



AUSTRALIAN RADIATION PROTECTION AND NUCLEAR SAFETY AGENCY

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

FOR THE PERIOD 1 JANUARY TO 31 MARCH 2000



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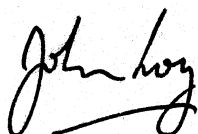
16 May 2000

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 January to 31 March 2000.

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

The National Uniformity Implementation Panel (Radiation Control) (NUIP(RC)) met on 20 March 2000. It considered its future role now that the ARPANSA Committee structure was in place, and agreed that it should become a working group of the Radiation Health Committee (RHC), with two primary tasks. Its first task is to oversee the National Competition Principles Review and the second is to develop a draft National Directory of Radiation Protection for consideration by the RHC. It was noted that the NUIP(RC) would have a limited lifetime and that its work would ultimately be taken over by the RHC.

The NUIP(RC) also reviewed the progress of a number of working groups established to develop proposals to be considered for inclusion in the National Directory of Radiation Protection.

A Radiation Regulators Forum was attended by all States, Territories and the Commonwealth to discuss regulatory implementation and jurisdictional issues requiring clarification followed the NUIP(RC) meeting. In particular, the forum recommended that a meeting of transport competent authorities be arranged to consider several issues regarding transport of radioactive materials. A number of

issues were identified where agreements between the States, Territories and the Commonwealth were necessary to ensure a consistent approach.

National Competition Principles Review

At its meeting on 20 March 2000, the NUIP(RC) discussed the process to appoint a contractor to conduct the National Competition Principles Review of Radiation Protection Legislation and requested that arrangements be commenced as soon as possible.

This review will commence once replies from all States and Territories endorsing the terms of reference and cost-sharing arrangements have been received. The meeting was advised that the last reply is about to be forwarded.

(b) ADVICE ON RADIATION PROTECTION AND NUCLEAR SAFETY

Nuclear Powered Warship Reference Accident

A revised draft reference accident for the Visiting Ships Panel (Nuclear) (VSP(N)) was issued and will be used in the assessment of the suitability of ports for visits by nuclear powered warships. This work took into consideration further discussions held with representatives of the States and Territories. This revised final draft was distributed by the VSP(N) to the States and Territories for comment and endorsement.

Visits by Nuclear Powered Warships

During the visit by an American nuclear powered submarine to Brisbane in February, ARPANSA officers analysed marine samples and maintained an on-call Health Physics team.

ARPANSA provided radiation protection and nuclear safety experts to the VSP(N) Working Group that visited Brisbane in late March to assess the Port Emergency Plan for visits by nuclear powered warships.

Maralinga

ARPANSA has finalised the clearance monitoring of rehabilitated areas at Maralinga to ensure compliance with the rehabilitation criteria. On 1 March at Maralinga, Dr John Loy presented Senator Minchin with a Summary Statement of Clearance Monitoring. In this Summary Statement, ARPANSA confirmed that the rehabilitated sites, including treated burial pits, all met the specified end-state criteria. An assessment of the residual contamination at Maralinga is continuing, including estimates of radiation doses to Aborigines who may reoccupy the area.

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

Solar Ultraviolet Radiation (UVR)

The paper presented at the International Workshop on Health Effects of Ultraviolet Radiation in Tokyo (17 - 19 February 1999) has been published in a special edition of the *Journal of Epidemiology*:

- Ambient Solar UVR, Personal Exposure and Protection. H P Gies, C R Roy, S Toomey and D Tomlinson. Presented at the International Workshop on Health Effects of Ultraviolet Radiation, Tokyo, 17 - 19 Feb 1999. *J Epidemiology*, 9: S115-S121, 1999.

Research in collaboration with James Cook University resulted in a further paper dealing with the UVR exposures of infants and small children:

- Solar Ultraviolet Radiation Exposure of Infants and Small Children. A F Moise, S L Harrison and H P Gies. *Photodermatol. Photoimmunol. Photomed.* 15: 109-114, 1999.

The quarterly audit of radiofrequency (RF) power levels in the Transgenic Mice Study in Adelaide (Vernon Roberts study) was conducted on March 9 and 10. This study which is a follow up to a previous similar study conducted by Repacholi *et. al.* is at its mid-point and will conclude in 2001.

