ANNUAL REPORT ON THE ADMINISTRATION OF
THE RADIATION PROTECTION AND CONTROL ACT 1982
1 JULY 2002 TO 30 JUNE 2003
The Hon John Hill MP  
Minister for Environment and Conservation  
Parliament House  
North Terrace  
ADELAIDE  
South Australia 5000

Dear Minister

I am pleased to provide the Annual Report on the administration of the *Radiation Protection and Control Act 1982* for the period 1 July 2002 to 30 June 2003, for tabling in Parliament in accordance with section 22 of the Act.

Yours sincerely

[Signature]

CHAIRMAN  
SOUTH AUSTRALIAN HEALTH COMMISSION

September 2003
This report provides information on the administration of the *Radiation Protection and Control Act 1982* (the Act) for the year 2002–03. Administration is carried out by the staff of the Radiation Protection Division of the Environment Protection Authority (EPA), which provides support for the Radiation Protection Committee, established under Section 9 of the Act.

The Radiation Protection Division has been operating within the EPA since 1 July 2002, successfully managing its transition from the Environmental Health Branch of the Department of Human Services. This timing corresponded with the EPA becoming a separate administrative agency within the State Government. These changes have come about in a year that has seen an increased community interest in radiation protection and control issues, particularly in relation to the storage and disposal of radioactive materials. In response, the Government of South Australia engaged the EPA to undertake an audit of the storage of all such materials in South Australia. This work was carried out by the division, and will be reported in 2003–04.

The ongoing work of the division continues, including the provision of a high-quality service to our clients; inspections related to the registration and safe use of X-ray apparatus, sealed radioactive sources and premises in which unsealed radioactive substances are handled; investigation of radiation incidents; and auditing of licence holders. The breadth of work undertaken by the division and its proactive approach are highlighted by examples such as the confiscation of laser equipment following a report of an eye injury to a member of the public, and an investigation of equine radiography to establish appropriate practices and minimise radiation exposures to workers during radiography procedures.

Training and education of rural and remote X-ray operators also continued throughout the year. An improved course structure was implemented, based on a review of outcomes and previous participant feedback.

Finally, I wish to take this opportunity to thank the staff of the division for their continued outstanding efforts during this extremely busy transitional period. I also wish to thank the members of the Radiation Protection Committee for their contribution, in particular the outgoing members, Dr RM Hope and Dr KJ Buckett.

Dr Paul Vogel

CHIEF EXECUTIVE AND CHAIR
ENVIRONMENT PROTECTION AUTHORITY

September 2003
# Contents

Letter of transmittal  ii
Foreword  iii
Introduction  1
Radiation Protection Committee  2
Legislative and regulatory developments  3
  Review of the Act
  Transport of radioactive material
Exemptions granted under the Act  3
Radiation incidents and accidents  4
Audit of radioactive material storage  5
CT scanner design fault  5
Equine Radiography Project  5
Non-ionising radiation  5
  Power lines
  Mobile phone technology
Maralinga rehabilitation  6
Licences to mine and mill radioactive ore  7
  Olympic Dam operations
  Beverley Uranium Project
  Honeymoon Uranium Project
Registration of apparatus, radioactive substances and premises, and licensing of radiation users  8
Radioactive waste management  9
Registration of former uranium mining and milling sites  9
Bachmann Report  9
International activities  10
National activities  10
  Radiation Health Committee
  Radiation Health and Safety Advisory Council
  Joint convention on waste management
Training and education  11
  Rural and remote X-ray operators
Appendices  12
  Conferences attended
  Abbreviations
The purpose of the *Radiation Protection and Control Act 1982* (the Act) is to provide for the control of activities related to radioactive substances and radiation apparatus and for protection against the harmful effects of radiation. Section 22 of the Act requires the South Australian Health Commission to present to the Minister a report on the administration of the Act following each financial year for tabling in Parliament.

On 27 June 2002 the Act was committed to the Minister for Environment and Conservation; the Radiation Section of the Environmental Health Branch, Department of Human Services (DHS) was transferred to the Environment Protection Authority (EPA) on 1 July 2002. After the transfer, the Radiation Section was re-titled Radiation Protection Branch of the EPA, and subsequently the Radiation Protection Division of the EPA.

The Radiation Protection Division is the principal unit responsible for administering the Act. Officers of the division who are authorised officers for the purposes of the Act carry out inspections of radiation apparatus, radioactive sources, premises where unsealed radioactive substances are kept or handled, and sites where radioactive ores are processed or have been processed in the past. They undertake surveillance of all sources of radiation and types of radiation used in South Australia to ensure compliance with the Act.

