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RAC

RADIATION ADVISORY COUNCIL

ANNUAL REPORT 2010–11

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The Hon. Robyn Parker MP
Minister for 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 2010 to 30 June 2011. This report has been prepared in accordance with the provisions of the *Radiation Control Act 1990*.

Yours sincerely

CRAIG LAMBERTON
Chairperson
Radiation Advisory Council

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Chairperson's review

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 Environment (the Minister) through the Office of Environment and Heritage (OEH).

The Council provides advice to the Minister and OEH on technical and policy matters relating to radiation in NSW.

During the 2010–11 reporting period, the Council held six meetings and provided policy and regulatory advice to OEH on the administration of the Act and a wide range of radiation matters. The Council's work and events that were of particular significance included the:

- passing of the Radiation Control Amendment Bill 2010 through parliament
- work of the Council's Regulatory Review and Reform Committee, specifically the committees preliminary discussions regarding the remake of the Regulation
- review of, and input into, the National Directory for Radiation Protection and national codes and standards arising from the national uniformity process
- review of the proposed use of the latest airport security scanners for whole body screening, which the Australian Government intends to introduce at all Australian major airports in 2011– the Council provided advice to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) on the benefits of non-radiation technologies
- consideration of recent developments in the use of lasers and Intense Pulsed Light (IPL) in cosmetic medicine, which have potential impacts on human health and safety – OEH wrote to ARPANSA on behalf of the Council, emphasising the importance of having nationally uniform regulation of lasers
- establishment of a committee to assist in the review of NSW *Radiation Guideline 6: Registration Requirements and Industry Best Practice for Ionising Radiation Apparatus Used in Diagnostic Imaging (2004)* – the 6-part guideline is defined in clause 11 of the Regulation as the applicable requirements for registration of ionising radiation apparatus
- support of Ms Tumurbaatar's placement in Australia as part of the International Atomic Energy Agency Fellowship program that was hosted by OEH over a three-month period – the program provides opportunities for people from developing countries to be trained in the application of nuclear techniques for peaceful purposes; the Council liaised with Ms Baigal Tumurbaatar on the regulatory infrastructure for the control of radiation sources in Mongolia
- review and provision of advice on proposed changes to strengthen the solarium regulation
- consideration of updates in relation to emergency preparedness, in particular, the development of *NSW Emergency Services Personnel Radiation Exposure Management Policy and Procedure during Radiation Emergencies*
- implementation of radiation security requirements agreed by the Council of Australian Governments as part of Australia's counter terrorism strategy, which continues to be an important OEH activity monitored by Council. Council reviewed legislative proposals in this area in the context of the *Radiation Control Amendment Act 2010* and received updates on progress. Council's members have been active in participating in the development of guidelines for stakeholders required to upgrade security in relation to sources for which they are responsible, particularly in the industrial radiography field.

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

- radiation licensing, registration, and accreditation of consulting radiation experts
- the review of radiation accidents and incidents
- assessment of radiation safety courses for the purposes of licensing.

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

- input into the remake of the Regulation
- input into the National Directory for Radiation Protection
- review and input into national codes and standards arising from the national uniformity process
- revision of *Radiation Guideline 6: Registration Requirements and Industry Best Practice for Ionising Radiation Apparatus Used in Diagnostic Imaging*.

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 OEH staff in supporting the Council and its committees.

CRAIG LAMBERTON
Chairperson

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 (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 17 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
- (o1) a person with expertise in mine radiation safety
- (p) a person chosen by the Minister.

A new member position (o1) a person with expertise in mine radiation safety was created through the *Radiation Control Amendment Act 2010* as a means to assist the Council in progressing uniformity initiatives for the regulation of radioactive ores at mines sites. At the

time of writing this report no individual had been appointed to this position although the position vacancy had been advertised.

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
 - (b) the 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; 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 Office of Environment and Heritage (OEH) exercises responsibilities and powers in the name of the Environment Protection Authority (EPA). OEH officers of the Hazardous Materials, Chemicals and Radiation Section support the work of the Council. The term EPA and OEH will therefore be used interchangeably throughout this document.

Meetings of the Council

During the reporting period ending 30 June 2011, the Council met on six occasions. 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 provided in Appendix 1. The Council reviewed the MoU at its February 2011 and made no changes to the document.

TABLE 1		
Members of the Radiation Advisory Council and meeting attendance 2010–11		
Member	Appointed position	Meetings attended
Mr Craig Lamberton Mr Greg Sullivan (appointed 1/11/2010) Mr Simon Smith (term expired 31/10/2010)	Chairperson Deputy of the member who is chairperson	5
Dr Philip Pasfield Dr Andrew Scott	Radiologist Deputy radiologist	6
Mr John Robinson Mr Glen Burt	Diagnostic radiographer Deputy diagnostic radiographer	5
Mr Frank Galea Mr Troy Jones	Expert in industrial uses of radiation Deputy expert in industrial uses of radiation	6
Mr Brent Rogers (appointed 1/11/2010) Mr Michael Polewski (appointed 1/11/2010) Mr Roger Alsop (term expired 31/10/2010)	Health physicist Deputy health physicist	6
Dr Eva Wegner (term expired 5/3/2011) Dr Hugh Dixson (term expired 5/3/2011)	Physician in nuclear medicine Deputy physician in nuclear medicine	2
Ms Kathy Meleady Dr Richard Broome (appointed 1/11/2010) Mr Wayne Smith (resigned 30/7/2010)	Officer of the Department of Health Deputy officer of the Department of Health	6
Dr Richard Smart Mr Paul Cardew	Medical physicist Deputy medical physicist	5
Mr Mark Moskvitch Mr Jeremy Allan (appointed 1/11/2010)	An officer of WorkCover Authority of NSW Deputy to an officer of WorkCover Authority of NSW	4
Ms Margaret Conley	Minister's nominee	6
Dr Brad Cassels Mr Michael Carter	Expert in naturally occurring radioactivity Deputy expert in naturally occurring radioactivity	6
Assoc. Prof. Lee Collins, AM Mr Howard Ackland	Expert in non-ionising radiation Deputy expert in non-ionising radiation	6
Mr Jon D'Astoli Ms Karen Wolfe	Occupational health and safety expert Deputy occupational health and safety expert	3
Dr Ludmilla Robinson Mr Geoff Bartels	Legal practitioner Deputy legal practitioner	6
Dr Cameron Hazlehurst Mr James Prior	Community representative Deputy community representative	5
Dr Mary Dwyer Dr Roland Yeghiaian-Alvandi	Radiation oncologist Deputy radiation oncologist	6

The Council granted leave to members who were unable to attend meetings. Absent members in many instances provided written advice on agenda items that were considered by the Council or its committees.

