Also in 2005, the Reserve Defence Forces and the Civil Defence held national exercises to test their roles under the National Emergency Plan for Nuclear Accidents and the RPII contributed to these exercises, particularly in relation to pre-exercise training.

International Activities

The RPII maintains an active involvement in the work of key international organisations that develop standards and guidance on nuclear safety and the uses of ionising radiation. These organisations include the European Commission, the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA) of the Organisation for Economic Co-operation and Development. Currently the RPII is represented on over 20 international scientific and technical committees and working groups. These include the Radioactive Substances Committee of OSPAR, that evaluates radioactive discharges to the marine environment, the Working Party on Nuclear Safety, that is reviewing approaches to nuclear safety and the safety of the management of spent nuclear fuel and radioactive waste in the European Union and the EURADOS Working Group that is harmonising procedures for monitoring radiation doses received by exposed workers.

During 2005, RPII staff received a number of prestigious international appointments. One staff member was elected to membership of Committee 4 of the International Commission

on Radiological Protection (ICRP). The ICRP is the primary international organisation providing basic guidance on radiation protection and its Committee 4 is charged with the practical implementation of this guidance. Another staff member was appointed chairman of the IAEA's Transport Safety Standards Committee (TRANSSC), while another chairs the World Health Organisation's Working Group on Radon Exposure Guidelines. An RPII staff member also chairs the newly formed European Radiation Protection Authorities Network (ERPAN) network.

The RPII continues to maintain close contact with the two UK nuclear regulators, namely the Nuclear Installations Inspectorate of the Health and Safety Executive and the Environment Agency. Meetings were held with both regulators during the year. The RPII also participates in an annual contact meeting with the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) in the UK and the marine radioecology laboratory of the Institut de Radioprotection et de Sûreté Nucléaire (IRSN) in France.

In August, the RPII signed a Memorandum of Understanding with the French Directorate General for Nuclear Safety and Radiation Protection (DGSNR). The purpose of the Memorandum is to facilitate the exchange of technical and regulatory information relating to radiation protection and to the safety of nuclear facilities. Given the scale of the nuclear programme in France, the Memorandum will also provide an important channel for keeping up to date with developments in nuclear technology generally. The first technical exchange under the terms of the Memorandum took place in December when an inspector from DGSNR joined RPII staff as an observer during the inspection of three radiotherapy facilities in Ireland.

The RPII contributes to the IAEA's Technical Co-operation Programme by providing experts to develop advisory literature, run training courses and provide guidance. During 2005, this involved working visits to Croatia, Ecuador, Japan and Lebanon. In addition, at the request of the EC and the IAEA, scientists from Cyprus and Mexico visited the RPII and its laboratories for training in radioactivity measurement techniques and to discuss emergency preparedness arrangements in Ireland, with particular emphasis on radiation monitoring systems, respectively.

During 2005, the RPII commenced work on an EC funded project to strengthen the capacity of the health administration in Bulgaria to implement the Drinking Water Directive (98/83/EC). The RPII's role in this project is to develop and deliver a training and education programme for the Bulgarian authorities who are responsible for implementing this legislation. Two scientists from the National Centre for Radiobiology and Radiation Protection, Sofia, took part in a visit to the RPII during December to study the analytical techniques used at the laboratory.

Advice to Government

Nuclear and Radiation Safety Abroad

During 2005, the RPII was made aware, through the IAEA Information Service, of 23 nuclear incidents abroad. Seven of these involved nuclear power reactors, 12 involved radiation sources, one occurred in a hospital and another involved a research laboratory. The two remaining incidents involved a nuclear fuel fabrication and a fuel reprocessing facility respectively.

The incident at the fuel reprocessing facility, which involved a pipe failure at the Thermal Oxide Reprocessing Plant (THORP) at Sellafield, was reported directly to the RPII by the UK Nuclear Installations Inspectorate (NII). It was rated level 3 on the IAEA's International Nuclear Event Scale (INES), classifying it as a serious incident. Eleven of the other incidents were rated level 2, indicating that while they were of lesser radiological significance, there had been a significant failure of safety systems.

The NII also informed the RPII directly of a number of more minor incidents which did not meet the IAEA's INES reporting criteria. Four of these occurred at Sellafield.

None of the incidents referred to above had any radiological implications for Ireland.

Pipe Failure in the THORP Facility at Sellafield

On 20th April 2005, a camera inspection of an internal cell within THORP revealed a significant quantity of liquid in the base of the cell. The inspection was carried out because of calculated discrepancies in the nuclear material balance, which initially had been ascribed to a miscalculation. The inspection revealed that a feed pipe to an accountancy tank, which is suspended from the ceiling, had fractured.