Given the high levels of public interest environmental RF levels from mobile telephone base stations, a summary paper of ARPANSA survey measurements was placed on the ARPANSA web site:

- Levels of Radiofrequency Radiation from GSM Mobile Telephone Base Stations. P Line, W A Cornelius, M J Bangay and M Grollo
http://www.arpansa.gov.au/pubs/eme_comitee/rfrep129.pdf

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

Polysulphone Film Dosimeters

Polysulphone film (PS) dosimeters were used in preliminary assessments of UVR workplace hazards at a mining site, a printing company and a car assembly area. The possibility of using the PS badges for assessment of UVR hazards as a backup to the regulatory work is being explored. A small, portable hazard assessment unit based on diode array technology is being developed for assessments that require increased accuracy.

Electromagnetic and Optical Radiation

Continued demand for routine laboratory calibrations and fieldwork resulted in a backlog of base station surveys and non-routine laser classification tasks.

During the quarter, ARPANSA staff made a number of presentations. Mr Graeme Elliott addressed several public meetings on mobile telephone base station antennas, powerlines and magnetic fields. Mr Michael Bangay spoke at the Australian Communications Authority (ACA) public seminars in Sydney and Melbourne on the issue of the expansion to 3GHz of the ACA's compliance requirements for mobile phone services and represented ARPANSA on a number of ACA Task Groups.

Environmental measurements have been conducted and prediction reports made for a number of carriers.

A technical report on a prediction methodology has been completed and is now a standard approach used by carriers or their representatives when making estimates of radio frequency electro magnetic energy around base stations.

Comprehensive Test Ban Treaty Organization (CTBTO)

ARPANSA convened and hosted a meeting on CTBT radionuclide monitoring issues in Melbourne from 17 - 22 January for 21 scientific experts from the United Nations and 10 countries.

The installation of the airborne radionuclide particulate matter monitoring stations in Melbourne and Perth on behalf of the CTBTO was completed by the end of March and performance testing of the stations commenced. Site surveys for the stations planned for Darwin and Townsville were completed. Negotiations on funding for the operation and maintenance of the Perth and Melbourne stations commenced. It is expected that the transfer of responsibility for operating the stations to ARPANSA from 1 May 2000 will be facilitated by the Facilities Arrangement signed by Ambassador Hoffman on behalf of the CTBTO and Minister Downer on behalf of the Commonwealth Government.

Personal Radiation Dose Monitoring Service (PRMS)

The first film badges for assessing the exposure of individuals to radiation in the course of their work were issued by a predecessor of ARPANSA in 1932. Since that time PRMS has adopted new technology and grown to the point where it now provides radiation monitoring badges for approximately 35,000 persons. The development of the new computer database in 1986 streamlined the process of providing cumulative dose reports for clients. During this quarter, the 100,000th person was entered into the database.

Development of Quality Systems and Accreditation of Services

ARPANSA is committed to achieving Quality Systems accreditation for a range of scientific services. The documents required by the National Association of Testing Authorities (NATA) for the accreditation of the RF calibration laboratory against ISO 17025 were submitted to NATA in March. An internal audit program has been established to facilitate the review of the quality manuals being developed for other services including the PRMS, radionuclide analysis, radon measurements, quality assurance of radiopharmaceuticals and Ultraviolet Protection Factor rating of fabrics.

(e) COUNCIL AND COMMITTEE OPERATIONS

Radiofrequency Exposure Standard Working Group

On 27 January, the Acting CEO of ARPANSA, Dr John Cable, announced the membership of a working group, which has been formed to draft a new standard on exposure to RF radiation for Australia. The working group will prepare a draft for consideration by the Radiation Health Committee.

In choosing the members of the working group, ARPANSA consulted widely with a range of relevant groups to achieve a good spread of relevant interests and expertise. The Radiation Health & Safety Advisory Council was also consulted on membership of the working group.

