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RADIATION ADVISORY COUNCIL

ANNUAL REPORT 2020-21

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The Honourable Matt Kean MP

Minister for Energy and 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 2020 to 30 June 2021.

This report is prepared in accordance with the provisions of the *Radiation Control Act 1990*.

Karen Marler

Chairperson, Radiation Advisory Council

Contents

Chairperson's review

The Radiation Advisory Council (the Council) provides advice to the Minister for Energy and Environment and the NSW Environment Protection Authority (EPA) on technical and policy matters in relation to the management of radiation in NSW under the *Radiation Control Act 1990* (the Act) and the Radiation Control Regulation 2013 (the Regulation).

As my first report as the Chair of the Council, I am proud to reflect on what the Council has achieved in the last year, particularly in light of the continuing COVID-19 pandemic restrictions and changing working conditions.

The Council during this period:

- farewelled and acknowledged the contribution and service of retiring members: Mr Asela Atapattu, (chair of the Council); Ms Fiona Henderson (lawyer position); Ms Leanne Houston (person chosen by the Minister); Dr Richard Smart and Mr Adam Jones (medical physicist position); and Ms Ellen Rawstron (nominee of Ministry of Health)
- welcomed newly appointed members: Ms Ingrid Klobasa (nominee of Ministry of Health), Ms Penny Murray (lawyer position); and Ms Taleen Shamlian (person chosen by the Minister)
- welcomed re-appointed members: Mr Lee Collins (person with expertise in non-ionising radiation); Mr Frank Galea (person with expertise in industrial uses of radiation); Mr Cameron Jeffries (expert in naturally occurring radioactivity); and Ms Joanne Muller (person who represents community interests).

The Council held six meetings during this period and provided the EPA with policy and regulatory advice on the administration of the Act. Among its activities, the Council:

- nominated Council members to the cross-government working group established by the Minister to assist in the review of the Act (see The Council's Work – Review of *Radiation Control Act 1990*)
- reviewed and endorsed minor amendments to the Regulation proposed by the EPA
- considered national uniformity initiatives specifically, Radiation Health Committee recommendations, and enHealth's progress on the implementation of a national plan for radiation protection that includes implementing the IAEA Integrated Regulatory Review Services Mission to Australia recommendations
- oversaw the implementation of Standard 6: Compliance requirements for ionising radiation apparatus used in diagnostic imaging requirements (replacing Radiation Guideline 6 (2004))
- reviewed and endorsed the work of the Council's Shielding Assessment and Verification Committee specifically: amendments to Draft Standard 7: Radiation shielding design assessment and verification requirements; the accompanying guidance document for self-assessment; and the cost benefit analysis for implementation of the Standard (see Committees of the Council – Shielding Assessment and Verification Committee)
- reviewed the work of the Council's Course and Competency Committee endorsing two courses for user licensing purposes and four courses for online delivery
- received presentations on:
    - whole body X-ray security screening equipment proposed for use in NSW prisons presented by Acting Commissioner Mr Luke Grant, NSW Corrective Services. As a result of the introduction of this new equipment the Council recommended amendments to the EPA user licence for human imaging for security screening purposes.
    - mine sites regulated by NSW Resources Regulator, presented by Council member Mr John Stacpoole. The presentation provided Council with an overview of mine sites that may be using regulated material.

- received a tour of the EPA Environmental Science Facility to understand the current activities undertaken at this site by the EPA.

During the reporting year, the Council also provided advice to the EPA on radiation matters that included:

- non-standard radiation licence applications and licensing matters (user and management licences)
- accreditation of consulting radiation experts (CREs) and radiation security assessors
- radiation accidents and incidents reported to the EPA.

The Council's work continues to focus on the objectives of its existing strategic direction:

- developing uniform regulatory initiatives through the National Directory for Radiation Protection (NDRP)
- providing advice to the Minister on amendments to the Act and the remake of the Regulation
- identifying and addressing emerging issues in radiation protection, such as new technology
- identifying procedures and requirements to prevent or minimise dangers arising from the misuse of radiation sources, specifically influencing better reporting of radiation accidents through education, emphasising responsiveness and prevention.

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

- reviewing and contributing to national codes and standards in the NDRP, and RHC and enHealth initiatives
- the review of the Act and proposed remake of the Regulation
- providing advice to the EPA on licensing, accreditation, safety courses, and radiation accidents
- developing and implementing an accreditation system for CREs who assess shielding requirements set out in Guideline 7: Radiation shielding design assessment and verification requirements
- reviewing the work of the Council's committees.

I would like to acknowledge the commitment and contribution made by previous and existing members of the Council, and the EPA staff who support the Council.

Karen Marler
Chairperson
Radiation Advisory Council

Responsibilities of the Council

The Council is established under section 29 of the *Radiation Control Act 1990* (the Act). The Act and the Radiation Control Regulation 2013 (the Regulation) are administered by the Minister for Energy and Environment through the NSW Environment Protection Authority (EPA).

Appendix A outlines the objects of the Act.

Annual report

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

Composition of the Council

Under Section 29(2) of the Act, the Council is to consist of 17 members appointed by the Minister. Appendix B outlines the constitution of the Council.

