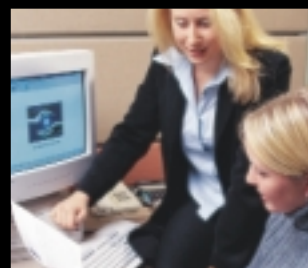


annual report & accounts 1999



**Radiological Protection Institute of Ireland**  
An Institiúid Éireannach um Chosaint Raideolaíoch

Radiological Protection Institute of Ireland

To the Minister for Public Enterprise

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 1999.

Francis J Mulligan, Chairman

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## chairman's statement



I am pleased to present the Annual Report and Accounts for the Radiological Protection Institute of Ireland for 1999. Having been appointed Chairman of the Institute in February 2000, I wish to acknowledge the debt that the Institute owes to my predecessor, the Chairman of the Institute from its establishment in 1992 until her election to Dáil Éireann in October 1999, Dr Mary Upton.

In the seven-and-a-half years of Dr Upton's chairmanship I believe that the Institute established itself as an independent and authoritative source of information and guidance on all issues relating to the protection of the public from hazards associated with ionising radiation, whether the origin of the radiation is the nuclear industry, radon gas in buildings or its multiple uses in medicine and industry. This record is ample testimony to Dr Upton's very substantial contribution to the development of radiological protection in Ireland.

An important milestone in this development was the recent bringing into force of Irish legislation (the Ionising Radiation Order, 2000) implementing a new EU Directive laying down basic standards for the protection of the health of workers and general public against the dangers arising from ionising radiation (Basic Safety Standards Directive). This followed a substantial process of consultation of interested parties, and represented a significant achievement on the part of staff of both the Institute and the Nuclear Safety Division of the Department of Public Enterprise.

It is a matter of regret, however, that the Minister for Health and Children has not put in place legislation to implement the companion EU Directive, relating to the protection of patients undergoing exposure to radiation in the course of medical or dental treatment, by the date in May 2000 prescribed in the Directive. This now leaves an important area of radiological protection in a state of legal limbo, as well as creating significant difficulties for the Institute in discharging its responsibility for regulation of uses of ionising radiation in the medical sector.

The Institute welcomes particularly the provisions of the new Ionising Radiation Order relating to exposure to natural sources of ionising radiation.

These introduce statutory measures for protection of workers exposed to high levels of radon in the workplace, or engaged in work activities involving natural radiation sources other than radon, while exposure of air crew to cosmic radiation is also subjected to legal safeguards for the first time. As far as radon is concerned, I welcome the continuing support of the Minister for Education and Science for the nationwide survey of radon in schools which his predecessor commissioned the Institute to undertake, and very importantly his Department's attention to the remediation of schools found to have high radon levels.

On a wider front, a major responsibility of the Institute is the provision of advice to Government about the actual and potential hazards to Ireland from nuclear installations in other countries. In recent months this has required an intensive focus on Sellafield, in the wake of strongly critical assessments of the management of safety at Sellafield by the UK's own regulatory authority, the Nuclear Installations Inspectorate.

Simultaneously, the Institute has had a continuing involvement in international negotiations on the implementation of the 1998 Sintra Agreement, within the framework of the OSPAR Convention, whereby the UK has committed itself to a programme of substantial and progressive reduction of radioactive discharges to the marine environment. The Institute will continue to commit itself in every way it can to the furtherance of national objectives in these areas.

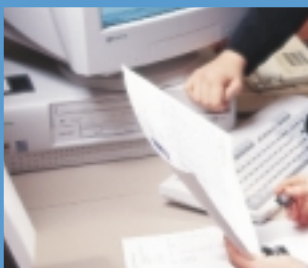
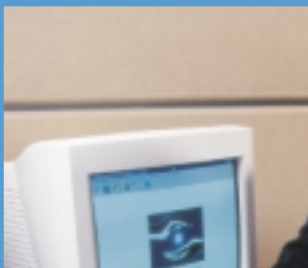
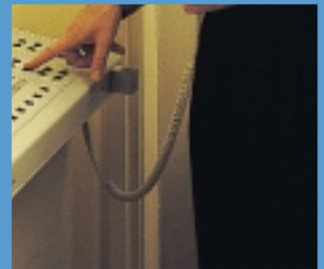
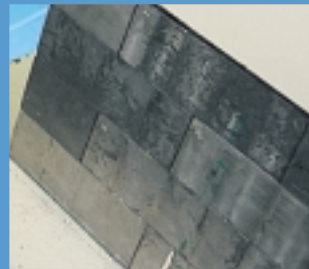
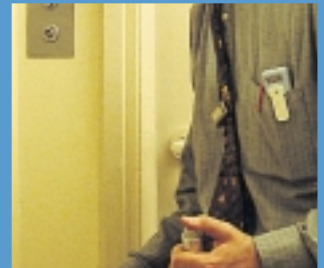
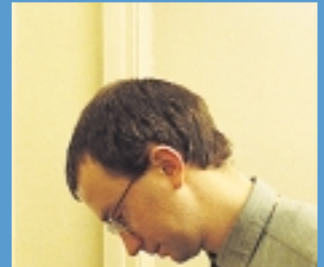
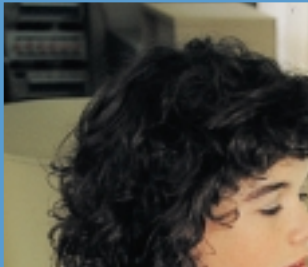
The Institute has for some time been advocating the provision of grants to assist householders with the cost of remediation of houses found to have high radon levels. I therefore greatly welcome the recent announcement by the Minister of State at the Department of Public Enterprise, Mr Joe Jacob, TD, that the Government has approved in principle the introduction of such grants. I understand also that active consideration is being given to the provision of a national facility for the safe storage of disused radioactive substances, which the Institute has recommended for a considerable time. I trust that action on this will follow at an early date.

I welcome the appointment to the Board of the Institute of Ms Mary Coffey, Head of the School of Therapeutic Radiography of Trinity College Dublin, to fill the vacancy left by the retirement of Dr Upton. The terms of office of three Board members expired in March 2000. I am pleased that two of these, Dr Patrick Connellan and Dr Edward Fitzgerald, have been reappointed to the Board for a further term on the nomination of the Dental Council and the RCSI Faculty of Radiologists, respectively. The representative of the Medical Council, Dr James Carr, has retired from the Board after three years service and I would like to thank him very sincerely for his invaluable contribution to the work of the Board and the admirable personal qualities he brought to its deliberations. I welcome the appointment of Dr William Blunnie as the Medical Council representative on the Board in the place of Dr Carr.

I wish to record my appreciation of the dedication and expertise which has at all times characterised the work of the Institute's staff. I also wish to thank the members of the Board for their generous service to the Institute, and to acknowledge the contributions of the members of the Institute's Advisory Committees who give their time voluntarily to assist the Institute in its work.

Finally, I wish to record the Institute's appreciation for the support received from the Minister for Public Enterprise, Ms Mary O'Rourke, TD. The Institute is particularly indebted to the Minister of State with responsibility for Nuclear Safety, Mr Joe Jacob, TD, for his active encouragement for the Institute's work. I must also acknowledge the co-operation received at all times from the officials of the Department of Public Enterprise, as well as the assistance received from other national organisations and from third-level educational institutions.

**Francis J Mulligan**  
*Chairman*





## ráiteas an chathaoirligh



Is cúis áthais dom Tuarascáil Bhliantúil agus Cuntais Institiúid um Chosaint Raideolaíoch na hÉireann, don bhliain 1999, a chur i láthair. Ceapadh mise i mo Chathaoirleach ar an Institiúid mí Feabhra, 2000 agus ba mhian liom aitheantas a thabhairt don méid oibre ar son na hInstitiúide a rinne mo réamhtheachtaí, An Dochtúir Mary Upton, Cathaoirleach na hInstitiúide, ó bunaíodh an áit sa bhliain 1992, go dtí gur toghadh chun Dáil Éireann í, i nDeireadh Fómhair na bliana 1999.

Le linn na seacht mbliana go leith de Chathaoirleacht an Dr Upton, creidim gur cruthaíodh an Institiúid ina foinse neamhspleách agus údarásach d'eolas agus de threoir ar gach ceist a bhaineann le cosaint an phobail ó na contúirtí a nasctar le radaíocht ianaíoch, cibé acu inar táirgtear an radaíocht sa tionscal núicléach, sa ghás radóin i bhfoirgnimh, nó ina iliomad úsáidí sa leigheas agus i dtionscal. Tá neart fianaise san obair seo den chuid mhór a thug an Dr Upton chun cosaint raideolaíochta in Éirinn a fhorbairt.

Ba phointe suntasach san fhorbairt sin an reachtaíocht a feidhmíodh sa tír seo ar na mallaibh (an tOrdú um Radaíocht Ianaíoch, 2000), ag cur i gcrích Treoir nua de chuid an Aontais Eorpaigh, treoir ina leagtar síos na caighdeáin bhunúsacha do chaomhnú sláinte na n-oibrithe agus an phobail i gcoitinne, i gcoinne na gcontúirtí a thagann ón radaíocht ianaíoch. Tharla sin i ndiaidh próiseas leathan breithnithe ag daoine leasmhara agus ba mhór an méid é le baint amach ag foireann na hInstitiúide agus ag an Rannóg Sábháilteachta Núicléiche de chuid na Roinne Fiontar Poiblí, araon.

Is cúis áiféala é, áfach, nár chuir an tAire Sláinte agus Leanaí reachtaíocht i bhfeidhm d'fhonn Treoir den sórt céanna ón Aontas Eorpach, maidir le cosaint d'othair a fhulaingíonn radaíocht le linn cóir leighis nó cóir fioclóra, a fheidhmiú faoin dáta i mí na Bealtaine 2000, a mholtar sa Treoir. Fágтар dá bharr sin gné thábhachtach den chosaint raideolaíochta i liombó maidir leis an dlí chomh maith le deacrachtaí bunúsacha a chruthú don Institiúid agus í i mbun a freagrachtaí chun úsáid radaíochta ianaíoch sa rannóg leighis a rialú.

Fáiltíonn an Institiúid, go háirithe, roimh fhorálacha an Ordaithe nua do Radaíocht Ianaíoch a bhaineann le nochtadh d'fhóinsí nádúrtha radaíochta ianaíoch. Soláthraíonn na forálacha bearta dlí do chosaint na n-

oibrithe a fhulaingíonn ard leibhéal radóin san áit oibre, nó dóibh siúd atá fostaithe i ngníomhaíochtaí oibre a úsáideann fóinsí nádúrtha radaíochta seachas radón, agus soláthraítear cosaintí dlí freisin don chéad uair do chriúna aeir a bhíonn faoi thionchar radaíocht chosmach. Maidir le radón, fáiltim roimh thacaíocht leanúnach an Aire Oideachais agus Eolaíochta do shuirbhé náisiúnta ar fud na tíre faoi radón sna scoileanna, suirbhé a choimisiúnaigh an tIarlair ón Institiúid, agus go háirithe aird a Roinne maidir leis an scéal a chur ina cheart i scoileanna ina n-aimsítear ard leibhéal radóin.

Ar bhonn níos leithne de, is freagracht ollmhór ar an Institiúid é comhairle a sholáthar don Rialtas maidir leis na contúirtí fein agus na contúirtí a d'fhéadfadh a bheith i gceist d'Éirinn ó fhearaí núicléacha i dtíortha eile. Le roinnt míonna, bhí gá le dianfhócas ar Sellafield, ar lorg measúnaithe a bhí an-chriticiúil ar fad faoi bhainistíocht shábháilteachta i Sellafield ag údarás rialacháin na Ríochta Aontaithe féin, An Fhoireann Cigireachta um Fhearaí Núicléacha.

Le linn an ama sin freisin bhí baint leanúnach ag an Institiúid leis na comhráit idirnáisiúnta faoi fheidhmiú Aontas Sintra 1998, taobh istigh de chreathlach Choinbhinsiún OSPAR faoinar chomhaontaigh An Ríocht Aontaithe clár substainteach agus forcheimnitheach laghdaithe ar dhiúscairt radaighníomhach sa timpeallacht mara a fheidhmiú. Leanfaidh an Institiúid lena cuid oibre ar gach bealach chun na haidhmeanna náisiúnta sna réimsí sin a fhorbairt.

Tá an Institiúid le tamall anuas ag moladh soláthar deontas chun cabhrú le sealbhóirí tí maidir le costas leasaithe tí ina bhfaightear leibhéil arda radóin. Dá bhrí sin fáiltim ó chroí roimh an bhfógra a rinne an tAire Stáit sa Roinn Fiontar Poiblí, An tUasal Joe Jacob, TD, le gairid, gur cheadaigh an Rialtas i bprionsabal deontais dá leithéid a chur ar bun. Tuigim freisin go bhfuil machnamh gníomhach á dhéanamh ar shaoaráid náisiúnta a chur ar fáil i gcomhair stóráil shábháilte substaintí raidighníomhacha atá as úsáid, rud a mhol an Institiúid le tamall maith anuas. Tá mé dóchasach go ndéanfar bearta dá réir seo go luath.