The Radiation Health Committee has now agreed the membership of the working group. The members are:

Dr Colin Roy
Chair
Director, NIR Branch
ARPANSA

Mr Vitas Anderson
Senior Research Engineer, EME Safety Research Group
Telstra

Mr Wayne Cornelius
Head, EMR Section
NIR Branch
ARPANSA

Dr Bruce Hocking
Consultant in Occupational Medicine

Dr Ken Joyner
Director, EME Strategy & Regulatory Affairs
Motorola Australia

Mr John Lincoln
Convenor
Electromagnetic Radiation Alliance of Australia

Mr David McKenna
National Organiser, Community & Public Sector Union

Dr Andrew Wood
Senior Lecturer in Biophysics
Swinburne University of Technology

Ms Jill Wright
Senior Inspector, Division of Workplace Health & Safety,
Qld Dept of Training & Industrial Relations

Dr David Black (Consultant)
Occupational & Environmental Physician

Professor Mark Elwood (Consultant)
Director, National Cancer Control Initiative

Mr Alan Melbourne (Secretariat)
Manager, Standards Development Section
ARPANSA

Mr Michael Bangay (Secretariat)
Technical Officer, EMR Section
NIR Branch
ARPANSA

Mr Ian McAlister (Observer)
Manager, Radiocommunications Standards
Australian Communications Authority

Dr Graeme Dickie (Observer)
Radiation Health & Safety Advisory Council

The first meeting of the RF Exposure Standard Working Group took place on 23 - 24 February 2000 at ARPANSA in Yallambie.

The meeting addressed many of the administrative and working procedures to be adopted for the Working Group. Topics covered included:

- ARPANSA's role and responsibilities;
- Radiation Health Committee role and responsibilities;
- the Australian Communication Authority's regulatory role;
- RF WG Terms of Reference/Operating Procedures;
- development of ARPANSA Standards/Codes/Safety Guides;
- Regulatory Impact Assessment requirements; and
- the Document Development plan for the RF Standard.

Members gave presentations which included an overview of RF standards development history, mechanisms of RF absorption, specific absorption rate, human studies, in-vivo and in-vitro studies and thermal and non-thermal effects.

It was agreed that the working group should take as its starting point the draft standard developed by Standards Australia's TE/7 committee. Task groups were established to investigate issues that needed further debate. These groups will report back to the next meeting, scheduled for 17 - 18 April 2000.

Radiation Health & Safety Advisory Council

The Council did not meet during this quarter, however a small group of Council members visited the Maralinga rehabilitation site to be briefed on progress with the rehabilitation project. Council is due to meet next on 14 April 2000.

Radiation Health Committee

The Radiation Health Committee (RHC) met on 21 - 22 March 2000 and considered a broad range of radiation protection issues. The RHC recommended that a Radiation Regulators Forum be established to discuss regulatory implementation and jurisdictional issues. It would not be a formal working group of the RHC.

Reports received by the RHC included a Radioactive Waste Management Conference attended by the CEO, the National Uniformity Implementation Panel (Radiation Control) meeting, ARPANSA's activities, a People's Conference on the Proposed National Radioactive Waste Repository, and an IAEA meeting on Safety and Security of Sealed Sources. A working group to examine medical radiation issues was established, and a working group on the scope of regulation (including exemption and exclusion issues) was recommended. The RHC agreed to hold a joint meeting of the working groups developing the two Mining Codes (the Radiation Protection Code and the Waste Code) with the CEO and secretariat to discuss structure and alignment of the two documents. The membership of the working party reviewing radioactive waste issues was confirmed and it will now commence. The RHC noted that the working group developing a RF exposure standard had met on 23 - 24 February 2000 and commenced its task. The RHC emphasised the need for a detailed rationale to be included in the standard.

The RHC also considered progress on its publication review program, including establishing priorities and work programs for nine of the NHMRC Radiation Health Series publications, as well report on reviewing a draft of the Transport Code. It was agreed that this draft should be forwarded to other transport competent authorities for comment, have a regulatory impact statement prepared and be released for public comment as soon as practicable. The RHC also finalised comment on the template for Radiation Protection Series publications, which was agreed to be ready for use by working groups to ensure a consistent format and presentation of publications.

Other issues discussed included thorium lantern mantles, draft *Australian Drinking Water Guidelines*, cosmic radiation exposure of aircrew, certification of personal

monitoring services, controls over laser pointers above class 2, working life of sealed sources, and the *West Australia Nuclear Waste Storage (Prohibition) Act*.

Nuclear Safety Committee

The Nuclear Safety Committee (NSC) did not meet during this quarter, however a working party it had formed to review ARPANSA's *Safety Assessment Principles for Controlled Facilities* met on 10 March 2000. The working party will provide comment to ARPANSA for inclusion in the document prior to it being circulated for public comment. The document will be finalised through the NSC later in the year.

