

The logo consists of the letters 'RAC' in a white, serif font, positioned on a dark blue, parallelogram-shaped background that is tilted at an angle.

**RAC**

The text 'RADIATION ADVISORY COUNCIL' is written in a dark blue, serif font and is contained within a white rectangular box. The box is positioned horizontally across the page, overlapping a light blue background shape.

**RADIATION ADVISORY COUNCIL**

The text 'ANNUAL REPORT 2008-09' is written in a white, serif font and is contained within a dark blue rectangular box. The box is positioned horizontally across the page, overlapping a light blue background shape.

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The Honourable John Roberston MP  
Minister for Climate Change and the Environment

Dear Minister

It is my pleasure to forward to you for presentation to the Parliament of New South Wales the Annual Report of the Radiation Advisory Council for the period 1 July 2008 to 30 June 2009. This report has been prepared in accordance with the provisions of the *Radiation Control Act 1990*.

Yours sincerely

A handwritten signature in cursive script, appearing to read "C. Lambertson", followed by a small dot.

**CRAIG LAMBERTON**

Chairperson  
Radiation Advisory Council  
September 2009



## Contents

<b>Chairperson’s review</b> .....	<b>1</b>
<b>Responsibilities of the Council</b> .....	<b>3</b>
<b>Constitution of the Council</b> .....	<b>3</b>
<b>Functions of the Council</b> .....	<b>4</b>
<b>Meetings of the Council</b> .....	<b>4</b>
<b>Council’s strategic direction</b> .....	<b>7</b>
<b>Council’s work</b> .....	<b>7</b>
<b>Committees of the Council</b> .....	<b>9</b>
<b>National uniformity</b> .....	<b>13</b>
<b>Review of radiation control legislation</b> .....	<b>14</b>
Review of the NSW Radiation Control Act 1990 .....	14
Radiation Control Amendment (Sun Tanning Units) Regulation .....	15
<b>Licensing, registration and accreditation</b> .....	<b>16</b>
Licences to use, possess and sell radioactive substances and radiation apparatus .....	16
Registration of radiation apparatus, sealed source devices, and premises .....	19
Registration of diagnostic imaging apparatus .....	20
Registration of cyclotrons .....	21
Registration of therapy apparatus .....	21
Registration of sealed source devices .....	22
Registration of premises where radioactive substances are kept or used .....	23
Accreditation of CREs .....	24
<b>Radiation accidents</b> .....	<b>26</b>
<b>Appendix 1: Memorandum of Understanding between the EPA and the Radiation     Advisory Council</b> .....	<b>31</b>
<b>Appendix 2: Membership of committees of the Council during 2008–09</b> .....	<b>35</b>
<b>Abbreviations</b> .....	<b>37</b>



## Chairperson's review

From 1 July 2009 the Department of Environment and Climate Change (DECC) referred to in this report, was renamed the Department of Environment, Climate Change and Water, with additional responsibilities for water.

The Radiation Advisory Council (the Council) is established under the *Radiation Control Act 1990* (the Act). The Act and the Radiation Control Regulation 2003 (the Regulation) are administered by the Minister for the Climate Change and the Environment.

The Council held 7 meetings during the year and provided policy and regulatory advice to the Department of Environment and Climate Change on the administration of the Act and a wide range of radiation matters.

During 2008–09 the Council's work and activities that were of particular significance included:

- the endorsement of the draft discussion paper on the review of the Act, which was released for public comment in January 2009
- the provision of advice on the regulation of solaria in NSW. The Radiation Control Amendment (Tanning Units) Regulation commenced on 29 May 2009
- the review of the National Directory for Radiation Protection and review of and input to national codes and standards arising from the national uniformity process. The majority of this work is undertaken through Council's National Directory Committee
- provision of advice in relation to the Parliamentary Inquiry into the former uranium smelter site at Hunter's Hill
- the establishment of a committee to develop a strategy to identify and address radiation risks to human health and the environment associated with Naturally Occurring Radioactive Material (NORM) and Technologically Enhanced Naturally Occurring Radioactive Material TENORM
- the review of the work of Council's Shielding Assessment and Verification Committee particularly the revised draft guideline *Radiation Shielding Design Assessment and Verification Requirements* and endorsement of the revised *RAC Policy on X-Ray Protective Clothing*
- consideration of the outcomes of the review undertaken by NSW Health on the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) report on the potential exposure to Sydney Water employees and the measures that can be implemented to manage waste water from health care facilities
- the participation of several Council members in a multi-agency radiological training exercise held in April 2009. The aim of the multi-agency exercise was to develop emergency response capabilities relating to the dispersal of a radioactive substance
- the provision of advice into the implementation of the Code of Practice on the Security of Radioactive Sources.

During the year the Council continued to provide advice to DECC on routine radiation matters in relation to:

- radiation licensing, registration and accreditation of Consulting Radiation Experts
- the review of radiation accidents and incidents; and the assessment of radiation safety courses.

The Council's primary focus in the year ahead will be on:

- the review of the Act; commencement of work on the review of the Regulation
- input into the National Directory for Radiation Protection
- review and input to national codes and standards arising from the national uniformity process
- identifying radiation risks to human health and the environment association with NORM and TENORM.

I would like to sincerely thank all the members of the Council for their contribution and commitment to radiation safety in NSW. I would also like to acknowledge the excellent work of DECC staff in supporting the Council and its committees.



**CRAIG LAMBERTON**  
Chairperson  
September 2009

## Responsibilities of the Council

The Radiation Advisory Council (the Council) is constituted under section 29 of the *Radiation Control Act 1990* (the Act).

The object of this Act is to:

... secure the protection of persons and the environment from exposure to harmful ionising and non-ionising radiation to the maximum extent that is reasonably practicable, taking into account social and economic factors and recognising the need for the use of radiation for beneficial purposes.

Section 33(1) of the Act requires that 'as soon as practicable after 30 June (but on or before 31 December) in each year, the Council is to prepare and forward to the Minister a report of its work and activities for the 12 months ending on 30 June in that year'.

## Constitution of the Council

The Council consists of 16 members appointed by the Minister. Membership of the Council consists of:

- (a) the Director General or a member of staff of the Authority, who is to be the Chairperson
- (b) a medical practitioner who is a specialist in radiology
- (c) a radiographer with expertise in the field of human diagnostic radiography
- (d) a person with expertise in the industrial uses of radiation
- (e) a person with expertise in health physics
- (f) a medical practitioner who specialises in nuclear medicine
- (g) a person with expertise in non-ionising radiation
- (h) a person with expertise in occupational health and safety
- (i) a person who is a legal practitioner of at least 7 years' standing
- (j) a person who represents community interests
- (k) an officer of the Department of Health
- (l) a radiation oncologist
- (m) a medical physicist
- (n) an officer of the WorkCover Authority
- (o) a person with expertise in naturally occurring radioactivity
- (p) a person chosen by the Minister.

## Functions of the Council

Section 30 of the Act prescribes the functions of the Council, namely:

- (1) The Council is to advise the Minister on:
  - (a) proposed amendments to this Act and the making, amendment or repeal of regulations under this Act, and
  - (b) the administration of this Act and the regulations, and
  - (c) measures to prevent or minimise the dangers arising from radiation, and
  - (d) the granting of exemptions authorised by the regulations for periods exceeding 60 days, and
  - (e) such other matters relating to radiation safety as the Minister considers appropriate.
- (2) Any such advice may be given either at the request of the Minister or without any such request.
- (2A) The Council may at any time, and must on the request of the Authority, provide advice to the Authority about licences, registrations and accreditations under Part 2.
- (2B) The advice provided to the Authority may be general or specific, as the circumstances require.
- (3) The Council has such other functions as are conferred or imposed on it by or under this or any other Act.

The Department of Environment and Climate Change (DECC) exercises responsibilities and powers in the name of the Environment Protection Authority (EPA). DECC officers of the Hazardous Materials and Radiation Section support the work of the Council. The term EPA and DECC will therefore be used interchangeably throughout this document.

## Meetings of the Council

The Council at its December 2008 meeting endorsed the Council's meeting dates and Council committees' meeting dates for 2009.

During the reporting period ending 30 June 2009, the Council met seven times. The attendance of members at meetings during this period is shown in Table 1.

The Memorandum of Understanding (MoU) between the Council and the EPA is found in Appendix 1. The Council reviewed the MoU at its April 2009 meeting and as no significant changes were proposed Council agreed that the MoU not be amended.

