



**QUARTERLY REPORT**

**OF THE**

**CHIEF EXECUTIVE OFFICER**

**OF ARPANSA**

**FOR THE PERIOD 1 OCTOBER TO 31 DECEMBER 2002**

**and**

**A Report to Parliament under Section 61 of the ARPANS Act 1998**





AUSTRALIAN RADIATION PROTECTION AND NUCLEAR SAFETY AGENCY

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ISSN 1444-4380

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Printed by

CanPrint Communications Pty Ltd  
16 Nyrang Street  
Fyshwick ACT 2609

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## **FOREWORD**

The *Australian Radiation Protection and Nuclear Safety Act 1998* (ARPANS Act) requires the Chief Executive Officer of the Australian Radiation Protection and Nuclear Safety Agency to submit to the Minister, at the end of each quarter, a report on the operations during the quarter of the CEO, ARPANSA and the Council and Committees constituted under the Act.

The quarterly report should also include 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 Radiation Health and Safety Advisory Council and the Nuclear Safety Council on radiation protection, nuclear safety and the safety of controlled facilities and details of facilities licensed under Part 5 of the Act.

Further details about matters contained in this report are available through the ARPANSA Public Affairs Officer who can be contacted by telephone on 02 9545 8333, by facsimile on 02 9545 8314 or by e-mail to [arpansa@health.gov.au](mailto:arpansa@health.gov.au).

## **REPORT ON PERFORMANCE**

### **1. Uniformity of Radiation Protection Frameworks**

#### **National Directory for Radiation Protection**

- 1.1 The National Uniformity Implementation Panel (Radiation Control) finalised its comments on the draft Directory in preparation for its release as a discussion paper. The draft Directory was released for public comment on 10 December 2002 until 31 January 2003. The draft document will be reviewed after consideration of the public submissions received.
- 1.2 A first draft Regulatory Impact Statement on the Directory was forwarded to the Office of Regulation Review for comment. The draft Statement will be finalised, and released for public comment, with a revised draft of the Directory during 2003.

#### **National Competition Policy Review of Radiation Protection Legislation**

- 1.3 Following endorsement of the Implementation Plan by the Australian Health Ministers' Conference, progress reports on the 12 projects were provided to the National Uniformity Implementation Panel (Radiation Control) at its November meeting. Arrangements to engage consultants to conduct three of the projects will be undertaken in the first quarter of 2003.

## 2. Advice on Radiation Protection and Nuclear Safety

### **Radiation Emergencies**

- 2.1 In October, officers from the Health Physics Section mapped natural radiation levels in suburbs around the Australian Nuclear Science and Technology Organisation (ANSTO) reactor site at Lucas Heights, in Sydney's south. Knowledge of background radiation levels is an important part of preparedness for dealing with the off-site environmental consequences of any radiation emergency at the Lucas Heights site. Like those conducted in other Australian locations, the results of this survey were posted on the ARPANSA website as they became available.
- 2.2 A workshop was convened in November on the radiation health aspects of radiation emergency response. Aspects of the revised ARPANSA recommendations on intervention in emergency situations involving radiation were outlined for members of the Radiation Health Committee. See paragraph 5.4 for more on the draft document.
- 2.3 Stephen Solomon represented ARPANSA at a meeting of the National Chemical, Biological and Radiological Working Group in October to provide advice on radiation issues, including equipment for the National Chemical, Biological and Radiological Enhancement Program of Emergency Management Australia.

### **Comment on draft Environmental Impact Statement for proposed National Radioactive Waste Repository**

- 2.4 Environmental and Radiation Health Branch and Regulatory Branch reviewed the National Radioactive Waste Repository Draft Environmental Impact Statement (EIS) in October.
- 2.5 The purpose of the review was to advise the Department of Education, Science and Training (DEST) prior to DEST preparing the Supplementary EIS that will form its submission to the Minister for the Environment seeking approval for the National Radioactive Waste Repository under the *Environment Protection Biodiversity Conservation Act 1999*.

### **Comprehensive Test Ban Treaty – air sampling monitoring systems**

- 2.6 As part of Australia's commitment to the Comprehensive Test Ban Treaty, work continued on the construction and operation of radionuclide monitoring stations. ARPANSA continues to operate and maintain the four radionuclide air monitoring stations in Australia.
- 2.7 Following on from the construction of a station at Kavieng, Papua New Guinea, ARPANSA commenced a testing and evaluation program for the station. The Provisional Technical Secretariat of the Comprehensive Test Ban Treaty Organisation (CTBTO) visited the station in November. Official certification of the station, expected in mid-December, was delayed due to a detector problem.

- 2.8 Desk-top site surveys for the construction of radionuclide sampling stations at Macquarie Island and Mawson were completed and sent to the CTBTO in Vienna, Austria. Site works for the Cocos Islands station continued in the quarter.

### **Radiofrequency (RF) exposure standard**

- 2.9 Staff responded to the Australian Communication Authority's discussion paper on proposed amendments to the Radiocommunications (Electromagnetic Radiation) Human Exposure Standard 2001 to incorporate the limits of the new Radiation Protection Standard developed by ARPANSA.

### **Nuclear powered warships**

- 2.10 Vince Diamond from Regulatory Branch attended a Visiting Ships Panel (Nuclear) meeting during the quarter. This panel maintains the arrangements for visits by nuclear powered warships to Australian ports.
- 2.11 In October, Stephen Solomon from Environmental and Radiation Health Branch participated in a re-validation of the Port of Melbourne for visits by nuclear powered warships conducted by the Technical Working Group of the Visiting Ships Panel (Nuclear).
- 2.12 During visits by US nuclear powered vessels to Perth in December, ARPANSA maintained an environmental monitoring team in readiness, and environmental samples from the ships' berths were analysed for any potential radioactive contamination.