The subsequent investigation by a Board of Enquiry, set up by the owners British Nuclear Group (BNG), revealed that the pipe may have started to leak as early as July 2004. By the time the leak was detected, 83.4 cubic metres of liquid, which was estimated to contain about 20 tonnes of uranium and 250 kg of plutonium, had been released from the pipe into secondary containment.

Of particular concern was the fact that the cell appeared to have been installed contrary to the original specification and the new design did not take proper account of movement of both the pipe and the tank to which it was attached. This situation was compounded by a "new plant" culture that led staff to conclude that the plant could not be at fault and hence that reported discrepancies in the nuclear material balance must be due to miscalculation. The BNG Report also identified a number of shortcomings in the application of procedures as well as the absence of documentation for certain procedures.

The NII subsequently charged BNG with a breach of the conditions of its licence. The company pleaded guilty.

Communications

A range of communications activities and events were undertaken during the year to build awareness of the RPII and its activities among its key audiences such as members of the public, customers, local and central government, employers and the media. The activities undertaken included:

- Public information campaigns
- Media briefings
- Publication of guidance documents
- Publication of scientific and technical information
- Publication of brochures and posters
- Issuing press releases
- Website development
- Presentations, exhibitions and seminars

As part of a proactive public and media relations campaign, 14 press releases were issued to coincide with the RPII's major events. Throughout the year, the RPII promoted awareness of its activities, particularly of radon, at regional and local level through radon road shows. Every opportunity was taken to use national and local radio as a means of disseminating information to the broadest possible audience. Media interest was intense during the year with staff participating in over 90 television and radio programmes. In addition, during the year, the RPII's activities were widely reported in the print media and many articles on the RPII and its work were featured in consumer and trade publications.

The RPII's website, www.rpii.ie, plays a vital role in communicating with and disseminating information to a wide range of audiences, both national and international. It is an up-to-date, relevant, and useful resource which was updated regularly during the year with press releases and publications and was developed to allow public access to the RPII's network of radiation monitoring stations across the country. On average, 4249 unique visitors accessed the site each month in 2005 representing a three fold increase on the numbers visiting in 2001. The most visited pages of the site included: radon maps and information, publications, press releases and emergency planning information.

The RPII's scientific experts regularly participated in conferences and seminars both nationally and internationally and provided speakers for public meetings, and for specialist courses to a wide spectrum of groups and various other professional bodies.

Publishing activities during the year included the production of a radon awareness poster that was widely distributed and a poster exhibition entitled 'Radioactivity in your environment' that was undertaken in ENFO during November and December. All RPII publications are made available free of charge on the website.

Publications

RPII Reports

Report of the RPII visit to BNFL Sellafield. RPII-05/01.

Environmental radioactivity surveillance programme 2001 and 2002. RPII-05/02.

Radioactivity monitoring of the Irish marine environment 2002. RPII-05/03.

Scientific Papers

Akinmboni, R., McMahon, C.A.* , Long, S.C.* and Colgan, P.A.* 2005. Environmental impact assessment of iodine-131 discharged from hospitals in Ireland', In Proceedings of the 3rd International Environmental Radioactivity Conference, Nice, October, 2005.

Duffy, J.T., O'Grady, J., Madden, J.S., Ryan, T.P. 2005. Transport of radioactive material in Ireland. In Proceedings of the 7th International Conference on Radioactive Materials Transport 2005, 27th-29th September, hosted by the Institution of Nuclear Engineers and held at Churchill College, Cambridge University, UK.

Jones, D.G., P.J. Kershaw, P.J., McMahon, C.A.* , Murray, M.* , Hunt, G.J. 2005. Changing patterns of radionuclide distribution in Irish Sea subtidal sediments', In Proceedings of the 3rd International Environmental Radioactivity Conference, Nice, October, 2005.

Kershaw, P.J., McMahon, C.A.* , Rudjord, A.L., Smedley, C., Leonard, K.S. 2005. Spatial and temporal variations in concentration factors in NW European seas – secondary use of monitoring data. *Radioprotection Colloques.*, 40, S93-S99.

McMahon, C.A.* , Fegan, M.* , Wong, J.* , Long, S.C.* , McKittrick, L.* , Thomas, K., Ryan, T.P.* , Rafferty, B.* 2005. Transfer of conservative and non-conservative radionuclides from the Sellafield nuclear fuel reprocessing plant to the coastal waters of Ireland. *Radioprotection Colloques.* 40, S629-S634.