<b>TABLE 1</b>			
<b>Members of the Radiation Advisory Council and meeting attendance 2008–09</b>			
<b>Member</b>	<b>Appointed position</b>	<b>Total meetings attended</b>	<b>Total meetings eligible to attend*</b>
Mr Craig Lamberton (Reappointed 16/3/2009)	Chairperson	6	7
Mr Simon Smith (Reappointed 16/3/2009)	Deputy Chairperson		
Dr Philip Pasfield (Reappointed 16/3/2009)	Radiologist	4	7
Dr Andrew Scott (Reappointed 16/3/2009)	Deputy Radiologist		
Mr John Robinson (Reappointed 16/3/2009)	Diagnostic Radiographer	6	7
Mr Glen Burt (Reappointed 16/3/2009)	Deputy Diagnostic Radiographer		
Mr Frank Galea (Appointed 27/6/2008)	Expert in industrial uses of radiation	6	7
Mr Colin Hockings (Term expired 5/7/2008)	Deputy expert in industrial uses of radiation		
Mr Troy Jones (Appointed 27/6/2008)			
Mr Brian Holland (Appointed 16/3/2009)	Health physicist	7	7
Mr Jeremy Pigott (Term expired 28/11/2008)	Deputy Health physicist		
Mr Roger Alsop (Appointed 2 October 2007)			
Dr Eva Wegner (Appointed 5/3/2008)	Physician in nuclear medicine	6	7
Dr Hugh Dixon (Appointed 5/3/2008)	Deputy physician in nuclear medicine		
Ms Kathy Meleady (Reappointed 16/3/2009)	Officer of the Department of Health	5	7
Dr Kerry Chant (Resigned Nov 2008 )	Deputy officer of the Department of Health		
Mr Wayne Smith (Appointed 5/6/2009)			
Dr Richard Smart (Reappointed 16/3/2009)	Medical physicist	7	7
Mr Paul Cardew (Reappointed 16/3/2009)	Deputy medical physicist		

<b>TABLE 1 (continued)</b>			
<b>Members of the Radiation Advisory Council and meeting attendance 2008–09</b>			
<b>Member</b>	<b>Appointed position</b>	<b>Total meetings attended</b>	<b>Total meetings eligible to attend*</b>
Mr Mark Moskvitch (Appointed 31 October 2007)	An officer of WorkCover Authority NSW	4	7
Ms Margaret Conley Appointed 27/6/2008)	Minister's nominee	6	7
Mr Luke Platt (Term expired 28/11/2008)			
Dr Brad Cassels (Appointed 16/3/2009)	Expert in naturally occurring radioactivity	7	7
Mr Michael Carter (Term expired 28/11/2008)	Deputy expert in naturally occurring radioactivity		
Mr Michael Carter (Appointed 16/3/2009)			
Assoc. Prof. Lee Collins, AM (Reappointed 16/3/2009)	Expert in non-ionising radiation	5	7
Mr Howard Ackland (Reappointed 16/3/2009)	Deputy expert in non-ionising radiation		
Mr Jon D'Astoli (Reappointed 2/10/2007)	Occupational health and safety officer	7	7
Ms Karen Wolfe (Appointed 2 October 2007)	Deputy occupational health and safety officer		
Dr Ludmilla Robinson (Reappointed 16/3/2009)	Legal practitioner	6	7
Mr John Clark (Term expired 28/11/2008)	Deputy legal practitioner		
Mr Geoff Bartels (Appointed 16/3/2009)			
Dr Cameron Hazlehurst (Reappointed 27/6/2008)	Community representative	7	7
Ms Lea Maher (Term expired 28/11/2008)	Deputy community representative		
Mr James Prior (Appointed 16/3/2009)			
Dr Mary Dwyer (Reappointed 16/3/2009)	Radiation oncologist	5	7
Dr Roland Yeghiaian-Alvandi (Reappointed 29/6/2009)	Deputy radiation oncologist		

\*There were 6 scheduled meetings of the Council and one Special Meeting to consider the draft discussion paper for the review of the Act.

The Council granted leave to members who were unable to attend meetings. In many instances absent members tendered written advice on agenda items. These submissions were considered by the Council and its committees.

## Council's strategic direction

During the reporting period, the Council continued to focus on its strategic direction for 2006 to 2009 by:

- developing uniform regulatory initiatives through the National Directory for Radiation Protection (the Directory) by reviewing national codes and standards and identifying regulatory gaps that may need to be addressed
- reviewing the regulatory model for radiation control in NSW to ensure an efficient and effective regime for controlling risks to human health and the environment, in particular, streamlining the Act by reducing red tape and duplication, considering a more outcomes-based legislation while accommodating national uniformity requirements
- identifying and addressing emerging issues in radiation protection such as Naturally Occurring Radioactive Material (NORM), Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) and the security of radioactive material
- identifying procedures and requirements to prevent or minimise dangers arising from the misuse of radiation materials. The Council in this area focused on emergency response capabilities through participation in a multi agency emergency management exercise and through participation in national programs.

## Council's work

During the reporting period Council focused its attention on:

- reviewing radiation control legislation, specifically the provision of advice to DECC on the draft discussion paper on the review of the Act, at a special meeting held on 18 July 2008
- the regulation of solarium in NSW
- the review of and input into national codes and standards arising from the national uniformity process
- the implementation of the *Code of Practice on the Security of Radioactive Sources*
- issues arising from NORM and TENORM and endorsing an approach for addressing NORM issues through the establishment of an RAC committee
- the provision of advice regarding the *National Radiation Protection Qualifications, Accreditations and Training Standards*.

Council nominated Mr John Robinson, a member of Council and the Council's National Directory committee, to the Radiation Health Committee Working Group, to consider these competencies.

A considerable amount of the work of Council is undertaken by the Council's committees. Details on the work of each of Council's committees are provided in the next section.

During the reporting period Council also provided advice to DECC in relation to routine matters such as:

- non-standard licensing applications
- radiation safety courses for the purposes of licensing

- non-standard registration applications
- non-standard accreditation applications
- the review of radiation accidents.

In addition, during the reporting period Council:

- considered and endorsed the Council's Annual Report 2008–09
- reviewed its corporate governance arrangements
- reviewed its work plan for 2009 and strategic direction for 2009 to 2012
- reviewed the Memorandum of Understanding between EPA and the Council
- considered and provided comments on the outcomes of the *Independent Review of the National Directory for Radiation Protection* coordinated by the Australian Government's Radiation Health and Safety Advisory Council
- considered advice on the current status of State and Commonwealth legislation of laser pointers
- considered and provided comment on the Parliamentary Inquiry into the former uranium smelter site at Hunters Hill (report of the General Purposes Standing Committee No. 5). Council was provided with updates on the remediation of the site and the government's submission to this Inquiry.
- considered and provided comment on the revised policy on the extension of working life for radiation sources in sealed source devices that have reached the manufacturer's recommended working life. Council recommended further discussion take place with the parties involved in order to seek practical outcomes regarding the working life of radiation sources. Council revisited the revised policy at its February and April 2009 meeting and supported the proposed policy as an interim measure until a national requirement is developed.
- considered the issue of some imported pet food that had undergone irradiation and noted that the producer of the pet food had withdrawn it from Australia
- considered the NSW Health revised *Policy for the Development of Prescription and Treatment Sheets for NSW Health Radiation Therapy Facilities*. The purpose of the policy is to provide a quality assurance framework to ensure the accurate delivery of specified dose of radiation to the selected targets by mandating data items to be recorded and checked during the radiation therapy prescription, planning and treatment process.
- considered the outcomes of the review by NSW Health of the ARPANSA report on the potential exposure to Sydney Water employees, and members of the public, when managing, discharging and reusing effluent collected from catchments that include hospitals with nuclear medicine capabilities. The report concluded that Iodine-131 discharges from hospitals are of no significant concern and in normal circumstances are well within annual dose limits for members of the public. The review recommended that future decisions to install decay holding tanks be based on actual data including any envisaged increase in Iodine-131 use.
- was briefed on a multi-agency radiological training exercise that was held in April 2009. Several Council members participated in this exercise. The aim of the multi-agency exercise was to develop emergency response capabilities regarding the dispersal of a radioactive substance

- considered a scoping paper and draft units of competency for a training course for assistants in medical imaging developed by the Community Services and Health Industry Skills Council
- received a presentation by DECC on the collection of radium paint from watchmakers
- considered a report provided by DECC on the use of radiation sources in schools. Council acknowledged that the activity of sources used in schools does not present a radiation health or security risk.
- considered reports of DECC compliance activities.

## **Committees of the Council**

Section 31 of the Act enables the Council to establish committees to help it carry out its functions. The Council has four standing committees:

- Regulatory Review and Reform Committee
- National Directory Committee
- Shielding Assessment and Verification Committee
- Naturally Occurring Radioactive Committee (NORM).

The Council at its October 2008 meeting endorsed the established of a new committee to consider a strategy to identify and address potential radiological risks relating to Naturally Occurring Radioactive Material (NORM) and Technologically Enhanced Naturally Occurring Radioactive Material (TENORM).

During 2008–09 the Council also:

- dissolved the Exemption Levels for Radionuclides Committee as the committee had fulfilled its terms of reference, specifically towards the development of a framework for applying the National Directory for Radiation Protection limits for radioactive material
- established a temporary committee to consider eight ANSTO training courses
- considered progress reports at each Council meeting on the work undertaken by each of its committees.

The Council's committees and the work of each committee are outlined below.

### **Regulatory Review and Reform Committee**

Council established the Regulatory Review and Reform Committee to ensure that the regulation of radiation in NSW is both efficient and effective in controlling risks to human health and the environment.