During the reporting period, the deputies of the Council were invited to attend two meetings of the Council (other than those where the member was unavailable) as an opportunity for deputies to consider the deliberations of the Council and to liaise with other members and deputies of the Council.

The Council's strategic direction

During the reporting period the Council continued to focus on its strategic direction for 2009 to 2012 by:

- developing uniform regulatory initiatives, through the National Directory for Radiation Protection, 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 that an efficient and effective regime for controlling the risks to human health and the environment is in place and, in particular, streamlining the Act and the remake of the Radiation Control Regulation 2003, by reducing red tape and duplication, and considering a more outcomes-based legislation while accommodating national uniformity requirements
- identifying and addressing emerging issues in radiation protection (in particular, new technology)
- identifying procedures and requirements to prevent or minimise dangers arising from the misuse of radiation materials. The Council will continue to focus on emergency response capabilities through support or participation in multi-agency emergency management exercises and through participation in national programs.

The Council's work

During the reporting period the Council concentrated its attention on:

- the review of radiation control legislation (see section under Review of radiation legislation)
- the review of, and input into, national codes and standards arising from the national uniformity process (see sections under The Council's Committees (National Directory Committee and National Uniformity))
- the provision of advice to OEHL in relation to routine radiation matters such as:
 - non-standard licensing applications
 - radiation safety courses for the purposes of licensing
 - non-standard registration and accreditation applications
 - review of radiation accidents
- the work of the Council's committees – a considerable amount of the work of the Council is undertaken by the Council's committees (details on the work of each of the Council's committees are provided in the next section)
- the Council's work plan for 2011–12.

Committees of the Council

Under section 31 of the Act the Council may establish committees to help it carry out its functions. During the reporting period the Council had four committees:

- Regulatory Review and Reform Committee
- National Directory Committee
- Review of Guideline 6 Committee
- Naturally Occurring Radioactive Committee (NORM).

During 2010–11 the Council considered progress reports on the work undertaken by each of its committees. The role and the work of each of the Council's committees are outlined in the next section.

Regulatory Review and Reform Committee

The Regulatory Review and Reform Committee was established by the Council to ensure that the regulation of radiation in NSW is both efficient and effective in controlling the 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 the Council and OEHL on potential reform.

The committee carries 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 to consider matters pertaining to the remake of the Regulation. The committee:

- considered the progress on the conversion from registrations to management licences
- considered the implementation of security requirements determined by the Council of Australian Governments (COAG)
- considered the adoption of the National Directory of Radiation Protection definition of a radioactive substance
- endorsed modification of Schedule 2 annual dose limits to include amendment for the lens of the eye
- reviewed clause 7 and Schedule 3 exemptions from the need for a licence to use against the requirement in the National Directory for Radiation Protection
- reviewed clause 8 and the exemption of certain persons from the requirement to hold a licence to use radiation apparatus or radioactive substances
- reviewed clause 9 and Schedule 3A exemption of certain Sealed Source Devices (SSD) from the need to be registered
- reviewed clause 11A and Schedule 3B exemptions from the need to register premises if they only contain the items listed in Schedule 3B
- reviewed clause 12 listing the prescribed activities of a consulting radiation expert (CRE)
- reviewed clauses 26, 27 and 32 and the definition of a reportable accident in relation to surface spills in nuclear medicine laboratories.

The committee's deliberations and recommendations were provided to the Council at its June 2011 meeting.

National Directory Committee

The Council established the National Directory Committee to assist the Radiation Health Committee (RHC) in the development and implementation of the National Directory for Radiation Protection and to ensure that RHC's proposals were practicable and effective in controlling radiation risks to human health and the environment.

The committee's role is to provide advice to the Council and OEH on the priorities and suitability of material in the National Directory for Radiation Protection, and its legislative, financial and operational impact on OEH, other NSW Government agencies and NSW as a whole. The committee reviews documents that are produced by RHC.

The committee met on three occasions during the reporting period and considered and provided advice to the Council and OEH on the following matters (as shown under each meeting below).

July 2010 meeting

- Establishing a best practice regulation for achieving a nationally uniform outcome.
- National Directory for Radiation Protection issues such as:
 - Amendment No. 5 (adoption of codes and the International Commission on Radiological Protection (ICRP) principles)
 - drinking water, recycled water and the disposal of radioactive material
 - airport security whole body screening
 - development of an ARPANSA strategy on public medical radiation exposure
 - national use of the *NSW Emergency Services Personnel Radiation Exposure Management Policy and Procedure during Radiation Emergencies*.
- The Health Services Union position of whether there is a need for licensing Medical Radiation Practice Board registered radiographers. The committee recommended that registration and licensing were sufficiently different that regulatory oversight through licensing should be retained.
- The *Safety Guide for the Use of Radiation in Schools, Part 2: Lasers*. Mr Collins, the Council's non-ionising radiation expert, agreed to be nominated to the RHC working group that is developing the safety guide. The committee and the Council supported Mr Collins' nomination and asked OEH to forward his nomination to ARPANSA.

November 2010 meeting

- The *Safety Guide: Methods for Monitoring, Assessing and Recording Occupational Radiation Doses in Mining and Mineral Processing*.
- The progress report on the national use of NSW Emergency Services Personnel Radiation Exposure Management Policy and Procedure during Radiation Emergencies.
- The preliminary impact analysis and justification for the revision of the *Code of Practice for the Near-surface Disposal of Radioactive Waste in Australia* (1992).
- The update on water recycling and the disposal of radioactive material and the establishment of a national working group.
- The *Regulatory Guidance, Justification and Optimisation of Practices, Human Imaging for Security Screening Purposes Using Ionising Radiation*.
- The draft summary of Radiation Health and Safety Advisory Council August meeting.