At 30 June 2003 the division’s 14 staff occupied 13 full-time equivalent positions. They comprised 11 scientific and technical staff (including the Acting Director) and three administrative and clerical officers. The Acting Director reports to the Chief Executive of the EPA.

---

1 Further information on the corporate administration of the division (e.g. financial and human resources) is presented in the EPA 2002-03 Annual Report.
Section 9 of the Act provides that there shall be a Radiation Protection Committee that shall have 10 members, one of whom shall be the Chairman, who shall be a member of the SA Health Commission or an officer or employee of the Department of the Minister to whom the Act is committed. The other members shall have specific qualifications or expertise relevant to the administration of the Act.

The Radiation Protection Division provides support for the statutory committee, which has functions set out in section 12 of the Act. These functions are to:

a. advise the Minister in relation to the formulation of regulations under this Act

b. advise the Minister in relation to the granting of licences under this Act, including the conditions to which they should be subject

c. investigate and report any other matters relevant to the administration of this Act at the request of the Minister or the Commission or of its own motion.

The members and deputy members of the committee, appointed for a term of three years on 26 July 2001, and the section of the Act under which each was appointed are listed below.

<table>
<thead>
<tr>
<th>Members</th>
<th>Deputy members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr KJ Buckett (Chairman)</td>
<td>s9(2)(a)</td>
</tr>
<tr>
<td>Dr S Le P Langlois</td>
<td>s9(2)(b)</td>
</tr>
<tr>
<td>Mr C Kapsis</td>
<td>s9(2)(c)</td>
</tr>
<tr>
<td>Mr KG Smith</td>
<td>s9(2)(d)</td>
</tr>
<tr>
<td>Dr GS Laurence</td>
<td>s9(2)(e)</td>
</tr>
<tr>
<td>Dr KH Lokan</td>
<td>s9(2)(f)</td>
</tr>
<tr>
<td>Dr MT Kitchener</td>
<td>s9(2)(g)</td>
</tr>
<tr>
<td>Mr S Caplygin</td>
<td>s9(2)(h)</td>
</tr>
<tr>
<td>Dr RM Hope</td>
<td>s9(2)(i)</td>
</tr>
<tr>
<td>Mr P Dolan</td>
<td>s9(2)(j)</td>
</tr>
<tr>
<td></td>
<td>(Dr TM Cain)</td>
</tr>
<tr>
<td></td>
<td>(Dr PJ Storer)</td>
</tr>
<tr>
<td></td>
<td>(Ms J Shearer)</td>
</tr>
<tr>
<td></td>
<td>(Dr BE Chatterton)</td>
</tr>
<tr>
<td></td>
<td>(Ms T Reif)</td>
</tr>
<tr>
<td></td>
<td>(Dr MT Lardelli)</td>
</tr>
<tr>
<td></td>
<td>(Ms S Douglas-Hill)</td>
</tr>
</tbody>
</table>

Dr S Le P Langlois tendered her resignation from the committee during the 2001-02 period, and Dr RM Hope and Dr KJ Buckett tendered their resignations from the committee during the period of this report. The division prepared a Cabinet submission to appoint members to the vacant positions on the committee but appointments had not been made by the end of the period of this report.

The committee met four times during the year and considered matters summarised in the remainder of this report.
Legislative and regulatory developments

Review of the Act

At the Radiation Protection Committee meeting held on 8 August 2002, several members agreed to participate in a working group to review the Act. The working group met on two occasions during the period of this report and discussed proposals for amendments to the Act, including:

- registration of premises in which unsealed radioactive substances are used, handled, or stored
- licences to mine or mill radioactive ores
- inclusion of protection of the environment in the objectives of the Act
- composition, roles and functions of the committee
- appointment of subcommittees
- references to, and the role of, the SA Health Commission.

The EPA also established a project team to progress the review of the Act. A project officer of the Policy and Strategic Services Division reviewed the findings of the working group, and relevant documents including the ‘Recommendations of the National Competition Policy Review of Radiation Protection Legislation’, and recent Acts of other jurisdictions.

Transport of radioactive material

The division prepared a Cabinet submission containing drafting instructions to revise the Radiation Protection and Control (Transport of Radioactive Substances) Regulations 1991 and adopt the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Code of Practice for the Safe Transport of Radioactive Material 2001. Cabinet approved the submission and Parliamentary Counsel subsequently undertook to draft new regulations. The division received a copy of the draft, which remained under review at the end of the reporting period.

