Annual Report of the Chief Executive Officer of ARPANSA 2013–14



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ARPANSA 619 Lower Plenty Road YALLAMBIE VIC 3085 Email: info@arpansa.gov.au URL: www.arpansa.gov.au

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Produced by:

Australian Government Australian Radiation Protection and Nuclear Safety Agency 619 Lower Plenty Road Yallambie VIC 3085

and

38-40 Urunga Parade Miranda NSW 2228

Mailing Address: PO Box 655 Miranda NSW 1490

ABN 61 321 195 155

Telephone: +61 3 9433 2211 and +61 2 9541 8333 Facsimile: +61 3 9432 1835 and +61 2 9541 8314

Email address: info@arpansa.gov.au Internet home page: www.arpansa.gov.au Annual Reports webpage: www.arpansa.gov.au/AboutUs/corporate/annualreports.cfm

Information on the content of this report may be directed to:

Annual Report Coordinator Australian Radiation Protection and Nuclear Safety Agency 619 Lower Plenty Road Yallambie VIC 3085

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Australian Government

Australian Radiation Protection and Nuclear Safety Agency

26 September 2014

Senator the Hon Fiona Nash Assistant Minister for Health The Senate Parliament House CANBERRA ACT 2600

Dear Assistant Minister

In accordance with section 59 of the *Australian Radiation Protection and Nuclear Safety Act 1998* (the ARPANS Act), I present to you for transmittal to the Parliament the Annual Report of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) for the period 1 July 2013 to 30 June 2014.

As required by the ARPANS Act, my report provides details on:

- the operations of the CEO, ARPANSA and the Council and Committees
- any direction given by the Minister to me under section 16 of the ARPANS Act and any breach
 of licence conditions by a licensee, of which I am aware
- all reports received from the Radiation Health and Safety Advisory Council on matters related to radiation protection and nuclear safety or the Nuclear Safety Committee on matters related to nuclear safety and the safety of controlled facilities.

The report of the independent auditor on the financial statements of ARPANSA for 2013–14 and the financial statements are included with this report which also meets the *Requirements for Annual Reports* issued by the Department of the Prime Minister and Cabinet and updated 29 May 2014.

Yours faithfully

CEO of ARPANSA

E-mail: info@arpansa.gov.au Web: www.arpansa.gov.au Freecall: 1800 022 333 (a free call from fixed phones in Australia) ABN No: 613 211 951 55 PO Box 655, MIRANDA NSW 1490 Phone: +612 95418333, Fax: +612 95418314 619 Lower Plenty Road, YALLAMBIE VIC 3085 Phone: +613 94332211, Fax: +613 94321835 3-5 National Circuit, BARTON ACT 2600 Phone: 1800022333 Part 1: CEO's Review



Part 1: CEO's Review



I am pleased to present to you the sixteenth Annual Report of the CEO of ARPANSA, the fifth under my stewardship of the Agency.

I have the pleasure of working with people who have a strong commitment to the protection of the Australian people and environment from the

ARPANSA CEO Carl-Magnus Larsson

harmful effects of radiation. Over this year we have, in accordance with statutory obligations:

- provided advice and services to the Australian community on radiation protection, nuclear safety, security, and medical exposures to radiation, including related research
- promoted national uniformity of radiation protection and nuclear safety policy and practices across the Australian Government and states and territories, and
- independently regulated the radiation sources, radiation facilities and nuclear installations of Australian Government entities and contractors.

I am pleased to report that we met the majority of our specific commitments to government. Details on what has been achieved can be found in *Part 3: Report on Performance*. We did not meet the target set for the length of time taken to assess facility and source licence applications due to the complexity of new applications for nuclear installations and prescribed radiation facilities received from the Australian Nuclear Science and Technology Organisation (ANSTO) simultaneously.

In this review, I take the opportunity to present some significant developments in radiation protection and nuclear safety during the year, as well as some challenges for the Agency as we enter the next financial year.

International best practice – relevance to Australia and ARPANSA

ARPANSA's engagement with the international radiation safety community is substantial and also vital to the Agency's capability to implement international best practice in radiation protection and nuclear safety/security in Australia. I review some aspects of this engagement and its domestic relevance below.

Standards, Guidance and Recommendations

ARPANSA participates in the work of the International Atomic Energy Agency (IAEA) Safety Standards Committees as well as in the IAEA Nuclear Security Guidance Committee. Of these Committees, ARPANSA (through Dr Geoff Williams) chairs the Waste Safety Standards Committee; I am a member of the Commission on Safety Standards which oversees the general direction of the Standards development.

The work in the Committees and the Commission on Safety Standards is of direct relevance to the implementation of international best practice across all Australian jurisdictions. One of my statutory obligations is to promote national uniformity in radiation protection and nuclear safety, and for this purpose the Radiation Health Committee has been established with regulators from all Australian jurisdictions. The Radiation Health Committee has agreed to adopt, to the extent practicable, the Safety Standards and Security Guidance developed by the IAEA. To this end, ARPANSA has improved its procedures for contributing to, and commenting on, draft standards and guidance, in consultation with state and territory regulators and other stakeholders. This will improve the effectiveness and efficiency of implementation of international best practice in a nationally consistent way, which will ultimately be beneficial to all regulated entities.

During this financial year, I was also elected to be a member of the Main Commission of the International Commission on Radiological Protection (ICRP)¹, which allows me to provide further support

The ICRP Main Commission has 13 members and is chaired by Dr Claire Cousins, UK. More than 200 radiation experts, regulators and policy makers are involved in ICRP's work, which is organised in five Committees covering: biological effects (chaired by William F Morgan, USA); dosimetry (chaired by John Harrison, UK); medical radiation (chaired by Eliséo Vañó, Spain); application (chaired by Jacques Lochard, France), and environment (chaired by Carl-Magnus Larsson, Australia).



ARPANSA's Fundamentals Document

to the development and national implementation of international best practice in radiation safety.

Fundamentals

One example of alignment to the international framework for radiation safety is the publication this year of Fundamentals for Protection Against Ionising Radiation (RPS F-1). The Fundamentals builds on a number of high-level international standards, recommendations, codes of conduct and conventions covering all applications of ionising radiation and all exposure situations, and integrates safety, security and radiation protection into one holistic, 'fundamental', approach to the management of radiation risks. The Fundamentals is a top level document in a revised hierarchy of fundamentals, codes and guides, intended to govern all uses of, and exposures to, radiation across all jurisdictions, developed by ARPANSA jointly with the states and territories through the Radiation Health Committee.

Dose register

Another example of implementation of international best practice is the establishment of a database on occupational exposures of radiation

workers, aligned with the requirements in the International Basic Safety Standards.² Based on an initial agreement with the then Department of Resources, Energy and Tourism, ARPANSA has developed the Australian National Radiation Dose Register. Originally, it was intended for uranium mine workers and has now, with the last mine coming on line this year, been implemented to all uranium mines licensed to operate in Australia.³ The register currently holds records of over 31 000 uranium mine workers. Work has commenced with the intent of expanding the register to other mining activities involving radioactive minerals, to Commonwealth licence holders, and beyond, as resources permit and obstacles can be overcome.

In relation to uranium mining, but also more generally in relation to exposure to radon and its progeny, the ICRP has advised that the dose conversion factors for some inhaled radioactive substances will change. This further emphasises the importance of better characterising the work environment in the mines. ARPANSA has carried out relevant measurements during the year, which will make it possible to further improve the understanding of the exposure of workers, and guide mitigation efforts. ARPANSA's participation in the development of ICRP's *Publication 126 -Radiological Protection against Radon Exposure*, has contributed to this objective.



A member of ARPANSA's Dose Register Team at work

^{2.} Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, GSR Part 3, IAEA, 2014. Normally referred to as the BSS; it is published by the IAEA on behalf of its member states and is co-sponsored by the European Commission, the Food and Agriculture Organization of the United Nations, the International Atomic Energy Agency, the International Labour Organization, the Nuclear Energy Agency of the Organization for Economic Cooperation and Development, the Pan American Health Organization, the United Nations Environment Programme, and the World Health Organization.

^{3.} These are: Olympic Dam, Beverley and Honeymoon (care and maintenance) in South Australia; and Ranger in Northern Territory.

Radiation protection of the patient

Of particular interest is the risks associated with the use of computed tomography (CT) scanning in diagnostic procedures involving children, which has been the subject of major studies internationally as well as in Australia (in which ARPANSA has participated). While the risk for cancer following such an examination is small and should not prevent justified medical examinations using ionising radiation, further fundamental research as well as guidance to the medical profession is warranted.

In October 2013, the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), which I have the honour to chair, published its scientific assessment: *Effects of radiation exposure of children*.⁴ The UNSCEAR study considered twenty-three cancer forms and the relative sensitivity of children - compared to adults - in developing such cancers after exposure to ionising radiation. Children are clearly more likely than adults to develop some cancers after exposure to ionising radiation; examples of such cancers are leukaemia (except chronic lymphocytic leukaemia), thyroid cancer, breast cancer and non-melanoma skin cancer. For other cancer forms, the sensitivity seems to be about the same; for some cancer forms the relationship to ionising radiation is unclear for both children and adults, or data are inconclusive. The study provides a valuable summary of current knowledge as we go forward exploring the important issue of optimisation of radiation protection of the patient.

On this note, it is also worth pointing out that ARPANSA has entered into a Memorandum of Understanding with the Department of Health to develop and disseminate web-based information and educational material related to the use of ionising radiation for diagnostic purposes for the medical profession. ARPANSA also continues to survey data to support the development of diagnostic reference levels (DRLs) for a variety of diagnostic procedures. International experience demonstrates that implementation of DRLs tend to drive exposures downward, with no detriment to the diagnostic outcome. These activities occur against the backdrop of international guidance, noting also that exposure to ionising radiation in diagnostic procedures is now the major contributor to radiation exposure of the Australian population (see Figure 1).

Figure 1: Radiation exposure to the Australian population

There are three main sources of artificial ionising radiation. They are:

- medical uses, such as diagnosis
- industrial uses, mainly in measurement and scientific research
- natural background.

The chart shows the relative annual per capita dose to the Australian population from the various radiation sources.



Source: ARPANSA website at www.arpansa.gov.au/RadiationProtection/basics/understand.cfm

 UNSCEAR 2013 Report to the UN General Assembly (A/68/46): Volume II: Sources, effects and risks of ionizing radiation. Annex B -Effects of radiation exposure of children.

World Health Organization collaboration

ARPANSA's collaboration with the World Health Organization (WHO) is formally recognised through ARPANSA's status as a Collaborating Centre for Radiation Protection. WHO and the International Commission for Non-Ionizing Radiation Protection (ICNIRP) are key fora for development of protective approaches to non-ionising radiation, in particular, ultraviolet radiation (prevention of skin cancer) and electromagnetic radiation such as radiofrequency radiation used in mobile and fixed communication (an area where perceptions of health effects and risks are widely divergent, both among experts and among the general public).

ARPANSA supports the WHO's work in both the ultraviolet radiation and electromagnetic radiation areas. An example of the importance of this collaboration is the opportunity it gives ARPANSA to tap into the most recent scientific evaluations at a time when ARPANSA is commencing work on review and revision of the radiation protection standards *Maximum Exposure Levels to Radiofrequency Fields* $- 3 \, kHz$ to $300 \, GHz$.⁵ During the year, ARPANSA published a review of recent studies of health effects of RF radiation⁶, which will form part of the underpinning scientific documentation supporting the revision.

As a member of the WHO Radiation Emergency Medical Preparedness and Assistance Network (with the Peter McCallum Cancer Institute), ARPANSA is sharing experience, information, best practices and technical expertise, in the public health and medical response to a radiation emergency.

The 2011 nuclear accident in Japan

The accident at the Fukushima Dai-ichi nuclear power station in 2011 has internationally prompted major reviews of safety practices among operators of nuclear facilities. The IAEA has reviewed its safety standards and is updating some of those standards with the participation of Member States. While Australia does not operate nuclear power reactors, ARPANSA has requested ANSTO consider Fukushima-related safety issues as relevant to safety of the Open Pool Australian Lightwater (OPAL) reactor. ARPANSA has also considered the first Periodic Safety Review of the OPAL reactor during the year. This material will inform considerations, in the beginning of next financial year, of the current OPAL operating licence and its associated conditions of licence.

In April 2014, UNSCEAR published its scientific assessment of the accident at Fukushima Dai-ichi nuclear power station: *Levels and effects of radiation due to the nuclear accident following the great east-Japan earthquake and tsunami.*⁷ A Japanese translation was published in May 2014. Whilst I chaired the Committee during the assessment, ARPANSA staff (through its Chief Radiation Health Scientist, Dr Stephen Solomon and others) led the international dose assessment team that estimated the radiation doses to different population groups.

Of particular relevance was the estimation of doses to the thyroid gland of infants and children, caused mainly by radioactive iodine released from the damaged reactors. The estimates of thyroid exposures of children after the accident carry significant uncertainties; however, the data indicates that the number of children exposed at levels where statistically discernible increases in thyroid cancer have been demonstrated in earlier studies, would be small. Overall, significant changes in health statistics, directly related to radiation exposure, are not expected. These findings do not negate that risks may have increased, nor disregard the suffering associated with any extra cancer case. Health statistics arising from the Fukushima Health Management Survey will only be possible to evaluate, with any degree of certainty, several years from now.

In addition, the suffering caused by evacuation, loss of livelihood and loss of family members through aggravation of health conditions that had been caused by the evacuation, is very significant among tens of thousands of people who remain evacuated in the wake of the nuclear accident. A further aggravating factor is the wide-ranging devastation of land, property and infrastructure caused by the effects of the earthquake and tsunami.

^{5.} Radiation Protection Series No. 3, ARPANSA 2002.

Report by the ARPANSA Radiofrequency Expert Panel: Review of Radiofrequency Health Effects Research – Scientific Literature 2000 – 2012' ARPANSA Technical Report Series No. 164 at www.arpansa.gov.au/pubs/technicalreports/tr164.pdf.

^{7.} United Nations Scientific Committee on the Effects of Atomic Radiation, (April 2014) Annex A - Levels and effects of radiation exposure due to the nuclear accident after the 2011 great east-Japan earthquake and tsunami.

Major licence applications from ANSTO

During the year, I issued licences to prepare a site for, and to construct, two nuclear facilities at the Lucas Heights Science and Technology Centre (LHSTC) in Sydney's south-west, namely the ANSTO Nuclear Medicine Molybdenum-99 Production Facility (the ANM Facility), and the Interim Waste Store (the IWS Facility). These decisions were made after careful review of the applications and the content of public submissions by ARPANSA staff from all operational branches (Regulatory Services, Radiation Health Services and Medical Radiation Services) and following discussions with, and advice from, the Nuclear Safety Committee.

The ANM Facility is intended to replace the existing radiopharmaceuticals production facility and increase the production capacity several-fold. The IWS Facility is intended to be an interim storage facility for radioactive waste returned from France in 2015. The waste originates from the reprocessing of fuel used for the operation of the now permanently shut down High Flux Australian Reactor, HIFAR. Australia is obliged to receive this waste by the end of 2015 at the latest. Whilst the waste was originally intended to be transported and stored at a planned National Radioactive Waste Management Facility, it is now clear that such facility will not be built in time to receive this waste. Any national facility will require the approval of the CEO of ARPANSA for siting, construction and operation.

During this financial year, ARPANSA also issued a licence to prepare a site for, and to construct, the Synroc Facility at the Lucas Heights Science and Technology Centre. This is a prescribed radiation facility intended to convert the liquid intermediate level waste resulting from the production of radiopharmaceuticals, to a ceramic form, using the ANSTO Synroc technique.

All documentation relevant to these licence decisions are available from ARPANSA's website. A number of other licence applications from ANSTO and other entities were handled during the year. These are reported in further detail in subsequent sections of this Annual Report.

Status of radiation safety among licence holders

ARPANSA monitors compliance with the Australian Radiation Protection and Nuclear Safety Act 1998 (the Act), the Australian Radiation Protection and Nuclear Safety Regulations 1999 (the Regulations) and with any additional condition of licence imposed by ARPANSA, through the review of quarterly or annual reports submitted by licence holders, inspections, and other interaction with licence holders including a yearly event called the 'Licence Holders' Forum'.

During the year, ARPANSA declared four breaches with implications for safety and five with no or minor implications for safety among its licensees. The breaches were recorded in the Quarterly Reports by the CEO of ARPANSA to the Assistant Minister for Health and were tabled in Parliament. Safety breaches included: failing to follow the approved change control process and for use of an unauthorised tool (pry bar) during fuel assembly clamping at the OPAL Reactor; and, PETNET's operation of a cyclotron without a functioning safety interlock system. The breaches are further detailed in Section 3.3 and Appendix 7, Table 13 of this Annual Report.

Incident reporting in Australia

ARPANSA maintains a nationwide incident register, called the Australian Radiation Incident Register (ARIR).⁸ During this financial year, ARPANSA reported four incidents to the register, including a contamination event resulting in a skin dose of 70% of the statutory limit (which was also a breach and is described in the Report on Performance). There was a total of 200 incidents for the 2013 calendar year. The majority of these incidents concern the medical uses of radiation, reflecting the high volume of medical radiation procedures conducted in Australia every year.

This number of incidents reported to the ARIR represents an increase from previous years, where the number of incidents over the last three years has been fairly stable at around 115. Analysis of

^{8.} The definition of incidents for the purpose of the ARIR is outlined in Schedule 13 of the National Directory for Radiation Protection, Radiation Protections Series 6: www.arpansa.gov.au/RadiationProtection/arir

this increase remains to be carried out; however, as a preliminary view, I would offer the hypothesis that this increase is at least partly due to proactive awareness-raising carried by ARPANSA, and which have resulted in an increased *reporting* of incidents to ARIR. Thus, the upward trend may be an illustration of improved safety culture rather than deterioration of safety *per se*.

In addition to the ARIR, ARPANSA is also responsible for reporting incidents to the IAEA International Nuclear Events Scale reporting scheme on behalf of Australia. There were no reportable events during the financial year 2013–14. Based on data in the ARIR and other information sources, such as inspections, the Australian National Radiation Dose Register and ARPANSA's Personal Radiation Monitoring Service, and notwithstanding the occurrence of incidents and breaches, I conclude that I have no indication suggesting that radiation safety in Australia across jurisdictions and practices is generally deficient or unsatisfactory.

Regulatory governance

The Australian National Audit Office (ANAO) carried out a review of ARPANSA's regulation of Commonwealth licence holders during the year.9 ANAO concluded that ARPANSA has been 'generally effective in managing key aspects of the regulatory framework applying to the possession and use of radiation and nuclear sources and facilities by Australian Government entities'. It also notes that 'overall, stakeholders reported that ARPANSA was approachable and professional, and commented on the generally positive working relationship between ARPANSA and its regulated entities'. However, the ANAO identified a number of areas for improvement and issued four major recommendations related to improved management of conflict of interest; and further strengthening of a risk-based approach to the regulatory activities. It also notes incomplete implementation of some of the earlier recommendations ANAO made.¹⁰

I have accepted the recommendations of the ANAO. Importantly, I take the observations in the audit report as support for the changes I have strived to implement over my tenure at ARPANSA as regards regulatory governance. I remain committed to implementing the recommendations, adapted as necessary to suit the approach to regulatory activities that I find most effective and proportionate, and report progress in the Annual Report. The way forward in relation to the main recommendations is outlined in Appendix 9.

These planned activities are well aligned with the Government's deregulation agenda. A long-term program, captured under the umbrella 'Regulatory Delivery Model' has commenced which considers the proportionality (from a risk perspective) of ARPANSA's regulatory activities with the aim of improving the efficacy of regulatory oversight and reducing regulatory burden, whilst not putting the safety outcome into jeopardy. I intend to include a more fulsome report on such activities and their impact on regulatory efficacy in the Annual Report covering the year 2014–2015.

As also pointed out by the ANAO, ARPANSA is not yet fully recovering the costs from the licence holders for its regulatory activities, although the situation has greatly improved in recent years. Parallel to the regulatory delivery model program, ARPANSA is also strengthening its framework for managing regulatory costs with the view to ensure, averaged over years, full cost recovery of its regulatory activities. ARPANSA has already received consent for adjustment of the fee structure for 2014–2015 to this effect.

Financial performance

ARPANSA delivered a small surplus of \$1.0m over the year in part driven by effective management of its discretionary cost base.

^{9.} Australian National Audit Office: Regulation of Commonwealth Radiation and Nuclear Activities, Performance Audit Report No. 29 2013–14.

^{10.} Australian National Audit Office: Regulation of Commonwealth Radiation and Nuclear Activities, Audit Report No. 30 2004-05.

Outlook

Creation of a leaner and more efficient Agency

Over the past few years, implementation of successive reductions in appropriation has been matched by a gradual reduction in staffing. By 30 June 2014, the staffing level was 132 FTE, and expected to go down to 124 in the beginning of the next financial year. This staffing number is down from the 152 FTEs as of 30 June 2011.

The reduction in staffing has taken place through a mix of planned down-sizing, natural attrition and voluntary redundancies. It has brought the Agency to a sustainable financial and staffing position. It was partly implemented through the Sustainable Futures Program that the Agency launched in to early 2014, in consultation with staff and their representatives pursuant to the provisions in the ARPANSA Agreement. This program not only addressed the staffing level but led to the implementation of fifteen recommendations on adjustments in organisational structure and operations, as modified during the consultation.

This reduction has so far been accomplished with only minor adjustments of the Agency's delivery essentially all programs are still running. However, it is now necessary to consolidate the position for the future. Continued efforts involve prioritisation (an improved planning process has contributed to this), succession planning, sustainable radiation protection services (including a major reinvestment and modernisation program), creating strategic relationships (through cooperation arrangements nationally and internationally governed by a national and an international engagement strategy), and general vigilance of discretionary expenditure. At the end of the financial year there had been no decision regarding future funding of the Australian Clinical Dosimetry Service.

A further challenge is to adapt the staffing profile to the needs. This will naturally also consider recruitment of specialised competence, noting the specialised nature of the Agency's activities.

While ARPANSA has dealt with a number of major licence applications during the year, it is expected that the pressure will be high on the regulatory

Sustainable Futures 2014

ARPANSA's Strategic Management Committee released its Sustainable Futures 2014 and Beyond strategy in January 2014. The strategy focuses on developing an organisation that meets the needs of Government whilst maintaining the Agency's financial position from 2014 and beyond.

The Sustainable Futures program ensures that a more co-ordinated and strategic approach is applied to the establishment of relationships with 'sister organisations' nationally and world-wide via Memoranda of Understanding. Additionally, Sustainable Futures aims to ensure that services provided internally and externally are delivered by the best possible service delivery models.

In keeping with the Agency's Strategic Directions for 2012-16, ARPANSA will continue to develop its leaders and its workforce. ARPANSA is committed to building a high performance organisation and aligning its human capital management strategies with the Agency's organisational direction.

staff next year as well. The regulatory delivery model and cost recovery projects will eventually help in streamlining the regulatory activities and contributing to the deregulation agenda. Major outcomes will be improved regulatory service focusing on the essentials, but with unchanged ambitions of protection of health and the environment.

The demand on ARPANSA staff to provide advice to government, other agencies, and the general public, is expected to remain high. Again, the ambition is to further streamline processes and engage in a constructive way with stakeholders.

ARPANSA, through its staff, experience and competence, is well placed to take on the challenges in the future – although I am also certain this will necessitate changes, adaptation and decisions that may not always be easy. **Part 2: Agency Overview**



Part 2: Agency Overview

Role and functions

ARPANSA is the Australian Government's primary authority on radiation protection and nuclear safety. ARPANSA regulates Commonwealth entities using radiation with the objective of protecting people and the environment from the harmful effect of radiation. ARPANSA also undertakes research, provides services, and promotes national uniformity and the implementation of international best practice across all jurisdictions.

The CEO of ARPANSA is responsible for applying and implementing the *Australian Radiation Protection and Nuclear Safety Act 1998.*

Our mission

Through our work, the Australian Government aims to: *protect people and the environment from the harmful effects of radiation*.

Our vision

Radiation safety¹¹ is appropriately considered in societal decision-making

• That decision making rests on sound science, with radiation safety given appropriate weight, guiding the use of precaution as necessary.

Radiation safety is addressed uniformly and effectively across Australia

• That radiation safety is consistently applied, across jurisdictions and across activities, in a manner that is commensurate with the risk.

Radiation safety in Australia is current international best practice

That ARPANSA takes a lead role in the enhancement of the international radiation safety and security
frameworks and promotes and implements best practice nationally, in the region and internationally.

What we do

Our activities can be categorised into six strategic themes where ARPANSA works with the government and community:

Expertise	Build and maintain expertise in measurement of radiation, assessment of health and environmental impacts, assessment of risks and response to radiation emergencies.
Advice	Provide advice on issues related to exposures and effects of radiation, and radiation protection and nuclear safety.
Regulation	Use our licensing powers and work with Commonwealth entities to promote the safety of the radiation facilities and sources operated by them, using a risk-informed regulatory approach.
Best Practice	Lead the development of codes, guides and advice to support radiation protection and nuclear safety throughout Australia. Play a prominent role in relevant international organisations, promoting and developing the global radiation protection and nuclear safety framework.
Services	Offer high quality services for the purpose of protection against the harmful effects of radiation.
Research	Undertake research and development in radiation protection and nuclear safety. Build strategic partnerships with relevant academic and research organisations, nationally and internationally.

11. 'Radiation safety', as used in this context, captures all activities within ARPANSA's mandate.

Funding Basis

ARPANSA is funded through appropriations received directly as part of the Federal Budget.

ARPANSA's own sourced income derives from:

- the sale of scientific services such as the Personal Radiation Monitoring Service
- Comprehensive Nuclear-Test-Ban Treaty Organization contracts to build, operate and maintain monitoring stations, and
- licence application fees and annual charges associated with ARPANSA's regulatory activities.

Our regulatory approach

In support of protecting people and the environment from the harmful effects of radiation, we use strategies that encourage licence holders to engage in our regulatory approach:

- We focus the primary responsibility for safety with the person or organisation responsible for facilities and activities that give rise to radiation risks.
- We promote effective communication with licensees and other stakeholders, and take our decisions in a transparent, robust, unbiased and consistent fashion.
- We work with licensees and other stakeholders for collaborative fostering of good safety and security cultures.
- We use a risk-informed approach to licensing, inspections and compliance monitoring.
- We take appropriate action against those who do not comply with their obligations.

Location and organisational structure

ARPANSA is composed of three Branches, two enabling and support Offices, and a General Counsel, across three locations: Sydney, Melbourne and Canberra.

Senior executive

Dr Carl-Magnus Larsson, CEO of ARPANSA

Dr Carl-Magnus Larsson commenced as Chief Executive Officer of ARPANSA in March 2010 with a background in chemistry and biology and a PhD in Botany from Stockholm University, Sweden. Prior to his appointment to



ARPANSA, Carl-Magnus worked at the Swedish Radiation Protection Authority (from 2008 the Swedish Radiation Safety Authority after a merger with the Swedish Nuclear Power Inspectorate) focusing on environmental aspects of nuclear power. He subsequently became Branch Head and Deputy Director-General with responsibilities for, among other things, radiation protection, waste management, radioactive materials and emergency preparedness and response. Carl-Magnus coordinated the multinational European Commission-supported research projects FASSET and ERICA (both on environmental assessment and protection) between 2000 and 2007. Carl-Magnus is a member of the Main Commission

Figure 2: ARPANSA senior management structure 2013–14



of the International Commission on Radiological Protection and is the current Chair of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). He is a member of the IAEA Commission on Safety Standards.



Professor Peter Johnston, Deputy CEO and Chief Medical Radiation Scientist, Medical Radiation Services¹²

Peter Johnston is ARPANSA's Chief Medical Scientist and was appointed as Head of the Medical Radiation Services Branch upon its creation in May 2011.

Prior to that Peter was Branch Head of ARPANSA's Environmental and Radiation Health Branch since 2009. Peter worked at Royal Melbourne Institute of Technology (RMIT) for 20 years commencing as a Lecturer, progressing to become Professor of Applied Nuclear Physics in 2001 and Head of Physics in 2003; he remains an Adjunct Professor at RMIT. During this period, Peter had several ministerial and government appointments and was a member of the Uranium Mining, Processing and Nuclear Energy Review in 2006. Peter first joined the Australian Radiation Laboratory at Yallambie (now ARPANSA) in 1979 and worked in Radioactivity Standards, Environmental Radioactivity and Health Physics for ten years. Peter has extensive experience in providing advice on environmental radiation matters including the contamination and rehabilitation of Maralinga, radiation protection issues in uranium mining as well as in the medical use of radiation.

Medical Radiation Services Branch is responsible for radiation protection in medicine and its mandate is based on the idea that all procedures involving radiation exposure of patients must be justified so that the procedure is appropriate in relation to alternatives and is likely to be beneficial to the patient. Medical Radiation must also be optimised to ensure that the procedure is implemented with minimal dose (diagnostic imaging) or harm (therapy) to the patient while maintaining efficacy.

The work of this branch focuses upon the outcomes of: correct dose delivery to patients in radiotherapy procedures; delivery of clinically adequate images affecting patient management using minimal doses; effective communication and interaction between ARPANSA, state and territory agencies, the medical profession and other professional bodies, patients and carers.

Dr Stephen Solomon Chief Radiation Health Scientist, Radiation Health Services

Stephen Solomon is acting Chief Radiation Health Scientist and has been head of Radiation Health Services Branch since its creation in May 2011. Prior to his



current appointment, Stephen was Manager Health Physics Section, Environmental and Radiation Health Branch, ARPANSA. Stephen has a PhD in Nuclear Physics and has over thirty-five years' experience in health physics and radiation protection.

He leads and coordinates ARPANSA activities as a World Health Organization (WHO) Collaborating Center for Radiation Protection and as a member of WHO Radiation Emergency Medical Preparedness and Assistance Network. Stephen was the Leader of Expert Group C (Assessment of doses and risk to humans and biota) and a member of the Coordination Expert Group for the UNSCEAR Assessment of Levels and Effects of Radiation Exposure due to the Nuclear Accident after the 2011 Great East Japan Earthquake and Tsunami.

The work of this Radiation Health Services Branch is focused on delivering ARPANSA radiation protection outcomes, including maintaining systems for the measurement of radioactivity in people and the environment, supporting the development

^{12.} Professor Peter Johnston acted in the role of Regulatory Services – Chief Inspector through to the end of the financial year. Dr Ivan Williams acted in this role through to the end of the financial year. Ivan Williams has fourteen years' experience as a professional medical physicist, initially at the Peter MacCallum Cancer Centre, the largest radiation oncology centre in Australia. Interspersed with his early clinical work he obtained a MSc (Research) in Physics from the University of Melbourne by designing, building and testing a parallel-plate ionisation chamber. Between 2004 and 2008 Dr Williams was attracted back into full-time research. Supervised by Prof. Rob Lewis at Monash University he completed his PhD on 'Optimisation of Phase Contrast Imaging in Mammography'. Dr Williams then left Australia for Ireland to take up a Principal Physicist position at St Luke's Hospital, Dublin. Dr Williams left Ireland in 2010 as Acting Head of the Department of Physics at St Luke's Hospital to be the inaugural Director of the Australian Clinical Dosimetry Service, ACDS.

frameworks for radiation protection, supporting Australian radiation emergency preparedness and response to nuclear radiological emergencies, monitoring and providing advice on population exposures to non-ionising radiation, advising on radiation protection for occupational health and safety exposure from man-made and naturally occurring ionising radiation; and the provision of a Personal Radiation Monitoring Service for exposures of workers across a variety of occupations.

Mr Martin Dwyer Chief Inspector, Regulatory Services¹³

Martin Dwyer is ARPANSA's Chief Inspector and was appointed as Head of Regulatory Services Branch in August 2011. Prior to his appointment, Martin was an engineer with a career



in the teaching hospital system which culminated in his role as Director of Biomedical Engineering and Medical Physics at Canberra Hospital. Martin has extensive experience with Australian Standards and currently chairs the Accreditation Board for Standards Development Organisations and was previously a member of Standards Australia's Council. He has also held significant roles in professional organisations, including as chair of the College of Biomedical Engineers and as Director, Engineering Practice with Engineers Australia.

The Regulatory Services Branch is responsible for Commonwealth regulatory activities including licensing, compliance, inspection and enforcement. The branch is responsible for assessment of incidents and accidents, as well as normal licence holder operations, from technical, managerial, human and organisational perspectives, and an incident register is maintained to support such analyses.

Regulatory Services is ARPANSA's principal driver for establishing a uniform regulatory framework across all jurisdictions, through the Radiation Health Committee. It also supports the Radiation Health and Safety Advisory Council and the Nuclear Safety Committee. Security and Community Safety also fall within the responsibility of the branch. In this area, as in other areas of responsibility, the branch collaborates with other branches and offices as appropriate.

Mr George Savvides Chief Administrator Corporate Office

George Savvides is ARPANSA's Chief Administrator and Head of the Corporate Office since its creation in May 2011. Prior to his current appointment, George had



many years' experience in senior finance roles in both the private and not-for-profit sectors, including Oakton Limited, Melbourne Football Club, Melbourne Health, Powercor Telecommunications and Ansett Australia. George is a Certified Practicing Accountant with an MBA from the Australian Graduate School of Management.

ARPANSA's Corporate Office is responsible for providing support to ARPANSA's key activities by creating the most effective environment enabling and encouraging excellence in research, policy, advice, regulation and the utilisation of knowledge.

Corporate Office includes four sections: Finance; Information Management; People and Culture and Administration Services. The Chief Administrator is also responsible for the Senior Corporate Adviser and Property Manager roles. The Finance team manages the Agency's financial transactions to ensure compliance with the Financial Management and Accountability Act 1997. Information Management delivers ARPANSA's computer network, telecommunications, database/system development, records management, library services. People and Culture administer ARPANSA's recruitment, pay and conditions for staff, including workplace policies and our enterprise agreement. It also develops training programs, workforce planning and advice regarding people management practices.

^{13.} Mr Martin Dwyer ceased with ARPANSA on 6 June 2014. Professor Peter Johnston acted in this role through to the end of the financial year.



Ms Brenna Lindsay Chief of Staff Office of the CEO

Brenna Lindsay is ARPANSA's Chief of Staff and Head of the Office of the CEO. She joined the Agency in February 2012 as the Director, Parliamentary

and Government Relations, and commenced in her current role in September 2012.

Brenna came to ARPANSA having served in a number of senior roles in the Australian Government primarily in government relations, governance, and communications.