11 March 2011 meeting

- The RHC Strategic Directions 2009–11 Key Activity Schedule review.
- The *Safety Guide: Occupational Doses Received in Mining and Mineral Processing*.
- The report on the development of guidance on *Radiological Protection of the Environment*.
- The progress report on the use of lasers/Intense Pulsed Light (IPL) for cosmetic purposes.
- The review of RHC statements on the ARPANSA website.
- The *Regulatory Guidance, Justification and Optimisation of Practices, Human Imaging for Security Screening Purposes Using Ionising Radiation*.

Review of Guideline 6 Committee

The Council at its June 2011 meeting established a committee to review the 2004 *Radiation Guideline 6: Registration Requirements and Industry Best Practice for Ionising Radiation Apparatus Used in Diagnostic Imaging*. The OEHL guideline is defined in clause 11 of the Regulation as the applicable requirements for registration of ionising radiation apparatus.

The review of the guideline is one of the Council's projects listed in its *Strategic Direction 2009–2012* and is scheduled in the Council's 2011–12 Work Plan. The committee is to commence its work in the next period. The aim of the review is to incorporate new technology and to update the requirements of the 6-part guideline in alignment with the new requirements of the *Radiation Control Amendment Act 2010*. The guideline includes the following 6 parts:

Part 1: Mammography

Part 2: Fluoroscopy and radiography

Part 3: Dentistry (including maxillofacial)

Part 4: Veterinary science

Part 5: Computed tomography and bone mineral densitometry

Part 6: Test protocols for parts 2–5.

Naturally Occurring Radioactive Materials Committee

The Naturally Occurring Radioactive Materials (NORM) Committee was established to identify, and where necessary, address radiation risks to human health and the environment associated with NORM. The committee's work included:

- 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
- prioritising NORM industries/issues needing attention in NSW and encouraging ARPANSA to bring these matters onto the priority list
- assisting OEHL in its work with the 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.

Membership of each committee is shown in Appendix 2.

National uniformity

National uniformity for radiation protection is being progressed through the National Directory for Radiation Protection which is being developed by the Radiation Health Committee (RHC) and facilitated by ARPANSA. National uniformity was agreed to at the Australian Health Ministers' Conference (AHMC) in August 1999. This process allows all jurisdictions, including the Commonwealth, to achieve national uniformity for radiation protection through each jurisdiction's radiation protection framework. The first edition of the National Directory for Radiation Protection was endorsed by AHMC in May 2005. In 2007 RHC agreed that further progression of the National Directory for Radiation Protection would be by individual amendments to be submitted to AHMC for endorsement.

Amendments to National Directory for Radiation Protection

During 2010–11 the Council considered one amendment (Amendment No. 5) to the National Directory for Radiation Protection. Amendment No. 5 at the time of writing this report was still awaiting formal endorsement from AHMC.

Amendment No. 5, when endorsed, will amend the National Directory for Radiation Protection specifically to include the:

- radiation protection principles of ICRP in regard to ionising radiation (to be incorporated in each jurisdiction's regulatory framework), for example:
 - justification of practices – no practice involving exposure to radiation should be adopted unless it can be shown that it produces sufficient benefit to the exposed individuals or society to compensate for any potential radiation detriment that it may cause
 - limitation of radiation doses to individuals from all practices – exposure to individuals as a result of a combination of all the relevant practices should be subject to dose limits, or to some control of the risks in the case of potential exposures. These actions are aimed at ensuring that no individual is exposed to radiation risks that are judged to be unacceptable in normal circumstances
 - optimisation of protection – in relation to any practice, the number of people exposed, and the likelihood of exposures where exposure is not certain, should be kept 'as low as reasonably achievable' taking into account social and economic factors.
- amendment to Schedule 11 – national adoption of referenced codes of practice and standards to include RPS 17 *Radiation Protection in Veterinary Medicine* (July 2009); and RPS 19 *Radiation Protection in the Application of Ionizing Radiation by Chiropractors* (November 2009).

The regulatory principles of justification, limitation and optimisation of ICRP have already been included in the NSW regulatory framework through the *Radiation Control Amendment Act 2010* and are currently waiting to be proclaimed. Documents referenced in Schedule 11 of the National Directory for Radiation Protection are to be adopted under the terms of the National Competition Policy agreements, by each jurisdiction within their regulatory framework.

National documents

During the reporting period the Council (in addition to the advice provided by the Council's National Directory Committee) considered and provided advice on the following national documents:

- National Framework for Regulating Cosmetic Medical and Surgical Procedures Consultation Draft (June 2010)

The Council was provided with the consultation draft *National Framework for Regulating Cosmetic Medical and Surgical Procedures* (June 2010) which is being developed by AHMC.

The Council was also provided with an overview and presentation by Mr Lee Collins, the Council's non-ionising radiation expert and a medical physicist, on the recent developments in the use of lasers and IPL in cosmetic medicine which have potential impacts on human health and safety and the need to progress the regulation of lasers nationally. The Council requested that OEHL write to ARPANSA requesting RHC take action on the regulation of lasers for cosmetic uses. ARPANSA replied in March 2011 indicating that a uniform regulatory outcome on a national level is desirable and that the RHC is working on an amendment to the National Directory for Radiation Protection on the use of lasers for cosmetic purposes.

- revision of RPS 1 *Recommendation for Limiting Exposure to Ionising Radiation* (1995) and *National Standard for Limiting Occupation Exposure to Ionizing Radiation* (1995)
- *Regulatory Guidance, Justification and Optimisation of Practices, Human Imaging for Security Screening Purposes Using Ionising Radiation*

The Council at its August 2010 meeting received a presentation from ARPANSA on the latest airport security scanners for whole body screening, which the Australian Government intends to introduce at all Australian major airports in 2011. ARPANSA advised the Council that it would be preparing a policy statement on the utilisation of ionising radiation for screening purposes of humans and will provide guidance to jurisdictions on the use of these technologies. The Council at its December 2010 and February 2011 meetings were provided with the ARPANSA draft document, *Regulatory Guidance, Justification and Optimisation of Practices, Human Imaging for Security Screening Purposes Using Ionising Radiation*, for comment. The Council provided comment on the guidance and considered that non-radiation technologies, if comparable, would be the preferred option.