Fearaim fáilté roimh cheapachán Ms Mary Coffey, atá ina ceann ar Scoil Raideagrafaíochta Teiripí i gColáiste na Tríonóide, Baile Átha Cliath, ar Bhord na hInstitiúide, chun folúntas a fágadh nuair a d'éirigh

an Dr Upton as, a líonadh. Tháinig deireadh le ré oifige i gcás triúr den Bhord, i mí na Marta, 2000. Tá áthas orm gur athcheapadh beirt acu, an Dr Patrick Connellan agus an Dr Edward Fitzgerald le haghaidh téarma eile arna n-ainmniú ag an Chomhairle Fiaclóra agus Dámh na Raideolaithe, faoi seach. D'éirigh ionadaí na Comhairle Leighis. An Dr James Carr as, tar éis trí bliana seirbhíse don Bhord agus ba mhaith liom buíochas a ghabháil leis, as a chuidiú fíorluachmhar d'obair an Bhoird agus as na cáilíochtaí pearsanta a thug sé chuig na díospóireachtaí. Fearaim fáilté roimh cheapachán an Dr William Blunnie mar ionadaí na Comhairle Leighis ar an mBord, in áit an Dr Carr.

Ba mhian liom a rá gur mór mo mheas ar dhúthracht agus ar shaineolas fhoireann na hInstitiúide, tréithe a léirítear seasta. Ba mhaith liom freisin buíochas a ghabháil le Baill an Bhoird as ucht a gcuid oibre ar son na hInstitiúide agus aitheantas a thabhairt d'obair na mball ar Choistí Comhairleacha na hInstitiúide, mar tugann siad a gcuid ama go deonach agus iad ag tacú le hobair na hInstitiúide.

Mar fhocal scoir ba mhaith liom buíochas na hInstitiúide a chur in iúl faoin tacaíocht a fuarthas ón Aire Fiontar Poiblí, Ms Mary O'Rourke, TD. Tá an Institiúid go mór faoi chomaoín ag an Aire Stáit ar a bhfuil freagracht faoi Shábháilteacht Núicléach, an tUasal Joe Jacob, TD, faoin spreagadh gníomhach a thug sé d'obair na hInstitiúide. Ní mór dom freisin aitheantas a thabhairt don chomhoibriú a fuarthas i gcónaí ó na feidhmeannaigh sa Roinn Fiontar Poiblí, i dteannta leis an gcabhair a fuarthas ó eagraíochtaí náisiúnta eile agus ó institiúidí oideachasúla triú leibhéal.

**Francis J Mulligan**  
*Cathaoirleach*

## members of the board

The membership of the Board during 1999 is set out below. In the case of six members, who were nominated by particular organisations for appointment to the Board, the names of their respective nominating organisations are given. The Board met nine times during the year, and the number of meetings attended by each member is also shown.

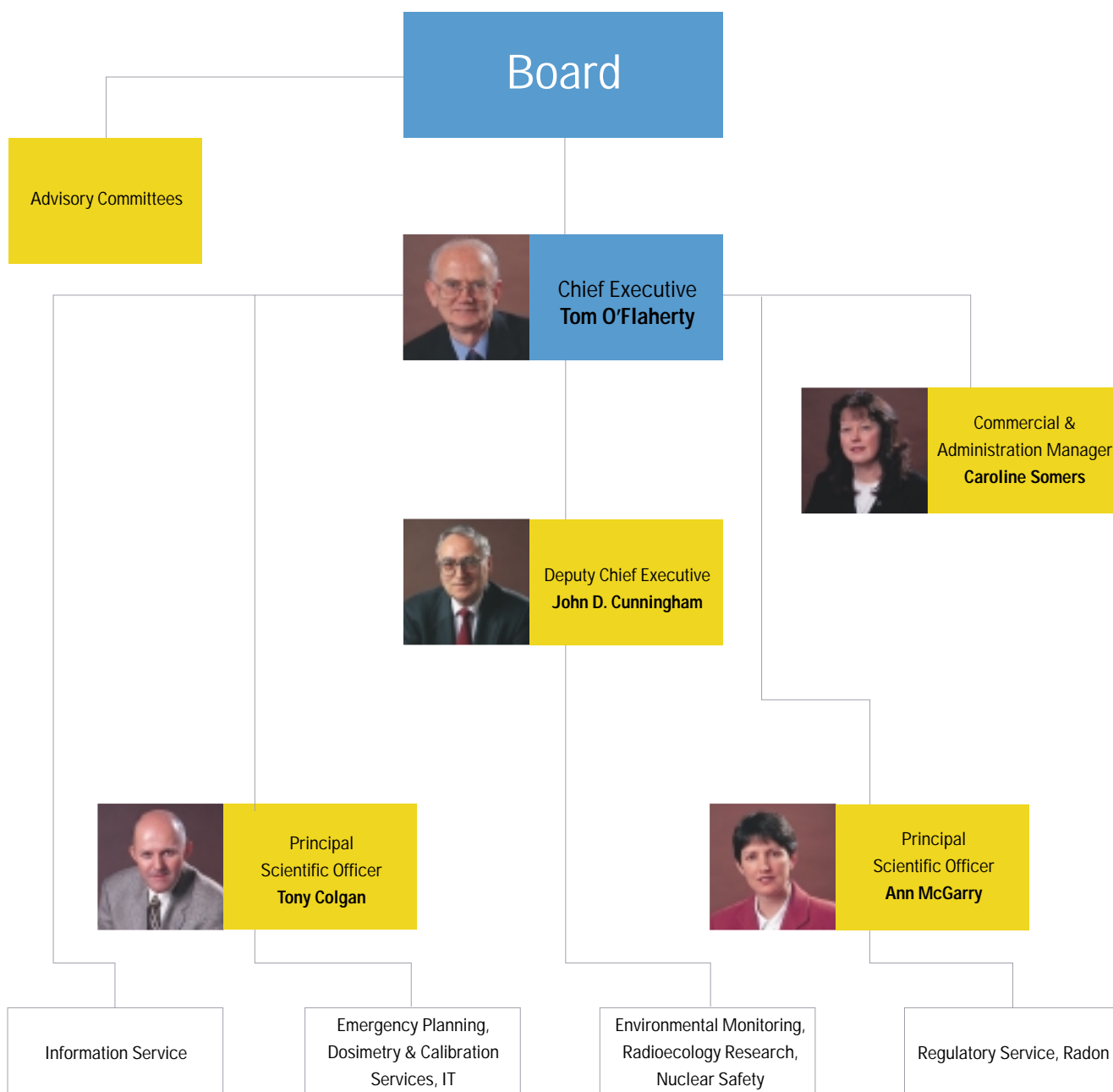
Dr Mary Upton ceased to be Chairman of the Institute on her election to Dáil Éireann on 28th October 1999.

On 22nd February 2000, the Minister for Public Enterprise appointed Dr Francis J Mulligan as Chairman of the Institute, and appointed Ms Mary Coffey to the Board. On 31st March Dr James Carr retired from the Board on the expiry of his term of appointment, and on 25th September Dr William Blunnie was appointed in his place, on the nomination of the Medical Council. Dr Patrick Connellan and Dr Edward Fitzgerald were re-appointed to the Board, following the expiry of their terms of appointment.

### Membership of the Board throughout 1999

Chairman	<b>Mary Upton</b> (to 28th October 1999)	7
	<b>Gregory Burke</b> Institute of Food Science and Technology of Ireland	8
	<b>James Carr</b> Medical Council	7
	<b>Patrick Connellan</b> Dental Council	7
	<b>George Duffy</b>	2
	<b>Edward Fitzgerald</b> Faculty of Radiologists RCSI	3
	<b>James Gibney</b>	8
	<b>Lesley Malone</b> Irish Nuclear Medicine Association	8
	<b>Darina Muckian</b>	9
	<b>Francis J Mulligan</b>	8
	<b>Geraldine O'Reilly</b> Association of Physical Scientists in Medicine	8
	<b>Adi Roche</b>	6

## staff structure



### Dr Noel V Nowlan

*The Institute learnt with deep regret of the death on 10th July, 2000, of Dr Noel V Nowlan, former Chief Executive of the Nuclear Energy Board, the predecessor organisation of the RPII. Dr Nowlan was Chief Executive from 1984 to 1990, a period of major developments in the organisation. At the request of the Board he generously agreed to defer his retirement in order to assist in laying the foundations for the new organisation, following the announcement in 1987 that a new Institute was to be established. After his retirement he remained active as a scientist and as a member of an Advisory Committee of the Institute until recent months. He will be sadly missed. Ar dheis Dé go raibh a anam.*



## objectives of the institute

### The Institute's principal objectives are:

- To provide advice to the Government, the Minister for Public Enterprise and other Ministers on matters relating to radiological safety.
- To provide information to the public on any matters relating to radiological safety which the Institute deems fit.
- To maintain and develop a national laboratory for the measurement of levels of radioactivity in the environment, and to assess the significance of these levels for the Irish population.
- To provide a personnel dosimetry and instrument calibration service for those who work with ionising radiation.
- To control by licence the custody, use, manufacture, importation, transportation, distribution, exportation and disposal of radioactive substances, irradiating apparatus and other sources of ionising radiation.
- To assist in the development of national plans for emergencies arising from nuclear accidents and to act in support of such plans.
- To provide a radioactivity measurement and certification service.
- To prepare codes and regulations for the safe use of ionising radiation.
- To carry out and promote research in relevant fields.
- To monitor developments abroad relating to nuclear installations and radiological safety generally, and to keep the Government informed of their implications for Ireland.
- To co-operate with the relevant authorities in other states and with appropriate international organisations.
- To represent the State on international bodies.
- To be the competent authority under international conventions on nuclear matters.

## main developments



### Sellafield

Public concern about safety at Sellafield intensified following the revelation that quality assurance data relating to the manufacture of fuel pellets in the MOX Demonstration Facility had been falsified. Following earlier representations, the Institute was given unprecedented access to documentation relating to the risk of a major accident to the tanks holding liquid high-level radioactive waste at the Sellafield site. These tanks have been identified as perhaps the most likely cause of an accident at Sellafield which could have significant effects on Ireland.

The Institute's scrutiny of this documentation took place in early 2000. While its findings did not substantially call into question estimates by the UK authorities of the probability of a major accident involving the tanks, they did identify a number of points of detail in which measures to further improve the safety of the tanks were possible.

### Radon in Dwellings

The Institute's work programme on radon in buildings developed significantly during 1999. A major landmark was the completion of the National Survey of Radon in Dwellings, in conjunction with the publication of the map "Radon in Irish Dwellings", categorising 10 km x 10 km grid squares over the whole country according to the percentage of dwellings in each grid square which are predicted to have radon concentrations greater than the national Reference Level of 200 becquerels per cubic metre (Bq/m<sup>3</sup>). In the course of the survey radon concentration was measured in 11 319 dwellings, and in 993, or 8.8%, of these the result was in excess of the Reference Level.

### Radon in Schools

In parallel with this, the Institute completed the first phase of its survey of radon in schools, which it has undertaken at the request of the Minister for Education and Science. Over three school years all the country's schools are to be tested for radon. In the first phase, completed in 1999, radon concentrations above the Reference Level were found in at least one classroom in 172 of the 685 schools in ten counties, mainly in the eastern part of the country, which the survey covered.

### Legislation

The Institute continued to collaborate with the Department of Public Enterprise in the preparation of a Ministerial Order to implement the 1996 Basic Safety Standards Directive. The 1996 Directive replaces Directives of 1980 and 1984, and its implementation involved substantial restructuring and extension of existing Irish legislation. Responses to a Consultation Document issued in April 1999 were given detailed consideration in finalising the new Order, which came into force on 13th May, 2000.

### Year 2000 Compliance

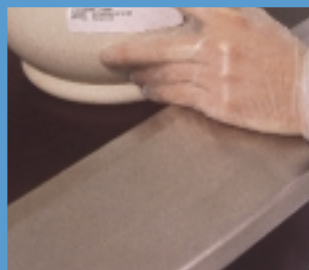
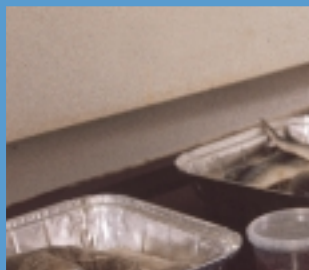
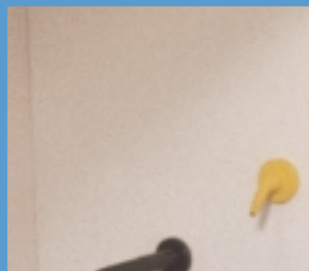
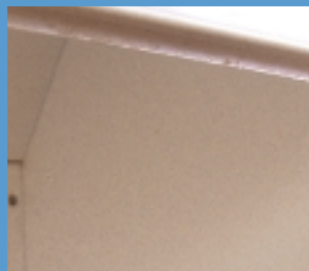
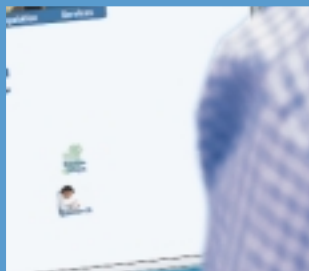
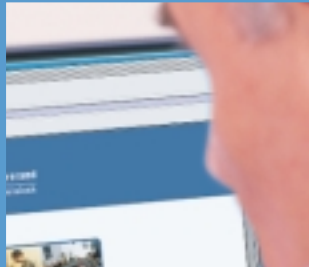
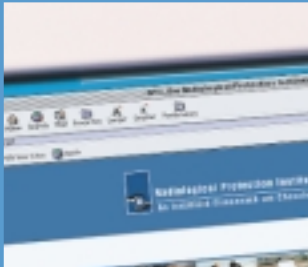
Considerable effort was devoted during 1999 to ensuring that all the Institute's computer systems would successfully handle the date change-over at the end of the year, and this proved to be the case. Staff were also on stand-by over the New Year period in case failure of safety systems in a nuclear installation abroad would pose a threat to this country, while the Regulatory Service monitored the compliance status of medical installations in which

date-related failures could have had the potential to compromise safety.

