



Australian Government

**Australian Radiation Protection
and Nuclear Safety Agency**

**QUARTERLY REPORT
OF THE
CHIEF EXECUTIVE OFFICER
OF ARPANSA
FOR THE PERIOD 1 JANUARY 2009 TO 31 MARCH 2009**



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and Nuclear Safety Agency**

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Further Information About This Publication

If you would like to know more about the content of this publication please contact ARPANSA's Manager Policy and Security of Sources on 1800 022 333 or e-mail at info@arpansa.gov.au. Further information about ARPANSA can be found on the Agency's website at www.arpansa.gov.au.

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Letter of Transmittal

7 May 2009

Senator the Hon Jan McLucas
Parliamentary Secretary to the Minister
for Health and Ageing
Parliament House
Canberra ACT 2600

Dear Parliamentary Secretary

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

- the operations during the quarter of the CEO, ARPANSA, the Radiation Health and Safety Advisory Council (the Council), the Nuclear Safety Committee (the NSC) and the Radiation Health Committee (the RHC);
- details of any direction given by the Minister to the CEO under Section 16 of the Act;
- any breach of licence conditions by a licensee, of which the CEO is aware;
- all reports received by the CEO from the Council and the NSC under paragraph 20(f) or 26(1)(d) of the Act; and
- a list of facilities licensed under Part 5 of the Act.

I am pleased to provide you with a report, meeting the requirements of the Act, covering the period 1 January 2009 to 31 March 2009.

As you would be aware, Section 60(6) of the Act requires you to cause a copy of the report to be laid before each House of the Parliament within 15 sitting days of the day on which this report was given to you.

Yours sincerely



Peter Burns
Acting CEO of ARPANSA

Report on the operations of the CEO and ARPANSA

The report on the operations of the CEO and ARPANSA is based on the three output groups:

- national leadership in radiation protection and nuclear safety;
- knowledge, information and services relating to radiation protection and nuclear safety; and
- regulation of Commonwealth entities using radiation sources and facilities or nuclear installations.

National leadership in radiation protection and nuclear safety

Engagement with the Australian Government and national stakeholder bodies

NATIONAL UNIFORMITY

The main vehicle for the promotion of national uniformity of radiation protection throughout the jurisdictions is the *National Directory for Radiation Protection* which is jointly developed by ARPANSA with the State and Territory jurisdictions through the Radiation Health Committee (RHC).

During the quarter, three amendments to the National Directory were forwarded to the Australian Health Ministers for endorsement of their adoption in the National Directory. Amendment 1 provided for adoption of a range of Codes of Practice and Radiation Protection Standards published since Edition 1 of the Directory. Amendment 2 clarified provisions related to existing exemptions and exclusions. Amendment 3 provided for the adoption of the *Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation*.

A fourth amendment on regulation of solaria was approved by the RHC and will now be forwarded to Australian Health Ministers' Advisory Council (AHMAC) and Health Ministers for endorsement. A supporting project to develop an online training module for solarium operators was progressed via a consultant. This module will support regulatory processes in implementation of the solaria amendment.

AUSTRALIAN NATIONAL RADIATION DOSE REGISTER

The Australian National Radiation Dose Register (ANRDR) will involve the collection, storage and auditing of radiological dose histories for uranium industry workers across Australia. ARPANSA is commissioned to design, develop and operate the database.

Responses to the Capability Questionnaire that allowed industry and regulators to comment on the ANRDR design process were received from all key stakeholders in

January. ARPANSA held a stakeholder workshop in Adelaide on 25 February to discuss the design of the Dose Register. The workshop was well attended by industry and government stakeholders who provided feedback to the design process. The design documentation and technical specifications for the Dose Register are in the final stages. Construction and testing of the Dose Register remains on track for completion by end 2009 and for implementation in 2010.

A Safety Guide is to be developed in parallel to the ANRDR and will provide recommendations on the methods for monitoring, assessing and recording occupational radiation doses. A report detailing the draft structure and layout of the Safety Guide has been completed following initial stakeholder consultation. The draft Safety Guide remains on track to be generated by the third quarter of 2009.

RADIOACTIVE WASTE MANAGEMENT FRAMEWORK

Work is proceeding with developing and drafting a new classification scheme for disposal of radioactive waste in Australia, with the formation of a drafting group to present a finalised draft to the Radiation Health Committee in June 2009.

As part of Australia's commitment to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, ARPANSA prepared a national report on Australia's compliance during the last quarter of 2008. The Joint Convention entered into force in Australia on 3 November 2003. The national report was prepared in consultation with other relevant Commonwealth agencies and radiation regulators of the states and territories. This was Australia's third national report, having previously reported in 2005 and 2003.

Compliance with the Joint Convention includes the review of the national reports of other contracting parties and the submission of questions. Australia reviewed national reports of 14 contracting parties and submitted 138 questions. Australia received 58 questions from contracting parties for which responses were prepared in April for submission to the IAEA. The Australian national report along with questions and responses and a report on the review meeting will be posted on the ARPANSA website following the review meeting in May 2009.

CONTROL AND REGULATION OF RADIOLOGICAL MATERIAL

Under a project for the Council of Australian Governments (COAG), ARPANSA is implementing, in conjunction with State and Territory jurisdictions, a national register of high activity radioactive sources. During the quarter, a tender selection process was conducted, a contractor was chosen and a contract is being prepared to initiate the work.

The *Code of Practice for the Security of Radioactive Sources* was mandated under the ARPANSA Regulations.

ARPANSA has finalised an education and awareness outreach strategy and practice specific security guides have been distributed to jurisdictions. Training is being conducted by ARPANSA in conjunction with the states and territories and its effectiveness is being monitored by survey during the training of participants' understanding of the key messages. The training program is planned to be completed

by end of June 2009. A review of the training will occur at the end of the current program and 12 months after the last of the training is delivered.

Also during the quarter, ARPANSA provided technical input into the planning for the forth coming Exercise Blue Glow, which will be held in Canberra in May, hosted by Australia as part of the Global Initiative on Combating Nuclear Terrorism.

VISTING SHIPS PANEL (NUCLEAR)

ARPANSA participated in a meeting of the Visiting Ships Panel (Nuclear) to provide expert advice on radiation protection and health physics issues, as part of the Australian planning to allow visits by nuclear powered warships. ARPANSA now chairs the Technical Working of the VSP(N).