(f) REGULATION

Standards

Safety Assessment Principles

The *Safety Assessment Principles for Controlled Facilities* document was updated to include some review comments prior to review by a working party of the Nuclear Safety Committee that is currently in progress. The objective of the principles is to provide a consistent approach in assessing the safety of controlled facilities to ensure that the health and safety of people, and the environment, will be adequately protected during siting, construction, operation and decommissioning of the facility.

Guideline on Expectations for Safety Plans and Arrangements

The *Expectations Guideline* was refined and released as a draft discussion document for review. The guideline is a 'living' document, based on good practice, and is being used for assessing the applicant's plans and arrangements for achieving safety that must be provided as part of each application for a radiation source or facility licence.

Decommissioning Guideline

A further draft was produced of the regulatory guideline *Criteria for the decommissioning of controlled facilities* and a paper based on that work was accepted for presentation at the forthcoming Annual Conference of the Australasian Radiation Protection Society.

Design Guideline

Further work was carried out on the regulatory guideline *Criteria for the design of new controlled facilities and modifications to existing facilities* to include some review comments.

Applications for Licence

Two new licence applications were received from Health Services Australia (S0081) and the Australian National University (ANU) Research School of Biological Sciences (S0082) this quarter. An additional licence application is in the process of being prepared by the Australian War Memorial with a few details yet to be formalised.

Australian Nuclear Science and Technology Organisation (ANSTO)

As required by regulation, during the quarter the CEO of ARPANSA advertised in a national newspaper and the Commonwealth Gazette his intention to make decisions regarding licence applications for controlled facilities operated at ANSTO, the Commonwealth Scientific and Industrial Research Organisation, the ANU and the ARPANSA scientific laboratories. Additionally, through advertisements in national and local newspapers, the ARPANSA web page and the Commonwealth Gazette, the CEO invited submissions from the public about ANSTO's application for licence to operate nuclear installations at the Lucas Heights Science and Technology Centre in southern Sydney. Copies of the application were placed in three public libraries around Lucas Heights, in the ARPANSA public reading room at Miranda and on the ARPANSA internet site. A comment period of three months was allowed for submissions.

An initial review against the *ARPANS Act, Regulations* and ARPANSA guidelines has resulted in additional information being requested from the applicants, to allow the ARPANSA review to continue. Regulatory Branch officers met with ANSTO personnel to clarify matters relating to the ANSTO applications for source and facility licences. Further visits and meetings with other applicant organisations were undertaken as part of the ongoing licence assessment process.

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

Freedom of Information Request

A number of requests for information under the Freedom of Information Act, relating to the decision to issue a licence to ANSTO to prepare a site for the proposed Replacement Research Reactor, were serviced and the actions finalised during the quarter.

Surveillance

Commonwealth Scientific and Industrial Research Organisation (CSIRO) Tritium Incident

A visit was made to CSIRO Plant Industry, North Ryde in response to a notification of a contamination incident involving tritium. ARPANSA has requested a report on the incident, which will be the subject of further investigation. The contamination

was confined mainly to a freezer with minor amounts detected in the freezer room. Urine samples were taken from staff and ARPANSA is awaiting confirmation that there were no significant radiation exposures.

Safety of 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, during 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

Although ARPANSA is notified of all Abnormal Occurrences at HIFAR, only those classified as Level 1 and above on the International Nuclear Event Scale (INES) are included in this report. Abnormal Occurrences below Level 1 are of no safety significance. One Abnormal Occurrence notified by ANSTO for the period 1 January to 31 March 2000 was classified as INES Level 1, *i.e.* anomaly beyond the authorised operating regime, by ANSTO.

This Abnormal Occurrence was due to a combination of equipment fault and human factors and involved the loss of the uninterruptible reactor instrumentation power supply for over one hour, causing the reactor to automatically shut down. The initial failure was due to the age of the equipment but subsequently, after the equipment fault was corrected, the external power source became disconnected and this was not evident to the operators for some time. Installation of a separate modern uninterruptible instrumentation power supply is being fast-tracked. The status of the reactor could be determined by diverse instrumentation and the availability of engineering safety provisions was not affected.

Audits of HIFAR Operation

Following a routine audit of the HIFAR Control Room Log, ARPANSA made a number of recommendations, some of which are already being addressed as part of the major shutdown of HIFAR presently in progress.

