Radiation Advisory Council

Annual Report 2014–15
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 2014 to 30 June 2015. This report has been prepared in accordance with the provisions of the *Radiation Control Act 1990*.

Yours sincerely

Craig Lamberton
Chairperson
Radiation Advisory Council
November 2015
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Chairperson’s review

The role of the Radiation Advisory Council (the Council) is to provide advice to the Minister for the Environment (the Minister) and the Environment Protection Authority (EPA) on technical and policy matters in relation to managing radiation in NSW within the parameters of the Radiation Control Act 1990 (the Act) and the Radiation Control Regulation 2013 (the Regulation).

During the reporting period the Council held five meetings and provided policy and regulatory advice to the EPA on the administration of the Act and on a wide range of radiation matters. The Council’s work and activities included:

- review of, and input into, national codes and standards developed for inclusion in the National Directory for Radiation Protection (NDRP)
- overseeing implementation of the Act and remade Regulation, including: establishment of the new management licensing system; implementation of new radiation security measures; creation of a public register of radiation licences; banning UV tanning units from 31 December 2014; and providing advice on the tanning units disposal scheme.
- review of, and provision of advice to the EPA on, the EPA’s radiation compliance and audit program
- review of the work of the Council’s Guideline 6 Committee, specifically the review of Radiation Guideline 6 – Registration requirements & industry best practice for ionising radiation apparatus used in diagnostic imaging. The aim of the review is to provide coverage for new technology being used in NSW and to align the guideline with the new requirements of the Act.
- establishment of the Council’s Review of Radiation User Licence Conditions Committee to review all EPA radiation user licence conditions. The committee completed its review in April 2015 and the Council endorsed the recommendations of the working group at its April 2015 meeting.
- continuing monitoring of matters pertaining to radioactive ores.

During the year, the Council also continued to provide advice to the EPA on radiation matters:

- radiation licensing (user and management licences)
- new radiation-related technologies
- assessment of radiation safety courses for licencing and accreditation purposes
- accreditation of consulting radiation experts (CREs) and radiation security assessors
- review of radiation accidents and incidents.

At its December meeting the Council was pleased to meet with the EPA Chair and CEO, Mr Barry Buffier. Mr Buffier expressed his thanks to Council members for their contribution to the work and important role that the Council plays in how the EPA regulates the radiation community in NSW.

In the year ahead, the Council’s work will focus primarily on:

- review of, and contribution to, national codes and standards in the NDRP
- review of the work of the Council’s Committees

I sincerely wish to 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 the EPA staff in supporting the Council.

Craig Lamberton
Chairperson
Responsibilities of the Council

The Radiation Advisory Council is established under section 29 of the Radiation Control Act 1990. The Act and the Radiation Control Regulation 2013 are administered by the Minister through the EPA.

Objects of the Act

Section 3 of the Act prescribes the objects of the Act as follows:

(a) to secure the protection of persons and the environment from exposure to ionising and harmful 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

(b) to protect security enhanced sources from misuse that may result in harm to people or the environment

(c) to promote the radiation protection principles.

The radiation protection principles are as follows:

(a) justification of a practice by assessing that the benefits of the practice involving exposure to ionising radiation outweigh any detriment

(b) optimisation of protection by ensuring that each of the following is kept as low as reasonably achievable, taking into account economic and social factors:
   - the magnitude of individual doses of ionising radiation
   - the number of people exposed to ionising radiation
   - the likelihood of exposure to ionising radiation.

(c) dose and risk limitation by setting dose limits or imposing other measures so that the health risk to any person exposed to ionising radiation is kept below levels that are generally considered to be unacceptable.

A person is to take the radiation protection principles into consideration when exercising functions under this Act or under a licence.

Annual report of the Council

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. Those members are:

(a) the Chairperson of the Authority or a member of staff of the Authority, who is to be the Chairperson of the Council
(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 work health and safety
(i) a person who is an Australian lawyer of at least 7 years’ standing
(j) a person who represents community interests
(k) a person nominated by the Secretary of the Ministry of Health
(l) a radiation oncologist
(m) a medical physicist
(n) a person nominated by the Secretary of the Department of Finance, Services and Innovation and who is employed in the part of the Department that is principally involved in the administration of the Work Health and Safety Act 2011
(o) a person with expertise in naturally occurring radioactivity
(p) a person with expertise in mine radiation safety
(q) a person chosen by the Minister for such reasons as the Minister thinks fit.

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 and accreditations under Part 2 of the Act.

(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 EPA exercises responsibilities and powers under the Act, and the EPA staff of the Hazardous Materials, Chemicals and Radiation Section support the work of the Council.

Meetings of the Council

During the reporting period ending 30 June 2015, the Council met on five occasions. The attendances of members at meetings during this period are shown in Table 1.