### **Conferences, meetings and technical advice**

#### Non-Ionizing Radiation Branch

- 2.13 Work continued on the Regulatory Impact Statement for the draft ARPANSA Occupational Ultraviolet Radiation (UVR) Exposures Standard. Data on the number of workers affected by the proposed standard was obtained from the Australian Bureau of Statistics.
- 2.14 Information was provided to the Australian Cancer Society for its car tinting position statement.
- 2.15 Staff attended another meeting at the Bureau of Meteorology organised by the Australian Cancer Society to coordinate the adoption of the new World Health Organisation (WHO) UV Index reporting formats. Adoption of the new formats commenced with the start of daylight saving on 27 October.
- 2.16 Peter Gies co-authored a publication of an information guide targeted at health professionals for the New Zealand Cancer Society *Cancer Updates*, covering *Effective Use of Sunscreens*. This will also be adopted by the Australian Cancer Society.
- 2.17 On 30 November in Geelong, Victoria, Peter Gies jointly presented an afternoon

- session on ultraviolet radiation at the Australian Institute of Occupational Hygienists Conference.
- 2.18 Staff provided comment to the National Radiological Protection Board's (UK) draft document titled *Proposals for Limiting Exposure to Magnetic Fields (0-300 GHz)*.
- 2.19 On 30 September, Wayne Cornelius, as Chairman, attended a meeting at the Australian National University of the Standards Australia/Standard New Zealand SF-19 joint committee *Personal Protection Against Laser Radiation* for the revision of AS/NZS 2211, parts 1 and 2.
- 2.20 On 10 October, Wayne Cornelius attended a briefing by the Mobile Carrier's Forum to the Victorian Government and met with a community group concerned about public exposure to mobile phone towers.
- 2.21 In November, John Javorniczky attended the November Engineering and Physical Sciences in Medicine (EPSM) 2002 conference in Rotorua, New Zealand. He presented a paper co-authored with Colin Roy, Peter Gies, Stuart Henderson and Des Lugg titled *Solar UVR measurements in Antarctica: 1998 to 2001*.
- 2.22 As Secretariat of the Committee on Electromagnetic Energy Public Health Issues (CEMEPHI), Ken Karipidis attended a meeting of the committee's Reference Group (EMERG) on 26 November in Canberra. There he presented CEMEPHI's response to recommendations on mobile telephony made previously by EMERG. He also provided a proposal on the establishment of the Electromagnetic Radiation Health Complaints Register.

### Medical Radiation Branch

- 2.23 The Medical Physics Section uses the most recent and appropriate epidemiological data to evaluate risks to the Australian population from diagnostic radiology. As part of this work, Keith Wise attended the EPSM 2002 conference. He presented a paper titled *Solid Cancer Risks Associated with Exposure to Radiation for the Australian Population*.
- 2.24 Milly Cox attended the EPSM 2002 conference. Milly presented a poster titled *TLD Therapy Dosimetry Quality Assurance Program for Australia*, detailing the work done on developing, analysing, reporting and implementing a pilot study of six radiotherapy centres in Australia. The pilot is preparatory to a national program to be rolled out by ARPANSA. Interest was expressed by the National Radiation Laboratory (New Zealand), indicating that New Zealand radiotherapy centres may also wish to participate in the quality assurance program. At the Radiotherapy Interest Group meeting, Milly answered questions about the program posed by hospital physicists.
- 2.25 Lew Kotler attended the EPSM 2002 Conference. In response to queries from the Australian medical physics community, he presented a paper describing the response of the Ionizing Radiation Section to international recommendations that absorbed dose calibrations be supplied at low and medium x-ray energies. Lew

noted that ARPANSA was able to provide air-kerma calibration coefficients to be converted to absorbed dose calibration coefficients in situ.

- 2.26 From 25 to 28 November, Robert Huntley attended the International Symposium on Standards and Codes of Practice in Medical Radiation Dosimetry in Vienna, Austria. The symposium was organised by the International Atomic Energy Agency (IAEA), was co-sponsored by several international medical organisations, and had representatives from 76 countries. Robert aided two sessions that discussed national dosimetry audit programs and presented a poster summarising the results of the pilot study (M Cox and others) for the Australian audit program.

### Standards, Policy and Operational Support Branch

- 2.27 Brendan Elliott also attended the EPSM 2002 conference. He presented a paper titled *Public Consultation On Proposed Construction Of The Replacement Research Reactor*, outlining the innovative methods used to successfully engage environmental groups and others that made substantive submissions on the licence application assessed by ARPANSA in 2001-2002.

### Environmental and Radiation Health Branch

- 2.28 In December, Stephen Solomon lectured on radiation emergency response at a regional workshop on practical response to radiological emergency organised by ANSTO and the IAEA. The location was ANSTO's Lucas Heights Science and Technology Centre.

### Regulatory Branch

- 2.29 Don Macnab and Stuart Prosser attended the Sutherland Shire Local Liaison Working Party exercise 'Inside Out' held on 14 October, to participate in a test of emergency procedures following a hypothetical radiation incident at ANSTO's Lucas Heights Science and Technology Centre.
- 2.30 Stuart Prosser attended a Commonwealth Scientific and Industrial Research Organisation (CSIRO) Occupational Health, Safety and Environment Symposium on 20 October and presented a paper, titled *Radiation Safety – Compliance with the ARPANS Act, Regulations and Conditions of Licence*.
- 2.31 On 16-18 December, ARPANSA inspection staff attended the National Association of Testing Authorities, Australia (NATA) training course on audit and inspection.

### **Public communication activities**

- 2.32 Non-Ionizing Radiation Branch continued to provide information to members of the public regarding electromagnetic energy (EME) and health. Powerline related inquiries continued to dominate in the quarter. Information was also sought on mobile telephony, especially radiation exposure from associated base stations. Inquiries on radiation leakage from microwave ovens that were prevalent in the last quarter diminished in this one. A review of existing EME factsheets progressed and

staff prepared new ones in accordance with recent developments in the field.

- 2.33 The Public Affairs Officer responded to numerous phone inquiries. Most commonly, callers requested information about health issues concerning magnetic fields from such things as powerlines, transformers, substations, and meter boxes. Other topics of interest included the possible health effects of mobile phones and base stations, radiation leakage from microwave ovens, exposure to radon gas, and x-rays on pregnant women.
- 2.34 Visitors to the ARPANSA website who download a single file are logged as a single hit. ARPANSA's site received a total of 91,872 successful 'hits' in the quarter. Average daily 'hits' over the period were: *October* – 1,175, *November* – 1,099 and *December* – 723. The three most popular page views were: *October* – Home (595), Resource Guide for UVR Protective Products: Product Categories (195) and ARPANSA Website Index (125); *November* – Home (480), Resource Guide for UVR Protective Products: Product Categories (230) and ARPANSA Web Site Index (162); *December* – Home (349), Resource Guide for UVR Protective Products: Ray's Tent City (144) and Resource Guide for UVR Protective Products: Product Categories (125).