Exemptions granted under the Act

Under Section 44 of the Act, the Minister or his delegate is empowered to grant exemptions from any specified provision of the Act, provided such action would not endanger the health or safety of any person. After careful consideration, the following exemptions were approved, subject to specified conditions:

- On 14 November 2002, an exemption from compliance with sub-regulations 42 (1)(a)(d) and 42(4)(a)(d) of the Ionizing Radiation Regulations 2000 (authorisation regarding the need for a signature) was granted to persons participating in the DHS OACIS Clinical Management Pilot Program at Royal Adelaide Hospital or Lyell McEwin Health Service during the period 15 November 2002 to 15 November 2003, for the purposes of allowing electronic submission of imaging orders.

- On 13 March 2003, an exemption from the requirements of Regulation 40 of the Ionizing Radiation Regulations 2000 (authorisation for the purposes of diagnostic radiography of extremities only) was granted to diagnostic radiographers at the Royal Adelaide Hospital, on the condition that an approved registered nurse who works in the Emergency Department of the hospital authorises the diagnostic radiography.

- On 13 March 2003, an exemption from the requirements of Regulation 40 of the Ionizing Radiation Regulations 2000 (authorisation for the purposes of diagnostic radiography of extremities only) was granted to diagnostic radiographers at Flinders Medical Centre, Lyell McEwin Health Service, Noarlunga Health Services, The Queen Elizabeth Hospital and the Women’s and Children’s Hospital, on the condition that an approved registered nurse who works in the respective health service’s Emergency Department authorises the diagnostic radiography.
On 27 March 2003, a conditional exemption from Regulation 41 of the Ionizing Radiation Regulations 2000 (authorisation regarding treatment with radionuclides) was granted to Dr Sunil Gupta, permitting him to authorise specified treatment of patients with radionuclides.

On 10 April 2003, a conditional exemption from Regulation 45 of the Ionizing Radiation Regulations 2000 (approval regarding research) was granted to any person who has been authorised to conduct in vivo research involving the use of ionising radiation on human subjects at The Queen Elizabeth Hospital and Health Service. An additional condition specified that Dr L Barnden, Hospital RSO, or Mr S Behin-Ain, while acting in the position of the Hospital RSO, must be present as a member of, or as an adviser to, the Ethics of Human Research Committee of the hospital which considers and approves such research.

On 19 June 2003, a conditional exemption from Regulation 40 of the Ionizing Radiation Regulations 2000 (authorisation regarding treatment with radionuclides) was granted to Dr Michael Kitchener permitting him—in addition to other radionuclides in his previous exemption—to authorise treatment of patients with indium-111.

On 19 June 2003, a conditional exemption from Regulation 40 of the Ionizing Radiation Regulations 2000 (authorisation regarding treatment with radionuclides) was granted to Dr Timothy Cain permitting him—in addition to other radionuclides in his previous exemption—to authorise other specified treatment of patients with iodine-131, yttrium-90 and samarium-153.

Radiation incidents and accidents

During the period, the following radiation incidents and accidents were reported to the Radiation Protection Division. These were investigated to determine the cause of the accident and the remedial action that could be taken to prevent a recurrence.

- A patient was incorrectly administered a dose of a technetium-99m compound instead of an indium-111 compound in a nuclear medicine facility. The misadministration occurred due to a failure in the checking of the label on the radiopharmaceutical before administration. Appropriate procedures and protocols for administration of doses to patients have been reviewed to ensure that the correct radiopharmaceutical is administered to patients.

- A radiation incident involving a spill of a technetium-99m compound occurred during a nuclear medicine cardiac study of a patient in a hospital. A syringe used for the process became detached from a catheter delivery system and the radioactive solution spilled on the floor and onto a nurse’s arms. The dose received by the nurse was estimated to be 0.1 millisievert (mSv). For comparison, the annual dose limit for radiation workers is 20 mSv. The spill was caused by incorrect use of equipment. The hospital undertook to ensure that appropriate instrumentation is used and staff assisting with the procedures are provided with training in the management and cleanup of spills.

