



AUSTRALIAN RADIATION PROTECTION AND NUCLEAR SAFETY AGENCY

**QUARTERLY REPORT
OF THE
CHIEF EXECUTIVE OFFICER
OF ARPANSA**

FOR THE PERIOD 1 OCTOBER TO 31 DECEMBER 1999



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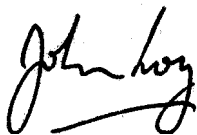
31 March 2000

The Hon Dr Michael Wooldridge MP
Minister for Health and Aged Care
Parliament House
CANBERRA ACT 2600

Dear Dr Wooldridge

In accordance with the *Australian Radiation Protection and Nuclear Safety (ARPANS) Act 1998*, I present to you my Quarterly Report for the period 1 October to 31 December 1999.

Yours sincerely



Dr John Loy
CEO of ARPANSA

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FOREWORD

The *Australian Radiation Protection and Nuclear Safety Act (1998)* requires the CEO each quarter to prepare and give to the Minister of Health and Aged Care a report on the operations during the quarter of the CEO, ARPANSA, the Council and committees. The Act requires that the report include:

- details of directions given by the Minister to the CEO during the quarter under section 16 of the Act;
- details of any breach of licence conditions by a licensee during the quarter, of which the CEO is aware;
- details of all reports received by the CEO during the quarter from the Council and Committees; and
- a list of all facilities licensed under Part 5 of the Act during the quarter.

REPORT ON PERFORMANCE

(a) UNIFORMITY OF RADIATION PROTECTION FRAMEWORKS

National Directory of Radiation Protection

At its November meeting the Radiation Health Committee (RHC) (see page 5) determined that a publication covering the scope of regulation needed to be urgently developed and included in the National Directory for Radiation Protection (NDRP). The National Uniformity Implementation Panel, as a standing working party of the RHC, is to establish the NDRP. The NDRP will provide an overall agreed framework for radiation safety, including both ionizing and non-ionizing radiation, together with clear regulatory statements that can be adopted within existing Commonwealth and State/Territory legislative frameworks.

(b) ADVICE ON RADIATION PROTECTION AND NUCLEAR SAFETY

Nuclear Powered Warship Reference Accident

ARPANSA issued a draft report, on behalf of the Visiting Ships Panel (Nuclear), documenting a revised 'reference accident' for assessing the suitability of ports for visits by nuclear powered warships to Australia. The report took into consideration advances in accident modelling, recent information on nuclear accidents and discussions with representatives of the States and Territories.

Following a meeting between the CEO of ARPANSA and the Chairman of the panel to discuss arrangements for publishing the report, the report was distributed to the States and Territories for comment and endorsement. Comments were received from the State and Territory agencies and a meeting was held with their representatives to resolve outstanding issues and finalise documentation.

ARPANSA officers ran a desktop emergency exercise at an international training course presented by Australian Nuclear Science and Technology Organisation (ANSTO) on behalf of the International Atomic Energy Agency (IAEA). This exercise involved simulating an incident and suspected release of radioactive material from a nuclear powered warship. The decision pathways necessary for ensuring that the public would be protected were followed, and the processes and problems in managing such an emergency were highlighted.

Maralinga

The last of the contaminated material from the soil removal areas was placed in burial trenches and the clearance monitoring of these areas was finalised. ARPANSA will continue monitoring outside the cleared areas to ensure compliance with the rehabilitation criteria.

Ultraviolet Radiation and Shade

ARPANSA provided input and advice on ultraviolet radiation to the Anti Cancer Council of Victoria for a publication being produced on shade.

(c) RESEARCH ON RADIATION PROTECTION, NUCLEAR SAFETY AND MEDICAL EXPOSURES TO RADIATION

Personal Dosimetry

Research in collaboration with James Cook University and Queensland Health resulted in two publications dealing with UVR exposures of infants and small children:

- Estimation of the Annual Solar UVR Exposure Dose of Infants and Small Children in Tropical Queensland, Australia, A.F. Moise, H.P. Gies and S.L. Harrison, *Photochem Photobiol* 69, 457-463, 1999.
- Correlations between Reported and Measured Ultraviolet Radiation Exposure of Mothers and Young Children, D.L. O'Riordan, W. Stanton, M. Eyeson-Annan, P. Gies and C. Roy, *Photochem Photobiol* 71, 60-64, 2000.