The committee's role is to review the basis of the current NSW regulatory regime and provide advice to Council and DECC on potential reform.

The committee is to carry out this work by:

- providing views from various stakeholders on the current regulatory framework
- comparing the NSW framework with those in other jurisdictions and overseas

- advising whether the framework is optimal to the needs of NSW
- providing advice on options for the development of a new model if required
- providing advice on any possible options to improve the existing framework, its effectiveness and administrative efficiency.

During the reporting period the committee met on two occasions and provided input to the draft discussion paper on the review of the Act. DECC provided the draft paper to the Council at a special meeting held on 18 July 2008 for Council's consideration. Council endorsed the draft discussion paper at this meeting and DECC released the paper for public comment in January 2009. The committee reviewed the public comments at its March 2009 meeting and the Council reviewed the committee's deliberations and provided advice to DECC on the key issues for the review of the Act at its June 2009 meeting.

The Chairperson especially thanked Dr Henry Forester (DECC), committee members and Council members for their work on the review. Council's recommendations will be utilised by DECC to prepare advice to the Minister on the review of the Act and the drafting of the new legislation.

### **National Directory Committee**

The National Directory Committee was established by Council to assist it in the development and implementation of the Directory and to ensure that its proposals are practicable and effective in controlling radiation risks to human health and the environment.

The role of the committee is to provide advice to Council and DECC on the priorities and suitability of material within the Directory, and its legislative, financial and operational impact on DECC, other NSW Government agencies and NSW as a whole.

During the reporting period the committee met on four occasions and considered and provided advice to the Council and DECC in relation to:

- Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) draft documents/issues:
  - *Code of Practice for Radiation Protection in the Use of Ionizing Radiation by Chiropractors* and the Regulatory Impact Statement
  - *Safety Guide: Management of Naturally Occurring Radioactive Material* (Radiation Health Committee approval draft 1, 1 July 2008)
  - *Safety Guide: Use of Radiation in Schools Part 1: Ionizing Radiation*, Consultation Draft: 7 August 2008
  - *National Directory for Radiation Protection Amendment No. 4 2008 Solaria* and the Regulatory Impact Statement
  - Proposal to produce further NORM Safety Guide annexes on the coal and mineral sands industries
  - *Classification and Operational Management of Radioactive Waste in Australia*
  - *National Directory for Radiation Protection: Amendment: X-ray Analysis Equipment*
  - *National Directory for Radiation Protection: justification of NIR sources/practices in NDRP*
  - the review of the Radiation Health Committee (RHC) approval draft: *Safety Guide for the Use of Radiation in Schools*

- *Code of Practice and Safety Guide on Radiation Protection in Veterinary Medicine and the Regulatory Impact Statement*
- RHC strategic direction document
- Radiation Protection Training Competencies
- International Atomic Energy Agency (IAEA) Draft Safety Standards:
  - *International Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources (Draft Safety Requirements DS379) Version 1.0 (2 July 2008)*
- *Scoping Report on Industrial Radiation Protection Training in Australia* by Government Skills Australia (May 2008)
- National Radiation Protection Qualifications, Accreditation and Training Standards

During the reporting period the committee also received an update on the draft solaria standard by Mr Lee Collins, Council's nominee on the Standards Australia Committee for the review of the Joint Australian/New Zealand Standard AS/NZS 2635:2002 *Solaria for Cosmetic Purposes*.

### **The Shielding Assessment and Verification Committee**

The Council established the Shielding Assessment and Verification Committee to address issues relating to premises shielding and the accreditation of Consulting Radiation Experts (CREs) for the purpose of certifying all premises in NSW where radioactive substances are kept or used and where radiation apparatus is used.

The committee is to carry out this work by determining:

- the technical criteria necessary for the proper safe shielding of premises for certification by CREs. The committee is to undertake this through the development of a guideline and by referring to technical documents published by professional and government organisations.
- a classification system of the CREs to be accredited and the criteria for the accreditation of these CREs by DECC. The accreditation criteria will depend on the level of the hazard of the practices/premises that the CREs are to certify as being compliant with the requirements of the Regulation
- an administrative mechanism whereby DECC, in collaboration with the Council, can issue these CREs with a Certificate of Accreditation.

The Council during the reporting period endorsed the revised draft radiation guideline 7: *Radiation Shielding Design Assessment and Verification Requirements* for premises which was developed by the committee in conjunction with DECC. DECC released the draft guideline for public comment on 18 February 2009. The committee considered the public consultation feedback at its 15 May 2009 meeting and recommended further amendments to the draft document. The committee proposes to submit the final draft guideline to Council at its August 2009 meeting for endorsement.

The committee also during the reporting period provided Council with the revised RAC *Policy on X-Ray Protective Clothing* for endorsement. The Council endorsed the revised policy at its June 2009 meeting and recommended that the matter in relation to non-lead garments be referred to:

- the Radiation Health Committee (RHC) to consider a national policy on protective clothing

- Standards Australia to review *AS/NZS 4543.1:1999 Protective devices against diagnostic medical X-radiation – Determination of attenuation properties of materials*.

The Chair thanked Ms Freschi (DECC) and committee members for their work on the revised policy.

### **Naturally Occurring Radioactive Materials Committee (NORM)**

The Council established the NORM Committee at its April 2009 meeting to identify, and where necessary address, radiation risks to human health and the environment associated with NORM and TENORM.

The committee is to carry out this work by:

- identifying operations, environments and/or materials involving NORM in NSW
- identifying potential industry sectors in NSW that might cause people to be exposed to elevated risks due to NORM and TENORM
- prioritising NORM industries/issues needing attention in NSW and encouraging ARPANSA to bring these matters onto the priority list
- assisting DECC to work with NSW industry on NORM-related issues to educate and encourage the adoption of working practices that minimise radiation exposure of employees, the public and the environment
- developing materials/strategies for priority NORM issues in NSW with the view of supplementing initiatives being undertaken at the national level
- assessing the implications of draft annexes of the ARPANSA *Safety Guide Management of Naturally Occurring Radioactive Material* on the NSW-regulated community and practice in general
- assisting in the development of further industry specific annexes for the National Directory for Radiation Protection: *Safety Guide for the Management of NORM*
- identifying what is necessary to put into the public domain and how that might be achieved.

The NORM Committee will provide advice to DECC and the Council on priorities and strategies relating to radiation safety pertaining to NORM and TENORM.

During the reporting period, the NORM Committee convened its first meeting on 19 June 2009 to discuss its work and outcomes.

### **Committee to consider eight ANSTO training courses**

Council established a temporary committee to consider eight ANSTO training courses for the purposes of licensing individuals across a wide range of uses under the Act. DECC submitted the initial application to the Council on 20 June 2008. However, due to the number of courses Council agreed to convene a committee to consider the courses. The committee met and considered the courses on 18 July 2008 and provided its recommendations to the Council on 15 August 2008. The committee considered each course in terms of its content, objectives, suitability of licence categories, assessment, entry requirements and course duration. The Council considered the committee's report and endorsed the recommendations of the committee and gave in principle approval subject to the issues raised by the committee being resolved.

Membership of all Council committees is shown at Appendix 2.

## National uniformity

In August 1999 the Australian Health Ministers' Conference (AHMAC) agreed that the approach to national uniformity would be through the development of the Directory, which would allow all jurisdictions, including the Commonwealth, to achieve national uniformity in their radiation protection frameworks.

The RHC is developing the Directory, facilitated by ARPANSA. The first edition of the Directory was endorsed in May 2005 by AHMAC.

Documents referenced in Schedule 11 of the Directory are to be specifically adopted, under the terms of the National Competition Policy (NCP) Agreements, by each jurisdiction within their regulatory frameworks. NSW amended the Act in 2001 to provide an easy mechanism for the adoption of such documents. The RHC in November 2007 agreed that the second edition of the Directory would not be progressed as a consolidated document, but would be a series of individual issues with separate regulatory impact statements, and, when finalised, submitted to AHMAC for endorsement.

During the reporting year, the Council (through its National Directory Committee) provided DECC with advice on:

- the *National Directory for Radiation Protection*
- safety guides, draft codes and corresponding Regulatory Impact Statement Consultation. These ARPANSA draft documents were issued for public comment and are intended for inclusion in the Directory.

During the reporting period the Council also:

- considered the implementation of the *Code of Practice on the Security of Radioactive Sources* and:
  - received a presentation on the national implementation of the code by Mr Peter Ellis, ARPANSA. Mr Ellis indicated that NSW was leading the way relative to other jurisdictions in implementing the code.
  - received a presentation from DECC on the progress of the implementation of the code in NSW and DECC's inspection/audit program 2008
  - was provided with advice on, and invited to attend, two three-day training courses conducted by ARPANSA and DECC (sponsored by DECC) for relevant organisations and individuals on the code held in March and April 2009. Several Council members attended the training
- received an update on the competency-based training for radiation occupations being developed by RHC
- received reports on the outcomes of the RHC meetings held in July 2008, November 2008 and March 2009.