With over ten years in the Australian Public Service, Brenna has held key roles in the Australian Taxation Office, Australian Federal Police, ACT Policing, and the Department of Immigration and Citizenship, covering a variety of coordination and advice functions including international policy, capacity building, ministerial services, strategic planning, media and marketing management, and government relations.

As Chief of Staff she has primary responsibility for Agency reputational management and leads ARPANSA's parliamentary and government relations, international relations, communications and media, governance and innovation functions.

Brenna holds a Master of Arts (International Relations) from Deakin University and a Bachelor of Communications (Journalism and Cultural Studies) from Griffith University.

Mr Martin Reynolds General Counsel

Martin Reynolds is ARPANSA's General Counsel and Head of the Legal Office since August 2011. Prior to his current appointment, Martin was Corporate Governance Officer at ARPANSA since 2008. Martin



has had many years' experience in both legal and senior management roles in government statutory authorities. Martin was trained as a lawyer at Monash University and also holds a Bachelor of Business (Management) from the same university.

General Counsel provides high quality legal services that cut across all aspects of the Agency's operations and to assist the CEO achieve his statutory mandate. General Counsel also assists the Agency to meet its obligations under applicable statutory frameworks such as the Government's financial management frameworks including advice on Internal Audit, Work Health and Safety, Certificate of Compliance Process, and Quality Management.

Outcome and program structure

As a portfolio Agency of the Department of Health, the following section describes our outcomes and programs framework, as set out in the 2013–14 Portfolio Budget Statements. Figure 3 shows our outcomes, program to achieve that outcome, and the components of that program.

The *Report on performance* section of this report outlines our program and details the performance of ARPANSA in achieving its outcome.

Outcome			
Protection of people and the environment through radiation protection and nuclear safety research, policy, advice, codes, standards, services and regulation			
Program			
Program 1 - Radiation protection and nuclear safety			
Program Objectives			
 1.1 Protect the public, workers and the environment from radiation exposure 1.2 Promote the effective use of ionising radiation in medicine 1.3 Ensure effective regulation and enforcement activities 			

Figure 3: ARPANSA outcomes and programs framework 2013–14

Our people

As at 30 June 2014, ARPANSA employed a total of 132 staff across three locations: Canberra, Melbourne and Sydney.

Figure 4: Organisational chart



About Us

Protecting people and the environment from the harmful effects of radiation

Clients

Australian Government



Commonwealth licence holders



Members of the public

Workforce Data



30 June 2014

59% of employees are male

41% of employees are female



are ongoing

6.8% of employees are non-ongoing

12.9% of employees work part-time

19.0% employees with over 20 years' service



About Us

Protecting people and the environment from the harmful effects of radiation

47 Journal articles and Ministerial conference papers published correspondence Technical Reports Briefing notes published 36 Updated codes Ministerial submissions and standards Question Time Briefs **Services** 1 100 1 500 **Public inquiries** 4 000 000 Swing tags

Scientific Knowledge

Responding to Ministerials and Public Inquiries

Our history at a glance

Protecting people and the environment from the harmful effects of radiation



Our history at a glance

Protecting people and the environment from the harmful effects of radiation



Part 3: Report on Performance



Part 3: Report on Performance

3.1 Protect the public, workers and environment from radiation exposure

ARPANSA, on behalf of the Australian Government, undertook a range of activities aimed at improving knowledge about the levels and effects of radiation in the environment, and providing guidance and advice to industry and the public on how best to mitigate radiation risks.

Major achievements

- Harmonising solar ultraviolet spectral measurement systems from ARPANSA, Public Health England, and the joint system from the Bureau of Meteorology and the New Zealand National Institute for Water and Atmosphere.
- Completion of the Radiofrequency (RF) Literature review by our RF Expert Panel in March 2014 which confirmed that the exposure limits in ARPANSA's RF Standard continue to provide a high degree of protection against the known health effects of RF electromagnetic fields.
- Collecting radiation dose data for workers across all uranium mines in Australia to assist uranium mining workers to monitor and safely manage their occupational exposure to radiation.

Challenges

- Continuing to educate the Australian public about the dangers of sun exposure in a country with more than 400 000 new cases of skin cancer each year and higher than average levels of ultraviolet radiation (UVR) due to Australia's geographical location.
- Continuing to address community concerns about potential health effects from exposure to sources of radiofrequency electromagnetic radiation (RF EMR) including from mobile phones, mobile phone towers, wi-fi and smart meters.
- Expansion of the Australian national radiation dose register to the mining and milling industries, and to Commonwealth licence holders.

Occupational exposure – ultraviolet radiation protection

Australia has one of highest rates of skin cancer in the world: with more than 400 000 new cases each year and approximately 2 000 deaths from skin cancer per year.



Figure 5: Example of UPF rating 'swing tags'



UPF testing of fabric samples

Skin cancer is an avoidable disease and a reduction in UVR exposure will lead to a reduction in skin cancer incidence; the use of sun protection (clothing, hats, sunscreen, sunglasses and shade) can play an important role in this. ARPANSA's National Association of Testing Authorities (NATA)-accredited Ultraviolet Protection Factor (UPF) Testing Service tested 2000 samples of sun protective clothing and hats, sunglasses and other sun protective materials and issued over 4 million labels for sun protective clothing ('swing tags'). Since the testing service began in 1991, over 70 million UPF rating swing tags have been issued. ARPANSA's UPF tags are designed to raise consumer awareness of sun protection strategies and assist in purchasing decisions for effective sun protective clothing.

The ARPANSA UVR monitoring network continues to provide real-time 'live' ultraviolet (UV) Index and exposure data for eleven Australian sites and four RF testing in the RF anechoic chamber

Antarctic stations via the ARPANSA website. The UV Index data (which is updated every minute) is also delivered to mobile phone users through the website and third-party applications. The ARPANSA website also describes protective strategies for avoiding excessive sun exposure. Research projects measuring the UVR exposures of outdoor workers, indoor workers, and other population groups, were carried out in collaboration with Cancer Council Victoria, Queensland Health and the Australian National University.

In October 2013, ARPANSA hosted an international program to support the inter comparison of international solar ultraviolet spectral measurement systems. The program for the first time compared systems from ARPANSA, Public Health England, and the joint system from the Bureau of Meteorology and the New Zealand National Institute for Water and Atmosphere which is based in Melbourne.

Performance against deliverables

Qualitative Deliverables for Program 1.1

Qualitative Deliverables	2013–14 Reference Point or Target				
Protect the public, workers and environment from radiation exposure					
Devise UV protection strategies for the Australian population and assess their effectiveness	Effective programs in place for assessment of UV exposure to the public and workers				
RESULT	Recent ARPANSA studies of outdoor workers have demonstrated an improvement in the effectiveness of solar UV exposure protection programs for large construction companies				

Overall, the program demonstrated a consistency in measurements taken from each system showing only small variations. Programs like these assist in validating the methodology and verifying ARPANSA's reported UV measurements as well as predictions made by the Bureau of Meteorology, and reinforce confidence in collaborations with the Cancer Councils, Sun Smart and other health related organisations. Together with ARPANSA's public advice, this forms part of a program to reduce the population's UV radiation exposures to assist in reducing the skin cancer rates in Australia.

ARPANSA continues to work within the UV Alert Group (which includes the Cancer Councils from every state and territory, the Bureau of Meteorology and, the New Zealand Cancer Council and New Zealand Health Sponsorship Council) to improve the delivery of UV Index measurements and information on sun protection. ARPANSA as a World Health Organization (WHO) Collaborating Center for Radiation Protection participates in the WHO Intersun UVR project. The WHO Intersun Project provides sound scientific information and practical advice on the health impact and environmental effects of UVR exposure encouraging countries to reduce UVR-induced health risks through provision of guidance about effective sun awareness programs. In June 2014, ARPANSA attended the annual international advisory committee Intersun UVR meeting in Geneva and reported on ARPANSA's current UVR work programs.

During this financial year, ARPANSA applied to Standards Australia to have the Shadecloth Standard revised based upon concerns about limitations of the existing Standard. Originally designed for horticultural use, shadecloths are now also used in a variety of outdoor shade structures in homes, public spaces, swimming pools, nurseries and childcare centres to provide shade for people. ARPANSA's submission to Standards Australia to reopen the Shadecloth Standard was successful. It is likely that the revised Australian Standard for shadecloth will incorporate revised test methods and a rating system to assist consumers in identifying products that provide appropriate levels of personal sun protection.

This financial year ARPANSA also provided input into the review of the Australian Standard for Sun Protective Clothing, Sunglasses and Fashion Spectacles and Lasers.

Monitor population exposures to electric and magnetic fields and electromagnetic radiation

In July 2013, ARPANSA released version 11 of its Environmental Electromagnetic Energy (EME) Report template (available from www.arpansa. gov.au/emereports/reports.cfm). The ARPANSA Environmental EME Report is a statement of the maximum calculated levels of radiofrequency radiation (RF) that will be produced around a proposed wireless base station or antenna following an installation or upgrade of equipment. This report is generally produced by a network operator (such as a mobile phone company) or consultants working on their behalf. In addition NBN Co is using the ARPANSA EME Report for the wireless base stations being deployed as a part of the National Broadband Network. After consultation with the Electromagnetic Energy (EME) Reference Group (EMERG), ARPANSA introduced changes to the format of the reporting template to make the report easier to read and understand. Completion of this report is part of the industry compliance process and by simplifying this process, ARPANSA supports the objectives of the Australian Government's Deregulation Agenda.

In response to increasing public concerns about the potential health effects from public exposure to radiofrequency (RF) sources, ARPANSA conducted a survey of RF measurements at forty-one sites across Melbourne, measuring the levels of RF produced by man-made sources, including mobile telephone, television and radio broadcast towers. The measurements were performed prior to the shutdown of analog broadcasting in Melbourne on 10 December 2013, to provide a baseline for comparison of future exposure levels. All the measured RF levels were well below the permitted limit for the general public given Radiation Protection Series (RPS) No. 3: Radiation Protection Standard for Maximum Exposure Levels to radiofrequency Fields – 3 kHz to 300 GHz (the ARPANSA RF Standard). The highest measured levels were equivalent to 2.4% of the RPS3 limit. The results showed that AM radio signals were usually the largest measured contributor to RF levels across the suburbs, except at sites with good line of sight to nearby mobile phone towers.

On 9 December 2013, ARPANSA published a technical report on preliminary RF measurements of an installed mesh network smart meter which found

CASE STUDY Advising the public about smart meters

ARPANSA, as the Commonwealth's radiation regulator, does not regulate smart meters. State and territory governments are directly responsible for the planning and regulation of electrical infrastructure such as smart meters and this role includes a requirement to undertake rigorous environmental assessments which consider the potential health impacts of any electrical infrastructure upon local communities.

RF EMR emissions from smart meters and other wireless devices are regulated by the Australian Communications and Media Authority (ACMA) under the terms of the ACMA Radiocommunications (Electromagnetic Radiation-Human Exposure) Standard 2003. This standard makes mandatory the exposure limits in the ARPANSA RF Standard which sets limits for human exposure to RF fields from all sources including smart meters. The exposure limits in the ARPANSA Standard are supported by current scientific knowledge and are intended to protect people of all ages and health status against all known adverse health effects.

Health effects

The combination of the relatively low power of the smart meter transmitter and its location on the outside of the home away from people means the overall RF EMR exposure from smart meters is expected to be very low and well below current exposure limits. Health authorities around the world, including ARPANSA and the World Health Organization, have examined the scientific evidence regarding possible health effects from RF EMR exposure and have concluded that the weight of evidence does not demonstrate the existence of health effects below current exposure limits.

ARPANSA smart meter survey

In early 2014, ARPANSA conducted initial measurements on a smart meter which confirmed the measurement levels expected to occur in an everyday household (ARPANSA Technical Report Series No. 163*). This study concerned measurements from an installed Mesh Network smart meter and indicated over 15 000 pulses in 25 hours. Of significance, these measurements found that the transmissions were not continuous and occurred less than 0.08% of those 25 hours at an average intensity of 0.00015% of the instantaneous exposure limit in the Australian RF standard for the general public. These levels are far less than the exposures typically encountered by people daily from many other RF EMR sources, including broadcast radio and television, mobile telephony and others. On this basis, there is no established evidence of adverse health effects from these measurements, which are typical for residents with smart meters installed at their homes.

Moving forward

ARPANSA is continually reviewing emerging research into the potential health effects of the RF EMR emissions from smart meters and other devices. Should new scientific evidence indicate that the current ARPANSA RF Standard does not adequately protect the health of Australians, then appropriate regulatory changes would be recommended to the Australian Government. This year, ARPANSA's Radiofrequency Expert Panel concluded that the ARPANSA RF Standard continues to provide adequate protection to users of RF EMR.



Smart meters measure electricity usage and communicate this information back to the electricity supplier using short bursts of radio waves and ARPANSA often receives public inquiries about the potential health effects of smart meters.

The overall exposure from smart meters falls well below ARPANSA exposure limits, even when a number of devices are communicating simultaneously. Typical exposure to an individual from a smart meter is many thousands of times less than the localised exposure to the brain from a mobile phone handset. ARPANSA works through the Radiation Health Committee to deliver national uniformity of radiation regulation; monitor the science around electromagnetic energy and provide advice on any associated health issues to the public.

Wijayasinghe, D, and Karipidis, K, 2013. 'ARPANSA Preliminary Measurements of Radiofrequency Transmissions from a Mesh Radio Smart Meter', Technical Report Series No. 163, December 2013 that measured exposures were well below the public exposure limits of the ARPANSA RF Standard. This study is discussed in more detail in the accompanying Case Study - Advising the public about Smart Meters (p.29). The technical report is available from www. arpansa.gov.au/pubs/technicalreports/tr163.pdf. These findings should provide some reassurance to consumers concerned about potential health effects likely to arise as a result of having a smart meter installed at their home.

Review of radiofrequency health effects research – scientific literature 2000-2012

On 14 March 2014, ARPANSA's Radiofrequency Expert Panel published its Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012 (www.arpansa.gov.au/pubs/technicalreports/tr164. pdf). The Expert Panel review found that the science behind the ARPANSA radiofrequency (RF) exposure Standard remains sound and the exposure limits in the Standard continue to provide a high degree of protection against the known health effects of RF electromagnetic fields. However, the Expert Panel also concluded that, on the basis of improved knowledge, some of the reference levels in the Standard are not as conservative under certain circumstances as originally thought; but there is no evidence that this difference has an impact on health. The Expert Panel identified areas where the RF Standard and its annexes could be updated, to incorporate increased scientific knowledge and to better harmonise these with revised international guidance.

EMR literature survey

During this financial year, ARPANSA continued to publish monthly summaries of recent scientific studies addressing electromagnetic radiation and health effects. Papers are selected and reviewed on the basis of importance to the protection of health, on perceived likely interest to the wider public and where Australian research is reported. The summaries are available at www.arpansa.gov.au/RadiationProtection/ EMR/literature. These summaries are intended to communicate and explain emerging highly technical scientific research for members of the public concerned about potential health effects from their exposure to sources of electromagnetic radiation.

ARPANSA guidelines for ELF and static electric and magnetic fields

ARPANSA, through the Radiation Health Committee, is currently developing *Guidelines for Managing Exposure to Electric and Magnetic Fields – 0 to 3kHz* to replace the National Health and Medical Research Council (NHMRC) Interim Guidelines published in 1989. The new Guidelines will align with the most recent scientific research and guidance from the International Commission on Non-Ionizing Radiation Protection (ICNIRP) published in 2010. The new Guidelines focus upon limiting human exposure to electric and magnetic fields in the frequency range of 0 to 3 kHz (which is extremely low frequency or ELF) and will include basic restrictions for occupational and public exposure, indicative reference levels, advice on how to reduce



ARPANSA Dose Register team at work

exposure through precautionary measures, and risk management for exposed persons. They will include a recommendation to assess the potential for reducing exposure to magnetic fields where this can be done in a cost-effective way.

The Australian National Radiation Dose Register

Occupational exposure to ionising or non-ionising radiation occurs across a variety of work environments which may contain man-made sources of radiation, elevated levels of natural radiation, or radioactive materials from past activities. ARPANSA strives to promote the identification, characterisation and monitoring of radiation levels present in work environments to assist workers to take the necessary steps to reduce their occupational exposure.

Uranium workers are one such occupationally exposed group who are monitored for exposure to ionising radiation. Radiation protection of workers requires the maintenance of radiation dose records to assess compliance with occupational dose limits and to minimise the radiation health risk to individuals through the continued improvement of work practices. ARPANSA operates and maintains the Australian National Radiation Dose Register (the Dose Register) for the collection, storage and auditing of radiation dose histories for uranium mine workers. The Dose Register is an electronic



Promotional poster developed as part of the educational outreach program for the Australian National Radiation Dose Register

database which stores radiation dose information for workers who are occupationally exposed to radiation. Uranium mining workers can request a copy of their dose history from ARPANSA and they can track their dose records throughout their career in the uranium mining industry. A worker's dose history report contains all past doses received while working in applicable industries in Australia, and while registered with the Dose Register.

Performance against key performance indicators

Qualitative Key Performance Indicators

Qualitative Indicator	2013-14 Reference Point or Target			
Protect the public, workers and environment from radiation exposure				
Control radiation dose to uranium mining workers	Annual reporting of trend in radiation doses received by workers compiled from Australian National Radiation Dose Register provides evidence or optimisation of radiation protection in the uranium mining industry.			
RESULT	Delivered by providing trend updates at national stakeholder meetings, conferences and Senate Estimates. Analysis of ANRDR data has shown an overall downward trend in radiation doses received by workers in the uranium mining industry. The information included in the ANRDR will assist industry to strengthen and maintain safe work practices for occupational exposed workers in the uranium mining industry			



ARPANSA Radiation Protection Services staff processing TLD badges which measure occupational radiation dose to determine the radiation dose to the wearers

The Dose Register has now been successfully implemented across all four operating uranium mines in Australia: Olympic Dam, Beverley and Honeymoon in South Australia, and Ranger in the Northern Territory. However, Honeymoon has been in a care and maintenance phase since November 2013. The Dose register currently holds dose records for more than 31 700 workers from the uranium mining and milling industry.

In supporting the control of doses to uranium workers, ARPANSA has focused upon reporting trends to key stakeholders as required, or on request, and ARPANSA is confident that this measure has been successfully met. Now that all operating uranium mines in Australia are actively providing records to the Dose Register, the trend data will become more meaningful and will allow ARPANSA to characterise radiation doses to uranium workers at the national level.

The Dose Register is now being considered for rollout to other industries where workers may be exposed to radiation sources, such as mineral sands mining and processing operations, and applicable Commonwealth practices. During this financial year, ARPANSA performed a review of the Australian mineral sands mining and processing industry to evaluate the feasibility of expanding the Register beyond uranium mining. In February 2014, a technical report outlining the key findings and recommendations of the review was published.¹⁴ This report will assist ARPANSA, regulatory authorities, and operators in establishing the legal and practical requirements for the proposed implementation of the Dose Register to occupationally exposed workers in the mineral sands industry.

ARPANSA has also commenced stakeholder engagement to include occupationally exposed Commonwealth employees in the Dose Register. During this financial year, ARPANSA performed a survey of applicable Commonwealth Licence Holders to assess the current status of dose record management practices, and identify possible issues relating to the disclosure of workers' dose records to ARPANSA.

Protection of the environment

ARPANSA has also provided ongoing advice, as part of follow-up to work required under an *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) referral to the Department of Environment from Cameco Australia Pty Limited relating to their application under the EPBC Act for their proposed Kintyre Uranium Project. ARPANSA's advice included an adequacy check of key areas and confirmation that dose constraints were in accordance with international best practices specified by the International Commission on Radiological Protection (ICRP).

Protection of workers

Changes to recommendations made in 2011 by the ICRP on the calculation of radiation doses from the inhalation of radon and radon progeny had significant

^{14.} Collett, S, Guilfoyle, R, Paritsky, B and O'Brien, R, 'Proposed Expansion of the Australian National Radiation Dose Register to the Mineral Sands Mining and Processing Industry', ARPANSA Technical Report Series No. 165, February 2014.

implications for assessing doses to uranium mine workers. In response, ARPANSA has formed a small group with representatives from the uranium mining industry, and state and territory regulatory authorities to coordinate an Australian response to these changes. In December 2013, the group commenced a program of measurements in the Olympic Dam mine at Roxby Downs, South Australia, to characterise the radioactive aerosols in different work situations within the mine and it is anticipated that these results will be published in late 2014.

Comprehensive Nuclear Test-Ban Treaty

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) bans all nuclear explosions, whether they are for civilian or military purposes. An International Monitoring System has been established to monitor compliance with the CTBT. As a signatory to the CTBT, Australia is committed to establish, operate and maintain air monitoring facilities at seven locations, which form part of the International Monitoring System. During this financial year, ARPANSA continued to operate and maintain the radionuclide air monitoring stations at Melbourne, Perth, Townsville, Darwin, the Cocos Islands, Mawson Base (Antarctica) and Macquarie Island, Australia, including two noble gas analyser facilities located in Melbourne and Darwin. As part of this commitment, ARPANSA also continued to act as a certified laboratory for analysis of check samples, as part of the CTBT laboratory network.

Radioactive waste safety

In Australia, the greatest volume of radioactive waste consists of materials with a low level of radioactivity or with a shorter half-life. These wastes are potentially able to be disposed of in a 'near-surface' disposal facility. Australia's national inventory of radioactive waste is recorded and published by ARPANSA on the IAEA website for the Net Enabled Waste Management Database (NEWMDB)¹⁵, as part of our commitment to the *Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management*.

ARPANSA radiation emergency preparedness

Radioactive material poses potential health risks if released into the environment through accidental or malicious acts. Measures need to be in place to control radioactive materials both within Australia and crossing Australia's borders. Protection of the Australian public and environment requires effective radiation emergency planning.

The Accident Reporting and Guidance Operating System (ARGOS) is ARPANSA's primary atmospheric dispersion modelling and decision support software tool and has been applied to a range of radiological and nuclear release situations, including emergencies and planning. ARGOS can provide an overview of the situation, create a prognosis of how the situation evolves, and calculate the consequences of the situation. ARPANSA continues to strengthen this tool by participating in the annual ARGOS consortium and user group meetings. Participation in the ARGOS Consortium and User Group meetings and through joint international collaborations has established ARPANSA as a world leader in the application of ARGOS as a decision support tool.

The ARPANSA Incident Management Plan

ARPANSA has continued to maintain specialised radiation emergency capabilities in line with the ARPANSA Incident Management Plan, including the Operations Centre and provision of a 24 hour a day point of contact. Work has progressed towards the finalisation of additional processes and procedures to support the full implementation of the Incident Management Plan across the Agency in preparation for testing and exercising in 2014–15. ARPANSA participated in two IAEA international Convex-2a exercises. The aim of these exercises was to test National Competent Authorities' ability to respond to hypothetical radiological emergency scenarios. Participation in the exercises enabled testing of the responsiveness of ARPANSA's Operations Centre.

During this financial year there were no security incidents requiring reporting.

^{15.} The NEWMDB contains information on national radioactive waste management programs, radioactive waste inventories, radioactive waste disposal, relevant laws and regulations, waste management policies, and plans and activities The NEWMDB contains information on national radioactive waste management programs, radioactive waste inventories, radioactive waste disposal, relevant laws and regulations, waste management policies, and plans and activities.

ARPANSA radiation emergency response capability

ARPANSA maintained specialised radiation emergency capabilities in line with Australian emergency planning arrangements and continued its training cycle by providing emergency response training to its staff, including in the certification in the use of breathing apparatus.

ARPANSA emergency response personnel took part in joint training exercises with other government agencies on advanced radiation and nuclear detection techniques. In September 2013, ARPANSA personnel also attended, as experts, an IAEA Response and Assistance Network capacity building exercise within the Fukushima Prefecture, Japan.

ARPANSA undertook a gamma spectroscopy capability exercise for Australasian radionuclide measurement laboratories. Six laboratories in Australia and New Zealand were sent a reference water sample for testing for six anthropogenic radionuclides. The technical report on this exercise was published in June 2014 and is available from www.arpansa.gov.au/pubs/technicalreports/tr169.pdf.

Performance against deliverables

Qualitative Deliverables for Program 1.1

Qualitative Deliverables	2013–14 Reference Point or Target				
Protect the public, workers and environment from radiation exposure					
Enhanced system for response to radiological and nuclear threats and events consistent with international guidance and best practice	The ARPANSA Incident Management Plan is implemented and tested				
RESULT	Partially met - Elements of Incident Management Plan covering the ARPANSA Operation Centre successfully tested as part of an IAEA Exercise program. A review of Business Continuity Planning resulted in the implementation of an alternate off-campus site to store a portion of the response kit.				

Quantitative Key Performance Indicators

Quantitative Indicator	2012–13 Revised Budget	2013–14 Budget Target	2014–15 Forward Year 1	2015–16 Forward Year 2	2016–17 Forward Year 3		
Protect the public, workers and environment from radiation exposure							
Number of security incidents involving high activity radioactive sources requiring immediate reporting	<2	<2	<2	<2	<2		
RESULT	0	0	N/A	N/A	N/A		
CASE STUDY Working with industry and regulators to protect radiation workers

A small but expert team in the Radiation Health Service Branch at ARPANSA operates and maintains the Australian National Radiation Dose Register (Dose Register) for the collection and long-term storage of radiation dose records for workers who are occupationally exposed in the Australian uranium mining and milling industry. This year the Dose Register team achieved a significant milestone - complete implementation of the Dose Register to the uranium mining industry. Achievement of this milestone, from its initiation in 1 July 2010, was only possible with the valuable contribution and strong support provided by operators, regulators and industry groups.

The Dose Register team has engaged with key stakeholders and worked through the technical issues to achieve this milestone. The Dose Register has been implemented to all four uranium mines that are licensed to operate in Australia: Olympic Dam, Beverley and Honeymoon in South Australia, and Ranger in the Northern Territory. Records for more than 31 700 individual workers in the uranium mining industry are currently registered in the Dose Register. This includes historical dose records dating back to commencement of uranium production for some operators (Beverley and Honeymoon).

ARPANSA performs periodic analysis of the Dose Register data in order to characterise the occupational exposure situation at the national level. The average and maximum annual effective doses to Australian uranium workers has exhibited an overall downward trend over the past 10 years. Doses to uranium mine workers have remained consistently low, with the average dose being kept at less than a tenth of the annual dose limit, as shown below.



Average and maximum effective dose trends for all Australian uranium mine workers (2004-2013)

The Dose Register works to promote uniformity and achieve a best practice approach for recording and maintaining occupational dose records that can be requested by workers. ARPANSA is currently seeking to expand the Dose Register beyond uranium mining to include occupationally exposed workers in other industries. This will initially include workers in the mineral sands mining and processing industry, and applicable Commonwealth licence holders. In February 2014, ARPANSA published Technical Report No. 165 which presents the findings of a review assessing the current status of dose record management practices in the mineral sands mining and processing industry. This report considers the legal and practical requirements for the proposed expansion of the Dose Register to cover occupationally exposed workers in the mineral sands industry.

3.2 Promote the effective use of ionising radiation in medicine

ARPANSA continues to promote the safe and effective use of ionising radiation in diagnostic imaging by conducting dose surveys which result in the establishment of Diagnostic Reference Levels (DRLs) for CT scans and other diagnostic imaging procedures. ARPANSA also maintains the national standard for absorbed dose, performs calibrations, and audits linear accelerators used in radiation therapy; activities that collectively contribute to improved patient safety.

Major achievements

- Analysis of the first draft nuclear medicine DRL survey data.
- ARPANSA's research contribution to the Australian Synchrotron's research project into the potential for microbeams for cancer treatment.
- ARPANSA's research on the primary standard for absorbed dose.
- Successful pilot of a national dosimetry service for Australia: The Australian Clinical Dosimetry Service (ACDS).

Challenges

- Improving guidance to medical practitioners on how to balance diagnostic image quality and radiation dose to optimise patient outcomes.
- Securing the operation of the Australian Clinical Dosimetry Service.

Radiotherapy calibrations

ARPANSA provides a calibration service for instruments used to measure radiation in various commercial, medical and public sector applications. The service is a quality assurance tool which ensures the radiation dose, and dose placement, are accurately controlled to treat diseased tissue and to minimise damage to surrounding and adjacent healthy tissue. As a part of ARPANSA's regular calibration services for radiotherapy providers and industry users of radiation, 23 therapy dosimeters, 36 radiation survey meters, four neutron monitors and nine personal dosimeters were calibrated. Air kerma rate measurements were made on-site for two clients.

The primary standard for absorbed dose

The Australian primary standard for absorbed dose¹⁶ is a graphite calorimeter and ARPANSA is authorised to maintain this standard by the National Measurement Institute. Australia. under the National Measurement Act 1960. The primary standard of absorbed dose to water is of fundamental importance in radiological protection for calculating radiation dose and can be used to specify the amount of radiation to be used in radiotherapy. Absorbed dose is closely related to the biological effects of radiation and has the advantage that it can be measured more directly than the quantity of air kerma.¹⁷ The significance of ARPANSA's work in maintaining this standard is that it is used to assist medical practices safely calibrate radiotherapy procedures to ensure that patients are given the most appropriate doses to treat their illness. The primary standard is disseminated by providing vital calibrations of dosimeters used in cancer centres across Australia.

For many years the primary standard for absorbed dose has only been realised on a cobalt-60 source (Co-60). ARPANSA installed a linear accelerator in 2009 and a new Co-60 source in 2010. More recently, the primary standard has been adapted to work in linear accelerator beams, and the validation and comparisons based on this standard were published this financial year.¹⁸

This study is the culmination of three years of work establishing the Australian primary standard of absorbed dose on a medical linear accelerator. It reports the results of a comparison between ARPANSA and the international primary standards laboratory (the Bureau International des Poids et Mesures, BIPM) in France. International consistency of dose measurements is critically important in

^{16.} Absorbed dose is the energy absorbed per unit of mass by ionising radiation.

^{17.} Air kerma in air is the sum of kinetic energy of all charged (ionised) particles liberated per unit of mass.

Picard, S, Burns, D, Roger, P, Harty, P, Ramanathan, G, Lye, J, Wright, T, Butler, D, Cole, A, Oliver, C, and Webb, D, 'Key comparison BIPM.RI(I)-K6 of the standards for absorbed dose to water of the ARPANSA, Australia and the BIPM in accelerator photon beams', *Metrologia* 51 Tech. Suppl. 06006 (2014).

radiotherapy treatments where dose prescriptions are frequently based on clinical trials and dose measurements made overseas.

As a result of this work, a new calibration services for megavoltage photons was established and the first calibrations were performed as field trials for radiotherapy providers early in 2014. This service, and a similar new service for electron beams, allows radiotherapy providers to have their equipment calibrated directly in linear accelerator beams and will result in more reliable and simpler clinical dose measurements.

This financial year ARPANSA also published a technical report¹⁹ describing the theoretical basis, construction and operation of the graphite calorimeter used to realise the Australian primary standard of absorbed dose. The report describes the operation of the calorimeter with these beams. The calorimetry measurements have been validated through international comparisons with BIPM, National Physical Laboratory (United Kingdom), National Metrology Institute of Japan and National Research Council (Canada). Comparisons such as these demonstrate that the radiation dose delivered during radiotherapy treatment is the same in Australia as in other countries.

Synchrotron dosimetry

ARPANSA made a series of measurements at the Australian Synchrotron in 2013 and 2014 where they used a graphite calorimeter to assist the synchrotron's Imaging and Medical Beam Line group to measure the high dose rate from their intense x-ray beam. The work was published in the journal *Medical Physics* in April 2014 ('*Absolute x-ray dosimetry on a synchrotron medical beam line with a graphite calorimeter*') and the innovative nature of this work was recognised by the journal authorising the entire contents to be made available on PubMed Central. The work is a significant breakthrough, since no previous dose rate measurements using a graphite calorimeter on similar beams have been reported in the scientific literature.

The Australian Synchrotron is conducting a research project into the potential of microbeams for cancer treatment. Before they move to treating human patients, there are three key criteria to satisfy: the first is determining how much dose is being delivered to the patient; the second concerns patient positioning; and the third is to understand and predict the biological response to doses of hundreds of Gray (Gy) in very small volumes of tissue. ARPANSA's work has provided the central piece of the dose puzzle and brings clinical use of the Australian Synchrotron closer to reality.

The Australian Clinical Dosimetry Service

The Australian Clinical Dosimetry Service (ACDS) commenced auditing radiotherapy centres in 2011. The ACDS audits the accuracy of radiation dose delivery from linacs in treatment centres to assure correct delivery of radiation dose to patients. The



(Left) The linac at ARPANSA with which new calibrations services have been developed. (Right) Staff from the Medical Radiation Services staff setting up the primary standard graphite calorimeter on the linac.

^{19.} Ramanathan, G, Harty, P, Wright, T, Lye, J, Butler, D, Webb, D and Huntley, R. The Australian Primary Standard for absorbed dose to water (graphite calorimeter) (2014) 2013, *Technical Report Series* No. 166, June 2014.

audits are conducted at a range of levels including: basic output audits of operational linacs (Level I); pre-operational audits of new linacs (Level Ib); audits of the whole radiation field using a twodimensional detector array (Level II); and audits involving the pseudo-treatment of a simulated human torso made from tissue-equivalent plastic which allows end-to-end audit of the treatment planning and delivery process (Level III).

The ACDS auditing requirements are described in a Memorandum of Understanding (MoU) with the Department of Health. All of the requirements of the MoU were met by the time the MoU concluded in December 2013. The pilot phase was reviewed for the Department of Health by KPMG, and the resulting report was accepted by the Department of Health in January 2014. The Memorandum of Understanding was extended to continue operation through to June 2014, and the ACDS is expected to meet all of the objectives under the extension by August 2014. A decision on future funding by the Department of Health is expected early in the 2014–15 financial year.

During this financial year, the ACDS performed 26 Level I, 12 Level Ib, 15 Level II and 13 Level III audits which exceeded the 2013–14 target of 90% by five percent.

Diagnostic imaging and nuclear medicine

Most of the 15 000 000 medical procedures involving ionising radiation that Australians undergo each year are diagnostic imaging procedures. Each of these procedures should provide diagnostic images obtained with equipment and protocols which have been optimised for the radiation protection of the patient.

The multi-detector computed tomography (MDCT or CT) Diagnostic Reference Level (DRL) Service evaluated data for the 2013 surveys and there were no significant changes in collective patient doses noted. The introduction of iterative reconstruction software for MDCT has had a beneficial impact in lowering doses to patients. During this reporting period, the first draft survey for Image Guided Interventional Procedures was completed and analysed. BreastScreen Victoria provided 65 000 de-identified mammography patient datasets for initial analysis in developing a mammography DRL survey. The first draft Nuclear Medicine DRL survey was given to seven specific facilities for testing to assist future implementation. Results have been reviewed and compared with some international data and presented at local scientific meetings.