### Website

In accordance with the Institute's policy of striving for maximum effectiveness in the dissemination of information, the Institute established a presence on the Internet with the launch on 26th July by the Minister of State at the Department of Public Enterprise, Mr Joe Jacob, TD, of the Institute's website, which is at [www.rpii.ie](http://www.rpii.ie). It is hoped that the website will significantly enhance the services the Institute provides to its customers and to the general public.

**Tom O'Flaherty**  
*Chief Executive*



## staff and resources

### Staff

During 1999 new promotional posts were filled in both scientific and administrative grades. Sanction was received for the upgrading of three Scientific Officer posts to Senior Scientific Officer. In respect of administrative staff, implementation of the Programme for Competitiveness and Work led to the creation of a new Executive Officer post, a consequential promotion to Staff Officer, and the upgrading of two posts to Higher Clerical Officer.

In early 2000, in response to an application by the Institute for sanction for the provision of a career structure for Technicians, approval was obtained for the upgrading of two permanent technician posts to Senior Technician, one to take effect immediately and the other in 2001.

The Institute was pleased to accede to a request from RTÉ for the secondment of a member of the Institute's scientific staff, Mr Brian Cummins, to work as a television weather presenter.

### Equality

The Institute is committed to a policy of equal opportunity in all aspects of its activities. Particular attention is given to equality in recruitment, conditions of employment and access to promotion, training and career development. The Institute operates a number of schemes which provide staff with options in relation to meeting their career and personal needs, such as job-sharing, study leave, parental leave and career breaks.

### Participation Forum

The Institute's Participation Forum, established under the terms of the Worker Participation (State Enterprise) Act, 1988, provides a representative mechanism for consultation between staff at the various levels in the organisation about all matters, other than industrial relations issues, affecting the operation and effectiveness of the Institute.

### Safety, Health and Welfare

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

### Cur chun cinn na Gaeilge

Deineann an Institiúid iarracht an Ghaeilge a úsáid a mhéid is féidir. I bhfógraíocht, baintear úsáid go rialta as an leagan Gaeilge d'ainm na heagraíochta taobh leis an ainm Béarla. Chomh maith leis sin, glactar le beagnach gach cuireadh a thugtar chun bheith páirteach i gcláracha Gaeilge ar na meáin chumarsaíde.

### Information Technology

The upgrading of the Institute's IT facilities, initiated in mid-1997, was completed during 1999. The work

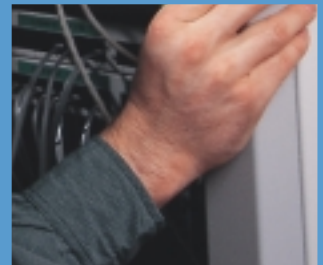
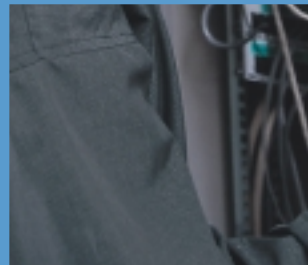
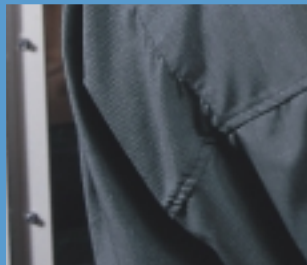
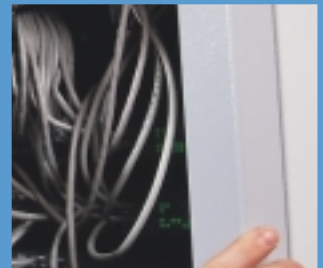
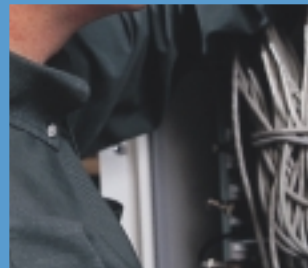
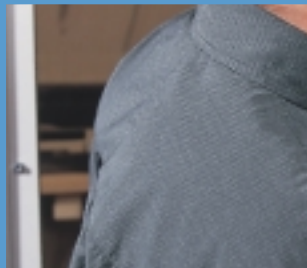
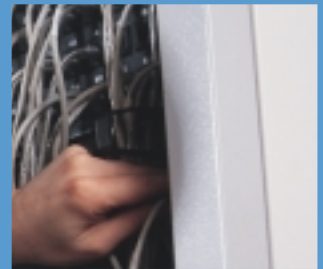
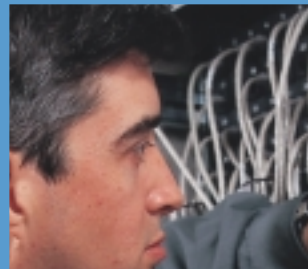
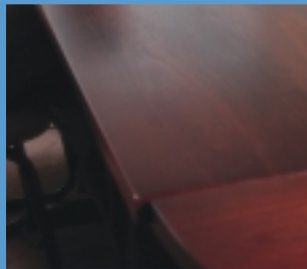
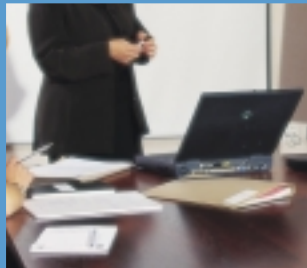
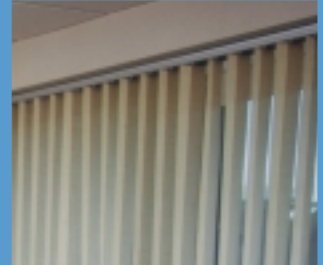
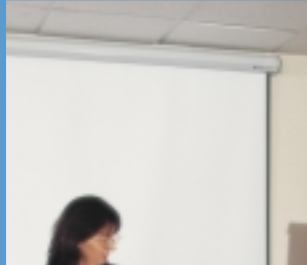
programme had three principal objectives: to standardise the use of operating systems, to upgrade all software applications and to identify and resolve any "Year 2000" compliance issues within the Institute.

The programme was directed by an in-house steering committee and an external consultant was employed to offer technical advice and to oversee the upgrading programme. All work was completed on time and without exceeding initial budgetary targets. It is particularly noteworthy that all computer systems operated correctly during the Millennium date change and no aspect of the Institute's operations or services was adversely affected.

Future work in the IT field will concentrate on ensuring that all operating systems are properly documented and on developing contingency plans for all computer systems. A programme of annual upgrading for hardware and software will also be put in place.

### Finance

The Institute's income in 1999 was £2.46 million, made up of grant-in-aid of £1.7 million and £0.76 million in earnings from dosimetry, product certification and other services, licence charges, and research and consultancy contracts. Capital expenditure, principally on information technology, including provision for Year 2000 compliance, and on equipment for monitoring of radioactivity in the environment, was £236,000. Income for the year exceeded expenditure by £46,000.





## environmental monitoring

The Institute continued its monitoring of radioactivity in foodstuffs and the environment in accordance with its statutory obligation to “monitor activity or ionising radiation levels in any thing in the State or in waters surrounding the State.” The monitoring programme includes both the terrestrial and marine environments and involves the sampling and analysis of a wide range of foodstuffs and environmental materials. The primary objectives are to assess the level of exposure of the Irish public to radioactivity and to measure its distribution in the environment.

The monitoring programme fulfils Ireland's obligations under Articles 35 and 36 of the Euratom Treaty which require each Member State of the European Union to carry out continuous monitoring of the levels of radioactivity in the environment and to send the data to the European Commission's Research Centre at Ispra, Italy, where a database is maintained of the radioactivity levels across the European Union.

The Institute's laboratory is the national centre for the measurement of radioactivity and most of its measurement procedures have been accredited by the Irish National Accreditation Board as meeting European Union and international standards. This is a requirement under European legislation for laboratories undertaking analyses of foodstuffs to ensure their safety for human consumption. During 1999, the laboratory added the measurements of carbon-14 in fish, shellfish and seaweed and of plutonium in sediments to its accredited procedures.

**Table 1: Radioactivity Testing on Environmental Samples and Foodstuffs, 1999**

Air	475
Beef	108
Lamb	68
Pork/Poultry	16
Drinking water	12
Fish and shellfish	198
Seawater, sediments and seaweed	114
Milk and dairy products	602
Miscellaneous	569
<b>Total</b>	<b>2162</b>

The results of all monitoring programmes are available in two series of reports published by the Institute and, in addition, marine monitoring results may be viewed on the Institute's website. The numbers and types of samples tested during 1999 are given in Table 1.

### Marine Environment

Radioactive contamination of the Irish marine environment is primarily caused by the discharge of radioactive effluents from the Sellafield reprocessing plant into the north-east Irish Sea. This has resulted in widespread contamination not only of the Irish Sea but also of the north-east Atlantic Ocean. Contamination from Sellafield's discharges has been clearly identified along the Norwegian coastline and even as far away as the Arctic Ocean. Whilst most of the radioactivity discharged was dispersed, some was deposited and remained in the bed of the Irish Sea, particularly in the muddy sediments near Sellafield. Remobilisation or release of radioactivity from these sediments is now contributing to the activity concentrations observed in the western Irish Sea.

The consumption of seafood remains the most important exposure pathway for the Irish public. Samples of cod, plaice, whiting, ray, herring, mackerel, prawns, oysters and mussels were regularly collected from major landing ports. Seawater, seaweed and sediment were also collected from coastline locations and from the western Irish Sea using the Marine Institute's research vessel, the Celtic Voyager. The sampling programme is carried out by Institute staff and by Fishery Quality Officers of the Department of the Marine and Natural Resources.

Particular vigilance is maintained on the levels of technetium-99 in fish and shellfish landed at Irish Sea ports and in the Irish Sea environment generally. The technetium-99 discharges from Sellafield peaked in 1995 when 190 terabecquerels (TBq) were released. The 1999 discharge was 50-60 TBq, similar to that of 1998. The highest seawater activity in 1999 was 28 millibecquerels per litre (mBq/l) compared with 38 mBq/l in 1998 and 65 mBq/l in 1997. The highest activity in seaweed was 850 becquerels per kilogram (Bq/kg) (wet) in 1999, lower than the value of 1675 Bq/kg (wet) recorded in 1998. The technetium-99 activities in seaweed from the south and west coasts were some 150 times lower than in those for the north-east coast. Concentrations in fish and shellfish continued to be very low.

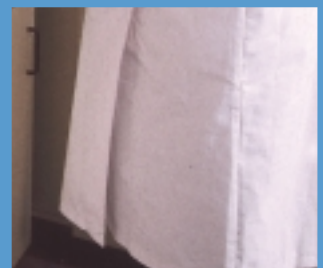
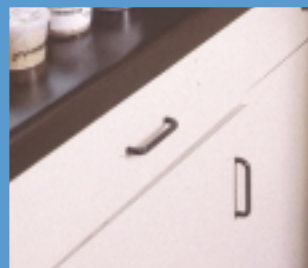
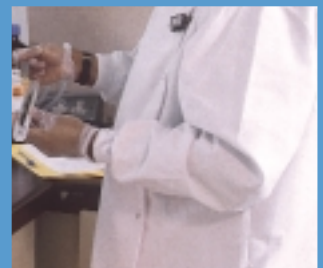
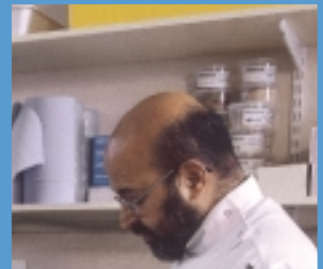
The dose to heavy consumers of seafood during 1999 due to artificial radionuclides was estimated to be similar to that in 1998, i.e. less than 2 microsieverts (µSv). The doses arising from recreational activities such as swimming, walking on beaches or fishing are smaller than this. The significance of these doses may be put into context by comparing them to the

annual dose to a member of the Irish public from all sources of radiation which can range from about 2000 µSv up to 20 000 µSv, or even higher in cases of exceptional exposure to radon gas. While radiation doses to Irish people resulting from the Sellafield discharges are clearly objectionable, they do not pose a significant health risk to people living in Ireland. The Institute advises that it is safe to continue eating fish and shellfish landed at Irish fishing ports and enjoying the amenities of the Irish Sea. However the Institute strongly takes the view that there is no justification for the continuing contamination of the Irish marine environment by discharges from Sellafield and that these discharges should be reduced in line with commitments made under the OSPAR Convention.