## **Review of radiation control legislation**

### **Review of the NSW Radiation Control Act 1990**

During 2008–09 the Council, at a special meeting held on 18 July 2008, considered and endorsed the draft discussion paper on the review of the Act. The discussion paper canvassed the issues that are proposed to be examined in the review. The draft discussion paper was approved by the Minister in December 2008 and released for public consultation for a period of time from mid January 2009 to 27 February 2009.

The review had examined a number of key issues including some that will have an impact on the achievement of Priority P3 (Cutting red tape) of the NSW Government's State Plan. Key issues included:

- the original intended objectives of the legislation and whether these are being met
- an examination of the role of the Council in achieving these radiation protection objectives
- the national uniformity process and the National Directory for Radiation Protection as it is being developed through codes of practice, safety guides, and national standards for adoption by the states and territories
- the final report of the NCP Review of radiation protection legislation and the National Competition Principles Agreement
- the Council of Australian Governments (COAG) Principles and Guidelines for National Standard Setting and Regulatory Action by Ministerial Councils and Standard Setting Bodies (the COAG Guidelines)
- parallels with other outcomes-based legislation (OH&S legislation, and Commonwealth, Queensland, Victorian, and United Kingdom radiation protection legislation)
- the implementation of security initiatives endorsed by COAG
- costs of administration of the Act, Regulation and legislative instruments (particularly the system of licensing and registration)
- examination of possible ways to reduce the burden of red tape on business and the regulated community, without compromising radiation safety
- an examination of potential ways to streamline the system of authorisations without compromising radiation safety.

Views were particularly sought in relation to the proposals for a system of registration with DECC for items of radiation apparatus, sealed source devices and premises where unsealed radioactive sources are kept or used.

The Council at its June 2009 meeting considered a summary of the key issues for the review of the Act which were derived from the consultation process including deliberations of the Council's Regulatory Review and Reform Committee, consultation with the Council and DECC. These issues will be used to provide advice to the Minister and where supported to guide the drafting of the amended legislation.

## Radiation Control Amendment (Sun Tanning Units) Regulation

During the reporting period the Council considered and provided input to the regulation of solaria in NSW in response to increasing public concerns about the health risks associated with exposure to ultraviolet radiation from sun-tanning units. Council:

- extended an invitation to Louisa Gordon from Queensland Institute of Medical Research to present her paper on *The Health Effects of Using Solaria and Cost-effectiveness of Enforcing Regulations in Australia*. Ms Gordon presented her paper to Council on 15 August 2008
- considered and provided comment on the draft Australian/New Zealand Standard – *Solaria for Cosmetic Purposes*. Council in the last period nominated Mr Lee Collins, a member of Council, who, during the reporting year, participated on the Standards Australia Committee for the review of the Joint Australian AS/NZS Standard
- discussed and provided comments on the proposed draft Radiation Control Amendment (Tanning Units) Regulation (draft Amendment Regulation) taking into consideration changes to the final draft AS/NZS Standard *Solaria for Cosmetic Purposes*.

DECC prepared the draft Amendment Regulation taking into account advice provided by the Council, and in December 2008 released the draft to the public seeking comment by 27 February 2009. The draft amendment Regulation was prepared to be consistent with draft uniform requirements prepared by ARPANSA, the RHC and Standards Australia (*AS/NZS 2635:2008: Solaria for Cosmetic Purposes*). The Australian Standard outlines the requirements for installing, maintaining and operating commercial sun-tanning units in, for example, clubs, sporting establishments, beauty salons and various cosmetic institutions.

Council members at the February 2009 meeting considered the Draft Amendment Regulation public consultation feedback and, provided further comment on the Draft Amendment Regulation.

During the reporting period the Radiation Control Amendment (Tanning Units) Regulation was gazetted and commenced on 29 May 2009. The Amendment Regulation covers a range of behavioural and technical issues on the use of tanning units, including:

- usage limited to persons over 18 years
- operators must receive appropriate training that is consistent with the National Standard
- the assessment of skin type must be conducted by a trained operator and persons with type 1 (fair) skin (that burns and never tans) must not be permitted to use the units
- prohibiting exposure of persons to radiation from tanning units without written consent
- restrictions on the amount of UV radiation exposure individuals are to receive
- restrictions on the frequency of exposure sessions (not within 48 hours of a previous session)
- requiring the supervision of clients by tanning unit operators
- requiring the training of tanning unit operators
- requiring the display of warning notices at solarium businesses
- prohibiting the making of representations or claims about any health benefits of tanning units and their safety from risk.

## Licensing, registration and accreditation

The EPA is the authority responsible for dealing with applications and variations for items listed under Part 2 of the Act. The EPA is empowered to seek, or take into consideration, the advice of the Council on licensing, registration and accreditation matters. Under section 30 of the Act, the Council can provide generic or specific advice to DECC on applications under Part 2 of the Act.

The way in which the Council and the EPA agree to work with each other on determining applications is set out in the MoU between the Council and the EPA. The MoU is provided at Appendix 1.

Council's deliberations in relation to licensing registration and accreditation are provided below.

### Licences to use, possess and sell radioactive substances and radiation apparatus

The Act under section 6 regulates the use and sale of radioactive substances and radiation apparatus. Section 6(2) prohibits a person from using, selling or possessing radioactive substances or radiation apparatus unless they hold a current licence and comply with its conditions. Clause 8 of the Regulation provides an exemption from section 6 of the Act for specified categories of persons.

During the reporting period, the Council:

- endorsed 16 non-standard licence conditions
- considered a licence application and recommended that the applicant verify that his qualifications are equivalent to a similar qualification in Australia (i.e. assessed by the National Office of Overseas Skills Recognition (NOOSR)) before the licence to use radioactive substances and radiation apparatus for radiation oncology physics (tier 2) could be approved by DECC
- considered a licence application where the applicant had an overseas qualification and was seeking a licence to use radioactive substances and radiation apparatus for oncology physics. Council recommended that the applicant be granted these licence conditions, without further referral to Council, subject to the following documentation being provided by the applicant:
  - certified copies of qualifications
  - verification that the last employer was contacted and a verbal reference given
  - verification by NOOSR or other acceptable assessment process to show that the qualifications are equivalent to Australian qualifications
- considered the statistics of routine licences issued by DECC during the year
- endorsed and provided advice on the following radiation safety courses/training programs for the purposes of licensing:
  - *Radiation Safety Course HH & FP XRF* provided by Thermo Optek (Australia) Pty Ltd for the purposes of licensing individuals to use portable x-ray fluorescence (XRF) radiation apparatus for analysis (IA19) and to use radioactive substances in a portable x-ray fluorescence (XRF) analyser (S19)

- *Radiation Safety and Radiographic Technique Training – Cone Beam Volumetric Tomography* provided by Gammasonics Radiological Services Pty Ltd for the purposes of licensing individuals to use dental CT
- Australian College of Physical Scientists and Engineers in Medicine (ACPSEM) Training, Education and Accreditation Program for the purposes of licensing individuals to use apparatus and radiation substances for radiation oncology physics – tier 2 (IA29S and S29S)
- *Introduction Course in Operational Radiation Protection of the Innov-X field Portable XRF Analyser* provided by JBS Health Physics for the purposes of licensing individuals to use portable XRF radiation apparatus for analysis (IA19)
- *Radiation Safety for Laboratory Workers* provided by University of Sydney for the purposes of licensing individuals to use radioactive substances for scientific or research purpose (S8)
- *Bachelor of Medical Radiation Science* provided by University of Newcastle for the purposes of licensing individuals to use computed tomography for nuclear medicine technology (IA16)
- *Certificate IV in Dental Assisting* provided by Integrated Care Management, subject to the provider resubmitting the course to the satisfaction of DECC for the purposes of gaining an IA20 licence to use radiation apparatus for general dental radiography – dental assistance/nurses. Council recommended that the provider include additional information to the course specifically in relation to digital technology; radiation safety; responsibilities of the user; and appropriate legislation requirements
- advised DECC that the radiation safety course *Work Safely with Instruments that Emit Ionising Radiation* provided by Bartlett Consulting Pty Ltd in its current status is not adequate for the purposes of licensing individuals to use radioactive substances for moisture/density determination (S30). The Council recommended that prior to it reconsidering the course the course needed to be reviewed and include: additional radiation safety course material; a practical component and an appropriate assessment
- provided advice on whether the use of courses approved for licensing in other jurisdictions could satisfy the criteria for an equivalent licence category in NSW. Council advised DECC that this approach could be useful.

During the reporting period the Council also:

- was informed of changes to the names of the following courses (where no significant change to the course content had occurred):
  - the course Radiography and Radiation Safety (Part of 1144A) provided by TAFE renamed Work Safely with Ionising Radiation (MEM13103B)
  - Courses provided by ANSTO:
    - Safe handling and use of unsealed radioactive sources renamed Radiation safety for laboratory workers (SLW)
    - Safe use of industrial radiation gauges; Safe use of industrial gauges renamed Safe use of fixed radiation gauges (SIG)
    - Safe use of nuclear type soil moisture and density gauges; Safe use of soil moisture gauges renamed Safe use of portable density/moisture gauges (SNG)
- received a presentation from DECC on its enforcement campaign that targeted dental, veterinary, chiropractic and medical facilities focusing on licensing requirements under the Act.