During the reporting period the Council also recommended that OEHL write to ARPANSA requesting that it include professional bodies in its consultation mail-out list for relevant codes and guidance documents so that these groups are provided with the opportunity to comment on these documents.

Radiation Health Committee

During the reporting period the Council:

- recommended that OEHL write to the Secretariat of RHC raising the Council's concerns regarding the limited release of the draft *Radiation Protection Standard for Exposure Limits to Electric and Magnetic Fields 0 Hz – 3 kHz* (2011) and its regulatory impact statement. The Council requested that ARPANSA reconsider its approach on consulting on these documents and that they be made available to the broader public for comment.

- considered the response from RHC regarding a national approach to the training of nuclear medicine technologist (NMTs) in the use of computed tomography coronary angiography (CTCA). The Council raised this matter in the previous period because this technology is rapidly becoming an alternative to the use of fluoroscopy. RHC agreed with Council's suggestion and undertook to write to the relevant professional bodies encouraging the development of a national approach to training in this area and also advised that some training courses had already been developed for this purpose in other jurisdictions.
- considered reports from OEH on the correspondence received from the Chair of the Radiation Regulators Forum in reply to the need for a reporting system for jurisdictions to notify each other of malpractice by health professions who are licensed to use radiation apparatus and radioactive sources in their jurisdiction.
- considered reports and was briefed on the major issues arising from RHC meetings held in July and November 2010 and March 2011.

National registration of health professions in Australia

During the reporting period, the Council was provided with advice on the progress of Australian Health Practitioner Regulation Agency (AHPRA), the national agency responsible for the registration and accreditation of ten health professions in Australia. AHPRA supports the ten National Health Practitioner Boards in implementing the National Registration and Accreditation Scheme. AHPRA's operations are governed by the *Health Practitioner Regulation National Law Act 2009*, which came into effect on 1 July 2010.

During the reporting period, the Council was provided with correspondence from the Australian Institute of Radiography, advising of its non participation with the National Medical Radiation Practice Accreditation Council process and that it will remain the accrediting body for radiographers in NSW until legislation incorporates the radiography profession.

During the reporting period, the Council received advice from OEH that AHPRA registration status is now being used as licensing criteria for proof of area of medical specialty for radiation licensing in NSW. The Council requested that NSW Health be advised that radiation professionals, who are licensed by OEH to use radiation apparatus and radioactive substances in NSW, may not be eligible to gain national registration through AHPRA if they do not hold Australian Institute of Radiography or Australian and New Zealand Society for Nuclear Medicine accreditation. The Council was concerned that accreditation by professional bodies or a current state registration, where it exists, may be used as the sole criterion to gain national registration. Limiting the criteria in this way may leave a proportion of those who have gained licences through other means of assessment unable to gain national registration. On the advice of the Council, OEH wrote to NSW Health seeking support and assistance in requesting APRAH to include licences issued by OEH for these occupations to be part of the accepted criteria for gaining registration with the National Boards for Medical Radiation Practice.

International documents and events

During the reporting period, the Council:

- was provided with the opportunity to review and provide comment on the International Atomic Energy Agency (IAEA) *Regulation for the Safe Transport of Radioactive Material* – the document when formalised will form the basis of the national code for adoption in the Regulation

- received a presentation by IAEA fellow from Mongolia, Ms Baigal Tumurbaatar, on *Regulatory Infrastructure for the Control of Radiation Sources in Mongolia*. OEH hosted Ms Tumurbaatar, who completed a three-month placement in the OEH Hazardous Materials, Chemicals and Radiation Section. Ms Tumurbaatar works for the Mongolian Nuclear Energy Agency as a state inspector on nuclear and radiation safety, specifically on the control of radiation sources in medical devices.

Ms Tumurbaatar's placement in Australia was part of the IAEA Fellowship program, which provides opportunities for people from developing countries to be trained in the application of nuclear techniques for peaceful purposes. As host, OEH developed a training program covering regulatory control of radiation used in diagnostic radiology, nuclear medicine and radiotherapy medical facilities, and the participation in site inspections and audits of these facilities. During her placement with OEH, Ms Tumurbaatar also visited three major hospitals in NSW spending a week at each to learn more about how the hospitals use their radiology, nuclear medicine and radiotherapy facilities and how radiation safety assessments are carried out. The Council's members, Mr Lee Collins, from Westmead Hospital, Dr Richard Smart, from St George Hospital, and deputy medical physicist, Mr Paul Cardew, from John Hunter Hospital, facilitated Ms Tumurbaatar's training at these hospitals.

Review of radiation control legislation

Radiation Control Amendment Act 2010

During the reporting period, the Council was informed by the Chair that the Radiation Control Amendment Bill 2010 was passed by NSW Parliament on 28 October 2010. The Bill amends the *Radiation Control Act 1990*.

The key changes to the Act were considered and endorsed by the Council during previous reporting periods. The key issues for the review of the Act were derived from the consultative process with stakeholders.

The changes to the Act through the Bill aim to strengthen the security of radioactive sources; to cut red tape by reforming the system of radiation registrations; and improve national harmonisation of radiation protection legislation through the National Directory for Radiation Protection.

The Radiation Control Amendment Act 2010 specifically:

- implements COAG's national requirements for the security of 'security enhanced radioactive sources'
- streamlines the system of radiation registrations by changing the requirement for individual items (i.e. radiation apparatus, sealed source devices and premises where radioactive substances are kept or used) to be registered to that of requiring all single items to be covered under one authorisation for each organisation
- progresses national uniformity initiatives through the National Directory for Radiation Protection, including the regulation of radioactive ores at mines sites within the radiation safety legislative framework (a new Council member position was created 'a person with expertise in mine radiation safety')
- adopts more contemporary radiation safety practices to help to reduce the risks of cancer in the community from exposure to radiation from all sources.

The Council was informed by OEH that some of the above provisions commenced on 4 November 2010 while others will commence by proclamation as they are dependent on provisions being introduced by the Regulation (due to be remade by 1 September 2012) and the establishment of new OEH processes/systems.

The Council at its February 2011 meeting was also provided with an update from OEH on the implementation of the new Act requirements.