The United Kingdom Government revealed in 1997 that dumping of radioactive wastes at locations in the Irish Sea and other waters around the coast of the UK had taken place between 1957 and 1976. The materials dumped included sludges and packaged solid wastes. In response to this the Minister for the Marine and Natural Resources established a Task Force to examine and assess the impact of this dumping. Staff of the Institute participated in this Task Force which was chaired by Ms Nuala Butler, BL, and included expert scientists and key officials from the Department of the Marine and Natural Resources, the Department of Public Enterprise and the Marine Institute. As part of the study the Institute, in conjunction with the Department of Experimental Physics at UCD, carried out an assessment of the potential doses to members of the Irish population resulting from the dumping.

The Task Force, reporting its findings in December 1999, concluded that “the potential radiation arising from the material we know to have been dumped does not create a hazard to human health or to marine life.” While the Task Force did not feel that additional monitoring of the marine environment is specifically required, it “considers it important that the monitoring programme should be maintained at existing levels.”





### Terrestrial Environment

The Institute's terrestrial monitoring programme included the measurement of radioactivity levels in air, drinking water supplies, milk, dairy products, beef, sheepmeat, vegetation and miscellaneous other products as well as the in-vivo monitoring of sheep in certain upland areas. These programmes are carried out in conjunction with the Department of Agriculture, Food and Rural Development, Met Eireann, local authorities, health boards and commercial producers.

Continuous monitoring of air is undertaken at 10 locations of which 9 are equipped with low volume particulate samplers, one with a high volume particulate sampler and one with atmospheric krypton-85 measuring equipment. Drinking water supplies are sampled in accordance with a county based programme with emphasis being placed on testing supplies to certain major population centres annually.

Live sheep were monitored in a limited number of upland areas and local slaughterhouses. The areas include parts of the north-west, north-east and south of the country. The results showed that some sheep grazing these upland areas continue to have radiocaesium activity concentrations considered unsuitable for marketing. However before being slaughtered sheep are grazed on lower richer pastures where their activity concentrations decrease rapidly. Whilst some sheep grazing these upland areas showed activity concentrations in the

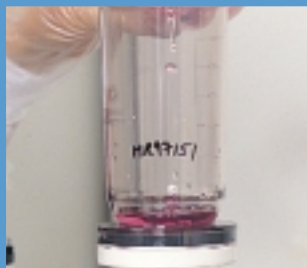
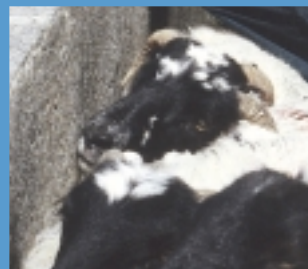
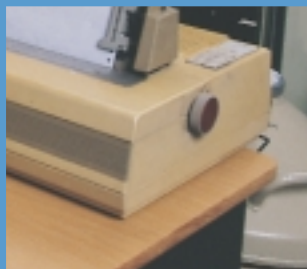
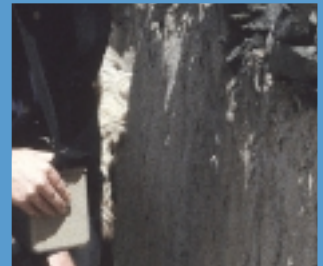
500-1000 Bq/kg range, activities were generally less than 100 Bq/kg, the lower level of detection, in sheep arriving for slaughter. The results show that regular consumption of sheepmeat does not constitute a significant health hazard.

The mean concentration of krypton-85 in air at Clonskeagh during 1999 was slightly above that recorded in previous years reflecting a small but continuing upward trend. Krypton-85 is released to the atmosphere almost exclusively as a result of the reprocessing of spent nuclear fuel at Sellafield, at La Hague in France and in Russia. The Institute will continue to monitor this trend in the light of the continued operation of the Magnox and Thorp reprocessing facilities at Sellafield. The doses due to krypton-85 are very small and do not represent a health hazard.

The monitoring programmes continue to demonstrate that the levels of radioactivity in air, foodstuffs and the terrestrial environment are low and do not give rise to any significant health risks to the population. Activity concentrations are, in general, indistinguishable from global levels.

### Radioactivity in export products

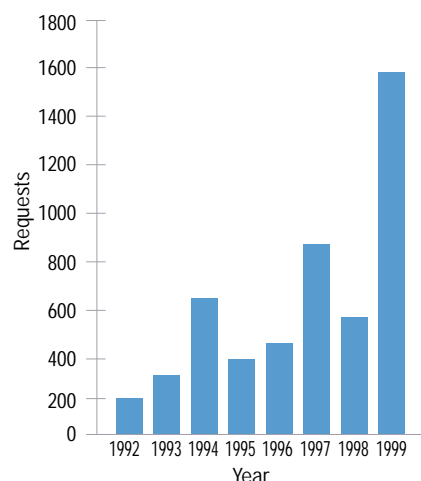
The Institute continued its testing and certification services to exporters of Irish food products and other goods. In 1999, the Institute issued 5810 certificates compared to 4862 in 1998, 5815 in 1997 and 4767 in 1996.



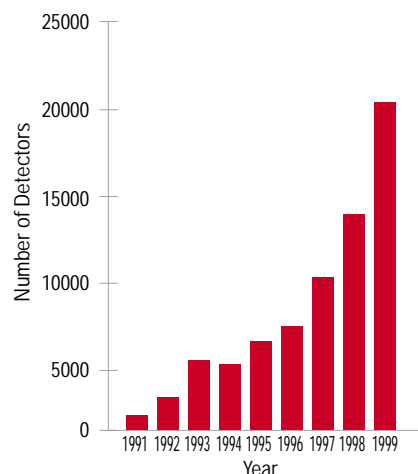


## radon

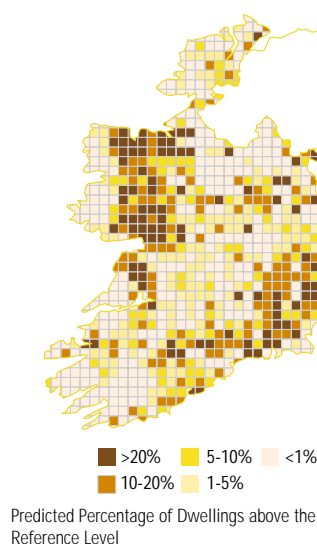
**Figure 1: Number of Requests for Radon Measurement**



**Figure 2: Number of Radon Detectors Issued, 1991 to 1999**



**Figure 3: Radon in Irish Dwellings**



Demand for the Institute's radon measurement service continued to grow strongly during 1999, with the total number of requests processed reaching three times the figure in 1998 (Figure 1). These requests contributed to the overall increase in the number of detectors issued which, for the first time, exceeded 20 000 (Figure 2). This figure represents an increase of more than 7000 over the number of detectors issued during 1998.

There were a number of significant developments in the Institute's radon programme during 1999. These included the completion of the National Survey of Radon in Dwellings, the publication of the "Radon in Irish Dwellings" map covering the whole country (Figure 3) and the completion of Phase I of the Radon in Schools Survey. Other important events included the Institute's involvement in the drafting of legislation to implement the Basic Safety Standards Directive and its collaboration with FÁS, the Training and Employment Authority, in the development of a training programme for agencies involved in radon prevention and remediation.

The increased demand for radon measurements is tangible evidence of a significant growth in public awareness of radon. This increase in awareness, together with initiatives such as the FÁS training programme in radon prevention and remediation, are positive indicators that an overall reduction in the dose to the Irish population from radon can be achieved. The Institute is concerned, however, that the number of householders actually undertaking remedial work to reduce high radon levels remains small. It is hoped that the recently announced radon remediation grant scheme will bring about a significant improvement in this position.

### National Survey of Radon in Dwellings

The National Survey of Radon in Dwellings was completed in 1999. The final report covering counties Galway and Mayo, together with the completed edition of the Radon in Irish Dwellings map, was published in July.

The aim of the survey, which began in 1992, was to identify those regions of the country where elevated radon levels are more prevalent. Invitations to participate in free radon measurements were sent to approximately 53 000 householders across the country. Typical participation responses ranged from 17% to 35% for individual counties and valid radon measurements were completed in a total of 11 319 dwellings. This figure represents a countrywide sampling rate of one in every 93 houses.

Measurements were carried out for a twelve-month period in a random selection of houses in each 10 km x 10 km grid square throughout the country.

The results were used to predict the percentage of houses in each grid square in which the radon concentration exceeds the Reference Level. Grid squares where this prediction is greater than 10% are designated High Radon Areas. The data were used to produce individual radon maps for each county and a national map entitled "Radon in Irish Dwellings". For grid squares in which fewer than five measurements were obtained, a smoothing algorithm using data in neighbouring squares was developed and a grid square prediction made using the interpolated results.

A summary of the radon measurement results for each county is presented in Table 2. A total of 993, or 8.8% of the dwellings surveyed had radon concentrations in excess of the Reference Level of 200 Bq/m<sup>3</sup>.

Since June 1999 individual radon maps for all 26 counties have been available on the Institute's website as a service to engineers, architects and members of the public who wish to know the radon designation of the site where they are planning to build.

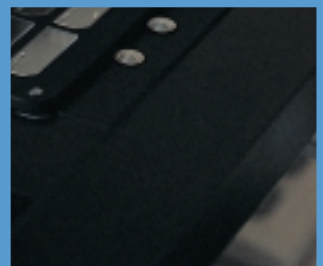
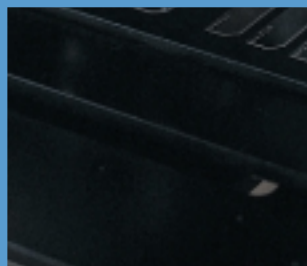
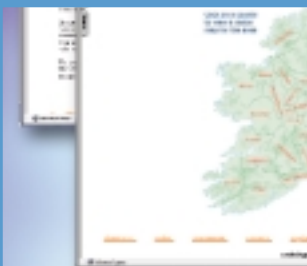
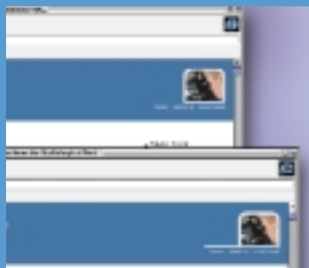
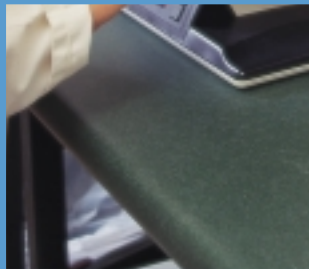
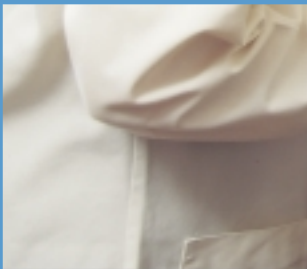
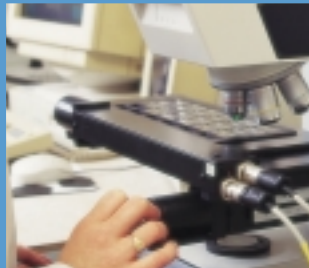
### Radon Measurement Service

The Institute provides a radon measurement service to members of the public who wish to have the radon levels measured in their houses. During the year, the Institute carried out 1554 such measurements. A large number of requests for measurement were received following the Institute's participation in the Ideal Homes Exhibition in Salthill, Galway in September. The exhibition ran over four days and staff from the Radon Department were on hand to provide general information on radon and to offer advice to householders whose houses had already been shown to have high radon levels.

### Radon in Schools

In 1998, the Minister for Education and Science commissioned the Institute to carry out a survey of radon levels in all primary and post-primary schools throughout Ireland. The survey, which is being conducted over three school years, will measure radon levels in 4000 schools.

Phase I of the survey covers 977 schools in counties Carlow, Cavan, Kildare, Kilkenny, Louth, Meath, Monaghan, Westmeath, Wexford and Wicklow. At the start of the 1998-99 school year, 8800 detectors were issued to the 772 schools who had agreed to participate in the survey. A total of 685 schools returned detectors to the Institute, representing an overall participation rate of 70% of the schools invited to participate in the survey. Schools which failed to participate in this phase of the survey are being given a further opportunity to participate in a later phase.