For the reporting period ending 30 June 2009, Council was advised that DECC issued 1370 new licences, including 89 licences for sale/possession and 1281 licences to use radiation apparatus and/or radioactive substances. The total number of licences (1370) is the number of actual individual new applications that resulted in a licence being issued.

Table 2 lists the licence conditions issued by occupational category. As a licence may contain more than one condition the total number of licence conditions issued for radioactive substances and ionising radiation apparatus in Table 2 is greater than the number of actual licences issued.

During 2008–09 DECC also renewed 5389 licences.

At the end of the reporting period there were 11,959 active licences.

<b>TABLE 2</b>		
<b>Number of new licence conditions issued in 2008-09 listed by licence category</b>		
<b>Occupational category</b>	<b>To use radioactive substances</b>	<b>To use ionising radiation apparatus</b>
Analytical work	1	13
Auditing and quality assurance work	4	5
Bone mineral analysis and body composition analysis work	n/a	133
Chiropractic work	n/a	136
Dental	n/a	323
Educational and demonstration work	7	5
Industrial and other related work	358	142
Installation and servicing work	50	108
Medical – Nuclear medicine work	105	58
Medical – Physics work	33	41
Medical – Radiation therapy work	127	150
Medical – Radiography radiology/fluoroscopy work	n/a	1142
Medical diagnosis work	1	n/a
Radiopharmacy work	9	n/a
Scientific and research work	195	26
Sell or Possess	108	183
Veterinary work	3	304
Other	5	31
<b>Total</b>	<b>1006</b>	<b>2800</b>

Table 3 summarises the number of new licence conditions issued by DECC during the period 2005–06 to 2008–09.

<b>TABLE 3</b>			
<b>Number of new licence conditions issued from 2005–06 to 2008–09</b>			
<b>Period</b>	<b>Radioactive substances</b>	<b>Radiation apparatus</b>	<b>Total</b>
July 2005–June 2006	873	1870	2743
July 2006–June 2007	742	1876	2618
July 2007–June 2008	683	1592	2275
July 2008–June 2009	1006	2800	3806

### **Registration of radiation apparatus, sealed source devices, and premises**

Section 7 of the Act requires the registration of sealed source devices (SSD) and certain prescribed radiation apparatus. Section 8 of the Act requires premises to be registered where radioactive substances, which are not contained in a sealed source device, are kept or used.

The purpose of registration is to:

- enable the regulatory authority to place best practice requirements on the operation and maintenance of radiation apparatus, SSD and radioactive substances; including the design and construction of premises where radiation apparatus, SSD and radioactive substances are kept or used
- enable up-to-date records to be kept on all sealed source devices, certain radiation apparatus, and on premises where radioactive substances are kept or used
- allow the regulatory authority to restrict the use of apparatus, SSD and radioactive substances to pre-agreed practices or activities, which ensure that the protection of individuals and the environment is optimised.

During the reporting period the Council also:

- received statistics for routine registrations issued during the year ending 30 June 2009
- received a presentation by DECC on its enforcement campaign that targeted dental, veterinary, chiropractic and medical facilities focusing on registration requirements under the Act.

Table 4 provides a list of items that are required to be registered with DECC and their registration commencement dates.

<b>TABLE 4</b>	
<b>Registration categories and registration commencement dates</b>	
<b>Registration category</b>	<b>Commencement date</b>
Diagnostic Imaging Apparatus	11 August 2000
Cyclotrons	1 December 2001
Therapy Apparatus	1 February 2004
Sealed Source Devices	1 July 2004
Premises where radioactive substances are kept or used	1 July 2004

A summary of each registration category and the number of registrations in each category is provided below.

### Registration of diagnostic imaging apparatus

The registration period for diagnostic imaging apparatus is valid for 2 or 5 years, depending on the type of apparatus as shown in Table 5.

<b>TABLE 5</b>	
<b>Duration of registration for diagnostic imaging apparatus</b>	
<b>Category</b>	<b>Duration of Registration</b>
Dental radiography (fixed and mobile)	5 years
Radiography (fixed and mobile)	5 years
Fluoroscopy (fixed and mobile)	2 years
Radiography/fluoroscopy (fixed and mobile)	2 years
Mammography (fixed and mobile)	2 years
Computed tomography (includes dental apparatus classified as computed tomography)	2 years
Panoramic radiography (with/without cephalometry)	5 years
Bone mineral densitometry	5 years

During the year ending 30 June 2009, DECC issued 974 new registrations for diagnostic imaging apparatus as shown in Table 6. Table 6 also summarises the number of new diagnostic imaging apparatus registered with DECC between 2005–06 and 2008–09.

As at 30 June 2009 the total number of diagnostic imaging apparatus registered with DECC was 7084.

In previous reports statistics for the number of registration renewals for diagnostic imaging apparatus by apparatus type were provided, however due to system limitations this data is unable to be provided for this report.

<b>TABLE 6</b>				
<b>Number of new diagnostic imaging apparatus registered between 2005–06 and 2008–09</b>				
<b>Equipment type</b>	<b>2005–06</b>	<b>2006–07</b>	<b>2007–08</b>	<b>2008–09</b>
Fixed dental radiography	422	374	197	363
Fixed radiography	119	92	73	117
Fixed fluoroscopy	16	10	8	14
Fixed radiography/fluoroscopy	19	22	14	25
Fixed mammography	26	16	31	68
Computed tomography	65	56	53	93
Dental CT	3	2	4	1
Bone mineral densitometry	27	16	18	24
Mobile dental radiography	10	6	11	15
Mobile radiography	101	61	51	60
Mobile fluoroscopy	38	21	26	54
Mobile radiography/fluoroscopy	7	7	3	14
Mobile mammography	4	0	2	10
Panoramic radiography	39	51	68	116
<b>Total</b>	<b>896</b>	<b>734</b>	<b>559</b>	<b>974</b>

### Registration of cyclotrons

The Radiation Control Regulation 2003 prescribes cyclotrons as radiation apparatus and requires cyclotrons to be registered under the Radiation Control Act. Cyclotrons are required to be registered every two years.

As at 30 June 2009, there was only one registered cyclotron.

### Registration of therapy apparatus

The Regulation requires that radiation apparatus used or intended to be used for radiotherapy or radiotherapy planning purposes must be registered. Radiotherapy apparatus is required to be registered every 2 years.

During the year ending 30 June 2009, DECC issued 12 new registrations for therapy apparatus as shown in Table 7. Table 7 also summarises the number of registrations for each type of therapy apparatus issued by DECC between 2005–06 and 2008–09.

As at the 30 June 2009 the total number of therapy apparatus registered with DECC was 74.

In previous reporting periods the numbers of registration renewals for each therapy apparatus type were also provided, however due to system limitations this data is unable to be provided for this reporting period.

<b>TABLE 7</b>							
<b>Number of therapy apparatus registrations between 2005-06 and 2008-09</b>							
<b>Equipment type</b>	<b>2005-06</b>		<b>2006-07</b>		<b>2007-08</b>		<b>2008-09</b>
	<b>New</b>	<b>Renewed</b>	<b>New</b>	<b>Renewed</b>	<b>New</b>	<b>Renewed</b>	<b>New</b>
Kilovoltage therapy x-ray (superficial/orthovoltage)	3	25	0	0	2	16	3
Linear accelerator	3	9	12	4	2	23	7
Simulator	0	14	2	0	1	5	2
<b>Total</b>	<b>6</b>	<b>48</b>	<b>14</b>	<b>4</b>	<b>5</b>	<b>44</b>	<b>12</b>

### Registration of sealed source devices

Under the Regulation sealed source devices must be registered. The registration period for sealed source devices is every 2 years.

During the reporting period, DECC registered 290 new sealed source devices as shown in Table 8. Table 8 also summarises the number of registrations of sealed source devices issued by DECC between 2005-06 and 2008-09. In previous reporting periods the number of registration renewals for sealed source devices were also reported, however due to system limitations this data is unable to be provided for this reporting period.

At the end of the reporting period there were a total of 1034 sealed source devices registered with DECC.

<b>TABLE 8</b>						
<b>Number of sealed source devices registered between 2005-06 and 2008-09</b>						
<b>Equipment type</b>	<b>2005-06</b>	<b>2006-07</b>		<b>2007-08</b>		<b>2008-09</b>
		<b>New</b>	<b>Renewed</b>	<b>New</b>	<b>Renewed</b>	<b>New</b>
Borehole logging	8	5	11	0	7	3
Soil moisture density & moisture determination	30	18	208	39	26	103
Density gauge	22	5	5	7	19	1
Neutron probe	1	7	36	2	1	31
Industrial radiography	14	6	20	3	6	25
XRF analyser	3	2	17	2	2	3
Portable gauge	1	0	8	0	1	2
Beta backscatter thickness testing	0	1	0	0	1	1
Self-shielded irradiator	2	4	12	2	2	4
Therapy device	3	1	8	2	3	6
Analyser	0	0	2	0	0	1
Nuclear medicine gamma camera	0	0	10	2	0	1
Fixed radiation gauges	63	58	249	70	319	109
<b>Total</b>	<b>147</b>	<b>107</b>	<b>586</b>	<b>129</b>	<b>387</b>	<b>290</b>

### Registration of premises where radioactive substances are kept or used

Section 8 of the Act requires that premises on which a radioactive substance, that is not contained in a sealed source device, is kept or used must be registered with DECC. The registration period for premises where radioactive substances are kept or used is 2 years.