- In March 2003 the EPA was notified that a down-hole logging tool containing two registered sealed radioactive sources had become stuck in a bore-hole (well) at an approximate depth of 9000 feet in the Moomba production area of the Cooper Basin. As the tool could not be retrieved despite strenuous efforts, the owner applied for approval to abandon the sources and plug the well with cement. The EPA recommended approval to dispose of the sources in situ, subject to conditions including a requirement for a site marker, with a plaque containing details of the abandoned sources and their location, to be placed in the vicinity of the well.

- During the reporting period a member of the public suffered an eye injury while attending a function where a laser was used for entertainment. A subsequent medical examination revealed that the injury was consistent with the type caused by a laser. The laser in question was seized by officers of the division, under section 42 of the Act. An investigation of the matter is continuing.

Details of accidents and incidents involving exposure or potential exposure to radiation were provided to ARPANSA for the National Register of Radiation Accidents and Incidents.
Audit of radioactive material storage

In September 2002, officers of the division began an audit of all radioactive material stored in South Australia, with a particular emphasis on waste, to determine the nature and volume of the material and whether it is safely and securely stored.

In conducting the audit, officers visited over 100 sites where radioactive material was stored, used, transported and disposed of. The physical inspection of sites storing radioactive material was completed in June 2003. A report on the audit’s results was being prepared at the end of the reporting period and was expected to be completed early in the 2003-04 financial year.

CT scanner design fault

On a routine post-installation inspection of a computed tomography (CT) scanner from a leading manufacturer, it was discovered that the slice thickness of the X-ray beam was above the recommended tolerance. This results in an unnecessary increase in radiation dose to patients undergoing CT examinations performed using that particular scanner, which was the only model of its type installed in Australia. Checks made with authorities overseas revealed that this defect had not been reported in countries that have similar installations.

Discussions with the South Australian agents and the parent company overseas led to major modifications in the CT scanner design to comply with the standards required, thus enabling it to be registered.

Equine Radiography Project

The Diagnostic X-rays Group had observed an increase in sales of portable X-ray machines to veterinary clinics, in particular to those that conducted equine services. Investigations revealed that the increase was a response to the new X-ray protocol guidelines for owners of yearlings before sale. This national protocol, called the ‘X-Ray Policy’ and introduced in Australia in June 2002, is endorsed by the Thoroughbred Breeders Association (Australia) and is based on the X-ray policy developed in the USA by a thoroughbred sales company. A minimum of 34 views is required for each horse, but can be as many as 42 views. Before the February 2003 yearling sales it was estimated that around 450 horses would have to undergo the X-ray protocol. As the pool of equine veterinary X-ray operators in South Australia is limited, concerns have arisen for the potential for radiation doses to those operators to exceed recommended levels if safe practices are not followed.

Literature searches have so far not identified any studies documenting radiation doses to operators performing this X-ray protocol. Officers of the division have observed the complete X-ray examination protocol and devised a method of monitoring the dose to various parts of the anatomy of these workers. Initial measurements have not indicated high doses but this study was based on a small sample of examinations. Investigations are continuing and dialogue on this matter with radiation protection agencies interstate and overseas has been established. This issue has implications nationally as the practice is undertaken in all states.

Non-ionising radiation

The Act provides for the control of both ionising and non-ionising radiation, although no regulations on non-ionising radiation have been made as yet. However, the Radiation Protection Division advises the Government, industry and the public on radiation safety of non-ionising radiation sources and recommends compliance with relevant Australian and international standards, guidelines and codes of practice.

The division responded to a large number of telephone enquiries from the public on possible health effects
from exposure to non-ionising radiation from sources such as power lines, computer screens, microwave ovens, mobile telephone technology and lasers used by the public, and in industrial and cosmetic applications. The division continually reviews ongoing research into the effects of non-ionising radiation and updates its public information as necessary.

Power lines

ARPANSA is continuing to develop a standard specifying limits on human exposure to extremely low frequency (ELF) electric and magnetic fields, such as those produced by power lines. An officer of the division is a member of ARPANSA’s ELF consultative group which will assist in developing this standard.

The division continues to lend (free of charge) magnetic field meters that allow members of the public to measure magnetic field strengths in their homes and workplaces. This service has been very popular and, together with information on the EPA web site which links to the World Health Organization’s ELF fact sheet, has enabled people to make informed choices on their magnetic field exposure.

Mobile phone technology

The specific absorption rate (SAR) is a measure of the rate at which a mobile phone user absorbs energy from the handset. The SAR is now available for every new mobile telephone sold in Australia. Telephone enquiries about SAR values are now directed to the manufacturers’ web sites.