Remake of Radiation Control Regulation

During 2010–11 the Council was updated on OEH's review of the Regulation. The Council's Regulatory Review and Reform Committee reconvened (for further detail see Committees of the Council) to provide the Council and OEH with input to the remaking of the Regulation. The remake of the Regulation is necessary in order to meet requirements of the NSW *Subordinate Legislation Act 1989* and to incorporate necessary provisions brought about by the 2010 amendments to the Act.

Proposed amendments to solaria regulation

The Council at its December 2010 meeting was provided with an overview of the amendments proposed to strengthen the regulation of solaria in NSW as announced by the then Minister, Hon. Frank Sartor. The Council supported extending the range of persons excluded from using a tanning unit and increasing the minimum age at which a person may be allowed to use a commercial cosmetic UV tanning unit. The proposed regulatory change was put out for public comment from 25 November 2010 to 21 January 2011, and 271 submissions were received. The Council at its April 2011 meeting was informed by the Chair that the previous Government had decided not to proceed with the proposed solaria regulation changes.

Licensing, registration and accreditation

Part 2, Regulatory Controls, of the Act provides that the EPA is the authority responsible for dealing with applications and variations for items listed under this part. The EPA is empowered to seek, or take into consideration, the advice of the Council on licensing, registration and accreditation matters. Section 30 of the Act, provides that the Council can give generic or specific advice to OEH on applications under Part 2 of the Act.

The MoU between the Council and the EPA sets out the way in which the Council and the EPA have agreed to work together in determining applications. The MoU is provided at Appendix 1.

During 2010–11 the Council provided advice in relation to licensing, registration and accreditation matters. The Council's standing advice was taken into account when considering applications submitted to OEH under the Act. The Council's advice for each of these areas is provided below.

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

Section 6 of the Act 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 that person holds a current licence and complies 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:

- recommended the granting of 51 non-standard licence conditions to use radiation apparatus/radioactive substances
- did not support one application for licence to use radiation apparatus for medical diagnostic radiography (IA14) on the basis that the applicant had not undertaken the required training to qualify for this licence type
- endorsed 11 radiation safety courses for the purposes of licensing
- endorsed new criteria for licensing the use of radioactive substances for veterinary radiation oncology and nuclear medicine; and also endorsed the amendment to the conditions of the licence to use radioactive substances for veterinary purposes, to incorporate the new national code requirements
- recommended that OEH investigate whether two levels of licence may need to be considered, for a licence to use for radioactive substances for radiopharmacy (S36), to cater for applicants with biological chemistry backgrounds and those specific to radiopharmacy; OEH agreed to consider applicable courses
- considered a report that students may be undertaking dental radiography on each other at a teaching facility and recommended to OEH that the matter should be further investigated
- recommended OEH formally advise NSW Health Area Health Services, hospitals, facilities and professional bodies of the requirements of *Code of Practice for Radiation Protection in the Medical Applications of Ionising Radiation*

During the reporting period, the Council also considered/received advice regarding:

- the introduction of the Australian Institute of Radiography National Professional Development Program
- statistics of routine licences issued during the year ending 30 June.

For the reporting period ending 30 June 2011, the Council was advised that OEH issued 1438 new licences, including 111 licences for sale/possession and 1327 licences to use radiation apparatus and/or radioactive substances. The total number of licences (1438) 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 2010–11 OEH renewed 3962 licences. At the end of the reporting period there were 13,346 active licences.

TABLE 2		
Number of new licence conditions issued in 2010–11 listed by licence category		
Occupational category	To use radioactive substances	To use ionising radiation apparatus
Auditing and quality assurance work	1	0
Analytical work	0	7
Bone mineral analysis and body composition analysis work	0	26
Chiropractic work	0	43
Dental	0	200
Educational and demonstration work	0	0
Industrial and other related work	240	93
Installation and servicing work	51	89
Medical – Nuclear medicine work	35	26
Medical – Physics work	16	18
Medical – Radiation therapy work	76	76
Medical – Radiography radiology/fluoroscopy work	0	353
Medical diagnosis work	0	0
Radiopharmacy work	9	0
Scientific and research work	57	15
Sell or possess	42	94
Veterinary work	2	140
Other	0	2
Total	529	1182

The introduction of the option of a three-year licence commenced in September 2007.

Table 3 summarises the number of new licence conditions issued by OEH during the period 2006–07 to 2010–11.

TABLE 3			
Number of new licence conditions issued from 2006–07 to 2010–11			
Period	Radioactive substances	Radiation apparatus	Total
July 2006–June 2007	742	1876	2618
July 2007–June 2008	683	1592	2275
July 2008–June 2009	1006	2800	3806
July 2009–June 2010	447	1195	1642
July 2010–June 2011	529	1182	1711

Registration of radiation apparatus, sealed source devices and premises

Section 7 of the Act requires the registration of sealed source devices (SSDs) and certain prescribed radiation apparatus. Section 8 of the Act requires premises to be registered where radioactive substances, which are not contained in an SSD, 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, SSDs and radioactive substances, including the design and construction of premises where radiation apparatus, SSDs and radioactive substances are kept or used
- enable up-to-date records to be kept on all SSDs, certain radiation apparatus, and premises where radioactive substances are kept or used to ensure that these items are controlled safely from cradle to grave
- allow the regulatory authority to restrict the use of apparatus, SSDs 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:

- received a progress report from OEH on the registration of the cyclotron at Macquarie University Hospital and were informed that the shielding survey and acceptance testing of the cyclotron had been assessed and found to be satisfactory and that OEH had issued a registration certificate for the production of radioisotopes for commercial purposes – the Council considered the application for partial registration in the previous period
- was provided with, and considered, statistics for routine registrations issued by OEH during the year ending 30 June 2011.

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

TABLE 4	
Registration categories and registration commencement dates	
Registration category	Commencement date
Diagnostic imaging apparatus	11 August 2000
Cyclotrons	1 December 2001
Therapy apparatus	1 February 2004
Sealed source devices (SSDs)	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.

TABLE 5	
Duration of registration for diagnostic imaging apparatus	
Category	Duration of registration
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 (CT) (includes dental apparatus classified as CT)	2 years
Panoramic radiography (with/without cephalometry)	5 years
Bone mineral densitometry	5 years

During the year ending 30 June 2011, OEH issued 738 new registrations for diagnostic imaging apparatus as shown in Table 6. Table 6 also summarises the number of new diagnostic imaging apparatus registered with OEH between 2006–07 and 2010–11.