At the end of the reporting period, DECC registered 41 new premises as shown in Table 9. Table 9 also summarises the number and category of new premises registered with DECC between 2005-06 and 2008-09. The table does not include renewals.

At the end of the reporting period, there was a total of 262 premises registered with DECC where radioactive substances are kept or used.

<b>TABLE 9</b>				
<b>Number and category of new premises registered where radioactive substances are kept or used between 2005–06 and 2008–09</b>				
<b>Premises category</b>	<b>2005–06</b>	<b>2006–07</b>	<b>2007–08</b>	<b>2008–09</b>
Low	29	20	12	33
Medium	13	7	12	8
High	2	0	2	0
<b>Total</b>	<b>44</b>	<b>27</b>	<b>26</b>	<b>41</b>

### **Accreditation of CREs**

The Act provides that the EPA is responsible for accrediting CREs and, through section 9A of the Act, may seek the Council's advice on accreditation matters. The Regulation sets out the following activities of a CRE:

- a) advising on the design of premises to be registered under section 8 of the Act in relation to radiation safety requirements
- b) assessing plans for premises to be registered under section 8 of the Act in relation to radiation safety requirements for the purpose of certifying compliance with the requirements necessary for registration
- c) measuring and assessing radiation doses from ionising radiation apparatus used for medical therapy
- d) measuring and assessing radiation doses from ionising radiation apparatus used for diagnostic purposes
- e) advising on the design of premises, in relation to radiation safety requirements, in which sealed source devices or radiation apparatus prescribed under section 7(1) of the Act are kept or used
- f) assessing plans for premises in which sealed source devices or radiation apparatus prescribed under section 7(1) of the Act are kept or used, for the purpose of certifying compliance with any requirements for registration under section 7(5) of the Act
- g) assessing radiation apparatus, sealed source devices and premises that are required to be registered under section 7 or 8 of the Act for the purpose of certifying compliance with the requirements for registration
- h) assessing the integrity of any shielding of premises in which sealed source devices or radiation apparatus prescribed under section 7(1) of the Act are kept or used for purposes of certifying compliance with the requirements for registration.

During the year the Council provided advice on:

- an application for CRE (industrial category) – Council informed DECC that it could not form a view on whether the applicant is able to gain accreditation in this category until the Council could consider the applicant's qualification/s or test the applicant's competence. Council suggested that DECC resurrect and review the EPA examination previously given to applicants
- statistics of routine accreditation issued by DECC during the year.

During the reporting year ending 30 June 2009, DECC issued two new CRE accreditations. The number of new accreditations is the number of actual individual applications resulting in a new accreditation being issued.

Table 10 lists the number of accreditation conditions issued for each category, which includes new applications and variations to existing accreditations. These figures represent the number of accreditation conditions issued, not the actual number of accredited CREs. A CRE may have more than one condition therefore the total number of accreditation conditions issued will be greater than the number of accredited CREs.

Table 10 shows that at the end of the reporting period there were 156 active accreditation conditions. The total number of accredited CREs was 99.

From 1 July 2003 CREs were required to renew their accreditation annually.

<b>TABLE 10</b>			
<b>Number of accreditation conditions issued during 2008–09 and the total number of accreditation conditions as at 30 June 2009</b>			
<b>Category</b>	<b>Equipment</b>	<b>2008–09</b>	<b>Total as at 30 June 2009</b>
Diagnostic imaging	Mammography	3	25
	Dental (intra-oral, OPG and cephalometry)	5	44
	Dental (intra-oral, OPG and cephalometry)		
	Radiography		
	Fluoroscopy	5	68
	Computed tomography		
	Bone mineral densitometry (including veterinary and chiropractic)		
	Radiography		
	Fluoroscopy		
	Computed tomography	1	6
	Bone mineral densitometry (including veterinary and chiropractic)		
Industrial	Fixed radiation gauges	0	13
<b>Total</b>		<b>14</b>	<b>156</b>

## Radiation accidents

Clauses 27 and 28 of the Regulation outline the mandatory requirements imposed on an employer in regard to the reporting and recording of radiation accidents. Clause 26 of the Regulation specifies the types of incidents that are classified as radiation accidents for the purposes of the Act.

Accidents are normally caused by either deficiency in the relevant management systems, or failures on the part of individuals to implement those systems correctly. The Council normally recommends that new procedures be developed and implemented in cases where investigations reveal that accidents were caused by a deficiency in the management system. The Council usually recommends counselling or further training where an individual is at fault where this has not been undertaken by the organisation to prevent the type of incident from recurring. In specific circumstances, enforcement action may be warranted.

Serious health (medical) related accidents may be referred to the Health Care Complaints Commission (HCCC) on the recommendation of Council. DECC has standing advice to refer all matters to the HCCC that are considered significant by the Council.

During the reporting period ending 30 June 2009, DECC was informed of 26 instances where radiation accidents may have occurred. These involved 32 people. The Council considered each case and, where appropriate, made recommendations that, in its opinion, would reduce the risk of a recurrence.

The Council emphasises that it is vital that accidents are consistently reported, even if the dose received was negligible, not just because of a legal requirement, but because the knowledge gained can help to develop processes and procedures that reduce the risk of similar accidents occurring in the future.

A summary of all the accidents reported to Council and subsequent recommendations of the Council are provided below. The summary is grouped by categories of accidents: nuclear medicine, therapy, radiology and other.

### Nuclear medicine

The Council reviewed the following accidents and the controls that the facilities had instigated to correct deficiencies in their standard operating procedures, and was satisfied with the steps the organisations had taken to prevent the type of incident from recurring.

- A patient received 564 MBq of Tc-99m dimercaptosuccinic acid (DMSA) instead of the prescribed 600 MBq Tc-99m diethylene-triamine-penta-acetic acid (DTPA) due to the wrong radiopharmaceutical being supplied to the practice. The patient received an effective dose of 4.96 mSv.
- A patient was incorrectly given 1.2 GBq Tc99m sestamibi (cardiac scan agent) rather than 1 GBq of Tc99m HDP due to the incorrect radiopharmaceutical being selected. The patient received an effective dose of 10 mSv.
- A patient undergoing a cardiac Sestamibi test was injected with 400 MBq Tc-99m Sestamibi instead of 1 GBq of Tc-99m resulting in an un-diagnostic scan resulting in the patient having to repeat the scan. The accident occurred due to the patient/dose label not being checked. The patient received an effective dose of 3.16 mSv.
- Four patients each received approximately 330 MBq of F-18 (FDG) as part of a routine PET/CT scan however, due to a breakdown in the PET/CT scanner gantry camera mechanism, each patient received an effective dose of approximately 6 mSv.

- A patient was injected with 615 MBq of Tc-99m Per technetate instead of 200 MBq of Tc-99m Per technetate. The accident occurred as the activity of the radionuclide was not checked. The effective dose to the patient was calculated to be 5.4 mSv.
- A patient was administered with 1040 MBq Tc-99m sodium per technetate instead of 99m Tc-MDP. The patient received an estimated effective dose of 13 mSv.
- A patient received 400 MBq of Tc-99m Sestamibi for a myocardial perfusion study instead of 400 MBq of Tc-99m per technetate. The patient received an effective dose estimate of 4.8 mSv. The accident occurred as a result of the wrong tracer vial being selected and drawn from.
- Two patients were incorrectly administered Tc-99m per technetate instead of Tc-99m DTPA due to the mislabelling of the radiopharmaceutical from the supplier.

The first patient was incorrectly administered with 770 MBq Tc-99m per technetate instead of 770 MBq of Tc-99m DTPA. The patient received an effective dose of 8.47 mSv.

The second patient was incorrectly administered with 120 MBq Tc-99m per technetate instead of 120 MBq Tc-99m DTPA. The patient received an effective dose of 1.32 mSv.