The Australian Communication Industry Forum’s code on the installation of new mobile phone towers was registered with the Australian Communications Authority in October 2002. Registration of the code allows for its requirements to become enforceable. The code sets out requirements on the telecommunications industry, including site selection for mobile phone towers, consultation with the community and dispute management. The code’s registration was expected to result in fewer community complaints about mobile phone towers but the current practice of installing mobile phone towers on stobie poles has increased public concern. The division is following this issue closely.

Maralinga rehabilitation

The former British atomic weapons test site at Maralinga (Section 400) is currently on Commonwealth land and is licensed under the Australian Radiation Protection and Nuclear Safety Act 1998 (Maralinga Facility Licence FV0043). The site includes burial trenches containing radioactive materials, constructed during the Maralinga Rehabilitation Project which was completed in 2000. The final report of the Maralinga Rehabilitation Technical Advisory Committee, which advised the Commonwealth on the rehabilitation, was tabled in the Commonwealth Parliament in March 2003.

While the Commonwealth’s rehabilitation project for the former atomic weapons test sites at Maralinga and Emu has been completed, the Radiation Protection Division remains involved with these sites. The Maralinga Consultative Group, on which the division is represented, consists of representatives of the Commonwealth and South Australian governments and the traditional owners, Maralinga-Tjarutja. The group is involved in negotiations on the proposed return of the site to the State, and then to Maralinga-Tjarutja. In particular, the group is examining a number of issues including the current radiological state of the site, responsibilities for continuing management of the site, procedures for handing back the land to Maralinga-Tjarutja, and indemnity issues.

Negotiations continued this year on developing the Maralinga Land and Environment Management Plan which will define the statutory framework, responsibilities, management tasks, and monitoring and reporting practices for the organisations responsible for the ongoing management of the former test sites at Maralinga and Emu.

Negotiations also continued on the terms of a deed between the Commonwealth, the State of South Australia and Maralinga-Tjarutja, which formalises the return of Section 400 to the State and Maralinga-Tjarutja, and also on the proposed registration of the site under the Radiation Protection and Control Act.
Licences to mine and mill radioactive ore

The three current licences to mine and mill radioactive ores, issued under section 24 of the Act, have been issued to:

- WMC (Olympic Dam Corporation) Pty Ltd
- Heathgate Resources Pty Ltd
- Southern Cross Resources Australia Pty Ltd.

The licences are subject to conditions that include compliance with the Commonwealth Code of Practice on Radiation Protection in the Mining and Milling of Radioactive Ores 1987 and the Code of Practice on Management of Radioactive Wastes from the Mining and Milling of Radioactive Ores 1982.

Transport of uranium ore concentrate to Outer Harbor is conducted in accordance with the Radiation Protection and Control (Transport of Radioactive Substances) Regulations 1991.

The Radiation Protection Division conducts routine surveillance of uranium mining activities by auditing companies’ monitoring results and conducting independent monitoring. Each licensed company provides quarterly occupational and environmental radiation monitoring data, including dose assessments, to the EPA. These reports are examined by divisional officers, compared with division monitoring results where appropriate, and reviewed with company officers at regular quarterly meetings.

**Olympic Dam operations**

WMC (Olympic Dam Corporation) Pty Ltd holds a licence (LM1) under the Act to mine or mill radioactive ores. Licence conditions stipulate annual reporting on the existing and proposed development of the project and details of the wastes produced. The LM1 Report for 2001–02 was received on 28 August 2002 and was considered by the Radiation Protection Committee. The Olympic Dam annual dose assessment summary for 2001–02 was received on 5 December 2002, and included an assessment of the adequacy and effectiveness of radiation protection measures.

The dose summary indicated that average doses to designated workers in the mine and the processing plant were less than 17% of the 20 mSv average annual limit for designated employees. The maximum individual dose received was assessed to be less than 45% of the limit.

The annual environmental radiation report for the period March 2001 to February 2002 was presented to the Radiation Protection Committee on 8 August 2002. This report again confirmed that the radiological effects of the operation continue to be confined within the mining lease. In particular, any addition to the annual radiation dose to members of the public living in Olympic Dam Village and Roxby Downs was assessed to be zero (indistinguishable from background).

There was one reportable spill during the reporting period on 18 February 2003 when 210 m$^3$ of process liquor was accidentally released in the hydrometallurgical plant. The material was contained and the incident did not result in accidental worker exposure, or represent a hazard to the environment or members of the public.