Functions of the Council

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

the Council is to advise the Minister on:

- proposed amendments to the Act and the making, amendment or repeal of regulations under the Act
- the administration of the Act and the regulations
- measures to prevent or minimise the dangers arising from radiation
- the granting of exemptions authorised by the regulations for periods exceeding 60 days, and
- such other matters relating to radiation safety as the Minister considers appropriate.

Any such advice may be given either at the request of the Minister or without any such request.

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.

The advice provided to the Authority may be general or specific, as the circumstances require.

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 staff of the EPA Environmental Solutions (Radiation) provide secretariat support to the Council.

Meetings of the Council

During the reporting period ending 30 June 2021, the Council met six times. Appendix C shows the attendances of members at meetings.

MoU between the EPA and the Council

During this period the Memorandum of Understanding (MoU) between the EPA and the Council was reviewed by both parties and signed on 4 September 2020. The MoU is provided in D.

Strategic direction

During this reporting period the Council endorsed the terms of reference of the Council's Strategic Direction Committee, namely to develop the Council's strategic direction document and to provide a draft to the Council in the next period.

Until this review is complete, the Council will continue to focus on the objectives of its strategic direction 2016-19:

- developing uniform regulatory initiatives through the National Directory for Radiation Protection (NDRP)
- reviewing and providing advice to the Minister on amendments to the Act and a remake of the Regulation
- identifying and addressing emerging issues in radiation protection, such as new technology
- identifying procedures and requirements to prevent or minimise dangers arising from the misuse of radiation sources, specifically influencing better reporting of radiation accidents through education, emphasising responsiveness and prevention.

The Council's work

National uniformity

The Australian Health Ministers' Conference (AHMC), in August 1999 agreed to develop the National Directory for Radiation Protection (NDRP), to promote national uniformity in radiation protection. All Australian jurisdictions agree to adopt codes and standards in the NDRP in their radiation protection frameworks. AHMC is now known as the Health Council.

Radiation Health Committee

The Radiation Health Committee (RHC) is responsible for the development of codes and standards for radiation protection in Australia for inclusion in the NDRP. The EPA represents NSW on the RHC.

The Council contributes to the development of codes and standards and other RHC policy documents by providing advice through the NSW representative.

During 2020-21 the Council provided advice to the NSW representative on:

- draft Standard for Limiting Exposure to Radiofrequency Fields – 100 KHz to 300 GHz (RPS S-1)
- development of an RHC statement on personal dosimeters and CT baggage scanners to avoid false high dose reports
- regulatory expectations for compliance with the Code for Radiation Protection in Medical Exposure (RPS C-5).

enHealth and Radiation Health Expert Reference Panel (RHERP)

In 2019 the Standing Committee on Environmental Health (enHealth) – a committee of the Australian Health Protection Principal Committee (AHPPC) – established the Radiation Health Expert Reference Panel (RHERP) to advise enHealth on radiation health-related matters.

While the RHC's work plan focuses on the development of codes, guides and standards, the focus of RHERP's work is to implement policy and develop regulatory approaches with a view to achieving national consistency in the areas of radiation safety and protection, and to provide oversight of implementation of the findings from the IAEA Integrated Regulatory Review Service (IRRS) 2017 Mission to Australia.

The EPA represents NSW on RHERP. The Council contributes to RHERP by providing advice through the NSW representative.

Other national and international documents and activities

During 2020-21 the Council also considered:

- the National Health and Medical Research Council (NHMRC) radiological chapters of the Australian Drinking Water Guidelines
- NHMRC public consultation on revised sections of the National Statement on Ethical conduct in Human Research
- Inter-Agency Committee on Radiation Safety (July 2020) – Managing exposure to radon at home and at work
- International Commission of Radiological Protection (ICRP) and the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) Information note for participants at the IAEA Technical Meeting on the Implications of the New Dose Conversion Factors for Radon
- ARPANSA online Occupational Radiation Exposure – Medical Facilities Training.

Review of *Radiation Control Act 1990*

During the reporting period the EPA commenced a statutory review of the *Radiation Control Act*. Section 39B of the Act requires the Minister to review the Act after 10 years from the commencement of substantial amendments to the Act made in 2010. This anniversary fell on 4 November 2020. The Minister is required to table a report on the review to Parliament. The Minister must seek, and take into consideration, the advice of the Council when undertaking the review.

During the reporting period the Council:

- was advised that the Minister had approved the establishment of a working group to assist in the review. The Council nominated several members to the working group
- assist in developing an issues paper for the review through working group meetings
- received regular updates on progress of the review.

Radiation Control Regulation 2013

During the reporting period the Council endorsed minor amendments the Regulation proposed by the EPA to:

- lower the annual radiation exposure limit for occupationally exposed 16-18-year-old persons, such as trainees and apprentices, in line with national standards and the *Code for Radiation Protection in Planned Exposure Situations*
- amend provisions relating to radiation exposure of members of the public (which exclude doses received as a patient) to align it to the definition of "medical exposure" in the *Code for Radiation*

Protection in Medical Exposure, which also includes exposure received by carers or comforters of patients, and volunteers in a program of biomedical research

- 'housekeeping' amendments relating to references in the Regulation to the *Code for the Safe Transport of Radioactive Material* and for the level at which premises are considered contaminated by radioactivity.