- A patient was prescribed 400 MBq Tc-99m sestamibi for a myocardial perfusion study instead was injected with 1 GBq Tc-99m MDP due to the wrong tracer being selected and drawn up. The patient received an effective dose of 5.7 mSv.
- Four patients were prescribed 800 MBq Tc-99m per technetate MDP for bone scans however the injection bio-distribution was incorrect as the MDP was not present in the reconstituted solution. The error occurred due to an error by the supplier. The effective dose to each patient was calculated to be approximately 10.3 mSv to 10.8 mSv.
- A patient incorrectly received 1 GBq Tc-99m HDP for a bone scan instead of 1GBq Tc-99m MIBI due to the incorrect radiopharmaceutical being dispensed and incorrectly labelled. The patient received an estimated effective dose of 8.5 mSv. Although Council was satisfied with the steps taken by the facility, Council suggested that DECC investigate whether the practice had a policy for direct supervision of individuals in their Professional Development Year. DECC informed Council that the facility advised that 'direct supervision until competent' is a requirement of their PDY training syllabus. Council noted the advice.
- A patient received 795 MBq Tc-99m sestamibi for a cardiac rest study and later 982 MBq Tc-99m sestamibi for the stress phase of the study instead of I-123 MIBG cardiac SPECT study. The error occurred due to the request being misread. The patient received an estimated effective dose of 7.12 mSv for the rest study and 7.76 mSv for the stress study.
- A patient received 844 MBq of Tc-99m Sestamibi while still in a resting state instead of during the exercise component of an exercise stress test. The error occurred due to insufficient checks of the dose prior to administration. The patient received an effective estimated dose from this of 7.6 mSv.
- A patient received 1087 MBq Tc-99m HDP (bone scan agent) instead of Tc-99m sestamibi. The accident occurred as the appropriate check when dispensing the radiopharmaceutical was not performed. The patient received an effective estimated dose of 6.2 mSv.

## Therapy

The Council reviewed the following accidents and the controls that the facilities had instigated to correct deficiencies in their standard operating procedures, and was satisfied with the steps the organisations had taken to prevent the type of incident from recurring.

- A patient received a repeat scan as the patient was not injected with the requested contrast media as part of radiotherapy treatment in the first scan. The accident occurred as a result of the correct protocol not being followed. The patient received an additional effective dose of 7 mSv.
- A patient received a second scan as the patient had not been scanned in the requested orientation site in the first scan. The accident occurred as a result of the correct protocol not being followed. The patient received an additional effective dose of 1.7 mSv.
- A patient received a repeat scan as the patient was placed on the wrong bed. The accident occurred due to the instructions on the work sheet not being read. The patient received an effective dose of 3.4 mSv.
- A patient undergoing radiation treatment was prescribed doses of 4, 8 & and 4 Gy respectively. The first site was given 8 Gy instead of 4 Gy as prescribed. The patient received an additional radiation dose to the area of approximately 4.34 Gy. The accident occurred as a result of protocols not being followed and poor documentation.

The Council reviewed the following accidents and recommended that the facility provide Council with the outcomes of the Root Cause Analysis (RCA) when it becomes available.

- An elderly patient incorrectly received 17 fractions (34 Gy) to the right mandible for a retromolar squamous cell carcinoma instead of to the left mandible. The patient was prescribed to receive 60 Gy in 30 fractions for the complete treatment. The initial report indicated that the error occurred due to the CT scan being marked on the wrong side (i.e. right side instead of the left side). At the time of writing this report the RCA had not been completed. The Council agreed that due to the severity of the accident it will consider recommending to DECC that the matter be referred to the HCCC once it has considered the complete report.

## Radiology

The Council reviewed the following accidents and the controls that the facilities had instigated to correct deficiencies in their standard operating procedures, and was satisfied with the steps the organisations had taken to prevent the type of incident from recurring.

- A patient incorrectly received a CT pulmonary angiogram (CTPA) instead of a DTPA Renal Scan due to the order for the procedure not being clearly identified on the request form. The patient received an effective dose of 5 mSv.
- A patient undergoing a therapeutic I-131 lipiodol liver procedure wrongly received an abdominal computed tomography (CT) as the protocol for this procedure had changed and the new procedure was not followed. The patient received an effective dose of 5.8 mSv.
- A patient received a CT pulmonary angiogram instead of an abdominal aortogram. The patient received an effective dose estimate of 14.8 mSv. The accident occurred as a result of the request form not being read.
- A patient incorrectly received a CT brain scan due to the wrong patient ID label being placed on the faxed request form. The patient received an effective dose of 3 mSv.

- A patient received a CTPA instead of a CT Spiral angiogram to repair an abdominal artery aneurysm. The patient received an effective dose estimated to be 12 mSv. The accident occurred due to the wrong angiogram, a CT pulmonary angiogram, being typed in the additional notes of the electronic booking system.
- A patient, enrolled in a clinical drug trial of adjuvant treatment for hepatocellular carcinoma, received two unscheduled CT scans. The accident occurred due to miscommunication between the research and radiology teams. The patient received an estimated total effective dose for both scans of 25 mSv.

### **Other**

- A Niton hand held XRF analyser was allegedly stolen from an owner's premises. The analyser was not registered with DECC, the company did not hold a licence and the operators were unlicensed. Council was satisfied with the measures taken.

### **Follow-up actions from accidents reported in the last period:**

#### **Therapy**

The Council recommended that the facility provide Council with the outcomes of the RCA when it becomes available.

- A patient was treated with one fraction from a total of 25 prescribed fractions of 18 MV radiation to treat pelvis and para-aortics. A geographic miss of 10 cm was noticed resulting in 10 cm inferior to the field treated to 1.8 Gy and 10 cm of the superior portion of the field untreated. The untreated volume is to be compensated for during the rest of the treatment regime. The patient received 1.8 Gy to an area 10 cm x 16 cm x 14.5 cm inferior to the treatment field as a result of incorrect settings.

At the time of writing this report, DECC had not received the RCA.

The Council requested further information from facilities regarding the following accident:

- A patient received a course of external beam radiotherapy for head/neck cancer where the therapeutic dose of radiation differed from the total prescribed treatment dose. The patient received a total dose of 76 Gray instead of 66 Gray as prescribed. The error occurred due to the incorrect fractions being typed into the apparatus control system. Council noted the additional information provided at its October 2008 meeting.
- A patient received 3 out of 5 fractions where the radiation field was offset inferiorly 8 cm from the required location. This resulted in the patient receiving 12 Gray to the wrong location.

The Council requested that further information be provided by the facility regarding the accident. Council noted the additional information provided at its October 2008 meeting.

#### **Radiology**

The Council reviewed the following accident and recommended that the facility provide further information regarding the accident in order to ascertain whether these facilities need further controls to correct deficiencies in standing operating procedures.

- Patient wrongly received CTPA angiogram instead of a renal angiogram examination. The patient received an estimated dose of 1378.79 DLP (mGy-cm).

Council noted the additional information provided at its August 2008 meeting.

The Council reviewed the following accidents and recommended that these facilities provide Council with the outcomes of the RCA when they become available.

- A patient incorrectly received an abdominal CT scan due to patient misidentification and received an effective dose of 21 mSv as a result of the error.

Council noted the additional information provided at its August 2008 meeting.

- A patient received the wrong CT scan due to a booking error. The calculated effective dose to the patient was 18.7 mSv.

Council noted the RCA at its October 2008 meeting.

- A patient was given an abdominal/pelvis CT scan when no scan was required. The patient received a calculated effective dose of 13 mSv.

Council noted the RCA at its October 2008 meeting.

- A patient was given a brain CT scan when one was not required. The patient received an effective dose of 3.6 mSv.

Council noted the RCA at its August 2008 meeting.

### Categories of radiation accidents reported between 2005 and 2009

Table 11 provides a summary of accidents reported to DECC in specific categories between 2005–06 and 2008–09.

<b>TABLE 11</b>				
<b>Categories of accidents reported between 2005 and 2009</b>				
<b>Accident category</b>	<b>2005–06</b>	<b>2006–07</b>	<b>2007–08</b>	<b>2008–09</b>
Nuclear medicine	25	9	10	14
Therapy	3	7	1	5
Radiology	4	12	13	6
Other	2	0	1	1
<b>Total</b>	<b>34</b>	<b>28</b>	<b>25</b>	<b>26</b>

## **Appendix 1: Memorandum of Understanding between the EPA and the Radiation Advisory Council**

### **Statement of Common Intent**

This Memorandum of Understanding has been agreed between the Environment Protection Authority (EPA) and the Radiation Advisory Council (Council) to document the practical aspects of the way that each will work with the other to advance radiation safety in New South Wales.

The EPA is part of the Department of Environment and Climate Change (DECC) and remains a statutory body with specific powers under environment protection legislation. Staff of DECC exercise regulatory activities for and on behalf of the EPA. Staff of DECC also provide administrative support to the Radiation Advisory Council on behalf of the EPA.

Both the Council and the EPA are committed to a cooperative and collaborative partnership with the aim of advancing the objectives of the Act. This Memorandum of Understanding shall be reviewed annually and remain in force until such time as both parties agree otherwise.

The roles and responsibilities for each body are set out in the *Radiation Control Act 1990* (the Act). Fundamentally, the Council provides expert advice to the EPA and the Minister for Climate Change and Environment across all radiation safety matters, while the EPA has responsibility for administering the regulatory functions provided by the Act. This Memorandum of Understanding includes an agreement on how advice from the Council will be utilised by the EPA in the details of issuing licences, registrations and accreditations.

The Council also has a key role in helping the EPA develop radiation safety policy for New South Wales. The EPA has responsibility for formally adopting and giving effect to such policies. The EPA must also take into account New South Wales Government policy, any direction from the Minister for Climate Change and Environment and other advice it receives in developing and implementing policy. In recognition of Council's special expertise, the EPA will engage openly, early and in detail with the Council in the development of radiation safety policy matters.