<table>
<thead>
<tr>
<th>Member</th>
<th>Appointed position</th>
<th>Meetings attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Craig Lamberton (reappointed 16/12/2013)</td>
<td>Chairperson</td>
<td>4</td>
</tr>
<tr>
<td>Mr Jon D’Astoli (reappointed 16/12/2013)</td>
<td>A person with expertise in work health and safety</td>
<td>4</td>
</tr>
<tr>
<td>Mr Brent Rogers (reappointed 16/12/2013)</td>
<td>A person with expertise in health physics</td>
<td>5</td>
</tr>
<tr>
<td>Ms Vanessa Brooks (appointed 16/12/2013)</td>
<td>A person nominated by the Secretary of the Ministry of Health</td>
<td>1</td>
</tr>
<tr>
<td>Assoc. Prof. Lee Collins AM (reappointed 1/12/2014)</td>
<td>A person with expertise in non-ionising radiation</td>
<td>5</td>
</tr>
<tr>
<td>Dr Richard Smart (reappointed 1/12/2014)</td>
<td>A medical physicist</td>
<td>5</td>
</tr>
<tr>
<td>Mr Frank Galea (reappointed 1/12/2014)</td>
<td>A person with expertise in the industrial uses of radiation</td>
<td>5</td>
</tr>
<tr>
<td>Ms Elizabeth Bailey (appointed 1/12/2014)</td>
<td>A person chosen by the Minister</td>
<td>2</td>
</tr>
<tr>
<td>Ms Colleen Harris (appointed 1/12/2014)</td>
<td>An officer of the WorkCover Authority</td>
<td>2</td>
</tr>
<tr>
<td>Mr Cameron Jeffries (appointed 1/12/2014) Prof. Greg Skilbeck (term expired 2/10/2014)</td>
<td>A person with expertise in naturally occurring radioactivity</td>
<td>3</td>
</tr>
<tr>
<td>Ms Fiona Henderson (appointed 1/12/2014) Mr Cormack Dunn (term expired 2/10/2014)</td>
<td>A person who is an Australian lawyer of at least 7 years’ standing</td>
<td>2</td>
</tr>
<tr>
<td>Ms Elizabeth Akmentins (appointed 1/12/2014) Ms Sarah Jones (term expired 2/10/2014)</td>
<td>A person who represents community interests</td>
<td>3</td>
</tr>
<tr>
<td>Dr Hugh Dixon (reappointed 21/1/2015)</td>
<td>A medical practitioner who specialises in nuclear medicine</td>
<td>4</td>
</tr>
<tr>
<td>Dr Mary Dwyer (reappointed 21/1/2015)</td>
<td>A radiation oncologist</td>
<td>4</td>
</tr>
<tr>
<td>Mr Robert McLaughlin (reappointed 21/1/2015)</td>
<td>A person with expertise in mine radiation safety</td>
<td>3</td>
</tr>
<tr>
<td>Dr Philip Pasfield (reappointed 21/1/2015)</td>
<td>A medical practitioner who is a specialist in radiology</td>
<td>4</td>
</tr>
<tr>
<td>Mr Glen Burt (reappointed 21/1/2015)</td>
<td>A radiographer with expertise in the field of human diagnostic radiography</td>
<td>4</td>
</tr>
</tbody>
</table>
Memorandum of understanding between the EPA and the Council

The memorandum of understanding (MoU) between the EPA and the Council is provided in Appendix 1.

The Council’s strategic direction

The Council continued to focus on its strategic direction for 2013–16:

- developing uniform regulatory initiatives through the NDRP by reviewing national codes and standards and identifying regulatory gaps that may need to be addressed
- 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 for, or participation in, multi-agency emergency management exercises and through participation in national programs.

The Council’s work

During the reporting period the Council focused on the following matters:

National Uniformity and Radiation Health Committee

National uniformity for radiation protection is delivered through the National Directory for Radiation Protection (NDRP) that is developed by the Radiation Health Committee (RHC) and facilitated by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). National uniformity was agreed to at the Australian Health Ministers’ Conference (AHMC) in August 1999. The first edition of the NDRP was endorsed by the AHMC in May 2005. This process allows all jurisdictions, including the Commonwealth, to achieve national uniformity for radiation protection through each jurisdiction’s radiation protection framework.

During the reporting period the RHC met on three occasions: 19 November 2014, 25 March 2015 and 24 June 2015. The Council was kept informed of and provided comment on the RHC deliberations and recommendations.

During 2014–15 the Council also:

- raised concerns that some research proposals governed by ARPANSA’s Code of Practice for the Exposure of Humans to Ionizing Radiation for Research Purposes (2005) are bypassing the requirement for the radiation component of the proposal to be assessed by a medical physicist by submitting proposals as ‘standard care’ protocols. On the Council’s recommendation, the EPA wrote to ARPANSA’s Radiation Health Committee and the committee agreed to address this issue in the next review of the Code of Practice.
- asked the EPA to investigate whether improvements could be made to distinguishing between the Security of Radioactive Sources Code threat level and the Australian Terrorism Public Alert Level in public communication following confusion about the impact of an increase in the terrorism alert level on the radiation security threat level. The EPA is following up with relevant agencies and will report back to Council in 2015–16.
- considered and provided comment on the following ARPANSA documents:
  - Code for Radiation Protection in Planned Exposure Situations
  - Radiation Protection of the Patient Module for Referrers
  - ARPANSA community perception survey
Implementation of radiation legislation
The Council provided advice on the implementation of the Act amendments and new Regulation including:

- Introduction of the new management licensing system, which replaced around 10,000 equipment registrations with less than 3,000 management licences. The EPA advised Council at its April 2015 meeting that the new licensing system was fully implemented.
- Introduction of a public register on the EPA website. The EPA advised Council at its December 2014 meeting the public register was available on the EPA website.
- Cosmetic Tanning Units Disposal Scheme: a ban on the commercial use of UV tanning units commenced 31 December 2014. A total of 63 units were collected under the scheme.
- Matters relating to radioactive ores, including:
  - a report undertaken by NSW Trade and Investment on radon monitoring in mines
  - a report by NSW Trade and Investment on the build-up of radioactive scale in pipes used in coal washery plants.