Radiation Protection Division officers visited the project on four occasions for radiation review meetings, inspections and/or workplace monitoring. Continuously operating environmental monitors were also maintained at a site near the town of Roxby Downs.

Routine transport of uranium ore concentrate from Olympic Dam to Outer Harbor continued without incident.

**Beverley uranium project**

Heathgate Resources, operators of the Beverley project 600 km north of Adelaide, holds a licence under the Act to conduct commercial uranium mining operations. This licence was renewed for a further 12 months from 4 August 2002.
Worker radiation doses reported for the 2002 calendar year indicate the average annual dose was approximately 4% of the 20 mSv annual limit recommended for designated employees.

There were no reportable incidents during the 2002–03 year and the transport of product continued without incident. Officers of the division visited the site once during this period.

**Honeymoon uranium project**

Southern Cross Resources holds a licence to mine and mill at its Honeymoon site, 25 km from the NSW border near Broken Hill. The licence, which was renewed on 9 February 2003 for a period of one year, does not permit the recovery of uranium from the ore zone.

The Honeymoon site remains on care and maintenance and divisional officers visited the site once during this period. A licence under the Act that permits commercial operations will be required before the operations outlined in the EIS can begin.

On 10 February 2003, the remaining uranium oxide produced during the field leach trial was transferred from the Honeymoon mine to the Beverley mine as part of a purchasing agreement.

**Registration of apparatus, radioactive substances and premises, and licensing of radiation users**

During the year, 75 ionising radiation apparatus, seven sealed radioactive sources and 11 premises where unsealed radioactive substances are used or stored, were registered for the first time. All were inspected for compliance with the regulations before registration was granted. Registration was renewed for 1070 apparatus, 270 sealed sources and 89 premises.

At 30 June 2003, the numbers of apparatus, sealed sources and premises registered in accordance with the Act were as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Section of Act</th>
<th>Number registered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ionising radiation apparatus</td>
<td>32</td>
<td>1765</td>
</tr>
<tr>
<td>Sealed radioactive sources</td>
<td>30</td>
<td>647</td>
</tr>
<tr>
<td>Premises where unsealed radioactive substances are handled or kept</td>
<td>29</td>
<td>165</td>
</tr>
</tbody>
</table>

At 30 June 2003, 3802 people held licences to use ionising radiation. During the year new licences were issued to 291 applicants and 3311 licence renewals were processed; 199 licences first issued during the previous year remained current and did not require renewal. In addition, it is estimated that 2000–3000 people not required to hold licences were employed in occupations involving exposure to ionising radiation. These include workers at Olympic Dam, Beverley and Honeymoon uranium projects, workers in Type C laboratories, operators of cabinet X-ray units and fully enclosed industrial X-ray units, users of industrial radiation gauges, and people assisting with medical, dental and veterinary X-ray procedures.

Where required under the provisions of the Act, radiation workers’ radiation doses were monitored using approved personal dosimeters. All radiation workers’ doses recorded were below the occupational limits prescribed in the Ionizing Radiation Regulations and the average and median of doses received by all workers were well below occupational limits.
Radioactive waste management

Applications for approval of annual radioactive waste management plans for users of unsealed radioactive substances for the period 1 October 2002 to 30 September 2003 were considered and approvals granted to 27 organisations. Approved applicants included hospitals, universities, pathology laboratories, commercial laboratories and Commonwealth and State government laboratories.

Approval to dispose of unsealed radioactive waste was granted where the waste and the disposal method complied with the requirements of the National Health and Medical Research Council (NHMRC) Code of Practice for the Disposal of Radioactive Waste by the User 1985. Approved disposal methods include incineration, disposal to sewers and disposal to a specified landfill site.

Very low level radioactive waste collected from these hospitals and laboratories was disposed of by landfill burial at two-monthly intervals. These disposals were supervised by an officer of the division to ensure compliance with the NHMRC code.

Registration of former uranium mining and milling sites

The former Radium Hill uranium mine, 100 km south-west of Broken Hill, was developed in the early 1950s and operated until its closure in the early 1960s. The northern end of the remaining tailings dam at Radium Hill has been used as a repository for low level radioactive waste since April 1981 when it was gazetted under the Crown Lands Act 1929 and placed under the care, control and management of the (then) Minister of Mines and Energy. The Port Pirie Treatment Plant processed uranium ore from Radium Hill between 1953 and 1962 and was operated by the (then) Mines Department of SA. It is estimated that approximately 200,000 tonnes of radioactive tailings remain in tailings dams at Port Pirie, on land owned by the State Government, under the care of the Minister for Mineral Resources Development.