Organo, C.* , Lee, E.M., Menezes, G., Finch, E.C. 2005. Investigation of occupational radiation exposures to NORM at an Irish peat-fired power station and potential use of peat fly ash by the construction industry. *Journal of Radiological Protection*, 25 p. 461-474.

General Articles

Dawson, D., 2005. Radioactivity in your environment. ENFO Exhibition.

Fenton, D., Colgan, P.A. 2005. Radon in Irish above-ground workplaces: regulatory and information efforts. 9th Workshop on Occupational Exposure to Natural Radiation, Augsburg, Germany, October 2005. www.eu-alara.net.

McMahon, C., Fegan, M., 2005. Food monitoring and research at the RPII. *Safefood CRRN-Newsletter*, No. 1 May. P. 3-4.

Somerville, S., McMahon, C., 2005. Upgrading the RPII's national monitoring network *The Irish Scientist 2005 Yearbook*. p. 37.

* RPII staff in conjunction with other authors

Media interest was intense during the year with staff participating in over 90 television and radio interviews and the RPII's activities were widely reported in the print media.



Corporate Services

Introduction

The Corporate Services Division encompasses corporate governance, central financial administration, IT and support services including facilities management and preparation for the application of the Freedom of Information Act in May 2006. Key achievements for the year are listed below under the various section headings.

Corporate Governance

In 2001, the Department of Finance issued a mandatory Code of Practice for the Governance of State Bodies to be applied by all commercial and non-commercial State bodies. The RPII has been implementing the Code on a phased basis, giving priority to the most immediate requirements. In this regard, the Board approved the following in 2005:

- Schedule of Matters Reserved to the Board
- Code of Business Conduct for members of the Board and Staff of the RPII
- Risk Assessment – register of key corporate risks and associated controls
- An Occupational Health and Safety Management system for the RPII.

In 2005, the Board oversaw the implementation of the recommendations of an organisation-wide review undertaken in 2004 and approved the 2005-2007 Strategy Statement. The required annual review of the effectiveness of the system of internal financial control was carried out in 2005 through the Audit Committee and the internal auditor.

Late in 2005, the Board commissioned consultants to carry out a review of its own performance, the recommendations of which will be implemented in 2006. The performance of the Chief Executive in 2005 was reviewed by the Board in early 2006.

Finance

The RPII's income in 2005 was €5.937 million made up of grant of €3.663 million and €1.264 million in earnings from licence charges, and dosimetry, product certification, radon measurement and other services. Under the new Accounting Standard FRS17 a further grant of €1.050 million is receivable by the RPII. Capital expenditure was €451,780. Income for the year exceeded expenditure by €202,305.

The RPII 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.

Human Resources

Addressing the recommendations detailed in the Organisation Review, a Human Resources Section was established mid-way through 2005.

A key task at the outset was the development of a HR Strategy, establishing the range of services to be provided and the delivery of those services. Throughout the remainder of the year the recruitment process was examined and it was decided that a competency based framework, in accordance with best practice, would be introduced. All RPII staff were introduced to the new process and training in interviewer and interviewee skills was organised. Based on the needs identified through the Performance Management Development System (PMDS), HR delivered a training and development plan for each staff member. Value for money and efficiency in the delivery of training was achieved by grouping training sessions and arranging in-house training where possible.

Staff

The implementation of the recommendations of the 2004 organisation review in relation to organisation structure and the establishment of a dedicated human resources section brought into focus the degree to which the staffing of the administration function in the RPII has fallen behind present day requirements. Increasing demand, particularly in the area of corporate governance, has exacerbated this situation. With the support of our parent department every opportunity was taken to ensure that the available staff complement of 46 was fully utilised but, in the absence of approval to increase staff numbers the issue of under-resourcing in the administrative area remained.

Equality

The RPII 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 RPII 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. Currently, nine staff avail of the work-sharing option enabling them to achieve their own personal work-life balance.

Partnership

In early 2005, a working group, set up to formulate a partnership strategy for the RPII, paved the way for the establishment of a Partnership Committee to replace the existing Worker Participation Forum. After consultation with staff, terms of

reference for the committee were drawn up with the aid of an independent facilitator. These reflected the broad aim of partnership to improve the work environment, productivity and service excellence by providing a forum for sharing information, consultation and joint problem solving. The Committee was established with eight representatives; one from the IMPACT trade union, one from each of the four divisions, the Chief Executive, one senior and one middle manager. The committee first met in August and established operating procedures by which it would govern itself and communicate with all staff. The committee met regularly thereafter and dealt with the code of business conduct, the internal communications strategy and work-sharing arrangements.