EPA radiation compliance and audit program
The Council:
- reviewed and provided advice on the EPA’s 2014–15 compliance program, which included compliance campaigns targeting: radiation oncology facilities using security category 1 sources; cosmetic UV tanning services; organisations that closed or were about to close major operations where sealed source devices were being used; transport of radioactive substances; and source security plan.
- considered and endorsed the EPA’s 2015–16 compliance program with the following recommendations:
  - that work health and safety considerations be included in the audit of Global Medical Solutions
  - that the compliance program include inspections of radiography cameras and borehole logging cameras.
- provided advice on a lost borehole logging source.

Advice to Council
The Council considered:
- Australian Capital Territory (ACT) Health advice informing regulatory agencies that it had made changes to the ACT Radiation Protection Act 2006 to allow the general supervision of fourth-year medical radiation students
- Medical Radiation Practice Board of Australia advice that it had introduced a Supervised Practice Program for graduate medical radiation practitioners which replaces the previous Professional Development Year (PDY) program approved by the Council
- Department of Defence advice regarding corrosion of magnesium-thorium Viper and Avon aircraft engines
- a paper by Health Physics, 2014 Occupational Exposure of I-131 – a case study

Council’s advice to the EPA on other radiation matters
During the reporting period the Council continued to provide advice to the EPA in relation to radiation matters, including:
- non-standard licensing applications
- acceptance of radiation safety courses for the purposes of licensing
- new radiation technologies
• non-standard accreditation applications
• radiation accidents and incidents
• review of Council business documents.

During the reporting period the Council also considered the work of its Guideline 6 Committee and Review of Radiation User Licence Conditions Committee. Details of the work carried out by the Council committee and working group is provided in the next section.

Committees of the Council

Under section 31 of the Act the Council may establish committees to help it perform its functions. In 2014–15 the Council had three committees:

• National Directory Committee
• Review of Guideline 6 Committee
• Review of Radiation User Licence Conditions Committee

The roles and work of each of the Council’s committees are outlined below.

The membership of the Council's committees and working group are provided at Appendix 2.

National Directory Committee

The National Directory Committee was established by the Council to help it to develop and implement the NDRP and to ensure that the recommendations proposed by the national RHC are practical and effective in controlling radiation risks to human health and the environment. The RHC advises the CEO of ARPANSA and the Radiation Health and Safety Advisory Council on matters relating to radiation protection, including formulating draft national policies, codes and standards for consideration by the Commonwealth, States and Territories.

The committee’s role is to provide advice to the Council and the EPA on the priorities and suitability of material proposed for inclusion in the NDRP, as well as on its legislative, financial and operational impact on the EPA, other NSW Government agencies and NSW as a whole. The committee reviews documents that are produced by the RHC.

The committee did not meet during the reporting period but dealt with specific issues arising from the RHC out of session.

Guideline 6 Review Committee


The Council, at its February 2015 meeting, endorsed new membership to the Committee.

The aim of the review is to incorporate new technology and to update the requirements of the six-part guideline to align with the new requirements of the Act. The six parts of the guideline are:

Part 1: Mammography
Part 2: Fluoroscopy & radiography
Part 3: Dentistry (including maxillofacial)
Part 4: Veterinary science
Part 5: Computed tomography & bone mineral densitometry
Part 6: Test protocols for parts 2–5.
During the reporting period the committee met on nine occasions. The Committee finalised 3 stand-alone parts of Guideline 6: Part 1 (mammography), Part 2 (radiography) and Part 5 (computed tomography).

The Council, at its October and December meetings, considered and endorsed parts 1, 2 and 5 of the draft guideline for public comment. The EPA released these parts for public comment between 23 March 2015 and 1 May 2015.

The Council also recommended an amendment to Radiation Guideline 7 – Radiation shielding design assessment and verification requirements to incorporate a new requirement of draft Radiation Guideline 6: Compliance requirements and industry best practice for ionising radiation apparatus used in diagnostic imaging.

Radiation User Licence Conditions Review Committee

The Council established the Review of Radiation User Licence Conditions Committee at its February 2015 meeting to review all EPA radiation user licence conditions. The Committee reviewed 76 user licence conditions and endorsed 6 new general licence conditions.

The Council, at its meeting in April 2015, was provided with the Committee's deliberations and recommendations. The Council endorsed the Committee's revised user licence conditions and recommendations and recommended that the EPA review which industries should be required to have radiation management plans.

Licensing and accreditation

Under Part 2 of the Act the EPA is the authority responsible for administering radiation user and management licence and consulting radiation expert and radiation security assessor accreditations. Section 30 of the Act provides that the Council may give generic or specific advice to the EPA on applications under Part 2 of the Act.