### 3. Research on Radiation Protection, Nuclear Safety and Medical Exposures to Radiation

#### **Non-ionizing radiation**

- 3.1 The collaborative study with the Menzies Centre for Population Health in Hobart and the National Centre for Epidemiology and Population Health at Australian National University (ANU) continued, with the winter phase of UVR exposure assessments of subjects with multiple sclerosis being completed. The UVR sensitive badges were returned to ARPANSA for measurement and analysis.
- 3.2 A manuscript covering an intercomparison of ultraviolet protection factor (UPF) testing with ten laboratories from around the world was accepted for publication in the international journal *Photochemistry and Photobiology*.
- 3.3 Staff prepared a draft proposal for the implementation of a national survey of residential magnetic field exposure. The proposal was presented to the Radiation Health Committee for its consideration. At the end of the quarter, ARPANSA awaited a response from state and territory radiation health authorities on their level of commitment to the project.
- 3.4 Analysis of measurements from a collaborative study with Victoria University, Wellington, on the UVR protection provided by shade structures at 30 schools around New Zealand was completed, and the first draft of a paper for eventual submission to the *Physics in Medicine and Biology* journal was completed.
- 3.5 A manuscript on a collaborative study between ARPANSA and Workplace Health and Safety Queensland on the solar UVR exposure of workers in the Queensland

building industry was submitted to the international journal Photochemistry and Photobiology for publication.

- 3.6 Peter Gies co-authored an article titled *Meteorology meets public health: UV forecasts and reports for sun safety* which was published in the Health Promotion Journal Australia.
- 3.7 Peter Gies co-authored an article titled *Using sunscreens effectively* which was published in New Zealand Pharmacy during December.
- 3.8 In addition, Peter Gies co-authored a technical article titled *Using broadband erythemal UV instruments to measure relative irradiance* published in the Journal of Geophysical Research during December.

### **Medical radiation**

- 3.9 The Medical Physics Section continued with its national survey on radiation doses from general diagnostic radiology. Most 'first round' questionnaires, that request participation and equipment details, were sent out and the returns processed. There was sufficient response to move into the measurement phase of the survey. In this phase, a selected group of respondents will have the radiation output of their x-ray equipment measured and details of technique factors for patient examinations will also be collected.
- 3.10 The Medical Physics Section has ongoing involvement in the development of Codes of Practice and Australian Standards (for equipment) for the safe use of radiation in medicine. For example, the ARPANSA *Code of Practice for Radiation Protection in Diagnostic and Interventional Radiology* progressed in the quarter and a draft will be presented to the Radiation Health Committee in 2003.

## **4. Services Provided in Radiation Protection, Nuclear Safety and Medical Exposures to Radiation**

### **Calibration services**

- 4.1 The Ionizing Radiation Standards Section dosimetry calibration service completed one, and commenced two, therapy calibrations and one protection level calibration for external clients. Three calibrations were in progress for ARPANSA itself. In addition, an internal audit was conducted into the scope for NATA accreditation of the protection level calibration services.
- 4.2 Since December 2001, ARPANSA has been the primary reference laboratory for the worldwide IAEA/WHO thermoluminescent dosimetry (TLD) quality assurance program for radiotherapy. ARPANSA's role is to expose reference TLDs sent to it annually, in order to confirm the accuracy of the IAEA's TLD measurements. The results in December 2002 showed good agreement within the uncertainty of the TLD measurements.

- 4.3 The Non-ionizing Radiation Branch RF Calibration Laboratory calibrated 49 monitors, 63 probes, 14 personal dosimeters and three other devices.

### **Fabric testing and labelling**

- 4.4 There was continued demand for fabric Ultraviolet Protection Factor (UPF) testing, licensing and labelling during the quarter. 80 jobs were received that involved the testing of 250 fabric samples. In addition, 217 UPF trademark licences were completed and 480,500 UPF swing tags were issued. 55 pairs of sunglasses were tested for their UVR protection properties.
- 4.5 The Non-Ionizing Branch Quality Management Committee met during the quarter. The drafting of documentation for accreditation of the UPF rating service continued and staff developed timelines for completion of all required documents.

### **UVR data and hazard assessments**

- 4.6 Scientific consultation and data on solar UVR levels worldwide was provided to three separate organisations interested in photodegradation of plastics and other materials. They were an engineering company, an overseas trade consulate and a plastics manufacturer. Two industrial UVR hazard assessments commenced; one on UVR hazards in Western Australia from a high temperature furnace, the other a hazard assessment of welding units at a major car company.

### **Testing of handheld UV index meters**

- 4.7 Testing of small handheld UV index meters for a Korean company commenced in October. Testing was set to continue over summer, with a report due in February 2003.

### **QA program for radiopharmaceutical products**

- 4.8 The quality assurance program for radiopharmaceutical products used by hospital nuclear medicine departments found that one batch failed to comply with radiochemical purity specifications. The relevant manufacturer was advised.

### **Surveillance of effluent discharges at ANSTO's HIFAR reactor**

- 4.9 Routine independent verification of the radioactivity of emissions from the High Flux Australian Research (HIFAR) reactor at Lucas Heights continued. In November, samples of liquid effluent discharges and filters used to monitor gaseous discharges were received and measured by Environmental and Radiation Health Branch for their radioactivity.

### **Measurement of radioactivity in drinking water**

- 4.10 Testing the radioactivity of drinking water, and other water samples, was carried out on a commercial basis for water authorities and other agencies around Australia. Environmental and Radiation Health Branch tested 182 samples during the quarter

against requirements of the Australian Drinking Water Guidelines.

### **Certification of radioactivity in exported foodstuffs**

- 4.11 Measurements of the radioactivity of foodstuffs destined for export was conducted on request and Environmental and Radiation Health Branch issued 20 Radioactivity Certificates for shipments of exported foodstuffs. The foodstuffs certified were meat, dairy, wheat, sugar and fruit juice.