Health and Safety

With the coming into force of the Safety, Health and Welfare at Work Act, 2005, the RPII undertook a review of its health and safety arrangements. As a result of this review, it was decided to carry out a risk assessment of the RPII facilities and of the activities carried out by RPII staff while on official business, and to develop a Safety Management System which would bring the RPII into full compliance with current legislation. Following a formal tendering process a Health and Safety Consultant was engaged to carry out this work, which commenced in September.

Energy and Efficiency

In keeping with Government policy on energy efficiency, the RPII's Energy Conservation Working Group, whose remit also includes waste management and recycling, was active in promoting energy conservation and recycling throughout the organisation. Almost all lighting in the building uses low energy fittings and the heating system was modified to facilitate temperature control in individual offices. There is also an increased emphasis on ensuring that all waste paper is collected and sent for recycling.

Information Communication Technologies

Information communication technologies (ICT) are key supports to RPII business. The demand for and reliance on ICT continues to grow and, as a result, the staff complement in the IT section was increased in 2005 through re-assignment of existing staff.

Key developments in 2005 were in the areas of internal networking infrastructure, internet access and external links. The internal network switching equipment was upgraded providing a faster more reliable network. A server was installed to allow consolidation of all internal web based systems on to one dedicated server. A proxy server was introduced allowing increased staff access to the internet. Wireless links were installed

between remote office locations to ensure service in the event of a failure in the existing fibre optical links. Additional external internet connections were also installed along with a system to provide load balancing and automatic failover.

To contribute to increased efficiency and effectiveness, the accounting system was streamlined by merging three separate accounting systems into a single system. The cost of communications services was reviewed, ensuring the RPII continues to benefit from the advantages of increased competition in this area.

Records Management

The first phase of a project, which commenced in 2004, to introduce a new record management system for RPII records was completed in 2005. The new classification system, based on the function and activities of the organisation is IT based and will ensure that organisational information can be quickly identified and easily retrieved, that important information is captured and preserved as necessary and that redundant information is routinely and effectively addressed.

Quality Customer Service

The RPII is committed to the provision of a high quality of service delivery to all of its customers across the full range of its activities. A customer service charter is in place that sets out the RPII's commitments to its customers. The RPII is accredited to the ISO 17025 standard by the National Accreditation Board for the measurement services it provides to the public and to industry.

In 2005, the RPII appointed a customer service manager through re-assignment of existing staff, and established a Quality Customer Service (QCS) Working Group. This group began development of the RPII's first QCS action plan with a view to publication in 2006. This plan will set out the actions to be undertaken to further improve quality in the delivery of services. The initial action plan is expected to run until the end of 2007 allowing for subsequent plans to be correctly aligned with the strategic plan process.

Members of the Board

The term of office of Dr W Blunnie expired on 25th September 2005. Dr M Hurley was appointed to the Board with effect from 24th October 2005.

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 organisations.

Chairman Dr Francis J Mulligan	8(8)	Dr William Blunnie <i>Medical Council</i>	1(6)
Mr Gregory Burke <i>Institute of Food Science and Technology of Ireland</i>	8(8)	Prof Kieran Byrne	1(8)
Dr Patrick Connellan <i>Dental Council</i>	5(8)	Ms Anita Dowling <i>Association of Physical Scientists in Medicine</i>	6(8)
Dr Seán Darby <i>Faculty of Radiologists RCSI</i>	3(8)	Mr James Fitzmaurice	2(8)
Dr Michael Hurley <i>Medical Council</i>	1(2)	Dr Lesley Malone <i>Irish Nuclear Medicine Association</i>	6(8)
Ms Darina Muckian	8(8)	Ms Adi Roche	4(8)
Mr Francis J Turvey	8(8)		

The total figure for Board remuneration and expenses, in 2005, was €83,054.

Membership of the Board's Audit Committee:

Dr F J Mulligan (Chair), Dr P Connellan and Mr J Fitzmaurice.

Staff Structure



Chief Executive
Dr Ann McGarry

Director of Radiation
Monitoring and
Measurement Services
Mr David Pollard

Director of
Corporate Services
Dr Barbara Rafferty

Director of
Advisory Services
Dr Tony Colgan

Director of
Regulatory Services
Dr Tom Ryan

Advisory Committees

Environmental Radiation Advisory Committee

This Committee provides advice to the Board on radioactivity in the environment.