As at 30 June 2011 the total number of diagnostic imaging apparatus registered with OEH was 7278.

TABLE 6					
Number of new diagnostic imaging apparatus registered between 2006–07 and 2010–11					
Equipment type	2006–07	2007–08	2008–09	2009–10	2010–11
Fixed dental radiography	374	197	363	344	345
Fixed radiography	92	73	117	88	74
Fixed fluoroscopy	10	8	14	14	17
Fixed radiography/fluoroscopy	22	14	25	14	10
Fixed mammography	16	31	68	26	15
Computed tomography	56	53	93	68	58
Dental computed tomography	2	4	1	7	4
Bone mineral densitometry	16	18	24	20	22
Mobile dental radiography	6	11	15	15	9
Mobile radiography	61	51	60	57	40
Mobile fluoroscopy	21	26	54	34	29
Mobile radiography/fluoroscopy	7	3	14	4	4
Mobile mammography	0	2	10	2	3
Panoramic radiography	51	68	116	119	108
Total	734	559	974	812	738

Registration of cyclotrons

Cyclotrons are prescribed in the Regulation as radiation apparatus and are required to be registered under the Act. Cyclotrons are required to be registered every two years.

As at 30 June 2011, there were two cyclotrons registered in NSW.

Registration of therapy apparatus

Radiation apparatus used or intended to be used for radiotherapy or radiotherapy planning purposes must be registered under the Regulation. Radiotherapy apparatus is required to be registered every 2 years.

During the year ending 30 June 2011, OEH issued 10 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 OEH between 2006–07 and 2010–11.

As at the 30 June 2011 a total of 78 therapy apparatus were registered with OEH.

TABLE 7					
Number of new therapy apparatus registrations between 2006–07 and 2010–11					
Equipment type	2006–07	2007–08	2008–09	2009–10	2010–11
Kilovoltage therapy X-ray (superficial and/or orthovoltage)	0	2	3	0	2
Linear accelerator	12	2	7	6	8
Simulator	2	1	2	0	0
Total	14	5	12	6	10

Registration of SSDs

SSDs must be registered under the Regulation. The registration period for SSDs is every 2 years.

During the reporting period, OEH registered 101 new SSDs as shown in Table 8. Table 8 also summarises the number of new registrations of SSDs issued by OEH between 2006–07 and 2010–11. At the end of the reporting period there were a total of 1018 SSDs registered with OEH.

TABLE 8					
Number of new sealed source devices registered between 2006–07 and 2010–11					
Equipment type	2006–07	2007–08	2008–09	2009–10	2010–11
Borehole logging	5	0	3	2	1
Soil moisture density & moisture determination	18	39	103	29	38
Density gauge	5	7	1	3	4
Neutron probe	7	2	31	2	4
Industrial radiography	6	3	25	9	4
XRF analyser	2	2	3	2	0
Portable gauge	0	0	2	0	0
Beta backscatter thickness testing	1	0	1	0	0
Self-shielded irradiator	4	2	4	0	2
Therapy device	1	2	6	0	2
Analyser	0	0	1	0	0
Nuclear medicine gamma camera	0	2	1	0	0
Fixed radiation gauges	58	70	109	38	46
Total	107	129	290	85	101

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 an SSD, is kept or used must be registered with OEH. The registration period for premises where radioactive substances are kept or used is 2 years.

At the end of the reporting period, OEH registered 17 new premises as shown in Table 9. Table 9 also summarises the number and category of new premises registered with OEH between 2006–07 and 2010–11.

At the end of the reporting period, there were 263 premises registered with OEH where radioactive substances are kept or used.

TABLE 9					
Number and category of new premises registered where radioactive substances are kept or used between 2006–07 and 2010–11					
Premises category	2006–07	2007–08	2008–09	2009–10	2010–11
Low	20	12	33	10	11
Medium	7	12	8	8	5
High	0	2	0	1	1
Total	27	26	41	19	17

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) assessing the integrity of any shielding of premises in which SSDs or radiation 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 SSDs or radiation apparatus prescribed under section 7(1) of the Act are kept or used
- (f) assessing plans for premises in which SSDs 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, SSDs, 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) 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 reporting period ending 30 June 2011 OEH issued 2 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 162 active accreditation conditions. The total number of accredited CREs was 105.

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

TABLE 10			
Number of accreditation conditions issued during 2010-11 and the total number of accreditation conditions as at 30 June 2011			
Category	Equipment	2010-11	Total at 30 June 2011
Diagnostic imaging	Mammography	1	26
	Dental (intra-oral, OPG and cephalometry)	1	46
	Dental (intra-oral, OPG and cephalometry)		
	Radiography		
	Fluoroscopy	0	69
	Computed tomography		
	Bone mineral densitometry (including veterinary and chiropractic)		
	Radiography		
Fluoroscopy			
Computed tomography	0	6	
Bone mineral densitometry (including veterinary and chiropractic)			
Industrial	Fixed radiation gauges	0	15
Total		2	162

Radiation accidents

Mandatory requirements imposed on an employer on the reporting and recording of radiation accidents are outlined in clauses 27 and 28 of the Regulation. The types of incidents that are classified as radiation accidents for the purposes of the Act are defined in clause 26 of the Regulation.

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

The Council may also recommend referral of serious health-related accidents to the Health Care Complaints Commission (HCCC). OEH has standing advice from the Council to refer all matters considered significant by the Council to the HCCC.

Each year 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 be used to develop processes and procedures that reduce the risk of similar accidents occurring in the future. As such, most reported accidents, although representing a process failure, may not result in any actual harm to an individual.

During the reporting period ending 30 June 2011, OEHL was informed of 28 instances where radiation accidents may have occurred involving 42 people. The Council considered each case and, where appropriate, made recommendations that, in its opinion, would reduce the risk of a recurrence.

