



Australian Government
**Australian Radiation Protection
and Nuclear Safety Agency**



Quarterly Report
of the
Chief Executive Officer of ARPANSA

January to March 2019



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The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is the Australian Government's primary authority on radiation protection and nuclear safety. Our purpose is to protect the Australian people and the environment from the harmful effects of radiation, through understanding risks, best practice regulation, research, policy, services, partnerships and engaging with the community.

Printed by:

CanPrint Communications Pty Ltd
16 Nyrang Street
Fyshwick ACT 2609

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Letter of transmittal

30 August 2019

Senator the Hon Richard Colbeck
Minister for Aged Care and Senior Australians
Minister for Youth and Sport
Senate
Parliament House
Canberra ACT 2600

Dear Minister

The *Australian Radiation Protection and Nuclear Safety Act 1998* (the Act) requires the Chief Executive Officer (CEO) of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) to submit to the Minister, at the end of each quarter, a report on:

- the operations during the quarter of the CEO, ARPANSA, the Radiation Health and Safety Advisory Council (the Council), the Nuclear Safety Committee (the NSC) and the Radiation Health Committee
- details of directions given by the Minister to the CEO under section 16 of the Act
- details of directions given by the CEO under section 41 of the Act
- details of improvement notices given by inspectors under section 80A of the Act
- details of any breach of licence conditions by a licensee, of which the CEO is aware
- details of all reports received by the CEO from the Council and the NSC under Part 4, paragraphs 20(f) or 26(1)(d) of the Act, and
- a list of all facilities licensed under Part 5 of the Act.

I am pleased to provide you with a report, meeting the requirements of the Act, covering the period 1 January 2019 to 31 March 2019.

Please note that subsection 60(6) of the Act requires you to cause a copy of the report to be laid before each House of the Parliament within 15 sitting days of the day on which this report was given to you.

Yours sincerely



Carl-Magnus Larsson
CEO of ARPANSA

The operations of the CEO and ARPANSA

ARPANSA sits within the Department of Health portfolio.

ARPANSA has a single outcome, as set out in the 2018–19 Portfolio Budget Statements (PBS):

Protection of people and the environment through radiation protection and nuclear safety research, policy, advice, codes, standards, services and regulation.

The Radiation Protection and Nuclear Safety Program, contained within the 2018-19 PBS, describes four performance criteria, against which ARPANSA seeks to achieve its outcome. These criteria are:

- protecting the public, workers and the environment from radiation exposure
- promoting radiological and nuclear safety and security, and emergency preparedness
- promoting the safe and effective use of ionising radiation in medicine
- ensuring risk-informed and effective regulation.

The report on the operations of the CEO and ARPANSA focuses on these criteria.

Protecting the public, workers and the environment from radiation exposure

Communicating ultraviolet (UV) radiation risk to the public

ARPANSA collaborated with Cancer Council Victoria to release a new version of the popular SunSmart™ app, which provides sun protection times for locations across Australia. The new version of the app, published in March 2019, will deliver smarter protection messages to the Australian community and increase the utilisation of ARPANSA's high quality, real-time UV radiation data. Supported by a joint study, the app aims to improve people's UV radiation knowledge and enable the public to make informed decisions on how they need to protect themselves from the harmful effects of solar UV radiation.

Communicating UV radiation risk to workers

ARPANSA co-sponsored Cancer Council's guide on protecting outdoor workers from skin cancer. The booklet, *Skin cancer and outdoor work: A work health and safety guide*, outlines the relationship between exposure to UV radiation and skin cancer. The booklet relies on ARPANSA advice and UV radiation data trends and is expected to help employers understand and confidently implement good sun protection policies and practices in the workplace. Developed on behalf of the National Skin Committee, it promotes a nationally uniform approach to protecting workers.