Chairman

Mr Gregory Burke	Dr Tony Colgan	Mr David Fenton	Mr Dermot Howett
Prof Ian R. McAulay	Dr Ann McGarry	Prof James P. McLaughlin	Prof Peter I. Mitchell
Ms Darina Muckian	Dr Geraldine O'Reilly	Mr David Pollard	Dr Barbara Rafferty
Prof William Reville	Ms Adi Roche	Prof Philip Walton	Ms Stephanie Long (Scientific Secretary)

Medical Radiation Advisory Committee

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

Chairman

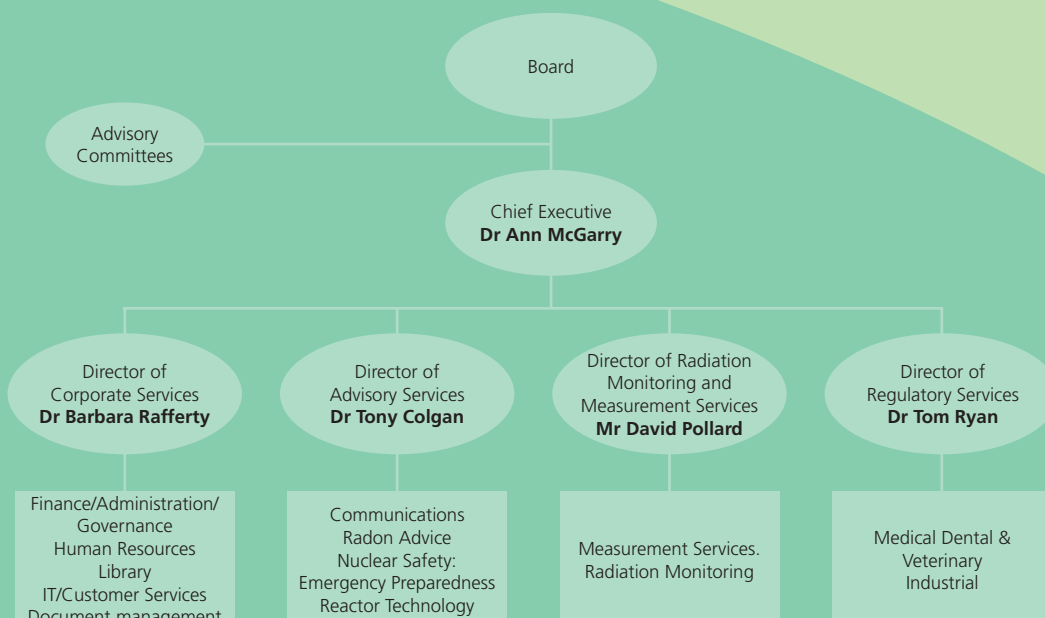
Dr George Duffy	Ms Fionnuala Barker	Dr David Clarke	Ms Mary Coffey
Ms Louise Diamond	Dr Stephen Fennell	Mr David Fenton	Dr Edward Fitzgerald
Mr Christopher Hone	Mr Dermot Howett	Dr Lynn Johnston	Dr Pat Kenny
Dr Brendan McClean	Dr Ann McGarry	Dr Lesley Malone	Dr James Masterson (retired 2005)
Ms Kate Matthews	Dr Michael Moriarty	Dr Geraldine O'Reilly	Prof Wil van der Putten
Dr Tom Ryan	Dr Stephen Skehan (appointed 2005)	Ms Tanya Kenny (Scientific Secretary)	

Public Relations Advisory Committee

This Committee provides advice relating to public relations.

Chairman

Mr James Fitzmaurice	Mr Gregory Burke	Dr Tony Colgan	Ms Marie Kelly	Dr Ann McGarry
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Report of the Comptroller and Auditor General for presentation to the Houses of the Oireachtas

I have audited the financial statements of the Radiological Protection Institute of Ireland for the year ended 31 December 2005 under the Radiological Protection Act, 1991.

The financial statements, which have been prepared under the accounting policies set out therein, comprise the Statement of Accounting Policies, the Income and Expenditure Account, the Statement of Total Recognised Gains and Losses, the Balance Sheet and the related notes.

Respective Responsibilities of the Institute and the Comptroller and Auditor General

The Institute is responsible for preparing the financial statements in accordance with the Radiological Protection Act, 1991, and for ensuring the regularity of transactions. The Institute prepares the financial statements in accordance with Generally Accepted Accounting Practice in Ireland. The accounting responsibilities of the Members of the Institute are set out in the Statement of Responsibilities of the Institute.