Participation in international conferences and meetings

IAEA SAFETY STANDARDS COMMITTEES

ARPANSA chaired a joint working group of IAEA Transport Safety Standards Committee and Waste Safety Standards Committee. The objectives of the working group were to identify issues common to both transport and waste safety, to consider any potential conflicts and gaps in the current standards documents, and to explore possible solutions to address the issues identified. An issue of specific relevance to Australian interests was a strong recommendation from the working group to retain the ten times higher limit for exempting shipments of naturally occurring radioactive materials than those imposed for artificial radioactive materials. Australia has strongly advocated this position because of the issues associated with mining.

IAEA NATIONAL COMPETENT AUTHORITY COORDINATION GROUP

In its role as the Australian National Competent Authority (NCA) for Radiation Emergencies, ARPANSA attended the NCA Coordination Group meeting held in Budapest, Hungary in March, to prepare the program for the July Meeting of Competent Authorities.

EUROPEAN CONGRESS OF RADIOLOGY

ARPANSA attended the European Congress of Radiology in Vienna in March. Discussions were held with the Health Protectorate Agency (UK) and the Norwegian Radiation Protection Association regarding the current methodologies being used in Europe for the implementation of Diagnostic Reference Levels (DRLs) for diagnostic radiology.

OECD-NEA RADIOACTIVE WASTE MANAGEMENT COMMITTEE (RWMC) AND REGULATORS FORUM

ARPANSA attended a meeting of the RWMC and Regulators' Forum held at OECD-NEA Headquarters and OECD Conference Centre, Paris, from 24 to 27 March. The object of the RWMC and Regulators' Forum is to share experience and foster best practice in radioactive waste management activities in Nuclear Energy Agency countries, including licensing of waste repositories. A presentation of the Australian country update on radioactive waste management issues was made to the RWMC,

with input from the Australian Department of Resources Energy and Tourism and the Australian Nuclear Counsellor in Vienna.

WASTE MANAGEMENT 2009 (WM2009)

ARPANSA attended an international symposium by WMSymposia in Phoenix, Arizona on March 1 to 5. The symposium addressed the emerging issues in relation to radioactive waste management and environmental management.

MEETING CONVENED BY AUTORITÉ DE SÛRETÉ NUCLÉAIRE (ASN) FRENCH NUCLEAR SAFETY REGULATOR TO DISCUSS THE SAFETY OF RADIOPHARMACEUTICAL PRODUCTION FACILITIES

ARPANSA attended a meeting in Paris from 7 to 9 January to discuss the 'crisis' in production of Molybdenum 99 that had seriously affected Europe in the last three months of 2008 and has had an on-going effect in 2009, principally due to the continued shutdown of the Dutch reactor (HFR).

The purpose of the meeting was to discuss means of co-ordinating the supply of reactor produced radiopharmaceuticals and to manage the transition period between the shutdown of old reactors and the commissioning of new reactors.

The meeting was attended by representatives of safety regulators from Australia, Belgium, Canada, the Netherlands, South Africa, the United Kingdom and the United States of America. Representatives of the French Health Ministry and the industry peak body in Europe, AIPES, also attended. AIPES is the Association of Imaging Producers and Equipment Suppliers.

The key issues identified at the meeting were the need to co-ordinate the supply of radiopharmaceuticals and also to harmonise the safety standards for both research reactors and radiopharmaceutical production facilities.

OECD NUCLEAR ENERGY AGENCY MEETING ON THE SUPPLY OF MEDICAL RADIOISOTOPES

This meeting was held on 29 to 30 January in Paris at the NEA Headquarters. It was attended by ARPANSA as well as representatives of the Australian Nuclear Science and Technology Organisation. The purpose of the meeting was to bring together all parties involved in the supply chain of medical radioisotopes. The workshop brought together 80 participants from 13 OECD and three non-OECD countries and from international organizations.

The outcome of the meeting was to identify short term measures to enhance the security of supply as well as longer term planning for the sustainable and secure supply of medical radioisotopes.

VIETNAMESE AGENCY FOR RADIATION AND NUCLEAR SAFETY (VARANS)

ARPANSA hosted two representatives from VARANS as part of a professional development fellowship. ARPANSA gave presentations on the topics of licensing, monitoring compliance, inspections and enforcement.

IRAQI SCIENTIFIC DELEGATION

ARPANSA coordinated a visit by an Iraqi scientific delegation to Yallambie offices of ARPANSA, Maralinga, Port Pirie, Radium Hill and Lucas Heights to learn about decontamination, remediation and waste management. The delegation was briefed by ARPANSA, other Australian Government and South Australian Government agency experts during their visit in March. The information gained from the visit will assist Iraq in the post war clean-up of a number of former nuclear facilities and sites.

International monitoring arrangements under the Comprehensive Test Ban Treaty

As part of Australia's commitment to the Comprehensive Nuclear-Test-Ban Treaty, ARPANSA continued to operate and maintain radionuclide air monitoring stations at Melbourne, Perth, Townsville, Darwin, and the Cocos Islands. ARPANSA also operates and maintains two noble gas analyzer facilities, co-located with the air monitoring stations in Melbourne and Darwin.

The two remaining stations to be installed are located at Macquarie Island and Mawson, Antarctica. A contract for the installation of a radionuclide air monitoring station on Macquarie Island was signed in December 2008. In March, a Request for Quotation was received from Comprehensive Test Ban Treaty Organisation (CTBTO) for the provision and installation of a redundant detector system for the Macquarie Island radionuclide station. ARPANSA finalized the quote and is waiting on formal approval from CTBTO to proceed with this activity.

A new twelve month contract with the CTBTO for Testing and Evaluation - Post Certification Activities submitted in the last quarter of 2008, was approved with a start date of 1 January 2009. This contract applies to all the radionuclide stations including the two noble gas facilities,

In February, ARPANSA installed a new detector to replace various station equipment at the CTBTO radionuclide air sampling station, at Kavieng in Papua New Guinea. All work was carried out under contract to CTBTO.