Some remediation work has been conducted by the Department of Primary Industries and Resources SA (PIRSA) at both the Radium Hill mine site and the Port Pirie plant and tailings dams over the last 20 years. The Radiation Protection Division has provided advice on the radiological aspects of this work and conducted occasional inspections and monitoring. However, neither site had been subject to specific control under the Radiation Protection and Control Act.

In 2002, Australia signed the international Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management and, in order to ratify it, sought an undertaking from the states and territories to have legislation and procedures in place to enable compliance with the convention. The convention requires, inter alia, that appropriate steps be taken to review the safety of any radioactive waste facility existing at the time the convention enters into force and ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility.

To ensure South Australia could comply with the requirements of the convention, the Radium Hill and Port Pirie sites were registered on 28 February 2003 as premises under section 29 of the Act. Conditions attached to the registration were designed to permit the development of appropriate long-term management plans.

Bachmann Report

In early May 2002, the State Government announced an independent review of reporting procedures for incidents at uranium mines. The review was in response to a spill of mining fluid at the Beverley in situ leach uranium mine in January 2002, and also a spill of copper concentrate slurry at the Olympic Dam mine in December 2001.

The review was to examine the existing incident reporting procedures associated with uranium mining and the current mechanism for public notification of such incidents, and to recommend changes or alternative mechanisms where appropriate. The review was also to examine the processes in place before the January
2002 spill at Beverley and in particular the effect of any ministerial correspondence related to reporting.

The review, conducted by Mr Hedley Bachmann, made recommendations on incident recording and reporting procedures, the revision of secrecy/confidentiality clauses of relevant legislation, and mechanisms for improving information flow to State and Commonwealth government agencies and the public.

The report was submitted to Government on 30 August 2002. The recommended recording and reporting mechanisms came into effect on 28 February 2003, approved as part of the radiation management plans for uranium mining operations. The requirement for radiation management plans arises from conditions attached to the licence to mine or mill radioactive ores granted under the Radiation Protection and Control Act.

International activities

To ensure that South Australia’s regulation of activities involving radiation keeps pace with international best practice, the division takes part in international activities to the extent that resources permit.

International activities this year were limited to attendance by one Radiation Protection Division scientist at an international conference on radiation protection of the environment, held in Darwin, and commenting on draft guidance documents circulated by ARPANSa on behalf of the International Atomic Energy Agency. Such documents, when finalised, are often used in development of Australian policies and practices for radiation protection.

National activities

Radiation Health Committee

An officer of the division attended meetings of the Radiation Health Committee and the National Uniformity Implementation Panel (Radiation Control) (NUIP(RC)) at ARPANSa in Melbourne on 20 and 21 November 2002, and on 19 and 20 March 2003. Discussions at the meetings included:

• progress with national uniformity in radiation protection legislation and various codes of practice—such as the user disposal, intervention, veterinary, radiotherapy, and gauges codes—being prepared by working groups of ARPANSa
• a survey of extremely low frequency electric and magnetic fields
• the National Directory for Radiation Protection
• security of sources.

The officer also attended a special meeting of the NUIP(RC) on 13 June 2003 to progress the development of the National Directory for Radiation Protection. This was agreed by the Australian Health Ministers’ Conference in 1999 as the approach to improving uniformity in legislative controls for radiation protection in Australia.

Several officers of the division are members of working groups developing codes of practice and policies for inclusion in the National Directory for Radiation Protection.

Radiation Health and Safety Advisory Council

The Acting Director of the Radiation Protection Division, Jill Fitch, is one of two state radiation control officers appointed to the Radiation Health and Safety Advisory Council. The RHSA Council advises the CEO of ARPANSa on a range of matters including emerging issues, matters of major concern to the community, and the adoption of codes, standards, recommendations and policies on radiation protection and nuclear safety. Jill Fitch was reappointed in this capacity for the second triennium of the council in August 2002.
The council met three times during the year, and provided advice on the use of radiation in preventive medicine, particularly unreferred whole body CT scanning and CT cardiac calcium scoring as screening tests. It also advised on radioactive waste issues and the use of precautionary approaches in radiation protection. Precautionary approaches have been adopted in standards for exposure to ionising radiation and radiofrequency radiation.

Other issues discussed by the council included Australia’s emergency response arrangements for radiological incidents, and development of the National Directory for Radiation Protection.