**Table 2: Results of the National Survey of Radon in Dwellings**

County	No. of Dwellings Measured	No. >200 Bq/m <sup>3</sup> (% of dwellings measured)	Mean (Bq/m <sup>3</sup> )	Max (Bq/m <sup>3</sup> )
Carlow	194	30 (15%)	123	1562
Cavan	180	5 (3%)	67	780
Clare	742	66 (9%)	88	1489
Cork	1211	71 (6%)	76	1502
Donegal	487	18 (4%)	69	512
Dublin	155	6 (4%)	73	260
Galway	1213	181 (15%)	112	1881
Kerry	932	52 (6%)	70	1924
Kildare	480	29 (6%)	90	1114
Kilkenny	181	16 (9%)	100	717
Laois	334	17 (5%)	83	565
Leitrim	145	6 (5%)	60	433
Limerick	524	41 (8%)	77	1102
Longford	132	8 (6%)	75	450
Louth	124	14 (11%)	112	751
Mayo	1184	152 (13%)	100	1214
Meath	233	18 (8%)	102	671
Monaghan	120	4 (3%)	68	365
Offaly	286	7 (2%)	68	495
Roscommon	235	17 (7%)	91	1387
Sligo	270	54 (20%)	145	969
Tipperary	852	63 (7%)	79	1318
Waterford	162	20 (12%)	119	1359
Westmeath	289	20 (7%)	91	699
Wexford	469	54 (12%)	99	1124
Wicklow	185	24 (13%)	131	1032

The Reference Level for schools is 200 Bq/m<sup>3</sup> averaged over the school year. In 172 schools, one or more of the rooms tested had a radon concentration above the Reference Level. In the remaining 513 schools, all of the results were below 200 Bq/m<sup>3</sup>. The highest radon level measured was 2688 Bq/m<sup>3</sup>. The results of all school measurements were forwarded to the Department of Education and Science who have put in place a programme of remedial measures for those schools with radon concentrations in excess of the Reference Level. Table 3 summarises the results of Phase I of the Radon in Schools Survey.

**Table 3: Results of Phase I of the Radon in Schools Survey**

County	Number of Schools Measured	Number of schools with radon levels > 200 Bq/m <sup>3</sup>
Carlow	42	17
Cavan	61	5
Kildare	82	15
Kilkenny	63	21
Louth	61	14
Meath	91	21
Monaghan	60	6
Westmeath	59	13
Wexford	82	25
Wicklow	84	35
<b>Total</b>	<b>685</b>	<b>172</b>

Phase II of the survey began in April 1999 with invitations to participate in the survey being sent to schools in counties Donegal, Dublin, Laois, Leitrim, Longford, Mayo, Offaly, Roscommon and Sligo. Invitations were issued to a total of 1520 primary and post-primary schools, with 85% of the schools agreeing to participate. A total of 17 465 detectors were sent to these schools during September and October to coincide with the start of the school year. The detectors were to remain in place for the duration of the 1999/2000 school year.

#### Radon in Workplaces

In conjunction with the Department of Public Enterprise, work on the drafting of legislation to implement the new Basic Safety Standards Directive was continued throughout 1999. This legislation, which came into force in May 2000, sets a Reference Level for exposure to radon in the workplace of 400 Bq/m<sup>3</sup>, averaged over a minimum period of three months. Under the legislation, the Institute can direct an employer to carry out a survey of the radon levels in his/her workplace. Where the result of the survey shows that the radon level exceeds the Reference Level, then the employer must consider implementing remedial measures to reduce the radon level. If such measures are unsuccessful or impractical, a system of radiation protection must be introduced in the workplace to ensure that exposure of workers and members of the public is kept to a minimum.

Following studies of radon levels in Irish show caves undertaken in the early 1990s, the Institute has been

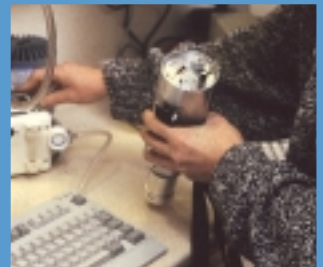
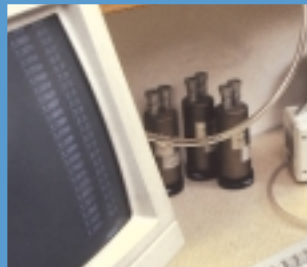
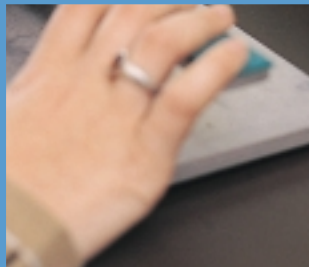
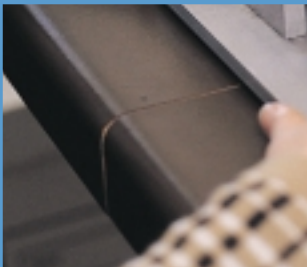
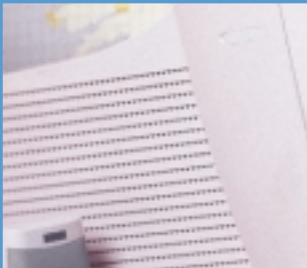
conducting personnel monitoring of show cave guides since 1995. During the 1999 operating season, a total of 27 staff employed in the four show caves were monitored. The annual radiation doses to individual staff members ranged from about 10 µSv up to 8000 µSv.

During 1999, area-based radon measurements were conducted in a limited number of above-ground workplaces at the request of the employer. Three of the 24 workplaces surveyed were found to have radon concentrations in excess of 400 Bq/m<sup>3</sup>. In these cases, the Institute advised that remedial measures be considered in line with the proposed legislation to implement the Basic Safety Standards Directive.

#### Training Programme in Radon Prevention and Remediation

The Institute contributed to the development by FÁS, the Training and Employment Authority, of a training programme on radon prevention and remediation. The programme, which comprises a series of fourteen training modules, is aimed at local authorities and private sector companies involved in radon prevention and remediation. Throughout the programme, participants undergo both written and practical assessments with a view to establishing competence. On successful completion of the required assessments, each participant is awarded a certificate. The programme was piloted by Roscommon County Council at a three-day course held in Athlone in November.





## emergency planning

### Decision Support Tool

Since the nuclear accident at Chernobyl in 1986, emergency preparedness has received high priority in many countries. Emergency management tools have been developed and are being continuously improved. Such tools facilitate the assessment of the consequences of any radioactive release into the environment and support decision-makers in their evaluation of the need to implement various countermeasures for the protection of the public.

Under the National Emergency Plan for Nuclear Accidents, the Institute has responsibility for the technical assessment of the potential or actual consequences of a nuclear accident and for recommending what measures should be taken to minimise the radiation exposure of members of the public. To assist it in this role, the Institute has adopted a decision support tool called ARGOS (Accident Reporting and Guiding Operational System), developed by the Danish Emergency Management Agency. The system provides a prediction of the trajectory of a release of radioactivity to the environment and predictions of both the contamination levels and radiation doses along its path. Graphical displays of the various contamination and radiation dose patterns across the country are also provided. The system will also be of great benefit in providing assessments of the consequences that could result from various nuclear release scenarios and as an educational/training tool for emergency preparedness.

### Exercises

Throughout the year routine tests were carried out on the international early warning systems that are in place for the notification of any radiological accident which may affect Ireland. These tests were aimed at

checking that the emergency contact names and addresses are up-to-date, the communication links are operational and that the competent authorities can be rapidly informed should an accident occur. All tests were completed successfully.

In co-operation with the Garda Communications Centre, the call-out procedures for the Emergency Response Co-ordination Committee (ERCC) were successfully exercised. These procedures involve the Gardai contacting each ERCC member by telephone, after which he/she must proceed as quickly as possible to the Institute's premises in Clonskeagh.

In January, representatives of the Institute attended as observers at the NI Emergency Centre in Belfast during the UK nuclear emergency exercise "Best Endeavours". Some interesting operational aspects in the management of the emergency were noted, particularly in the area of media and public relations.

In November, the Institute participated in a joint marine exercise with the Irish Coast Guard (ICG), the UK Coast Guard and British Nuclear Fuels plc (BNFL). The exercise took place while a BNFL ship was passing through the Irish Sea on a return trip to the UK from Japan. While no radioactive material was on board, for the purposes of the exercise it was assumed that the ship was transporting spent nuclear fuel. The exercise scenario centred on a request to the ICG to airlift an "injured" crew member to a hospital in Ireland. The role of the Institute was to advise the ICG with regard to any radiological safety aspects of the incident. Simulated media involvement was included in the exercise. The Institute also dealt with several inquiries on the exercise from the national and local media.

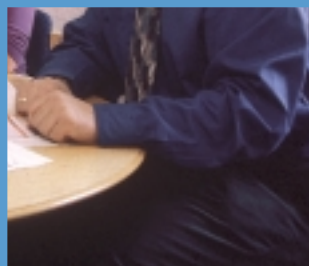
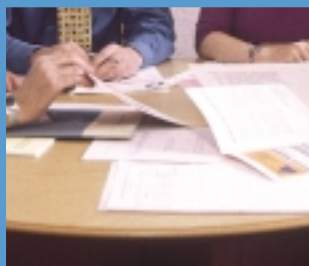
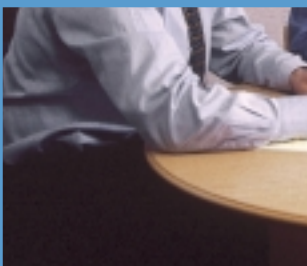
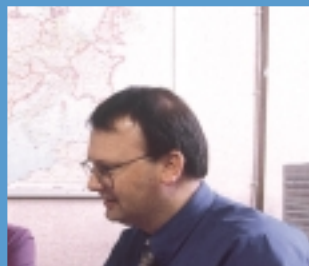
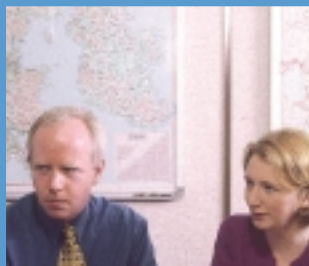
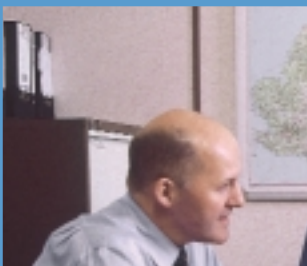
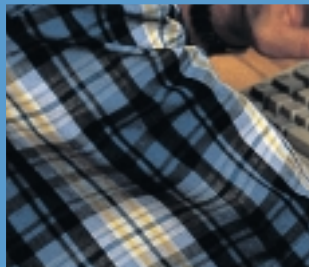
### Monitoring Systems

During the year the Institute published a pamphlet entitled "National Radiation Monitoring Systems for Nuclear Emergencies". This pamphlet outlines the type and locations of systems that are operating continuously for the detection and measurement of radioactivity across the country. These are:

- the gamma dose rate monitoring system
- the air sampling system
- the rainwater collection system.

These systems have been in operation since the late 1980s and are an essential component in the assessment of the effects of any nuclear accident that would result in radioactive contamination of the country. Over the intervening years the number of monitoring sites has increased and major improvements, particularly in the area of computer software used for data handling, have taken place.

At the international level, the Institute routinely exchanges summarised national gamma dose rate readings with both EU and non-EU States. The programme is co-ordinated and managed by the EU Joint Research Centre at Ispra in Italy.





## regulatory service

The Institute's licensing system is designed to ensure that all activities involving the use of ionising radiation are carried out in a safe manner and that all radiation sources which are not in use are stored safely and securely. During 1999, the principal activities of the Regulatory Service continued to centre on the licensing system. These activities include the issuing of new licences, renewal of existing licences, inspection of licensees and the provision of advice to licensees on the interpretation of legislative requirements.

In addition to these activities, the Regulatory Service was also involved during 1999 in the drafting of new legislation governing the uses of ionising radiation and in Y2K compliance issues. In September, a new software system developed specifically for the Regulatory Service was installed.

### Licensing and Inspection

The number of licence holders at the end of 1999 was 1264 compared with a total of 1261 at the end of 1998. During the year, 20 new licences were issued, while 17 of the existing licenses lapsed due to cessation of the work involving ionising radiation. One hundred and thirty two inspections of licensees were carried out. The breakdown of licences and inspections by licence category is given in Table 4.

**Table 4: Licence Categories and Inspections, 1999**

Category	Licences	Inspections
Dental Surgeons	723	6
Hospitals	102	24
Veterinary Surgeons	114	3
Industrial Gauges	89	39
Laboratory Instruments	82	11
Distributors	55	6
Research Laboratories	27	5
Industrial Radiography	22	12
Lightning Preventors	14	4
Static Controllers	8	0
Process Irradiation Facilities	3	3
Chiropractors	5	5
Miscellaneous	20	14
<b>TOTAL</b>	<b>1264</b>	<b>132</b>

### Incidents

During 1999, four incidents occurred which required the intervention of the Regulatory Service.

The first incident occurred in the early part of the year when a package containing a radioactive source was

shipped to France by a licensee without the proper labelling or dangerous goods documentation. In the absence of labels or documentation, the carrier and other personnel handling the package would not have been aware of any potential hazard associated with the package. The company was clearly in breach of the condition of its licence requiring it to comply with international regulations governing the transport of radioactive materials. The staff involved were also in breach of their own Radiation Safety Procedures which detail the measures to be taken to prevent accidental exposure. Following an inspection by the Institute, the company undertook a full review of its procedures regarding the transport of radioactive materials. This resulted in the introduction of new procedures aimed at preventing a similar type of incident.