### **Radiological survey of uranium at Maralinga**

- 4.12 At the request of DEST, ARPANSA officers undertook an extensive survey of uranium contamination around Kuli at the former nuclear test site of Maralinga. A two metre wide vehicle equipped with radiation detectors scanned some 106 km, effectively scanning an area of 21.2 hectares. Uranium fragments as small as two g were located and larger ones were discovered buried as deep as 15 cm. Upon completion, the survey results were reported to DEST. ARPANSA staff measured particles from ground-zero outwards and they demonstrably stopped at a radius of 1800 metres. In addition, no further clean-up of uranium at Kuli is feasible as fragments were not found beyond one km.

## **5. Council and Committee Operations**

### **Radiation Health and Safety Advisory Council**

- 5.1 The Council met on 15 November in Sydney. A summary of the meeting is available at this web address: <http://www.health.gov.au/arpansa/rhsac.htm>.

### **Radiation Health Committee**

- 5.2 The Committee met on 20-21 November in Yallambie. Summaries of the meetings are available at <http://www.arpansa.gov.au/rhc.htm>.

### **Nuclear Safety Committee**

- 5.3 The Committee did not meet during the quarter.

### **Radiation Protection Series publication program**

- 5.4 The draft *Recommendations for Intervention in Emergency Situations Involving Radiation Exposure* was released for public comment on 5 December 2002 until 24 January 2003 [and subsequently extended to 28 February 2003].
- 5.5 A working group of the Radiation Health Committee was initiated to develop a draft *Radiation Protection Standard for Limiting Human Exposure to Extremely Low Frequency Electric and Magnetic Fields (0 Hz to 3 kHz)*.

## 6. Regulation

### Licensing

#### Licence Applications

- 6.1 Four source licence applications were received as follows:
- ANU National Institute of the Arts, to allow UV resin curing;
  - Australian Government Analytical Laboratory, for a variety of Group 1 sources;
  - Australian Institute of Marine Science, for additional non-ionizing sources and to possess and use veterinary x-ray equipment;
  - CSIRO Energy Technology, for an x-ray baggage scanner and a CT scanner.
- 6.2 One facility licence application was received from the Australian Customs Service, to operate a container x-ray facility at West Melbourne.

#### Application Assessment and Licence Issuance

- 6.3 Regulatory assessment of applications and, in some cases, existing licences resulted in the CEO of ARPANSA making the following licensing decisions:
- 6.4 Source licences were issued to:
- Australian Federal Police;
  - Australian Radiation Protection and Nuclear Safety Agency Non-ionizing Radiation Branch;
  - Telstra Corporation – Telstra Research Laboratories;
  - ANU School of Art issued as a schedule to the existing source licence.
- 6.5 Amended source licences, incorporating previously issued source licences, were issued to:
- ANU, comprising 11 schools, faculties or departments;
  - CSIRO Manufacturing and Infrastructure Technology resulting from the merger of two divisions – Building Construction and Engineering and Manufacturing Science and Technology;
- 6.6 Facility licences were issued to:
- Australian Customs Service to operate a controlled facility, namely a shipping container examination facility at West Melbourne;
  - ARPANSA to operate controlled facilities called the Teletherapy Laboratory and Linear Accelerator;
  - ANSTO to operate a controlled facility called the Actinide Suite;
  - Australian Department of Defence to possess and control a prescribed radiation facility, namely the Salisbury Waste Storage Facility;
  - CSIRO to operate a controlled facility, namely a neutron generator at the Lucas Heights Science and Technology Centre;

- 6.7 Amended facility licences incorporating previously issued licences were issued to:
- DEST concerning the Maralinga facility;
  - ANSTO Radiopharmaceuticals Division, that consolidates three facility applications and subsequent application amendments.

#### Import Permits issued under the Customs (Prohibited Import) Regulations 1956

- 6.8 The Regulatory Branch issued 107 Customs Prohibited Release permits for the importation of non-medical radioisotopes. The Radiopharmaceutical Section issued 96 Customs Prohibited Release permits for the importation of medical radioisotopes.

#### ANSTO Actinide Suite

- 6.9 On 13 November, the CEO issued a facility licence to the Materials Division Actinide Suite. The facility is a prescribed radiation facility.

#### ANSTO Materials Division – Fabrication Bay

- 6.10 ANSTO provided the Safety Analysis Report requested by the CEO to allow review of the fabrication bay construction application to proceed.

#### Department of Defence

- 6.11 ARPANSA officers held a meeting with Defence representatives in Canberra on 2 December to discuss the Department's compliance with licence conditions.

### **Monitoring compliance under the ARPANS Act**

#### ANSTO - Replacement Research Reactor

- 6.12 On 22 October the CEO affirmed the seismic design basis for the Replacement Research Reactor at Lucas Heights that he approved in April 2002 when he issued a licence for construction of the reactor. Faulting discovered on the site is not 'capable' and does not increase the risk of displacement of the ground at the surface. It therefore does not prevent construction activities under the licence from proceeding. The CEO reached this conclusion after examining a submission from ANSTO and considering advice on this report, and its supporting evidence, from international and Australian independent experts (his ten-page assessment can be downloaded from the ARPANSA website via this URL: <http://www.arpansa.gov.au/rrrp.htm>). Dr Leonello Serva of Italy advised that the faulting is not 'capable' as defined by the IAEA (IAEA Safety Guide 50-SG-S1, 1991) and advice from Geoscience Australia supported the view that the site faulting has not moved in at least five million years. Work on the building foundations halted in June when the find was confirmed.
- 6.13 ANSTO submitted 16 requests for approval (RFAs) by the CEO for construction of items important for safety, in accordance with regulation 54 and licence condition 4.6. The items important for safety covered by 11 of these RFAs, plus 12 RFAs from the previous quarter, received CEO approval during the quarter.