A summary of all the accidents reported to the 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 presented for a bone scan and received 1118 MBq of Tc-99m sestamibi instead of Tc-99m HDP. The error occurred due to the radiopharmaceutical label being misread. The patient received an estimated effective dose of 8.8 mSv.
- A patient was injected with 260 MBq of Tc-99m colloid for a liver/spleen scan. The scan revealed that the radiopharmaceutical did not distribute throughout the body as intended. The patient received an estimated effective dose of 3.36 mSv.
- A patient undergoing a cardiac stress test was injected with the prescribed radiopharmaceutical but the cannula had displaced. The scan revealed that the majority of the radiopharmaceutical was not distributed as intended. The patient was re-booked to have the stress phase of the test performed again. The patient received an estimated effective dose of 7.9 mSv.
- A patient received 850 MBq of Tc-99m pertechnetate instead of Tc-99m MDP for a bone scan. The error occurred due to the label not being read correctly. The estimated dose to the patient was 11 mSv.
- Six patients were injected with Tc-99m pertechnetate instead of Tc-99m HDP due to an error made by the pharmaceutical supply company. The error occurred as a result of the test dispensing results being misread. The effective dose to each patient was estimated to be approximately 18 mSv.
- A patient was injected with 621MBq Tc-99m DMSA for a split kidney function study instead of Tc-99m DTPA due to the incorrect radiopharmaceutical being selected. The patient received an estimated effective dose of 2.4 mSv.
- Two patients at two different practices were injected with 124 MBq of Tl-201 chloride instead of Tc-99m disofenin. The error occurred as the incorrect radiopharmaceutical was dispensed by the radiopharmaceutical supplier. The effective dose to each patient was estimated to be 45 mSv.

The Council recommended that OEHL carry out an inspection of the facility particularly with respect to the facilities' quality assurance procedures. The Council considered the outcomes of the investigation undertaken by OEHL and endorsed the recommendations, among other things, requiring the supplier to prepare a Radiation Safety Manual under

clause 16 of the Regulation and to include in this manual relevant training that should be provided to compounding and dispensing staff to minimise errors in these processes; and that OEHL also review the adequacy of the existing criteria of the licence.

- A patient was referred for two procedures, a PET/CT study and a gated heart pool scan (GHPS) for pre-chemotherapy assessment. The patient was injected with F18 for the PET/CT study and the study was undertaken. The patient was then injected with 1044 MBq Tc99m Pertechnetate for the GHPS. Ninety minutes after the injection it was found that an adequate study could not be acquired due to residual radiation left from the PET/CT study. The GHPS was rebooked. The patient received an effective dose estimated to be 13.6 mSv. The Council noted that this type of accident occurred due to a lack of knowledge by staff as to the effects that each type of radionuclide has on each other and the sequence of when procedures should be performed because of the types of radionuclides administered.
- A patient received 640 MBq of 99mTc-HDP instead of Tc-99m sestamibi as a result of the incorrect radiopharmaceutical being provided by the supplier. The effective dose to the patient was estimated to be 3.7 mSv. An investigation of the facility was undertaken by OEHL and the Council was satisfied with the actions put in place to prevent recurrence of such accidents.
- A patient received a *in vivo* C-14 urea breath test instead of a *in vivo* C-14 dextrose breath test. The error occurred due to the wrong procedure being entered into the radiology information system and the referral not being checked against this entry. The patient received an estimated effective dose of 30 microsieverts.
- The wrong patient received a bone scan due to the study being incorrectly ordered. The patient received an estimated effective dose of 4.7 mSv.
- A patient was injected with 561 MBq Tc99m DMSA instead of Tc99m DTPA for a renal study due to an error made by the supplier when dispensing the radiopharmaceutical. The accident was discovered when the bio-distribution of the radiopharmaceutical was examined. The patient received an estimated effective dose of 4.9 mSv.
- A patient was injected with 830 MBq of Tc99m HMPAO, whilst fitting, for a brain scan. Following the scans it was found that the HMPAO had not collected in the brain tissue as required and, therefore, the scans could not be used for diagnostic purposes. On further investigation it was found that the HMPAO was either prepared 30 minutes prior to its activation window or that there was a problem with the kit powder itself. The patient received an estimated effective dose of 10.8 mSv. The Council was satisfied with the actions taken by the facility (among other things) the use of new kits that contain a stabilising agent increasing the activation time to 4 hours) to prevent recurrence of similar accidents.
- nine patients at various nuclear medicine facilities received doses of Myoview to image cardiac muscle in rest and stress stages however it was found that the Myoview had deteriorated and not enough of it was present to target the heart muscle thus the scans could not be used for diagnostic purposes. The estimated effective dose calculated for these patients: 3 mSv for 5 patients; 2.5 mSv for 3 patients; and 7.6 mSv for 1 patient. The cause of this accident is still being determined. OEHL advised however that incident will be referred to the Therapeutic Goods Administration as it is a compounding product failure that caused these radiation accidents.

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 was scanned for radiotherapy planning using CT but the scan was conducted on the hip instead of the lower spine. The error occurred due to the request form not being checked. The estimated effective dose to the patient was 11 mSv.

The Council reviewed the following accidents and the controls that the facilities had instigated to correct deficiencies in their standard operating procedures and is waiting on further advice. The accidents may be subject to further investigation by the NSW Health Department. The Council was advised that it would be provided with updates as they occur.

- A patient undergoing radiation therapy had both sides of the neck irradiated when it should have been the left side only. The error occurred due to lack of prescription specificity. The estimated dose to the patient was 2 Sv.
- A patient undergoing radiation therapy was given treatment approximately 13 cm from the planned area. The incident occurred as a result of the second anterior opposing field being accidentally moved (the patient was moved to reposition the gantry of the apparatus but was not moved back to the correct position). The estimated dose to the patient was 2 Sv.

The Council reviewed the following accident and requested that further information be provided prior to considering whether the accident should be reported to the HCCC

- A patient received 3.34 Gy of prescribed external beam radiation therapy to the wrong side of the neck over two treatments on two consecutive days. The error occurred as the wrong side of the neck was marked on the planning CT. At the time of writing this report no further information had been provided.