Guidance on intense pulsed light (IPL) devices and lasers

ARPANSA published advice on cosmetic treatments using lasers, intense pulsed light (IPL) devices and light-emitting diode (LED) phototherapy for the first time. Collectively known as light-based therapy, these treatments have grown significantly in popularity and availability in recent years. The evidence-based advice from ARPANSA targets both the providers of commercial services and consumers. The advice gives information to providers to assist in safely applying light-based therapies and separate advice is provided to consumers to inform them of risks. Reports of injuries resulting from radiation burns, increased media coverage and industry calls for regulation of non-surgical cosmetic treatments using light-based devices

have led radiation regulators to consider these potential problems within the cosmetic and beauty therapy industry. The ARPANSA advice promotes the safe use of non-surgical cosmetic treatments using light-based devices and strengthens the mechanism for reporting injury to the relevant authorities.

Occupationally exposed workers in Australia

In January 2019, ARPANSA commenced a project to make improvements to the employer interface for the Australian National Radiation Dose Register (ANRDR), a database which stores and maintains radiation dose records for workers occupationally exposed to ionising radiation in Australia. The work will result in the capture of additional critical information on dose assessment methodologies. This will ensure that records are traceable to identified service providers and methodologies, allowing for future verification and improved data quality. It will also feed information contained in the ANRDR directly back to employers, to improve the identification of individuals and provide access to uploaded files for record management.

The ANRDR data helps inform better work practices and improve radiation safety for occupationally exposed workers in Australia. As of March, the ANRDR holds dose records for around 44 000 workers. This currently includes full coverage of workers from all state and territory-licensed uranium mining and milling operations, and partial coverage of workers from Commonwealth licence holders, state and territory regulatory bodies, and the mineral sands mining and processing industry. The ultimate goal for the ANRDR is to cover all occupationally exposed workers in Australia.

Promoting radiological and nuclear safety and security, and emergency preparedness

International monitoring system

The Australian Comprehensive Nuclear-Test-Ban Treaty (CTBT) Radionuclide Laboratory was in service for the entire quarter. Four atmospheric monitoring samples were obtained from overseas monitoring stations and independently analysed during this period. This verifies the measurements obtained from those stations, and adds to the credibility of the international monitoring system. ARPANSA operates and maintains the Australian CTBT Radionuclide Laboratory in Melbourne and radionuclide air particulate monitoring stations that are part of the CTBT International Monitoring System, as part of Australia's ongoing commitment to the CTBT.

Australia's stations are located in Melbourne, Perth, Townsville, Darwin, the Cocos Islands, Macquarie Island, and Mawson Base (Antarctica). Two noble gas monitoring facilities are co-located with the air particulate monitoring stations in Melbourne and Darwin. Data is provided to the CTBT Organisation on a daily basis. The Australian CTBT monitoring stations and laboratory forms a part of the worldwide coverage of the international monitoring system and is an important part of the verification regime for the prevention of clandestine nuclear tests around the globe.

The seven particulate stations operated by ARPANSA provided data to the CTBT Organisation more than 95 per cent of the time.

Emergency preparedness

ARPANSA coordinated the participation of several Australian Government organisations in an International Atomic Energy Agency (IAEA) emergency preparedness 'Convention Exercise' (ConvEx) from 26-28 March 2019. Other participating organisations included the Department of Home Affairs and Department of Health. An IAEA ConvEx tests the global operational arrangements for responding to nuclear or radiological

emergencies, as laid out under the *Convention on Early Notification of a Nuclear Accident* and the *Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency*. ARPANSA is the IAEA-designated 'National Competent Authority' in Australia for nuclear or radiological emergencies.

This ConvEx tested Australian Government-wide coordination mechanisms for responding to such events, including requests for assistance, and helped clarify each organisation's roles and responsibilities. Further efforts are being made to ensure all appropriate organisations are available for any future ConvEx. Participation in an IAEA ConvEx helps improve Australia's readiness to respond in a timely manner to such international emergencies, including to a request for assistance from the international community. Through its coordination of the Australian Government's participation, ARPANSA can directly promote Australia's radiological and nuclear emergency preparedness.

Promotion of safety and security

ARPANSA and the Department of Defence discussed future joint emergency response exercises. The meeting allowed Defence to understand ARPANSA's established arrangements and capacity to support domestic nuclear and radiological emergencies within Australia in the context of a joint-agency response. Information about future scheduled exercises was also shared, building on years of collaboration with Defence. This illustrates ARPANSA's commitment to whole-of-government arrangements to improve Australia's nuclear and radiological emergency preparedness.