Presentations to the Council

During the reporting period the Council received the following presentations:

- whole body X-ray security screening in prisons for security purposes – presented by Acting Commissioner Mr Luke Grant, NSW Corrective Services. The Council was provided with an overview of new screening apparatus proposed for security screening purposes at NSW correctional facilities, which resulted in amendments to current user licensing conditions (refer to User licensing and Accreditation).
- mine sites regulated by NSW Resources Regulator – presented by Council member Mr John Stacpoole**.** The presentation provided the Council with an overview of mine sites that may be using regulated material.

Council offsite visit

During the reporting period the Council visited the EPA Environmental Science Facility as a means of keeping itself informed of the activities undertaken at this site by the EPA.

Council advice to the EPA on other radiation matters

During the reporting period, the Council continued to provide advice to the EPA in relation to routine radiation matters, including:

- licensing matters and non-standard licence applications (see *Licensing and accreditation*)
- radiation safety courses for the purposes of radiation user licensing (see *Committees of the Council – Course and Competency Committee*)
- accreditation matters and non-standard accreditation applications (see *Licensing and accreditation*)
- radiation accidents and incidents (see *Radiation accidents*).

Committees of the Council

Under section 31 of the Act, the Council can establish committees to help it perform its functions. In 2020–21, the Council had the following committees:

- Course and Competency Committee
- Guideline 3 Recommendations for minimum standards and safety requirements for fixed radiation gauges (sealed source devices) Review Committee
- Guideline 6 Registration requirements and industry best practice for ionising radiation apparatus used in diagnostic imaging Review Committee
- Shielding Assessment and Verification Committee
- Strategic Direction Committee.

The roles and work of each of the Council's committees are outlined below. Members are listed in Appendix E.

Course and Competency Committee

In October 2017 the Council re-established the Course and Competency Committee (CCC) to undertake a periodical review of all radiation safety courses approved by the EPA for licensing radiation users.

In 2020 the committee completed its review which included:

- developing a methodology for assessing courses for radiation user licensing
- provision of generic advice to course providers
- recommendations resulting in the approval of 73 courses across 46 providers
- recommended that courses used for licensing purposes be reviewed every five years
- agreed that future courses submitted to the EPA would be considered by the Council's CCC expert member before being submitted to the Council.

During 2020–21 the committee continued to review courses applications as part of its ongoing work. During this period, the Council, on the recommendation of the committee, approved two courses for user licensing purposes and four courses to be delivered online as a result of COVID-19 restrictions.

Guideline 3 Review Committee

The Council at its December 2016 meeting established the Guideline 3 Review Committee to review *Guideline 3: Recommendations for minimum standards and safety requirements for fixed radiation gauges (sealed source devices).* In 2017 the Council endorsed the committee's terms of reference:

- review the existing guideline requirements
- identify and determining content of the guideline
- consult with CREs and stakeholders
- review all relevant codes and standards
- submit a draft revised guideline for the Council's consideration.

During 2017–19, the committee reviewed Guideline 3, and the Council endorsed the committee's recommendation that the guideline include all sealed source devices (SSDs) for industrial applications. The draft Guideline was provided to the EPA to progress.

The EPA informed the Council that the committee's work had not progressed, because of changes within the EPA and priorities associated with the COVID-19 pandemic.

Guideline 6 Review Committee

In 2013, the Council established the Guideline 6 Committee to review Radiation Guideline 6: Registration requirements and industry best practice for ionising radiation apparatus used in diagnostic imaging (2004) to take account of new technology and have its requirements aligned with the Act.

The committee finished its review in 2016 and the Council endorsed the Guideline for the EPA to progress. The revised guideline, *Radiation Guideline 6: Compliance requirements for ionising radiation apparatus used in diagnostic imaging,* has six parts:

- mammography
- radiography (medical) and bone mineral densitometry
- dentistry (including maxillofacial)
- fluoroscopy
- computed tomography

- veterinary science (radiography and fluoroscopy).

The revised guideline requires CREs to carry out new kinds of assessments. In 2016–17 the committee, with the EPA and key stakeholders, considered additional training CREs would need, and endorsed the EPA seminar to upskill CREs. During 2017–19 the Council continued to oversee the upskilling of CREs.

In the previous period the Council endorsed amending the guideline for fluoroscopy, and for radiography requirements for fluoroscopy high-level boost mode – as recommended by the committee – and noted that the EPA had undertaken a cost-benefit analysis and released the guideline (retitled Standard 6) to targeted stakeholders for comment.

During 2020–21 the Council oversaw the implementation of Standard 6 requirements, including amending management licence conditions and the CRE conditions of accreditation to align with the new requirements of Standard 6.

Shielding Assessment and Verification Committee

In August 2017, at the EPA's request, the Council reconvened the Shielding Assessment and Verification Committee (SAVC) to progress the accreditation of CREs to certify that premises storing or using regulated material complies with shielding requirements.

Shielding requirements are outlined in *Radiation Guideline 7: Radiation shielding design assessment and verification requirements* (Guideline 7) developed by the Council and published by the EPA as a guidance document in 2009.