During 2014–15 the Council advised the EPA on licensing and accreditation matters. The Council’s standing advice was taken into account in the EPA’s consideration of applications submitted to it under the Act. The Council and the EPA work together on determining the outcomes of applications, as set out in the MoU between the Council and the EPA (see Appendix 1).

An overview of radiation user licences, management licences, accreditation of consulting radiation experts and accreditation of radiation security assessors is provided below.

Radiation user licences

Section 7 of the Act requires a natural person who intends to use regulated material\(^1\) to hold a radiation user licence and comply with any conditions to which the licence is subject.

**Purpose of a radiation user licence**

The aim of a user licence is to:

- regulate, restrict or prohibit the use of regulated material
- ensure that persons who use regulated material:
  - are fit and proper persons
- have appropriate knowledge of the principles and practices of radiation safety and protection applicable to the activities proposed to be carried out
- protect the NSW community and the environment from harmful exposure to radiation through the application of conditions of licence that restrict how, when and where radiation may be used.

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\(^1\) Regulated material means any of the following: radioactive substances, ionising radiation apparatus, non-ionising radiation apparatus of a kind prescribed by the regulations, and sealed source devices.
Occupations requiring a user licence

User licences are held by individuals who work across a wide range of occupations in NSW such as scientists, medical specialists, nurses, radiographers, industrial radiographers, service engineers, technologists, dentists, chiropractors and tertiary lecturers.

Number of user licences issued by the EPA

During the reporting period ending 30 June 2015 the EPA issued 1,613 radiation user licences and renewed 5,247 user licences. At the end of the reporting period there was a total of 13,469 radiation user licences (3,938 one-year licences and 9,531 three-year licences).

Council’s advice to the EPA

During the reporting period, the Council gave the EPA specific expert advice in relation to radiation safety and licensing requirements across a wide range of occupational areas that use radiation (see below).

Non-standard licence conditions

The Council recommended:

- the granting of two non-standard licence conditions to use regulated material
- the refusal of one non-standard licence as the applicant was not qualified to receive a licence and advised that the applicant will need to be registered by the Medical Board of Australia as a specialist in radiology prior to being eligible for this licence type. The applicant was advised that their employer could grant them an exemption from licensing under cause 10 of the Regulation as they were considered to still be in training, allowing them to work under general supervision.

Radiation user licence conditions

The Council considered and approved a licence condition to use mammography apparatus for breast screening (IA14M) following the approval of a course that was developed by Charles Sturt University for this purpose (see Radiation safety courses).

Radiation safety courses

The Council considered and approved the following radiation safety courses for the purpose of licensing:

- Virtual Accident online Radiation and Research course to use radioactive substances for analytical purposes (S5) and scientific or research purposes (S8) subject to the inclusion of demonstration videos on radiation monitoring; how to handle spills; and radiation safety. The revised course including demonstration videos was provided to the Council at its February 2015 meeting.
- Portable XRF Services Pty Ltd Radiation Theory and Training in the Use of Portable XRFs course to use portable x-ray fluorescence radiation apparatus for analysis (IA19).
- Charles Sturt University Graduate Diploma of Mammography course to use mammography apparatus for breast screening. This course was first given without being approved for licensing purposes. Council reviewed the course and considered that it did not include sufficient practical training. The Council recommended that students that had completed the course could be given a licence but would require direct supervision until they gained sufficient practical experience. The course has now been amended to include additional practical training and has been approved for licensing purposes.
- Rural Alliance in Nuclear Sintigraphy (RAINS) Diagnostic CT Certification program for the purposes of licensing nuclear medicine technologists to use CT for nuclear medicine and general diagnostic CT (IA16D).
- University of Newcastle Department of Rural Health Limited Licence Radiography Course for the purposes of licensing remote medical practitioners or registered nurses to use radiation apparatus for medical diagnostic radiography (IA14R). The course was approved subject to course references being updated.
**Radiation management licences**

**Requirement for management licences**
Under Section 6 of the Act persons responsible for regulated material are required to hold a radiation management licence and to comply with any condition to which the licence is subject.

The EPA issues two types of management licence: one to own, store, give away, sell and possess regulated material and the other only for the purpose of selling regulated material.

**Purpose of management licences**
The purpose of management licences is to regulate, restrict or prohibit the possession, sale, storage, giving away and disposal of regulated material so as to secure the protection of people and the environment from exposure to radiation.

**Persons responsible for regulated material**
Persons responsible for regulated material are: owners of regulated material; persons storing, selling or giving away regulated material; and persons in possession of regulated material, other than:

(a) a person who is the holder of a radiation user licence in respect of the regulated material and who has possession of the regulated material only for the purposes of using the regulated material, or

(b) a person who has possession of the regulated material only for the purposes of transporting the regulated material.

**Number of management licences issued by the EPA**
During the reporting period ending 30 June 2015, the Council was advised that the EPA issued 136 general management licences and 5 sell-only management licences. At the end of the reporting period there was a total of 2,761 management licences (2629 general and 132 sell only).