Promoting the safe and effective use of ionising radiation in medicine

Medical imaging

In March, the *Code for Radiation Protection in Medical Exposure* (Medical Exposure Code, RPS C-5) was provided to the Radiation Health Committee (RHC) for approval. The Medical Exposure Code, in combination with the *Code for Radiation Protection in Planned Exposure Situations* (RPS C-1), will replace the existing *Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation* (RPS 14). The Medical Exposure Code outlines requirements on license holders for use by state and territory regulators in assuring appropriate radiation protection for exposures of patients, including volunteers exposed in medical research and carers assisting in the conduct of a medical exposure.

The approval of the code (see **Radiation Health Committee** below) is the culmination of more than four years of work by ARPANSA involving managing the development of the new code, consulting with stakeholders, responding to public comments, and providing assessment of the impact of the revised requirements. The RHC requested the development of a document giving guidance on regulatory expectations to assist with the implementation of the code. Publishing the code will help to promote the safe and effective use of ionising radiation in medicine, and can help lead to a nationally uniform approach to regulation.

Primary Standards Dosimetry Laboratory

As a part of ARPANSA's regular calibration services for radiotherapy providers and medical industry users of ionising radiation, ARPANSA calibrated six therapy dosimeters and three neutron monitors for surveying levels of radiation for the quarter. Clinics use therapy dosimeters to determine the radiation dose delivered during radiotherapy. Calibrating this equipment ensures accurate radiation dose delivery which is vital for treatment efficacy and patient safety.

A significant amount of calibration work was also performed for other sections of ARPANSA. Two ion chambers, which are used for measuring radiation dose, were calibrated for the Australian Clinical Dosimetry Service (ACDS), in support of its development of an audit for clinics delivering radiotherapy using orthovoltage (medium energy) X-rays. Accurate ACDS audits help confirm the safe and effective delivery of radiotherapy treatments to cancer patients.

Eighty occupational radiation badges were irradiated with a range of X-rays for the ARPANSA Personal Radiation Monitoring Service (PRMS). This was to verify the correct performance of these devices in measuring occupational dose to workers. One hundred and eighty-seven PRMS neutron radiation badges were also irradiated with accurately known neutron doses, as part of monthly quality assurance activities to confirm the accurate performance of the neutron monitoring service. Ensuring these radiation badges are recording radiation exposure accurately and appropriately allows the tracking of workers' exposure to harmful radiation. This data feeds into the ANRDR to protect workers from overexposure to radiation.

Ensuring risk-informed and effective regulation

Significant regulatory activities

ARPANSA granted regulatory approval for five changes with significant safety implications, including:

- Approval for ANSTO to transfer intermediate level liquid waste to the ANSTO Nuclear Medicine Facility.
- Approval for ANSTO to amend the Open-Pool-Australian-Lightwater (OPAL) Reactor Safety Analysis Report to take into account changes to the reactor's service pool.

Changes to anything described in a licence application, or modifications to apparatus, material or facilities under regulatory control that have significant implications for safety, require prior approval from the CEO of ARPANSA. Significance is determined in accordance with the regulatory guide 'When to seek approval to make changes important for safety' with an example being a change resulting in a potential to expose someone above a regulatory limit.

Approval of such changes allows the regulated entities to continue operations under their existing licence. Requiring approval of such changes also helps to maintain regulatory oversight of licensees' ongoing activities and ensure risk-informed and effective regulation.

Two licences were surrendered due to no longer being required: one held by ANU Enterprise Pty Ltd, which no longer deals with sources of radiation, and one held by ARPANSA following the end of the construction phase for the medical linear accelerator facility. Licences issued by ARPANSA continue to be in operation until the CEO has consented to the surrender of the licence. This ensures that the licence holder remains responsible until the regulator has assessed that regulatory control is no longer required.

Inspections

ARPANSA conducted six scheduled inspections and 11 site visits during the quarter. ARPANSA undertakes a program of scheduled inspections of licence holders to monitor compliance with the Act and the Australian Radiation Protection and Nuclear Safety Regulations 2018 (ARPANS Regulations). The scope and frequency of inspections is determined from an assessment of the risk presented from the controlled activity and takes into account a range of factors including licence holder safety performance.