- 6.14 For one of the RFAs submitted during the quarter, the Reactor Protection System and Post Accident Monitoring System (RPS/PAM), ARPANSA was unable to grant construction approval because all information required for that decision would not be available until after some hardware and software had been procured, installed and tested. ARPANSA indicated it would further consider construction approval at that later stage.
- 6.15 At the end of the quarter, six RFAs including the RPS/PAM were under review by ARPANSA. One of these, Safety Category 1 Electrical Switchboards, was received the previous quarter ARPANSA awaited further analysis from ANSTO.
- 6.16 A database used by Regulatory Branch to assist it with review of RFAs was extended and improved during the quarter.
- 6.17 A table listing all items important for safety approved for construction by the CEO in the quarter now follows:

RFA number	RFA description
005	CO of Reactor Building Structures
009	MP of Reactor and Service Pool Cooling System (RSPCS) Decay Tank
012	CO of Grounding System (earthing and lightning protection system)
015	MP and IN (installation) of Second Shutdown System SSS
016	CO of Auxiliary Building Structures (including Reactor Facility Substation and Fire Prevention Bldg)
017	MP and IN of Spent Resin Handling and Storage System
019	MP and IN of Emergency Make-Up Water System
020	MP and IN of Secondary Cooling System
022	MP and IN of Reflector Cooling and Purification System
023	MP of Neutron Beam Primary Shutters Embedded Components
024	MP and IN of Reactor Pool Hot Water Layer System
025	MP and IN of Inter Hot Cell Elevator and Gravity Transfer Pipes
026	MP and IN of Primary Cooling System (PCS) - Main Pumps and Heat Exchangers
027	MP and IN of Primary Cooling System (PCS) - Excluding Main Pumps and Heat Exchangers
028	MP and IN of Reactor Hall Crane
030	MP and IN of Pneumatic Target Cooling System Embedded Piping

031	MP and IN of Reactor and Service Pools Cooling System
032	MP and IN of Reactor Coolant Purification System
033	MP & IN of Demineralised Water Supply System
036	MP and IN of Compressed Air, Breathing Air and Gas Supply Systems
037	MP of Nucleonics Instrumentation
039	MP of Fuel Clamps
040	MP & IN for Neutron Guide Helium Cooling System embedded piping
<b>Key:</b> MP: Manufacture/Procurement    IN: Installation    CO: Construction	

6.18 ARPANSA turned three RFAs into additional licence conditions imposed under Section 36(2)(a) of the ARPANS Act during the quarter, thus:

- 5 November – Condition RFA008-1 (related to RFA009); The Licence Holder must ensure that all factory and on-site welds of the Reactor and Service Pool Cooling System Decay Tank are subjected to 100 per cent radiographic or ultrasonic inspection;
- 22 November – Condition RFA027-1 (related to RFA027, RFA031 and RFA032); The Licence Holder must ensure that seamless piping is used within these systems [Primary Cooling System, Reactor and Service Pool Cooling System, Reactor Coolant Purification System] where the nominal diameter is not greater than 200mm; and  
Condition RFA027-2 (related to RFA027, RFA031 and RFA032); The Licence Holder must ensure that all factory and on-site butt welds of piping that is greater than 25mm nominal diameter, within these systems [Primary Cooling System, Reactor and Service Pool Cooling System, Reactor Coolant Purification System], are subjected to 100 per cent radiographic inspection, unless the welds are both:
  - butt welds of longitudinal seams made during the factory manufacture of piping, and
  - not embedded within concrete.

#### ANSTO HIFAR Reactor Operations

6.19 The quarterly report on compliance with licence conditions and other reportable items was received. This included the status of plant modifications and engineering projects between October and December, as required under the conditions for Facility Licence No. FO0044-4A. Six new projects were identified during the quarter and all but two were assigned a safety classification. 30 projects were in progress, while a further one had reached practical completion and none had reached

final completion.

- 6.20 As part of the requirement of Special Licence Condition 3.10(c), HIFAR-specific waste procedures and instructions were being prepared to cover monitoring, sampling, recording and reporting of radioactive waste transfers from HIFAR to Waste Operations. These procedures and instructions were completed in December.
- 6.21 The Operational Limit and Condition 4.1.1.5 on rig reactivity worth was not completed. ARPANSA comments on the draft were being considered by ANSTO.
- 6.22 Routine contact visits by Regulatory Branch staff to monitor HIFAR operations and maintenance continued during the quarter. These provided the opportunity for officer to officer discussions on licensing and other regulatory issues.

### ANSTO - Inspections

- 6.23 ARPANSA established an office at the Australian Institute of Nuclear Science and Engineering (AINSE) building, which is in close proximity to the ANSTO site. AINSE is connected with the Australian universities nuclear science and engineering studies. This office will be a base for inspectors connected with inspections of the Replacement Research Reactor Project, other ANSTO nuclear installations, sources and facilities.

### HIFAR Compliance

- 6.24 An audit of the HIFAR Control Room Log Book was undertaken during the quarter.

### ANSTO Replacement Research Reactor Site Licence

- 6.25 The 12<sup>th</sup> and 13<sup>th</sup> quarterly reports by ANSTO on its compliance with the *Replacement Research Reactor Facility Licence, Site Authorisation* were evaluated by Regulatory Branch. Satisfactory compliance with the conditions of licence was demonstrated.

### ANSTO Fuel Operations

- 6.26 ARPANSA received a quarterly report on compliance with licence conditions.
- 6.27 Progress in satisfying Special Licence Condition 3.7(e) in the Facility Licence No. FO0044-4C reached the point where the design of engineered secondary containers for plutonium dioxide powder was completed and then approved by the CEO.
- 6.28 An upgrade of the Building 23 storage pond purification system was in progress.
- 6.29 The maintenance management plan for the fuel storage pond facility was being implemented. A high priority was given to further reducing contamination of water in the Building 23 storage pond caused by the fuel cropping incident in March 2002.
- 6.30 The Safety Analysis Report for Building 23 was completed and underwent internal ANSTO review. Work began in the quarter on the Safety Analysis Reports for

Buildings 17, 27 and 41.

- 6.31 There are two boreholes for monitoring groundwater close to the Building 23 and 41 ponds in compliance with a Special Licence Condition. Samples were taken during the quarter and the results for alpha, beta and gamma were all low, comparable to other background values around the Lucas Heights Science and Technology Centre.

#### ANSTO Physics Division

- 6.32 ANSTO informed ARPANSA on 4 November that changes to the ANSTO management structure would result in Physics Division ceasing to exist on 1 December 2002. The Gamma Technology Research Irradiator (GATRI) facility would be transferred to the managerial control of ANSTO Radiopharmaceuticals and Industrials (ARI).
- 6.33 The CEO requested confirmation that the GATRI management changes did not have significant implications for safety and the ANSTO Executive Director provided confirmation of this in December. The ANSTO quarterly report for the facility indicated a number of relevant changes. These changes are within the scope of GATRI's quality assurance system and do not have significant implications for safety.