Solar Ultraviolet (UV) Radiation Measurements and Protection

Collaboration with the Cooperative Research Centre for Southern Hemisphere Meteorology to validate forecasts of UV Index against ground based measurements resulted in a publication on UV Indices:

- The operational Australian Ultraviolet Index forecast 1997, L Lemus-Deschamps, L Rikus and P Gies, *Meteorological Applications* 6: 241-251, 1999.

(d) SERVICES PROVIDED IN RADIATION PROTECTION, NUCLEAR SAFETY AND MEDICAL EXPOSURES TO RADIATION

Northwest Institute of Nuclear Technology(NINT), China

ARPANSA entered into a contract with NINT of China in December 1998 for the provision of two specially equipped vehicles developed to facilitate the detection and monitoring of radionuclide contamination of the environment.

This equipment was shipped to China in early August. In late October, staff members Stuart Baylis, Ian McLeish, Jeff Fry and Lindsay Martin visited China for two and a half weeks to commission the equipment. The Final Acceptance Certificate was signed at NINT on 9 November 1999.

Comprehensive Test Ban Treaty Organisation (CTBTO)

ARPANSA has been contracted to operate and maintain radionuclide air-sampling stations as part of an international monitoring network being established by the CTBTO.

The radionuclide monitoring station in Melbourne has been established and installation of the Perth station commenced in December. Once commissioned, data from Australia will be beamed by satellite directly to Vienna to monitor compliance with the provisions of the Treaty.

These first stations will be followed with further stations in Townsville, Darwin, the Cocos Islands, Macquarie Island and Mawson in the Antarctic.

A Technical Training Program for six radionuclide monitoring station operators from Australia, Cook Island, Mongolia and Russia was organised and conducted by ARPANSA in Melbourne on behalf of the CTBTO from 8 to 12 November.

Accreditation of Testing and Calibration Services

The necessary documenting of procedures for a number of services offered by ARPANSA to gain quality systems accreditation has gained momentum. An internal quality systems audit of the RF calibration service was completed in December and it is expected that an application for accreditation by National Association of Testing Authorities (NATA) will be lodged next quarter.

It is anticipated that the extension of a contract to facilitate the completion of documentation for the RF calibration service will enable NATA accreditation of the personal radiation monitoring and ionizing radiation calibration services of ARPANSA to be sought by the end of the financial year.

Fabric Testing and Labelling

A UVR Resource Guide listing companies and their products that have been tested at ARPANSA was finalised and published.

65 testing jobs involving 217 fabric samples were processed and 8 trademark licenses were issued. UPF licensees placed 51 orders for UPF swing tags totalling 497,000 tags.

Electromagnetic & Optical Radiation

There was a strong demand for commercial radiofrequency survey and consultation work and laser/optical equipment tests. Many requests were unable to be met due to limited staff resources.

Michael Bangay conducted a workshop involving communications carriers and interested parties to develop an agreed measurement protocol for mobile phone base stations. The workshop concentrated primarily on CDMA transmission protocol.

(e) COUNCIL AND COMMITTEE OPERATIONS

Radiation Health and Nuclear Safety Committees Announced

On 5 November, the CEO of ARPANSA, John Loy, announced the members of the Radiation Health Committee and Nuclear Safety Committee, who have been appointed for a three year term.

The role of the Radiation Health Committee (RHC) is to advise the CEO and the Radiation Health & Safety Advisory Council on matters relating to radiation protection, including formulating draft national policies, codes and standards for consideration by the Commonwealth, States and Territories. The members of the RHC are:

Mrs Jill Fitch (SA)
Chair
Director, Radiation Protection Branch,
Dept of Human Services
South Australia

Dr John Loy
CEO
ARPANSA

Mr Len Potapof (NSW)
A/Manager, Radiation Policy Unit
Environment Protection Authority
New South Wales

Mr Morrie Facci (Vic)
A/Chief Radiation Officer
Department of Human Services
Victoria

Dr Sujit Dey (WA)
A/Managing Physicist
Radiation Health Section
Department of Health

Mr Brad Cassels (NT)
Senior Policy Officer
Radiation Health
Territory Health Services
Northern Territory