The SAVC is to carry out this work:

- reviewing Guideline 7
- reviewing CRE competencies, and developing premises-shielding assessments for accrediting CREs
- reviewing licensing and accreditation conditions
- assessing CRE applications to be accredited to assess premises shielding.

During 2017–18 the Council endorsed the revised Guideline 7; competencies for the accreditation of CREs; CRE test requirements; and self- assessment templates for low-risk premises.

In the previous period the Council endorsed advice from the SAVC to include extra information in *Guideline 7* regarding wall shielding requirements and noted that the EPA had engaged a consultant to undertake a cost benefit analysis (CBA) on the implementation of the draft guideline.

During 2020–21 the Council noted that the SAVC reviewed and provided input into the draft CBA and endorsed amendments to Guideline 7 (now titled Standard 7) and recommended to the EPA that the Standard, the accompanying self-assessment guidance document and cost benefit analysis (CBA) could now be prepared for targeted consultation.

Strategic Direction Committee

The Council in June 2020 established the Strategic Direction Committee to review the Council strategic direction. During this reporting period the Council endorsed the terms of reference and membership of the committee. The Committee is to carry out this work:

- reviewing the Council's Strategic Direction 2016–19 approach, objectives, priorities and achievements
- developing the Council's strategic approach, objectives and priorities for the next 3 years
- ascertaining whether outstanding projects need to be carried forward and/or new projects should be considered
- developing a draft Council Strategic Direction 2021–2024 for Council's consideration.

Licensing and accreditation

The EPA, under Part 2 of the Act, is the authority responsible for administering:

- radiation user licences
- radiation management licences
- accreditation of consulting radiation experts
- accreditation of radiation security assessors.

The Council, under section 30 of the Act, may give generic or specific advice to the EPA on applications. The EPA considers the council's standing advice for all 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 D).

During 2020–21, the Council:

- provided specific advice on licensing and accreditation matters (see Council's advice to the EPA)
- reviewed licensing and accreditation statistics reports provided by the EPA at each meeting.

Radiation user licences

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

'Regulated material' means any of the following:

- radioactive substances
- ionising radiation apparatus
- non-ionising radiation apparatus of a kind prescribed by the regulations
- sealed source devices.

Purposes of a radiation user licence

The purposes of a radiation user licence are to:

- regulate, restrict or prohibit the use of regulated material
- ensure that those 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.

Occupations requiring a radiation user licence

Radiation user licences are held by individuals working in a wide range of occupations, such as scientists, medical specialists, nurses, radiographers, industrial radiographers, service engineers, technologists, dentists, chiropractors, veterinarians and tertiary lecturers.

Number of radiation user licences issued by the EPA

During the reporting period ending 30 June 2021, the Council noted that the EPA:

- issued 3,181 radiation user licences

- renewed 7,479 user licences.

At the end of the reporting period, the EPA administered a total of 17,767 active radiation user licences (6,296 one-year licences and 11,471 three-year licences).

Council's advice to the EPA

During 2020–2021, the Council provided the EPA with specific advice regarding radiation safety and licensing requirements for a wide range of occupational areas that use radiation, which are listed below.

Non-standard user licence applications

The Council reviewed and endorsed 14 non-standard user licence applications.

Radiation user licence criteria and conditions

During the reporting period the Council endorsed:

- revised threshold limits for the S7 licence to use sealed source devices for industrial gauging and that only applications greater than the threshold limit be referred to the Council
- amendments to radiation user licence for nuclear medicine physics purposes to include radiology physics
- amendments to radiation licence to use radiation apparatus for human imaging for security screening purposes.

Radiation licensing matters

During the reporting period the Council:

- considered the NSW Government Industry Stakeholder Consultation on automatic mutual recognition of occupation licences. The Council asked the EPA to keep the Council informed on the matter, as the proposed reforms raise a number of challenges which will need to be addressed before it can be implemented in NSW.

  Background: the NSW Federal Treasurer announced that the Council on Federal Financial Relations (CFFR) which comprises Commonwealth, State and Territory Treasurers, had agreed to progress occupational mobility reforms. These reforms will enable people who have occupational licences, including radiation user licences in one State or Territory, to be deemed as licensed to work in the equivalent occupation in another State or Territory without the need to obtain a licence in the second jurisdiction.
- recommended that the EPA write to the Cardiac Society of Australia and New Zealand to advise that cardiology registrars should be required to complete an approved fluoroscopy course as a prerequisite to commencing their registrar training. The EPA provided the Council with the correspondence sent to the Society.
- recommended that the EPA write to licensees reminding them of their obligations regarding student supervision. The EPA provided Council with the correspondence sent to licensees.

Radiation management licences

Requirement for management licences

Section 6 of the Act requires persons responsible for regulated material to hold a radiation management licence and comply with its conditions.

The EPA issues two types of management licences:

- a licence (valid for one year) that allows its holder to own, store, give away, sell and possess regulated material

- a licence (valid for either one or three years) that allows its holder only to sell regulated material.

Persons responsible for regulated material

Section 6 of the Act defines 'persons responsible for regulated material' and means a person who owns, stores, sells or gives away or is in possession of regulated material. This does not apply to people who hold a user licence for the purposes of using regulated material, or to a person transporting regulated material.