The Australian DRL Service gathers data that will be used to establish and update National DRLs for common diagnostic imaging procedures. DRLs are a quality assurance tool and ARPANSA's work on

Quantitative Deliverables	2012–13 Revised Budget	2013–14 Budget Target	2014–15 Forward Year 1	2015–16 Forward Year 2	2016–17 Forward Year 3			
Promote the effective use of ionising radiation in medicine								
Cumulative proportion of centres audited by the ACDS for accuracy in dose measurement of radiotherapy*	80%	90%	N/A	N/A	N/A			
RESULT	80%	95%	N/A	N/A	N/A			

Performance against deliverables

* This program is operating on a trial basis and is funded until August 2014 when it will be reviewed and its future determined.

the Australian National DRL Service is designed to provide individual medical facilities with a means of comparing their doses with National DRLs of patient doses received, in the first instance, from CT scans. The DRL service is expected to later encompass other medical radiation imaging modalities such as interventional/fluoroscopic, mammography and nuclear medicine and general examinations.

The CT survey is ongoing with 834 compliant surveys submitted in the 2013–14 period. In addition, approximately 25% of CT facilities have been registered for survey participation.

Existing modelling software, previously developed in-house, has been reviewed and adapted for contemporary computer platforms to calculate organ doses from various diagnostic imaging modalities.

ARPANSA has signed a Memorandum of Understanding with the Department of Health in partnership with the Australian Commission on Safety and Quality in Health Care to produce a Radiation Protection of Patients module for medical imaging referrers. Stakeholder engagement has commenced with preliminary work being undertaken on the design of the module.

What are DRLs?

DRLs are a quality assurance tool designed to provide individual medical facilities with a means to benchmark their practice with national DRLs of patient doses received. ARPANSA's work on the National Diagnostic Reference Level Database (NDRLD) allows radiology practices to log patient doses and receive Practice Reference Level reports with which they can compare their practice dosimetry against those of their peers. While a nationally determined DRL is not a dose limit, in cases where the practices are delivering higher doses than Australian DRLs, it is expected that the practice will investigate and, where appropriate, reduce doses while maintaining the diagnostic outcome, thus optimising radiation protection of the patient.

Performance against key performance indicators

Qualitative Indicator	2013–14 Reference Point or Target
Promote the effective use of ionising radia	tion in medicine
Establish DRLs for Interventional Cardiology and Radiology as tools for quality improvement in diagnostic radiology	Improved diagnostic practice using lower dose levels
RESULT	Draft survey developed - the DRL project has successfully raised the profile of radiation exposure of the patient within the radiological community. ARPANSA is seen as an important resource in this area. Ongoing analysis of CT DRL data indicates that the introduction of improved scanner software has led to patient dose reduction.

CASE STUDY Developing a Draft Diagnostic Reference Level Survey for Image Guided Interventional Procedures

During this financial year, ARPANSA conducted an initial survey of selected medical facilities (nine practices and fourteen rooms) that perform coronary angiographic procedures. Participants were asked to complete and comment a draft NDRL survey form for interventional angiography procedures. Testing was only conducted on patients with clinically diagnosed 'normal' coronary arteries. Most practices delivered the requested thirty patients undergoing a standard coronary angiogram showing an unremarkable (or healthy) outcome.

Data was collected for a total of 305 patient cases which is a well-sized data set for this type of preliminary analysis. The survey results indicated that Australian dosimetry for diagnostic coronary artery angiography is similar with current European practice values. Any variation from a larger non-selected survey should be investigated as required by section 3.1.8 of ARPANSA's Radiation Protection Series 14 - Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (2008).



CORONARY ANGIOGRAPHY

The above diagram shows the passage of a catheter into the aortic root or other major vessels for the purpose of angiography of the native coronary arteries. Angiograms can be conducted through entering the femoral artery or radial artery.

The outcomes of this survey showed that the draft survey structure is appropriate for the data types to be collected. Potential exists for the survey to be expanded further to cover other interventional angiographic procedures for the development of interventional fluoroscopy DRLs.

Developing DRLs

ARPANSA undertakes national DRL surveys on behalf of the Commonwealth. Notwithstanding this important role, ARPANSA acknowledges that DRLs should be owned by the respective professions and can only be constructed with appropriate consultation and influence from the relevant stakeholders.

To obtain a clearer assessment of the potential radiation risk from diagnostic imaging it is imperative that a review of the doses delivered from common radiology procedures is undertaken both at the facility and consolidated into a regional or national analysis. DRLs can then be constructed and used as a comparative indicator of radiation efficiency at the facility, regional, national and international levels. Once facility DRLs are established they can be regularly reviewed against national DRLs and used as a baseline for the implementation of an optimisation program to maximise the efficient use of radiation while maintaining diagnostic image quality.

The CT survey will be based on common dosimetry metrics. This will be recorded for twenty patients, for seven common protocols, for as many facilities as wish to participate. It is estimated that there are approximately 1000 CT platforms registered/licensed in Australia. ARPANSA has developed a web-based survey form where practices can log their dose data and receive a calculated practice DRL to comply with RPS 14. ARPANSA will then log the practice data into the national DRL dose database. ARPANSA will also develop DRLs for interventional fluoroscopy, nuclear medicine and mammography.

'Normal' coronaries are defined as those with no or physiologically insignificant diameter stenosis (<50% coronary diameter narrowing) by visual inspection in patients studied specifically to assess coronary anatomy.

3.3 Ensure effective regulation and enforcement activities

During this financial year, ARPANSA's licensing and compliance workload was dominated by the assessment of major licence applications for new ANSTO facilities including the interim waste store facility, a new and expanded molybdenum-99 manufacturing facility and the waste treatment facility using ANSTO's Synroc technology, known as the 'SyMo' facility.

Major achievements

- Evaluating lengthy and complex siting and construction licence assessments for three major controlled facilities at ANSTO.
- Further work on ARPANSA's holistic safety practices.
- Conducting 42 inspections and site visits exceeding the target of 35.
- Publication of top-tier radiation protection document - Radiation Protection Series F-1 Fundamentals for Protection against Ionising Radiation.
- Obtaining 'in-principle' agreement from ARPANSA's Council and Committees, to use IAEA Safety Standards publications as the basis for International Best Practice in Radiation Protection for the purposes of developing Nationally Uniform guidance for the Australian situation.

Challenges

- Communicating to licence holders the benefits of holistic safety practices.
- Achieving national uniformity in radiation protection and nuclear safety.

Major licensing activities

During the financial year, ARPANSA issued the following new or amended facility licences as follows:

 Nuclear installation licence (F0270) to prepare a site for the ANSTO Nuclear Medicine Molybdenum-99 Facility at Lucas Heights Science and Technology Centre issued to ANSTO on 4 October 2013.

- Prescribed radiation facility licence (F0280) to operate the 1MV Compact Accelerator within the Centre for Accelerator Science at Lucas Heights Science and Technology Centre issued to ANSTO on 9 October 2013.
- Amended prescribed radiation facility licence issued to the Director of National Parks on 27 November 2013 establishing dose constraints for the South Alligator Disposal Facility.
- Nuclear installation licences to prepare a site (F0277) and to construct (F0279) the Interim Waste Store at Lucas Heights Science and Technology centre issued to ANSTO on 29 November 2013.
- Amended prescribed facility licence (F0271) issued to Synchrotron Light Source Australia Pty Ltd with revised licence conditions on 20 December 2013.
- Amended prescribed radiation facility licence (F0280) issued to ANSTO to undertake routine operations of the 1 MV Compact Accelerator within the Centre for Accelerator Science at Lucas Heights Science and Technology Centre on 28 April 2014.
- Prescribed radiation facility licence (F0266) to prepare a site for and construct the ANSTO SyMo facility at Lucas Heights Science and Technology Centre issued to ANSTO on 13 May 2014.
- Prescribed radiation facility licence (F0287) to construct the 6 MV accelerator known as SIRIUS at Lucas Heights Science and Technology Centre was issued to ANSTO on 29 May 2014.
- Nuclear installation licence (F0285) to construct the ANSTO Nuclear Medicine Molybdenum-99 Facility at Lucas Heights Science and Technology Centre was issued to ANSTO on 27 June 2014.

Other significant activities in relation to regulatory oversight

- On 16 November 2013, ARPANSA granted approval to ANSTO under Regulation 51 to make a change in shift roster at ANSTO Health.
- On 12 December 2013, ARPANSA and ANSTO met to progress the OPAL Research Reactor Periodic Safety Review which is expected to be completed by the end of the first quarter of the 2014–15 financial year.

- On 13 January 2014, ARPANSA granted approval to ANSTO under Regulation 51 requests for approval to:
 - » change in inventory limits at ANSTO Health facilities
 - » the hot commissioning and operation of Lu-177 hot cells
- On 11 April 2014, ARPANSA granted ANSTO permission under Regulation 51 to undertake an additional molybdenum-99 production run per week at Building 54 up to 8 times per year.
- During the financial year, ARPANSA also issued amended source licences to hot commission the ANSTO Bragg Institute neutron beam instruments JOEY, KOOKABURRA, DINGO and BILBY. In addition, amended source licences have been issued to undertake routine operations at KOOKABURRA and JOEY.
- ARPANSA undertook the first of a series of planned thematic inspections of its licence holders. The first thematic inspection involved the delivery of radiation protection services across the ANSTO organisation, with a view to identifying holistic safety characteristics and attitudes across ARPANSA licence holders.

Inspections

During the course of the year ARPANSA undertook a planned inspection program of sources, prescribed radiation facilities and nuclear installations operated by licence holders in order to monitor compliance with the ARPANS Act and the ARPANS Regulations.

A summary report of these inspections can be found on the ARPANSA website at: www.arpansa.gov.au/Regulation/Inspections

The inspection program was planned on the basis of:

- licence holder risk ranking
- licence holder compliance history
- licence holder incident and accident history, and
- date of last inspection.

Breaches

Breaches with safety implications

Four breaches with potential safety implications were identified during the financial year as follows:

- PETNET Australia breach of Regulation 49 by operating the PETNET cyclotron without a functioning safety interlock system.
- PETNET Australia breach of Regulation 51 by implementing a Safe Operating Procedure with significant implications for safety without the appropriate approval.
- ANSTO OPAL Reactor breach of Regulation 49 by failing to follow the approved change control process for use of an unauthorised tool during fuel assembly clamping.
- ANSTO Life Sciences breach of Regulation 49 by not following its quality control procedures and change control process.

In relation to the two breaches by PETNET Australia, the licence holder (PETNET) accepted the conclusions of ARPANSA's inspection report and the licence holder returned to compliance with no formal enforcement action had to be pursued by ARPANSA.

In relation to ANSTO OPAL Reactor breach of Regulation 49, ANSTO returned to compliance by making appropriate redesign changes and no formal enforcement action had to be pursued by ARPANSA.

In relation to the ANSTO Life Sciences breach of Regulation 49, ANSTO implemented appropriate corrective actions to return to compliance and no formal enforcement action was pursued by ARPANSA.

Breaches with no or minor safety implications

During the financial year, breaches with minor or no safety implications were recorded across the following areas:

 Disposal of controlled apparatus without prior approval from ARPANSA. The equipment was returned to an x-ray equipment supplier who is appropriately licensed to deal with the devices.

- Failure to follow own safety procedures.
- Possession of controlled apparatus without an appropriate licence in place. An application was subsequently submitted and the appropriate licence granted.
- Failure to undertake radiation monitoring surveys around controlled apparatus at the recommended frequency.
- Possession of a controlled apparatus without the appropriate licence in place. However the controlled equipment was not used by the licence holder until an appropriate licence was obtained.
- Exceeding a building activity limit with no safety implications.

In all of the above cases, the breach was assessed to have minor safety implications, corrective actions were implemented by the licence holder and no enforcement action was considered necessary.

During this financial year, 42 inspections and site visits were achieved against a target of 35.

ARPANSA is committed to carrying out its regulatory functions in a responsive and timely manner. In relation to timeliness of assessing licence applications we advise that:

- On average, Regulation 51 requests for approval were processed in 18 days against a target of 30 days
- On average source licence applications were processed in 43 days against a target of 30 days
- On average facility licence applications for large facilities were processed in 96 days against a target of 60 days.

The target for source and facility licence applications was not met due to the complexity of new applications for nuclear installations and prescribed radiation facilities received from ANSTO. As a result, ARPANSA is working with large licence holders to improve the forecasting and management of upcoming licensing requirements. The Key Performance Indicator for inspections was reduced from last financial year in acknowledgement of the resource burden of a forecast number of applications for ARPANSA to manage.

Performance against key performance indicators

Quantitative Indicators suggested by Australian National Audit Office (ANAO)	2012–13 Budget Target	2013–14 Achieved
Timeliness of Licence Application Assessments		
Average time to assess facility licence applications	<60 days	96 days
Average time to assess source licence applications	<30 days	43 days
Average time to assess Regulation 51 requests	<30 days	18 days

Performance against key performance indicators

Qualitative Deliverables for Program 1.1

Qualitative Deliverable	2012–13 Revised Budget	2013–14 Budget Target	2014–15 Forward Year 1	2015–16 Forward Year 2	2016–17 Forward Year 3			
Ensure effective regulation and enforcement activities								
Number of inspections and site visits of facilities holding a Commonwealth60353535licence								
MET	59	42	N/A	N/A	N/A			

CASE STUDY

Licensing of Nuclear Installations and Radiation Facilities

During this financial year, ARPANSA licensed ANSTO to operate three significant nuclear installations and radiation facilities: ANSTO Nuclear Medicine Molybdenum-99 (ANM Mo-99) Facility, Interim Waste Store (IWS) and ANSTO's SyMo Facility.

ANM Mo-99 Facility

In October 2013, ARPANSA issued a licence (F0270) to ANSTO to prepare a site for the ANM Mo-99 Facility and in June 2014, a licence (F0285) for construction of this facility. The proposed facility will be used to produce molybdenum-99 (Mo-99), the precursor of technetium 99m (Tc-99m) which is the radionuclide used in about 80% of all diagnostic nuclear medicine procedures for diagnosing various diseases such as heart and bone diseases. Apart from meeting the demand of the domestic Australian market for Tc-99m, this facility will also have the capacity to export which will help secure the future global supply. The proposed facility will have capability of producing Mo-99 at about four times of the current level. Molybdenum-99 will be produced by neutron irradiation of low enriched uranium (LEU) at OPAL reactor. The use of LEU will enhance the international efforts for nuclear non-proliferation.

In granting licences to ANSTO, ARPANSA's assessment has taken into account relevant legislative requirements, design and technological aspects including the increased level of production, current use of similar technology in other countries, operating experience in a similar process and use of improved technology in controlling airborne emissions, contents of public submissions, operational waste contingencies, decommissioning and management of decommissioned wastes at the end of facility life and the contents of public submissions. The ANM Mo-99 Facility is currently under construction.

Intermediate Waste Store

In November 2013, ARPANSA issued a licence (F0277) to ANSTO to prepare a site for the Intermediate Waste Store, and a licence (F0279) for construction of this facility. The IWS Facility will store radioactive waste resulting from reprocessing of fuel that was used in the now permanently shut down High Flux Australian Reactor (HIFAR). This includes residual fission products after separation of fissile material from the fuel and secondary waste resulting from the reprocessing operations; the secondary waste, referred to as 'technological waste', includes mechanical components such as piping, valves, pumps and protective clothing such as gloves that have been contaminated during the reprocessing.

This waste will be immobilised in a vitreous form and transported/stored in an engineered shielded dual storage and transport container known as the TN81. In addition, technological waste will be returned from France cemented within steel drums. The IWS may also be required to store radioactive waste returning from the United Kingdom, which is due to return around 2020, if the National Radioactive Waste Management Facility is not available at that time.

In granting a licence to site and construct this facility, ARPANSA's assessment has considered relevant legislative requirements, design features, international best practice, contingencies and contents of public submissions. The IWS Facility is currently under construction.

SyMo Facility

In May 2014, ARPANSA issued the licence (F0266) to ANSTO to site and construct a purpose built intermediate level liquid waste conditioning facility, namely the SyMo Facility. The proposed SyMo facility will apply Synroc (synthetic rock) technology, developed by ANSTO, for immobilisation of intermediate liquid waste generated from Mo-99 production process into highly immobilised glass ceramic and/or ceramic form for the safe disposal of radioactive waste. The facility is designed to manage current and future alkaline intermediate level liquid waste, from ANM Mo-99 Facility and acidic legacy waste.

Regulation 40 requires the CEO to invite public submission if the facility is a nuclear installation. Though the proposed facility is a prescribed radiation facility, public submissions on this facility were invited to consider its interface with the ANM Mo-99 Facility.

In granting a licence to site and construct the proposed SyMo Facility, ARPANSA's assessment has taken into account relevant legislative requirements, conservative proven design and engineering practice and contents of public submissions. In addition, ARPANSA also requires ANSTO to undertake a full scale trial using non-radioactive material as part of testing and commissioning.

Figure 6: Licensing phases



Transport of radioactive material

During this financial year ARPANSA issued one certificate of design, one certificate of approval and validated five package designs for the transport of radioactive material.

ARPANSA approved the package design of model 1860A and issued the following certificate of design to Analogue and Digital Measurements Pty Limited, Australia:

AUS/2013-47/B(U)-96

ARPANSA validated five overseas Package Designs and issued the following certificates of validation to ANSTO:

- AUS/2013-48/B(U)F-96
- AUS/2013-49/B(U)-96
- AUS/2014-50/B(U)F-96
- AUS/2014-51/B(U)-96
- AUS/2014-52/B(U)-96

ARPANSA also issued the following certificate of approval of zirconium-89 radionuclide value to Sir Charles Gairdner Hospital:

• AUS/2014-53/Zr-89/RV-96.

Incidents

The following three safety incidents among Commonwealth licence holders were reported for this financial year:

ANSTO Bragg Institute

On 27 August 2013 work was being undertaken on the installation of a new neutron beam experiment fitted to a previously unused beam line HB-2. An area radiation monitor alarmed in the Reactor Beam Hall and a single worker in the area at the time evacuated. The alarm was also registered by the Reactor Control and Monitoring System and operators followed standard management practices to investigate the cause. The investigation identified that adjacent primary shutter (HB-1), had accidentally opened. The shutters are used to block the passage of neutrons from the reactor core to neutron beam apparatus when not needed. The shutter concerned was an unused beam and was fitted with additional concrete shielding and the low level of radiation measured was the result of neutron scatter and not the direct beam. The maximum dose to any worker was assessed as negligible (1 microsievert). An investigation into the incident discovered that it was caused by the shutter

control circuits incorrectly interpreting electrical interference, from the closing of the HB-2 shutter, as a command to open the unused HB-1 shutter. The design of HB-1 and HB-2 control circuitry differs from other shutter controls and a number of design weaknesses were identified and modifications were introduced to prevent this from reoccurring. In the interim period before these modifications, these particular shutters were electrically isolated to prevent them from opening. ARPANSA was satisfied with the ANSTO safety response to this incident and with the adequacy of modifications made.

ANSTO Life Sciences – Camperdown Sydney

On 30 October 2013, a worker at ANSTO Life Sciences' Camperdown Facility was contaminated with a liquid radioactive source, fluorine-18 while handling a syringe containing the quality control sample, contaminating the hands of the worker, some clothing and personal items. ANSTO's analysis of the dose implications from the incident estimated that the worker received a dose of 355 millisieverts to the hands which is 70 percent of the annual statutory dose limit (500 mSv to the hands and feet). ANSTO assessed the incident as a near miss of a 7.1 sievert dose. An internal ANSTO investigation into the cause of the incident was undertaken. ARPANSA also undertook its own review and inspection of the incident. A number of causes identified included weaknesses in risk assessment, failure to work within approved operating limits and poor safety culture. ARPANSA made several recommendations to ANSTO to improve work practices and ARPANSA is monitoring implementation. ANSTO was also found to have breached Section 30(2) by failing to comply with Regulation 49 by not following its own plans and arrangements for managing safety.

ANSTO – OPAL – tellurium rig dropped into reflector vessel

On 3 June 2013, during the transfer of a tellurium rig from the OPAL irradiation facility in the reflector vessel, the rig detached from the lifting tool and fell from approximately one metre under water onto the reflector vessel. Operators had verified that the rig nozzle was appropriately latched to the lifting tool in accordance with safety requirements prior to removing the rig from the facility. The rig was raised from the reflector vessel facility and the operators commenced transferring the rig to the Service Pool. Immediately following the incident, the Utilisation Manager and Reactor Manager were notified, the risk was assessed and the recovery plan undertaken. After a period of two hours, the rig was recovered and transferred to the Service Pool.

Following the incident, both the rig and reflector vessel were inspected for damage using the underwater camera but no deformation was observed. The reflector vessel is designed to withstand impact of a 100 kilogram silicon ingot which is significantly greater than the impact of the 5 kilogram tellurium rig. The rig was visually inspected in the hot cell, found to be fully operational and returned to service. The tellurium targets were unloaded from the rig undamaged.

No abnormal radiation doses were received by the personnel involved and no release of radioactive material into the pool water or air was detected at any time during the incident. ARPANSA was advised of this incident during their 5 June 2013 inspection. The event is still under ANSTO's investigation. The event causes have not been confirmed.

None of the incidents listed above qualified for the IAEA's International Nuclear and Radiological

Qualitative Deliverable	2012–13 Revised Budget	2013–14 Budget Target	2014–15 Forward Year 1	2015–16 Forward Year 2	2016–17 Forward Year 3			
Ensure effective regulation and enforcement activities								
Number of safety incidents involving Commonwealth users of radiation<10<10<10<10<10								
MET	6	3	N/A	N/A	N/A			

Performance against key performance indicators

Event event rating Scale as the safety significance of all of these incidents was well below their lowest designated level of anomaly.

ANAO performance audit

In May 2014, the Australian National Audit Office (ANAO) released their report into Regulation of Commonwealth Radiation and Nuclear Activities that commenced in April 2013. The findings of that report are described in detail in the *External Scrutiny and Advice* on Page 62.

National uniformity

ARPANSA promotes national uniformity and international best practice in radiation and nuclear safety through the *National Directory for Radiation Protection* (the National Directory) which is jointly developed by ARPANSA and state and territory radiation regulators through the Radiation Health Committee.

After endorsement by the Radiation Health Committee, the Radiation Health and Safety Advisory Council (the Council) and consideration by the Office of Best Practice Regulation (OBPR), in February 2014 ARPANSA published *Radiation Protection Series F-1 Fundamentals for Protection Against Ionising Radiation*. This publication is the top tier document in the Australian national framework to manage risks from ionising radiation.

The proposed sixth amendment of the National Directory to Schedules 5, 6, 9 and 13 (covering a number of topics including: expansion of the licensing criteria for chiropractors; clarification of the incident reporting requirements and editorial matters) was considered out of session by the Standing Committee on Health (SCOH) following endorsement by the Australian Health Ministers' Advisory Council. The SCOH endorsed the sixth amendment, and the amended National Directory was published in February this year. However, work continues on a more significant amendment to Schedule 13 National Incident reporting.

Work continued on a proposed amendment of the National Directory relating to Personal Radiation Monitoring Service provider certification. The Radiation Health Committee considered that, as an interim measure, Australian jurisdictions could apply the guidance of chapter 7 of the International Atomic Energy Agency's (IAEA) draft safety guide DS453 Occupational Radiation Exposure.

The Radiation Health Committee considered a draft statement Regulatory Expectations for Users of Radiation *Sources Seeking to Obtain Authorisations in More than One State or Territory*. Once finalised, this statement should provide a mechanism for reducing unnecessary regulatory and additional costs for business within existing agreed national policy of mutual recognition.

Work continued on a proposed amendment of the National Directory on user disposal of very lowlevel radioactive material intended to replace the National Health and Medical Research Council's *Code of practice for the disposal of radioactive waste by the user* (1985). Work continued on a proposed amendment of the National Directory for control of intense pulsed light (IPL) and lasers for cosmetic use, and the Radiation Health Committee agreed to proceed to a Consultation Regulatory Impact Statement (in accordance with the requirements of the OPBR).

The Radiation Health Committee agreed that the Radiation Protection Series should, over time, reflect the IAEA's framework and hierarchy of radiation protection publications. The Radiation Health Committee also considered adopting, where possible and with regard to the Australian context, IAEA and other international best practice publications as a means of revising and updating the Radiation Protection Series. It was recognised that, given the limited resources available within all jurisdictions, this approach would be an effective and appropriate means of providing nationally uniform Australian radiation protection requirements and guidance.

A formal review of the National Directory in 2007 found that while it has contributed to national uniformity, there is room for improvement. In June 2008 the Radiation Health and Safety Advisory Council concluded, among other things, that the National Directory model should be reviewed at an appropriate time to ensure that more efficient regulatory processes for improving national uniformity can be developed. ARPANSA, through the Radiation Health Committee, has commenced work on developing options to improve national uniformity in radiation protection policies and practices.

CASE STUDY

ARPANSA's Holistic Safety Program

ARPANSA has developed and promotes a holistic approach to radiation safety in its regulatory functions. Holistic safety refers to a best practice approach to safety management which considers the interaction and interdependence between three key aspects relevant to the handling of nuclear and radiological materials, namely: human, technological and organisational aspects to both create and maintain safe operations and reduce the relative risk.

Research into accident causation found that the promotion of holistic safety can empower licence holders to improve safety practices by providing both the operator and the regulator with a deeper understanding of the dynamic factors affecting nuclear and radiological safety. ARPANSA's holistic safety program supports a risk-informed approach to regulation in dealing with licence holders. A holistic safety program is not expected to result in an increased regulatory burden to licence holders who are currently operating consistently and in accordance with Holistic Safety principles. Where an assessment of issues from a Holistic Safety perspective raises new aspects that may impact on safety, these issues will be managed as part of the normal practice in current inspections.



This holistic approach (also called systemic safety) is increasingly being adopted by international organisations (such as the International Atomic Energy Agency) and is being favourably considered by many businesses, regulators and organisations around the world.

Holistic Safety principles have developed from the analysis and lessons learned from incidents, accidents, and real-life events. ARPANSA has taken these principles to form the basis of its Holistic Safety Guidelines (*www.arpansa.gov.au/Regulation/Holistic/HolisticSafetyGuidelines.cfm*).

Holistic safety is structured around seven key characteristics relevant when analysing the inter-relationships between individuals, technology and organisational factors in a nuclear or radiological setting. These characteristics are: human factors; non-technical skills; resilience; defence in depth; integrated safety management; safety culture; and, protective security and security culture.

ARPANSA's Holistic Safety Guide is an enabling document designed to encourage and assist licence holders to review their operations and is also used by ARPANSA's regulatory staff in assessments and inspections. The guide describes the attributes of each characteristic and is accompanied by a second publication with more specific questions which explore how an organisation performs against each characteristic. It is the overlap between the characteristics that helps to build an understanding of the interactions between individual, technological and organisational factors.

ARPANSA has begun to undertake holistic safety assessments of licence holders. The objective is to map our understanding of safety strengths and vulnerabilities of a licence holder. This information is used to engage with the licence holder on safety management, to make comparisons between organisations to promote cross organisational learning, and to make improvements to ARPANSA's risk informed inspection program. ARPANSA has also developed micro and macro tools in the form of questionnaires available on our website to assist licence holders to undertake their own holistic assessments. ARPANSA cooperates with the international community by sharing its experience and knowledge of our holistic approach to safety. This also helps to keep ARPANSA at the leading edge of developments on the subject.

3.4 Stakeholder engagement

ARPANSA's stakeholder engagement takes many forms. This section reviews a selection of the activities. Other activities include presentations at conferences and other meetings, as well as international engagement, both considered separately in this report.

Dose Register Workshop

On 13 October 2013, the annual Dose Register Workshop was held in Cairns and was attended by key stakeholders, including representatives from the uranium and mineral sands mining industries, state and territory radiation and mining regulators, and Commonwealth licence holders. Presentations were made by ARPANSA staff and industry representatives. Material covered included the operational status of the Dose Register, analysis of data, national uniformity and best practice, and proposed expansion of the Register to other industries. The purpose of the workshop was to provide a platform for feedback from industry and to facilitate a greater level of communication between ARPANSA and industry about the Dose Register work programs and plans for future development of the Register.

Electromagnetic Energy Reference Group

On 27 November 2013 and 14 May 2014, meetings of ARPANSA's Electromagnetic Energy Reference Group (EMERG) were held focusing upon ARPANSA's review of the science concerning radiofrequency (RF) radiation and health, and included considerations on future planning for updating the RF Standard. EMERG was established to provide stakeholder and community input into electromagnetic energy issues and the group includes representatives from consumer organisations, the telecommunications industry, the health sector, academic organisations, other government organisations and community groups (www.arpansa.gov.au/AboutUs/Committees/emerg.cfm).

Science and Wireless Symposium

On 27 November 2013, the newly formed Australian Centre for Electromagnetic Bioeffects Research hosted the public 'Science and Wireless' symposium at RMIT University where ARPANSA's CEO officially opened the Centre, delivering the opening address. The symposium provided an opportunity for scientists, regulators, industry specialists and members of the community to meet and exchange views on radiofrequency and health in a public forum. ARPANSA's Chief Radiation Health Scientist delivered a presentation at the symposium on public health aspects of new technologies (www.rmit.edu.au/scienceandwireless).

Environmental Health Professionals of Australia Symposium

On 17 September 2013, an ARPANSA scientific officer delivered a presentation on electromagnetic fields in the environment at the Environmental Health Professionals of Australia Symposium held in Cape Schanck.

Meeting with World Health Organization (WHO) UV Collaborating Centers on ultraviolet radiation

In November 2013, ARPANSA met in Melbourne with representatives from three of the world's six WHO UV Collaborating Centres, including Public Health England, the Cancer Council Victoria and SunSmart, to discuss the role of UV science and its communication. The Cancer Council and SunSmart raised a number of issues highlighting the necessity and value of collaboration, and the interdependence of the agencies. Cancer Council Victoria is carrying out a \$400 000 national survey on UV exposure and skin cancer this summer and data from the ARPANSA Ultraviolet Radiation network will be used to correlate sun exposure data.

The 38th Annual Conference of the Australasian Radiation Protection Society, Cairns, Australia 13-17 October 2013

In October 2013, ARPANSA delivered presentations at the Australasian Radiation Protection Society (ARPS) Conference held in Cairns, Queensland, covering: naturally occurring radioactive materials; the Australian National Radiation Dose Register; radioactive waste management; environmental assessments; and health impacts from the Fukushima Dai-ichi accident. ARPANSA's attendance at this forum provided an opportunity to network with other regulators responsible for uranium mining and milling and to publicise ARPANSA's work in protecting occupationally exposed workers.

Regulation of IPLs and lasers used for cosmetic purposes, Sydney, Australia 8-11 May

In May 2014, ARPANSA was invited by the Australian Society of Aesthetic Plastic Surgery and the Cosmetic Physicians Society of Australasia to give a presentation on lasers and intense pulsed light (IPL) sources at the 2014 Non-Surgical Symposium. The symposium brought together medical specialists that use lasers and IPLs for cosmetic purposes. ARPANSA presented statistical data of injuries and the process for the regulation of lasers and IPLs used in the cosmetic industry.

House of Representatives Standing Committee on Health Inquiry into Skin Cancer in Australia, Melbourne – 6 June 2014

ARPANSA lodged a submission to the House of Representatives Standing Committee on Health Inquiry into Skin Cancer in Australia. The Committee held a hearing in Melbourne to hear submissions from various organisations involved in skin cancer prevention and detection, including ARPANSA. ARPANSA presented evidence to the Committee that solar ultraviolet radiation levels in Australia are extremely high in comparison to other countries and that this was a significant reason for the high skin cancer rates in Australia, given population exposures are generally proportional to the levels of ambient solar ultraviolet radiation.

LABCON Conference

On 3 December 2013, ARPANSA scientific officers delivered presentations on electromagnetic radiation (EMR) and ultraviolet (UV) radiation awareness and protection at the annual Laboratory Technicians Association of Victoria Conference held in Melbourne.

Australian Clinical Dosimetry Service

The Australian Clinical Dosimetry Service (ACDS) pilot phase concludes in 2014. As a result of recommendations in a review of the pilot phase, ARPANSA ran a one-day workshop with ACDS stakeholders on 6 March 2014. The stakeholders included state and territory regulators and representatives from the jurisdiction departments of Health, the three radiotherapy professional colleges (Australian Institute of Radiography, the Royal Australian and New Zealand College of Radiologists, Australasian College of Physical Scientists and Engineers in Medicine) and patients. The workshop considered the justification for the ACDS to continue; the auditing model which should be recommended by ARPANSA; whether the audits should be mandatory; if audits are mandatory, how would this be regulated; and how would the ACDS be funded. The view of the stakeholders was overwhelmingly positive, all of them agreeing that participation in the ACDS audits was a tool for improving the quality of radiotherapy.

ARPANSA conducted a course on reference dosimetry (*External Beam Reference Dosimetry Course*, 10-11 October 2013, Lifehouse building, Camperdown, Sydney) in collaboration with the Royal Prince Alfred Hospital. The course was attended by 54 medical physicists and covered a range of topics including techniques and protocols for radiation measurement for all types of external beam radiotherapy. ARPANSA also made multiple presentations at the annual conferences of the Australasian College of Physical Scientists and Engineers in Medicine (ESPM 2013) and the Australian Radiation Protection Society (ARPS 2013).

Licence Holders' Forum – 30 October 2013

On 30 October, ARPANSA's annual Licence Holders' Forum was hosted by the Australian War Memorial in Canberra and attended by forty-four attendees, representing thirteen licence holders. The CEO of ARPANSA, Dr Carl-Magnus Larsson delivered the opening address. There were presentations on annual licence charges and cost recovery, introduction of the Licence Administration Database, update on Codes and Standards, and radiation incident reporting which included workshop activities. A guest speaker from ANSTO gave a presentation on safety culture.

Defence-ARPANSA Liaison Forum – 13 June 2014

A Defence-ARPANSA Liaison Forum (DALF) was held at Department of Defence, Canberra on 13 June 2014. The main topics of discussion involved progress on outstanding Defence source licence applications, Defence radioactive waste management strategy and Defence risk assessments of radiation sources. It was agreed that the frequency of DALF meetings would move from twice per year to an annual meeting. However, lower level operational meetings would occur more frequently via videoconferencing facilities, where possible.