In addition to operating the stations, ARPANSA also operates the Australian Radionuclide Laboratory, which has the role of testing samples obtained by other monitoring stations. The Laboratory operates under contract to CTBTO. In January, the laboratory service was suspended in order to install new hardware and configure software. Unfortunately the installation of CTBT communications software failed. Rather than extend the outage, the previously used hardware and software was re-installed. The changeover to the new hardware and software is planned for July 2009.

ARPANSA continues to maintain a National Data Centre that provides advice to the Australian Safeguards and Non-Proliferation Office on any event detected by the CTBT radionuclide network that may be indicative of a nuclear weapon test explosion.

Strengthening of regional capacities for emergency response

ACCIDENT REPORTING AND GUIDANCE OPERATIONAL SYSTEM (ARGOS)

The software system, ARGOS is a decision support system for chemical biological radiological and nuclear (CBRN) emergencies. ARPANSA completed a national

project to evaluate the suitability ARGOS for Australian CBRN emergency planning, and presented a presentation at a CBRN Science & Technology Workshop held in March at the Defence Science & Technology Organisation in Melbourne.

ARPANSA RADIATION EMERGENCY RESPONSE TEAMS

The ARPANSA Radiation Emergency Operations Unit (REOU) participated in specialist detector training, call out exercises and readiness training and operational training activities on search, identification and recovery.

ARPANSA provided a presentation on Australia's radiation emergency response at a Workshop in Seoul, South Korea in April under the Global Initiative on Combating Nuclear Terrorism.

Knowledge, information and services relating to radiation protection and nuclear safety

Study of science relevant to knowledge of health effects of radiation

ULTRAVIOLET RADIATION (UVR)

A collaborative study with the Cancer Council Victoria to measure the effectiveness of shade structures over toddler pools around Melbourne as well as the UVR exposures of lifeguards was commenced in January and field measurements were completed in March. The study examined two groups: young children, as UVR exposures in early life are very important; and outdoor workers (lifeguards) who receive very high UVR exposures. The lifeguards also filled out questionnaires on their sun protection habits to allow assessments of their normal outdoor and workplace behaviour. A number of scientific publications summarizing the results are planned for later in 2009.

The study to assess the solar UVR levels in and around CFA fire stations using UVR sensitive polysulphone badges continued until the end of March. UVR related research done in collaboration with Emory University in the United States by ARPANSA has led to two publications, one in the American Journal of Preventive Medicine, the other in the Journal of the American Academy of Dermatology (see publications). ARPANSA also reviewed two scientific papers, one for an Australian journal and one for an international journal.

ARPANSA attended the Standards Australia/New Zealand Sunscreen Meeting in Auckland, New Zealand in March.

ELECTROMAGNETIC RADIATION (EMR)

ARPANSA attended, as an observer, a meeting of the New Zealand Ministry of Health Interagency Committee on the Health Effects of Non-ionising Fields in Wellington on 25 February. This Committee, which meets at six monthly intervals, discusses recent research and policy relevant to management of public health issues arising from electromagnetic fields and radiation. Of particular interest at this meeting was the new collaborative study by International Agency for Research on Cancer on

the risk of brain cancer in childhood and adolescence from exposure to radiofrequency fields (MOBI-kids) and the Australian progress on a new standard for exposure to extremely low frequency electric and magnetic fields.

ARPANSA attended a meeting of the Standards Australia TE7 Committee on Human Exposure to Electromagnetic Fields in Melbourne on 23 February. ARPANSA also participated in a meeting of the Working Group TE7/2 preparing a draft of a revision of the radiofrequency measurement standard, AS/NZS 2772.2 Radiofrequency radiation - Principles and methods of measurement - 300 kHz to 100 GHz.

The ARPANSA survey of radiofrequency exposure levels produced by mobile phone base stations is continuing with a further 3 sites being measured. ARPANSA is currently preparing appropriate quality systems to obtain NATA accreditation for measurements of public exposures to radiofrequency electric fields from base stations.

Following a decision of the Radiation Health Committee, ARPANSA commenced compilation of a comprehensive catalogue of scientific research studies and literature reviews relating to possible health effects from exposure to radiofrequency electric and magnetic fields published since the completion of the ARPANSA Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz (2002). The catalogue will be used to facilitate a review of key scientific results so that the need to revise the standard can be assessed.

ARPANSA continued to provide information to state and Australian government agencies and to the public and media regarding EMR and health. ARPANSA answers several hundred telephone enquiries and e-mails each year regarding electric and magnetic fields and electromagnetic radiation from a variety of sources. Approximately 60% of enquires relate to electric and magnetic fields in the extremely low frequency range, predominantly from electrical power infrastructure such as substations, transmission lines and domestic installations. Approximately 20% of enquires relate to mobile phone base stations with a few percent each on other matters such as mobile phone handsets, broadcast radio and television and computer wireless networks.

HEALTH PHYSICS

ARPANSA maintains scientific expertise, modelling and analysis tools and measurement facilities to provide advice on the protection of members of the public, workers and the environment.

The Radon Calibration Laboratory provided 15 radon-222 standard exposures for calibration of the ARPANSA radon dosimetry service maintained by the Personal Radiation Monitoring Service. The Laboratory has been successfully upgraded with a second ATMOS radon detection system calibrated to an international primary standard.

The software system, ARGOS (Accident Reporting and Guidance Operational System) is a decision support system for chemical biological radiological and nuclear (CBRN) emergencies. The ARGOS server was upgraded to receive 72 hour weather information from the Bureau of Meteorology twice a day. The installation of a population sensor database now enables community dose assessments to be performed.

During November and December 2008 a number of detections of ^{133}Xe were made at the CTBT detection station sited at ARPANSA, Yallambie (AUX04). In collaboration with Australian Nuclear Science and Technology Organisation (ANSTO) and the Comprehensive Test Ban Treaty Organisation, atmospheric dispersion modelling tools were applied in order to determine the likely source of ^{133}Xe . Initial backtracking indicated a strong possibility that the release was initiated at ANSTO, Lucas Heights. Any discharges from ANSTO were within authorised limits. An abstract has been accepted for publication at the Workshop on Signatures of Medical and Industrial Isotope Production which is being hosted from 1 to 3 July 2009 in Italy by Pacific Northwest National Laboratory of the US Department of Energy.