**Consulting radiation experts**

**Accreditation and activities of consulting radiation experts**
Section 8 (1) of the Act provides for the accreditation of CREs. The Regulation sets out the activities of a CRE, which include:

(a) advising on the design of premises, in relation to radiation safety requirements, on which regulated material is kept or used, for the purpose of certifying compliance with any conditions imposed on a radiation management licence

(b) assessing plans for premises on which regulated material is kept or used, for the purpose of certifying compliance with any conditions imposed on a radiation management licence

(c) assessing any regulated material and the premises at which it is kept or used, for the purpose of certifying compliance with any conditions imposed on a radiation management licence

(d) assessing the integrity of any shielding of premises at which any regulated material is kept or used, for the purpose of certifying compliance with any conditions imposed on a radiation management licence.

**Purpose of accrediting consulting radiation experts**
CREs are accredited by the EPA to assess apparatus and/or premises and issue a certificate of compliance verifying that they comply with the requirements of licensing.

The Council was advised that the EPA intends to commence the accreditation of CREs to assess shielding in premises subject to an individual having completed an approved training program. Council was also advised that an appropriate training program is currently being
developed by the Australasian College of Physical Scientists & Engineers in Medicine (ACPSEM) that would be relevant for CREs seeking accreditation for assessing shielding in medical premises. Council also noted that the EPA in conjunction with the Council will assess individually any for applicant currently doing this type of work but who would not meet the new requirements.

Council’s advice to the EPA
The EPA under section 9A of the Act may seek the Council’s advice on accreditation matters. During the reporting period ending 30 June 2015 the Council:

- considered and recommended approval of a CRE application for accreditation (fixed radiation gauge category)
- considered two CRE applications for accreditation (diagnostic imaging excluding dental and mammography) and recommended that in the absence of a training program being available that the applicants be assessed individually by two independent CREs selected by the EPA; that the assessment include an interview with the applicant to ascertain the applicant’s knowledge; and that a practice test be undertaken to ascertain the applicants competency to use/assess radiation equipment safely. One applicant was assessed to be competent and is now accredited in this category. The other applicant withdrew their application.
- considered a CRE application to vary an accreditation to include mammography and recommended that the applicant be assessed by an independent CRE selected by the EPA. The applicant was assessed to be competent by the EPA and is now accredited in this category.

Number of CREs accredited by the EPA
During the reporting period ending 30 June 2015 the EPA issued six CRE accreditations and renewed 43 CRE accreditations. At the end of the reporting period a total of 114 CREs were accredited by the EPA to perform one or more of the prescribed activities.

Radiation security assessors

Accreditation and activities of radiation security assessors
Section 8(2) of the Act provides for the accreditation of radiation security assessors. The activities of a radiation security assessor, as prescribed in Clause 13 of the Regulation, are:

- reviewing security plans or amended security plans to assess whether the plans are made or amended in accordance with the Act
- endorsing security plans so that the plan, or the plan as amended, satisfies the requirements of the Act.

Purpose of accrediting radiation security assessors
The purpose of accrediting radiation security assessors is to ensure that the persons responsible for security-enhanced sources\(^2\) prepare source security plans and source transport security plans in accordance with the requirement of the Act.

Number of radiation security assessors accredited by the EPA
As at 30 June 2015 the EPA had accredited a total of five radiation security assessors.

\(^2\) A sealed radioactive source (or an aggregation of sealed radioactive sources) that is a category 1, 2 or 3 source is a security-enhanced source for the purposes of the Act.
Summary of licences and accreditations issued by the EPA

Table 2 summarises the total numbers of radiation user licences, management licences and accreditations issued by the EPA as at 30 June 2015.

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licence to use regulated material</td>
<td>13,469</td>
</tr>
<tr>
<td>Management licences (general)</td>
<td>2,629</td>
</tr>
<tr>
<td>Management licences (sell only)</td>
<td>132</td>
</tr>
<tr>
<td>Accreditation of consulting radiation experts</td>
<td>114</td>
</tr>
<tr>
<td>Accreditation of radiation security assessors</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16,349</strong></td>
</tr>
</tbody>
</table>

Radiation accidents

**Mandatory requirement to report radiation accidents**

The mandatory requirements imposed on persons responsible for regulated material for the reporting and recording of radiation accidents is outlined in clauses 38 and 39 of the Regulation. Clause 37 of the Regulation specifies the types of incidents that are classified as radiation accidents for the purposes of the Act. The Council reviews accident reports at the request of the EPA.

Each year the Council emphasises that it is vital that accidents are consistently reported, even if the dose received has been negligible. This is not just because of the legal requirement, but also because the knowledge gained can be used to develop processes and procedures that reduce the risk of similar accidents occurring in the future. Most reported accidents do not result in any actual harm to an individual.

**Causes of radiation accidents**

Radiation accidents are normally caused by either deficiencies in the management systems or failures on the part of individuals to implement those systems correctly. Where investigations reveal that accidents have been caused by a deficiency in the management system, the Council may recommend that new procedures be developed and implemented or that specific regulatory action be taken. Where an individual is at fault, the Council may (if this has not been done by the organisation) recommend counselling or further training to prevent this type of incident from recurring.

**Serious accidents reported to the Health Care Complaints Commission (HCCC)**

The Council may also recommend that serious health-related accidents be referred to the HCCC. The EPA has standing advice from the Council to refer all matters considered significant by the Council to the HCCC.

**Number of accidents reported to the EPA**

During the reporting period ending 30 June 2015, the EPA was informed of 39 instances where radiation accidents may have occurred. These involved 59 people.