Purposes of management licences

The purposes of radiation management licences are to regulate, restrict or prohibit the possession, sale, storage, giving away and disposal of regulated material. This is to protect people and the environment from unnecessary exposure to radiation and ensure that regulated material is managed from cradle to grave.

Number of radiation management licences issued by the EPA

During the reporting period ending 30 June 2021, the Council was advised that in 2020–21 the EPA issued:

- 296 general management licences
- 11 sell-only management licences.

At the end of the reporting period, the EPA was administering 2,821 active management licences (2,706 general and 115 sell-only).

Council's advice to the EPA

During 2020–21, the Council:

- considered the Liverpool Hospital Cyclotron 2019–20 report on the operation of its cyclotron
- considered the Cyclotek NSW Pty Ltd 2020–21 report on operation of cyclotron
- was informed that the EPA had amended the conditions of Radiation Management Licences to impose compliance with the new Radiation Standard 6, and to change requirements relating to Manufacturer's Recommended Working Life as recommended by the Council in the last period.
- recommended the EPA write to management licence holders, reminding them of their obligations under the Regulation regarding student supervision. The EPA provided the Council with a copy of the advice it sent to licensees regarding this recommendation.

Consulting radiation experts

Accreditation and activities of consulting radiation experts

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

- advising on the design of premises, in relation to radiation safety requirements, on which regulated material is kept or used, for the purposes of certifying compliance with any conditions imposed on a radiation management licence
- assessing plans for premises on which regulated material is kept or used, for the purposes of certifying compliance with any conditions imposed on a radiation management licence
- assessing any regulated material and the premises at which it is kept or used, for the purposes of certifying compliance with any conditions imposed on a radiation management licence

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

Purpose of accrediting consulting radiation experts

The EPA accredits CREs to assess apparatus and/or premises and issue a certificate of compliance verifying that regulated material complies with the requirements of licensing.

Council's advice to the EPA

Section 9A of the Act provides that the EPA may seek the Council's advice on accreditation matters.

During the reporting period ending 30 June 2021, the Council:

- endorsed the criteria required by a person to gain accreditation as a CRE in diagnostic imaging (excluding mammography) and in fixed radiation gauge compliance testing
- agreed that the Council no longer needs to review applicants for accreditation as a CRE where the person was assessed and found to meet the above-mentioned criteria
- noted that the requirements of Standard 6 had commenced; and that amendments to CRE conditions of accreditation to include revised Standard 6 requirements had been made by the EPA.

Number of CREs accredited by the EPA

At 30 June 2021, the EPA held a total of 111 active accreditations.

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:

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

Purpose of accrediting radiation security assessors

Radiation security assessors are accredited to review source security and source transport plans to ensure that they are made or amended in accordance with the requirements of section 14 of the Act, and to endorse those plans that satisfy those requirements.

A person responsible for a category 1, 2 or 3 security-enhanced source must prepare and follow an endorsed source security or transport security plan as required under the provisions of Part 2A of the Act.

Number of radiation security assessors accredited by the EPA

At 30 June 2021, four radiation security assessors held active accreditation from the EPA.

Summary of licences and accreditations issued by the EPA

Table 1 summarises the radiation licences and accreditations issued by the EPA active at 30 June 2021.

Table 1 Active licences and accreditations at 30 June 2020

Category	Number
Licence to use regulated material	17,767
Management licences (general)	2,706
Management licences (sell only)	115
Accredited consulting radiation experts	111
Accredited radiation security assessors	4
Total radiation licences and accreditations	20,703

Radiation accidents

Mandatory requirement to report radiation accidents

The Regulation (clause 37) outlines the types of incidents classified as radiation accidents and clauses 38 and 39 outline the mandatory requirements imposed on persons responsible for regulated material for the reporting and recording of radiation accidents.

Causes of radiation accidents

An accident usually involves many contributing factors. Many accidents or incidents would not have occurred if one of the contributing factors had been prevented. Factors include deficiencies in management systems, a failure to implement controls effectively, communication errors and equipment failure.

The Council considers that the prevention of accidents can be managed through effective safety leadership combined with understanding of the causes of incidents, continuously improving risk controls, and sharing improvements and lessons learned.

Serious accidents reported to the Health Care Complaints Commission

The EPA has standing advice from the Council that any reported accident which may cause a patient to have a serious health-related affect should also be reported tto the Health Care Complaints Commission (HCCC) for further investigation. During 2020–21 the Council did not refer any accidents to the HCCC.

Australian Radiation Incident Register

Accidents reported to the EPA are provided to the Council for review and are reported to ARPANSA for inclusion in the Australian Radiation Incident Register (ARIR). The accident register is intended to raise awareness on where, how and why incidents and events occur and how they can be prevented, and facilitates the sharing of lessons learned from radiation incidents across Australia.

Number of accidents reported to the EPA

During the reporting period ending 30 June 2021, the EPA received, and forwarded to the Council to consider, 209 accident reports:

- 132 instances where accidents reported doses of over 1 millisievert (mSv) involving 134 people, summarised in Table 2
- 77 instances where accidents reported doses of less than 1 mSv involving 78 people, summarised in Table 4.