#### ANSTO Waste Operations and Technology Development

- 6.34 The quarterly report was received on compliance with licence conditions, including updated waste inventories, along with an inventory of safeguarded store within a Waste Operations Facility.
- 6.35 The draft Safety Analysis Reports for the Waste Operations facilities were being reviewed by ANSTO before submission to ARPANSA. These reports are scheduled to be finalised by the end of June 2003.

#### ANSTO Radiopharmaceuticals and Industrials (ARI)

- 6.36 ARI is licensed to operate four nuclear installations and three prescribed radiation facilities in a single licence (F0044-5A, 5B and 5C). The licence conditions require ARI to submit quarterly reports to the CEO of ARPANSA. The quarterly report received addressed the following areas:

##### *Modifications*

- Swipe card entry system was installed in ARI buildings that previously did not have such a system.
- The incoming and outgoing industrial radioactive sources are controlled in a locked cage in the handling bay area of Building 23, and a logbook records all the industrial sources within the cage at any one time.
- The ventilation upgrade of Buildings 23 and 23A was progressing

##### *Safety Management Plan*

- A Special Licence Condition requires formal accreditation of operators. The ARI

quarterly report mentioned that an accreditation program for Good Manufacturing Practice and Radiation Safety commenced in November and three operators were accredited.

- Special Licence Conditions require ARI to have a safety categorisation system in place to undertake an assessment of Buildings 23A and 23 against an appropriate standard and to perform an engineering assessment of adequacy of the program for maintenance, periodic inspection and testing. ARPANSA was reviewing responses to these conditions at the end of the quarter.

#### *Radiation protection*

- Special Licence Conditions require ARI to review the dose constraint of 15 mSv/yr and optimisation of radiation protection, taking into account the exposure to staff exceeding 2 mSv/yr. ARPANSA was reviewing responses to these conditions contained in the ARI quarterly report at the end of the quarter.
- A Special Licence Condition necessitates the development and implementation of procedures and instructions on radiological safety in accordance with the ANSTO Safety Directive and ARPANSA regulatory requirements, and practical implementation of the as low as reasonably achievable (ALARA) policy. The ARI quarterly report responded to these issues and the responses were under review at the end of the quarter.
- Another Special Licence Condition requires an assessment of the risk of non-ionizing radiation at the National Medical Cyclotron. The ARI quarterly report contained an assessment that was under review by ARPANSA and further details were to be the subject of an ARPANSA audit.

### ANSTO Environment

- 6.37 Changes in the management structure at ANSTO during the quarter led to accelerators of the former Physics Division being transferred to ANSTO Environment.
- 6.38 ANSTO Environment is licensed to operate a 3MV Van de Graaf Accelerator as a prescribed radiation facility. Under a Condition of Licence, ANSTO Environment submitted a quarterly report to the CEO of ARPANSA stating that:
- No abnormal occurrences, incidents or accidents occurred.
  - There were no modifications to plant and procedures.
  - No radioactivity was released to the environment.
- 6.39 ANSTO Environment is licensed to site and construct a 2MV Tandem Accelerator (TANDETRON) under Facility Licence F0134. ANSTO Environment submitted a quarterly report in accordance with the licence condition; it mentioned:
- There were no abnormal occurrences and incidents or accidents in relation to construction and installation.
  - Electrical installations were in accordance with Australian Standards.
  - A Safety Analysis Report was being drafted, and operational documents reviewed, as part preparation for an application for an operating licence.
  - Equipment assemble was on schedule.

- No radioactivity was generated in the construction phase.

### Abnormal Occurrences at ANSTO's Nuclear Installations

- 6.40 ARPANSA is notified of all abnormal occurrences at ANSTO's nuclear installations but only includes in this report those classified as Level 1 or above on the International Nuclear Event Scale (INES) as all others are of no safety significance. There were no abnormal occurrences, classified as INES Level 1 or above, at any of the nuclear installations notified by ANSTO in this quarter.

### ANSTO Airborne Radioactive Discharges – Compliance with licence conditions

- 6.41 The Regulatory Branch review of all airborne radioactive discharges reported by ANSTO for the period 22 September-29 December showed that discharges remained less than the relevant notification levels under the licence authorisation, with the exception of tritium released from the Building 20 (decontamination and laundry) stack. As required by the relevant ARPANSA licence, the Director Nuclear Technology notified ARPANSA prior to the scheduled maintenance of the HIFAR heavy water pump that would result in airborne tritium emissions exceeding the Discharge Authorisation notification levels.
- 6.42 The tritium discharge from stack 20 for the period was 350 giga-becquerel, with nearly all this amount arising from the pump maintenance operation. Routine quarterly releases from Building 20 are typically several giga-becquerel, compared to (as an example) routine releases from HIFAR operations that result in authorised releases of several hundreds of giga-becquerel per quarter.
- 6.43 The radiation dose at 1.6km from HIFAR of all airborne discharges for the quarter was assessed at less than one microsievert. This compares favourably to the Discharge Authorisation dose objective of less than 20 microsievert. ARPANSA concluded that ANSTO complied with the requirements of the Airborne Discharge Authorisation.

### ANSTO Liquid Radioactive Discharges

- 6.44 Regulatory Branch reviewed ANSTO's reports of liquid radioactive discharges from the Lucas Heights Science and Technology Centre to 31 December and found that they complied with the Trade Waste Agreement of 31 May 2001 between Sydney Water and ANSTO.

### ARPANSA, Melbourne

- 6.45 Sealed source certificates and details of additions to their source inventory were received from the Environmental and Radiation Health Branch and Medical Radiation Branch, as their licence conditions require.

### Australian Customs Service

- 6.46 On two separate occasions in November, Regulatory Branch officers inspected the Australian Customs Service Container X-ray Facility, West Melbourne, to review

the facility operations before final commissioning.

### CSIRO

- 6.47 A review of compliance with licence conditions to the end of quarter indicated some inconsistency across the organisation. ARPANSA was encouraging all areas to meet the exemplary standards of the best. Significant effort was being directed towards completion of useable source inventory information for all Divisions.

### ANU

- 6.48 Two Regulatory Branch officers attended a meeting of the ANU Safety Committee on 27 November. The purpose was to answer questions on licensing issues and to discuss Special Conditions of Licence. The University's action plan was well on track at the end of the quarter to ensure timely compliance.