My responsibility is to audit the financial statements in accordance with relevant legal and regulatory requirements and International Standards on Auditing (UK and Ireland).

I report my opinion as to whether the financial statements give a true and fair view, in accordance with Generally Accepted Accounting Practice in Ireland. I also report whether in my opinion proper books of account have been kept. In addition, I state whether the financial statements are in agreement with the books of account.

I report any material instance where moneys have not been applied for the purposes intended or where the transactions do not conform to the authorities governing them.

I also report if I have not obtained all the information and explanations necessary for the purposes of my audit.

I review whether the Statement on Internal Financial Control reflects the Institute's compliance with Code of Practice for the Governance of State Bodies 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. I am not required to consider whether the Statement on Internal Financial Control Covers all financial risks and controls, or to form an opinion on the effectiveness of the risk and control procedures.

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 International Standards on Auditing (UK and Ireland) 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 and regularity of the financial transactions included 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 in order 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, the financial statements give a true and fair view, in accordance with Generally Accepted Accounting Practice in Ireland, of the state of the Institute's affairs at 31 December 2005 and of its income and expenditure for the year then ended.

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



Gerard Smyth

For and on behalf of the Comptroller and Auditor General

24 November 2006

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.

The Board established formal processes to identify and evaluate business risks by

- identifying the nature, extent and financial implications 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.

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. The Board is provided with an annual report of internal audit activity by the Internal Auditor. The report includes the Internal Auditor's opinion on the adequacy and effectiveness of the system of internal financial control.

Annual Review of Controls

I confirm that in the year ended 31 December 2005 the Board had conducted a review of the effectiveness of the system of internal financial controls.

Signed on behalf of the Board



G Burke

Board Member

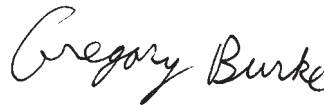
23 November 2006

Statement of Responsibilities of the Institute

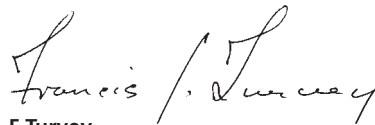
Section 16 (1) of the Radiological Protection Act, 1991, requires the Institute to prepare financial statements in such form as may be approved by the Minister for the Environment, Heritage and Local Government with the concurrence of the Minister for Finance. In preparing these financial statements,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

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

The 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.



G Burke
Board Member



F Turvey
Board Member

23 November 2006

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 are used as follows:

- Office & Laboratory, Furniture & Equipment: 20%
- Leasehold Improvements are depreciated over the life of the lease.

4. Superannuation

The Radiological Protection Institute operates a defined benefit pension scheme which is funded annually on a pay as you go basis from monies provided by the Minister for the Environment, Heritage and Local Government and from contributions deducted from staff salaries.

Pension costs reflect pension benefits earned by employees in the period and are shown net of staff pension contributions which are retained by the Institute. An amount corresponding to the pension charge is recognised as income to the extent that it is recoverable, and offset by grants received in the year to discharge pension payments.

Actuarial gains or losses arising on scheme liabilities are reflected in the Statement of Recognised Gains and Losses and a corresponding adjustment is recognised in the amount recoverable from the Department of the Environment, Heritage and Local Government.

Pension liabilities represent the present value of future pension payments earned by staff to date. Deferred pension funding represents the corresponding asset to be recovered in future periods from the Department of the Environment, Heritage and Local Government.

5. Capital Account

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

6. Income in Advance

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

Income and Expenditure Account

for the year ended 31st December 2005

2004 Euro		Notes	2005 Euro
INCOME			
3,310,000	Oireachtas Grant		3,663,000
805,448	Net Deferred Funding for Pensions	7b	1,050,014
(69,156)	Transfer to Capital Account	2	(40,443)
4,046,292			4,672,571
471,101	Dosimetry & Calibration Service		528,719
358,605	Radon Measurement Service		296,323
300,357	Radiation Monitoring Service		301,440
130,016	Regulatory Service		144,973
59,011	Miscellaneous/Contract Income		(7,003)
1,319,090			1,264,452
5,365,382			5,937,023
EXPENDITURE			
2,576,562	Salaries	3	2,750,069
808,302	Pensions	7c	1,018,491
188,660	Dosimetry & Calibration Service		93,816
117,862	Radon Measurement Service		122,448
87,390	Radiation Monitoring Service		61,623
17,443	Regulatory Service		55,938
71,543	Communications		122,192
48,650	Nuclear Safety		49,618
23,848	Library & Document Management		20,489
515,824	Accommodation & Insurance	4	513,762
143,189	Travel & Subsistence		159,887
96,131	Recruitment and Training		89,717
72,627	MIS, IT & Customer Service		76,487
65,777	Postage, Phone & Office Supplies		88,716
164,944	Professional Fees & Miscellaneous		76,096
11,950	Audit Fees		11,950
0	Bad Debts		12,082
356,478	Depreciation		411,337
5,367,180			5,734,718
(1,798)	SURPLUS/(DEFICIT) FOR YEAR		202,305
413,931	Balance at 1st January		412,133
412,133	Balance at 31st December		614,438