In the second incident, radioactive material was detected in a consignment of scrap metal entering a steel manufacturing plant in Co. Cork. The consignment comprised about 190 disused mortar stands owned by the Department of Defence which were to be discarded. On examination, the radioactive material was identified as radium-226 which was contained in the sight indicators on each of the stands. The sight indicators were removed from the mortar stands and returned to the Department of Defence. The sight indicators are now in secure storage and the Department of Defence's licence has been amended to include these additional sources.

In March 1999, the Institute was informed that construction work being carried out adjacent to a hospital X-ray room had resulted in damage to the integrity of the shielding of the room. The radiography staff closed the room pending further instruction from the Institute. Given the degree of damage, the Institute could not allow the X-ray room to be used until it had received a report from the hospital's Radiological Protection Advisor (RPA) confirming that the necessary shielding had been refitted. This report was received some months later and the X-ray room is now in full use. It is a condition of all licences issued to hospitals that building work which is carried out in or adjacent to X-ray rooms be subject to the approval of the hospital's Radiation Safety Committee and the RPA. In this case, the necessary prior approval was not sought resulting in the X-ray room being out of service for some months.

The final incident took place in November 1999 when the Institute was notified of the loss of a package containing radioactive material at Dublin Airport. The package comprised four transport pots each containing a small vial of phosphorus-33. Following an

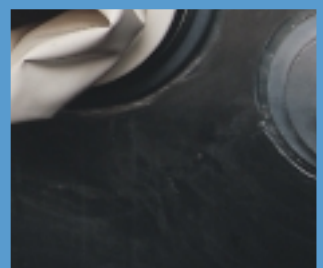
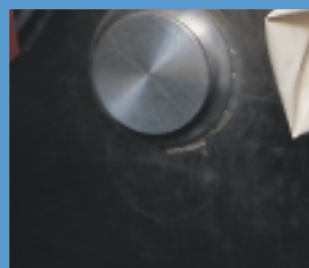
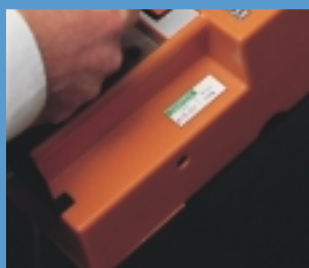
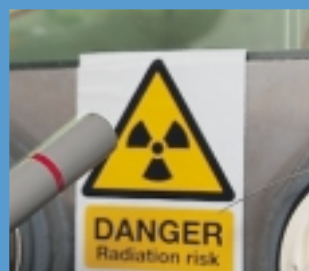
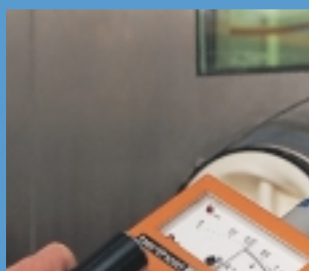
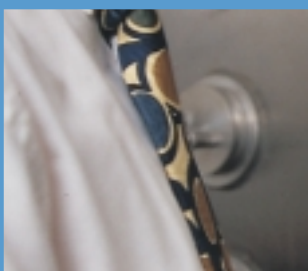
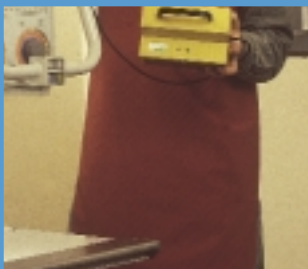
investigation by airport personnel and an Institute inspector, it transpired that the package had fallen off a freight bin en route from the aircraft to the cargo terminal and been damaged by a vehicle. Two of the transport pots were located the next morning with their vials intact. Some internal packaging and the remains of a broken transport pot lid were also discovered. A third vial, also intact, was located three days later. The fourth vial was never found. Fortunately, although the radioactivity content of all four vials taken together was licensable, the activity of phosphorus-33 in a single vial was not radiologically significant. The company involved was ordered to review its procedures for transporting radioactive materials within the airport and to ensure that all relevant staff were made aware of these procedures.

### Prosecutions

In March 1999, a third-level college was successfully prosecuted for the unlicensed custody of a nuclear device containing 3.7 gigabecquerels (GBq) of caesium-137. The prosecution was brought following the college's failure to comply with a number of shortcomings identified during a routine inspection in 1998. The college was fined and ordered to pay costs.

In November 1999, a successful prosecution was brought against a company for the unlicensed distribution of a thickness gauge containing 1.85 megabecquerels (MBq) of thallium-204. Due to the infrequent sale of such gauges by the company, it had previously been allowed by the Institute to apply for a short-term licence as required. However, during an inspection, it came to light that the company had distributed a source without the necessary licence. The company was fined and ordered to pay costs.

During the year, prosecutions were brought against three different companies for the unlicensed custody of equipment containing radioactive sources. The equipment included a disused density gauge containing 3.7 GBq of caesium-137, a gamma backscatter gauge containing 940 MBq of americium-241 and five disused static controllers each containing between 7 and 31 MBq of polonium-210. In the case of two of the companies, the prosecution resulted from failure by the company to renew its licence. In the third case, the equipment had never been licensed. All three prosecutions were successful and in each case the company was fined and ordered to pay costs.



### Radioactive Waste

Throughout 1999, the Regulatory Service continued to encourage licensees with disused sealed radioactive sources to return these to the supplier in the country of origin. One initiative in this area, which was facilitated by the Regulatory Service, resulted in approximately 200 disused sources being returned to the UK for disposal.

Progress was made during the year on the plans to develop a national facility for the storage of radioactive waste. The Institute, at the request of the Department of Public Enterprise, has developed a prototype design. The next phase will involve the identification of a suitable location for the siting of the facility.

In the early part of the year, the Regulatory Service was involved in an investigation of the burial of waste at a north Dublin location during the 1970s. The waste had arisen from the use of unsealed radioactive materials for teaching and research purposes at a Dublin university. A review of the Institute's archives relating to the period and a survey of the current condition of the site were carried out. The investigation concluded that burial of the waste did not cause a radiological hazard.

### New Legislation

The Regulatory Service continued to be involved in the drafting of legislation to implement the new Basic Safety Standards Directive, particularly with regard to those sections of the Directive which will impact on licensees. The preparation of guidance documents to assist licensees in the interpretation of the legislation was also commenced.

The Regulatory Service was also active in liaising with other national and professional bodies regarding the implementation of a second EU Directive dealing with the protection of persons undergoing medical exposure.

The Regulatory Service was also involved during 1999 in the preparation of new transport regulations pursuant to the Carriage of Dangerous Goods by Road Act, 1998.

### Year 2000 Compliance

Following the initial contact with licensees on the issue of Year 2000 compliance in 1998, the Regulatory Service continued to monitor the situation during 1999. In line with international recommendations, particular attention was given to ensuring that Year 2000 related problems would not impact adversely on the safe use of sources of ionising radiation in radiotherapy and nuclear medicine imaging facilities. There were no reported incidents of any radiological significance resulting from the date change.

### Lectures, Presentations & Scientific Visits

During the year, staff of the Regulatory Service gave seven presentations on various aspects of the regulations governing the use of ionising radiation in Ireland. As in previous years, staff addressed the Radiological Protection Course at NUI Galway as well as the Diploma in Safety, Health and Welfare at Work course (Occupational Hygiene) at University College Dublin. Two of the participants taking the diploma course subsequently accompanied Regulatory Service staff undertaking inspections as part of a course placement.

A presentation was given to the Higher Diploma in Occupational Health organised by the Department of Public Health Medicine & Epidemiology at University College Dublin. A presentation on radiological protection in dental radiography was made to the course in Vocational Training in Dentistry organised by the Post-Graduate Medical and Dental Board. A presentation on radioactive waste in medical institutions in Ireland was made to a seminar organised by the European Commission.

Presentations on the regulations governing the use of ionising radiation in Ireland were given to non-radiology hospital doctors in Cork University Hospital and also to users of radioactive materials at Trinity College Dublin.

These presentations provide the Regulatory Service with excellent opportunities to communicate with a wide range of users of ionising radiation in industry, medicine and education and also with safety officers and other personnel who, while not directly involved with the use of such sources, require a basic knowledge of the principles of radiological protection.

During the year, the Regulatory Service was pleased to accept two visitors from Syria and Lithuania who were awarded placements with the Institute under the Technical Co-operation Programme of the International Atomic Energy Agency.



## personnel dosimetry/instrument calibration

The Institute provides a comprehensive range of personnel dosimetry services for assessing occupational exposure to ionising radiation. The dosimeter types available include whole-body dosimeters capable of determining the dose from X- or gamma rays, beta rays or neutrons, and extremity dosimeters that measure the dose from X-, gamma or beta rays. During 1999 approximately 59 000 whole-body thermoluminescent dosimeters, 3600 extremity dosimeters and 750 neutron dosimeters were issued. The number of workers monitored exceeded 6000.

The highest annual whole-body dose recorded in 1999 was 8.4 millisieverts (mSv) received by an industrial radiographer. A further 10 industrial radiographers received annual radiation doses in excess of 2 mSv. These doses compare with the legal dose limit for a radiation worker of 20 mSv.

Personnel undertaking research and working in the cardiology, radiotherapy and nuclear medicine departments of hospitals recorded measurable extremity doses. A hospital physicist working with unsealed sources recorded the highest annual extremity dose of 107.2 mSv, which compares with the legal limit for extremity doses of 500 mSv.

### Instrument Calibration Service

The Institute offers a calibration service for ionising radiation dose/dose-rate meters used to measure ambient radiation intensity, surface contamination

monitors and personal monitors/alarms used to give a direct reading of radiation dose. In 1999, 316 instruments were tested, of which 12 failed to meet the manufacturer's specification.

Licensees holding sealed radioactive sources are required to have them tested every two years for leakage. Testing is carried out by wiping the source or source housing and analysing the radioactivity content of the wipe. In 1999 a total of 644 sources were checked, which represents a 45% increase over 1998. None of the wipes contained greater than the allowable quantity of radioactivity specified in licence conditions.

The Institute's Calibration Laboratory was one of 19 participants in the 3rd Intercomparison of Calibrations of Portable Gamma-Ray Dose-rate Monitors (1998-1999) organised by the National Physical Laboratory in the UK. All results and their associated errors calculated by the Institute agreed with the true values established by the organisers of the intercomparison. The successful participation in this international intercomparison exercise complements the laboratory's accreditation awarded in 1998 by the Irish National Accreditation Board.

## research programmes

### Terrestrial Radioecology

Two international research projects were successfully completed in 1999. Dealing with ecosystem modelling and restoration strategies, they commenced in 1996 and were part funded under the European Union Fourth Framework Research Programme. These projects provided improved understanding of the long-term impacts of radioactive contamination and the results will assist in the application of countermeasures following a nuclear accident.

The first of the two projects, SEMINAT, aimed to achieve a fuller understanding of the long-term behaviour of radiocaesium in semi-natural environments such as forests and rough grazing meadows. The characteristics of these environments mean that after radioactive contamination they could make a significant contribution to the long-term exposure of man. The project achieved considerable insight into specific factors that control the long-term transfer of radionuclides from these environments into the foodchain and those factors that cause this behaviour to vary both between sites and with time. An important product of this project is a suite of dynamic models for predicting the long-term behaviour of radiocaesium in forests and peatland meadows. These models were calibrated using data collected in Irish sites and so are directly applicable to the Irish situation.

The aim of the second project, TEMAS, was to provide a decision support system, for use following a nuclear accident, that will assist in the selection of appropriate remediation actions for agricultural, urban and semi-natural environments. Selection of appropriate remediation actions involves analysis of the suitability of various actions to a given site and the benefits of the actions in terms of reduction of radiation dose to man. These factors must then be weighed against the costs of applying the remediation, and any side or secondary effects that

may result from the remediation. The role of the Institute in this project was to identify and evaluate the secondary effects associated with a range of remediation actions that were applicable to agricultural land. The project achieved its objectives and produced a decision support system that is based on the best available knowledge of practical and technical aspects of remediation strategies, balanced with consideration of economic, social and ecological factors. This comprehensive assessment represents a considerable advance on existing approaches to remediation strategy development.

Work continued in 1999 on a third project, FORECO, also part funded by the European Commission. In collaboration with partners from Germany, Italy, Belarus, Ukraine and Russia remediation options specifically appropriate for forests are being classified with regard to the specific situations that prevail in Eastern European countries. A system is being developed to rank these options in terms of their effectiveness in reducing dose to man, the costs associated with their application and the ecological and social secondary effects that they cause. These elements will form the basis of a decision support system, similar to, but less complex than, the TEMAS system described above, which is appropriate to the environmental and unique social and economic needs of Eastern Europe. The system will consider the close economic, social and cultural links that exist in these countries between the forest environment and the inhabitants of small rural communities. This work relies heavily on local knowledge of the forest communities and on expert judgement of the remediation options and their potential impacts. This information is being supplemented with targeted field studies in Belarus, Russia and the Ukraine of remediation effectiveness and their secondary impacts.