Radiology

During 2010–11, 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 medical imaging procedure involving fluoroscopic x-ray. The accident occurred as a result of the medical practitioner ordering the correct examination but on the wrong patient. The patient received an estimated effective dose of 2.6 mSv.
- A patient incorrectly received a CT scan of the chest. The protocol was checked but then the incorrect body part was scanned. The estimated dose to the patient was 4 mSv.
- A patient received a CT scan of the brain instead of an angiogram. The accident occurred as there was inadequate imaging examinations selection data on the imaging ordering system. The estimated dose to the patient was 8.2 mSv.
- A patient received a CT scan of the neck, chest, abdomen and pelvis instead of a TBI CT scan for radiotherapy planning purpose due to the wrong procedure being requested by the medical officer. The estimated dose to the patient was 21 mSv.

- A patient received a post-operative CT scan on the day before it was requested and the procedure had to be repeated on the following day. The estimated dose to the patient was 25.9 mSv.
- The wrong patient in the emergency department received a CT scan of the brain due to patient misidentification. The effective dose to the patient was estimated to be 2 mSv.
- A patient received two CT scans of the abdomen instead of one scan. The error occurred as the first scan request was incorrect but was not deleted from the request system when the second scan was requested. The estimated effective dose to the patient was 15 mSv.
- A patient received a CT of the brain instead of the intended blood test as a result of patient misidentification. The estimated effective dose to the patient was 2.2 mSv.
- A patient received a CT scan after it had been cancelled. The error occurred due to a lack of timely communication of the changes to the patient's treatment plan. The patient received an estimated excess dose of 4 mSv.

Other

An industrial radiographer received an estimated dose of 9.7 mSv when he went to retrieve a gamma camera following completion of an industrial radiography procedure but failed to notice that the isotope had not been fully wound back into the shielded housing. The industrial radiographer could not hear the warning emitted by his electronic personal monitoring device because it was under several layers of clothing. The Council recommended that an article be prepared for the industry newsletter advising practitioners of industrial radiography of the need to ensure when using such equipment that the source is fully wound back into the shielded housing and of the appropriate use of thermoluminescent dosimeters (TLD). The Council also suggested that OEH consider auditing/inspecting industrial radiography companies specifically targeting appropriate use of TLD detectors. An article on industrial radiography safety was drafted and forwarded to the Institute for Non-Destructive Testing for placement in their newsletter.

Categories of radiation accidents reported between 2006 and 2011

Table 11 provides a summary of accidents reported to OEH in specific categories between 2006–07 and 2010–11.

TABLE 11					
Categories of accidents reported between 2006 and 2011					
Accident category	2006–07	2007–08	2008–09	2009–10	2010–11
Nuclear medicine	9	10	14	9	14
Therapy	7	1	5	5	4
Radiology	12	13	6	10	9
Other	0	1	1	0	1
Total	28	25	26	24	28

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 (the 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 Office of Environment and Heritage (OEH) and remains a statutory body with specific powers under environment protection legislation. Staff of OEH exercise regulatory activities for, and on behalf of, the EPA. Staff of OEH 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 the Environment (the Minister) 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 and other advice it receives in developing and implementing policy. In recognition of the 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 asked to consider endorsing 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 of the EPA Board.

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 the Council members of the agendas for meetings of the Council and committees
- the taking of minutes and their distribution to members
- 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 the Council. The EPA will also seek the advice of the 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 the 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 recognising 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 the 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.
- The 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. 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 Chief Executive 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 Chief Executive 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
Chief Executive
Office of Environment and Heritage

CRAIG LAMBERTON
Chairperson
Radiation Advisory Council

Appendix 2: Membership of committees of the Council during 2010–11

Regulatory Review and Reform Committee	
Member	Membership category
Dr Ludmilla Robinson	Legal practitioner (Chairperson)
Mr John Robinson	Diagnostic radiographer
Dr Cameron Hazlehurst	Community representative
Mr Mark Moskvitch	An officer of WorkCover Authority NSW
Mr Brent Rogers	Health physicist
Ms Margaret Conley	Minister's nominee
Dr Henry Forester	OEH (Hazardous Materials Chemicals and Radiation Section)

National Directory Committee	
Member	Membership category
Dr Cameron Hazlehurst	Community representative (Chairperson)
Dr Ludmilla Robinson	Legal practitioner
Mr John Robinson	Diagnostic radiographer
Dr Richard Smart	Medical physicist
Ms Kathy Meleady	An officer of the Department of Health
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	OEH (Hazardous Materials, Chemicals and Radiation Section)

Review of Guideline 6 Committee	
Member	Membership category
Mr Lee Collins	Expert in non-ionising radiation
Dr Philip Pasfield	Radiologist
Dr Andrew Scott	Deputy radiologist
Mr Frank Galea	Expert in industrial uses of radiation
Mr John Robinson	Diagnostic radiographer
Mr Paul Cardew	Deputy medical physicist
Dr Mary Dwyer	Radiation oncologist

NORM Committee	
Member	Membership category
Dr Brad Cassels	Expert in NORM (Chairperson)
Mr Mike Carter	Deputy expert in NORM
Dr Cameron Hazlehurst	Community representative
Mr Mark Moskvitch	An officer of WorkCover Authority of NSW
Ms Margaret Conley	Minister's representative
Mr Roger Alsop	Health physicist
Ms Sue Macalpine	OEH (Hazardous Materials, Chemicals and Radiation Section)
Dr Tony Hodgson	OEH (Hazardous Materials, Chemicals and Radiation Section)
Mr Rob McLaughlin	Department of Industry and Investment NSW

Abbreviations

AHMC	The Australian Health Ministers' Conference
AHPRA	Australian Health Practitioner Regulation Agency
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
COAG	Council of Australian Governments
CRE	Consulting radiation expert
CT	Computed tomography
CTCA	Computed tomography coronary angiography
OEH	Office of Environment and Heritage
EPA	Environment Protection Authority
Gy	Gray
HCCC	Health Care Complaints Commission
IAEA	International Atomic Energy Agency
ICRP	The International Commission on Radiological Protection
IPL	Intense Pulsed Light
MBq	Megabecquerel
MoU	Memorandum of Understanding
mSv	milliSievert
NMTs	Nuclear medicine technologists
NORM	Naturally Occurring Radioactivity
RAC	Radiation Advisory Council
RHC	Radiation Health Committee (National)
SSD	Sealed source device
Sv	Sieverts
TLD	Thermoluminescent dosimeters