The Statement of Accounting Policies and notes 1 to 11 form part of these Financial Statements.

Gregory Burke

G Burke

Board Member

Francis J. Turvey

F Turvey

Board Member

23 November 2006

Statement of Total Recognised Gains and Losses

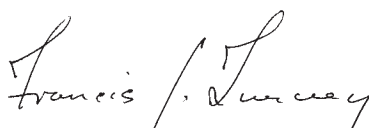
for the year ended 31st December 2005

2004 Euro		Notes	2005 Euro
(1,798)	Surplus/(Defecit) for year		202,305
(443,000)	Experience (Losses)/Gains on pension scheme liabilities		478,000
(1,806,000)	Change in assumptions underlying the present value of pension scheme liabilities		(777,000)
(2,249,000)	Actuarial (Loss)/Gain on Pension Liabilities	7f	(299,000)
2,249,000	Adjustments to Deferred Pension Funding		299,000
(1,798)	Total recognised Gain/(Loss) for the year		202,305

The Statement of Accounting Policies and notes 1 to 11 form part of these Financial Statements.



G Burke
Board Member



F Turvey
Board Member

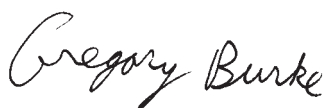
23 November 2006

Balance Sheet

as at 31st December 2005

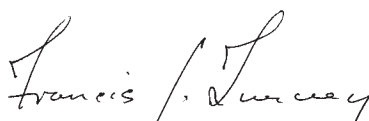
2004 Euro		Notes	2005 Euro
1,122,231	FIXED ASSETS	1	1,162,674
	CURRENT ASSETS		
332,746	Cash on Hand & at Bank		744,785
425,523	Debtors		387,271
758,269			1,132,056
	CREDITORS - amounts falling due within one year		
266,148	Creditors		393,464
79,988	Income in Advance		124,154
346,136			517,618
412,133	NET CURRENT ASSETS		614,438
1,534,364	TOTAL ASSETS LESS CURRENT LIABILITIES		1,777,112
12,228,000	Deferred Pension Funding	7d	13,577,000
(12,228,000)	Pension Liability	7e	(13,577,000)
1,534,364	NET ASSETS		1,777,112
	Financed by:		
412,133	INCOME & EXPENDITURE ACCOUNT		614,438
1,122,231	CAPITAL ACCOUNT	2	1,162,674
1,534,364			1,777,112

The Statement of Accounting Policies and notes 1 to 11 form part of these Financial Statements.



G Burke

Board Member



F Turvey

Board Member

23 November 2006

Notes to the Financial Statements

for the year ended 31st December 2005

1. FIXED ASSETS

	Leasehold Improvements €	Office and Laboratory Furniture and Equipment €	Total €
Cost:			
At 1st January 2005	788,301	4,232,114	5,020,415
Additions	0	451,780	451,780
Disposals	0	(30,419)	(30,419)
At 31st December 2005	788,301	4,653,475	5,441,776
Depreciation:			
At 1st January 2005	429,696	3,468,488	3,898,184
Charge for year	25,617	385,720	411,337
On disposals	0	(30,419)	(30,419)
At 31st December 2005	455,313	3,823,789	4,279,102
Net Book Value at			
31st December 2004	358,605	763,626	1,122,231
Net Book Value at			
31st December 2005	332,988	829,686	1,162,674

During 2005, the Institute reviewed its Register of Fixed Assets and removed items originally costing €30,419 which were fully depreciated and no longer in use.