Dr Barbara Shields (Tas)
Senior Health Physicist
Department of Health & Human Services
Tasmania

Mr Simon Critchley (Qld)
Director
Radiation Health
Department of Health
Queensland

Mr David Smoker (ACT)
Director, Radiation Safety Section
ACT Department of Health & Community Care

Dr Peter Jezukaitis (SA)
Occupational Physician
Nuclear Safety Committee representative

Dr Harry Cohen (WA)
Representing the General Public
Gynaecologist

Dr Nicholas Daunt (Qld)
Diagnostic Radiologist

Dr Andrew Wood (Vic)
Senior Lecturer in Biophysics
Swinburne University of Technology

The role of the Nuclear Safety Committee (NSC) is to advise the CEO and the Council on matters relating to nuclear safety and the safety of controlled facilities, including developing and assessing the effectiveness of standards, codes, practices and procedures.

The current membership of the NSC comprises:

Ms Sylvia Kidziak (NSW)
Chair
Occupational Health and Safety Consultant

Dr John Loy
CEO
ARPANSA

Dr Garry Smith (NSW)
Local Government representative
Principal Environmental Scientist
Sutherland Shire Council

Ms Jean McSorley (NSW)
Representing the General Public

Dr Barbara Shields (Tas)
Radiation Health Committee representative
Senior Health Physicist
Department of Health & Human Services
Tasmania

Emeritus Professor Ian Polmear (Vic)
Materials Science Department
Monash University

Professor Robert Melchers (NSW)
Civil Engineering & Surveying Department
University of Newcastle

Dr Peter Jezukaitis (SA)
Occupational Physician

Dr Rob Lee (ACT)
Director Human Factors
Systems Safety & Communications
Australian Transport Safety Bureau

Mr Michael Allen (NSW)
former Director
Nuclear Safety Bureau

Mr Bob McAneny (NSW)
former Manager
ANSTO
HIFAR (Nuclear Technology Division)

(f) REGULATION

Standards

Guideline on Expectations for Safety Plans and Arrangements

Significant progress was made with a draft guideline setting out expectations against which ARPANSA will review safety plans and arrangements which are provided as part of licence applications. A systematic work program focussed on international best practice obtained through literature scanning and concentrated ARPANSA workshops.

Applications for Licence

ARPANSA received three applications for source licences during the quarter. A total of 78 applications for a facility or source licence are currently under review. A program for the technical review of these applications has been developed. Regulatory Branch officers undertook several visits and meetings with applicant organisations as part of the assessments. For each application, a Safety Evaluation Report will be prepared. The Report will include recommendations to the CEO on the decision to issue a licence together with recommended conditions of licence.

The CEO of ARPANSA issued no facility licences during the quarter.

Australian Defence Industry

In late 1999, officers identified the Australian Defence Industries (ADI) as a Commonwealth entity that may have possessed sources of radiation but had not applied for an appropriate licence. The CEO of ADI was advised of the legislative requirements by letter. No reply has been received by ARPANSA to date.

Australian War Memorial

A letter was sent to the Australian War Memorial regarding their responsibility under the ARPANS Act to apply for a licence for a large amount of 'radium dial' instrumentation.

Freedom of Information Request

ARPANSA received a request under the Freedom of Information (FOI) Act for the release of documents and correspondence related to the decision to issue a facility licence to ANSTO to prepare a site for the Replacement Research Reactor. Following a search of ARPANSA records to identify documents that would relate to the request, the ARPANSA FOI delegate advised the requestor of the preliminary assessment of the charge that would be made on the request. As of the end of the quarter, the requestor had not replied to that advice.

Surveillance

ANSTO National Medical Cyclotron Audit

ARPANSA performed a quality system audit of the management of safety at the National Medical Cyclotron operated by ANSTO at Camperdown in Sydney. The auditors made minor recommendations for improving the demonstration of 'effective control' of the facility and noted that ANSTO was already in the process of addressing the relevant documentation.

Transport of Radioactive Material

During the quarter, ARPANSA gave agreement to ANSTO to load spent fuel from the HIFAR research reactor into two transport packages in preparation for shipment to France; and approval was given for the transport of the shipment from Lucas Heights to the port. This transfer of spent fuel was successfully completed within the quarter.