The Council considered each case and, where appropriate, made recommendations that, in its opinion, would reduce the risk of a recurrence. The EPA also provided the Council with
information on 22 incidents that involved doses of less than 1 mSv (milliSieverts). These are not included in the accident summary below.

**Advice to the EPA**

During the reporting period the Council also:

- advised the EPA that the information provided by the facilities reporting accidents was not consistent and that the EPA consider a template for the reporting of radiation accidents. The template was considered and approved by the Council at its February 2015 meeting and is now available on the EPA radiation webpage.
- raised the issue that similarly named radionuclides are still consistently being misidentified and suggested that colour labelling or another system of differentiation be considered. The Council indicated that it had previously raised this matter some time ago and a letter was sent to Standards Australia with the Council’s recommendation that they consider colour-labelled radiopharmaceuticals in order to avoid this type of accident from occurring. The EPA agreed to engage an appropriately qualified person to consider the issue of better labelling of radionuclides in NSW.

**Summary of radiation accidents considered by the Council 2014–15**

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

**Nuclear medicine**

During the reporting period the Council reviewed the following accidents and the controls instigated by the facilities responsible to correct deficiencies in their standard operating procedures or equipment. The Council was satisfied with the steps the organisations had taken to prevent these types of incident from recurring.

- Three patients were injected with F18-FDG but could not be scanned due to a malfunction of the PET-CT scanner. The patient’s received an estimated effective dose of 4.75 mSv each.
- A patient undergoing a stress sestamibi scan was injected with Tc-99m MIBI but did not receive the adenosine required for this part of the study so the study had to be repeated. The patient received an estimated effective dose of 5.9 mSv.
- A patient was injected with the wrong radiopharmaceutical for a gated heart blood pool scan due to the preparation protocols not being followed. The patient received an estimated effective dose of 6.8 mSv.
- A patient was injected with Tc-99m Pertechnetate instead of Tc-99 MDP resulting in an unusable scan. The patient received an estimated effective dose of 1 mSv. The Council requested further information on how the accident occurred, where it occurred and what steps had been taken to minimise recurrence of this type of accident. Council considered the additional information at its next meeting.
- Four patients received a radiopharmaceutical otherwise than prescribed due to CT scanner software module failure. The estimated effective dose to each patient:
  - Patient 1 – 19.25 mSv from repeat CT
  - Patient 2 – 12.34 mSv from repeat CT
  - Patient 3 and 4 – 2.8 mSv each from extra 150 MBq of 18 FDG
- A patient received a repeat scan as the adenosine (a compound) required for the test was not administered. The patient received an estimated effective dose of 7.3 mSv.
- A patient was injected with Sestamibi instead of Tc-99m HDP due to dispensing protocols not being followed. The patient received an estimated effective dose of 0.9 mSv.
- Two patients required repeat SPECT CTs due to the failure of the CT scan. The estimated effective dose to the patients was 1.1 mSv and 1.4 mSv respectively.
A patient was injected with Tc-99m MDP instead of Tc-99m Sodium Pertechnetate due to the wrong radiopharmaceutical being selected. The patient received an estimated effective dose of 1.5 mSv.

A patient was injected with Tc-99m DTPA instead of Tc-99m DMSA due to the wrong radiopharmaceutical being selected as both pots were the same colour. The patient received an estimated effective dose of less than 1 mSv.

The wrong patient received a PET-CT study due to the wrong patient sticker being placed on the referral form. The patient received an estimated effective dose of 6.5 mSv.

A patient was incorrectly injected with Tc-99m HDP instead of Sestamibi due to the wrong radiopharmaceutical being selected. The patient received an estimated effective dose of 6.1 mSv.

A patient was injected with two radiopharmaceuticals Tc-99m DTPA and HDP for a renal scan. The accident occurred as a result of supplier error at the time of compounding the radionuclides. The patient received an estimated effective dose of 3.3 mSv.

Two patients were injected with Tc-99m Myoview resulting in an altered bio-distribution due to the incorrect compounding of the radiopharmaceutical by the supplier. The patient’s received an estimated effective dose of 4.5 mSv and 3.9 mSv respectively.

A patient had a brain scan that showed low tracer uptake in the brain. The cause of the accident was considered to have been supplier related. The patient received an estimated effective dose of 10.7 mSv.

The wrong patient received a ventilation-perfusion scan due to patient misidentification. The patient received an estimated effective dose of 3 mSv.

A patient was injected with Tc-99m DISIDA instead of Ga-67 due to the wrong radiopharmaceutical being selected. The patient received an estimated effective dose of 3.4 mSv.

**Therapy**

During the reporting period the Council reviewed the following accidents and the controls instigated by the facilities to correct deficiencies in their standard operating procedures. The Council was satisfied with the steps the organisations had taken to prevent these types of incidents from recurring.

- A patient received 210 MBq Y-90 SIR-spheres instead of 920 MBq Y-90 SIR-spheres for therapy treatment of the liver due to protocols not being followed. The patient received a dose of approximately 75% less than was prescribed.

- A patient undergoing radiation therapy treatment received treatment to the wrong shoulder as a result of protocols not being followed. The patient received an estimated dose of 2 Gy.