### **Agreed details of how the Council and EPA collaborate**

#### **1. Development of Regulatory Guidelines and Policies**

The EPA will provide the Council with drafts of any new or amended guidelines, policies or standards that are developed or reviewed by the EPA or other external bodies.

The EPA will seek the formal advice of the Council at each stage in the process of the development of these guidelines, policies and standards. This consultation will include the results of any feedback obtained in community consultation processes. The Council will also be formally requested to endorse the final products of the development of guidelines, policies and standards.

## **2. Provision of Advice from the Council to the Minister**

Section 30 of the Act gives the functions of the Council in relation to provision of advice to the Minister.

1. The Council is to advise the Minister on:
  - (a) proposed amendments to this Act and the making, amendment or repeal of regulations under this Act,
  - (b) administration of this Act and the regulations,
  - (c) measures to prevent or minimise the dangers arising from radiation,
  - (d) the granting of exemptions authorised by the regulations for periods exceeding 60 days,
  - (e) such other matters relating to radiation safety as the Minister considers appropriate.
2. Any such advice may be given either at the request of the Minister or without any such request.

The Council may also provide advice to the EPA from time to time, as it sees fit and on issues that it considers to be of relevance, at the request of the EPA or of its own accord.

## **3. Correspondence**

When requested by the Council to prepare correspondence on its behalf, the EPA will present a draft of the correspondence for comment. After amendments to the draft have been prepared in light of the comments offered by the Council, the EPA will submit a final version for endorsement prior to signing by the Chair.

The timeframes for the preparation of drafts and presentation of final versions of correspondence for endorsement by the Council, will be managed by the EPA to accommodate the workload of Hazardous Materials and Radiation Section at the time.

Finalised correspondence which has been mailed out, and correspondence received, will be tabled by the EPA at the next Council meeting subject to the deadlines for submission of business papers for that meeting.

## **4. Storage of Documents**

Records of meetings, including agendas, minutes, and all documents associated with the meetings of the Council are kept by the EPA. These records will, as far as is possible, be kept in electronic format and will be made available to the members of the Council upon request to the EPA, in a timely manner.

## 5. Provision of Secretariat Support

The EPA will provide secretariat support to the Council and all its committees. This support will include the:

- preparation and distribution to Council members of the agendas for meetings of the Council and committees;
- the taking of minutes and their distribution to members; and
- the preparation of any correspondence requested by the Council.

## 6. Development of Procedures

The EPA and the Council will further develop the system of generic advice for applications to the EPA for licences, registrations and accreditations and the EPA will continue to refer applications not covered by the generic advice to Council. The EPA will also seek the advice of Council in regard to radiation accidents and incidents and their investigation, and in regard to the assessment of radiation safety courses.

The EPA will seek active input from Council on strategic and policy matters. These will include substantive input on any review or development of legislation, and emphasis on the development of standards, codes of practice and guidelines. There will be substantial activity during the development of the National Directory for Radiation Protection.

While recognizing that the RAC performs an advisory function, and the EPA is the decision maker, the parties agree to work through disagreement as follows:

- That there will be an opportunity for discussion, including consideration of the decision making process of both the RAC and the EPA;
- The EPA will advise Council if it has formed a view that it intends to make a decision which is inconsistent with RAC advice, and will provide an opportunity for discussion about the differences;
- Council may request the EPA to provide an independent facilitator, and the EPA agrees to consider each such request in good faith;
- If the EPA decides to proceed in a manner inconsistent with RAC advice, it will provide the RAC with a written explanation of why it has decided to do so.

## 7. Determinations for Licensing, Registration and Accreditation

The EPA is the determining authority for applications for licences, registrations, accreditations and variations to licences and accreditations, made under Part 2 of the *Radiation Control Act 1990*. The EPA is empowered by section 9A of the Act to seek and take into consideration the advice of the Council on such matters.

Section 30 (2A and 2B) of the Act empowers the Council to provide advice to the EPA on Part 2 applications at any time and requires the Council to do so when so requested by the EPA. The advice provided by the Council may be generic or specific, as the circumstances require.

The Council has provided the EPA with generic advice on Part 2 applications and this advice, known as '*standing advice*' is recorded at Schedule 2 of the Council's *Corporate Governance and Operating Procedures* manual. It is the duty of the EPA to maintain the standing advice in Schedule 2 up to date. Part 2 applications that are fully covered by the standing advice at

Schedule 2 are known as '*routine applications*'. Part 2 applications that are not covered, or are only partly covered, by the standing advice are known as '*non-routine applications*'.

Before an officer with the delegated authority to do so determines a Part 2 application, s/he must have regard to relevant requirements of Part 2 of the Act, the *Radiation Control Regulation 2003*, and the standing advice of the Council.

Unless the Director-General has agreed in writing to the following procedure being varied, the officer:

- may approve any routine application without first seeking the specific advice of the Council on the application; but
- before approving any non-routine application must seek and take into consideration the advice of the Council on the application; and
- before refusing any application must seek and take into consideration the advice of the Council on the application.

Normally the Director-General will only approve a variation in this procedure in an emergency, in which case the concurrence of the Council to the determination is to be sought retrospectively as soon as practicable.

**LISA CORBYN**  
Director General  
Department of Environment and Climate Change

**CRAIG LAMBERTON**  
Chairperson  
Radiation Advisory Council

## Appendix 2: Membership of committees of the Council during 2008–09

<b>Regulatory Review and Reform Committee</b>	
<b>Member</b>	<b>Membership category</b>
Dr Lucy Robinson	Legal practitioner (Chairperson)
Mr John Robinson	Diagnostic radiographer
Dr Cameron Hazlehurst	Community representative
Mr Mark Moskvitch	An officer of WorkCover Authority NSW
Mr Luke Platt (term expired 28/11/2008)	Minister's nominee
Ms Margaret Conley	
Dr Henry Forester	DECC (Hazardous Materials & Radiation)

<b>National Directory Committee</b>	
<b>Member</b>	<b>Membership category</b>
Dr Cameron Hazlehurst	Community representative (Chairperson)
Dr Lucy Robinson	Legal practitioner
Mr John Robinson	Diagnostic radiographer
Dr Richard Smart	Medical physicist
Ms Kathy Meleady	An officer of the Department of Health
Mr Mark Moskvitch	An officer of WorkCover Authority NSW
Mr Jon D'Astoli	Occupational health and safety
Dr Philip Pasfield	Radiologist
Dr Eva Wegner	Physician in nuclear medicine
Dr Mary Dwyer	Radiation oncologist
Mr Lee Collins	Expert in non-ionising radiation
Mr Frank Galea	Expert in industrial uses of radiation
Mr Mike Carter	Deputy expert in NORM
Ms Sue Macalpine	DECC (Hazardous Materials & Radiation)

<b>The Shielding Assessment and Verification Committee</b>	
<b>Member</b>	<b>Membership category</b>
Dr Richard Smart	Medical physicist (Chairperson)
Mr Jeremy Pigott	Health physicist
Mr Paul Cardew	Deputy medical physicist
Mr Lee Collins	Expert in non-ionising radiation
Mr Howard Ackland	Deputy expert in non-ionising radiation
Mr Kevin Fitzsimmons	Industry representative (Radiation Services Australia)
Mr Barry Field	DECC (Hazardous Materials & Radiation)
Ms Daniela Freschi	DECC (Hazardous Materials & Radiation)

<b>NORM Committee</b>	
<b>Member</b>	<b>Membership category</b>
Dr Brad Cassels	Expert in NORM (Chair)
Mr Mike Carter	Deputy expert in NORM
Dr Cameron Hazlehurst	Community representative
Mr Mark Moskvitch	An officer of WorkCover Authority NSW
Ms Margaret Conley	Minister's representative
Mr Roger Alsop	Health Physicist
Ms Sue Macalpine	DECC (Hazardous Materials & Radiation)
Dr Tony Hodgson	DECC (Waste Management)

<b>Committee to consider eight ANSTO courses</b>	
<b>Member</b>	<b>Membership category</b>
Mr John Robinson	Diagnostic Radiographer
Mr Michael Carter	Expert in NORM
Mr Jon D'Astoli	OH&S expert
Mr Colin Hockings	Expert in the uses of industrial radiography
Ms Daniela Freschi	DECC, HM&RS Policy Officer
Mr Barry Field	DECC OPS Officer

## Abbreviations

ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
CRE	Consulting radiation expert
CT	Computed tomography
DECC	Department of Environment and Climate Change NSW
EPA	Environment Protection Authority
GBq	Gigabecquerel
Gy	Gray
HCCC	Health Care Complaints Commission
MBq	Megabecquerel
MoU	Memorandum of Understanding
mSv	milliSievert
NCP	National Competition Policy
NDRP	National Directory for Radiation Protection
NORM	Naturally Occurring Radioactivity
RAC	Radiation Advisory Council
RCA	Root Cause Analysis
RHC	Radiation Health Committee