This quarter’s inspections identified one potential non-compliance and five areas for improvement. Potential non-compliances indicate an area where the licence holder may not have complied with legislation or a condition of licence, such as adherence to a code – once confirmed these are considered to be a breach. Areas for improvement indicate where licence holder safety performance could be improved, such as to meet international best practice.

Inspections play an important part in ARPANSA's compliance and performance monitoring program. A well implemented, rigorous inspection program supplemented by monitoring and performance reviews provides assurances that licence holders are operating safely. The inspection reports can be found at www.arpansa.gov.au/regulation/inspections/reports.

National uniformity

ARPANSA, with support from members of the RHC, established a working group to conduct research to support the re-introduction of a national system to track radioactive sources covered by the *Code of Practice for the Security of Radioactive Sources*, Radiation Protection Series (RPS) 11. The research to be performed by the working group will inform the direction of a national system and will shape how transfers of these radioactive sources between jurisdictions will occur. A national system to oversee these sources is important to maintain regulatory oversight across jurisdictions in a nationally uniform manner.

Standards development

The *Code for the Safe Transport of Radioactive Material* (RPS C-2, Rev 1) was endorsed by the Radiation Health and Safety Advisory Council. This Code adopts the *International Atomic Energy Agency Regulations for the Safe Transport of Radioactive Material 2018 Edition* (SSR-6, Rev 1).

The objective of the code is to establish uniform requirements for the transport of radioactive material in Australia by road, rail and those waterways not covered by maritime legislation. The anticipated adoption of the code by the Commonwealth, the states and the territories will help maintain a national system consistent with the latest international standards that represent international best practice to facilitate international transport and trade.

Radioactive material import and export permits

Authorised ARPANSA officers issued the following permits for the importation and exportation of radioactive material to and from Australia this quarter:

Type of permits	<i>Urgent (single shipment)</i>	<i>Standard (single shipment)</i>	<i>12 Month</i>
<i>Import of non-medical radioisotope</i>	68	49	2
<i>Import of medical radioisotope</i>		154	11
<i>Export of high activity source</i>			

The Minister for Health has authorised ARPANSA officers to issue import and export permits under Regulation 4R of the Customs (Prohibited Imports) Regulations 1956 and Regulation 9AD of the Customs (Prohibited Exports) Regulations 1958. Permits ensure that radioactive material entering and exiting the

country is subject to appropriate regulatory control. This includes that the end user is authorised to deal with the material, and that it is subject to appropriate safety and security provisions en route and at its final destination. This material is used for a wide range of medical, industrial and scientific purposes. The efficient movement of nuclear medicine internationally is particularly important to ensure that patients receive appropriate imaging and therapy, while maintaining effective regulatory oversight of such material.

Transport of radioactive material

ARPANSA endorsed three transport security plans this quarter. Under the *Code of Practice for the Security of Radioactive Sources* (RPS 11) some sources of radiation require a greater level of protection planning for transportation. ARPANSA assessment of transport plans for these radioactive sources helps to ensure the safety and security considerations, including the transport arrangements and route, are suitable for their shipment. This maintains risk-informed and effective regulatory oversight of these types of radiation sources.

International engagement

ARPANSA's international engagement provides the agency with the means of influencing the international radiation protection and nuclear safety and security framework, and for taking stock of international developments to ensure ARPANSA's regulatory framework and radiation protection standards are based on international best practice. The following is a summary of key international engagement this quarter.

Preparatory meeting for Integrated Regulatory Review Service Follow-up Mission to Indonesia, 13-14 February 2019, Jakarta, Indonesia

The CEO of ARPANSA participated in this meeting, hosted by the Nuclear Energy Regulatory Agency of Indonesia (BAPETEN). The meeting discussed progress to date in implementation of recommended and suggested actions, from the original mission in August 2015, and finalised the arrangements for the follow-up mission with regard to review team and logistics. The travel was mainly funded by the IAEA.