Council's advice to the EPA

During this reporting period, the Council considered each accident report and, where appropriate, made recommendations that in its opinion would reduce the risk of a recurrence.

During this reporting period the Council, in addition to considering accident reports:

- recommended that ACI inform appropriate parties of the need to complete a patient's clinical history on the request form and for correct patient, correct site and correct procedures checks

to be undertaken to prevent accidents from occurring. Council's health representative raised the matter with ACI.

- considered that incidents involving students not being supervised may be more prevalent than expected and recommended to the EPA that it write to tertiary institutions and NSW Health reminding them of the requirement for students to be supervised under the Act. The EPA wrote to management licence holders reminding them of student supervision requirements.
- recommended to the EPA that it write to the mining and industrial licensees in the next period reminding them of their obligation to report radiation accidents to the EPA.
- asked the EPA to provide a running total and analysis of organisations reporting accidents and those not reporting accidents across all areas of radiation use, to ascertain reporting trends in the next period.
- recommended to the EPA that it consider developing a protocol for the reporting of radiation accidents involving foetal doses. The EPA agreed to raise the matter with the Hospital and University Radiation Safety Officers Group (HURSOG) with the aim of developing a general protocol for reporting such accidents. At the time of writing this report, the EPA had raised this issue with HURSOG which agreed to develop such a protocol for Council to consider in the next period.
- considered the Australian Clinical Dosimetry Services (ACDS) in Review January 2019 – June 2020. The ACDS reports back to the radiotherapy community on known dosimetry issues, case studies and trends in audit results.

Summary of radiation accidents considered by the Council in 2020-21

In 2020-21 the Council considered 209 accidents for comment. This total represents a 49% increase on the total accidents reported last financial year (130) and reaffirms the strong year-on-year upward trend in reporting established prior to the effect of COVID in the last period.

Reports of less than 1 mSv and greater than 1 mSv accidents had increased for each (77 and 132 incidents, respectively).

The accidents reported are typical of previous years:

- a significant majority (>80%) involved medical imaging procedures (nuclear medicine and diagnostic radiology)
- human error is the primary cause, often due to failure to double-check patient identities, medical requests, clinical notes and protocol details
- equipment failures accounted for 20% of all accidents, an increase from 15% FY2020.

With human error as a leading cause of most accidents, preventative strategies remain focused on improving the situational awareness of radiation workers, for example by including systems to double-check procedure details prior to any planned exposure.

Table 2 summarises the causes of accidents **greater than 1 mSv** that were reported to the EPA and reviewed by the Council in 2020-21.

Table 2 Summary of causes of radiation accidents (> 1 mSv) reported in 2020-21, by accident category and type

Type of accident	Nuclear medicine	Radiology	Therapy	Other	Total
Patient notes/plans/requests not interpreted/read/checked correctly	7	11	3	0	21
Incorrect isotope selected and drawn up	2	0	0	0	2
Incorrect isotope drawn up by supplier	1	0	0	0	1
Equipment/software failure	19	13	3	0	35
Booking/request error: Incorrect procedure requested for the right patient	2	1	1	0	4
Booking/request error: Failure to cancel booking	0	0	0	0	0
Booking/request error: Booking request not amended with new scan requested	0	0	0	0	0
Booking/request error: Same examination repeated	0	1	0	0	1
Booking/request error: Wrong patient name entered on request form	0	3	0	0	3
Radiopharmaceutical not administered correctly (injection into cannula)	0	0	0	0	0
Operator/medical radiation practitioner error	9	6	6	0	21
Physiology (failure of radiopharmaceutical)	2	0	0	0	2
Calculation error	0	0	3	0	3
Protocols not followed	2	8	3	0	13
Patient ID not checked	0	6	0	0	6
Industrial/other	0	0	0	0	0
Human error (other)	2	2	2	0	6
Unforeseeable patient factor	8	5	1	0	14
Total number of reported accidents	**54**	**56**	**22**	**0**	**132**

Note: Two additional categories added by the Council to clarify cause: Human error (other) and Unforeseeable patient factor.

Table 3 gives the number of accidents, **greater than 1mSv**, reported to the Council between 2015–20.

Table 3 Accidents (> 1 mSv) reported to the Council between 2015 and 2020, by category

Accident category	2016–17	2017–18	2018–19	2019–20	2020–21
Nuclear medicine	24	48	47	49	54
Radiology	23	54	35	27	56
Therapy	13	3	7	9	22
Other	0	0	0	0	0
Total	**60**	**105**	**89**	**85**	**132**

Prior to 2018 the Council only provided summaries of accidents involving more than 1 mSv of radiation. The Council since 2018 has included in its report to the Minister summaries for accidents of less than 1 mSv enabling the Council to monitor all accident trends.

Table 4 summarises the causes of incidents, **less than 1 mSv,** that were reported to the EPA and reviewed by the Council in 2020-21.