Safety of Australian Nuclear Science and Technology Organisation (ANSTO) Nuclear Plant

The *Australian Nuclear Science and Technology Organisation Amendment Act 1992* established the Nuclear Safety Bureau (NSB) with functions including the review and safety of ANSTO's nuclear plant. This part of the Act was repealed with the proclamation of the *ARPANS Act*. However, in the period prior to a decision being made on an application for licence for these facilities, the CEO of ARPANSA has functions and powers to enable the safety review formerly performed by the NSB to be continued by ARPANSA.

HIFAR Abnormal Occurrences

During the quarter ARPANSA officers reviewed five abnormal occurrences, all related to equipment fault and it was concluded that none had adverse safety implications. All were assigned Level 0 on the International Nuclear Event Scale (INES) i.e. of no safety significance.

Unexpected Tritiated Water Discharge

ANSTO advised of an unexpected release of tritiated water into a stormwater drain on the ANSTO site. There was no off-site release of tritiated water. The water in the drain was pumped into the ANSTO internal sewerage effluent system and Sydney Water was notified as required in the Trade Waste Agreement. The drain was flushed with clean water until drinking water standards were achieved. This water was also captured in the stormwater bund and pumped to the ANSTO sewerage effluent tanks. ANSTO advised that the source of the problem was traced to the flushing of a HIFAR liquid level pump during a routine maintenance operation and action was taken to prevent recurrence of such an incident.

Fuel Element Handling Incidents

A review of the ANSTO report on the root cause analysis of the three spent fuel-handling incidents that occurred during 1998 and 1999 was completed. ARPANSA notified ANSTO that it agreed with the recommendations of the report and requested that the plan and schedule for implementing be provided to ARPANSA by the end of the quarter.

Radioactive Discharges

Radioactive airborne discharges from HIFAR were reviewed by ARPANSA and were found to comply with the airborne discharge authorisation issued by the NSB. ARPANSA is currently negotiating a site-wide airborne discharge authorisation to include all existing facilities at the Lucas Heights Science and Technology Centre. The authorisation will include a requirement on ANSTO to report radiation doses arising from airborne discharges calculated using a method approved by ARPANSA and compared with the agreed dose constraints and objectives.

Liquid discharges from the Lucas Heights Science and Technology Centre are required to comply with the Trade Waste Agreement between Sydney Water and ANSTO. This agreement includes limits in the concentrations of radioactive materials at the discharge point and at the Cronulla Sewerage Treatment Plant, based on World Health Organisation Guidelines for Drinking Water Quality (1993). ARPANSA reviewed a revision of the agreement and is satisfied that adequate radiation protection is provided for sewerage workers and the public.

The liquid discharges for the quarter complied with the Trade Waste Agreement.

ANSTO Management of Criticality Hazards

ARPANSA questioned ANSTO Waste Management in regard to specific detail on nuclear criticality safety following the criticality accident in Japan. A response was received describing the criticality arrangements associated with the storage and transfer of uranyl nitrate liquid wastes resulting from the fission product molybdenum-99 separation process. The information provided in the criticality assessment indicates that the situation is safe even if the concentration of uranium is twice the maximum concentration measured in the waste tanks.

HIFAR Y2K Compliance

ARPANSA reviewed the HIFAR instructions for Y2K testing of the reactor safety systems during the New Year rollover and contingency arrangements to be taken in the event of an unforeseen failure. Subject to a number of conditions the CEO of ARPANSA agreed with the arrangements and instructions.

The reactor was shut down before midnight and returned to power at approximately 0020 on 1 January 2000. HIFAR management reported that there was no loss of services or communications or failure of safety or process systems during the New Year rollover.

ANSTO Emergency Arrangements

The ANSTO Local Liaison Working Party, formed under the NSW *Emergency Management and Rescues Act 1989*, coordinates the involvement of NSW 'combat' agencies having responsibilities under the arrangements for emergencies at the Lucas

Heights Science and Technology Centre. Meetings of the working party are held each quarter and an ARPANSA officer attends as an observer.

An emergency exercise of ANSTO's emergency arrangements was carried out in October 1999 successfully utilising the ANSTO's new emergency control centre and involving the combat agencies. ARPANSA officers observed the exercise and provided comments to the organisers.