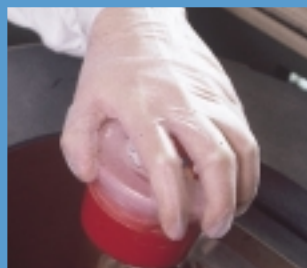
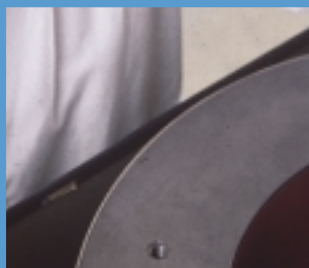
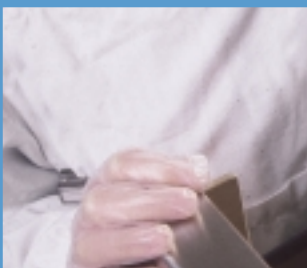
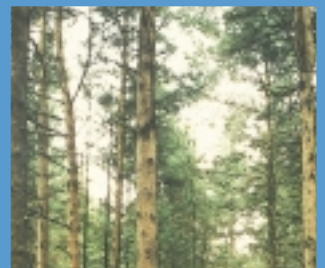
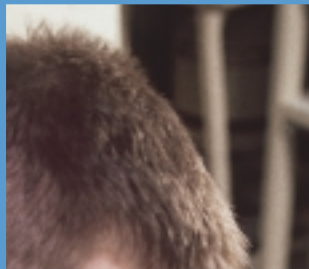
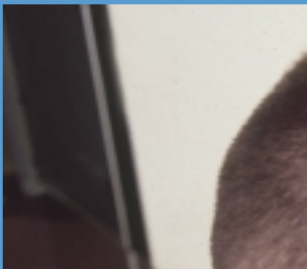
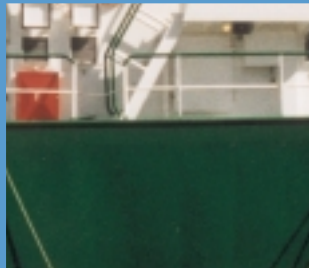
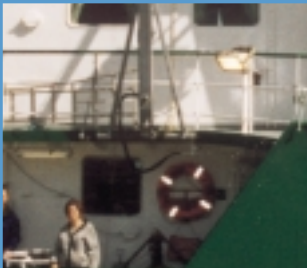
A new research project was initiated in 1999, which is funded under the European Union Special Support Programme for Peace and Reconciliation in Northern

Ireland. In co-operation with the Department of Agriculture, Northern Ireland (DANI) the Institute will investigate effectiveness and environmental impacts of the field application of ammonium-ferric-hexacyano-ferrate (AFCF). ACFF is a compound that binds with radiocaesium and prevents its transfer from soil to vegetation and then to grazing animals. Field studies will be conducted in peatland sites in counties Cavan and Antrim and will be complemented by experiments at the DANI laboratories.

### Marine Radioecology

The international research project, ARMARA, was completed in 1999. Thirteen European laboratories from nine European countries were involved in the project which was partially funded by the European Commission under the European Union Fourth Framework Research Programme. The project focused on modelling the key processes which control radionuclide behaviour in the marine environment with the Institute investigating the transfer from contaminated sediments into the food chain. Over the course of the project, the Institute participated in three sampling expeditions in the Irish Sea and one off the coast of Greenland in the Arctic.

Of particular interest were the Institute's studies on the availability of plutonium for transfer into sediment dwelling invertebrates. Measurements made in samples from the Irish Sea and the Arctic region showed that this transfer was very low. Furthermore, plutonium and americium activity determinations in species such as plaice which feed on the sediment dwelling invertebrates demonstrate that the transfer to predator species is also characterised by very low transfer ratios. The dose due to plutonium and americium to a typical Irish consumer of fish from the Irish Sea was determined to be less than 0.1 microsieverts in a year during the period, 1988 to 1997.



## international liaison

Institute staff were active in the key international organisations that develop guidance on safety in the use of ionising radiation. These organisations include the European Union, the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA) of the Organisation for Economic Co-operation and Development (OECD) as well as those associated with international conventions such as the OSPAR Convention for the prevention of pollution of the marine environment. The main objective is to support the development and improvement of international standards in radiation protection and nuclear safety.

The Institute continued its formal exchange of information on nuclear licensing and safety issues with the Nuclear Installations Inspectorate (NII) of the UK Health and Safety Executive. It also joined the Department of Public Enterprise in formal meetings with the UK Department of the Environment, Transport and the Regions and other UK government agencies. Exchange of information meetings also took place with the Northern Ireland Office and the Heritage Service of the Northern Ireland Department of the Environment.

### Sellafield

The Institute provided continuing advice to the Government on issues relating to Sellafield. A crucial development was the revelation in September that data relating to quality assurance checks on fuel from the MOX Demonstration Facility at Sellafield had been falsified. This event became the subject of one of three reports, on safety and related issues at Sellafield, published in February 2000 by the NII. Together the reports amounted to a scathing indictment of safety standards at the site, and resulted in sweeping changes in the management of BNFL.

The storage of high-level liquid radioactive waste in tanks has been identified as representing possibly the greatest risk of an accident at Sellafield which could have serious consequences for Ireland. The opportunity had been sought for some time for scrutiny by Irish experts of detailed documentation incorporating assessment of the risks associated with these tanks.

In 1998 BNFL agreed to give Institute personnel access to the documentation at Sellafield under certain conditions. In 1999 a preliminary visit was made to Sellafield to assess the feasibility of carrying out a useful examination of the documents under the prescribed conditions. The outcome of this visit was positive, and arrangements were made for detailed scrutiny of the documents in early 2000.

### European Union

The Institute participated with the Department of Public Enterprise in drafting legislation to implement the 1996 Basic Safety Standards Directive. These proposals were issued in a Consultation Document for public comment prior to the making of a new Order to replace existing legislation. Many comments were received and were taken into account in finalising the legislation which came into force on 13th May 2000.

Institute staff participated in expert groups established to evaluate proposals for funding under the EU Fifth Framework Research Programme and in Consultative Committees assisting the Commission in implementing the programme. A member of the Institute staff also participated in an External Advisory Group to provide an independent assessment of the implementation of the programme in relation to its strategic objectives and advice on the review of the programme.

The Institute continued to be represented on the group of experts established under Article 37 of the European Treaty to advise the Commission on the potential impact of plans for the disposal of radioactive wastes. The main work of the group during the year involved advice to the Commission for a revised Commission Recommendation on the application of this Article of the European Treaty.

A member of the Institute staff also participated in the work of a group of experts on the implementation of Articles 35 and 36 of the Euratom Treaty. These Articles require each Member State to establish radiation monitoring facilities and to keep the Commission informed of the level of radioactivity that could affect members of the public. In particular, the group agreed a draft Commission Recommendation designed to provide a harmonised approach to the surveillance of radioactivity across the European Union.

### Convention on Nuclear Safety

The Institute participated in the first Review Meeting of countries participating in the Convention on Nuclear Safety which relates to the regulation, management and operation of nuclear power plants. Each Contracting Party was required to submit in advance a national report describing measures it had taken to meet its obligations under the Convention. The Irish report was primarily concerned with emergency planning arrangements. Each national report was reviewed during the meeting and the issues important for future progress in nuclear safety were identified. The review process demonstrated a strong commitment by all Contracting Parties to the safety objectives of the Convention.

### Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

This Convention had been signed by 40 Member States including Ireland, and ratified, by 13 States by the end of 1999. The Convention will enter into force when 25 States, at least 15 of which have an operational nuclear power plant, have ratified, approved or accepted the Convention. The Institute participated in a third meeting of signatories during 1999 which reviewed and amended drafts of rules of procedure, guidelines for the preparation of national reports and guidelines for the review process. Similar to the Convention on Nuclear Safety each Participating Party will be required to submit a national report, describing measures

taken to meet its obligations under the Convention, for examination at a Review Meeting.

### Nuclear Energy Agency (NEA) of the OECD

The Institute continued to provide national representation on the Steering Committee of the NEA and on the Agency's Standing Committees on Radiation Protection and Public Health, Radioactive Waste Management and the Safety of Nuclear Installations. The focus of the work of the NEA continued to be on the development of nuclear safety and radiation protection. A member of the Institute staff participated in an ad hoc Expert Group which completed a report on the radiological impact of spent nuclear fuel management options. This report was prepared at the request of the OSPAR Commission.

### OSPAR Convention

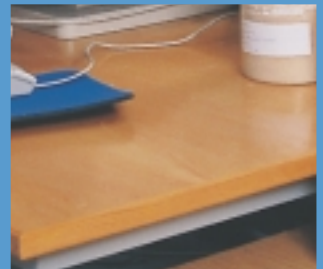
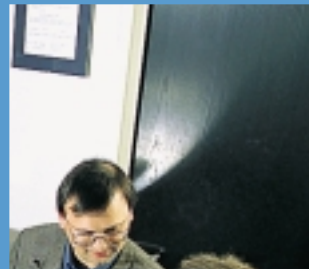
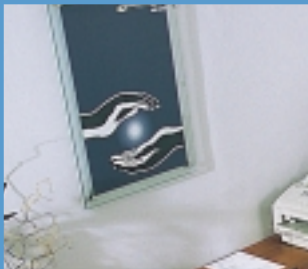
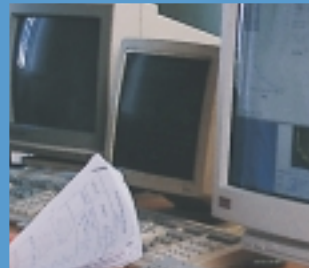
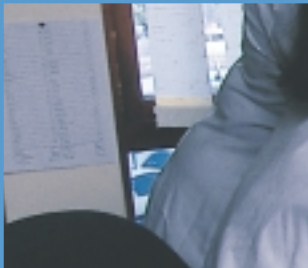
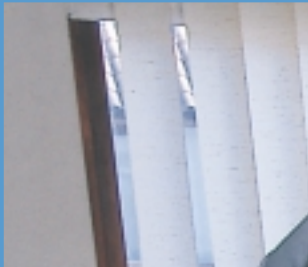
The Institute participated in the work of the OSPAR Commission and its Working Group on Radioactive Substances. The main work of this Group during 1999 was the review of the national reports submitted by Participating Countries describing measures taken to meet their obligations under the Convention, notably those arising from the OSPAR Strategy for Radioactive Substances agreed at the OSPAR Ministerial Meeting of 1998.

### Incidents

The Institute was informed of 45 incidents at nuclear installations around the world during 1999, of which 22 were in the UK. None of these incidents had any direct effect on Ireland. The reports were received through the IAEA information service. In the case of incidents in the UK, reports were also received from the UK authorities and the plant operators involved.

The most serious nuclear incident to be reported during the year occurred at the Tokaimura uranium processing facility in Japan. A self sustaining nuclear fission chain reaction occurred when workers violated operating procedures. Three workers who were in the building suffered large radiation doses from which two died and another suffered serious injury. The chain reaction, or criticality incident, continued intermittently for about 20 hours. During the incident, 161 residents of households within 350 m of the building were evacuated and people living within 10 km were advised, as a precaution, to stay indoors. Apart from the three seriously overexposed workers, some 60 other workers were exposed as a result of the accident. Monitoring indicated that trace amounts of short-lived radioactive isotopes of noble gases and gaseous iodine were released to the environment but there was no residual contamination.





## information service & publications

The Institute's Information Service dealt with almost 1000 enquiries during 1999. About 150 were requests for information from the media, and staff members were interviewed on over 50 radio and television programmes. Subjects which aroused greatest interest were issues relating to Sellafield, and the health hazards associated with radon, while there was also considerable public interest in the serious accident which occurred on 30th September at the Tokaimura fuel fabrication facility in Japan.

A major development in 1999 was the launch of the Institute's website, which is to be found at [www.rpii.ie](http://www.rpii.ie), and provides Internet users with ready access to information on the work of the Institute. Particular features are the county maps showing the results of the national survey of radon in dwellings, and data from the Institute's programme of monitoring of radioactivity in the marine environment.

The Institute's specialist library on radiological protection and nuclear safety continued to service the needs of researchers, students and members of the public, as well as the Institute's staff. When requested, the Institute provided speakers for public meetings and for specialist courses at third-level institutions, hospitals and elsewhere. To increase awareness of radon in the home as a health issue, the Institute exhibited at the Ideal Homes Exhibition in Galway in September. The Institute also provided tours of its facilities for individual visitors and specialist groups. Publication of reports and scientific papers was continued (see below), while Institute staff also edited the proceedings of the International Conference held in Dublin in 1998 on Cosmic Radiation and Aircrew Exposure.

The Institute continued to provide the Irish Liaison Officer for the IAEA's International Nuclear Information Systems (INIS), which provides a database of publications on nuclear science and its peaceful applications. Relevant items published in Ireland are input to the system using software supplied by the IAEA.

### PUBLICATIONS

#### *RPII Reports*

**Radon in dwellings - The National Radon Survey Galway and Mayo.** Radiological Protection Institute of Ireland, RPII-99/1.