CASE STUDY Engaging the Community

In October 2012, the Australian Nuclear Science and Technology Organisation (ANSTO) announced its intention to expand its Molybdenum-99 (Mo-99) production with the construction of a new Mo-99 facility at Lucas Heights. Molybdenum-99 is an important radioisotope used in nuclear medicine for the diagnosis of a wide variety of medical disorders and ANSTO is a major national and international supplier.

On 4 October 2013, the CEO of ARPANSA decided to issue a licence to ANSTO to prepare a site for the new Molybdenum-99 production facility.

In deciding to grant the licence, the ARPANS Regulations mandate that the CEO advertise ARPANSA's receipt of the licence application and that a licensing decision would follow a public consultation process.

ARPANSA advertised the application and invited submissions via ARPANSA's website, the Public Service Gazette and newspapers, both locally and nationally.

On 16 May 2013, the CEO hosted a community information session on the licence application and related applications for the Interim Waste Store, and the SyMo Facility at the Engadine Community Centre in Engadine, New South Wales. The session provided presentations from the regulator on the framework and process for assessing the licence application and from the proponent (ANSTO) describing the purpose, design and timeline for developing the new facility. After sessions on each application, members were invited to question presenters, the CEOs of ARPANSA and ANSTO, and comment on the applications.

As a result of the entire consultation process, submissions from members of the public identified five major issues that were considered and responded to in the CEO's Statement of Reasons, and a separate supporting document, both of which have been published on ARPANSA's website.

ANSTO-ARPANSA OPAL Quarterly Review Meetings

ARPANSA and ANSTO met in August 2013, November 2013, February 2014 and May 2014 to review the OPAL research reactor Quarterly Reports submitted by ANSTO. These OPAL Quarterly Review meetings are designed to discuss the OPAL reactor operations during the previous quarter, including operational history, reactor events, unplanned reactor trips, safety performance indicators and liquid and airborne discharges from OPAL.

3.5 International engagement

ARPANSA's international engagement enhances the safe and secure use of radiation in Australia by ensuring that our national activities are based on international best practice in radiation protection and nuclear safety and radioactive material security.

ARPANSA administers several internationally binding and non-binding instruments on behalf of the Australian Government. It represents Australia on virtually all key United Nations international committees and commissions dealing with the regulation of nuclear safety (excluding nuclear power) and radiation protection, and holds positions on international organisations recognised worldwide as setting the fundamentals of radiation.

ARPANSA pursues its international engagement objectives through a suite of interlocking and mutually reinforcing strategies, each of which contributes to Australia's safety, security and emergency preparedness.

The strategies and selected fora and activities within those strategies are summarised in Table 1.

Strategy	Key international forums and arrangements						
Participating in	International Commission on Radiological Protection (ICRP)						
scientific networks and activities internationally	 The International Commission on Radiological Protection is an independent, international organisation that advances the science of radiological protection for the public benefit, in particular by providing recommendations and guidance on all aspects of protection against ionising radiation. ICRP is comprised of a Main Commission, a Scientific Secretariat, five standi Committees (on Effects, Doses, Medicine, Application, and the Environment), and a series of T Groups and Working Parties. The CEO chairs the Committee on Environmental Protection and member of the Main Commission. 						
	United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)						
	• UNSCEAR was established by the General Assembly of the United Nations in 1955. Its mandate in the United Nations system is to assess and report levels and effects of exposure to ionising radiation. Governments and organisations throughout the world rely on the Committee's estimates as the scientific basis for evaluating radiation risk and for establishing protective measures.						
	 Australia chaired the 60th and 61st Sessions of the Committee (in 2013 and 2014). UNSCEAR's assessment of the level and effects of radiation exposure to humans and environment from the Fukushima Dai-ichi nuclear accident was published in early 2014. The Chair along with the Scientific Secretariat will visit the Fukushima Prefecture and provide the assessment including an explanation of the findings and recommendations to the government and people of the region. 						
	International Commission on Non-Ionizing Radiation Protection (ICNIRP)						
	• The International Commission on Non-Ionizing Radiation Protection is a body of independent scientific experts and has the principal aim of disseminating information and advice on the potential health hazards of exposure to non-ionising radiation. Much of the ICNIRP's work is published in the form of scientific reviews and reports and the proceedings of scientific meetings. The results of these reviews combined with risk assessments carried out in collaboration with the World Health Organization, WHO, result in the publication by ICNIRP of Exposure Guidelines. The Exposure Guidelines are a key consideration in ARPANSA's development of standards and advice.						
Participating	Nuclear Energy Regulatory Agency of Indonesia (BAPETEN)						
in regional and bilateral capability building activities	 The Nuclear Energy Regulatory Agency of Indonesia is responsible for regulating the safety, security and safeguarding of nuclear facilities and radioactive material in Indonesia. It also has responsibilities for national emergency preparedness and response. ARPANSA signed an Arrangement for Cooperation with BAPETEN in 2011. 						
	United Kingdom Public Health England (PHE)						
	 Public Health England is an executive agency of the Department of Health in the United Kingdom that began operating on 1 April 2013. ARPANSA has a Cooperation Arrangement with PHE to exchange information with respect to areas of radiation protection and nuclear safety and cooperate on programs and projects in the area of radiation protection research and development. 						

Table 1: Key international forums and arrangements

Table 1: Key international forums and arrangements (cont.)

Strategy	Key international forums and arrangements						
Contributing to	International Atomic Energy Agency (IAEA)						
in respected international standards setting fora	• The IAEA is an independent intergovernmental science and technology-based organisation of the United Nations. It serves as the global focal point for nuclear cooperation. The IAEA assists its Member States in planning for and using nuclear science and technology for various peaceful purposes. It develops nuclear safety standards and, based on these standards, promotes the achievement and maintenance of high levels of nuclear safety as well as the protection of human health and the environment against ionising radiation. The Agency verifies through its inspection system that States comply with their commitments, under the Non-Proliferation Treaty and other non-proliferation agreements, to use nuclear material and facilities only for peaceful purposes.						
	World Health Organization (WHO)						
	 ARPANSA is a designated WHO research collaboration centre involved in projects to assess the health and environmental effects of ultraviolet and electromagnetic exposure (the INTERSUN and EMF Projects). ARPANSA is also a designated collaborating centre for the WHO REMPAN which is designated to provide emergency medical and public health assistance to people over-exposed to radiation. 						
Participating in	Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)						
international benchmarking and monitoring activities, such as international peer reviews	 The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organizati was set up in 1996. It is an interim organisation tasked with building up the verification regime of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) in preparation for the Treat entry into force as well as promoting the Treaty's universality. The Commission consists main organs: a plenary body composed of all States Signatories and the Provisional Tech Secretariat. Australia ratified the CTBT in 1998. ARPANSA is responsible for the installatii implementation and operation of seven radionuclide monitoring stations located in Australia Provide Mission Mission (IBPS) 						
	Integrated Regulatory Review Service Mission (IRRS)						
	 IRRS missions are important international peer reviews of the regulatory intrastructure in IAEA Member States, carried out at the request of a Member State. Australia, through ARPANSA, requested an IRRS Mission in 2007 and a follow-up mission in 2011. This year, ARPANSA's Deputy CEO Prof Peter Johnston acted as Deputy Team Leader for the IRRS mission to the Czech Republic 						
Working closely with	International Atomic Engery Agency General Conference (IAEA GC)						
other Australian Government agencies with roles in international safety and security	• ARPANSA CEO attended the IAEA General Conference as well as a number of important bilateral meetings held in Vienna, Austria. The General Conference is a yearly event which brings together all IAEA Member States for agreement on budget, work program and resolutions. In addition, numerous side events are held in the margins of the Conference, such as the Senior Regulators' Forum and the Scientific Forum. ARPANSA coordinated the Australian input to the safety resolution and Australia, through the Mission to Vienna, coordinated the international negotiations of the resolution which was unanimously approved with 52 co-sponsors.						
	 ARPANSA's CEO chaired the Senior Regulators' meeting which is a yearly full-day event involving global nuclear safety regulators 						
	IAEA International Conference on Nuclear Security: Enhancing Global Efforts						
	 ARPANSA was part of the Australian delegation* to the International Conference on Nuclear Security: Enhancing Global Efforts, held in Vienna, Austria. ARPANSA provided assistance to the Australian Embassy and Permanent Mission to the United Nations during the Ministerial sessions; and shared Australian delegation responsibility in covering Plenary and Technical sessions held concurrently during the conference. This conference and side-meetings provided a useful opportunity for ARPANSA to learn about international practices in border security and influence the development of international guidance to detect illicit trafficking of nuclear and other radioactive material across borders. 						

* The Australian delegation comprised the Department of Foreign Affairs and Trade, the Australian Safeguards and Non-Proliferation Office, the Australian Science and Technology Organisation and the Australian Mission in Vienna.

Detail of the forums we have attended over the financial year can be found in our Quarterly Reports on the ARPANSA website at: www.arpansa.gov.au/AboutUs/Corporate/quarterlyreports.cfm.

3.6 Discussion and analysis of financial performance

Report on performance

For the financial year ending 30 June 2014, ARPANSA reported an operating deficit of \$1.26m. This deficit is attributed to \$2.27m depreciation and amortisation expense not requiring appropriation. The underlying result is therefore a surplus of \$1.0m; which is a solid result for the Agency.

Revenue for the year remained unchanged from the previous year of \$25.1m, 55% of which is appropriated by government. The remaining amounts related to regulatory licence fees and charges and from the sale of goods and services. ARPANSA's expenses totalled \$26.4m, which was a \$1.0m reduction on the previous year. Approximately 65% of the Agency's expenses are attributable to Employee benefits. The component of Non-Employee benefits is the area where greatest reduction occurred; with an across the board decrease in discretionary expenditure.

The Agency will continue to implement initiatives it commenced during this financial year to ensure the ongoing efficiency and effectiveness by which it delivers its program, to ensure it operates within its financial resource base.

Table 2: ARPANSA Expenses for Outcome 1

Outcome 1: Protection of people and the environment through radiation protection and nuclear safety research, policy, advice, codes, standards, services and regulation	Budget ¹ 2013–14 \$'000 (a)	Actual Expenses 2013–14 \$'000 (b)	Variation 2013–14 \$'000 (a)-(b)
Program 1.1: (Radiation protection and nuclear safety)			
Departmental Expense			
Departmental appropriation ²	13 813	13 813	-
Special Accounts	10 046	10 277	(231)
Expenses not requiring appropriation in the Budget year	2 171	2 273	(102)
Operating Loss	214	-	214
Subtotal for Program 1.1	26 244	26 363	(119)
Total for Outcome	26 244	26 363	(119)
	2012–13	2013–14	
Average staffing level (FTE)	142	125	

¹ Full year budget, including any subsequent adjustment made to the 2013–14 Budget.

² Appropriation Bill (No.1) 2013–14 and Appropriation Bill (No.5) 2013-14.

Table 5. ANFANSA Nesource statement $-2013-14$
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	Actual Available Appropriation	Payments Made	Balance Remaining
	for 2013–14 \$'000 (a)	2013–14 \$'000 (b)	2013–14 \$'000 (a-b)
Ordinary Annual Services ¹ Department appropriation			
Prior year departmental appropriation ²	1 086	1 086	-
Departmental appropriation ³	15 757	14 113	1 644
Total	16 843	15 199	1 644
Total ordinary annual services	16 843	15 199	
Other services ⁴ Departmental non-operating			
Equity injections	2 500	1 275	1 225
Total	2 500	1 275	1 225
Total other services	2 500	1 275	
Special Accounts ⁵			
Opening balance	1 000		
Appropriation receipts ⁶	16 474		
Non-appropriation receipts to Special Accounts	11 126		
Payments made		27 205	
Total Special Account	28 600	27 205	1 395
Total resourcing	47 943	43 679	
Less departmental appropriations and equity injections drawn from the above and credited to special accounts	(16 474)	(16 474)	
Total net resourcing for ARPANSA	31 469	27 205	

¹ Appropriation Bill (No.1) 2013–14 and Appropriation Bill (No.5) 2013–14.

² Balance carried from previous year for annual appropriations.

³ Includes an amount of \$1.944 million in 2013–14 for Departmental Capital Budget. For accounting purposes this amount has been designated as 'contributions by owner'.

⁴ Appropriation Bill (No.2) 2013–14.

⁵ Does not include 'Special Public Money' held in accounts like Other Trust Monies accounts. Services for other Government and Non-agency Bodies accounts, or Services for Other Entities and Trust Moneys Special accounts.

⁶ Appropriation receipts from ARPANSA's annual and special appropriations for 2013–14 included above.

Part 4: Management and Accountability



Part 4 - Management and accountability

ARPANSA's role, functions and powers are defined by the *Australian Radiation Protection and Nuclear Safety Act 1998* (ARPANS Act). ARPANSA is constituted by the CEO, created by the ARPANS Act, who is authorised to engage employees under the *Public Service Act 1999*. ARPANSA is a statutory agency for the purpose of the Public Service Act and a prescribed agency under the *Financial Management and Accountability Act 1997* (FMA Act).

The CEO reported during 2013–14 to the Parliamentary Secretary to the Minister for Health and Ageing and then the Assistant Minister for Health, following the September 2013 Federal Election, on the administration of the following Acts:

- Australian Radiation Protection and Nuclear Safety Act 1998
- Australian Radiation Protection and Nuclear
 Safety (Consequential Amendments) Act 1998
- Australian Radiation Protection and Nuclear Safety (Licence Charges) Act 1998.

ARPANSA has an integrated corporate governance framework designed to provide a sound basis for decision making, to define the mechanisms for accountability and stewardship, to support the achievement of organisation goals and to ensure all legal and regulatory requirements are met.

ARPANSA management

The CEO has delegated various powers and functions to Branch and Office Heads, and staff reporting to them, to ensure that ARPANSA business is carried out efficiently and effectively. The CEO requires his delegates to act in accordance with approved policies and procedures, including Chief Executive Instructions, formulated in accordance with the Commonwealth legislative framework, including the FMA Act. A program of mandatory formal training on various compliance issues is maintained to provide refresher training to staff over a rolling three year cycle.

The ARPANSA General Counsel provides independent advice to the CEO on regulatory and operational matters.

The CEO and senior executives (the Executive Group) meet regularly, usually weekly, to discuss day-to-day administrative and operational matters.

Additionally, a number of advisory committees support the CEO and Branch and Office Heads in their management role.

Strategic Management Committee

The Strategic Management Committee is an administrative body established by the CEO to provide advice to the CEO and leadership to staff within ARPANSA. The Strategic Management Committee supports the CEO and is the major vehicle for collegiate decision making in the Agency. The Strategic Management Committee assists the CEO by:

- advising the CEO on corporate governance responsibilities in ARPANSA, including in relation to the approval of :
 - » the Agency's strategic plan and annual business plans
 - » the Agency's annual budget and five year rolling plan for capital expenditure
- internal policy making
- ensuring that the Agency has:
 - » adequate reporting systems at a strategic level
 - » a robust control environment in place (both operational and financial)
 - » an appropriate risk management framework
 - » good management practices and the highest standards of financial and ethical behaviour
 - » clearly defined delegations of authority across the Agency
- monitoring
 - » progress against the budget and business plans
 - » progress of major capital expenditure
 - » progress of major projects
 - issues arising from meetings of formally established management and governance committees

The Strategic Management Committee is composed of the following:

- CEO (Chair)
- Branch and Office Heads
- Chief Financial Officer (the Chief Administrator is also ARPANSA's Chief Financial Officer)
- General Counsel
- one or more external members appointed by the CEO.

In its deliberations, vigorous and informed discussion of the issues by members is not only encouraged, but expected. The primary role of the external member is to challenge organisational attitudes and approaches, as well as to enhance the range of skills and experience of the SMC. During this financial year, Ms Megan Morris was the external



Ms Megan Morris

member of the SMC. The SMC generally meets on the third Tuesday of each month.

Audit and Risk Committee

The ARPANSA's Audit and Risk Committee comprised an independent chair, two senior managers from within ARPANSA and an external member. Representatives of the Australian National Audit Office attended committee meetings as observers provided external audit services through PriceWaterhouse Coopers. The Agency's internal auditor, RSM Bird Cameron (who also served as the secretariat for the Committee) and Chief Financial Officer attended meetings to report on particular matters. Branch Heads were also invited to attend on occasions to discuss particular audit reports and risks relevant to their responsibilities. The CEO is an observer to the Committee.

The Audit and Risk Committee, through the internal audit program, assists the CEO to maintain and improve:

- the effectiveness of the internal control framework
- the effectiveness of ARPANSA's risk management processes including business continuity and fraud control
- the quality of financial management and reporting processes
- overall compliance with relevant legislation in particular the FMA Act.

The Audit and Risk Committee met four times in 2013–14. As well as considering audit reports, during the year the Audit and Risk Committee:

- reviewed the risk based rolling five year strategic audit plan
- maintained a program of self-assessing its own performance and reviewing the performance of internal audit

 provided assurance to the CEO on the integrity of the Agency's Financial Statements and compliance processes.

Work Health and Safety Committee

The Work Health and Safety Committee is chaired by the CEO, assisted by the ARPANSA Work Health and Safety Co-ordinator, and comprises staff health and safety representatives and management representatives from both the Yallambie and Miranda premises. The Work Health and Safety Committee meets every two months and reviews and reports to the Strategic Management Committee on work, health and safety (WHS) issues, on the effectiveness of ARPANSA's performance in these areas and compliance with relevant legislation in accordance with the ARPANSA Work Health and Safety Management System. During this financial year the Work Health and Safety Committee conducted a number of WHS work area inspections. Further information in respect of Work Health and Safety arrangements within the Agency is at Appendix 2.

Senior officers at each campus, Yallambie, Miranda and Canberra are authorised to perform the functions of a Site Manager. As the CEO can never be present in all sites at the same time it was necessary to ensure that at all times each site has an officer who is authorised by the CEO to take necessary action to comply with ARPANSA's duties under the *Work Health and Safety Act 2011*.

Radiation Safety Committee

The Radiation Safety Committee, chaired by the Radiation Safety Officer and comprised of Branch Radiation Safety Advisors and other relevant staff, reports to the Work Health and Safety Committee on matters relating to workplace radiation protection and safety.

ARPANSA Staff Consultative Forum

ARPANSA's enterprise agreement continues to provide for a Staff Consultative Forum as the key employee consultative body. The Staff Consultative Forum comprises the CEO, employees elected by staff and officials from unions that are party to ARPANSA's enterprise agreement.

During the year, the Staff Consultative Forum met on seven occasions to discuss a range of issues relating to the management of ARPANSA. Agenda papers and outcomes of meetings were provided to all staff. Standing reports on the Agency's finances, activities of the Work Health and Safety Committee and matters considered by the Executive Group and Strategic Management Committee were also provided and discussed at Forum meetings with the CEO.

Corporate and operational planning and performance

The ARPANSA Strategic Directions 2012-2016 sets out strategic directions and key priority areas the Agency intends to focus on during the coming year and beyond.

The Strategic Directions are supported by Corporate and Section operational business plans that describe the activities undertaken to accomplish those key priorities. Individual performance and development plans provide the framework for performance and accountability assessment. The framework is underpinned by management systems and strategies including internal audit, risk management, security, fraud control, compliance, business continuity, quality and information management.

Identification and management of risk

Risk management is an integral part of ARPANSA's Corporate Governance Framework. The Agency's business planning framework, including setting of performance targets for staff, is also underpinned by relevant risk assessment processes. Strategic and key operational or project risks are reviewed quarterly by the Audit and Risk Committee and monitored by the Strategic Management Committee.

ARPANSA has developed a Risk Appetite Statement which describes in general terms the extent to which the Agency is willing to pursue or accept

Figure 7: ARPANSA corporate frameworks



risk associated with its various objectives. The Agency's appetite for risk is categorised into levels described as low, medium or high and provides guidance in determining agency risk tolerances in various categories and in developing appropriate treatments for each risk.

Internal control

The CEO must report annually to the Portfolio Minister, by way of a certificate of compliance, on the financial management and sustainability of the Agency.

The certificate requires the CEO to certify that, based on ARPANSA's internal control mechanisms, management assurance and Audit and Risk Committee advice, ARPANSA has:

- complied with the Australian Government's financial management framework and other specified Commonwealth policies
- operated within the agreed resources for the current year and has adopted, or will adopt the appropriate management strategies for all known risks that may affect the financial sustainability of their Agency.

ARPANSA has a robust internal governance and control framework comprising formal plans, policies, instructions, and guidelines. The Agency has adopted the Compliance Self Assessment methodology for annual compliance sign-off and developed a risk-based compliance assessment questionnaire to guide management in their review. The annual Compliance Self Assessment by management and internal audit review of the effectiveness of internal control mechanisms provide the assurances required to support the certification. Branch and Office Heads are required to provide additional assurances and certifications regarding compliance for their areas of responsibility, and to report on any instances of non-compliance with the framework.

Oakton Services Pty Ltd has been ARPANSA's internal auditor since November 2008 and they were replaced by RSM Bird Cameron in November 2013. Significant internal audits conducted this financial year included reviews of:

- Budgeting, Financial Management and Sustainability
- Review of Project Management Framework.

In response to these audits, ARPANSA is addressing all findings.

Business continuity

The ARPANSA Business Continuity Plan was tested as required during 2013–2014. It is planned to be revised later in 2014 according to the lessons learned from this testing and aligned with the ARPANSA Incident Management Plan.

Compliance with Commonwealth Fraud Control Guidelines

ARPANSA's fraud control plan is in accordance with the requirements set out in the *ARPANSA Risk Management Framework* and conforms to the *Commonwealth Fraud Control Guidelines*. The plan outlines strategies and processes to detect, prevent, investigate and minimise the effect of fraud.

In accordance with the *Commonwealth Fraud Control Guidelines* ARPANSA provided the Annual Fraud Report to the Australian Institute of Criminology for the year ended 30 June 2014.

ARPANSA Quality System

The ARPANSA Quality System employs two levels of management review. The first, at the Branch level, reviews each Branch's service activities in detail, and the second at senior management level is conducted by the ARPANSA Quality Management Committee. The Quality Management Committee, which comprises the CEO, Branch and Office Heads and the Quality Manager, acts under the auspices of the Strategic Management Committee Charter. The Quality Management Committee has the overall responsibility for ensuring the services offered by ARPANSA are delivered in a manner consistent with the principles of quality and as set out in ISO 17025 and are subject of the Agency's progress against the ISO 9000 series.

Seven of ARPANSA's laboratories maintain National Association of Testing Authorities (NATA) accreditation and are regularly assessed by NATA. During the year, NATA conducted technical re-assessments of the quality systems in place in each of the Chemical Testing services.

As required by the Quality Standard, AS ISO/IEC 17025, all service activities are internally reviewed annually by qualified auditors selected from

the ARPANSA Quality Assurance Team made up of representatives of the services. Operational procedures and aspects of the management requirements of the Standard are audited in accordance with an approved schedule.

Ethical standards

All ARPANSA staff must adhere to the Australian Public Service (APS) Values, APS Employment Principles and Code of Conduct under the *Public Service Act 1999.* ARPANSA actively promotes ethical standards among its staff by conducting training and awareness program relevant to the APS Values, Employment Principles and Code of Conduct. Additionally, a mandatory training program is in place which includes refresher training over a three year cycle on a range of issues including Preventing Bullying and Harassment in the Workplace and Privacy.

A commitment to ethical standards is also highlighted in the ARPANSA Agreement 2011-2014, the ARPANSA Strategic Directions 2012-2016 and the Workplace Diversity Program 2012-2015 and is included in the induction packages provided to all new employees. ARPANSA's Strategic Management Committee also endorsed a supplement to an all staff Performance Agreement, APS Values and ARPANSA Workplace Ethics, which staff are assessed against.

There are formal procedures to ensure disclosure of any real or apparent conflict of interest. Staff are required to disclose to the CEO all direct or indirect pecuniary interests in businesses and companies which may be affected by ARPANSA's decisions. As a matter of course, members of the Strategic Management Committee, the Audit and Risk Committee, and the advisory bodies to ARPANSA (see Appendix 2) are reminded to declare any conflict of interest in general, and specifically in relation to agenda items at meetings, and requested to excuse themselves when such issues are discussed.

External scrutiny and advice

Key external accountability institutions for ARPANSA include the:

- Commonwealth Parliament
- Commonwealth Auditor General, who is an officer of the Parliament
- Commonwealth Ombudsman
- Australian Information Commissioner, including the FOI and Privacy Commissioners
- Administrative Appeals Tribunal, and
- Federal system of courts, including the Federal Court and High Court of Australia.

As required by the ARPANS Act, the following mechanisms for external stakeholder input to ARPANSA's processes are in place:

- Radiation Health and Safety Advisory Council
- Radiation Health Committee
- Nuclear Safety Committee.

Their activities for the current year are reported in Appendix 8 of this Report.

Australian National Audit Office Performance Audit

In May 2014, the Australian National Audit Office (ANAO) released its report into *Regulation of Commonwealth Radiation and Nuclear Activities* (Audit Report No. 29 2013–14).²⁰

Commencing in April 2013, the objective of the ANAO audit was to assess the effectiveness of ARPANSA's management of the regulation of Commonwealth nuclear, radiation facilities and sources, including ARPANSA's compliance with its legislative requirements.

The ANAO found that ARPANSA has largely been effective in managing key aspects of its regulatory framework and is considered by licensees to be professional and service-oriented. However, the ANAO made the following four recommendations to enhance the Agency's risk-informed approach, management of conflict of interest, and program of independent inspections for ARPANSA licences:

^{20.} The full ANAO report into *Regulation of Commonwealth Radiation and Nuclear Activities* (Audit Report No. 29 2013–14) is available at: www.anao.gov.au/Publications/Audit-Reports/2013-2014/Regulation-of-Commonwealth-Radiation-and-Nuclear-Activities.

Recommendation No. 1 Paragraph 2.23	 To maintain stakeholder confidence in the independence and impartiality of its regulatory operations and decisions, the ANAO recommends that ARPANSA: (a) periodically conducts training for regulatory staff on identifying and managing conflicts of interest, including personal conflicts; and (b) obtains written declarations from regulatory staff at annual intervals indicating whether they have any potential, perceived or actual conflicts.
	ARPANSA response: Agreed
Recommendation No. 2 Paragraph 3.48	To streamline its applications process and more effectively use its limited resources, the ANAO recommends that ARPANSA implements a documented risk based approach to assessing licence applications, having regard to the: (a) hazard of the source or facility to workers, the public and environment; and (b) the applicant's compliance maturity.
	ARPANSA response: Agreed
Recommendation No. 3 Paragraph 4.30	 To strengthen its risk based approach to monitoring compliance, the ANAO recommends that ARPANSA more directly links its management of licences to risk rankings, focusing particularly on: (a) clearly aligning its planned inspection program to risk rankings of licences; and (b) strategic targeting of unannounced inspections. ARPANSA response: Agreed
Recommendation No. 4 Paragraph 4.65	 To improve transparency and support continuing public confidence in the regulation of licences held by ARPANSA, the ANAO recommends that: (a) inspections of its own licences are conducted periodically using inspectors from a state or territory radiation regulator; and (b) provisions are made for independent review of other regulatory decisions relating to ARPANSA's own licences, particularly licence applications and Regulation 51 approvals.

ARPANSA accepted the four recommendations and will continue to:

- advance staff understanding of conflicts of interest and the related procedures and processes
- improve internal procedures to support and promote a risk-informed approach
- strengthen our risk-informed compliance monitoring program and strategic targeting of inspections, and
- look to advance the frequency of our rigorous self-inspection program and explore options for a broader base of suitable organisations for independent oversight of regulatory decisions relating to ARPANSA's own licences.

While the ANAO audit was not a follow up to the performance audit conducted in 2005, the ANAO were able to assess the extent to which ARPANSA has implemented the recommendations in the previous audit noting that eleven of the nineteen recommendations from the 2005 performance audit had been fully implemented and six had been partially implemented. ARPANSA accepts the recommendations contained in the ANAO report and has developed an Action Plan for implementing the recommendations. This Action Plan also includes activities to address ANAO's assessment of ARPANSA's progress of previous recommendations from the ANAO's 2005 performance audit of ARPANSA's regulatory function.^{21,22} The Action Plan with status updates as at 30 June 2014 is at Appendix 9.

^{21.} While this audit was not a follow up to the ANAO's 2005 performance audit of ARPANSA's regulatory function, the ANAO also assessed the extent to which ARPANSA has implemented the previous 19 recommendations noting that 11 had been fully implemented and six had been partially implemented.

Judicial decisions and decisions of administrative tribunals, reports by the Auditor-General, a Parliamentary Committee or the Commonwealth Ombudsman

There have been no judicial decisions and decisions of administrative tribunals during 2013–14 that have had, or may have, a significant impact on the operations of ARPANSA.

There have been no reports on the operations of ARPANSA by the Auditor General (other than the report on financial statements), a Parliamentary Committee, or the Commonwealth Ombudsman during 2013–14.

ARPANSA Service Charter

This Service Charter outlines what the Agency is and what it does, the standards of service expected from ARPANSA and how our stakeholders can help us improve our service. ARPANSA's vision is to be the leading organisation in Australia for scientific excellence and practical expertise in radiation protection and nuclear safety and to be a highly effective and efficient regulator of Commonwealth Government entities. The current service charter was established in 2013–2014 and will be reviewed every three years.

ARPANSA's customers are in both the public and private sectors (overseas as well as within Australia) and include:

- people who use radiation in medicine, research and industry (including mining)
- Commonwealth, state and local government agencies
- environment protection agencies
- international organisations
- academia and research organisation
- general public, interest groups and the media.

Services provided by ARPANSA include but are not limited to:

- traceable calibrations of ionising and non-ionising radiation monitoring equipment
- the Personal Radiation Monitoring Service
- the assessment of Ultraviolet Protection Factors

- advice, measurements, consultancy, and training on a range of radiation protection issues, and
- issuing Customs (Prohibited Imports) permits for the importation of radioactive materials into Australia.

The charter provides a complaints resolution mechanism and is available in full on the ARPANSA website at www.arpansa.gov.au/AboutUS/corporate/ servicecharter.cfm. Agency Formal Complaints Management Process will be established in 2014–2015 which, in addition to the establishment of associated customer service performance monitoring, will enable future comprehensive reporting of performance against the charter.

As part of the quality management system of ARPANSA and services accredited by the National Association of Testing Authorities, all corrective actions arising from client complaints are recorded. In accordance with the quality system, these actions are reported to the ARPANSA Quality Manager and the relevant Branch Head. The RF Calibrations Client Complaints received a minor complaint in April 2014 relating to an invoice. This was reported to the Quality Manager and the Branch Head at the last Quality Management Committee meeting.

Management of human resources

Organisational capability

ARPANSA's organisational capability is built around the skills and capacities of its staff and involves the Agency's systems, structures, processes, governance and culture; and how resources are utilised to address evolving priorities by building capacity to ensure ARPANSA can adapt to its changing environment.

Learning and development undertaken

Executive Leadership Development Program

As part of ARPANSA's ongoing commitment to the development of its current and future leadership cadre it conducted an APS level 5 and 6 Leadership Development program over two days in December 2013. Twenty-four staff attended this program

See ANAO Audit Report No.30 2004–05 Regulation of Commonwealth Radiation and Nuclear Activities available from: www.anao.gov.au/Publications/Audit-Reports/2004-2005/Regulation-of-Commonwealth-Radiation-and-Nuclear-Activities/Audit-brochure.

and this was the third in a series of leadership development programs which commenced in 2012 and early 2013.

Managing behaviour in the workplace

Mandatory training for all staff on Managing Behaviour in the APS Workplace was held in July and August 2013. The sessions were organised as part of ARPANSA's ongoing corporate compliance training program. With amendments to the Public Service Act in 2013 coming into effect on 1 July 2013, it was timely to inform staff of the changes to the Act and reinforce expectations about general workplace behaviour. Staff feedback on these sessions was very positive.

Workplace Diversity Program and Commonwealth Disability Strategy

ARPANSA's Workplace Diversity Program 2012-2015 continued to operate during the reporting period and this program is supported by a *Workplace Diversity* Action Plan and in line with recent amendments to the Public Service Act 1999; it has been posted on ARPANSA's website. The program is linked to ARPANSA's Corporate Plan and is aimed at creating an inclusive environment which respects, values and uses the contributions of staff with different backgrounds, experiences and perspectives. ARPANSA continued to promote workplace diversity and reinforce the roles and responsibilities of all staff in increasing awareness and acceptance of workplace diversity principles through fostering diversity and using the broad range of skills, experience and cultural backgrounds of staff.

Underpinning ARPANSA's 2012-15 Workplace Diversity Plan is an implementation plan outlining various initiatives, responsibilities and outcomes. The strategy sets standards for performance and accountability to meet the objectives of having a productive and supportive workforce by enabling individuals to achieve successful results in a supportive environment as well as assisting them to balance their work and personal responsibilities.

The Commonwealth Disability Strategy is taken into account in ARPANSA's forward-planning and corporate planning processes. ARPANSA's workplace diversity program ensures that we meet our legal obligations, both as a government agency and as an employer, to apply the principles of equity, merit and equal employment opportunity. Part of this process requires that ARPANSA make allowances for reasonable adjustment to the workplace or work practices to accommodate the needs of people with a disability.

Prevention of workplace harassment and bullying

The Agency's *Respect – ARPANSA Policy for the Prevention of Workplace Harassment and Bullying* seeks to minimise harassment and bullying that may arise in the workplace. The policy:

- provides information on informal and formal approaches to resolving claims of harassment and bullying (including the legislative framework)
- reinforces the role of the APS Values and Code of Conduct
- broadens the concept of harassment by including definitions of bullying behaviours
- clarifies the roles and responsibilities of managers and staff.

Support for staff

ARPANSA continues to promote a work environment that provides a reasonable work/life balance for all employees, and supports staff otherwise in situations where circumstances (internal or internal) affect the work life and ability to perform. These initiatives include access to flexible working arrangements, including:

- flextime
- job-sharing
- part-time and home based work, and
- extensive leave provisions contained in the ARPANSA enterprise agreement including:
 - » 4-weeks annual leave each year with provision to take this leave at half pay and access to purchased annual leave
 - » cumulative personal/carers leave
 - » increased paid leave for maternity leave purposes of up to 22-weeks which can be taken at full or half pay, paid paternity/non primary care giver leave of up to 6 weeks and parental leave
 - » study leave, and
 - » a range of miscellaneous leave entitlements which can be taken with or without pay.

Converge International is the provider of the Employee Assistance Program for ARPANSA employees across all three offices: Victoria, New South Wales, and Australian Capital Territory. Assistance is available to all ARPANSA employees and their immediate families with personal or work related problems that might affect their work or life. Converge have many years of experience and are available to help employees clarify and/or resolve issues. The program is recognised as a valuable resource for managing personal and workplace difficulties.