Workshop on Evaluation and Finalisation of the Joint IAEA/ARPANSA Regional Intercomparison Exercise on Individual Monitoring for External Exposure, 19-21 February 2019, Vienna, Austria

ARPANSA chaired this workshop to finalise the joint IAEA/ARPANSA regional intercomparison exercise on individual monitoring for external exposure to radiation. This exercise enhanced ARPANSA's already positive reputation as a leader in radiation protection in the Asia-Pacific region. ARPANSA was also able to provide the exercise results to all three Australian monitoring service providers. These results could be used as a basis for authorisation of these providers by Australian regulators. This travel was funded by the IAEA.

Consultancy meeting on development of a Training Package on Occupational Radiation Protection in Uranium Mining and Processing Industry, and Consultancy meeting on review and re-design of the global survey on Information System on Occupational Radiation protection in Uranium Mining, 4-13 March 2019, Vienna, Austria

ARPANSA participated in both consultancy meetings as part of a bilateral Practical Arrangement with the IAEA for work related to radiation protection in uranium mining. The first meeting (4 – 8 March) developed a training package, for delivery by the IAEA, related to the key aspects of radiation protection in this area.

The second meeting (11 – 13 March) reviewed and revised the existing global survey on uranium mining exposure (UMEX) and delivered an updated survey that is intended to be incorporated into the existing IAEA Information System on Occupational Exposure in Medicine, Industry and Research platform. The work ensures that ARPANSA continues to play a critical role in the development of radiation protection material for the uranium mining and processing industry. This travel was funded by the IAEA.

Convention on Nuclear Safety (CNS) Officer's Turnover Meeting and the CNS Officer's Training, 19-21 March 2019, Vienna, Austria

The CEO of ARPANSA and one ARPANSA staff member participated in their roles as nominated Vice President and Rapporteur, respectively. Both meetings are provided for under the Guidelines regarding the Review Process under the Convention on Nuclear Safety (INFCIRC/571/Rev7) paragraph 11. The key outcome was preparation and training to ensure both could fulfil their officer roles for the Eighth CNS Review Meeting to be held in March 2020. This travel was funded by ARPANSA.

OECD NEA 22nd Session of the Radioactive Waste Management Committee (RWMC) Regulator Forum (RF), NEA 52nd Session of the RWMC, the 1st Joint Session of the Committee on Decommissioning of Nuclear Installations and Legacy Management (CDLM) and the RWMC and the 1st Session of the CDLM, 18-21 March 2019, Paris, France

ARPANSA attended the meetings to discuss and consider a range of subjects including challenges in regulating the management of very low-level waste, the regulatory challenges in competency management, comprehensive optimisation of predisposal in radioactive waste management based on holistic consideration of environmental, economic and societal factors and decommissioning and legacy management activities. This travel was funded by ARPANSA.

52nd Session of the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO) Working Group B, 25 March to 5 April 2019, Vienna, Austria

ARPANSA participated in this meeting that discussed technical issues related to the Comprehensive Nuclear-Test-Ban Treaty (CTBT) including sessions on capacity building, technology refreshment, testing, provisional operations and performance assessment. Attendance at this working group ensures that ARPANSA can contribute to the technical aspects of implementing the CTBT and verification regime. This has a direct impact on our work as we are the third largest operator of radionuclide stations in the world. Attendance at the meeting also provides the opportunity to meet with other Member State representatives and discuss and share information on operational issues. The travel was funded by ARPANSA.

Details of directions given by the Minister

No directions were given by the Minister under section 16 of the Act.

Details of directions given by the CEO

No directions were given by the CEO under section 41 of the Act.

Details of improvement notices given by inspectors

No improvement notices were issued by ARPANSA under section 80A of the Act.