ENVIRONMENTAL RADIOACTIVITY

ARPANSA is participating in an IAEA-sponsored project to develop methods for the rapid analysis of strontium (Sr-89 and Sr-90) in milk. The results of preliminary tests will be presented at the IAEA Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA) regional meeting in South Korea in April.

A project to study the radiological impact of coal mining and coal burning in the Latrobe Valley has commenced with an initial visit to coordinate with the Victorian EPA and collect some soil and coal samples.

A paper on the development and validation of a rapid method for the analysis of Polonium-210 in urine has been submitted for publication. The project to investigate a method for determining low levels of polonium in fish and tinned sea-food is continuing.

ARPANSA undertook a proficiency test exercise (ALMERA) for gross-alpha and -beta emitters: all results were within acceptance limits.

Scientific programs to support the measurement and assessment of radiation (ionizing and non-ionizing)

SURVEYS OF PATIENT DOSES

ARPANSA in collaboration with Queensland Health, the Quality Use in Diagnostic Imaging Program of the Royal Australian and New Zealand College of Radiologists and the Australasian College of Physical Scientists and Engineers in Medicine is implementing the second phase the internet-based survey of common adult and paediatric scanning protocols. The first phase of the project was successfully completed, including a training and optimisation workshop held in February in Coolumb, Queensland.

Computed Tomography (CT) statistics obtained from the Medicare Benefits Schedules have been analysed in respect of procedure, gender, age, State and radiation dose. The results show that the increase in use of CT in Australia is similar to overseas experience.

IONIZING RADIATION STANDARDS

Through January and February the new medical standards linear accelerator underwent commissioning and acceptance testing. A formal launch of the facility was held on February 13 and the facility was visited by the Parliamentary Secretary for Health at the end of March. The Mosaiq record and verify system has been installed to assist the delivery of reference beams and to facilitate development programs utilising clinical treatment plans from collaborating hospitals.

The long-term stability of the ARPANSA and IAEA graphite photon calorimeters were ascertained through a series of electrical calibration factors and they have been found to be within acceptable limits. The graphite calorimeter has been positioned for making measurements in the beam line of the medical standards linac and pre-irradiation measurements are in progress.

The graphite electron calorimeter has been assembled after incorporating the thermistors and connecting to the electronics. The temperature calibration of thermistors in the calorimeter against the standard platinum resistance thermometer in a standard water bath has been performed and the calorimeter is being readied for measurements in the electron beams of the medical standards linac.

A total of 17 calibration certificates were issued in the quarter. The further delay in the replacement of the teletherapy cobalt-60 source has necessitated the recommencement of some therapy dosimeter calibrations and several are in progress. However the full cobalt-60 based program cannot be resumed until the new source is installed and characterised.

In the therapy dosimetry audit program, a further two centres in NSW and Queensland have been audited for a total of seven megavoltage x-ray beams. To date 45 x-ray beams from 24 accelerators been audited since August 2007.

In other dosimetry activities, ARPANSA attended a Treatment Plan Optimization Mathematics Conference sponsored by Deakin University in February, and the annual scientific meeting of the Trans-Tasman Radio Oncology Group (TROG) in Queensland in March. Following the TROG meeting ARPANSA and the Peter MacCallum Cancer Centre sponsored the visit to Melbourne by Professor Geoffrey Ibbot, Department of Radiation Physics and Director of the Outreach Physics Section of the M D Anderson Cancer Care Center, Houston, Texas.

In late October 2008, ARPANSA took several transfer standards to the International Bureau of Weights and Measures (BIPM) in Paris for a comparison of low energy kV x-ray standards. The equipment was returned in March and follow up measurements were made to complete the comparison. Preliminary results are good and support our participation in an upcoming Asia Pacific Metrology Program comparison, APMP.RI(I)-K2.

RADIOPHARMACEUTICAL QUALITY ASSURANCE

ARPANSA is assisting radio-pharmacists and radio-chemists in nuclear medicine departments to find practical alternatives for the use of instant thin-layer chromatography silica gel media for the measurement of the radiochemical purity of reconstituted ^{99m}Tc -radiopharmaceuticals in the clinical environment. This media is

soon to be unavailable and a quick and reliable alternative is required for the measurement of radiochemical purity prior to administration to patients.

In the preparation for potential use in nuclear medicine, a research collaboration between ARPANSA and the Medical Radiations Research Group of RMIT University, in new generator systems for positron emission tomography (PET) was progressed during the quarter.

Also during the quarter, ARPANSA chaired the Australia and New Zealand Society of Nuclear Medicine Victorian/Tasmanian Branch invited lecture by Professor Kim Williams from Chicago.

RADIOFREQUENCY MEASUREMENTS

ARPANSA continues to operate a NATA accredited radiofrequency calibration service for hazard probes and monitors in support of occupational health and safety, mainly in the area of telecommunications. In this quarter, the service completed 93 calibration jobs of which 84 were completed to NATA accreditation requirements. This included 48 monitors with 37 associated probes and 45 personal monitors and badges.

Personal radiation monitoring service

ARPANSA has continued to offer a comprehensive radiation monitoring service for persons who may be exposed to ionizing radiation as a consequence of their occupation. A service is also provided for the measurement of radon and natural background radiation levels.

At the end of March 2009, the service had 25,893 active wearers. During the March quarter the service issued 40,752 monitors.

Information through written material

PUBLICATIONS

Barnes, E. M., Long, S. A., and Tinker, R. A., Difficulties in obtaining an HPGe detector for low-level measurements, *Applied Radiation and Isotopes* Volume 67, Issue 5, (2009).

Buermann, L., M O'Brien, D Butler, I Csete, F Gabris, A Harkanen, J-H Lee, M Palmer, N Saito and W de Vries, Comparison of national air kerma standards for ISO 4037 narrow spectrum series in the range 30 kV to 300 kV, *EUROMET.RI(I)-S3 Final Report, Metrologia Tech. Suppl 45. 06013 (2008) 48 pages.*

Butler, D., Haworth, A., Sander T., and Todd, S. Comparison of 192Ir air kerma calibration coefficients derived at ARPANSA using the interpolation method and at the National Physical Laboratory using a direct measurement, *Aust. Phys. Eng. Sci. Med.* 31, No. 4 (2008) 332-338.