ARPANSA provides a carer's room in its Victorian office and has provision to arrange for a carer's room in New South Wales at short notice. Staff in ARPANSA's Canberra offices have access to a carer's room under the terms of their tenancy arrangements. The rooms provide a temporary workplace for employees to carry out as much of their normal work as possible while caring for their dependents and family members for whom care is temporarily unavailable. The rooms provide a quiet, comfortable environment for a variety of uses including a facility for nursing mothers.

Workforce planning, staff retention and turnover

At 30 June 2014, ARPANSA employed 132 staff; 123 of whom are employed on an ongoing basis. These staff were divided between the Agency's Victoria office (Yallambie) (78%), New South Wales (Miranda) (19%) and Canberra Office (3%). More detailed information on the nature and breakup of ARPANSA's workforce is set out in Tables 4 and 5.

In 2013, ARPANSA prepared a three year Workforce Plan covering its Information and Communication Technology (ICT) staffing resources and needs. The plan was approved by the Agency's Strategic Management Committee and received a positive response from the APSC. The priorities outlined in the plan remain relevant and are reflected in the ICT staffing and recruitment decisions made during 2013–2014.

In late 2013, the commencement of work on the development of a Succession Planning strategy covering the Agency's Radiation Health Services Branch which represents approximately one third of the Agency's staffing. Positions were assessed in terms of the likelihood of the occupant leaving, the impact of the occupant leaving unexpectedly and the degree of difficulty in replacing them. The next stage of this process is the development of strategies to address those roles and positions representing the greatest vulnerability. This process will be rolled-out across ARPANSA with an agency-wide succession plan being the ultimate aim.

Table 4: Staff retention and turnover 2012–13 and 2013–14

		Fen	Female Ma			lale				
Classification	Ong	oing	Non-O	ngoing	Ong	oing	Non-O	ngoing	VARIA	ATION
	June 2013	June 2014								
SES										
Commencement										
Separation	-1					-1			-1	-1
Executive Level 1-2										
Commencement	+1			+1	+2		+1	+2	+4	+3
Separation		-4	-1		-3	-7	-2	-3	-6	-14
APS Level 1–6										
Commencement	+1		+2		+2	+3	+2		+7	+3
Separation	-2		-1		-1	+3	-4		-8	-8

2014 APS Employee Census

During the period May to June 2014, the Australian Public Service Commission (APSC) conducted an employee census. This is the third year the census has been conducted by the APSC with the timing aligned with the annual APSC State of the Service Report. This year ARPANSA's participation rate was 79%, which placed ARPANSA in the top third in terms of response rates and above the APS average return of 68%.

The results of the census will be a valuable source of information for ARPANSA's workforce management issues and organisational priorities and will link back into the Agency's strategic decision-making and future planning. The feedback will also help maintain ARPANSA's reputation for professional and technical excellence.

Performance Pay

No staff received performance pay this financial year.

Workplace agreements in ARPANSA

The Agency's seventh enterprise agreement, *ARPANSA Agreement 2011–2014*, which was approved by the Fair Work Commission on 15 December 2011, continued to operate throughout the 2013–14 financial year.

The agreement provides the terms and conditions of employment for all employees below the Senior Executive Service level. The agreement has a nominal expiry date of 30 June 2014. ARPANSA has commenced negotiating a successor enterprise agreement in accordance with the Australian Government's Public Sector Workplace Bargaining Policy. The salary ranges for ARPANSA's classification levels are set out in Table 6.

Common law contracts

Terms and conditions of employment for the Agency's Senior Executive Service (SES) employees are covered under common law contracts. As at 30 June 2014, ARPANSA approved common law contracts for one ongoing senior executive service employee; noting that a second employee is currently acting at the SES level and a third SES employee resigned in June 2014. Recruitment action is underway for the two SES vacancies in ARPANSA. The salary range available for senior executive service employees on common law contracts is from \$174 000 to \$187 000 per annum.

Statistics on staffing

Remuneration, statistics and staffing profile

All ARPANSA staff are employed under the *Public Service Act 1999*. The CEO is a full-time holder of a Public Office, whose salary and allowances are determined by the Remuneration Tribunal.

Statistics on staffing are set out in Tables 7 to 9.

Purchasing

In 2013–14, with exception of those instances reported in the Certificate of Compliance, ARPANSA complied with the Government's purchasing policies as stated in the Commonwealth Procurement Rules (CPRs). ARPANSA's Procurement activities for the year, were consistent with the 'value-for-money' rule underpinning the CPRs.

ARPANSA's Annual Procurement Plan was published on the AusTender website in June 2014.

	Full- Ong	time oing	Full- Non-O	time ngoing	Part Ong	-time joing	Part- Non-O	-time ngoing	то	TAL
	June 2013	June 2014	June 2013	June 2014	June 2013	June 2014	June 2013	June 2014	June 2013	June 2014
Female	48	41	1	1	11	10	2	2	62	54
Male	79	71	4	2	-	1	4	4	87	78
TOTAL	127	112	5	3	11	11	6	6	149	132

Table 5: Staff employed under the PS Act as at 30 June 2013 and 2014 showing full or part-time status

Table 6:Salary ranges as at 30 June 2014

APS Classification	Salary Range (\$)
ARPANSA Graduate	58 524 – 76 221
APS Level 1	43 901 - 49 901
APS Level 2	51 398 – 56 424
APS Level 3	58 524 – 65 484
APS Level 4	67 449 – 70 481
APS Level 5	72 596 – 76 221
APS Level 6	78 507 – 89 800
Executive Level 1	96 987 – 111 593
Executive Level 2 lower	118 512 - 134 581
Executive Level 2 upper	139 963 – 150 329

Table 7: Full-time equivalent (FTE) staff by gender and classification

	Fen	nale	M	ale	TO	TAL
Classification	June 2013	June 2014	June 2013	June 2014	June 2013	June 2014
Graduate	-		-	-	-	-
APS Level 1	-		-	-	-	-
APS Level 2	7.68	7.6	-	-	7.68	7.6
APS Level 3	9.8	9.4	2	1	11.8	10.4
APS Level 4	6.6	4.8	-	1	6.6	5.8
APS Level 5	7.29	6.69	10.6	10	17.89	16.69
APS Level 6	10	7.4	20	18.2	30	25.6
Executive Level 1	13.6	11.2	26.2	24.2	39.8	35.4
Executive Level 2	2	2	22	19.2	24	21.2
SES Band 1	-	-	3	2	3	2
TOTAL	56.97	49.09	83.8	75.6	140.77	124.69

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		-								
		Fen	nale			M	ale			
	Ong	oing	Non-O	ngoing	Ong	oing	Non-O	ngoing	то	TAL
Branch	June 2013	June 2014								
Office of the CEO	4	6	-	-	2	5	-	-	6	11
Legal Office	2	-	-	-	2	1	-	-	4	1
Radiation Health Services	22	18	-	1	29	26	-	-	51	45
Medical Radiation Services	4	3	1	2	9	10	8	5	22	20
Regulatory Services	9	6	1	-	18	17	-	1	28	24
Corporate Office	18	18	1	-	19	13	-	-	38	31
TOTAL	59	51	3	3	79	72	8	6	149	132

Table 9: Distribution of staff by Branch

Asset management

ARPANSA manages non-financial assets totalling \$28.9 million. The major categories are land and buildings and infrastructure plant and equipment. ARPANSA's capital investment plan is reviewed annually to ensure on-going building maintenance and renovation; equipment purchases and IT infrastructure upgrades meet future research and operational requirements.

Consultants

During 2013–14, eight new consultancy contracts were entered into involving total actual expenditure of \$99 972. In addition, six ongoing consultancy contracts were active during the 2013–14 year, involving total actual expenditure of \$463 892.

The Agency policy on selection and engaging consultants is in accordance with the CPRs, based on the core rule of value for money and underpinned by:

- encouraging competitive and nondiscriminatory processes
- using Commonwealth resources in an efficient, effective, economical and ethical manner that is not inconsistent with the policies of the Commonwealth

- making decisions in an accountable and transparent manner
- considering the risks, and
- conducting a process commensurate with the scale and scope of the procurement.

ARPANSA engaged consultants where there was a requirement for specialist expertise that was not available within the Agency, or where an independent assessment was required. The selection process included selection from a panel or direct engagement of a recognised or pre-eminent expert.

The annual report contains information about actual expenditure on contracts for consultancies. Information on the value of contracts and consultancies is available on the AusTender website www.tenders.gov.au.

Grants

ARPANSA did not administer any grants in this reporting period.
Appendices



Appendix 1: Stakeholder Engagement

Table 10: ARPANSA Stakeholder engagement

Date	Event
August 2013 November 2013 February 2014 May 2014	ANSTO-ARPANSA OPAL Quarterly Review Meetings.
September 2013	Environmental Health Professionals of Australia Symposium – electromagnetic fields and health.
October 2013	ARPANSA's annual Licence Holders' Forum held in Canberra, ACT.
October 2013	38th Annual Conference of Australasian Radiation Protection Society, Cairns, Queensland.
October 2013	ARPANSA conducted 'External Beam Reference Dosimetry Course' at Royal Prince Alfred Hospital, Sydney.
October 2013	Annual Dose Register event held in Cairns, Queensland – attended by key stakeholders.
November 2013	EMERG – held in Sydney – focusing on RF radiation and health.
November 2013	Science and Wireless Symposium – ARPANSA CEO officially opens newly formed Australian Centre for Electromagnetic Bioeffects Research.
November 2013	World Health Organization Ultraviolet Radiation Collaborating Centres meeting held in Melbourne.
December 2013	Presentations at annual Laboratory Technicians Association of Victoria Conference held in Melbourne, Victoria.
March 2014	Australian Clinical Dosimetry Service one-day workshop with key stakeholders.
May 2014	Presentation at 2014 Non-Surgical Symposium to Australian Society of Aesthetic Plastic Surgery and Cosmetic Physicians Society of Australasia on laser and intense pulsed light sources.
May 2014	EMERG, held in Sydney focusing on RF radiation and health.
June 2014	Defence-ARPANSA Liaison Forum held at Department of Defence, Canberra, ACT.

Appendix 2: Work health and safety

Work Health and Safety Committee

ARPANSA staff and management consult through the operation of the Work Health and Safety Committee. The Committee is chaired by the CEO and made up of Health and Safety Representatives, management representatives of all offices and branches and the Health and Safety Co-ordinator to provide work health and Safety expertise and co-ordination. Specialist advisors for emergency response, radiation safety, chemical safety, property management, human resources, legal and security attend the Work Health and Safety Committee as required and provide updates on issues impacting on health and safety. The committee meets six times a year.

Work health and safety measures taken in 2013–2014 include the following:

- influenza immunisations for staff in all three campuses
- completion of further Yallambie renovations and property services to better comply with the new Work Health and Safety Act
- delivery of additional mandatory Work Health and Safety Act training for all staff, both workers and managers
- inspections of the Yallambie and Miranda Campuses for house-keeping, emergency response equipment and compliance issues
- further Investigation of hazards, incidents and nearincidents and agreement on additional controls
- updating the Work Health and Safety policy
- continued the comprehensive review and updating of ARPANSA's Work Health and Safety Management Arrangements.

At the meetings there was a demonstrated collegiate approach by committee members to address and rectify, as quickly as possible, any issues that arose during the meetings.

Health and safety management arrangements

Health and Safety Management Arrangements have been in place in ARPANSA since late 2007. The arrangements explain the following:

- roles and responsibilities
- consultation
- confidentiality
- organisational arrangements, including dispute resolution
- implementation, and
- review.

The Health and Safety Management Arrangements are currently under review. The Health and Safety Policy was updated in early 2014.

Incidents or injuries

There were fourteen hazards and near incidents reported including electrical, design, exposure, slip or trip, stuck by object, bushfire and lost.

There were seven incidents including a small fire, two slips, struck by object, a burn and a small chemical spill.

There was no medical treatments required, no lost time injuries and there were no Comcare claims for the duration of this annual report. The small fire caused no damage or injury.

Investigations or notices issued

During this financial year, there were no Provisional Improvement Notices issued by Health and Safety Representatives. There were no Comcare investigations conducted, nor improvement notices issued at any ARPANSA workplace.

Date	Location
9 July 2013	Yallambie ground floor east wing
3 September 2013	Yallambie ground floor west wing
28 January 2014	Yallambie Basement and plant rooms
27 May 2014	Miranda

Table 11: 2013–14 Work health and safety inspection schedule

Appendix 3: Information Publication Scheme

Agencies subject to the *Freedom of Information Act 1982* are required to publish information to the public as part of the *Information Publication Scheme*. This requirement is in Part II of the Freedom of Information Act and has replaced the former requirement to publish a section 8 statement in an annual report. Each agency must display on its website a plan showing what information it publishes in accordance with the Information Publication Scheme requirements.

ARPANSA as an Australian Government agency is subject to the Freedom of Information Act and is required to comply with the Information Publication Scheme provisions. ARPANSA has developed an Agency plan describing ARPANSA's compliance with the Information Publication Scheme provisions as required by s 8(1) of the Freedom of Information Act. The plan can be accessed at: www.arpansa.gov.au/ips.cfm.

Feedback on this plan can be provided by contacting the Freedom of Information Coordinator at email: foi@arpansa.gov.au or by mailing to:

The FOI Coordinator ARPANSA PO Box 655 MIRANDA NSW 1490

or by telephoning: (03) 9433 2211.

Appendix 4: Advertising and market research

Forms of Advertising

ARPANSA did not commission any work from creative advertising agencies, market research organisations, polling organisations or direct mail organisations. During 2013–2014 total expenditure on advertising and public notices amounted to \$12 555 (inclusive of GST). Section 311A of the *Commonwealth Electoral Act 1918* requires details of payments of \$12 400 and above (inclusive of GST). ARPANSA did not have any payments above this threshold.

During 2013–14, ARPANSA did not conduct any advertising campaigns.

Appendix 5: Ecologically sustainable development and environmental performance

The object of the ARPANS Act is to protect the health and safety of people and to protect the environment from the harmful effects of radiation. In accordance with the Act, ARPANSA takes into account the radiological impact on the environment in assessing licence applications from Commonwealth entities and their contractors.

The Agency supports and promotes practices that can improve energy management and environmental practices within both the Sydney, Melbourne, and Canberra offices. ARPANSA has in place an Environment Policy and is committed to:

 complying with relevant Commonwealth and state environment legislation and with the Australian Government's environmental policies and initiatives

- implementing a continually improving standard of environmental performance and provide an environmentally sound workplace
- integrating environmental, social and economic considerations in its decision making including decisions on purchasing, in contracting for goods and services and in any building work it undertakes
- encouraging openness, transparency and improved accountability by reporting its environmental management annual reports and engaging with the community
- implementing and maintaining an Environmental Management System aligned with the ISO 14001 Standard.

Appendix 6: Legal services directions

The legal services directions reflect the obligations imposed on Chief Executives by the Financial *Management and Accountability Act (1997)* and emphasise the general requirement that Commonwealth resources be used efficiently and effectively.

Chief Executives are required to take responsibility for the proper recording and public reporting of their agency's legal services expenditure. Proper recording will enhance the ability of Chief Executives to engage in decision making about legal resources that complies with their legal obligation to use resources efficiently and effectively. Making publicly available records about expenditure will enhance transparency. In accordance with the Directions, the CEO has certified that:

- ARPANSA has appropriate systems and procedures in place to ensure compliance with the Directions
- ARPANSA has no record of any alleged, possible or determined breach of the Directions by this Agency during the financial year.

Details of the legal services expenditure for the Agency for 2013–14 are provided in Table 12.

Table 12: Legal services expenditure by ARPANSA for 2013–14

Legal Service	Expenditure (incl. GST)
Agency's total legal services expenditure	429 527
Agency's total external legal services expenditure	25 286
External expenditure on solicitors	-
External expenditure on counsel	-
Other disbursements on external legal services	-
Agency's total internal legal services expenditure	404 261

Appendix 7: ARPANSA licensing activities

Licensee	Licence Number	Nature of breach	TRIM Reference
PETNET Australia Pty Ltd	F0211	Breach of S31(2) of the Act by failing to follow licence conditions - operation of the PETNET cyclotron without a functioning safety interlock system which resulted in a breach of Regulation 49.	R13/11425
		Corrective actions have now been undertaken and the facility has returned to compliance.	
PETNET Australia Pty Ltd	F0211	Breach of S31(2) of the Act by failing to follow licence conditions -development and implementation of a Safe Operating Procedure with significant implications for safety was undertaken without the appropriate approval required under ARPANS Regulation 51.	R13/11425
		Corrective actions have now been undertaken and the facility has returned to compliance	
ANSTO OPAL Reactor	F0157	Breach of S30(2) of the Act by failing to comply with Regulation 49 – use of a tool during fuel assembly clamping without following the approved change control process.	R13/07464
ANSTO Life Sciences	F0251	Breach of S30(2) of the act by failing to comply with Regulation 49 – not following quality control procedures and change control process.	R14/07465

Table 13: Details of any breach of licence conditions by a licensee during the financial year of which the CEO is aware

Table 14: Facility licences as at 30 June 2014

Commonwealth entity	Licences held
Australian Nuclear Science and Technology Organisation (ANSTO)	22
Australian Customs and Border Protection Service	4
Australian Defence Force /Department of Defence	5
Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)	1
Australian National University	3
Department of the Environment – Parks Australia	1
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	2
Total	38

Table 15: Source licences as at 30 June 2014

Commonwealth entity	Licences held
ANU Enterprise Pty Ltd	1
ASC Pty Ltd	1
Attorney-General's Department	1
AUSTRAC	1
Australian Crime Commission	1
Australian Customs and Border Protection Service	2
Australian Defence Force /Department of Defence	1
Australian Federal Police	1
Australian Institute of Marine Science	1
Australian National University	1
Australian Nuclear Science and Technology Organisation (ANSTO)	3
Australian Postal Corporation	1
Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)	2
Australian Securities and Investments Commission	1
Australian Sports Commission	1
Australian Trade Commission	1
Australian War Memorial	1
Bureau of Meteorology – Cape Grim	1
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	11
Decipha Pty Ltd	1
Department of Agriculture	1
Department of Foreign Affairs and Trade	1
Department of Infrastructure and Regional Development	1
Department of Immigration and Border Protection	1
Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education – National Measurement Institute	1
Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education – Department of Climate Change and Energy Efficiency	1
Department of Parliamentary Services	1
Department of the Prime Minister and Cabinet	1
Department of Regional Australia, Regional Development and Local Government – Indian Ocean Territories Health Service	1
Department of Resources Energy and Tourism - Geoscience Australia	1

Commonwealth entity	Licences held
Department of Resources Energy and Tourism - Geoscience Australia – Geospatial and Earth Monitoring Division	1
Department of the Environment – Australian Antarctic Division	1
Department of the Environment – Australian Antarctic Division, Polar Medicine	1
Department of the Environment – Supervising Scientist	1
Family Court of Australia	1
Federal Court of Australia	1
Health Services Australia	1
High Court of Australia	1
Law Courts Limited	1
National Archives of Australia	1
National Gallery of Australia	1
National Museum of Australia	1
Note Printing Australia	1
Reserve Bank of Australia	1
Royal Australian Mint	1
Silex Systems Ltd	1
Total number of licences	60

Appendix 8: Operations of the Radiation Health and Safety Advisory Council and Committees

Operations of the Radiation Health and Safety Advisory Council 2013–14

The Radiation Health and Safety Council (Council) met on three occasions during the year (August 2013, November 2013 and April 2014) and considered a wide range of radiation protection and nuclear safety topics. Summaries of the meetings as well as other relevant Council information can be found at: www.arpansa.gov.au/AboutUs/Committees/ rhsacmt.cfm.

During this financial year, Council was chaired by Ms Sylvia Kidziak AM (NSW) until December 2013 and Professor Ray Kemp (Victoria) from January 2014 to present.

Council for the 2012–14 triennium is composed of the following:

- CEO of ARPANSA: Dr Carl-Magnus Larsson (NSW)
- Person to represent the interests of the general public: Em Prof Ian Lowe AO (QLD)
- Radiation Control Officers: Mr Keith Baldry (SA), Mr Simon Critchley (QLD)
- Nominee of the Chief Minister of the Northern Territory: Dr Stephen Skov (NT)
- Seven other Members:
 - » Dr Roger Allison (QLD)
 - » Ms Jill Fitch (SA)
 - » Dr Brad Cassels (VIC)
 - » Dr Denise Wheeler (QLD)
 - » Ms Melissa Holzberger (QLD)
 - » Mr Frank Harris (QLD)
 - » Professor Ray Kemp (VIC)/ Ms Sylvia Kidziak AM (NSW)

The current membership term will end in December 2014 and expressions of interest for membership from 2015 will be sought in mid-2014.

Adoption of Codes of Practice and Standards

During the year, Council advised the CEO to adopt Fundamentals for Protection Against Ionising Radiation developed by the Radiation Health Committee into the Radiation Protection Series as RPS F-1.

Reports to the CEO

The Council forwarded advice on the Management of Risks in the Transport of Radioactive Material in Australia to the CEO of ARPANSA on 13 December 2013. This advice can be found at: ww.arpansa.gov.au/Publications/RHSAC/rhsac stat.cfm

Other issues considered

Topics discussed and reviewed by the Council during this financial year include:

- Cosmic radiation exposure of aircrew, monitoring programs, exposure levels and company policies within the Australian airline industry.
- Current radiofrequency research and public exposures and the preliminary outcomes of the ARPANSA radiofrequency literature review.
- Roles and Expectations of ARPANSA's Advisory Bodies, the Council, the Radiation Health Committee (RHC) and the Nuclear Safety Committee (NSC), and how interactions between these groups might be enhanced to ensure optimal benefit from the skills and expertise of members.
- Strategies for increasing the visibility of the role of the Member representing the interests of the general public.
- ARPANSA's Communication Strategy and Plan, and Council discussed outcomes from the Australasian Radiation Protection Society (ARPS) 2013 Conference which had included considerable discussion about how this profession communicates radiation risks.
- The Australian Government's Deregulation Agenda and the implications for the revision of the ARPANS Act, ARPANSA's activities, including the status of work with medical imaging activities, progress of the Radon Progeny Technical Working Group and the strategy for the revision of the ARPANSA Radiation Protection Series framework that implement the new hierarchy of documents which were endorsed by Council in December 2011.

- Changes to ARPANSA's structure and other recommendations proposed by the Strategic Management Committee to ensure a sustainable future for ARPANSA.
- The findings of the 2013 UNSCEAR Report -Annex A Levels and effects of radiation exposure due to the nuclear accident after the 2011 Great East-Japan Earthquake and Tsunami which had been launched by Dr Larsson as Chair of UNSCEAR on 2 April 2014. An overview of the Report was presented including a detailed discussion of dose estimates to members of the public, effects upon non-human biota and dose estimates and health effects for workers and the public in Japan from the radiation exposures received as a result of the nuclear accident. The CEO reflected on the lessons learned by ARPANSA as a result of the Fukushima nuclear accident and noted that communication is one area of significant importance where there could be clear support from Council. The CEO also noted that ARPANSA had established closer working arrangements with a number of organisations, both nationally and internationally as a result of the accident. Council formally expressed their gratitude to ARPANSA for taking such a leading role in this significant and important body of work. Members congratulated all of the ARPANSA staff involved with this project and on the publication of the report.
- Progress with the revision of the ARPANS Act and the Memorandum of Understanding for Medical Imaging with the Department of Health.
- Progress on mapping the Radiation Protection Series documents (and Radiation Health Committee Statements and Radiation Health and Safety documents) against relevant international publications: including IAEA safety series, ICRP publications and ICNIRP publications; noting the Radiation Health Committee's proposal to consider adoption of IAEA publications as Radiation Protection Series documents subject to legislative approvals and requirements.
- Review and analysis of the linear no-threshold (LNT) hypothesis and model and consideration of the merits of the continued use of the LNT model as the basis for Australia's radiation protection framework. Members agreed that whilst there is uncertainty with the LNT model in the low dose range, it still offers the best approach from a regulatory perspective.

- The Bonn Call-for-Action Joint Position Statement by the IAEA and WHO which was developed as an outcome of the Bonn 2012 International Conference on Radiation Protection in Medicine: Setting the Scene for the Next Decade. Council noted the Bonn Call-for-Action against the background of work already done by ARPANSA encouraging ARPANSA to undertake further dialogue with relevant Australian stakeholders and that the Radiation Health Committee be requested to review the Bonn Call-for- Action in relation to their planned work activities.
- Briefings on the proposed changes to ARPANSA's Strategic Directions for the Financial Years 2014–17.

Members reviewed Council's Mission, Vision, Values, Strategic Goals and Strategic Directions and agreed to the following:

- Council's Mission, Vision and Values should closely align with ARPANSA's Mission, Vision and Values.
- Proposed editorial changes to Council's Strategic Goals be accepted.
- Strategic Directions should align with the ARPANSA Strategic Directions 2014–2017 document and be reviewed on an annual basis.
- The three priority areas where Council should consider and complete work are:
 - » medical radiation focusing on: paediatric doses, computed tomography, breast scanning and rationalisation of diagnostic imaging
 - » ongoing and emerging issues in radiation protection and science - focusing on existing exposure situations (aircrew and legacy sites) and issues associated with non-ionising radiation exposure
 - » effective communication and engagement on radiation management and nuclear safety.

Operations of the Radiation Health Committee 2013–14

This financial year, the Radiation Health Committee (RHC) met on three occasions at ARPANSA's office in Miranda, New South Wales: 13 November 2013, 5 March 2014 and 25 June 2014. Minutes of the meetings as well as other relevant committee information can be found at:

www.arpansa.gov.au/AboutUs/Committees/rhc.cfm

The Chair and Members for the 2012–14 triennium are set out below:

- *Chair*: Mr Keith Baldry (SA), Director, Regulation and Compliance, Environment Protection Authority
- CEO of ARPANSA: Dr Carl-Magnus Larsson (NSW)
- Radiation Control Officers: (each state and territory)
 - » Mr Ross Bevan (ACT), Manager Radiation Safety, Health Protection Service, ACT Health Directorate
 - » Associate Professor Brad Cassels (VIC), Expert Advisor Radiation, Department of Health
 - » Mr Simon Critchley (QLD), Director, Radiation Health, Department of Health
 - » Mr Len Potapof (NSW), Manager Radiation Regulation Unit, Environment Protection Authority
 - » Mr Russell Robinson (NT), Manager Radiation Protection, Department of Health
 - » Dr Barbara Shields (TAS), Senior Health Physicist, Department of Health and Human Services
 - » Ms Hazel Upton (WA), Managing Health Physicist, Radiation Health Unit, Department of Health
- Nuclear Safety Committee representative: Mr Robert Lyon (QLD), nuclear safety expert, formerly with AECL (Canada) and IAEA.
- Person to represent the interests of the general public: Dr Peter Karamoskos (VIC), radiologist and nuclear medicine specialist
- Other members:
 - » Dr Roslyn Drummond (VIC), Deputy Director of Radiation Oncology, Peter MacCallum Cancer Centre
 - » Dr Andrew Kerans (ACT), Adjunct Associate
 Professor of Engineering, James Cook
 University (QLD)

The current membership term of the RHC will end in December 2014 and expressions of interest for membership from 2015 will be sought in mid-2014.

Work undertaken by the Radiation Health Committee during this financial year included:

 Endorsement of the CEO's proposal about interactions between ARPANSA and the advisory bodies focusing on revitalising the committees and the Council and promoting the RHC's role in the promotion of national uniformity including encouraging broader public interaction with their work.

- Endorsement of a new project management strategy for working groups, including a 21 Step process for the production of publications.
- Consideration of progress on development of a number of publications in the Radiation Protection Series (RPS) as well as amendments to the National Directory for Radiation Protection (the NDRP).
- Approval of the final version of ARPANSA's top tier document, *Fundamentals for Protection Against Ionising Radiation*, which was subsequently endorsed by the Council, and published as RPS F-1 in February 2014.
- Completion of preliminary deliberations on the draft *Code of Practice for Radiation Protection in Planned Exposure Situations* (together with the Fundamentals) which will supersede RPS 1 *Recommendations for Limiting Exposure to Ionizing Radiation (1995) and National Standard for Limiting Occupational Exposure to Ionizing Radiation* (republished 2002).
- Continuing work on regulatory impact assessment process for the draft Code (above) with a view to proceeding to public comment sometime in the next financial year, pending approval by the Office of Best Practice Regulation (OBPR).
- Significant progress on the development of the Safety Guide for Radiation Protection of the Environment and noting that drafting had reached the public consultation stage, having satisfied the requirements of the OBPR, and this Safety Guide is expected to be published in late 2014.
- Recommendations that the Committee Working Group developing the Safety Guide on Clearance and Closure Criteria for Sites Contaminated by Past and Present Activities incorporate or adopt relevant international publications and consider how radiological contamination criteria can be built into the National Environmental Protection (Assessment of Site Contamination) Measure.
- Completion of Revision of RPS 2 Code of Practice for Safe Transport of Radioactive Material to align with the 2012 Edition of the IAEA Regulations for Safe Transport of Radioactive Material (SSR-6) with the revised Code approved with minor final editorial changes by the Committee in June 2014.

- Noted that additional consultation is required on the ELF Guidelines Reducing exposure to electric and magnetic fields (0 Hz – 3 kHz) to satisfy the OBPR requirements.
- ARPANSA's Radiofrequency (RF) Research Report was considered as a basis for revising and simplifying RPS 3 *Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz (2002)*, noting that RPS 3 still continues to provide an adequate level of protection to the public.
- Noted a proposal from the Victorian Health Department to the Standing Committee on Health seeking a national ban on commercial solaria and tanning units. Members confirmed that their respective jurisdictions were already moving toward such a ban, but it was not expected to extend to domestic solaria.
- Noted ARPANSA's mapping of the RPS documents against relevant international publications and the resulting gap analysis which is being used to inform a revised work program based on international best practice. In principle support was given for the process of adopting relevant international publications as RPS documents, with appropriate guidance, to assist users in Australia. Also considered was a proposal to provide convenient links to international documents from the ARPANSA website.
- Consideration and discussion of the Australian Government's Deregulation Agenda and potential ramifications for the National Directory and the amendments process.
- Consideration of issues of mutual recognition by jurisdictions and the effectiveness of national uniformity and the National Directory, with members agreeing that that national uniformity has not been fully achieved in its implementation.
- Consideration of a draft protocol Regulatory Expectations for Users of Radiation Sources Seeking to Obtain Authorisations in More than One State or Territory, which should provide a mechanism for reducing unnecessary regulatory burden and additional costs for business within the existing agreed national policy of mutual recognition.

The following Radiation Health Committee Project Proposals for new or revised RPS documents were considered:

- Fundamentals for Protection Against Non-Ionising Radiation
- Code for Government, Legal and Regulatory Framework for Safety
- Code for Management Systems
- Code for Radiation Protection in Existing Exposures
- Code for Emergency Exposures to Ionising Radiation
- Safety Guide for Emergency Preparedness and Response
- Guidelines on Limits of Exposure to Electric and Magnetic Fields 0 to 3 kHz
- Revision of RPS 3 *Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz* (2002) and production of associated Safety Guide
- Revision of RPS 14 Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (2008).

Operations of the Nuclear Safety Committee 2013–14

The role of the Nuclear Safety Committee (NSC) is to advise the CEO and the Radiation Health and Safety Advisory Council on matters relating to nuclear safety and the safety of controlled facilities. This includes reviewing and assessing the effectiveness of standards, codes, practices and procedures. The Nuclear Safety Committee met on three occasions during this financial year: 1 November 2013, 28 February 2014 and 20 June 2014. A summary of each meeting is available on the ARPANSA website at www.arpansa.gov.au/AboutUs/Committees/nscmt.cfm

Membership of the Nuclear Safety Committee for the 2012–14 triennium is as follows:

- Chair: Dr Tamie Weaver (VIC), Technical Director - Hydrogeology, environmental resources management consultancy
- CEO of ARPANSA: Dr Carl-Magnus Larsson (NSW)
- Radiation Health Committee representative: Dr Barbara Shields (TAS) Senior Health Physicist, Department of Health and Human Services
- Local Government representative: Mr Ian Drinnan (NSW) Principal Environmental Scientist, Sutherland Shire Council
- Person to represent the interests of the general public: Mr Christopher Tola (NSW) Officer, local government authority

• Other members:

- » Ms Kerrie Christian (NSW), metallurgist with background in governance, safety and reliability
- » Dr Rob Lee (ACT), human factors, systems safety and risk management expert with experience of aviation and other high technology industries
- » Mr Robert Lyon (QLD), nuclear safety expert, formerly with AECL and IAEA
- » Mr Don Macnab (NSW), former Director, Regulatory and Policy Branch, ARPANSA
- » Em Prof Ian Polmear (VIC), Monash University, Materials Science, metallurgist with expertise in nuclear and other high technology industries
- » Mr Peter Wilkinson (ACT), consultant in safety management and safety culture in hazardous industries

Key topics reviewed by the Nuclear Safety Committee during this financial year included:

- ARPANSA issuing a siting and construction licence to ANSTO for the proposed ANSTO Nuclear Medicine Molybdenum-99 Facility which will be used to produce molybdenum-99 for manufacturing radiopharmaceuticals.
- ANSTO's applications for siting and construction of an Interim Waste Store which is a purposebuilt store for intermediate level solid radioactive waste returning from France towards the end of 2015. The Committee discussed various safety aspects of ANSTO's proposed application for licences to prepare a site for, and to construct, an Interim Waste Store which is a purpose-built store for intermediate level solid radioactive waste returning from France towards the end of 2015. Aspects considered included: waste storage methodology; plans and arrangement for ongoing maintenance of the store; duration of storage; and maintaining ongoing oversight of the store. The CEO requested the Committee provide more detailed advice out-of-session which was subsequently provided by letter dated 22 November 2013.
- Various aspects about the licensing of ANSTO's SyMo facility which will be used to condition intermediate level liquid waste, arising from ANSTO's production of molybdenum-99, into an immobilised form using Synroc technology. Issues considered included: safety of the

proposed Synroc technology; adequacy of the risk assessment conducted; safety regulations during construction; and proposed plans for future decommissioning.