Details of any breach of licence conditions by a licensee

Eight breaches, determined in the quarter, were considered to have minor or no significant safety implications. These were for failing to comply with licence conditions under the ARPANS Regulations:

- One breach related to not complying with a relevant code or standard, specifically UV sterilisation equipment training and labelling.
- Three breaches involved organisations failing to review their plans and arrangements, which describe how the licence holder manages the safety of the source or facility, within three years.
- Two breaches were for failing to maintain an accurate inventory of sources of radiation. This accurate inventory must be submitted periodically to ARPANSA.
- One breach for not having prior approval to dispose of an X-ray apparatus. This allows ARPANSA to assess if all relevant arrangements, such the use of appropriately trained and licenced persons, have been made before the disposal occurs.
- One breach for not having plans and arrangements in place, and ensuring that they are implemented to the extent reasonably practicable.

One breach with significant safety implications was identified this quarter. This breach was at Australia's Nuclear Science and Technology Organisation (ANSTO) National Research Cyclotron Facility. ANSTO failed to seek approval to make a change to a process with potential safety significance, as required by section 63 of the Regulations. This involved new equipment which had not been placed into routine operation; however, it was operated to obtain specific data, despite ANSTO's risk assessment having identified an inherent risk of radiation exposure to workers in excess of the statutory dose limit.

Facilities licensed under Part 5 of the ARPANS Act

No new facility licences were issued in the period.

The operations of the Council and Committees

Radiation Health and Safety Advisory Council

The Radiation Health and Safety Advisory Council (the Council) met on 5-6 March 2019 in Sydney.

The Council discussed the CEO of ARPANSA's regulatory Direction to ANSTO following recent safety-related events, and the subsequent report on safety practices at ANSTO from an independent expert panel, including some recommendations directly about ARPANSA's role as the regulator. Separately, the Council reviewed a model for measuring the maturity of an organisation's internal safety culture based on

international best practice, that ARPANSA was trialling internally and intending to publish the results for transparency, before offering as a tool for regulated entities.

Council received briefs on the International Atomic Energy Agency (IAEA) Integrated Regulatory Review Service (IRRS) Mission to Australia, held in November 2018, which provided a peer review of Australia's federal system of regulation for radiation protection and nuclear safety, and an ARPANSA-developed training package for the radiation protection of medical personnel. Council recommended adopting the new draft Medical Exposure Code (RPS C-5), and a revised *Code for the Safe Transport of Radioactive Material* (RPS C-2 Rev 1). Council also received an overview of an ARPANSA-led Australian study on mobile phone use and incidence of brain cancer, published in December 2018 with the British Medical Journal Open, and associated emerging public concern around 5G technology.

The minutes of past meetings are published on ARPANSA's website at www.arpansa.gov.au/rhsac. The next meeting is scheduled for 1-2 August 2019 in Sydney.

Reports to the CEO from the Council under paragraph 20(f) of the Act

The Council did not provide any reports to the CEO during this quarter.

Radiation Health Committee

The Radiation Health Committee (RHC) met on 12-13 March 2019 in Sydney.

At this meeting the RHC approved publication of a Code, a Guide and an Advisory Note. The approved Code is for Radiation Protection in Medical Exposure; the Guide is for Radiation Protection in Emergency Exposure Situations; the Advisory Note is on Dose and Risk Criteria to supplement the Code for Disposal facilities for Solid Radioactive Waste. In order to address the IAEA IRRS recommendations and suggestions, the RHC agreed to revise the National Directory for Radiation Protection (NDRP) 2nd Edition, and to amend the Code for Radiation Protection in Planned Exposure Situations to include the dose limits for age group of 16 years to under 18 years.

Further information can be found in the meeting minutes which are published online at www.arpansa.gov.au/rhc. The next RHC meeting will take place in Brisbane on 2 and 3 July 2019.

Nuclear Safety Committee

The Nuclear Safety Committee (NSC) met on 15 March 2019. The committee discussed regulatory performance of licence holders at nuclear installations and related significant ARPANSA activities. The NSC provided comments on the progress of the ANSTO Health independent review action plan being developed by ANSTO. The NSC supported the approach and stance adopted by ARPANSA and agreed that the current action plan was not sufficiently mature for approval.

The minutes of the meeting are provided online at www.arpansa.gov.au/nsc. The next meeting of the NSC is scheduled for 21 June 2019 in Miranda.

Reports to the CEO from the NSC under paragraph 26(1)(d) of the Act

The NSC did not provide any reports to the CEO during this quarter.