Table 4 Summary of causes of radiation incidents (<1 mSv) reported in 2020–21

Type of accident	Nuclear medicine	Radiology	Therapy	Other	Total
Patient notes/plans/requests not interpreted/read/checked correctly	1	21	0	0	22
Incorrect isotope selected and drawn up	0	0	0	0	0
Incorrect isotope drawn up by supplier	0	0	0	0	0
Equipment/software failure	4	7	1	0	12
Booking/request error: Incorrect procedure requested for the right patient	0	1	0	0	1
Booking/request error: Failure to cancel booking	0	0	0	0	0
Booking/request error: Booking request not amended with new scan requested	0	0	0	0	0
Booking/request error: Same examination repeated	0	1	0	0	1
Booking/request error: Wrong patient name entered on request form	0	1	0	0	1
Radiopharmaceutical not administered correctly (injection into cannula)	0	0	0	0	0
Operator/medical radiation practitioner error	2	4	0	0	6
Physiology (failure of radiopharmaceutical)	0	0	0	0	0
Calculation error	0	0	0	0	0
Protocols not followed	1	7	0	0	8

Type of accident	Nuclear medicine	Radiology	Therapy	Other	Total
Patient ID not checked	0	14	0	0	14
Industrial/other	2	0	0	0	2
Human error	0	8	0	0	8
Unforeseeable patient factor	2	0	0	0	2
Total number of reported accidents	**12**	**64**	**1**	**0**	**77**

Table 5 summarises reported incidents < 1 mSv.

Table 5 Summary of reported incidents < 1 mSv

Accident group category	2018–19	2019–20	2020–21
Nuclear medicine	11	8	12
Radiology	57	21	64
Therapy	0	16	1
Other	1	1	0
Total	**69**	**46**	**77**

Appendix A: Objects of the Act

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

- 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
- to protect security-enhanced sources from misuse that may result in harm to people or the environment
- to promote the radiation protection principles. The radiation protection principles are as follows:
    - **justification of a practice** by assessing that the benefits of the practice involving exposure to ionising radiation outweigh any detriment
    - **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.
    - **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.

Appendix B: Constitution of the Council

The Council consists of 17 members appointed by the Minister:

- the Chairperson of the Authority or a member of staff of the Authority, who is to be the Chairperson of the Council
- a medical practitioner who is a specialist in radiology
- a radiographer with expertise in the field of human diagnostic radiography
- a person with expertise in the industrial uses of radiation
- a person with expertise in health physics
- a medical practitioner who specialises in nuclear medicine
- a person with expertise in non-ionising radiation
- a person with expertise in work health and safety
- a person who is an Australian lawyer of at least seven years' standing
- a person who represents community interests
- a person nominated by the Secretary of the Ministry of Health
- a radiation oncologist
- a medical physicist
- 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*
- a person with expertise in naturally occurring radioactivity
- a person with expertise in mine radiation safety
- a person chosen by the Minister for such reasons as the Minister thinks fit.

Appendix C: Membership and attendance at Council meetings in 2020–21

The Council met six times during the reporting period.

Table 6 Council membership and meeting attendance 2020–21

Member	Appointed position	Meetings attended
Mr Asela Atapattu (term expired 15/2/2021) Ms Karen Marler (appointed 16/4/2021, term expires 15/4/2024)	Chairperson	4
Dr Philip Pasfield (re-appointed 23/1/2019, term expires 22/1/2022)	Medical practitioner who is a specialist in radiology	6
Mr Luke Platt (appointed 23/1/2019, term expires 22/1/2022)	Radiographer with expertise in the field of human diagnostic radiography	3
Mr Frank Galea (re-appointed 1/12/2020, term expires 30/11/2023)	Person with expertise in the industrial uses of radiation	5
Mr Brent Rogers (re-appointed 19/12/2019, term expires 18/12/2022)	Person with expertise in health physics	6
Dr Hugh Dixson (re-appointed 23/1/2019, term expires 22/1/2022)	Medical practitioner who specialises in nuclear medicine	6
Assoc. Prof. Lee Collins AM (re-appointed 1/12/2020, term expires 30/11/2023)	Person with expertise in non-ionising radiation	6
Andrew Niven (appointed 19/12/2019, term expires 18/12/2022)	Person with expertise in work health and safety	6
Ms Fiona Henderson (term expired 30/11/2020) Ms Penny Murray (appointed 1/2/2021, term expires 30/11/2023)	Person who is an Australian lawyer of at least seven years' standing	4
Ms Joanne Muller (re-appointed 16/4/2021, term expires 15/4/2024))	Person who represents community interests	6
Ms Ellen Rawstron (term expired 15/2/2021) Ms Ingrid Klobasa (appointed 16/4/2021, term expires 15/4/2024)	Person nominated by the Secretary of the Ministry of Health	5
Dr Dion Forstner (appointed 23/1/2019, term expires 22/1/2022)	Radiation oncologist	5
Dr Richard Smart (term expired 30/11/2020) Mr Adam Jones (appointed 1/12/2020 – term expires 30/11/2023 – resigned June 2021)	Medical physicist	5

Mr Mark Moskvitch (appointed 18/10/2019, term expires 17/10/2022)	Person nominated by the Secretary of the Department of Finance, Services and Innovation (now Customer Service) involved in the administration of the *Work Health and Safety Act 2011*	3
Mr Cameron Jeffries (re-appointed 1/12/2020, term expires 30/11/2023)	Person with expertise in naturally occurring radioactivity	6
Mr John Stacpoole (appointed 18/10/2019, term expires 17/10/2022)	Person with expertise in mine radiation safety	4
Ms Leanne Houston (term expired 15/2/2021) Ms Taleen Shamlian (appointed 16/4/2021, term expires 15/4/2024)	Person chosen by the Minister	4

Appendix D: MoU between the EPA and the Council

Statement of common intent

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

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* (the Act). This MoU shall be reviewed periodically and will 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 protection matters, whereas the EPA has responsibility for administering the regulatory functions provided by the Act. This MoU includes an agreement on how advice from the Council will be used 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 protection 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 Council's expertise, the EPA will engage openly, early and in detail with the Council in the development of radiation protection policy matters.