- Safety aspects of ANSTO's licence to operate the Australian Synchrotron and in particular the licensing requirement that ANSTO provide ARPANSA with the updated plans and arrangements, safety analysis report, and operating limits and conditions by September 2013 focusing upon safety aspects of documents submitted, specifically the safety of the future use of the imaging and medical beam-line.
- Safety of controlled facilities at ANSTO which included a brief outline of the inspections undertaken, and applications received, assessed and approved since the June 2013 meeting.
- Items discussed at the Radiation Health and Safety Advisory Council and the Radiation Health Committee meetings including progress on ARPANSA's Fundamentals for Protection Against Ionising Radiation.
- Reports of ARPANSA's involvement and collaboration at IAEA technical standards committees on Radiation, Waste and Transport Safety, and at the Fukushima Comprehensive Report Drafting Group meeting.
- Safety aspects relating to a transport incident had occurred involving the movement of radiation sources from Queensland to Germany when a package lid became dislodged during the movement and was later detected on arrival in Germany.
- Updates on the current situation in Japan following the Fukushima nuclear accident.
 Discussions on how the Japanese are monitoring the site including seawater; plans for remediation; and operation of reactors.
- The Committee discussed and agreed to finalise its advice to the CEO out-of-session on: (1) best practice approaches to applying licence conditions; and (2) beam calibration work that ARPANSA's Medical Radiation Branch currently performs at the Australian Synchrotron.
- The Committee reviewed ANSTO's hypothetical assessment of the scenario of a fuel plate being released from a fuel assembly during normal reactor operation. Key aspects discussed were the design and physical characteristics of fuel plates; potential storage of fuel plates

or other items should they be dislodged; and the assumptions applied to operator performance. Members considered that while modified fuel design renders the possibility of this event virtually impossible, the assessment was useful to help ANSTO understand and continuously improve its organisational resilience and response capability. Members provided comments reviewing ANSTO's investigation report regarding the difficulties occasionally experienced during fuel assembly clamp operations. The Committee discussed: the thoroughness and breadth of the report; ANSTO's assessment of systemic factors; processes and practices of both management and operational staff; risk assessment and mitigation; and OPAL procedures and document control. The Committee discussed: the thoroughness and breadth of the report: ANSTO's assessment of systemic factors; processes and practices of both management and operational staff; risk assessment and mitigation; and OPAL procedures and document control.

 The Committee reviewed ARPANSA's discussion paper which outlined the roles and expectations of the Committee, the Radiation Health Committee and the Radiation Health and Safety Advisory Council. Members discussed: the potential for increased interactions with the Radiation Health Committee and Council; the Committee's visibility to the public; and facilitating advice to the CEO.

- The Committee provided advice on two matters pertaining to controlled facilities: the Periodic Safety Review submitted to ARPANSA by ANSTO in connection with the condition placed upon the OPAL reactor operating licence; and the ANSTO Nuclear Medicine facility construction licence submission.
- The Committee reviewed two draft procedures and guidelines: draft 'Regulatory Guide: siting of controlled facilities' which provides information for applicants who intend to apply for a siting licence; and a set of draft, non-mandatory selfassessment tools ARPANSA has developed to assist licence holders and applicants identify and promote holistic safety practices within their organisation.
- The Committee considered the implications of analysing risk from the perspective of raw or inherent risk versus one which examines residual risks (with controls). Members discussed how the different approaches influence safety management and regulation.
- The Committee discussed the suite of draft publications necessary to better align the Radiation Protection Series publications with the IAEA Safety Standard Series.

ARPANSA's action plan addressing Australian National Audit Office (ANAO) recommendations Appendix 9:

ANAO 2014 Recommendations	Action	Status at 30 June 2014	Target Date
 To maintain stakeholder confidence in the independence and impartiality of its regulatory operations and decisions, the ANAO recommends that ARPANSA: a) periodically conducts training for regulatory staff on identifying and managing conflicts of interest, including personal conflicts b) obtains written declarations from regulatory staff at annual intervals indicating whether they have any potential, perceived or actual conflicts. 	 a) Col training will be added into existing staff training program including web based support information b) Col declaration to be drafted by Legal Office completed declarations collected and register maintained. 	 a) Reviewing Mandatory Compliance Program¹ with particular reference to Col b) Completed 	July 2014
To streamline its applications process and more effectively use its limited resources, the ANAO recommends that ARPANSA implements a documented risk-based approach to assessing licence applications, having regard to the: a) hazard of the source or facility to workers, the public and the environment b) the applicant's compliance maturity.	Incorporate into Delivery Model Project ²	Delivery Model Working Group established; first meeting held 4 June to discuss scope. A range of efficiency and deregulation activities are under investigation.	June 2015
 To strengthen its risk-based approach to monitoring compliance, the ANAO recommends that ARPANSA more directly links its management of licences to risk rankings, focusing particularly on: a) clearly aligning its planned inspection program to risk rankings of licences b) strategic targeting of unannounced inspections. 	Incorporate into Delivery Model Project ²	Delivery Model Working Group established; first meeting held 4 June to discuss scope. A range of efficiency and deregulation activities are under investigation.	June 2015
 To improve transparency and support continuing public confidence in the regulation of licences held by ARPANSA, the ANAO recommends that: a) inspections of its own licence are conducted periodically using inspectors from a state or territory radiation regulator b) provisions are made for independent review of other regulatory decisions relating to ARPANSA's own licences, particularly licence applications and Regulation 51 approvals. 	 a) Independent inspection for ARPANSA licences incorporated into inspection schedule b) Procedures to be modified for review of licence applications and modifications. 	 a) Inspector from Qld Health participated in an inspection of ARPANSA-owned sources in June 2014 b) Considering a generic co-operative agreement for use with state and territory regulators to provide for independent oversight of regulatory activities in relation to ARPANSA's own licences. A diversity of oversight is required depending on availability and expertise. 	July 2014 October 2014

Required under CEI6.
 The Delivery Model Project will explore and develop a graded approach to the regulation of low risk sources to relieve regulatory burden.

ANAO 2005 Recommendations	ANAO 2014 Assessment	ARPANSA Action	Status at 30 June 2014	Target Date
The ANAO recommends that ARPANSA enhance its risk management framework to identify risks to achievement of regulatory outcomes, mitigation strategies to manage those risks, residual risks, and a process of systematic monitoring of residual risks and their treatment.	Partial Chapter 2 has noted deficiencies with ARPANSA's regulatory risk management, including clear identification of risks, clearly developed mitigation strategies, and residual risks.	Address in planned review of risk register.	The risk register has been revised in the annual update performed in June 2014. A process of systematic monitoring of residual risks and their treatment is now in place.	Completed
 The ANAO recommends that ARPANSA strengthen management of the potential for, or perceptions of, conflict of interest, in accordance with legislative responsibilities, by: ensuring adequate documentation of all perceived or potential conflicts of interest taking action to better manage the conflict of interest arising from its regulatory role in 	Partial Chapter 2 has noted inadequate documentation of conflicts of interest, limited action and insufficient implementation to address self-regulation, and an empty conflict of interest register.	 Col training will be added into existing staff training program including web based support information Col declaration to be drafted by Legal Office completed declarations collected and register maintained 	Conflict of interest declarations completed by all regulatory staff; register maintained by Office of the General Counsel.	Completed
 respect of its own sources and facilities implementing and ensuring compliance with instructions issued. 		 Independent inspection for ARPANSA licences incorporated into inspection schedule Procedures to be modified for review of licence applications and modifications. 	Inspector from Qld Health participated in an inspection of ARPANSA-owned sources in June 2014; considering a generic co-operative agreement for use with state & territory regulators to provide for independent oversight of regulatory activities in relation to ARPANSA's own licences. A diversity of oversight is required depending on availability and expertise.	October 2014
 The ANAO recommends that ARPANSA: review and assess performance against customer service standards in its customer service charter systematically action and report on all complaints received. 	Partial Chapter 6 has noted no evidence that ARPANSA review and assess performance against charter standards.	Implement a complaints management system. Future annual reports will include assessment of performance against the revised service charter.	The Customer Service Charter has been revised and a plan established to develop and implement a Customer Complaints Management process. This will provide the ability to review, assess and report on that performance against the Charter beginning in the 2014–2015 Annual Report.	July 2014

ANAO 2005	ANAO 2014	ARPANSA Action	Status at	Target
Recommendations	Assessment		30 June 2014	Date
 The ANAO recommends that, in order to provide assurance that cost recovery is consistent with better practice and government policy, ARPANSA: develop a policy framework to guide its cost recovery arrangements have sufficiently reliable data, and analysis, on cost elements to support management decisions on cost recovery—such analysis should include the alignment of fees and charges with the costs of regulation for particular groups of clients or types of licences, to the extent that this is cost effective. 	Insufficient Chapter 5 has noted ARPANSA's cost recovery arrangements do not consistently reflect better practice and government policy. Cross-subsidisation continues and fees and annual charges are not clearly aligned with regulatory effort. The ANAO has noted these arrangements are currently under review.	ARPANSA will continue to advance its cost recovery model in a staged approach in consultation with licence holders, supported by the current review of the regulatory delivery model to reduce regulatory burden. Phase 1 – develop a robust cost model accurately accounting for all regulatory activities associated with licence holders. Phase 2 - identify all regulatory activities not associated with licence holders and review funding and cost recovery arrangements (commencing 3rd quarter 2014).	Time Tracker implemented for regulatory activities. Preliminary definitions of other elements of cost recovery are being developed.	Phase 1: completed Phase 2: April 2015
The ANAO recommends that ARPANSA introduce appropriate systems to ensure its application processing complies with the requirements of the ARPANS Act and Regulations	Insufficient Chapter 3 has noted that, in the current ANAO audit sample, six out of 100 applications were being processed and even approved before payment was received. This approach is not consistent with the relevant legislation and documented procedures for managing applications.	Incorporate into Delivery Model Project.	Delivery Model Working Group established; first meeting held 4 June to discuss scope. A range of efficiency and deregulation activities are under investigation.	June 2015
 The ANAO recommends that ARPANSA develop and implement an explicit, systematic and documented overall strategic compliance framework that: identifies and articulates the purpose, contribution, resourcing and interrelationships of the various compliance approaches is based on systematic analysis of the risk posed by licensees and the sources and facilities under their management targets compliance effort measures in accordance with assessed licensee risk. 	Partial Chapter 4 has noted that ARPANSA's compliance effort is not clearly linked to assessed licensee risk. ARPANSA's guidance also does not clearly articulate the interrelationships between the various compliance approaches.	Incorporate into Delivery Model Project.	Delivery Model Working Group established; first meeting held 4 June to discuss scope. A range of efficiency and deregulation activities are under investigation.	June 2015

ANAO 2005 Recommendations	ANAO 2014 Assessment	ARPANSA Action	Status at 30 June 2014	Target Date
The ANAO recommends that ARPANSA develop standard procedures, for the consideration and assessment of reports, that address:	Partial Chapter 4 has noted a lack of monitoring of reported information to identify trends and support a risk-based approach.	Partial Incorporate into Delivery Model Project ack of monitoring of reported information identific transfe and	Delivery Model Working Group established; first meeting held 4 June to discuss scope.	June 2015
 processes to provide assurance that license reports are appropriately assessed and acted upon 			Some analytical functions of Licence Administration Database	May 2015
 the collation and monitoring of reported information for risk management purposes. 			implemented; others to come in Stage.	
The ANAO recommends that ARPANSA establish a systematic,	Partial	Incorporate into Delivery Model Project	Delivery Model Working Group	June 2015
risk-based framework for compliance inspections that includes:	Chapter 4 has noted ARPANSA's inspection program is not directly liked to assessed	is noted ispection ot directly Stage 2 of the Licence Administration Database to allow for interrogation of	established; first meeting held 4 June to discuss scope.	
 an integrated inspection program based on systematic 	licensee risk ratings.		Noted in change management register	May 2015
and transparent assessment of the relative risks of facilities and hazards	Report findings are not subject to trend analysis to inform future compliance activity.	inspection findings.		
• inspection reporting procedures that clearly assess the extent of licensee compliance with licence conditions		future compliance activity.		
 recording of report findings in management information systems, to facilitate future compliance activity, and analysis of licence compliance trends 				
 accountable and transparent procedures for discretionary judgements, where compliance inspections vary from standard procedures 				
 reporting on ARPANSA's performance in conducting inspections. 				

Appendix 10: Publications

Radiation Protection Series

Australian Radiation Protection and Nuclear Safety Agency, *RPS F-1 Fundamentals for Protection Against Ionising Radiation* (2014). This publication, together with the Code of Practice for Radiation Protection in Planned Exposure Situations as Applied to Workers, the Public and the Environment (expected to be published in 2014) will supersede RPS 1 Recommendations for Limiting Exposure to Ionizing Radiation (1995) and National Standard for Limiting Occupational Exposure to Ionizing Radiation (republished 2002).

Book chapters

- Gies, P, Henderson, S & King, K 'Chapter 2: Ultraviolet Radiation (UVR) – Nuts and bolts of the big skin cancer factor'. (Editor Terry Slevin WACC). In Press.
- Gies, P. McLennan, A & Javorniczky, J 'Chapter 4: UV Protection by Clothing, Umbrellas and Hats'. in Sun & Health (Editor Terry Slevin WACC). In Press.

Journal articles

- Harty, P, Lye, J, Ramanathan, G, Butler, D, Hall, D, Hall, C, Stevenson, A & Johnston, P 2014, 'Absolute x-ray dosimetry on a synchrotron medical beam line with a graphite calorimeter', *Medical Physics* 41, 052101.
- Karipidis, K 2014, 'Assessment of bias in a survey of residential magnetic fields in Melbourne', Australia, Radiat Prot Dosimetry in press.
- Karipidis, K 2014, 'Survey of residential power-frequency magnetic fields in Melbourne', Australia, *Radiat Prot Dosimetry*. In press.
- Lehman, J, Dunn, L, Lye, J, Kenny, J, Andrew, C, Alves, D, Cole, A, Asena, A, Kron, T & Williams, I 2014, 'Angular dependence of the response of the nanoDot OSLD system for measurements at depth in clinical megavoltage beams', *Medical Physics* 41, 061712; doi: 10.1118/1.4875698.
- Lye, J, Dunn, L, Kenny, L, Lehman, J, Kron, T, Oliver, C, Butler, C, Alves, A, Johnston, P, Franich, R & Williams, I 2014, 'Remote auditing of radiotherapy facilities using optically stimulated luminescence dosimeters', *Medical Physics* 41, 032102; doi: 10.1118/1.4865786.
- Orr, B, Schöppner, M, Tinker, R & Plastino, W 2013, 'Detection of radioxenon in Darwin, Australia following the Fukushima Dai-ichi nuclear power plant accident'. *Journal of Environmental Radioactivity* 126 (0), 40-44.

- Picard, S, Burns, D, Roger, P, Harty, P, Ramanathan, G, Lye, J, Wright, T, Butler, D, Cole, A, Oliver, C & Webb, D 2014, 'Key comparison BIPM.RI(I)-K6 of the standards for absorbed dose to water of the ARPANSA, Australia and the BIPM in accelerator photon beams', *Metrologia* 51 Tech. Suppl. 06006.
- Schöppner, M, Plastino, W, Hermanspahn, N, Hoffmann, E, Kalinowski, M, Orr, B, Tinker, R 2013, 'Atmospheric transport modelling of time resolved 133Xe emissions from the isotope production facility ANSTO', Australia. *Journal of Environmental Radioactivity* 126 (0), 1-7.

Technical reports

- Australian Radiation Protection and Nuclear Safety Agency 2014 'Radiofrequency Expert Panel, 2014 Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012', ARPANSA Technical Report Series No. 164.
- Collett, S, Guilfoyle, R, Paritsky, B & O'Brien, R 2014 'Proposed Expansion of the Australian National Radiation Dose Register to the Mineral Sands Mining and Processing Industry', *ARPANSA Technical Report Series No. 165.*
- Hirth, G 2014 'A review of existing Australian radionuclide activity concentration data in non-human biota inhabiting uranium mining environments', ARPANSA Technical Report Series No. 167.
- Long, S & Sdraulig, S 2014, 'A Survey of the Capabilities of Australasian Radioanalytical Laboratories', ARPANSA Technical Report Series No. 168.
- Long, S 2014, 'Australasian Gamma-ray spectrometry Capability Exercise – 2013, ARPANSA Technical Report Series No. 169.
- Ramanathan, G, Harty, P, Wright, T, Lye, J, Butler, D, Webb, D & Huntley, R 2014, 'The Australian Primary Standard for Absorbed Dose to Water (Graphite Calorimeter)', *ARPANSA Technical Report Series No. 166.*
- Wijayasinghe, D & Karipidis, K 2013. 'ARPANSA Preliminary Measurements of Radiofrequency Transmissions from a Mesh Radio Smart Meter', *Technical Report Series No. 163.*

Conference papers

Alves, A 2013, 'Long Term OSLD Reader Stability in the Level I Audit', *Engineering and Physical Sciences in Medicine Conference*, Perth, 3-7 November.

- Butler, D, Cole, A, Ramanathan, G, Harty P, Lye, J, Oliver, O, Takau, V, Webb, D & Wright T 2014, 'Adapting A Clinical Medical Accelerator For Primary Standard Dosimetry', *The 5th Asian Forum for Accelerators and Dosimetry*, Melbourne, 14-16 January.
- Butler, D 2013, 'Progress report on the APMP comparison of air kerma for ISO x-ray beams APMP.RI(I)-S3', *Asia Pacific Metrology Program Technical Committee for Ionising Radiation Meeting* 24-29 November.
- Butler, D, Cole, A, Harty, C, Oliver, O, Ramanathan, G, Takau, V, Wright, T, Lye, J & Webb, D 2013, 'Shift in absorbed dose when using Monte Carlo kQ factors or ARPANSA direct calibration coefficients with TRS-398', Engineering and Physical Scientists in Medicine Conference, 3-7 November 2013 Perth, and at the Asia Pacific Metrology Program Technical Committee for Ionising Radiation Workshop in Taiwan 24-29 November 2013.
- Cole, A 2013 'QA measurements on the ARPANSA Elekta synergy linac using a sun nuclear daily QA3[™] ion chamber and diode array', *Engineering and Physical Sciences in Medicine Conference*, Perth, 3-7 November.
- Dunn, L 2013, 'Three Years running: ACDS level I photon audit, EPSM Conference', Engineering and Physical Sciences in Medicine Conference, Perth, 3-7 November.
- Gies, P, Dunstone, K, King, K, Makin, J & Javorniczky, J 2014, 'Measured Occupational Solar UVR Exposures of Outdoor Workers in Victoria in Winter'. New Zealand National Institute of Water and Atmosphere (NIWA) UV Workshop Proceedings, Auckland, 15-17 April.
- Harty, P, Ramanathan, G, Butler, D & Lye, J 2013, 'Calorimetry on the Australian Synchrotron Imaging and Medical Beamline', Engineering and Physical Sciences in Medicine Conference, Perth, 3-7 November.
- Henderson, S 2014, 'The future of the ARPANSA UV Monitoring Network'. NZ National Inst. *Water and Atmosphere (NIWA) UV Workshop Proceedings*, Auckland, 15-17 April.
- Harty, P, & Ramanathan, G 2013, 'Response of Active Electronic Radiation Monitors in Pulsed X-ray Beams from Linacs', *Australasian Radiation Protection Society Conference*, Cairns, 13-16 October.
- Hayton, A, Marks, P, Wallace, A, Thomas, P & Johnston, P
 2013 'The Australian diagnostic reference level service
 what we have learnt so far and how to use DRLs now we have them', Engineering and Physical Sciences in Medicine Conference, Perth, 3-7 November.

- Johnston, P, Marks, P, Wallace, A, Thomas, P & Hayton, A 2013, 'A review of the Mathew's et al research: 'Cancer risk in 680 000 people exposed to computed tomography scans in childhood or adolescence: data linkage study of 11 million Australians'', *Australasian Radiation Protection Society Conference*, Cairns, 13-16 October.
- Johnston, P, Williams, I, Lehmann, J, Lye, J, Kenny, J, Dunn, L, Alves, A & Oliver, C 2013, 'The Australian Clinical Dosimetry Service: The findings and the future' *Australasian Radiation Protection Society Conference*, Cairns, 13-16 October.
- Johnston, P, Marks, P, Wallace, A, Thomas, P & Hayton, 2013, A 'The Australian National Diagnostic Reference Level Service – Lessons learnt so far,' Australasian Radiation Protection Society Conference, Cairns, 13-16 October.
- Johnston, P 2013, 'The Australian Clinical Dosimetry Service at Three Years', *Australasian Radiation Protection Society Conference*, Cairns, 13-16 October 2013.
- Kenny, J 2013, 'ACDS Level IB Audits: Outcomes From Three Years Of Operation', Engineering and Physical Sciences in Medicine Conference, Perth, 3-7 November.
- Lehmann, J 2013, 'ACDS A Nation-Wide Three Level Audit Service - the Australian Experience', American Association of Physicists in Medicine Meeting, Indianapolis, United States, 5 August.
- Lehmann, J 2013, 'ACDS Level II Audit: Wedged and Asymmetric Fields with Inhomogeneities for Lung Treatments (WAIL)', *Engineering and Physical Sciences in Medicine Conference*, Perth, 3-7 November.
- Lehmann, J 2013, 'The Australian Clinical Dosimetry Service at three years', *Engineering and Physical Sciences in Medicine Conference*, Perth, 3-7 November.
- Lehmann, J 2013, 'ACDS Level III Audit: What have we found and where are we going', *Engineering and Physical Sciences in Medicine Conference*, Perth, 3-7 November.
- Lye, J 2013 'ACDS Level I remote OSLD audit Electrons', Engineering and Physical Sciences in Medicine Conference, Perth, 3-7 November.
- Lye, J 2013, Oliver, C, Butler, D, Webb, D, 'Progress report on the APMP.RI(I)-K1.1 extended comparison of AIR KERMA at Co-60', *Asia Pacific Metrology Program Technical Committee for Ionising Radiation Meeting* 24-29 November.
- Marks, P 2013, 'From Eyes to Thighs; Radiation Protection in Nuclear Medicine', *Australia & New Zealand Society of Nuclear Medicine* One Day Seminar, Melbourne, October.

- Marks, P, Wallace, A, Thomas, P, Hayton, A, Beveridge, T & Johnston, P 2013, 'How Does Your Referral Effect Radiation Protection of the Patient' *Australian College of Rural and Remote Medicine Conference*, Cairns, November.
- Marks, P, Wallace, A, Thomas, P, Hayton, A & Johnston, P 2013, 'Report on the application of the European DOSE DATAMED projects and the development of a Radiation Protection of the Patient program in Australia' Australasian Radiation Protection Society Conference, Cairns, 13-16 October.
- Marks, P, Wallace, A, Thomas, P, Hayton, A, Beveridge, T & Johnston, P 2014, 'Radiation Protection in a Clinical Environment' *Victorian Allied Health Research Conference*, Melbourne, March.
- Marks, P, Wallace, A, Thomas, P, Hayton, A & Beveridge, T 2014, 'Nuclear Medicine Diagnostic Reference Levels in Australia – A Pilot Study' ANZSNM Conference, Adelaide, April.
- Oliver, C 2013, 'ARPANSA Report to 13th Asia Pacific Metrology Program Technical Committee Meeting' Taipei, *New Taiwan, Asia Pacific Metrology Program Technical Committee for Ionising Radiation Meeting* 24-29 November.
- Oliver, C, Wright, T, Butler, D, Ramanathan, G, Harty, P, Cole, A, Webb, D & Takau, V 2013, 'Co-60 measurements at ARPANSA', Engineering and Physical Sciences in Medicine Conference, Perth, 3-7 November.
- Oliver, C, Wright, T, Butler, D, Ramanathan, G, Harty, P, Cole, A, Webb, D & Takau, V 2013, 'ARPANSA electron cross calibration service', *Engineering and Physical Sciences in Medicine Conference*, Perth, 3-7 November.
- Ramanathan, G, Harty, P, Oliver, C & Butler, D 2013, 'Performance of ARPANSA Reference Chambers for Direct Calibration in Linac Photons', *Engineering and Physical Sciences in Medicine Conference*, Perth, 3-7 November.
- Williams, I 2014, A review of the ACDS pilot: a national dosimetry audit in the Australian context, *Trans Tasman Radiation Oncology Group Conference*, Sunshine Coast, 4 March.
- Williams, I 2013, 'The Australian Clinical Dosimetry Service: The findings and the future', *Royal Australian and New Zealand College of Radiologists* Conference, Auckland, 19 October.
- Wright, T, Lye, J, Butler, D, Ramanathan, G, Harty, P, Oliver, C, Cole, A & Webb, D 2013, 'Validating a Monte Carlo linac model: how good is good?', *Engineering and Physical Sciences in Medicine Conference*, Perth, 3-7 November.

Presentations and seminars

- Butler, D 2013, 'Introduction to measurement uncertainty', and 'Megavoltage electron beam dosimetry uncertainties', Presentation to trainee medical physicists - Peter MacCallum Cancer Centre, 23 August.
- Butler, D 2013, Presentations at ARPANSA's 'External
 Beam Reference Dosimetry Course Ion chambers for
 dosimetry of complex treatment fields', 10-11 October
 2013, Lifehouse building, Camperdown, Sydney,
 Australasian College of Physical Scientists & Engineers
 in Medicine Summer School, Perth, 31 October-2
 November.
- Collett, S, Guilfoyle, R & Paritsky, B 2013 'Expansion of the Australian National Radiation Dose Register', *38th Australasian Radiation Protection Society Conference*, October, Cairns, Queensland.
- Collett, S 2013, 'The Australian National Radiation Dose Register – A Tool for the Optimisation of Worker Protection', *Australian Uranium and Rare Earths Conference*, July, Fremantle, Western Australia.
- Collett, S 2014, 'The Australian National Radiation Dose Register: Issues in Establishing, Operating and Expanding a National Dose Registry', IAEA Training Course on Harmonisation of National Dose Registries, Vienna, Austria.
- Dessent, K, Javorniczky, J and Karipidis, K, 2013, Radiation Protection and Awareness in Australia, *Laboratory Technicians Association of Victoria Conference*, Melbourne, Victoria.
- Guilfoyle, R, Thomas, P & Wallace, A 2013, 'Implications of a Reduced Dose Limit for the Lens of the Eye', *38th Australasian Radiation Protection Society Conference*, October, Cairns, Queensland.
- Hirth, G 2014, 'Assessing the impacts of radiation on Humans. Levels and effects of radiation exposure due to the nuclear accident after the great East-Japan earthquake and tsunami: The UNSCEAR Assessment'.
 Guest lecture at Radioecology Masters Course, 11 June, Norwegian University of Life Sciences, Ås, Norway.
- Hirth, G 2014, 'Assessing the impacts of radiation on Humans. Nuclear weapons testing in Australia: Legacy of the Maralinga tests', Guest lecture at Radioecology Masters Course, 11 June, Norwegian University of Life Sciences, Ås, Norway.
- Javorniczky, J 2014, 'Statistical data of injuries and the process for the regulation of lasers and IPLs used in the cosmetic industry, Regulation of IPLs and lasers used for cosmetic purposes', Australian Society of Aesthetic Plastic Surgery and the Cosmetic Physicians Society of Australasia Non-Surgical Symposium, May, Sydney.

- Karipidis, K 2013, 'Radiation Safety, Guest lecture in Environmental Influences in Health', Monash University, Victoria.
- Karipidis, K 2013. 'Electromagnetic Fields in the Environment', Environmental Health Professionals of Australia Symposium held, Cape Schanck, Victoria.
- Kenny, J 2013, 'QA of Complex Treatment Plans -Understanding Your Equipment', Australasian College of Physical Scientists & Engineers in Medicine Summer School, Perth, 31 October-2 November.
- Orr, B 2013, 'Status Report Australia' ARGOS consortium meeting, Copenhagen Denmark, September.

- Paritsky, B, Collett, S & Guilfoyle, R 2013. 'An Analysis of Data in the Australian National Radiation Dose Register', *38th Australasian Radiation Protection Society Conference*, October 2013, Cairns, Queensland.
- Paritsky, B, Carpenter, J, O'Brien, R & Williams, G 2013, 'A National Radioactive Waste Inventory for Australia', *38th Australasian Radiation Protection Society Conference*, October, Cairns, Queensland.
- Solomon, S, Hirth, G, Tinker, R, Sdraulig, S and Larsson, C-M 2013, 'Health Impacts from the 2011 Fukushima Daiichi Nuclear Power Station Accident', 38th Australasian Radiation Protection Society Conference, October, Cairns, Queensland.

Appendix 11: Financial statements for the year ended 30 June 2014



I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Independence

In conducting my audit, 1 have followed the independence requirements of the Australian National Audit Office, which incorporate the requirements of the Australian accounting profession.

Opinion

In my opinion, the financial statements of the Australian Radiation Protection and Nuclear Safety Agency:

- (a) have been prepared in accordance with the Finance Minister's Orders made under the *Financial Management and Accountability Act 1997*, including the Australian Accounting Standards; and
- (b) give a true and fair view of the matters required by the Finance Minister's Orders, including the Australian Radiation Protection and Nuclear Safety Agency's financial position as at 30 June 2014 and its financial performance and cash flows for the year then ended.

Australian National Audit Office

Peter Kerr Executive Director Delegate of the Auditor-General Canberra 16 September 2014

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)

Financial Statements - 30 June 2014

Australian Radiation Protection and Nuclear Safety Agency STATEMENT BY THE CHIEF EXECUTIVE AND CHIEF FINANCIAL OFFICER

In our opinion, the attached financial statements for the year ended 30 June 2014 are based on properly maintained financial records and give a true and fair view of the matters required by the Finance Minister's Orders made under the *Financial Management and Accountability Act 1997*, as amended.

Signed.....

Carl-Magnus Larsson Chief Executive Officer

16 September 2014

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Signed.....

George Savvides Chief Financial Officer

16 September 2014

Australian Radiation Protection and Nuclear Safety Agency STATEMENT OF COMPREHENSIVE INCOME

for the period ended 30 June 2014

		2014	2013
NET COST OF SERVICES	Notes	\$	\$
EXPENSES			
Employee benefits	3A	17,138,979	17,314,382
Supplier	3B	6,637,147	7,726,220
Depreciation and amortisation	3C	2,272,567	2,330,302
Write-down and impairment of assets	3D	314,198	30,279
Total expenses	-	26,362,891	27,401,183
OWN-SOURCE INCOME			
Own-source revenue			
Sale of goods and rendering of services	4A	6,679,150	7,131,176
Licence fees	4B	4,549,548	4,428,701
Other revenue	4C	56,500	55,000
Total own-source revenue	-	11,285,198	11,614,877
Gains			
Foreign exchange	4D	805	127
Total gains	-	805	127
Total own-source income	-	11,286,003	11,615,004
Net cost of services	-	15,076,888	15,786,179
Revenue from Government	4E	13,813,000	13,498,000
Deficit attributable to the Australian Government	-	(1,263,888)	(2,288,179)
OTHER COMPREHENSIVE INCOME			
Items not subject to subsequent reclassification to net cost of			
Changes in asset revaluation surplus		1.375.058	509 292
Total other comprehensive income	-	1 375 058	509,292
Total comprehensive income (loss) attributable to the Australian	-	1,070,000	507,272
Government	-	111,170	(1,778,887)

The above statement should be read in conjunction with the accompanying notes.

Australian Radiation Protection and Nuclear Safety Agency STATEMENT OF FINANCIAL POSITION

as at 30 June 2014

		2014	2013
	Notes	\$	\$
ASSETS			
Financial assets			
Cash and cash equivalents	6A	1,395,004	999,734
Trade and other receivables	6B	4,075,822	1,995,377
Other financial assets	6C	90,922	113,746
Total financial assets	_	5,561,748	3,108,857
	_		
Non-financial assets			
Land and buildings	7A	21,182,301	18,982,031
Plant and equipment	7B,7F	5,743,710	6,121,867
Intangibles	7C,7G	591,661	622,129
Inventories	7D	1,473,815	1,437,945
Other non-financial assets	7E	368,855	350,383
Total non-financial assets	_	29,360,342	27,514,355
Total assets		34,922,090	30,623,212
LIABILITIES			
Payables			
Suppliers	8A	1,157,261	668,277
Other payables	8B	832,727	1,289,454
Total payables	_	1,989,988	1,957,731
Dravisions			
Employee provisions	0	4 620 837	4 000 386
Total provisions	· ·	4,020,837	4,909,380
Total provisions	-	6 610 825	6 867 117
Net assets	-	28 311 265	23 756 005
Incl assets	=	20,511,205	23,730,093
EQUITY			
Contributed equity		15,500,000	11,056,000
Reserves		11,014,129	9,639,071
Retained surplus	_	1,797,136	3,061,024
Total equity	_	28,311,265	23,756,095

The above balance sheet should be read in conjunction with the accompanying notes.

Asset revaluati					
	ion	Contributed	- 7	Total eq	uity
surpus 2014	2013	equity/capits 2014	2013	2014	2013
\$	÷	÷	÷	÷	\$
9,639,071 9,1	129,779 11,0	56,000 9,	,120,000	23,756,095	23,598,982
9,039,U/I 9,	173,179 11,0		,120,000	c60,0c1,c7	286,866,62
1,375,058 5	509,292		I	1,375,058	509,292
				(1,263,888)	(2,288,179)
1,375,058	509,292		1	111,170	(1,778,887)
	1,9	44,000 1, ⁻ 00,000	,936,000 -	1,944,000 2,500,000	1,936,000 -
	- 4,4	44,000 1;	,936,000	4,444,000	1,936,000
			026 000	36 111 26	72 756 005
1,375,058 5 1,375,058 5	509,292	1,9	, 1,944,000 2,500,000 4,444,000 1,	1,944,000 1,936,000 2,500,000 1,936,000	1,375,058 1,375,058 1,375,058 1,1,170 111,170 111,170 1,944,000 2,500,000 2,500,000 4,444,000 1,936,000

Australian Radiation Protection and Nuclear Safety Agency CASH FLOW STATEMENT

for the period ended 30 June 2014

		2014	2013
	Notes	\$	\$
OPERATING ACTIVITIES			
Cash received			
Appropriations		13,813,000	14,078,000
Sales of goods and rendering of services		10,905,698	11,695,459
Net GST received		220,542	249,167
Total cash received		24,939,240	26,022,626
Cash used			
Employees		(17,256,546)	(17,750,046)
Suppliers		(7,624,400)	(8,929,847)
Total cash used		(24,880,946)	(26,679,893)
Net cash from (used by) operating activities	10	58,294	(657,267)
INVESTING ACTIVITIES			
Cash used			
Purchase of property, plant, equipment and intangibles		(2,324,024)	(848,880)
Total cash used		(2,324,024)	(848,880)
Net cash (used by) investing activities		(2,324,024)	(848,880)
FINANCING ACTIVITIES			
Cash received			
Contributed equity		2,661,000	850,000
Total cash received		2,661,000	850,000
Net cash from financing activities		2,661,000	850,000
Net (decrease) increase in cash held		395,270	(656,147)
Cash and cash equivalents at the beginning of the reporting period		999,734	1,655,881
Cash and cash equivalents at the end of the reporting period	6A	1,395,004	999,734

The above statement should be read in conjunction with the accompanying notes.