HIFAR Major Shut-down

ARPANSA continued to monitor ANSTO's preparation for the four-yearly extended shutdown of the reactor scheduled for February 2000. The shutdown will allow inspections and modifications to be carried out that cannot be undertaken during routine operating programs. ARPANSA completed a review of the proposed program of work for the shutdown and the CEO of ARPANSA wrote agreeing to the proposal subject to a number of conditions requiring reporting of inspection results and prior agreement from ARPANSA before reactor start up.

HIFAR Plant and Procedure Modifications

ARPANSA agreed to various stages of a number of modifications to safety systems including refurbishment of primary coolant pump control cabinets, switching arrangements for a containment space conditioner sub-system, power supplies for the emergency core cooling system level sensors, replacement of the electrical panel for safety systems and strainers for the secondary coolant system. Comments were forwarded to HIFAR management on a proposed procedure for project management for plant modifications.

ARPANSA is reviewing ANSTO's quarterly report of the status of modifications in progress.

(g) INTERNATIONAL LIAISON

Korean Peninsula Energy Development Organisation (KEDO)

Mr Don Macnab, attended a meeting of the Nuclear Safety Advisory Group (NSAG) of KEDO in New York during December. The NSAG oversees the safety and regulation of an international project to finance and construct two nuclear power stations in the Democratic Peoples Republic of Korea and provides advice to the Executive Director of KEDO.

Gamma Ray Spectrometry

Dr Lindsay Martin presented a two-week training course on gamma ray spectrometry systems at the Malaysian Institute of Nuclear Technology Research, Bangi Selangor from 25 November.

Asia Pacific Metrology Program

Two visiting scientists from the Institute of Nuclear Energy Research, Taiwan performed an inter-comparison of ion chambers with the ARPANSA standards over two weeks in late November. The inter-comparison was undertaken as part of the Asia Pacific Metrology Program.

International Atomic Energy Agency (IAEA)

Mr Michael Kerr visited Karlsruhe, Germany for four weeks from 21 October to attend an IAEA training course that covered the instrumentation and control of nuclear power plants and focused on software and digital based technology. Practical applications were examined during visits to a number of modern nuclear power plants. The technology is also relevant to nuclear research reactors.

From 25 to 28 October, Dr Ches Mason participated in an IAEA Peer Review Mission that reviewed legislative and institutional measures for radiation control in Bangladesh, and prepared a report of its findings.

Drs Lindsay Martin and Malcolm Cooper attended an IAEA Regional Training Workshop in Korea from 25 to 29 October to give presentations on environmental monitoring of radioactive materials

Also during October, Mr Trevor Mountford-Smith chaired a working group at a technical committee meeting of the IAEA, in Vienna, for the purpose of simplifying the *IAEA Regulations for the Safe Transport of Radioactive Material*. These regulations form the basis for revision of the Australian code of practice, which is to be implemented in Australia by the beginning of 2001.

In November-December, Mr Robert Huntley visited the IAEA, in Vienna, as well as the International Bureau of Weights and Measures, Paris, and the National Physics Laboratory, London for discussions on how to set up a radiodosimetry quality audit program for Australia.

Mr Peter Burns attended the IAEA Advisory Commission on Safety Standards in Vienna from 22 to 23 November and Malcolm Cooper attended the IAEA Waste Safety Advisory Committee from 6 to 10 December.

Dr Stephen Solomon attended an Expert Advisory Group meeting on internal dosimetry from 22 to 26 November in Korea. This meeting was held as part of the Regional Cooperative Agreement of the IAEA.

In early December, the CEO attended a conference in Warrenton VA, USA on 'Bridging Radiation Policy and Science'.

A senior scientific officer from the Atomic Energy Authority of Sri Lanka completed a two-month IAEA Fellowship training program at ARPANSA on 29 October.

From 8 - 12 November, the Chairman of the Vietnam Atomic Energy Commission (VAEC) and the Deputy Director of the Department of International Relations and Planning at VAEC visited both the Yallambie and Miranda campuses to gain an understanding of Australia's legislative infrastructure, licensing and inspection system and emergency planning arrangements. During the IAEA sponsored scientific visit, preliminary discussions were held on possible bilateral agreements between Australia and Vietnam.

John Loy
CEO
31 March 2000