- Two patients receiving radiotherapy treatment to the lung received an under dose of approximately 17% and 12% respectively. The error occurred as a result of the wrong algorithm being used when the calculation of the dose to the lung was carried out.

- A patient receiving radiotherapy treatment was prescribed a total dose of 50.4 Gy in 28 fractions of treatment but only received phase 1 of the prescribed treatment (45 Gy in 25 fractions). The error occurred due to protocols not being followed. The patient received an under dose of approximately 10.7% from the prescribed dose.

- A patient received a pelvic CT scan unnecessarily as it was decided that the treatment was not required however the scan was not cancelled and went ahead as a result protocols not being followed. The Council indicated that the estimated dose to the patient was incorrectly calculated and should be estimated to be 6 mSv.

During the reporting period the Council reviewed the following accident and the controls instigated by the facilities to correct deficiencies in their standard operating procedures. Due to the seriousness of the accident the Council recommended that this accident be referred to the HCCC.
A patient received radiation treatment to the wrong groin due to the incorrect entry on the patient’s treatment plan. The patient received an estimated dose of 30 Gy.

**Radiology**

During the reporting period the Council reviewed the following accidents and the controls instigated by the facilities responsible to correct deficiencies in their standard operating procedures. The Council was satisfied with the steps the organisations had taken to prevent these types of incidents from recurring.

- A patient wrongly received a CT scan of the right hip due to the wrong patient being selected during the ordering of the CT scan. The patient received an estimated effective dose of 17 mSv.
- A patient required a repeat CT scan due to a malfunction which caused the CT to operate before the scan was ready. The patient received an effective dose of 6.2 mSv.
- A patient wrongly received X-rays of the lumbosacral spine due to patient misidentification. The patient received an estimated effective dose of 3 mSv.
- A patient wrongly received a chest and upper abdomen CT due to patient misidentification. The patient received an estimated effective dose of 7.8 mSv.
- A patient received four repeat CT scans of the neck before sufficient images were obtained. The error occurred as a blood pressure cuff was left on the arm of the patient which automatically inflated just as the auto injector was injecting contrast into the patient for the scan. This delayed the contrast getting to the scan site resulting in the repeat scans. The patient received an estimated effective dose of 24 mSv.
- A patient received a CT of the chest and abdomen instead of a CT of the abdomen pelvis as a result of the request form not being read correctly. The patient received an estimated effective dose of 4.2 mSv.
- A patient was given oral contrast for a CT when it was not required. The patient received an estimated effective dose of 5.1 mSv from the repeat scan.
- A patient received the wrong CT protocol due to the wrong protocol being selected. The patient received an estimate effective dose of 17.17 Gy.
- A patient wrongly received a CT scan of the brain due to patient misidentification. The patient received an estimated effective dose of 2.2 mSv.
- A patient received a repeat CT scan as the contrast was not injected into the patient due to the tube not being connected to the patient’s cannula. The patient received an estimated effective dose of 3.8 mSv.
- A patient received a chest CT instead of a CT of the abdomen and pelvis due to an electronic booking error. The patient received and estimated effective dose between 4.9 mSv and 6.1 mSv.
- A patient received a CT scan that was not requested due to protocols not being followed. The patient received an estimated effective dose between 4.9 and 6.1 mSv.
- The wrong patient received a CT of the brain due to patient misidentification. The patient received an estimated effective dose of 2.2 mSv.
- A patient received a repeat CT scan due to CT console computer failure. The patient received an estimated effective dose of 5.8 mSv.
- The wrong patient received a CT of the brain due to patient misidentification. The patient received an estimated effective dose of 1.8 mSv.

The following incident is not a radiation accident as defined by clause 37 of the Radiation Control Regulation, however, a report was provided to the Council where Council provided specific advice:

- A facility had purchased a new QA device (ArcCheck) for volumetric modulated radiotherapy treatments on linear accelerators. Initial results suggest that a number of
patients were outside international QA protocols for intensity modulated radiotherapy. The variation of planned doses of 14 patients were between +5 and -5%.

Council recommended that the issue be referred to the vendor of the machine to investigate and that a letter be sent to NSW oncology facilities highlighting potential issues. A QA assessment tool can now more precisely calculate actual volumetric doses being delivered to the patient.

**Follow-up from the previous period**

- A patient received a CT scan of the chest, abdomen, and pelvis that was not required because their name was inadvertently placed on the x-rays of another patient. The patient received an estimated effective dose of 28 mSv.

In the last period the Council recommended that the EPA investigate the matter further, specifically asking the facility for advice on the level of supervision provided to the student who was involved in the accident. The EPA advised Council at its December 2015 meeting of the outcome of the investigation which resulted in a Penalty Infringement Notice being issued to the facility for failure to provide immediate supervision to a student.

**Other**

An accident occurred at the premises of a supplier of radiopharmaceuticals, when two guide needle holders (used for iodine dispensing) required repair and during the repair process the needles released approximately 180 MBq of liquid Iodine-131 which contaminated the floor and the bench of an office at the premises. In addition to surface contamination, airborne contamination had also occurred. The contamination involved 13 staff members with three chemists receiving an estimated effective dose of 3 mSv, 9 mSv and 25 mSv respectively, and the remaining staff of 10 who received estimated effective doses of 1 mSv or less.