## 7. International Liaison

- 7.1 Vince Diamond from Regulatory Branch represented Australia on the two OECD Nuclear Energy Committees dealing with nuclear safety matters. He attended the December 2002 meetings of the Committee on Nuclear Regulatory Activities (CNRA) and the Committee on the Safety of Nuclear Installations (CSNI).
- 7.2 Sergei Zimin from Regulatory Branch attended the 24<sup>th</sup> International Meeting on Reduced Enrichment for Research and Test Reactors (RERTR) on 3-8 November in Bariloche, Argentina, and the 24<sup>th</sup> RERTR Post-Meeting Technical Visit held on 11-13 November in Buenos Aires, Argentina. He represented ARPANSA at the round table discussion for regulators held during the meeting. The discussion was very useful and concentrated on regulatory requirements for uranium molybdenum fuel qualifications by different countries.
- 7.3 While in Argentina, Sergei Zimin visited three INVAP sites in the vicinity of Bariloche to familiarise himself with the prototype systems built by the company for the Replacement Research Reactor project. He also visited two facilities in Buenos Aires, the Constituyentes Atomic Centre and Ezeiza Atomic Centre, run by the Argentine Nuclear Energy Commission (CNEA). Discussions were held with a particular focus on CNEA capabilities in fabrication and reprocessing modern research reactor fuel. Following these visits, Sergei worked with the Argentine Nuclear Regulator in Buenos Aires for two weeks as part of a collaborative program on licensing of the Australian replacement reactor.
- 7.4 During November, Allan Murray of Regulatory Branch participated in the IAEA technical committee meeting on developing a document titled *Guidelines for the Self-Assessment of Sabotage Induced Risk of Nuclear Installations*. The meeting was held in Vienna.
- 7.5 Allan Murray visited, and held discussions with, the UK Health and Safety Executive Nuclear Safety Directorate in November on regulatory policy matters and

- progressing a memorandum of understanding for mutual cooperation.
- 7.6 Again in November, Allan Murray (with David Tredinnick of Standards, Policy and Corporate Services Branch) visited, and held discussions with, the US Nuclear Regulatory Commission on progressing a memorandum of understanding for mutual cooperation. In addition, both staff members visited the US State Department and Department of Energy for discussions on nuclear safety and security.
- 7.7 David Webb from Medical Radiation Branch attended the Asia Pacific Metrology Program meeting on November 11-15 in Hanoi, Vietnam, where he was elected Chairman of the Technical Committee for Ionizing Radiation.
- 7.8 Stuart Woollett from Environmental and Radiation Health Branch attended the International Conference on Issues and Trends in Radioactive Waste Management in Vienna, Austria, from 9-13 December. Through Stuart's participation, ARPANSA learnt current knowledge of both international best practice in managing radioactive waste and issues hampering progress in these practices.
- 7.9 Michael Bangay from Non-ionizing Radiation Branch presented a paper on the ARPANSA RF Standard at the 2nd International Workshop on Biological Effects of Electromagnetic Fields in Rhodes, Greece, 7-11 October. He attended presentations on mobile phone base station RF surveys and topics related to exposure to RF EME. After the conference Michael visited a RF hazard probe calibration laboratory in Germany (PTB) and the UK (NPL), viewing their calibration methods and having valuable discussions with staff. He was also able to visit the NRPB (UK), where he addressed staff on the ARPANSA RF Standard and toured their laboratory.
- 7.10 Colin Roy from Non-ionizing Radiation Branch participated in a static fields workshop sponsored by the Gezondheidsraad (Health Council of the Netherlands) in Vlaardingen (via Rotterdam), 15-24 November. The workshop aimed to draft a paper on static fields as part of the WHO's Health Risk Assessment on static and ELF time-varying fields. Three days were also spent at the WHO in Geneva, Switzerland, in order to progress the workshop draft and to have broader discussions on the WHO Health Risk Assessment.
- 7.11 The CEO visited Rio de Janeiro, Brazil, to participate in an IAEA Conference on Safety Culture in Nuclear Installations during December. That month he also visited Vienna, Austria, to attend the international conference on radioactive waste management described above and to chair an expert group drawing up a Code of Conduct on the safety of research reactors.

## **REPORT TO PARLIAMENT OF THE CEO OF ARPANSA UNDER SECTION 61 OF THE AUSTRALIAN RADIATION PROTECTION AND NUCLEAR SAFETY ACT 1998 (THE ACT)**

### **Investigation into alleged breaches of licence condition – Outcome of the investigation**

I have concluded an investigation into actions taken by the Australian Nuclear Science and Technology Organisation (ANSTO) and their principal contractor INVAP in relation to construction undertaken on the Replacement Research Reactor (RRR) under the facility licence F0118.

Under the *Australian Radiation Protection and Nuclear Safety Act 1998 (the Act)* I am responsible for, inter alia, monitoring compliance by Licence Holders and persons covered by the licence with licence conditions.

Early in January 2003 I was advised that certain events had occurred that indicated that ANSTO and/or INVAP may have been in breach of certain licence conditions imposed on facility licence F0118.

There are three types of licence condition that this facility licence is subject to:

- ❖ Those imposed by the Act
- ❖ Those imposed by the *Australian Radiation Protection and Nuclear Safety Regulations 1999*
- ❖ Those imposed by the CEO at the time the licence is issued or subsequent to its issue.

The licence conditions in question in this investigation were:

- ❖ Licence condition 4.6 imposed by the CEO at the time that the licence was issued
- ❖ Licence condition imposed by Regulation 54 of the ARPANS Regulations
- ❖ Licence condition imposed by Regulation 44 of the ARPANS Regulations
- ❖ Licence condition imposed by Regulation 45 of the ARPANS Regulations

The text of these licence conditions is set out at **Annex A**.

### **Circumstances that gave rise to the investigation**

On 11 July 2002 I granted an approval to ANSTO (the Licence Holder) under Licence Condition 4.6 of Facility Licence F0118 for the construction of nine (9) items important for

safety, including:

1. Reactor Pool Tank and Welded Parts (Subsystem 0610) but excluding the cut outs for the heavy water pipes

The approval was based on the submission of a request for approval (RFA 001) that was provided to me by ANSTO on 18 June 2002. After consideration of the submission, I excluded the cut outs from the scope of this approval, as their position and size were dependent on the design of the heavy water penetrations, which had not been approved by me at that time and were the subject of a separate request for approval (RFA 041). I did not at that stage wish to pre-empt my decision in relation to that approval.