Australian Radiation Protection and Nuclear Safety Agency SCHEDULE OF COMMITMENTS as at 30 June 2014

	2014	2012
BV TVPF	2014	2013
	Ψ	Ψ
Vot CST receivable on commitments	(377 954)	(107.606)
Tetel commitments receivable	(377,854)	(107,696)
Commitments receivable	(377,034)	(107,090)
Capital commitments		
Puilding Infrastructure plant and aquinment ²	1 002 452	297 506
Total conital commitments	1,995,455	287,590
i otar capitar commitments	1,995,455	387,390
Other commitments		
Operating leases ³	653.965	261.109
Other commitments ⁴	1.508.978	535,952
Total other commitments	2,162,943	797,061
Net commitments by type	3,778,542	1,076,961
	- / - /-	,,
BY MATURITY		
Other commitments receivable		
One year or less	(323,995)	(107,696)
From one to five years	(53,859)	
Total other commitments receivable	(377,854)	(107,696)
Commitments payable		
Capital commitments		
One year or less	1,993,453	387,596
From one to five years	-	-
Total capital commitments	1,993,453	387,596
Operating lease commitments		
One year or less	390,948	261,109
From one to five years	263,017	
Total operating lease commitments	653,965	261,109
Other commitments		
One year or less	1.179.540	535 952
From one to five years	329.438	000,002
Total other commitments	1.508.978	535,952
Net commitments by maturity	3,778,542	1,076,961

Note:

1. Commitments are GST inclusive where relevant.

2. Building, Infrastructure plant and equipment - contractual payments for building renovation, computer and scientific equipment

3. Operating leases are effectively non-cancellable and comprise:

Leases for office accommodation.

Lease payments are not subject to annual increase as per the lease. The lease term is 2 years.

Agreements for the provision of motor vehicles to senior executive officers.

No contingent rentals exist. There are no renewal or purchase options available to the Agency.

4. Other commitments - contracts for the procurement of goods and services

The above schedule should be read in conjunction with the accompanying notes.

Australian Radiation Protection and Nuclear Safety Agency SCHEDULE OF CONTINGENCIES

as at 30 June 2014

	2014	2013 \$
Total contingent assets	φ 	φ -
Total contingent liabilities	<u> </u>	
Net contingent assets (liabilities)	<u> </u>	-

The above schedule should be read in conjunction with the accompanying notes.

NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS for the period ended 30 June 2014

Note 1: Summary of Significant Accounting Policies Note 2: Events after the Reporting Period Note 3: Expenses Note 4: Income Note 5: Fair Value Measurements Note 6: Financial Assets Note 7: Non-Financial Assets

Note 8: Payables

Note 9: Provisions Note 10: Cash Flow Reconciliation

Note 11: Contingent Liabilities and Assets

Note 12: Executive Remuneration

Note 13: Remuneration of Auditors

Note 14: Compensation and Debt Relief

Note 15: Financial Instruments

Note 16: Financial Assets Reconciliation

Note 17: Appropriations

Note 18: Special Accounts

Note 19: Compliance with Statutory Conditions for Payments from the Consolidated Revenue Fund

Note 20: Reporting of Outcomes

Note 21: Comprehensive Income attributable to the Agency

Note 1: Summary of Significant Accounting Policies

1.1 Objectives of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)

ARPANSA is an Australian Government controlled entity. It is a not-for-profit entity. The objectives of ARPANSA are described in the body of this Annual Report.

The Agency is structured to meet one outcome:

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

The continued existence of the Agency in its present form and with its present programs is dependent on Government policy and on continuing funding by Parliament for the Agency's administration and programs.

ARPANSA's activities contributing toward the outcome are classified as departmental. Departmental activities involve the use of assets, liabilities, income and expenses controlled or incurred by the Agency in its own right.

1.2 Basis of Preparation of the Financial Report

The financial statements are general purpose financial statements and are required by section 49 of the Financial Management and Accountability Act 1997.

The financial statements and notes have been prepared in accordance with:

a) Finance Minister's Orders (or FMOs) for reporting periods ending on or after 1 July 2011; and

b) Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The financial statements have been prepared on an accrual basis and are in accordance with historical cost convention, except for certain assets and liabilities at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position.

The financial statements are presented in Australian dollars and values are rounded to the nearest dollar unless otherwise specified.

Unless an alternative treatment is specifically required by an accounting standard or the FMOs, assets and liabilities are recognised in the balance sheet when and only when it is probable that future economic benefits will flow to the Agency or future sacrifice of economic benefits will be required and the amounts of the assets or liabilities can be reliably measured. However, assets and liabilities arising under executor contract are not recognised unless required by an accounting standard. Liabilities and assets that are unrecognised are reported in the schedule of commitments or the schedule of contingencies.

Unless alternative treatment is specifically required by an accounting standard, income and expenses are recognised in the statement of comprehensive income when and only when the flow, consumption or loss of economic benefits has occurred and can be reliably measured.

1.3 Significant Accounting Judgements and Estimates

In the process of applying the accounting policies listed in this note, ARPANSA has made the following judgement that have the most significant impact on the amounts recorded in the financial statements:

- The long service leave liability is calculated using the shorthand method developed by the Australian Government Actuary. This method is impacted by fluctuations in the Commonwealth Government 10 year Treasury Bond rate and the Agency's estimated salary growth rates.

No accounting assumptions or estimates have been identified that have a significant risk of causing a material adjustment to carrying amounts of assets and liabilities within the next accounting period.

1.4 New Australian Accounting Standards

Adoption of new Australian Accounting Standard requirements

No accounting standard has been adopted earlier than the application date stated in the standard.

The following new or revised standards were issued prior to the signing of the statement by the Chief Executive and Chief Financial Officer, were applicable to the current reporting period and had an effect on the Agency's financial statements.

- AASB 13 Fair Value Measurement - introduced a common principle on how to measure fair value, placed a greater emphasis on valuing from the perspective of market participants and required additional disclosures for non-financial assets

- AASB 119 Employee benefits revised the definition of short and long term employee benefits, placing emphasis on when the benefit is expected to be settled rather than when it is due to be settled.

Future Australian Accounting Standard requirements

New standards, revised or amending standards and interpretations that were issued prior to the signing of the statement by the Chief Executive and Chief Financial Officer and are applicable to the future reporting period are not expected to have a future material impact on the Agency's financial statements.

AASB 1055 Budgetary Reporting will require ARPANSA to disclose budgeted information, presented to Parliament in the Portfolio Budget Statements. ARPANSA will also be required to provide explanations of significant variances between the budgeted amounts and actual results. This standard will be applicable to reporting periods commencing on or after 1 July 2014.

1.5 Revenue

Revenue from Government

Amounts appropriated for departmental appropriations for the year (adjusted for any formal additions and reductions) are recognised as Revenue from Government when the Agency gains control of the appropriation, except for certain amounts that relate to activities that are reciprocal in nature, in which case revenue is recognised only when it has been earned.

Section 56 (3) of the Australian Radiation Protection and Nuclear Safety Act 1998 (the Act), requires that money appropriated by the Parliament be transferred to the special account (notes 5A and 16 refer).

Appropriations receivable are recognised at their nominal amounts.

Licence Fees

Under paragraph 34(b) of the Act, an application for a licence must be accompanied by a fee prescribed in the regulations. Revenue for licence applications is recognised when an application for a licence is received.

Revenue for annual licence fees is recognised when a licence is issued to the licensee.
Other Types of Revenue

Revenue from the sale of goods is recognised when:

a) The risks and rewards of ownership have been transferred to the buyer;

- b) The Agency retains no managerial involvement nor effective control over the goods;
- c) The revenue and transaction costs incurred can be reliably measured; and
- d) It is probable that the economic benefits associated with the transaction will flow to the Agency.

Revenue from rendering of services is recognised by reference to the stage of completion of contracts at the reporting date. The revenue is recognised when:

a) The amount of revenue, stage of completion and transaction costs incurred can be reliably measured; and

b) The probable economic benefits associated with the transaction will flow to the Agency.

The stage of completion of contracts at the reporting date is determined by reference to the proportion that costs incurred to date bear to the estimated total costs of the transaction.

Receivables for goods and services, which have 30 day terms, are recognised at the nominal amounts due less any impairment allowance account. Collectability of debts is reviewed at end of reporting period. Allowances are made when collectability of the debt is no longer probable.

Resources Received Free of Charge

Resources received free of charge are recognised as revenue when and only when a fair value can be reliably determined and the services would have been purchased if they had not been donated. Use of those resources is recognised as an expense.

Resources received free of charge are recorded as either revenue or gains depending on their nature.

Parental Leave Payments Scheme

All amounts received by the Agency under the parental leave payments scheme have been paid to employees. The total amount received under this scheme was \$11,197 (2013: \$10,917).

1.6 Gains

Contributions of assets at no cost of acquisition or for nominal consideration are recognised as gains at their fair value when the asset qualifies for recognition, unless received from another Government entity as a consequence of a restructuring of administrative arrangements. (Refer Note 1.7)

Sale of Assets

Gains from disposal of assets are recognised when control of the asset has passed to the buyer.

Foreign exchange

Gains from disposal of assets are recognised when control of the asset has passed to the buyer.

1.7 Transactions with the Government as Owner

Equity Injections

Amounts appropriated which are designated as 'equity injections' for a year (less any formal reductions) and Departmental Capital Budgets (DCBs) are recognised directly in contributed equity in that year.

Restructuring of Administrative Arrangements

Net assets received from or relinquished to another Government entity under a restructuring of administrative arrangements are adjusted at their book value directly against contributed equity.

1.8 Employee Benefits

Liabilities for 'short-term employee benefits' (as defined in AASB 119 *Employee Benefits*) and termination benefits expected within twelve months of the end of the reporting period are measured at their nominal amounts.

The nominal amount is calculated with regard to the rates expected to be paid on settlement of the liability.

Other long-term employee benefit liabilities are measured as net total of the present value of the defined benefit obligation at the end of the reporting period minus the fair value at the end of the reporting period of plan assets (if any) out of which the obligations are to be settled directly.

Leave

The liability for employee benefits includes provision for annual leave and long service leave. No provision has been made for sick leave as all sick leave is non-vesting and the average sick leave taken in future years by employees of the Agency is estimated to be less than the annual entitlement for sick leave.

The leave liabilities are calculated on the basis of employees' remuneration at the estimates salary rates that will be applied at the time the leave will be taken, including the Agency's employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The liability for long service leave is recognised and measured at the present value of the estimated future cash flows to be made in respect of employees as at 30 June 2014. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Separation and Redundancy

Provision is made for separation and redundancy benefit payments. The entity recognises a provision for termination when is has developed a detailed plan for terminations and has informed those employees affected that it will carry out the terminations.

Superannuation

The majority of staff of ARPANSA are members of the Commonwealth Superannuation Scheme (CSS), the Public Sector Superannuation Scheme (PSS) or the PSS accumulation plan (PSSap), and the Australian Government Employee Superannuation Trust (AGEST). There are a small number of staff covered under various other superannuation schemes.

The CSS and PSS are defined benefit schemes for the Australian Government. The PSSap is a defined contribution scheme. The AGEST Superannuation Trust is an industry fund which was previously the Australian Government Default Superannuation fund for non-ongoing employees.

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course. This liability is reported by the Department of Finance and Deregulation's administered schedules and notes.

ARPANSA makes employer contributions to the employees' superannuation scheme at rates determined by an actuary to be sufficient to meet the current cost to the Government. ARPANSA accounts for the contributions as if they were contributions to defined contribution plans.

The liability for superannuation recognised as at 30 June represents outstanding contributions for the final fortnight of the year.

1.9 Leases

A distinction is made between finance leases and operating leases. Finance leases effectively transfer from the lessor to the lessee substantially all the risks and rewards incidental to ownership of leased assets. An operating lease is a lease that is not a finance lease. In operating leases, the lessor effectively retains substantially all such risks and benefits.

Where an asset is acquired by means of a finance lease, the asset is capitalised at either the fair value of the lease property or, if lower, the present value of minimum lease payments at the inception of the contract and a liability is recognised at the same time and for the same amount.

The discount rate used is the interest rate implicit in the lease. Leased assets are amortised over the period of the lease. Lease payments are allocated between the principal component and the interest expense.

Operating lease payments are expensed on a straight-line basis which is representative of the pattern of benefits derived from the leased assets.

1.10 Fair Value Measurement

When an asset or liability, financial or non-financial, is measured at fair value for recognition or disclosure purposes, the fair value is based on the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date; and assumes that the transaction will take place either: in the principle market; or in the absence of a principal market, in the most advantageous market.

Fair value is measured using the assumptions that market participants would use when pricing the asset or liability, assuming they act in their economic best interest. For non-financial assets, the fair value measurement is based on its highest and best use. Valuation techniques that are appropriate in the circumstances and for which sufficient data are available to measure fair value, are used, maximising the use of relevant observable inputs and minimising the use of unobservable inputs.

Assets and liabilities measured at fair value are classified, into three levels, using a fair value hierarchy that reflects the significance of the inputs used in making the measurements. Classifications are reviewed each reporting date and transfers between levels are determined based on a reassessment of the lowest level input that is significant to the fair value measurement.

For recurring and non-recurring fair value measurements, external valuers may be used when internal expertise is either not available or when the valuation is deemed to be significant. External valuers are selected based on market knowledge and reputation. Where there is a significant change in fair value of an asset or liability from one period to another, an analysis is undertaken, which includes a verification of the major inputs applied in the latest valuation and a comparison, where applicable, with external sources of data.

1.11 Cash

Cash is recognised at its nominal amount. Cash and cash equivalents includes:

a) cash on hand;

b) cash held by outsiders; and

c) cash in special accounts.

1.12 Financial Assets

The Agency classifies its financial assets in the following categories:

- a) financial assets at fair value through profit or loss;
- b) held-to-maturity investments;
- c) available-for-sale financial assets; and
- d) loans and receivables.

The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition. Financial assets are recognised and derecognised upon trade date. ARPANSA only holds "loans and receivables"

Effective Interest Method

The effective interest method is a method of calculating the amortised cost of a financial asset and of allocating interest income over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset, or, where appropriate, a shorter period.

Income is recognised on an effective interest rate basis except for financial assets that are recognised at fair value through profit or loss.

Loans and receivables

Trade receivables, loans and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'loans and receivables'. Loans and receivables are measured at amortised cost using the effective interest method less impairment. Interest is recognised by applying the effective interest rate.

Impairment of Financial Assets

Financial assets are assessed for impairment at the end of each reporting period.

Financial assets held at amortised cost - if there is objective evidence that an impairment loss has been incurred for loans and receivables or held to maturity investments held at amortised cost, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows discounted at the asset's original effective interest rate. The carrying amount is reduced by way of an allowance account. The loss is recognised in the Statement of Comprehensive Income. Available for sale financial assets - if there is objective evidence that an impairment loss on an available-for-sale financial asset has been incurred, the amount of the difference between its cost, less principal repayments and amortisation, and its current fair value, less any impairment loss previously recognised in expenses, is transferred from equity to the Statement of Comprehensive Income.

Financial assets held at cost - If there is objective evidence that an impairment loss has been incurred, the amount of the impairment loss is the difference between the carrying amount of the asset and the present value of the estimated future cash flows discounted at the current market rate for similar assets.

1.13 Financial liabilities

Financial liabilities are classified as either financial liabilities 'at fair value through profit or loss' or other liabilities. Financial liabilities are recognised and derecognised upon 'trade date'. The Agency only holds other liabilities.

Other Liabilities

Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

1.14 Contingent Liabilities and Contingent Assets

Contingent liabilities and contingent assets are not recognised in the balance sheet but are reported in the relevant schedules and notes. They may arise from uncertainty as to the existence of a liability or asset, or represent an asset or liability in respect of which the amount cannot be reliably measured. Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

1.15 Acquisition of Assets

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where appropriate.

Assets acquired at no cost, or for nominal consideration, are initially recognised as assets and income at their fair value at the date of acquisition, unless acquired as a consequence of restructuring of administrative arrangements. In the latter case, assets are initially recognised as contributions by owners at the amounts at which they were recognised in the transferor's accounts immediately prior to the restructuring.

1.16 Property, Plant and Equipment

Asset Recognition Threshold

Purchases of property, plant and equipment are recognised initially at cost in the balance sheet, except for purchases costing less than \$2,000, which are expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

Revaluations

Fair values for each class of asset are determined as shown below:

Asset class	Fair value measures at:
Land	Market Value
Buildings exc.leasehold improvement	Depreciated replacement cost
Leasehold improvements	Depreciated replacement cost
Plant & equipment	Market Value

Following initial recognition at cost, property plant and equipment are carried at fair value. Valuations are conducted with sufficient frequency to ensure that the carrying amounts of assets do not differ materially from the assets' fair values as at the reporting date. The regularity of independent valuations depends upon the volatility of movements in market values for the relevant assets.

Revaluation adjustments are made on a class basis. Any revaluation increment is credited to equity under the heading of asset revaluation reserve except to the extent that it reverses a previous revaluation decrement of the same asset class that was previously recognised in the surplus/deficit. Revaluation decrements for a class of assets are recognised directly in the surplus/deficit except to the extent that they reverse a previous revaluation increment for that class.

Any accumulated depreciation as at the revaluation date is eliminated against the gross carrying amount of the asset and the asset restated to the revalued amount.

Depreciation

Depreciable property plant and equipment assets, are written-off to their estimated residual values over their estimated useful lives to ARPANSA, using the straight-line method of depreciation. Leasehold improvements are depreciated using the straight line method over the lesser of the estimated useful life of the improvements or the unexpired period of the lease.

Depreciation rates (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate.

Depreciation rates applying to each class of depreciable asset are based on the following useful lives:

	2014	2013
Buildings on freehold land	18 years	19 years
Leasehold improvements	Lease term - 4 years	Lease term - 4 years
Plant and equipment	1 year to 27 years	1 years to 27 years

Impairment

All assets were assessed for impairment at 30 June 2014. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.

The recoverable amount of an asset is the higher of its fair value less costs to sell and its value in use. Value in use is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows, and the asset would be replaced if ARPANSA were deprived of the asset, its value in use is taken to be its depreciated replacement cost.

Derecognition

An item of property, plant and equipment is derecognised upon disposal or when no further future economic benefits are expected from its use or disposal.

1.17 Intangibles

ARPANSA's intangibles comprise purchased software, internally developed software for internal use and trade marks. These assets are carried at cost less accumulated amortisation and accumulated impairment losses. Intangibles are amortised on a straight-line basis over their anticipated useful life. The useful lives of ARPANSA's intangibles are 5 to 15.5 years (2012-13: 5 to 15.5 years).

All intangibles assets were assessed for indications of impairment as at 30 June 2014.

1.18 Inventories

Inventories held for sale are valued at the lower of cost and net realisable value.

Inventories held for distribution are valued at cost, adjusted for any loss of service potential.

1.19 Foreign currency transactions

Transactions denominated in a foreign currency are converted at the exchange rate at the date of the transaction. Foreign currency receivables and payables are translated at the exchange rates current at balance date where the impact is assessed as material. Exchange gains and losses are reported in the statement of comprehensive income.

1.20 Taxation

The Agency is exempt from all forms of taxation except Fringe Benefits Tax (FBT) and the Goods and Services Tax (GST).

Revenues, expenses and assets are recognised net of GST, except:

- a) where the amount of GST incurred is not recoverable from the Australian Taxation Office; and b) for receivables and payables.
- b) for receivables and payables

Note 2: Events after the Reporting Period

There have been no significant subsequent events after the reporting period that impact on the financial statements for the year ended 30 June 2014

Note 3: Expenses		
	2014	2013
	\$	\$
Note 3A: Employee benefits		
Wages and salaries	12,039,746	12,431,538
Superannuation - defined contribution	1,743,676	2,075,126
Superannuation - defined benefit	409,021	381,282
Leave and other entitlements	2,328,519	2,216,693
Separation and redundancies Total employee benefits	618,017 17,138,979	209,743
Note 3B: Suppliers		
Goods and services supplied or rendered		
Audit fees - ANAO	56,500	55,000
Audit fees - outsourced	94,581	92,598
Advisory council and committees	101,158	116,811
Communications	338,909	592,880
Construction and maintenance - Comprehensive nuclear test ban treaty	646,069	523,855
Contractors/Consultants	407,911	787,277
Information technology	705,714	643,220
Insurance	519,252	522,917
Laboratory supplies	301,749	423,883
Postage and freight	191,070	187,020
Reference material & subscriptions	225,878	235,363
Repair and maintenance	387,755	388,886
Training and conferences	208,235	353,976
Travel	900,764	1,126,680
Utilities	586,174	560,310
Other goods and services	530,743	6/8,226
Total goods and services supplied or rendered	6,202,462	7,288,902
Goods supplied in connection with		
External parties	1,209,771	1,534,544
Total goods supplied	1,209,771	1,534,544
Services rendered in connection with		
Related entities	1,061,672	1,341,367
External parties	3,931,019	4,413,021
Total services rendered	4,992,691	5,754,388
Total goods and services supplied or rendered	6,202,462	7,288,932
Other supplier expenses		
Operating lease rentals - external entity		
Minimum lease payments	383,598	384,159
Workers compensation premiums	51,087	53,129
Total other supplier expenses	434,685	437,288
Total supplier expenses	6,637,147	7,726,220
Note 3C: Depreciation and amortisation		
Depreciation:		
Property, plant and equipment	1,238,576	1,269,818
Buildings	807,090	824,133
Total depreciation	2,045,666	2,093,951
Amortisation:		
Intangibles:		
Computer software	226,571	236,021
Other	330	330
Total amortisation	226,901	236,351
Total depreciation and amortisation	2,272,567	2,330,302
Note 3D: Write-down and impairment of assets		
Impairment on financial assets	25	30
Property, plant and equipment - write-off	74,135	11,197
Computer software - write-off	25,990	17,630
Inventories - write-off	214,048	1,422
Total write-down and impairment of assets	314,198	30,279

	2014	2013
<u>Own-source revenue</u>	\$	\$
Note 4A: Sale of goods and rendering of services		
Scientific services - Personal radiation monitoring service	2,574,137	2,505,819
Construction and maintenance - Comprehensive nuclear test ban treaty	1,792,880	2,017,644
Other scientific services	2,312,133	2,607,713
Total sale of goods and rendering of services	6,679,150	7,131,176
Sale of goods in connection with		
Related entities	3,322	1.754
External parties	320,377	312,586
Total sale of goods	323,699	314,340
Rendering of services in connection with		
Related entities	418 663	1 062 217
External parties	5 936 788	5 754 619
Total rendering of services	6 355 451	6 816 836
Total sale of goods and rendering of services	6.679.150	7 131 176
Note 4B: Licence fees Application fees Annual charges Total licence fees	514,769 4,034,779 4,549,548	528,797 3,899,904 4,428,701
Note 4C. Other revenue		
Resources received free of charge - ANAO audit fees	56,500	55,000
Total other revenue	56,500	55,000
<u>Gains</u>		
Note 4D: Foreign exchange gains		
Non-speculative	805	127
Total foreign exchange gains	805	127
<u>Revenue from Government</u>		
Note 4E: Revenue from Government		
Appropriation:		
	12 012 000	12 400 000
Departmental appropriation	13,813,000	13,498,000

The Agency has received \$11,197 (2013: \$10,917) under the Parental Leave Payments Scheme.

Note 5: Fair Value Measurements

The following tables provide an analysis of assets and liabilities that are measured at fair value. The different levels of the fair value hierarchy are defined below.

Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities that the entity can access at measurement date. Level 2: Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly. Level 3: Unobservable inputs for the asset or liability.

Note 5A: Fair Value Measurements

Fair value measurements at the end of the reporting period by hierarchy for assets and liabilities in 2014 Fair value measurements at the end of the Fair value Level 1 inputs Level 2 inputs Level 3 inputs \$ \$ \$ \$ Non-financial assets 5,700,000 5,700,000 Land 15,482,301 15,482,301 Buildings on freehold land Leasehold improvements 5,743,710 2,606,252 Plant and equipment 3.137.458 Total non-financial assets 26,926,011 8,306,252 18,619,759 Total fair value measurements of assets in the statement of financial position 26,926,011 8,306,252 18,619,759

Fair value measurements - highest and best use

ARPANSA's assets are held for operational purposes and not held for the purposes of deriving a profit. The current use of the assets is considered the highest and best use.

Note 5B: Level 1 and Level 2 Transfers for Recurring Fair Value Measurements

There have been no level 1 or level 2 transfers for recurring fair value measurements.

The entity's policy for determining when transfers between levels are deemed to have occurred can be found in Note 1.

Note 5: Fair Value Measurements (continued)

Note 5C: Valuation Technique and Inputs for Level 2 and Level 3 Fair Value Measurements

Level 2 and 3 fair value measurements - valuation technique and the inputs used for assets and liabilities in 2014 Category (Level Fair value Valuation Inputs used Range 2 or Level 3) (weighted technique(s)¹ average)² \$ Non-financial assets Land Level 2 5,700,000 Market approach Values based on evidence of comparable sales Buildings on freehold land Level 3 15.482.301 Depreciated Values based on \$3433 sqm and estimated 2.5% per annum3 replacement cost construction cost for replacement Plant and equipment Level 2 2,606,252 Market approach Adjusted market transactions Replacement cost new 2.5%-20.00% Plant and equipment Level 3 3.137.458 Depreciated Consumed replacement cost economic (9.59%) per benefit/ annum obsolescence of asset

1. No change in valuation technique occurred during the period.

2. Significant unobservable inputs only. Not applicable for assets or liabilities in the Level 2 category.

3. The remaining and total life of the buildings were assessed by the valuer based on the use, condition and location of the building in question. The replacement cost information used to assess the replacement costs of the buildings is considered to be a Level 2 input but the assessment of total and remaining lives are considered to be Level 3 inputs as they are essentially subjective assessments made by the valuers.

Recurring and non-recurring Level 3 fair value measurements - valuation processes

The Agency procured valuation services from the Australian Valuation Office (AVO) in relation to land and buildings at 30 June 2014. The AVO provided written assurance that their valuations were in compliance with AASB 13. The Agency also procured the services of the Australian Valuation Services (AVS) to undertake a review of the leasehood improvements and plant and equipment valuations. The AVS provided written assurance that these valuations were in compliance with AASB 13.

Recurring Level 3 fair value measurements - sensitivity of inputs

The significant unobservable inputs used in the fair value measurement of the Agency's buildings relate to total and remaining useful life, as these are essentially subjective assessment by the valuers. The significant unobservable inputs in the fair value measurement of the Agency's plant and equipment relate to the consumed economic benefit /obsolescence of the asset. A significant increase (decrease) in this input would result in significantly lower (higher) fair value measurement.

Note 5D: Reconciliation for Recurring Level 3 Fair Value Measurements

Recurring Level 3 fair value measurements - reconciliation for assets

	Non-financial assets		
	Buildings	Plant and	Total
		equipment	
	2014	2014	2014
	\$	\$	\$
Opening balance	14,118,000	2,993,764	17,111,764
Purchases	1,632,301	826,942	2,459,243
Revaluation	475,058	-	475,058
Depreciation	(743,059)	(683,248)	(1,426,307)
Closing balance	15,482,301	3,137,458	18,619,759

The entity's policy for determining when transfers between levels are deemed to have occurred can be found in Note 1.

	2014	2013
	\$	\$
Note 6A: Cash and cash equivalents	1 257 082	062.956
Special accounts	1,357,982	962,856
Cash on hand or on deposit	1 205 004	30,878
l'otal cash and cash equivalents	1,395,004	999,734
Note 6B: Trade and other receivables		
Goods and services receivables in connection with		
External parties	1,134,496	924,516
Total goods and services receivables	1,134,496	924,516
Annropriations receivable:		
appropriations receivance.	2 860 000	1 086 000
Fotal appropriations receivables	2,869,000	1,086,000
······································		
Other receivables	0447	
Statutory receivables - GST	86,154	4,560
Fotal other receivables	86,154	4,560
Fotal trade and other receivables (gross)	4,089,650	2,015,076
Less impairment allowance account		
Goods and services	(13,828)	(19,699)
Fotal trade and other receivables (net)	4,075,822	1,995,377
Frade and other receivables (net) to be recovered in:		
No more than 12 months	4,075,822	1,995,377
More than 12 months		-
Total trade and other receivables (net)	4,075,822	1,995,377
Fotal trade and other receivables (gross) are aged as follows:		
Not overdue	3,996,220	1.890.586
Overdue by:	× · · · · ·	,
0 to 30 days	75,168	97,299
31 to 60 days	18,262	26,937
61 to 90 days	-	254
Total trade and other receivables (gross)	4,089,650	2,015,076
Impairment allowance is aged as follows:		
Overdue by:		
31 to 60 days	13,828	19,445
61 to 90 days	-	254
Fotal impairment allowance	13,828	19,699
Goods and sevices receivable was with entities external to the Austr tre net 30 days (2013: 30 days)	calian Government .	Credit terms
Reconciliation of Impairment Allowance		
Goods and services		
Opening Balance	19,699	21,489
Amounts recovered and reversed	-	915
Amounts written off	(5,896)	(2,735)
Increase/decrease recognised in net cost of services	25	30
	13,828	19,699
Closing Balance		
Closing Balance <u>Note 6C: Other financial assets</u>		
Closing Balance <u>Note 6C: Other financial assets</u> Accrued revenue	90,922	113,746

Note 7: Non-Financial Assets		
	2014	2013
	\$	\$
Note 7A: Land and buildings		
Land at fair value		
Total land at fair value	5,700,000	4,800,000
Buildings on freehold land:		
 Work in progress 	1,632,301	-
 Fair value 	13,850,000	14,118,000
 Accumulated depreciation 	-	-
Total buildings on freehold land	15,482,301	14,118,000
Leasehold improvements		
– Fair value	159,600	159,600
 Accumulated depreciation 	(159,600)	(95,569)
Total leasehold improvements		64,031
Total land and buildings	21,182,301	18,982,031

Revaluation of land and buildings

All revaluations are conducted in accordance with the revaluation policy stated at Note 1. On 30 June 2014 independent valuers from the Australian Valuation Office conducted a valuation of Land and Buildings. The previous revaluation was conducted on 30 June 2013.

Revaluation increments of \$900,000 for land (2013: \$300,000) and \$475,058 for buildings on freehold land (2013: \$209,292).

All increments were transferred to the asset revaluation reserve surplus by asset class and included in the equity section of the statement of financial position

No indicators of impairment were found for land and buildings.

No land and buildings are expected to be sold or disposed of within the next 12 months.

	2014	2013
	\$	\$
Note 7B: Plant and equipment		
Plant and equipment:		
 work in progress 	-	359,274
– fair value	8,041,336	7,026,457
 accumulated depreciation 	(2,297,626)	(1,263,864)
Total plant and equipment	5,743,710	6,121,867

Revaluation of plant and equipment

All revaluations are conducted in accordance with the revaluation policy stated at Note 1. Plant and equipment was subject to a revaluation at 30 June 2012.

No indicators of impairment were found for plant and equipment

No plant and equipment are expected to be sold or disposed of within the next 12 months.

Note	7C:	Intangibles
-		

Computer software:		
Purchased	1,637,967	1,477,659
Accumulated amortisation	(1,265,743)	(1,181,375)
Internally developed - in use	1,121,464	1,121,464
Accumulated amortisation	(902,196)	(796,118)
Total computer software	591,492	621,630
Trademarks:		
Trademarks	4,620	4,620
Accumulated amortisation	(4,451)	(4,121)
Total trademarks	169	499
Total intangibles	591,661	622,129

No indicators of impairment were found for intangible assets.

No intangibles are expected to be sold or disposed of within the next 12 months.

Note 7: Non-Financial Assets (continued)		
	2014	2013
	\$	\$
Note 7D: Inventories		
Inventories held for sale		
Finished goods	236,704	62,419
Total Inventories held for sale	236,704	62,419
Inventories held for distribution	1,237,111	1,375,526
Total inventories	1,473,815	1,437,945

During 2013-14, \$76,759 of inventory held for sale was recognised as an expense (2012-13: \$106,591). During 2013-14, \$69,156, of inventory held for distribution was recognised as an expense (2012-13: \$57,068).

No items of inventory were recognised at fair value less cost to sell.

All inventory is expected to be sold or distributed in the next 12 months.

Note 7E: Other non-financial assets		
Prepayments	368,855	350,383
Total other non-financial assets	368,855	350,383
Other non-financial assets expected to be recovered		
No more than 12 months	368,855	350,383
Total other non-financial assets	368,855	350,383

No indicators of impairment were found for other non-financial assets.