The Council requested further advice on the accident from the organisation. After reviewing the details of the accident the Council expressed concern at the poor adherence to proper radiation safety practice exhibited by staff working within the organisation. On the advice of the Council the EPA requested that the CEO of the company attend a future Council meeting (in 2015–16) to clarify issues surrounding this and other matters of non-compliance attributed to this organisation.

**Categories and numbers of radiation accidents reported to the Council from 2008–15**

Table 3 summarises the accidents reported to the EPA in specific categories between 2008–09 and 2014–15.

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<td>1</td>
<td>–</td>
<td>1</td>
<td>2</td>
<td>1</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
<td><strong>24</strong></td>
<td><strong>28</strong></td>
<td><strong>9</strong></td>
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Appendix 1: Memorandum of understanding between the EPA and the 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 provides administrative support to the Council.

Both the Council and the EPA are committed to a cooperative and collaborative partnership with the aim of advancing the objectives of the Radiation Control Act 1990. This Memorandum of Understanding shall be reviewed every 3 years and remain in force until such time as both parties agree otherwise.

The roles and responsibilities for each body are set out in the Act. Fundamentally, the Council provides expert advice to the EPA and the Minister for the Environment (the Minister) across all radiation safety matters, whereas 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 and accreditations.

The Council also has a key role in helping the EPA to 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 the 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 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 before it is signed by the Chair of the EPA Board.

The time frames 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 the Hazardous Materials, Chemicals and Radiation Section at the time.

Finalised correspondence that 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:

- preparation of agendas for meetings of the Council and committees, and their distribution to Council members
- taking of minutes and their distribution to members
- 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 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, with 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 Council performs an advisory function and that the EPA is the decision maker, the parties agree to work through disagreement as follows:

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

7. **Determinations for licensing and accreditation**

The EPA is the determining authority for applications for licences and accreditations as made under Part 2 of the *Radiation Control Act 1990*. The EPA is empowered by section 9(8) 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. 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, she or he must have regard to the relevant requirements of Part 2 of the Act, the Radiation Control Regulation 2013, and the standing advice of the Council.

Unless the CEO of the EPA 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 CEO of the EPA will approve a variation in this procedure only in an emergency, in which case the concurrence of the Council with the determination is to be sought retroactively as soon as practicable.

Barry Buffier  
CEO Environment Protection Authority (EPA)

Craig Lamberton  
Chairperson  
Radiation Advisory Council

The MoU was signed by both parties on 17 September 2013.
Appendix 2: Membership of Committees of the Council during 2014-15

### National Directory Committee

<table>
<thead>
<tr>
<th>Member</th>
<th>Membership category</th>
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<tbody>
<tr>
<td>Dr Richard Smart</td>
<td>Medical physicist</td>
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<tr>
<td>Mr Jon D’Astoli</td>
<td>Work health and safety</td>
</tr>
<tr>
<td>Dr Philip Pasfield</td>
<td>Radiologist</td>
</tr>
<tr>
<td>Dr Mary Dwyer</td>
<td>Radiation oncologist</td>
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<tr>
<td>Mr Lee Collins</td>
<td>Expert in non-ionising radiation</td>
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<tr>
<td>Mr Frank Galea</td>
<td>Expert in industrial uses of radiation</td>
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<tr>
<td>Mr Len Potapof</td>
<td>EPA (Hazardous Materials, Chemicals and Radiation Section)</td>
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### Review of Guideline 6 Committee

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<tbody>
<tr>
<td>Dr Richard Smart</td>
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<tr>
<td>Mr Lee Collins</td>
<td>Expert in non-ionising radiation</td>
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<tr>
<td>Dr Philip Pasfield</td>
<td>Diagnostic radiographer</td>
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<tr>
<td>Mr Glen Burt</td>
<td>Expert outside RAC – medical physicist specialist (radiology, radiotherapy and mammography)</td>
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<tr>
<td>Ms Tiffany Chiew</td>
<td>Expert outside RAC – radiographer</td>
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<tr>
<td>Dr Jennifer Diffey</td>
<td>Expert outside RAC – medical physics specialist (radiology)</td>
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<tr>
<td>Dr Ravinda Grewald</td>
<td>Expert outside RAC – medical physicist specialist (radiology)</td>
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<td>Mr Adam Jones</td>
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<tr>
<td>Mr Peter Williams</td>
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### Review of User Licence Conditions Committee

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<td>Dr Richard Smart</td>
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<tr>
<td>Mr Brent Rogers</td>
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<tr>
<td>Mr Cameron Jeffries</td>
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<tr>
<td>Dr Hugh Dixson</td>
<td>Nuclear Medicine Physician</td>
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<tr>
<td>Daniela Freschi</td>
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## Acronyms and abbreviations

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<tr>
<th>Acronym</th>
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<td>AHMC</td>
<td>Australian Health Ministers’ Conference</td>
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<td>ARPANSA</td>
<td>Australian Radiation Protection and Nuclear Safety Agency</td>
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<td>mSv</td>
<td>milliSievert</td>
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<td>NDRP</td>
<td>National Directory for Radiation Protection</td>
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<td>Radiation Health Committee (National)</td>
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<td>Radiation Protection Series</td>
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