**Environmental radioactivity surveillance programme 1997 and 1998.** Radiological Protection Institute of Ireland, RPII-99/2.

#### *Scientific Papers*

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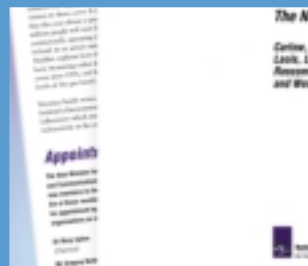
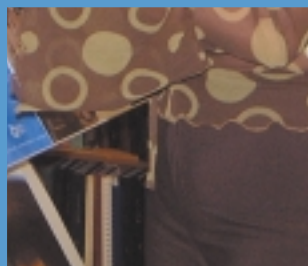
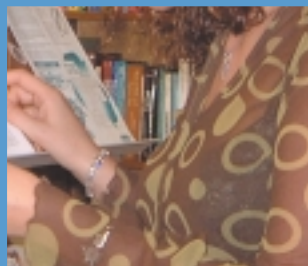
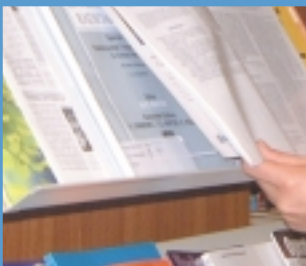
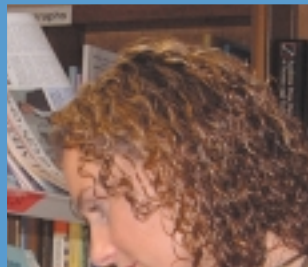
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\* RPII staff in conjunction with other authors.





## advisory committees

### Environmental Radiation

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

#### Chairman

Gregory Burke  
 Tony Colgan  
 John D. Cunningham  
 Ian R. McAulay  
 Ann McGarry  
 James P. McLaughlin  
 Peter I. Mitchell  
 Darina Muckian  
 Noel V. Nowlan  
*(deceased 10th July 2000)*  
 Tom O'Flaherty  
 Geraldine O'Reilly  
 David Pollard  
 William Reville  
 Adi Roche  
 Wil van der Putten  
 Philip Walton

#### Scientific Secretary

Tom Ryan

### Medical Radiation

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

#### Chairman

George Duffy  
 Fionnuala Barker  
 James Carr  
 David Clarke  
 Mary Coffey  
 John D. Cunningham  
 Edward Fitzgerald  
 Christopher Hone  
 Lynn Johnston  
 Pat Kenny  
 Brendan McClean  
 Ann McGarry  
 Jacinta McLoughlin  
 Lesley Malone  
 James Masterson  
 Kate Matthews  
 Michael Moriarty  
 Dan Murphy  
 Liam Murray  
 Tom O'Flaherty  
 Geraldine O'Reilly  
 Wil van der Putten  
 David Fenton

#### Scientific Secretary

## financial statements

### Prompt Payment of Accounts Act 1997

The Prompt Payment of Accounts Act 1997 (the Act) came into operation on 2 January 1998. The Radiological Protection Institute of Ireland comes under the remit of the Act. The payment practices of the Radiological Protection Institute of Ireland are reported on below for the year ended 31 December 1999 in accordance with Section 12 of the Act.

(a) It is the policy of the Radiological Protection Institute of Ireland to ensure that all invoices are paid promptly. Specific procedures are in place to enable it to trace all invoices and ensure that payments are made before the due date. Invoices are registered daily and cheques are issued as required to ensure timely payment.

(b) The system of internal control incorporates such controls and procedures as are considered necessary to ensure compliance with the Act. The organisation's system of internal control includes accounting and computer controls designed to ensure the identification of invoices and contracts for payment within the prescribed payment dates defined by the Act. The accounts department produces a report that identifies unpaid outstanding invoices and this report is reviewed regularly.

(c) During the year the total number of late payments in excess of £250 was six with a total value of £15 338. These were on average 30 days over the due date. The total value of all late payments was £16163, representing 1.8 per cent of total supplier payments. The penalty interest in respect of these payments was £280. Approximately 99.5 per cent of all payment demands were made within the prescribed timeframe.

T O'Flaherty  
Chief Executive

31 October 2000

## report of comptroller & auditor general

I have audited the financial statements on pages 36 to 40.

### **Responsibilities of the Institute and of the Comptroller and Auditor General**

The accounting responsibilities of the Institute are set out in the Statement of Responsibilities of the Institute on page 35. It is my responsibility, under Section 16 of the Radiological Protection Act, 1991, to audit the financial statements presented to me by the Institute and to report on them. As a result of my audit I form an independent opinion on the financial statements.

### **Basis of Opinion**

In the exercise of my function as Comptroller and Auditor General, I plan and perform my audit in a way which takes account of the special considerations which attach to State bodies in relation to their management and operation.

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

My audit was conducted in accordance with auditing standards which embrace the standards issued by the Auditing Practices Board, and in order to provide sufficient evidence to give reasonable assurance that the financial statements are free from material misstatement whether caused by fraud or other irregularity or error. I obtained all the information and explanations that I required to enable me to fulfil my function as Comptroller and Auditor General and, in forming my opinion, I also evaluated the overall adequacy of the presentation of information in the financial statements.

### **Opinion**

In my opinion, proper books of account have been kept by the Institute and the financial statements, which are in agreement with them, give a true and fair view of the state of affairs of the Radiological Protection Institute of Ireland at 31 December 1999 and of its income and expenditure for the year then ended.

John Buckley  
For and on behalf of the  
Comptroller and Auditor General

12 December 2000

## 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 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.

Francis J Mulligan  
Chairman

Geraldine O'Reilly  
Board Member



## statement of accounting policies

### 1. General

The Radiological Protection Institute was established in April 1992 in accordance with the provisions of the Radiological Protection Act, 1991.

Its functions include the provision of advice, the regulation of activities relating to the use of ionising radiation, the preparation of safety codes and the promotion of knowledge, proficiency and research in nuclear science and technology. Other functions are to monitor and measure levels of radioactivity in the environment, to assess their significance, to maintain a national laboratory for this purpose, and to assist in the development of national plans for emergencies arising from nuclear accidents.

The Radiological Protection Act, 1991 provided for the dissolution of the Nuclear Energy Board and the subsequent transfer of its functions and net assets to a new body to be known as the Radiological Protection Institute of Ireland. The Nuclear Energy Board was dissolved on 1st April 1992.

### 2. Accounting Convention

The Financial Statements have been prepared using the accruals method of accounting (or as indicated below), and in accordance with generally accepted accounting principles under the historical cost convention. Financial Reporting Standards recommended by the recognised accountancy bodies are adopted as they become operative.

### 3. Grants

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

### 4. Fixed Assets

Fixed Assets are stated at cost less accumulated depreciation. Depreciation is calculated on a straight line basis by reference to the expected useful lives of the assets concerned. The rates used are as follows:

Office & Laboratory, Furniture & Equipment:	20%
Motor Vehicles:	20%
Leasehold improvements are depreciated over the life of the lease.	

### 5. Superannuation

A Superannuation Scheme under Section 14 of the Nuclear Energy (An Bord Fuinnimh Nuicléigh) Act, 1971 was in operation up to 31st March 1992. A new scheme has been drawn up in accordance with the provisions of Section 13 of the Radiological Protection Act, 1991 and is awaiting final approval. Contributions of £76,437 in 1999 were credited against salaries. No provision has been made in the Financial Statements in respect of future superannuation liability. Superannuation benefits are met from revenue as they arise.

### 6. Capital Account

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

### 7. Contract Income

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

### 8. Income in Advance

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

## income & expenditure account

For the year ended 31 December 1999

1998			1999	
£			£	£
	<b>Income</b>			
1,507,000	Oireachtas Grant in Aid		1,704,000	
(59,353)	Transfer to Capital Account (Note 2)		(27,969)	
<u>1,447,647</u>				1,676,031
153,836	Dosimetry	185,027		
174,799	Product Certification	184,474		
279,985	Contract Income	230,314		
373	Interest Income	804		
57,942	Other Income	69,122		
89,817	Licence Fees	89,524		
<u>756,752</u>				<u>759,265</u>
<u>2,204,399</u>				<u>2,435,296</u>
	<b>Expenditure</b>			
1,293,733	Salaries and Pensions (Note 3)			1,291,147
54,488	Dosimetry Service			102,063
47,298	Library and Information Service			57,619
79,412	Radon and Radioecology			62,996
29,367	Emergency Plan			34,005
44,714	Environmental Monitoring			65,425
222,568	Accommodation and Insurance (Note 4)			317,131
78,653	Travel and Subsistence			88,334
121,424	Telephone, Postage and Office Supplies			101,376
11,830	Recruitment and Training			29,333
27,188	Miscellaneous including Professional Fees			33,437
5,000	Audit Fees			4,524
187,749	Depreciation (Note 1)			202,079
<u>2,203,424</u>				<u>2,389,469</u>
975	<b>Surplus for year</b>			45,827
<u>177,418</u>	Balance at 1 January			<u>178,393</u>
<u>178,393</u>	Balance at 31 December			<u>224,220</u>

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

The Statement of Accounting Policies and notes 1 to 6 form part of these Financial Statements.

Francis J Mulligan  
Chairman  
Date: 5 December 2000

Geraldine O'Reilly  
Board Member  
Date: 5 December 2000

## balance sheet

As at 31 December 1999

1998 £		Notes	1999 £
774,887	<b>Fixed Assets</b>	1	802,856
	<b>Current Assets</b>		
317,270	Cash on Hand and at Bank		251,741
104,039	Debtors and Prepayments		194,522
<u>421,309</u>			<u>446,263</u>
	<b>Creditors - amounts falling due within one year</b>		
(190,833)	Creditors and Accruals		(134,336)
(52,083)	Income in Advance		(87,707)
<u>(242,916)</u>			<u>(222,043)</u>
178,393	<b>Net Current Assets</b>		224,220
<u>953,280</u>	<b>Net Assets</b>		<u>1,027,076</u>
	Financed by:		
178,393	<b>Income and Expenditure Account</b>		224,220
774,887	<b>Capital Account</b>	2	802,856
<u>953,280</u>			<u>1,027,076</u>

The Statement of Accounting Policies and notes 1 to 6 form part of these Financial Statements.

Francis J Mulligan  
Chairman  
Date: 5 December 2000

Geraldine O'Reilly  
Board Member  
Date: 5 December 2000

## notes to the financial statements

For the year ended 31 December 1999

### 1 Tangible Fixed Assets

	Leasehold Improvements £	Office and Laboratory Furniture and Equipment £	Motor Vehicles £	Total £
<b>Cost:</b>				
At 1 January 1999	620,838	2,839,137	15,955	3,475,930
Additions	-	219,015	17,415	236,430
Disposals	-	-	(15,955)	(15,955)
At 31 December 1999	<u>620,838</u>	<u>3,058,152</u>	<u>17,415</u>	<u>3,696,405</u>
<b>Depreciation:</b>				
At 1 January 1999	217,363	2,474,107	9,573	2,701,043
Charge for year	20,175	178,421	3,483	202,079
On disposals	-	-	(9,573)	(9,573)
At 31 December 1999	<u>237,538</u>	<u>2,652,528</u>	<u>3,483</u>	<u>2,893,549</u>
<b>Net Book Value at</b>				
31 December 1998	<u>403,475</u>	<u>365,030</u>	<u>6,382</u>	<u>774,887</u>
<b>Net Book Value at</b>				
31 December 1999	<u>383,300</u>	<u>405,624</u>	<u>13,932</u>	<u>802,856</u>

### 2 Capital Account

	1999 £
Balance at 1 January 1999	774,887
Transfer from Income and Expenditure Account:	
Grants allocated for Capital purposes	236,430
Grants amortised in year	<u>(202,079)</u>
	34,351
Amount released on disposal of fixed assets	<u>(6,382)</u>
Balance at 31 December 1999	<u>802,856</u>

## notes to the financial statements

Continued

### 3 Salaries and Pensions

	1999 £	1998 £
Gross Salaries	1,331,596	1,325,268
Employer's P.R.S.I.	35,988	31,614
Pension Deductions	(76,437)	(63,149)
	<u>1,291,147</u>	<u>1,293,733</u>

#### Breakdown of Salaries and Pensions

Administration	222,277	251,050
Regulation/Dosimetry	346,524	319,549
Environmental Monitoring	301,474	327,196
Information/Radon/Radioecology	299,632	299,142
Emergency Plan	96,252	77,521
Nuclear Safety	24,988	19,275
Charged to Income and Expenditure Account	<u>1,291,147</u>	<u>1,293,733</u>

### 4 Commitments and Lease Obligations - Operating Leases

#### 3 Clonskeagh Square

Lease commitments payable in the next twelve months amount to £195,000 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 1998.

#### Floor 1, Block 1, 1 Clonskeagh Square

Lease commitments payable in the next twelve months amount to £10,000 on the basis of current rental rates and comprise rental payments on a leasehold interest, the term of which expires on 11 January 2002.

### 5 Board Members' Interests

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

### 6 Approval of Financial Statements

The financial statements were approved by the Board on 5th December, 2000.