On 16 July 2002, following receipt of my approval under licence condition 4.6, ANSTO forwarded my letter of approval to INVAP.

On 18 July 2002, INVAP forwarded a copy of my approval to John Holland Evans Deakin Industries (JHEDI) advising JHEDI that manufacture of the components could now proceed in accordance with the corresponding 'Approved for construction' documents which were issued by INVAP. The document also stated 'Please note that there are conditions on these authorisations that should be complied with by JHEDI.'

During September 2002 a series of meetings was held between ANSTO, INVAP and JHEDI to discuss the terms of my approval in relation to the construction of the Reactor Pool Tank. At one of these meetings the exclusion of the cut outs was expressly discussed and a "cloud" was drawn around the heavy water penetration holes (the cut outs) that appeared on the construction drawing. However, in late September 2002 INVAP instructed its sub contractor to go ahead and manufacture the prohibited part of the item, namely the cut outs. INVAP gave effect to this intention by replacing the Design Approval (DAP document) that expressly referred to my approval as a condition of the manufacture, with a DAP document that did not and that was expressed as "rescinding" the previous DAP and replacing it with a new DAP.

In December 2002, during a surveillance visit to the manufacturer, ANSTO staff noticed that the cut outs had been made and reported this fact to ARPANSA staff.

Early in January 2003, ANSTO staff raised the issue again with ARPANSA staff. ARPANSA staff drew attention to the fact that the cut outs were unauthorised, having regard to the express terms of my earlier approval. Subsequent to this meeting, ANSTO raised a non-conformance report under its quality assurance process and transmitted it to INVAP SE.

### Investigation and findings

On 23 January 2003 I commenced compliance monitoring and requested documentation and information from ANSTO and INVAP that would assist me in this task.

I received documentation in February 2003. After review of this information, my initial findings in relation to compliance with licence conditions were communicated to ANSTO and INVAP on 27 February 2003. At that time I had reached the preliminary view, based on my understanding of the events, that INVAP had breached the terms of licence condition

Regulation 54 and ANSTO had breached the terms of licence condition Regulation 45.

Both INVAP and ANSTO were given the opportunity to respond to my preliminary view. INVAP conceded that they had committed a breach of regulation 54, whilst ANSTO were firmly of the view that they had done all that Regulation 45 required. ANSTO's submission characterised the early notification to ARPANSA staff as fulfilling the requirements of subregulation 45(1) and the Executive Director described the nature of the investigation undertaken by ANSTO that culminated in the issue of a non-conformance report to INVAP. ANSTO submitted that this rectified the breach as the issue of the non-conformance report meant that INVAP could not use that item until the non-conformance had been rectified. The only way in which this could be rectified would be when and if ANSTO received an approval from me that included within it the cut outs on the tank. This required an approval to be given to the design of the heavy water penetrations (RFA 041).

I communicated my final determination as to whether or not either the Licence Holder (ANSTO) or a person covered by a licence (INVAP) was in breach of the conditions of licence to ANSTO and INVAP on 17 March 2003.

I found that INVAP was in breach of Regulation 54 of the ARPANS Regulations, a condition of licence. This was a result of its actions in authorising the completion of the cut outs that had clearly been excluded from the parameter of my approval of the construction of an item important for safety.

I also found that ANSTO was not in breach any of the conditions of licence applicable to it as they had identified a suspected breach and taken steps to rectify the breach and bring it to my attention.

I decided not to impose any sanction on INVAP, as this was the first occasion when a breach of a condition of licence had occurred. In addition I was satisfied with the commitments that INVAP made to me in relation to improvements to their process that they will institute to ensure that this situation does not occur again. These actions are to:

- a) establish a group within INVAP's project management structure to ensure observance of ARPANSA's requirements by all parties;
- b) amend INVAP's procedures to explicitly include ARPANSA's requirements in manufacturing documentation and drawings;
- c) modify the project management plan to implement these changes; and
- d) communicate these actions to the complete sub contractor chain.

Subsequent to these issues being resolved, I have authorised the approval of RFA 0041.

**JOHN LOY**  
**CEO OF ARPANSA**  
**26 March 2003**

## **Annex A**

### Licence condition 4.6 imposed by the CEO at the time that the licence was issued:

#### Construction of an item important for safety

- 4.6 Without derogating from the obligations and limitations imposed by Regulation 54 of the Regulations, the Licence Holder must gain the approval of the CEO of ARPANSA prior to commencing construction of any item important for safety, being those items identified as safety category 1 and safety category 2 in the Application:
- 4.6.1 In seeking such approvals, the Licence Holder must provide information establishing that:
- a) the detailed design of the item has been
    - i) completed in accordance with the design description and intentions in the Application; and
    - ii) reviewed, verified and accepted by the Licence Holder; and
  - b) construction of the item will be:
    - i) in accordance with the detailed design;
    - ii) under a certified quality assurance program;
    - iii) in accordance with a program that has been documented, reviewed and approved by the Licence Holder; and
    - iv) under a construction schedule that is made available to the CEO of ARPANSA.
- 4.6.2 The Licence Holder must demonstrate, in any submission to the CEO of ARPANSA to construct an item important for safety, that it has taken into account, to the satisfaction of the CEO of ARPANSA, the recommendations set out in the RAR in relation to that item.

### Licence condition imposed by Regulation 54 of the ARPANS Regulations

#### Approval required to construct safety item

The holder of a licence, or a person covered by a licence, must not construct an item that is important for safety, and that is identified in a safety analysis report, as part of the construction of a controlled facility, unless the CEO has given the holder or the person approval to construct the item.

### Licence condition imposed by Regulation 44 of the ARPANS Regulations

The holder of a licence must take all reasonably practicable steps to prevent breach of licence condition.

### Licence condition imposed by Regulation 45 of the ARPANS Regulations

Holder of a licence to investigate and rectify breaches of licence conditions

- (1) The holder of a licence must investigate suspected breaches of licence conditions.
- (2) If the holder of a licence identifies a breach, the holder of a licence must rectify the breach and any consequences of the breach as soon as reasonably practicable.
- (3) If the holder of a licence identifies a breach, the holder of a licence must tell the CEO as soon as reasonably practicable.