Glanz, K., McCarty, F., Nehl, E., O'Riordan, D.L., Gies, P., Bundy, L., Locke, A. and Hall, D.M. (2009) Validity of Self-Reported Sunscreen Use by Parents, Children and Lifeguards. *Am. J. Prev. Med.* 36:63-69.

Lee, J. H., Hwang, W. S., Kotler, L. H., Webb, D. V., Büermann, L., Burns, D. T.,

Takeyeddin, M., Shaha, V. V., Srimanoroth, S., Meghzifene, A., Hah, S. H., Chun, K. J., Kadni, T. B., Takata N. and Msimang, Z. APMP/TCRI key comparison report of measurement of air kerma for medium-energy x-rays (APMP.RI(I)-K3), Metrologia Tech. Suppl. 45 06012 (2008).

O’Riordan, D. L., Nehl, E., Gies, P., Bundy, L., Burgess, K., Davis, E., Glanz, K. (2009) Validity of Covering-Up Sun Protection Habits: Association of Observations and Self-Report. *J. Am. Acad. Dermatol.* 60:739-744.

CONFERENCE PAPERS

Wallace, A B., Sibelle, K., Budd, R., Stanley, M., Goergen, S. and Heggie, J. C. P. Paediatric Multidetector CT Optimisation Training: A Survey of Common Scanning Procedures and the Resultant Dose Reduction Associated with Paediatric MDCT Investigations in Australia, Proceedings IRPA 12, 12th International Congress of the International Radiation Protection Association, 19-24 October 2008, Buenos Aires Argentina., www.irpa12.org.ar

Wallace, A.B., U, P., Hickson, K., Bradley, J., Welch, J. and Pathmaraj, K. A Real-Time Monitoring Study of the Personal Dose Received By Nuclear Medicine Technologists Administering ¹⁸F-FDG in a High Patient Throughput PET Centre, Proceedings IRPA 12, 12th International Congress of the International Radiation Protection Association, 19-24 October 2008, Buenos Aires Argentina., www.irpa12.org.ar

WORKSHOP PAPERS

Cabrera, P., Privacy Information Collection and Disclosure, Australian National Radiation Dose Register Workshop, Adelaide, 25 February 2009.

Doering, E. M., and Tinker, R. A., Project Overview and Business Requirements for the Australian National Radiation Dose Register, Australian National Radiation Dose Register Workshop, Adelaide, 25 February 2009.

Davidson, L., The ANRDR Database: What is in it and how it is organised, Australian National Radiation Dose Register Workshop, Adelaide, 25 February 2009.

Grzechnik, M., Tinker, R. A., and Solomon, S. B., Radiation Plume Modelling, Implementation Advisory Group Security of Radiological Material, Melbourne, ARPANSA, 20 March, 2009

Mason, C., Doering, E. M., and Tinker, R. A., Development of a Safety Guide on dose assessment, Australian National Radiation Dose Register Workshop, Adelaide, 25 February 2009.

Osmanovic, A., The ANRDR System: From an Employers Perspective, Australian National Radiation Dose Register Workshop, Adelaide, 25 February 2009.

ARPANSA website

In the reporting period there were 233,640 visits to the ARPANSA website. The most popular information being viewed was radiation and health information sheets, particularly those concerning mobile phones and educational pages about the basics of radiation science.

Visitors downloaded 41,836 documents predominantly from the ARPANSA Radiation Protection series which can be found at: <http://www.arpansa.gov.au/Publications/codes/rps.cfm>. The most frequently downloaded page was a factsheet about measuring magnetic fields: http://www.arpansa.gov.au/pubs/factsheets/mag_fields.pdf.

Regulation of Commonwealth entities using radiation sources and facilities or nuclear installations material, apparatus and facilities

Regulatory activities

INSPECTIONS - UNANNOUNCED

Licensee	Licence Number	Location
ANSTO Radiopharmaceuticals and Industrials	F0044-5A, 5B and 5C	Building 23A ANSTO
ANSTO Fuel Operations	FO0044-4C	Building 23 ANSTO
ANSTO (OPAL)	F0157	Lucas Heights ANSTO Site - OPAL
ANSTO (OPAL)	F0157	Lucas Heights ANSTO Site - OPAL

INSPECTIONS - ANNOUNCED

Licensee	Licence Number	Location
ANSTO Institute for Environmental Research	S0045	Lucas Heights, NSW
ANSTO Radiotracer Facility	F0044-7B	Lucas Heights, NSW
Australian Defence Force and Department of Defence (medical equipment)	S0042	3CSH, RAAF Richmond, NSW
Australian Defence Force and Department of Defence (industrial radiography)	S0042	37 Squadron, RAAF Richmond, NSW
CSIRO Livestock Industries	S0022	St Lucia, QLD.
CSIRO Minerals	S0064	Pullenvale, QLD.
CSIRO Plant Industry	S0021	Black Mountain, ACT

Licensee	Licence Number	Location
Department of Resources Energy and Tourism – Geoscience Australia	S0014	Canberra, ACT
ANSTO (HIFAR)	F0184	Lucas Heights ANSTO Site, NSW

INSPECTION REPORTS ISSUED

Licensee	Report number	Inspection
Australian Customs Service	R09/01498	Container Examination Facility, Matraville, NSW
Australian Defence Force and Department of Defence	R09/00477	Bandiana Waste Storage Facility, VIC
Australian Defence Force and Department of Defence	R08/13145	HMAS Penguin, NSW
Australian Federal Police	R09/00761	Mobile backscatter x-ray unit
National Measurement Institute	R08/12413	West Lindfield, NSW
ANSTO – HIFAR (14/01)	R09/00380	Inspection of removal of 3V8 Gasholder Supply Side of 03 Graphite Circuit

LICENCE APPLICATIONS

Licensee	Licence Number	Type
ANSTO	S0045	Magnetic field non-destructive testing device

REGULATION 51 REQUESTS FOR APPROVAL (RECEIVED)

Licensee	Number	Type	Comment
ANSTO Radiopharmaceuticals and Industrials	F0044-5A, 5B and 5C	Facility	Request for increase in the I-131 activity holdings levels at Buildings 23A and Building 23 from 1.2 TBq to 1.035 TBq and from 2 TBq to 2.035 TBq.
ANSTO Radiopharmaceuticals and Industrials	F0044-5A, 5B and 5C	Facility	Request to approve the operation of Building 54 Mo-99 fission product plant