Agreed details of how the Council and the EPA collaborate

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.

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 protection as the Minister considers appropriate.

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.

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 the Environmental Solutions CLR Branch at the time.

Finalised correspondence that has been dispatched, 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.

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 formats and will be made available to members of the Council upon request to the EPA in a timely manner.

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; and
- preparation of any correspondence requested by the Council.

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.

Conflict resolution

While recognising that the Council performs an advisory function, and that the EPA is the decision maker, the parties agree to work through disagreements 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 ask the EPA to provide an independent facilitator, and the EPA will agree to consider each 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.

Determinations for licensing and accreditation

The EPA is the determining authority for applications for licences and accreditations and for variations to licences and accreditations, as made under Part 2 of the Act. 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 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 so it is 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, they 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 retrospectively as soon as practicable.

Tracy Mackey	EPA Chief Executive Officer
Asela Atapattu	Radiation Advisory Council Chair

Signed by both parties 4/9/2020

Appendix E: Membership of Council committees in 2020–21

Table 7 Course and Competency Committee membership

Member	Membership category
Assoc. Prof. Mr Lee Collins (Chair)	Expert in non-ionising radiation (medical physicist (radiology))
Mr Paul Cardew	Expert outside RAC: medical physicist specialist (radiation oncology, radiology and nuclear medicine)
Mr Frank Galea	Expert in industrial uses of radiation
Mr Cameron Jeffries	Expert in naturally occurring radioactivity
Ms Daniela Freschi	EPA Environmental Solutions (Radiation)

Table 8 Guideline 3 Review Committee membership

Member	Membership category
Mr Frank Galea (Chair)	Expert in industrial uses of radiation
Mr Brent Rogers	Expert in health physics
Mr Michael Colella	EPA Environmental Solutions (Radiation)

Table 9 Guideline 6 Review Committee membership

Member	Membership category
Dr Richard Smart (chair) Retired from Council 30/11/2020	Medical physicist (nuclear medicine)
Mr Lee Collins	Expert in non-ionising radiation
Dr Philip Pasfield	Radiologist
Mr Adam Jones	Medical physicist (radiology)
Mr Paul Cardew	Expert outside RAC: medical physicist specialist (radiotherapy and mammography)
Ms Tiffany Chiew	Expert outside RAC: radiographer
Ms Lucy Cartwright	Expert outside RAC: medical physicist specialist (radiology)
Dr Jennifer Diffey	Expert outside RAC: medical physics specialist (radiology)
Dr Ravinda Grewald	Expert outside RAC: medical physics specialist (radiology)
Mr Peter Williams	EPA Environmental Solutions (Radiation)

Table 10 Shielding Assessment and Verification Committee membership

Member	Membership category
Dr Richard Smart (chair) Retired from Council 30/11/2020 – continues as member	Medical physicist (nuclear medicine)
Mr Paul Cardew	Expert outside RAC: medical physicist specialist (radiation oncology, radiology and nuclear medicine)
Mr Lee Collins	Expert non-ionising radiation (medical physicist (radiology))
Mr Kevin Fitzsimmons	Expert outside RAC: Industry (shielding and construction)
Mr Frank Galea	Expert in industrial uses of radiation
Mr Dean Inwood	Medical physics specialist (radiation oncology)
Mr Adam Jones	Medical physics specialist (radiology)
Mr Nick Hille	Medical physics specialists (radiology and nuclear medicine)
Mr Brent Rogers	Health physicist
Ms Daniela Freschi	EPA Environmental Solutions (radiation)

Table 11 Strategic Direction Committee

Member	Membership category
Mr Cameron Jeffries	Expert in naturally occurring radioactivity
Mr Mark Moskvitch	Person nominated by the Secretary of the Department of Finance, Services and Innovation (now Customer Service)
Dr Philip Pasfield	Radiologist
Mr Sieu Tran	EPA Environmental solutions (radiation)

Acronyms and abbreviations

Table 12 Acronyms and abbreviations

Acronym or abbreviation	Name
ACPSEM	Australian College of Physical Scientists and Engineers in Medicine
AHPPC	Australian Health Protection Principal Committee
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
CRE	Consulting Radiation Expert
enHealth	Environmental Health Standing Committee
EPA	NSW Environment Protection Authority
HCCC	NSW Health Care Complaints Commission
IAEA	International Atomic Energy Agency
MoU	Memorandum of Understanding
mSv	millisievert
NDRP	National Directory for Radiation Protection
RAC	Radiation Advisory Council
RHC	Radiation Health Committee