NOTE /F: RECONCILIATION OF THE OPENING AND CLOSING BALANCES OF FTOPETVY, FLAIR AND E-JULIDHEIN	=				
Reconciliation of the opening and closing balances of property, plant and equipment for 2014					
	Land	Buildings &	Leasehold Improvements &	PP & E &	Tota ¢
As at 1 July 2013	•	9	•	9	
Gross book value	4,800,000	14,118,000	159,600	7,385,731	26,4
Accumulated depreciation and impairment	•		(95,569)	(1,263,864)	(1,35
Net book value 1 July 2013	4,800,000	14,118,000	64,031	6,121,867	25,1
Additions:					
By purchase	•	1,632,301	•	934,555	52
Revaluations and impairments recognised in other comprehensive					
income	900,000	475,058	'		1.3
Depreciation expense	•	(743,059)	(64,031)	(1,238,576)	(2,04
Disposals:					
Other disposals	•			(74,136)	(74
Net book value 30 June 2014	5,700,000	15,482,301		5,743,710	26,920
Vid book advand 100 mm 700 mm					
The book value as of our line 2014 represented by			000 000		
Gross book value	5,700,000	15,482,301	159,600	8,041,336	29,38
Accumulated depreciation and impairment	•		(159,600)	(2,297,626)	(2,457,
Net book value 30 June 2014	5,700,000	15,482,301	•	5,743,710	26,92
<u>Reconciliation of the opening and closing balances of property, plant and equipment 2013</u>					
			Leasehold		
	Land \$	Buildings \$	Improvements \$	PP & E \$	Tot
As at 1 July 2012	÷	÷	÷	÷	*
Gross book value	4,500,000	14,570,000	159,600	6,702,310	25,93
Accumulated depreciation and impairment	'	'		'	
Net book value 1 July 2012	4,500,000	14,570,000	159,600	6,702,310	25,931
Additions:					
By purchase		67,272		700,572	767
Revaluations and impairments recognised in other comprehensive					
income	300,000	209,292	'		509
Depreciation expense	'	(728,564)	(95,569)	(1,269,818)	(2,093,
Disposals:					
Other disposals	'	'		(11,197)	(11,
Net book value 30 June 2013	4,800,000	14,118,000	64,031	6,121,867	25,103,
Net book value as of 30 June 2013 represented by:					
Gross book value	4,800,000	14,118,000	159,600	7,385,731	26,463,
Accumulated depreciation and impairment	'	'	(95,569)	(1,263,864)	(1,359,

The communication of the operation of the communication of the				
Reconciliation of the opening and closing balances of intangibles 2	014			
	Computer software internally developed \$	Computer software purchased \$	Other intangibles - Trademarks \$	Total \$
As at 1 July 2013				
Gross book value	1,121,464	1,477,659	4,620	2,603,74
Accumulated amortisation and impairment	(796,118)	(1,181,375)	(4,121)	(1,981,614)
Net book value 1 July 2013	325,346	296,284	499	622,12
Additions:				
By purchase		222,422	•	222,422
Amortisation	(106,078)	(120,492)	(330)	(226,900)
Disposals:				
Other disposals		(25,990)	•	(25,990
Net book value 30 June 2014	219,268	372,224	169	591,66
Net book value as of 30 June 2014 represented by:				
Gross book value	1,121,464	1,637,967	4,620	2,764,05
Accumulated amortisation and impairment	(902,196)	(1,265,743)	(4,451)	(2,172,39)
Net book value 30 June 2014	219,268	372,224	169	591,66
<u>Reconciliation of the opening and closing balances of intangibles 2</u>	<u>1013</u>			
		Computer	Other	
	Computer software internally developed \$	software purchased \$	intangibles - Trademarks \$	Total \$
As at 1 July 2012				
Gross book value	1,121,464	1,425,730	4,620	2,551,81
Accumulated amortisation and impairment	(689,278)	(1,060,740)	(3,791)	(1,753,809
Net book value 1 July 2012	432,186	364,990	829	798,005
Additions:				
By purchase		78,105		78,10
Amortisation	(106,840)	(129,181)	(330)	(236,351
Disposals:				
Other disposals		(17,630)		(17,630
Net book value 30 June 2013	325,346	296,284	499	622,129
Net book value as of 30 June 2013 represented by:				
Gross book value	1,121,464	1,477,659	4,620	2,603,743
Accumulated amortisation and impairment	(796,118)	(1,181,375)	(4,121)	(1,981,614
Net book value 30 June 2013	210 200	100,000	100	

	2014	2013
	\$	\$
Note 8A: Suppliers		
Trade creditors and accruals	1,157,261	664,110
Operating lease rentals	<u> </u>	4,167
Total supplier	1,157,261	668,277
Suppliers expected to be settled		
No more than 12 months	1,157,261	668,277
More than 12 months	-	-
Total suppliers	1,157,261	668,277
Suppliers in connection with		
Related parties	314,502	81,619
External parties	842,759	586,658
Total supplier payables	1,157,261	668,277
Settlement is usually made within 30 days.		
Note 8B: Other payables		
Salaries and wages	452,727	416,936
Superannuation	61,894	65,578
Separation and redundancies	235,471	96,596
Unearned income	48,613	676,466
Other	34,022	33,878
Total other payables	832,727	1,289,454
Other payables are expected to be settled in:		
No more than 12 months	832,727	1,289,454
More than 12 months	-	
Total other payables	832,727	1,289,454
Note 9: Provisions		
Employee provisions		
Leave	4,620,837	4,909,386
Total employee provisions	4,620,837	4,909,386
Employee provisions are expected to be settled in:		
No more than 12 months	1,152,866	1,122,600
More than 12 months	3,467,971	3,786,786
Total employee provisions	4,620,837	4,909,386
More than 12 months Total employee provisions	3,467,971 4,620,837	3,786,7 4,909,3

Note 10: Cash Flow Reconciliation		
	2014	2013
	\$	9
Reconciliation of cash and cash equivalents as per financial position to Cash Flow Statement		
Cash and cash equivalents as per:		
Cash Flow Statement	1,395,004	999,734
Statement of financial position	1,395,004	999,734
Difference		
Reconciliation of net cost of services to net cash from (used by) operating activities:		
Net cost of services	(15,076,888)	(15,786,179)
Revenue from Government	13,813,000	13,498,000
Adjustments for non-cash items		
Depreciation /amortisation	2,272,567	2,330,302
Net write down of non-financial assets (excluding write-down of		
inventories)	100,125	30,249
Capital contributions	1,317,745	
Changes in assets / liabilities		
(Increase) / decrease in net receivables	(2,080,445)	700,704
(Increase) / decrease in inventories	(35,870)	50,220
(Increase) / decrease in prepayments	(18,472)	112,035
(Increase) / decrease in accrued revenue	22,824	(32,043
Increase / (decrease) in employee provisions	(288,549)	(318,815
Increase / (decrease) in supplier payables	488,984	(709,801)
Increase / (decrease) in other payables	(456,727)	(531,939)
Net cash from (used by) operating activities	58,294	(657,267

Note 11: Contingent Liabilities and Assets

As at 30 June 2014, and 30 June 2013 ARPANSA had no quantifiable, unquantifiable or significant remote contingencies.

Note 12: Executive Remuneration

Note 12A: Senior Executive Remuneration Expense for the reporting period

	2014	2013
	\$	\$
Short-term employee benefits:		
Salary	841,992	804,145
Performance bonuses	300	1,000
Motor vehicle and other allowances	93,141	109,105
Total short-term employee benefits	935,433	914,250
Post-employment benefits		
Superannuation	137,099	125,634
Total post-employment benefits	137,099	125,634
Other long-term employee benefits		
Annual leave accrued	3,411	7,325
Long-service leave	10,208	14,632
Total other long-term employee benefits	13,619	21,957
Total senior executive remuneration expenses	1,086,151	1,061,841

Notes:

1. Note 12A was prepared on an accrual basis

2. Note 12A excludes acting arrangements and part-year service where remuneration expensed for a senior executive was less than \$195,000

	e Senior Executive	s During the Re	porting Period			
Average annual reportatore remuneration paid to substantive senior exect	IIIVES III 2014 Sanior	Renortable	Contributed	Renortable		
Average annual reportable remuneration ¹	Executives No.	salary ² \$	superannuation ³	allowance ⁴ \$	Bonus paid ⁵ \$	
Total reportable remuneration (including part-time arrangements):						
less than \$195,000	•	•	•	•	•	
\$225,000 to \$254,999 \$345 000 to \$254,999	~ -	204,637 377 740	30,392 30 383	28		235,0
Total number of substantive senior executives	÷ 6		anatra			
Average annual reportable remuneration paid to substantive senior executives	in 2013					
	Senior	Reportable	Contributed	Reportable		
Average annual reportable remuneration ¹	Executives	salary ²	superannuation ³	allowance ⁴	Bonus paid ⁵	Tc
	No.	\$	\$	\$	\$	
Total reportable remuneration (including part-time arrangements): less than \$195,000				•		
	' (020 000	007000	120		37 000
3225,000 to \$234,999 \$325,000 to \$354,999	- 1	000,202	33 471	- 100		326.18
Total number of substantive senior executives		1011111	11 62			16220
Notes: Notes: 1. This table reports substantive senior executives who received remuneration band.	during the reporting	g period. Each r	ow is an averaged fig.	ure based on head	count for individu	als in the
 Reportable salary includes the following: a) gross payments (less any bonuses paid, which are separated out and discle b) reportable fringe benefits (at the net amount prior to 'grossing up' to accord by exempt foreign employment income; and b) the second for the net amount prior to 'grossing up' to accord by the second for the second for the second second	osed in the 'bonus _F unt for tax benefits)	aid' column););				
 The contributed superanneation amount is the average actual superannuation as per the individuals paysing. 	on contributions pai	d to senior execu	trives in that reportable	e remuneration ba	nd during the rep	orting peric
4. Reportable allowances' are the average actual allowances paid as per the 'to	tal allowances' line	on individuals' pa	ayment summaries.			
Bonus paid'represents average actual bonuses paid during the reporting per particular band may vary between financial years due to various factors such a vear.	iod in that reportab s individuals comm	le remuneration l nencing with or le	band. The 'bonus paid' saving the entity durin	' within a g the financial		

Note 12C: Average Annual Reportable Remuneration Paid to Other Highly	y Paid Staff	during the Rep	orting Period			
Average annual reportable remuneration paid to other highly paid staff in 2	2014					
Average annual reportable remuneration ¹	Staff No.	Reportable salary ² \$	Contributed superannuation ³	Reportable allowance ⁴ \$	Bonus paid ⁵ \$	
Total reportable remuneration (including part-time arrangements): \$195,000 to \$224,999 \$225,000 to \$234,999		173,106 207.964	24,233 36 932	4,123	300 300	
Total number of other highly paid staff	7 7					
Average annual reportable remuneration paid to other highly paid staff in 2013						
Average annual reportable remuneration ¹	Staff No.	Reportable salary ² \$	Contributed superan nuation ³	Reportable allowance ⁴ \$	Bonus paid ⁵ \$	
Total reportable remuneration (including part-time arrangements): \$195,000 to \$224,999	-	175,539	23,518	4,067	1,000	
\$225,000 to \$254,999	2	210,832	23,491		1,000	
Total number of other highly paid staff Notes: 1. This table reports staff: a) who were employed by the entity during the reporting period; b) whose reportable renumeration was \$195,000 or more for the financial year. c) were not required to be disclosed in Table B	3 r; and					
 Reportable stary includes the following: a) gross payments (less any bonuses paid, which are separated out and disclose b) reportable fininge benefits (at the net amount prior to 'grossing up' to account c) exempt foreign employment income; and d) salary sacrificed superannuation 	ed in the 'bon at for tax bene	us paid' column) efits);	ä			
The 'contributed superannuation' amount is the average actual superannuation during the reporting period as per the individuals' payslips.	contribution	s paid to staff in	that reportable remuner.	ation band		
4. 'Reportable allowances' are the average actual allowances paid as per the 'total	allowances'	line on individua	uls' payment summaries.			
 Bonus paid' represents average actual bonuses paid during the reporting perior particular band may vary between financial years due to various factors such as in year. 	d in that repc individuals co	ortable remuneral ommencing with	tion band. The 'bonus pa or leaving the entity du	uid' within a ring the financial		

Note 13: Remuneration of Auditors		
	2014 \$	2013 \$
Financial statement audit services were provided free of charge to the Agency by the Australian National Audit Office (ANAO)		
The fair value of the financial statement audit services provided:	56,500	55,000
No other services were provided by the auditors of the financial statement	ts.	
Note 14: Compensation and Debt Relief		
No "Act of Grace payments" were expensed during the reporting period (2013: nil)		
No waivers of amounts owing to the Australian Government were made pursuant to subsection 34(1) of the Financial Management and Accountability Act 1997 (2013: nil).	<u> </u>	
No payments were provided under the Compensation for Detriment caused by Defective Administration (CDDA) Scheme during the reporting period (2013: nil).	<u> </u>	
No ex-gratia payments were provided for during the reporting period (2013: nil).		
One payment was provided in special circumstances relating to APS employment pursuant to section 73 of the <i>Public Service Act 1999</i> (PS Act) during the reporting period. (2013: 2 payments).	50,187	65,363

	2014	2012
	2014	2013
	\$	\$
Note 15A: Categories of financial instruments		
Financial assets		
Loans and receivables		
Cash and cash equivalents	1,395,004	999,734
Receivables for goods and services	1,120,668	904,817
Other financials assets	90,922	113,746
Total loans and receivables	2,606,594	2,018,297
Total financial assets	2,606,594	2,018,297
Financial liabilities		
Financial liabilities measured at amortised cost		
Trade creditors	362,010	367,438
Total financial liabilities measured at amortised cost	362,010	367,438
Total Financial liabilities	362,010	367,438

Note 15: Financial Instruments (continued)

Note 15B: Credit risk

ARPANSA is exposed to minimal credit risk as loans and receivables are cash and trade receivables. The maximum exposure to credit risk is the risk that arises from potential default of a debtor. This amount is equal to the total amount of trade receivables (2014: \$1,134,496 and 2013:\$924,516). ARPANSA has assessed the risk of the default on payment and has allocated \$13,828 in 2014 (2013: \$19,699) to an impairment allowance account.

ARPANSA has policies and procedures that guide employees' debt recovery techniques that are to be applied when debts are past due.

ARPANSA holds no collateral to mitigate against credit risk.

Credit quality of financial assets not past due or individually determined as impaired

	Not Past Due Nor Impaired	Not Past Due Nor Impaired	Past due or impaired	Past due or impaired
	2014	2013	2014	2013
	\$	\$	\$	\$
Cash and cash equivalent	1,395,004	999,734	-	-
Receivables for goods and services	1,041,066	800,026	93,430	124,490
Other financials assets	90,922	113,746		
Total	2,526,992	1,913,506	93,430	124,490

Ageing of financial assets that were past due but not impaired in 2014

	0 to 30	31 to 60	61 to 90	90+	
	days	days	days	days	Total
	\$	\$	\$	\$	\$
Loans and receivables					
Receivables for goods and services	75,168	4,434	-	-	79,602
Total	75,168	4,434	-	-	79,602

Ageing of financial assets that were past due but not impaired in 2013

	0 to 30	31 to 60	61 to 90	90+	
	days	days	days	days	Total
	\$	\$	\$	\$	\$
Loans and receivables					
Receivables for goods and services	97,299	7,492	-	-	104,791
Total	97,299	7,492	-	-	104,791

Note 15: Financial Instruments (continued)

Note 15C: Liquidity risk

ARPANSA's financial liabilities are trade creditors. The majority of ARPANSA's funding is appropriated from the Australian Government. The Agency manages its budgeted funds to ensure it has adequate funds to meet payments as they fall due. In addition, ARPANSA has policies in place to ensure timely payments are made when due and has no past experience of default. ARPANSA does not expect to have difficulty meeting its financial liabilities as and when they become due and payable.

Maturities for non-derivative financial liabilities in 2014

	On demand	within 1	1 to 2	2 to 5	
		year	years	years	Total
		2014	2014	2014	2014
		\$	\$	\$	\$
Trade creditors	-	362,010	-	-	362,010
Total	-	362,010	-	-	362,010

Maturities for non-derivative financial liabilities in 2013

	On demand	within 1	1 to 2	2 to 5	
		year	years	years	Total
		2013	2013	2013	2013
		\$	\$	\$	\$
Trade creditors		367,438	-	-	367,438
Total		367,438	-	-	367,438

ARPANSA has no derivative financial liabilities in either 2014 or 2013.

Note 15D: Market Risk

Currency Risk

ARPANSA's exposure to "Currency Risk" is minimal as only a small number of contracts are in currencies other than Australian Dollars.

Interest Rate Risk

ARPANSA's financial instruments are not exposed to interest rate risk.

Other Price Risk

ARPANSA's financial instruments are not exposed to other price risk.

Note 16: Financial Assets Reconciliation

	Notes	2014 \$	2013 \$
Total financial assets as per statement of financial position		5,561,748	3,108,857
Less: Non-financial instrument components			
Appropriations receivables	6B	2,869,000	1,086,000
Other receivables	6B	86,154	4,560
Total non-financial instrument components	_	2,955,154	1,090,560
Total financial assets as per financial instruments note	15A	2,606,594	2,018,297

	erable GST exclusive')								
Annual Appropriations for 2014									
	- Al	ppropriation Act			FMA Act			Appropriation	
	Amual Appropriation \$	Appropriations reduced ¹ \$	AFM ² \$	Section 30 \$	Section 31 \$	Section 32 \$	Total appropriation \$	applied in 201 (current and pric year	4 5 8 %
DEPARTMENTAL Ordinary annual services Other services	15,804,000						15,804,000	15,199,000	-
Equity	2.500.000						2.500.000	1.275.000	_
Total departmental	18,304,000		•			•	18,304,000	16,474,000	
	A .	ppropriation Act						Appropriation	
	Annual Appropriation	Appropriations reduced ¹	AFM ²	Section 30	Section 31	Section 32	Total appropriation	applied in 2013 (current and prior years)	
	**	÷	÷	\$	\$	÷	\$	•	- 60
DEPARTMENTAL Ordinary annual services Other services	15,522,000	(88,000)					15,434,000	14,928,00	•
Equity	•	•	•						× .
Total departmental	15.522,000	(88,000)				•	15,434,000	14,928,000	_

Note 17: Appropriations (continued)							
Note 178: Departmental Capital Budgets ('Recoveral	ble GST exclusive')						
	2014 Capital Budge	et Appropriations		Capital Budget Ap	propriations Appli	ed in 2014 (current	and prior ye
	Appropriation Act Annual Capital Appropriations Budget reduced ² s s	FMA Act Section 32 \$	Total Capital Budget Appropriations	Payments for non-financial assets ³ \$	Payments for other purposes \$	Total payments \$	Varia
DEPARTMENTAL Ordinary annual services - Departmental Capital Budget	1,944,000	÷ 1	1,944,000	2,324,000	÷ •	2,324,000	(380,00
 Notes: Departmental Capital Budgets are appropriated throut information on ordinary annual services appropriations. F. Appropriations, F. Appropriations reduced under Appropriation Asis (N. 3. Payments made on non-financial assets include purch component of finance leases. 	ugh Appropriation Acts (No.1.3.5). T phase see Note 17A: Annual Approp to.1.3.5) 2013-14: sections 10, 11, 12 hases of assets, expenditure on assets	hey form part of ord priations. 2 and 15 or via a det s which has been cap	inary annual service emination by the Fi	ss, and are not separ nance Minister. red to make good ar	ately identified in th	e Appropriation Acts condition, and the ca	. For more pital repayment
	2013 Capital Budge	et Appropriations		Capital Budget Ap	propriations Appli	ed in 2013 (current	and prior years
V	Appropriation Act Amual Capital Appropriations Budget reduced ²	FMA Act Section 32	Total Capital Budget Appropriations	Payments for non-financial assets ³	Payments for other purposes	Total payments	Varian
DEPARTMENTAL Ordinary annual services - Departmental Capital Budeat	* * * * *	е ,	\$ 1.936.000	\$48.880	÷ '	\$ 848.880	1.087.12
Nates: 1. Departmental Capital Budgets are appropriated throu information on outiany annual services appropriations. F 2. Appropriations reduced under Appropriation Acts (N 3. Phyments made on non-financial assets include purch component of finance leases.	ugh Appropriation Acts (No.1.3.5). T please see Note 17 A. Annual Appro- to.1.3.5) 2012-13: sections 10, 11, 12 hases of assets, expenditure on assets	They form part of ord pritations. 2 and 15 or via a det s which has been cap	inary annual service armination by the Fi	s, and are not separ nance Minister. red to make good ar	ately identified in th asset to its original	e Appropriation Acts condition, and the ca	. For more pital repayment
Note 17 C: Unspent Departmental Annual Appropria	ations ('Recoverable GST exclusive	()					
Authority					2014 *	2013 \$	
DEPARTMENTAL					>	÷	
Appropriation Act (No. 1) 2012-13 Appropriation Act (No. 1) 2013-14					1,681,022	-	
Appropriation Act (No. 2) 2013-14					1,225,000		
Total Departmental					2.906.022	1 1 2 2 8 78	

Note 18: Special Accounts

ARPANSA Special Account (Departmental)	2014	2013
	\$	\$
Establishing Instrument: ARPANS Act 1998; s56(4)		
Appropriation: Financial Management and Accountability Act	1997; s21	
Purpose: The purpose of the Special Account is set out in the	ARPANS Act at section 56(4):
"The purposes of the Special Account are to make payments: (a) to further the object of this Act (as set out in section 3); a (b) otherwise in connection with the performance of the CEC Regulations."	nd D's functions under this Act o	or the
Balance brought forward from previous period	999,734	1,655,88
Appropriations credited to special account	16,474,000	14,928,00
GST credits (FMA Act s30A)	220,542	249,16
Other receipts	10,905,698	11,695,45
Total increase	27,600,240	26,872,62
Available for payments	28,599,974	28,528,50
Payments made to employees	(17,256,546)	(17,750,046
Payments made to suppliers	(9,948,424)	(9,778,727
Total decrease	(27,204,970)	(27,528,773
T-4-1 D-1	1 205 004	000 72

Note 19: Compliance with Statutory Conditions for Payments from the Consolidated Revenue Fund

Section 83 of the Constitution provides that no amount may be paid out of the Consolidated Revenue Fund except under an appropriation made by law. The Department of Finance and Deregulation provided information to all agencies in 2011 regarding the need for risk assessments in relation to compliance with statutory conditions on payments from special appropriations, including special accounts.

During 2012-13 additional legal advice was received that indicated there could be breaches of Section 83 under certain circumstances with payments for long service leave, goods and services tax and payments under determinations of the Remuneration Tribunal. The agency reviewed its

processes and controls over payments for these items to minimise the possibility for future breaches as a result of these payments. The agency determined that there is a low risk of the certain circumstances mentioned in the legal advice applying to the department, and was not aware of any specific breaches of Section 83 in respect of these items.

The agency completed a review of possible exposure to risk of non- compliance with statutory conditions on payments from appropriations. This involved:

 a review of the Australian Radiation Protection and Nuclear Safety Act 1998 and Australian Radiation Protection and Nuclear Safety Regulations 1999; and

 determining the risk of non-compliance by assessing the difficulty of administering the statutory conditions and assessing the extent to which existing payment systems and processes satisfy those conditions

The agency has only one special account involving statutory conditions for payment.

This work had been completed in respect of all amounts with statutory conditions for payment - representing \$24.09m of total expenditure in 2013-14 (\$ 25.1m in 2012-13)

No issues of non-compliance with Section 83 have been identified.

The Australian Government continues to have regard to developments in case law, including the High Court's most recent decision on Commonwealth expenditure in Williams v Commonwealth [2014] HCA 23, as they contribute to the larger body of law relevant to the development of Commonwealth programs. In accordance with its general practice, the Government will continue to monitor and assess risk and decide on any appropriate actions to respond to risks of expenditure not being consistent with constitutional or other legal requirements

Note 20: Reporting of Outcomes

All ARPANSA's transactions fall within Outcome 1, "The Australian people and the environment are protected from the harmful effects of radiation"

Note 20A: Net cost of outcome delivery

	Outo	come
	2014	2013
	\$	\$
Departmental		
Expenses	26,362,891	27,401,183
Own-source income	11,286,003	11,615,004
Net cost of outcome delivery	15,076,888	15,786,179

Net cost shown include intra-government costs that are eliminated in calculating the actual Budget Outcome.

Note 20B: Major classes of departmental expense, income, assets and

	Outcome	
	2014	2013
	\$	\$
Expenses		
Employees	17,138,979	17,314,382
Suppliers	6,637,147	7,726,220
Depreciation and amortisation	2,272,567	2,330,302
Write-down and impairment of assets	314,198	30,279
Other expenses	-	-
Total	26,362,891	27,401,183
Income		
Revenue from government	13,813,000	13,498,000
Sales of goods and services	6,679,150	7,131,176
Licence Fees	4,549,548	4,428,701
Other revenue	56,500	55,000
Foreign exchange	805	127
Total	25,099,003	25,113,004
Assets		
Cash and cash equivalents	1,395,004	999,734
Trade and other receivables	4,075,822	1,995,377
Other financial assets	90,922	113,746
Land and buildings	21,182,301	18,982,031
Property, plant and equipment	5,743,710	6,121,867
Intangibles	591,661	622,129
Inventories	1,473,815	1,437,945
Other non-financial assets	368,855	350,383
Total	34,922,090	30,623,212
Liabilities		
Suppliers	1,157,261	668,277
Other payables	832,727	1,289,454
Employee provisions	4,620,837	4,909,386
Total	6,610,825	6,867,117

Net cost shown include intra-government costs that are eliminated in calculating the actual Budget Outcome.

Note 21: Net Cash Appropriation Arrangements		
	2014 \$	2013 \$
Total comprehensive income (loss) less depreciation/amortisation expenses previously funded through revenue appropriations *	2,383,737	551,415
Plus: depreciation/amortisation expenses previously funded through revenue appropriations	, ,	, -
Depreciation and amortisation expenses	(2,272,567)	(2,330,302)
Total comprehensive income (loss) as per the Statement of		
Comprehensive Income	111,170	(1,778,887)

* From 2010-11, the Government introduced net cash appropriation arrangements, where revenue appropriations for depreciation/amortisation expenses ceased. Entities now receive a separate capital budget provided through equity appropriations. Capital budgets are to be appropriated in the period when cash payment for capital expenditure is required.

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Abbreviations

ACDS	Australian Clinical Dosimetry Service
ANAO	Australian National Audit Office
ANM Facility	Nuclear Medicine Molybdenum-99 Production Facility
ANRDR	Australian National Radiation Dose Register
ANSTO	Australian Nuclear Science and Technology Organisation
APS	Australian Public Service
ARGOS	Accident Reporting and Guidance Operating System
ARIR	Australian Radiation Incident Register
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
BIPM	Bureau International des Poids et Mesures,
BSS	Basic Safety Standards
CEO	Chief Executive Officer
Col	Conflict of Interest
СТ	computed tomography
CTBT	Comprehensive Nuclear-Test-Ban Treaty
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
DRLs	diagnostic reference levels
ELF	extremely low frequency
EME	electromagnetic energy
EMERG	Electromagnetic Energy Reference Group
EMF	electric and magnetic fields
FMA Act	Financial Management and Accountability Act 1997
FOI	Freedom of Information
HIFAR	High-Flux Australian Research Reactor
IAEA	International Atomic Energy Agency
ICNIRP	International commission for Non-Ionizing Radiation Protection
ICRP	International Commission on Radiological Protection
ICT	information and communication technology
IM	information management
IPL	intense pulsed light
IRRS	Integrated Regulatory Review Service (IAEA)
IWS	Interim Waste Store
KPIs	key performance indicators
LHSTC	Lucas Heights Science and Technology Centre
linac	medical linear accelerator
MDCT	multidetector computed tomography
MoU	Memorandum of Understanding
NATA	National Association of Testing Authorities
NDRP	National Directory for Radiation Protection
NSC	Nuclear Safety Committee
OBPR	Office of Best Practice Regulation
OPAL	Open Pool Australian Lightwater reactor
RF EMR	radiofrequency electromagnetic radiation
RHC	Radiation Health Committee
SES	Senior Executive Service
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
UPF	Ultraviolet Protection Factor
WHO	World Health Organization
WHS	work health and safety
Glossary

absorbed dose

The energy absorbed per unit mass by matter from ionising radiation which impinges upon it.

accident

An unintended event which causes, or has the potential to cause, employees or members of the public to be exposed to radiation from which the individual doses or collective doses received do not lie within the range of variation which is acceptable for normal operation. An accident may result from human error, equipment failure or other mishap; it may require emergency action to save life or to safeguard health, property or the environment; it requires investigation of its causes and consequences and, possibly, corrective action within the program for control of radiation; and it may require remedial action to mitigate its consequences.

activity

The measure of quantity of radioactive decay.

air kerma

The measure of the kinetic energy of all charged particles liberated per unit of mass and released in a volume of air at some distance from a radioactive source.

AS/ISO

Standard established by Standards Australia and the International Organization for Standardization.

Australian National Radiation Dose Register

A centralised repository for the radiation dose records of workers as supplied by the employers, maintained by ARPANSA. It is currently limited to those engaged in the uranium mining and milling industry in Australia.

Code of Practice for radiation protection

A document prescribing specific requirements for radiation protection in a particular application.

computed tomography (CT)

A three dimensional x-ray image of an object or patient. The final image is a combination of multiple images taken as an x-ray tube rotates about the object or patient.

constraint

Either dose constraint in the case of exposures anticipated to be received, or risk constraint in the case of potential exposures (see dose constraint and risk constraint).

controlled apparatus – as defined in the ARPANS Act

 (a) An apparatus that produces ionising radiation when energised or that would, if assembled or repaired, be capable of producing ionising radiation when energised,

- (b) An apparatus that produces ionising radiation because it contains radioactive material, or
- (c) An apparatus prescribed by the Regulations that produces harmful non-ionising radiation when energised.

diagnostic reference levels (DRLs)

Dose levels for medical exposures in medical radiodiagnostic practices, or levels of activity in the case of radiopharmaceuticals, applied to groups of standardsized patients or standard phantoms for common types of diagnostic examination and broadly defined types of equipment. These levels are expected not to be consistently exceeded for standard procedures when good and normal practice regarding diagnostic and technical performance is applied. DRLs will be set by relevant professional bodies and published by ARPANSA or the relevant regulatory authority from time to time.

dose

A generic term which may mean absorbed dose, equivalent dose or effective dose depending on context.

dose constraint

A prospective restriction on anticipated dose, primarily intended to be used to discard undesirable options in an optimisation calculation. In occupational exposure, a dose constraint may be used to restrict the options considered in the design of the working environment for a particular category of employee. In medical exposure, a dose constraint for volunteers in medical research may be used to restrict the options considered in the design of an experimental protocol. In public exposure, a dose constraint may be used to restrict the exposure of the critical group from a particular source of radiation.

dosimetry

The theory and application of the principles and techniques involved in the measurement, calculation and recording of radiation doses.

effective dose

A measure of dose which takes into account both the type of radiation involved and the radiological sensitivities of the organs and tissues irradiated.

electromagnetic energy

The energy stored in an electromagnetic field. Expressed in joule (J).

equivalent dose

A measure of dose in organs and tissues which takes into account the type of radiation involved.

exposure

The circumstance of being exposed to radiation.

Fluorine-18 (18F)

Short-lived radiopharmaceutical isotope used in positron emission tomography (PET scans) as a radioactive tracer in patients. Fluorine is usually manufactured in a cyclotron.

extremely low frequency radiation

Has very long wavelengths (in the order of a thousand kilometres or more) and frequencies in the range of 100 hertz or less.

gamma ray

lonising electromagnetic radiation emitted by a radionuclide during radioactive decay or during a nuclear (isomeric) transition.

incident

An event which causes, or has the potential to cause, abnormal exposure of employees or of members of the public and which requires investigation of its causes and consequences and may require corrective action within the program for control of radiation, but which is not of such scale as to be classified as an accident.

Integrated Regulatory Review Service

A peer review and appraisal service offered by the IAEA to strengthen and enhance the effectiveness of a national regulatory system in nuclear, radiation, radioactive waste, transport safety and nuclear security.

Intense Pulsed Light Devices (IPLs)

Instruments that use a full spectrum (noncoherent), nonlaser, broadband, filtered Xenon flash lamps. Flash lamps emit in the UVR, visible and IR region of the electromagnetic spectrum. The UVR and IR wavelength components of the emissions are blocked using specific cut-off filters. These properties allow for variability in selecting individual treatment parameters and adapting to different skin types. Cosmetic uses of IPLs include hair removal, removal of skin pigmentation, wrinkles and the treatment of certain skin disorders by dermatologists.

ionisation

The process by which one or more electrons are removed from, or sometimes added to, an atom leaving the atom in a charged state.

ionising radiation

Radiation which is capable of causing ionisation.

optically stimulated luminescence dosimetry

A method of measuring the dose of ionising radiation which uses storage of energy in a crystal lattice by the ionising radiation and the release of that energy by optical stimulation which yields light of a different frequency.

ISO Series

Internationally accepted standards developed by the International Organization for Standardization which is a network of the national standards institutes of 157 countries, one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

justification

The notion that human activities which lead to exposure to radiation should be justified, before they are permitted to take place, by showing that they are likely to do more good than harm.

licence

A written authorisation issued to an operator which allows the operator to carry out an operation legally.

limitation

The requirement that radiation doses and risks should not exceed a value regarded as unacceptable.

linac – linear accelerator

An electrical device used to produce highly penetrating radiation beams. Frequently employed for the treatment of cancer or research.

medical exposure

Exposure of a person to radiation received as a patient undergoing medical diagnosis or therapy, or as a volunteer in medical research, or non-occupational exposure received as a consequence of assisting an exposed patient.

non-ionising radiation

Ranges from extremely low frequency radiation, through the radiofrequency, microwave, and visible portions of the spectrum into the ultraviolet range.

occupational exposure

Exposure of a person to radiation which occurs in the course of that person's work and excludes the the component of exposure that arises from natural background radiation.

operator

Any person or entity responsible for an operation which may lead to exposure to ionising radiation.

optimisation

The process of determining what level of radiation protection and safety makes exposures, and the probability and magnitude of potential exposures, as low as reasonably achievable with economic and societal factors being taken into account.

public exposure

Exposure of a person, or persons, to radiation which is neither occupational nor medical exposure.

radiation

Electromagnetic waves or quanta, and atomic or sub-atomic particles, propagated through space or through a material medium.

radioactive material

Material which spontaneously emits ionising radiation as a consequence of radioactive decay.

radiofrequency

Electromagnetic energy with frequencies in the range 3 kHz to 300 GHz.

radiofrequency field

A physical field, which specifies the electric and magnetic states of a medium or free space, quantified by vectors representing the electric field strength and the magnetic field strength.

radiological emergency

An emergency in which there is, or is perceived to be, a hazard due to:

- (a) the energy resulting from a nuclear chain reaction or from the decay of the products of a chain reaction, or
- (b) radiation exposure.

radionuclide

A species of atomic nucleus which undergoes radioactive decay.

radiopharmaceutical

A radioactive pharmaceutical administered to patients for medical diagnosis or therapy.

Regulatory Impact Statement

A Regulatory Impact Statement (RIS) is required, under the Australian Government's requirements, when a regulatory proposal is likely to have significant impacts on business and individuals or the economy. The primary role of the RIS is to improve government decision-making processes by ensuring that all relevant information is presented to the decision maker when a policy decision is being made. A RIS is prepared for each of ARPANSA's Codes of Practice and Standards and contains a cost benefit analysis.

solaria

Salons for artificial sun tanning through exposure to ultraviolet radiation.

Synchrotron

A giant particle accelerator capable of creating light beams a million times brighter than the sun to examine the sub microscopic structures.

Tellurium (Te)

Chemical element which is used as a target in the OPAL reactor to produce radioiodine for nuclear medicine.

UV Index Data

Simple numerical indication of the maximum solar UVR during the day, the higher the number, the higher the UVR hazard. The UV index is calculated from data collected by broadband detectors which measure the UV radiation from the sun. It is a scale primarily used in daily forecasts aimed at the general public.

X-ray

lonising electromagnetic radiation emitted during the transition of an atomic electron to a lower energy state or during the rapid deceleration of a charged particle.

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