Licensee	Number	Type	Comment
ANSTO	S0045	Source	Request to deal with sealed sources off-site for training and educational purposes
CSIRO Land and Water	S0009	Source	Request to deal with calibration sources greater than 40 MBq in optically stimulated luminescence readers
CSIRO Land and Water	S0009	Source	Request to deal with a sealed sources in a fully enclosed analytical device in gas chromatograph/electron capture detectors
ARPANSA Medical Radiation Branch	S0003	Source	Request to deal with unsealed sources in Ge-68/Ga-68 generators
ANSTO - MOATA	FO0044-6A	Facility	Request to dismantle the MOATA reactor bioshield Received on 09/02 and withdrawn on 5 March 2009
ANSTO - HIFAR	F0157	Facility	Request for removal of HIFAR cranes

REGULATION 51 APPROVALS

Licensee	Number	Type	Comment
ANSTO Radiopharmaceuticals and Industrials	F0044-5A, 5B, 5C	Facility	Approval to amend the Facility Licence to increase Sodium Molybdate (Mo-99) activity holdings from 25 TBq up to 65 TBq in Building 23 A
ANSTO Radiopharmaceuticals and Industrials	F0044-5A, 5B and 5C	Facility	Approval to increase the I-131 activity holdings levels at Buildings 23A and Building 23 from 1.2 TBq to 1.035 TBq and from 2 TBq to 2.035 TBq.
ANSTO	S0045	Source	Approval to authorise off-site dealings with sealed sources for educational and training purposes
Australian Defence Force and Department of Defence	F0117	Facility	Approval to allow sorting and consolidation of radioactive waste drums at RAAF Edinburgh waste storage facility
CSIRO Minerals	S0064	Source	Approval to authorise dealings with partially enclosed x-ray analysis units and sealed sources greater than 400 MBq in a fixed gauge

Licensee	Number	Type	Comment
ANSTO (OPAL)	F0184	Facility	Approval of Mobile Liquid Transfer System
ANSTO (OPAL)	F0184	Facility	Approval to modify plant procedures
ANSTO (HIFAR)	F0157	Facility	Approval to dismantle cooling towers
ANSTO (HIFAR)	F0157	Facility	Approval to remove HIFAR area cranes

ISSUED, SURRENDERED OR AMENDED LICENCES

Licensee	Number	Type	Comment
ANSTO	S0045	Source	Source licence S0045 amended to allow dealings with magnetic field non-destructive testing devices
CSIRO Textile Fibre Technology	S0010	Source	CSIRO Textile Fibre Technology no longer exists, and has been incorporated into the new Materials Science and Engineering division of CSIRO

LICENCE EXEMPTION

No licence exemptions were granted during the quarter.

OPAL (FACILITY LICENCE F0157)

During the reporting period, ANSTO informed ARPANSA that during the operations of transfer of a molybdenum rig between the irradiation position (within the reflector vessel) and the reactor pool bulk irradiation rig storage rack, a rig became detached from the handling tool and fell onto the reflector vessel. The event did not lead to any release of activity in the reactor pool and after examination of the target plates contained in the rig, it was confirmed that no damage to the target plates occurred.

ANSTO advised ARPANSA that their initial rating of this event on the International Nuclear Event Scale (INES) is zero. ARPANSA has agreed to this rating. Additionally, ANSTO has also advised that they are currently developing a modification to the design of the handling tool to prevent the reoccurrence of similar events. It is anticipated that this modification would be subject to regulatory review.

During the quarter ending December 2008, ANSTO has advised that they experienced some problem in tripping an inoperable channel of the protection system (i.e. CIC Channel 10) while the reactor was at power operations. It is to be noted that in accordance to the Operating and Limit Conditions requirements that set the safe operation of OPAL reactor, any protection channel declared inoperable is required to be tripped within a time delay of 12 hours. If this task is not completed within that period of time the reactor shall be put in shutdown mode within one hour.

On 25 March, during a meeting held at ARPANSA with ANSTO, ARPANSA requested additional information about the problem encountered with the CIC channel 10 and in particular about the actual timing at which the inoperable channel was tripped.

Following this meeting, ANSTO had reopened the investigation of the event and advised on 27 March that they declared a breach of an OLC in relation to the failure to trip an inoperable protection channel within the completion time specified within the OLC (i.e. the inoperable channel was tripped within 28 hours and 29 minutes instead of the 12 hours required by the OLC). They also advised that it was their intention to upgrade their initial rating of the event from INES Level 0 to INES Level 1.

The documentation collected by ARPANSA inspectors during two separate inspections of the OPAL log books on 23 and 26 March confirmed the relevant OLC was not complied with during that event.

TRANSPORT OF RADIOACTIVE MATERIAL

The CEO of ARPANSA, is the competent authority for transport of radioactive material by road and rail under the *Code of Practice for the Safe Transport of Radioactive Material*. Decisions made during the quarter were:

- AUS/2008-21/AF-96 Revision 2 for A Type Fissile Radioactive Materials Package Design, validating certificate USA/9329/AF-96, Revision 2, issued by the United States of America Competent Authority;
- AUS/2008-22/S-96 Revision 2 for Special Form Radioactive Material, validating certificate USA/0696/S-96, Revision 4, issued by the United States of America Competent Authority; and
- approval of shipment of ANSTO Fuel from ANSTO to a dedicated port in the Sydney area.

IMPORT PERMITS

The importation of radioactive material into Australia requires permission under Regulation 4R of the *Customs (Prohibited Imports) Regulations 1956*. These regulations are made under the *Customs Act 1901*. Under the *Customs (Prohibited imports) Regulations 1956*, the Minister to Health and Ageing may authorise ARPANSA officers to approve import permissions.

ARPANSA authorised officers issued 162 permits for medical radioisotopes including 4 urgent single shipments, 151 single shipments and 7 twelve month permits. ARPANSA authorised officers also issued 132 permits for customs release of non-medical radioisotopes, comprising 78 urgent single shipments, 48 standard single shipments and six twelve monthly permits.