Fuel Element Handling Incidents

A plan and schedule for implementing the recommendations of the ANSTO report on the root cause analysis of the three spent fuel handling incidents, which occurred in 1998 and 1999, was received during the quarter in response to a request from ARPANSA. The Regulatory Branch is reviewing the plan and schedule.

Radioactive Discharges

Radioactive airborne discharges from HIFAR were reviewed by ARPANSA and were found to comply with the airborne discharge authorisation issued by the Nuclear Safety Bureau. ARPANSA is currently negotiating a site-wide airborne discharge authorisation to include all existing facilities at the Lucas Heights Science and Technology Centre. ANSTO submitted further information during the quarter. 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. Information on liquid discharges for the quarter is yet to be received from ANSTO.

HIFAR Y2K Compliance

ANSTO formally notified ARPANSA of the results of the 'Y2K roll over' at the New Year. There were no failures of control systems and the safety of ANSTO activities were not compromised.

HIFAR Major Shutdown

Nominally every four years, HIFAR is shutdown for an extended period to allow inspections and modifications that cannot be undertaken during routine shutdowns. ARPANSA agreed to the schedule work for the current major shutdown that commenced on 7 February 2000. At the commencement of the shutdown HIFAR Management approached ARPANSA on 10 February 2000 for urgent agreement to a routine operation that would have required the accreditation of staff who do not normally undertake the operation. Agreement was not provided.

An important task in the program of work during the major shutdown was to confirm the integrity of the reactor aluminium tank and associated piping. Inspections of these components were witnessed by ARPANSA officers. The inspections indicated that the tank condition had not changed significantly since the 1995 inspection and was suitable for continued operation. Regulatory officers continue to monitor the ongoing maintenance and modification activities being performed during the shutdown.

Agreement of the CEO of ARPANSA is required before the reactor may be restarted following the shutdown. It is anticipated that ANSTO will apply to restart HIFAR towards the end of April.

HIFAR Plant and Procedure Modifications

ARPANSA agreed to various stages of a number of modifications to safety systems including upgrading of instrumentation, refurbishment of parts of the secondary coolant system and work on penetrations to the containment building.

ARPANSA received a letter from ANSTO confirming proposed changes to the Authorisation for the operation of HIFAR that had been agreed at an earlier meeting. ARPANSA is yet to receive ANSTO's quarterly report on the status of modifications in progress.

(g) INTERNATIONAL LIAISON

International Atomic Energy Agency (IAEA)

From 6 - 9 March 2000, Mr Peter Colgan attended a meeting in Vienna to draft a 'Code of Conduct' for the safety and security of radiation sources. It is envisaged that the Code would be adopted by each Member State on a voluntary basis, and the associated political commitments could then be used to ensure progress with national radiation safety regulations.

Dr Malcolm Cooper also attended a meeting convened in Vienna in March to develop a coordinated research program on waste arising from naturally occurring radioactive materials

ARPANSA provided occupational training in radiation protection for IAEA sponsored scientific visits by:

- Prof. Dr Tran Dai Nghiep, Vice Director, Vietnam Atomic Energy Commission Institute of Nuclear Science and Technique, Hanoi, from 17 - 21 January;
- Mr Po Myint, Assoc. Prof., Meiktila Degree College, Myanmar from 24 - 28 January; and
- Mr Hyeog-Ju Kim, Senior Researcher, Korea Food and Drug Administration, from 21 - 25 February.

Mr Mohd Yasin Sudin, Science Officer, Atomic Energy Licensing Board, Malaysia commenced a three month IAEA training fellowship at ARPANSA on 13 March 2000. His main areas of interest are quality assurance in radiological protection and emergency response planning and preparedness.

CEO's Overseas Visit

On 10 March 2000, Dr John Loy visited Paris for discussions with the Nuclear Energy Agency of the OECD and the French Regulatory Agency (DSIN) prior to attending an IAEA conference in Cordoba, Spain on legislation and radiation safety issues related to radioactive waste management.

International Bureau of Weights and Measures

Dr David Burns, a physicist from the International Bureau of Weights and Measures (BIPM), Paris, visited ARPANSA for two weeks in March. Dr Burns brought three ionisation chambers from BIPM which were used to make measurements to confirm the calibration capability of ARPANSA as a National Measurement Institute that maintains a primary measurement standard for absorbed dose to water and air kerma at cobalt-60. ARPANSA is one of eight national laboratories that maintain this standard.

John Loy
CEO
16 May 2000