2. CAPITAL ACCOUNT

	2005 €
Balance at 1st January 2005	1,122,231
Transfer from Income and Expenditure Account	
Grants allocated for the Purchase of Fixed Assets	451,780
Grants amortised in year	(411,337)
	40,443
Balance at 31st December 2005	1,162,674

Notes to the Financial Statements

for the year ended 31st December 2005

3. SALARIES AND PENSIONS

	2005 €	2004 €
Gross Salaries	2,643,070	2,471,784
Employers P.R.S.I.	106,999	104,778
Pension Deductions	(166,509)	(148,698)
	2,750,069	2,576,562

The average number of full-time persons employed, excluding Board members, in the financial year was 46 (2004 - 46)

4. COMMITMENTS & LEASE OBLIGATIONS – Operating Leases

3 Clonskeagh Square

Lease commitments payable in the next twelve months amount to €270,000 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 2003.

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. CAPITAL COMMITMENTS

The value of capital commitments authorised at 31 December 2005 amounted to €219,657.

6. BOARD MEMBERS' INTERESTS

The Board adopted procedures in accordance with guidelines issued by the Department of Finance in relation to the disclosure of interests by Board members and these procedures have been adhered to in the year. There were no transactions of any significance in the year in relation to the Institute's activities in which the Board members had any beneficial interest.

7. PENSIONS

a. Pension Scheme

Radiological Protection Institute operates a defined benefit scheme which is unfunded.

The valuation used for FRS17 disclosures has been based on an actuarial valuation in 2003 by a qualified independent actuary to take account of the requirements of FRS17 in order to assess the scheme liabilities at 31st December 2005. The financial assumptions used to calculate scheme liabilities under FRS17 are

	At 31/12/2005	At 31/12/2004
Discount rate	4.25%	4.5%
Rate of Expected Salary Increase	4.0%	4.0%
Rate of increase in pension payment	4.0%	4.0%
Inflation	2.25%	2.25%

Notes to the Financial Statements

for the year ended 31st December 2005

7. PENSIONS (continued)

b. Net Deferred Funding for Pensions in Year

	2005 (€'000)	2004 (€'000)
Funding recoverable in respect of Current Year Pension Costs	1,185	957
State Grant Applied to Pay Pensions	(135)	(152)
	1,050	805

c. Analysis of total pension costs charged to Expenditure

	2005 (€'000)	2004 (€'000)
Current service cost	624	466
Interest on Pension Scheme liabilities	561	491
Employee Contributions	(167)	(149)
	1,018	808

d. Deferred Funding Asset for Pensions

The RPII recognises amounts owing from the State for the unfunded deferred liability for pensions on the basis of a number of past events. These events include the statutory backing for the superannuation scheme, and the policy and practice in relation to funding public service pensions including the annual estimates process. The RPII has no evidence that this funding policy will not continue to progressively meet this amount in accordance with current practice. The deferred funding asset as at 31st December 2005 amounted to €13.577 million (2004 €12.228 million).

e. Movement in Net Pension Liability during the financial year

	2005 (€'000)	2004 (€'000)
Net Pension Liability at 1st January	12,228	9,174
Current Service Cost	624	466
Interest Costs	561	491
Actuarial loss/(gain)	299	2,249
Pensions Paid in the year	(135)	(152)
Net Pension liability at 31st December	13,577	12,228

Notes to the Financial Statements

for the year ended 31st December 2005

7. PENSIONS (continued)

f. History of experience gains and losses

	2005	2004
Experience (gains)/losses on scheme liabilities amount (€'000)	478	443
Percentage of the present value of scheme liabilities	3%	4%
 Total Amount recognised in STRGL (€'000)	 299	 2,249
Percentage of the present value of scheme liabilities	(2%)	(18%)

g. Effect of change of Accounting Policy

The effect of the change in the Accounting Policy arising from the introduction of FRS 17 is to recognise as expenditure in the year, the cost of pensions earned rather than payments made to Pensioners, and the corresponding funding amount. In addition, the Balance Sheet recognises the cumulative liability for Pensions earned by Employees as at 31 December 2005, together with a corresponding asset, whereas previously this liability was disclosed only by Note. The comparative figures for 2004 have been restated accordingly.

8. DEBTORS

	2005 €	2004 €
Debtors for Services	201,581	261,394
Bad Debts Provision	(12,082)	0
Prepayments	197,772	164,129
	<hr/> 387,271	<hr/> 425,523

9. CREDITORS

	2005 €	2004 €
Accruals	387,492	260,642
Collector General	5,972	5,506
	<hr/> 393,464	<hr/> 266,148

10. INCOME AND EXPENDITURE ACCOUNT

Due to the reclassification of some of the Institute's Income and Expenditure, the prior year figures have been restated.

11. APPROVAL OF FINANCIAL STATEMENTS

The financial statements were approved by the Board on 25 July 2006.