EXPORT PERMITS

The export of high activity radiation sources from Australia requires permission under Regulation 9AD of the *Customs (Prohibited Export) Regulations 1958*. These regulations are made under the *Customs Act 1901*. Under the *Customs (Prohibited*

Export) Regulations 1958, the Minister for Health and Ageing may authorise ARPANSA officers to approve export permissions.

In accordance with the authorisation by the Minister for Health and Ageing under the *Customs (Prohibited Import) Regulations 1958*, ARPANSA authorised officers issued three export permissions during the quarter.

Regulatory process and performance

QUALITY MANAGEMENT

ARPANSA is continuing with its revision and improvement of the regulatory quality management system (QMS) to ensure that the regulatory processes are managed according to a comprehensive QMS which meets the ISO 9000 standard.

Significant progress has been made and work is currently focused on completing the development of documentation of detailed policies and procedures. It is expected that this labour intensive phase of the work will be completed by December 2009.

PLANNING

A planning day was held on 16 March to begin the process of collaboratively preparing the Regulatory and Policy Branch Business Plan for 2009/2010. The completed plan will be included in the June 2009 quarterly report.

REGULATORY KEY PERFORMANCE INDICATORS

The regulatory Management Information System is being further revised to allow more accurate and complete collection of data particularly for determining performance against key performance indicators.

Regulatory performance is reported annually according to targets set in the Portfolio Budget Statement in three main categories as follows:-

1. Number of accidents and incidents.
2. Number of licence and relevant change assessments and inspection reports per staff member
3. Stakeholder satisfaction surveys

Performance in category 1 for the March quarter is tabled below. Performance in categories 2 and 3 will be reported annually where it can be more meaningfully interpreted in an annual context against the targets set in the Portfolio Budget Statement.

PROGRESS AGAINST KPI'S 2008/2009

Measure	March 2009	Annual Target ^a
Accidents/incidents that must be reported within 24 hours	2	< 5
Incidents that are not accidents	8	< 40

Notes

- a. The annual targets were derived based by estimation only. They will be progressively refined over time as actual data is collected and trends can be determined.

Details of any breach of licence conditions by a licensee during the quarter, of which the CEO is aware

BREACHES DETERMINED BY THE CEO

Licensee	Number	Nature of breach	Action
ANSTO	F0044-5A, 5B,5C	Breach of s30(2) of the ARPANS Act. Exceeding operational limits and conditions.	Corrective actions taken by ANSTO. Identification of breach and reporting to ARPANSA complies with regulation 45(3). No enforcement action was initiated.
ANSTO	F0044-5A, 5B,5C	Breach s30(2) of the Act . Non-compliance with the Code of Practice for the safe Transport of Radioactive Material 2008. Exceeding the radioactive content for 'Type A' package.	Corrective actions taken by ANSTO. Identification of breach and reporting to ARPANSA complies with regulation 45(3). Awaiting final investigation report from ANSTO.
Australian War Memorial	S0080	Breach of S31(2) of the ARPANS Act – failure to comply with licence conditions by not providing updated source inventory	Submission made to rectify breaches. No enforcement action necessary
CSIRO Manufacturing and Materials Technology	S0066	Breach of S31(2) of the ARPANS Act – failure to comply with licence conditions by not complying with relevant codes and standards	Submission made to rectify breaches. No enforcement action necessary
CSIRO Manufacturing and Materials Technology	S0066	Breach of S31(2) of the ARPANS Act – failure to comply with licence conditions by not following own written work procedures as per Regulation 49	Submission made to rectify breaches. No enforcement action necessary
CSIRO Manufacturing and Materials Technology	S0066	Breach of S31(2) of the ARPANS Act – failure to comply with licence conditions by not reporting relevant changes to laser training as per Regulation 52	Submission made to rectify breaches. No enforcement action necessary

Licensee	Number	Nature of breach	Action
CSIRO Manufacturing and Materials Technology	S0066	Breach of S31(2) of the ARPANS Act – failure to comply with licence conditions by not submitting the Jan – Mar 2008 quarterly report within the specified time	Report provided 3 months later. No enforcement action necessary
CSIRO Manufacturing and Materials Technology	S0066	Breach of S31(2) of the ARPANS Act – failure to comply with licence conditions by not submitting the Jul – Sept 2008 quarterly report within the specified time	Report provided 3 months later. No enforcement action necessary
CSIRO Industrial Physics	S0105	Breach of S31(2) of the ARPANS Act – failure to comply with licence conditions by not submitting the Jan – Mar 2008 quarterly report within the specified time	Report provided 3 months later. No enforcement action necessary
CSIRO Industrial Physics	S0105	Breach of S31(2) of the ARPANS Act – failure to comply with licence conditions by not submitting the Jul – Sept 2008 quarterly report within the specified time	Report provided 3 months later. No enforcement action necessary
CSIRO Minerals	S0064	Breach of S31(2) of the ARPANS Act – failure to comply with licence conditions by not making a request for prior approval to deal with additional items under Regulation 51	Submission made to rectify breaches. No enforcement action necessary
CSIRO Minerals	S0064	Breach of S31(2) of the ARPANS Act – failure to comply with licence conditions by not complying with the relevant codes and standards	Submission made to rectify breaches. No enforcement action necessary
Department of Agriculture Fisheries and Forestry – Australian Quarantine Inspection Service	S0120	Breach of S31(2) of the ARPANS Act by –failure to comply with licence conditions by disposing of controlled apparatus without prior approval as per Regulation 53(1)	Submission made to rectify breaches. No enforcement action necessary

Licensee	Number	Nature of breach	Action
Law Courts Limited	S0165	Breach of S31(2) of the ARPANS Act - failure to comply with licence conditions by not submitting the Jul – Sept 2008 quarterly report within the specified time	Submission made to rectify breaches. No enforcement action necessary
National Measurement Institute	S0142	Breach of S31(2) of the ARPANS Act - failure to take all reasonably practicable steps to prevent accidents from occurring as per Regulation 46(1)	Submission made to rectify breaches. No enforcement action necessary
National Measurement Institute	S0142	Breach of S31(2) of the ARPANS Act - failure to comply with their own plans and arrangements as per Regulation 49	Submission made to rectify breaches. No enforcement action necessary
National Measurement Institute	S0142	Breach of S31(2) of the ARPANS Act - for unapproved disposal of controlled apparatus as per Regulation 53(1)	Submission made to rectify breaches. No enforcement action necessary

A list of all facilities licensed under Part 5 of the *ARPANS Act*

There were no new facility licences issued during the quarter.