Joint convention on waste management

In anticipation of Australia’s ratification of the convention, the Commonwealth sought input from states and territories to prepare the Australian National Report on compliance with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. The division provided information to ARPANSA on South Australia’s compliance with the convention. The Australian National Report was not finalised during the period of this report.

Training and education

As an important part of its role in endeavouring to ensure safe use of radiation in South Australia, the division continued to participate in education and training programs conducted by a number of organisations including the University of South Australia, The University of Adelaide, Royal Adelaide Hospital, Institute of Medical and Veterinary Science, Flinders Medical Centre and North Western Adelaide Health Service. Lectures on radiation protection legislation and the principles and practices of ionising and non-ionising radiation protection were given to various occupational users of radiation and to groups receiving training in occupational health and safety.

Rural and remote X-ray operators

The division conducted four one-week basic diagnostic radiography courses for general practitioners (GPs) and registered nurses (RNs) requiring licences to perform limited radiographic procedures. These courses were conducted at the University of South Australia, School of Medical Radiation, which is now incorporated in the School of Health Sciences. Several in-service training sessions in basic radiography for licensed GPs and RNs were presented in a number of rural sites. The training was provided to practitioners working in locations with limited or no immediate access to specialist radiology services. This training is considered crucial for maintaining appropriate standards of radiography by GPs and RNs in remote locations, and facilitating access to appropriate radiological services while minimising medical radiation exposure to the rural population.

A revised remote and rural X-ray operators’ course began on 10 February 2003. The courses continue to be conducted over four-day (basic) or five-day (intermediate) duration. The structure of the course was changed as a direct result of film audits conducted throughout the State for non-radiographer operated sites, and feedback received from the Australian Institute of Radiography’s ‘Radiography—Outback Study Weekend’ at Whyalla in August 2002.

The previous range of radiography performed by licensed GPs and RNs allowed limited full body radiography. The new course limits the operators to perform radiography of the limbs, chest, pelvis and cervical spine, and provides more supervised clinical practical opportunities before students return to their workplaces.
Appendix—Conferences attended

Three officers attended the Australian Institute of Radiography National Conference, Reveal and Heal, at the Adelaide Convention Centre in March 2003. One officer presented an oral paper, Remote and Rural Radiography—the South Australian Perspective, outlining the necessity for changes in the training course for remote operators.

Two officers attended the annual conference of the Australasian Radiation Protection Society in Rotorua, New Zealand in November 2002. A range of radiation protection issues relevant to the regulatory functions of the division was discussed at the conference, including the latest information on human exposure to non-ionising radiation and the threat of nuclear terrorism. An officer of the division presented an oral paper, Medical X-ray Units—quality assurance measurement uncertainty, at the conference.

One officer attended the Third International Symposium on the Protection of the Environment from Ionising Radiation (SPEIR 3) in Darwin in July 2002. The symposium was organised by the Supervising Scientist Division of Environment Australia and ARPANSA in cooperation with the International Atomic Energy Agency. The program included sessions dedicated to ongoing research on the effects, responses and mechanisms of the interactions of ionising radiation with biota; policy and ethical dimensions of the development of a framework for environmental radiation protection; and the development and use of methods and models for evaluating radiation as a stressor in the environment.
### Appendix—Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARPANSA</td>
<td>Australian Radiation Protection and Nuclear Safety Agency</td>
</tr>
<tr>
<td>CT</td>
<td>computed tomography</td>
</tr>
<tr>
<td>DHS</td>
<td>Department of Human Services</td>
</tr>
<tr>
<td>ELF</td>
<td>extremely low frequency</td>
</tr>
<tr>
<td>EPA</td>
<td>Environment Protection Authority</td>
</tr>
<tr>
<td>GP</td>
<td>general practitioner</td>
</tr>
<tr>
<td>mSv</td>
<td>millisievert</td>
</tr>
<tr>
<td>NHMRC</td>
<td>National Health and Medical Research Council</td>
</tr>
<tr>
<td>NUIP(RC)</td>
<td>National Uniformity Implementation Panel (Radiation Control)</td>
</tr>
<tr>
<td>OACIS</td>
<td>Open Architecture Clinical Information System</td>
</tr>
<tr>
<td>PIRSA</td>
<td>Department of Primary Industries and Resources, South Australia</td>
</tr>
<tr>
<td>RN</td>
<td>registered nurse</td>
</tr>
<tr>
<td>SAR</td>
<td>specific absorption rate</td>
</tr>
</tbody>
</table>