Operations of the Radiation Health and Safety Advisory Council, the Radiation Health Committee and the Nuclear Safety Committee

Radiation Health and Safety Advisory Council

The Council met at ARPANSA's Miranda office on 27 February. A summary of Council's meeting is available on the ARPANSA web site at <http://www.arpansa.gov.au/AboutUs/Committees/rhsacmt.cfm>. This was the first meeting of a new triennium.

Outcomes of the meeting were:

- The CEO requested that Council undertake a scoping review of the type of intermediate level waste in Australia and the type of regulatory guidance required. Council also noted the need to characterise waste, to consider the suitability and sustainability of long term storage, and that the outcomes of the Joint Convention review meeting in May would be relevant.
- Council discussed a number of radiotherapy accidents that had occurred both in Australia and overseas in the past few years. Council noted that the accidents involved different areas of radiotherapy, and also discussed the common factors between the accidents. Council was informed of ARPANSA's ongoing role in the radiotherapy community, including publishing a Code of Practice and Safety Guide, and the installation of the new multi-energy medical linear accelerator (LINAC), which will provide calibration information that matches those used clinically as well as provide a platform for ongoing study and research into dosimetry.
- Council noted the roles of the Radiation Health Committee and Nuclear Safety Committee, and endorsed the CEO's proposed appointments to the Committees for the new triennium.

Being the first meeting of the triennium, Council was briefed on a range of issues, including the following:

- Role and functions of Council;
- Role and functions of ARPANSA;
- ARPANSA's international and regional role;
- ARPANSA's publication program and national uniformity;
- Reports from the Radiation Health Committee and Nuclear Safety Committee.

Radiation Health Committee

The Committee met on 18 and 19 March at ARPANSA's Yallambie offices. A summary of the meeting is available at <http://www.arpansa.gov.au/AboutUs/Committees/rhcmt.cfm>. This was the first meeting of a new triennium.

The outcomes of the meeting were:

- The Committee decided that the priority outcome areas for the RHC were the medical applications of ionizing radiation, including diagnostic reference levels when developed, a review of the *Code of practice for the safe use of industrial radiography equipment* (RHS 31), environmental protection (non-human biota) from naturally occurring radioactive material (NORM), including uranium mining, and areas of public concern, such as non-ionizing radiation and radioactive waste.
- The Committee voted in favour of the inclusion in the *National Directory for Radiation Protection* (NDRP) of Amendment 4, containing provisions on solaria. A consultant has been contracted by ARPANSA to develop a web-based training package for solarium operators.
- The Committee approved the draft X-ray Analysis Equipment Amendment to be released for public comment, subject to completing the regulatory impact statement.
- The Committee agreed that the ionizing radiation principles of justification, optimisation, limitation, and population exposure do not apply to non-ionising radiation sources/practices and the NDRP should be amended to clarify this point.
- The Committee was advised that preparation of a public comment draft of the NDRP amendment on Cabinet X-ray equipment had commenced and would be circulated to members for comment out of session, with the expectation that a draft ready for approval for release for public comment would be tabled at the July 2009 meeting.
- The Committee was advised that a draft Regulatory Impact Statement (RIS) is still being developed for the draft NDRP amendment containing provisions for lasers and Intense Pulsed Lasers. It is proposed to employ a consultant to complete this RIS.
- The Committee considered a revised draft of the *Code of Practice and Safety Guide for Radiation Protection in Veterinary Medicine*, which will be finalised out-of-session.
- The Committee agreed to the release of the *Code of Practice for Radiation Protection in the Use of Ionizing Radiation by Chiropractors* for public comment. Following the RHC meeting, the draft Code was released on 23 March 2009 for a period of public comment until 15 May 2009.
- The Committee considered a revised draft of the draft *Safety Guide for the Use of Radiation in Schools Part 1: Ionizing Radiation*, which will be circulated to RHC members for approval out-of-session.
- The Committee was advised that the working group had been unable to prepare a near-final draft of the Radiation Protection Standard for Exposure Limits to Electric and Magnetic Fields 0 Hz - 3 kHz, a final draft of the RIS or responses to public submissions in time for the meeting. It is expected that the near-final draft will be circulated to the Consultative Group during the next quarter. The Committee asked ARPANSA to ensure that a final version of the Radiation Protection Standard for Exposure Limits to Electric and Magnetic Fields 0 Hz - 3 kHz is available for the July 2009 meeting. The electrical supply industry is unable to provide updated costing figures for the RIS until a near-final draft is available.

- The Committee considered a draft RHC Statement to assist crematorium and funeral parlour workers in the safe handling of corpses containing radioactive material and to replace NHMRC RHS 18, *Code of Practice for the Safe Handling of Corpses Containing Radioactive Materials (1986)*. The revised statement will be circulated out-of-session for RHC approval.
- The Committee agreed that letters be sent to department heads of all jurisdictions requesting cost-sharing for employment of consultants to develop regulatory impact statements.
- The Committee was informed that the working group developing national core competencies for radiation protection is preparing a package of draft competencies for the Committee to endorse their direction at the July 2009 meeting.
- The Committee members were asked to provide feedback by 15 May 2009 on the disqualifying offences, any legislative issues and the methods of security background checking used in their jurisdiction in relation to the *Code of Practice for the Security of Radioactive Sources*.
- The Committee approved a proposal to appoint a consultant to accelerate the progress in developing the ‘National Standard’ part of RPS 1.
- The Committee were also briefed on the International Workshop on Intermediate Depth Disposal of Radioactive Waste held in Gyeongju, Korea in December 2008. The Workshop discussed national strategies, disposal options, safety concepts, and existing and planned facilities.

Nuclear Safety Committee

The Committee did not meet during the quarter. The next meeting, which is the first for the new triennium, is scheduled for 1 May 2009.

Reports to the CEO from the RHSAC and NSC (paragraphs 20(f) and 26(1)(d) of the Act)

No reports from the RHSAC and NSC were provided to the CEO of ARPANSA during the quarter.

Details of directions given by the Minister under Section 16

No directions were given by the Minister under Section 16 of the ARPANS Act during the quarter.