



Australian Government

**Australian Radiation Protection
and Nuclear Safety Agency**

QUARTERLY REPORT

OF THE

CHIEF EXECUTIVE OFFICER

OF ARPANSA

FOR THE PERIOD 1 JANUARY TO 31 MARCH 2004



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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 9541 8333, by facsimile on 02 9541 8314 or by e-mail to info@arpansa.gov.au.

REPORT ON PERFORMANCE

1. Uniformity of Radiation Protection Frameworks

National Directory for Radiation Protection

- 1.1 On 5 March the draft of Edition One of the National Directory, and the accompanying draft Regulatory Impact Statement, were released for public comment until 2 April.

National Competition Policy Review of Radiation Protection Legislation

- 1.2 The NCP review project on Advertising Restrictions was completed in the quarter. The National Uniformity Implementation Panel (Radiation Protection) agreed to develop agreed licensing criteria for five principal occupations as an alternative to the project on trans-boundary issues.

Proposed National Offshore Petroleum Safety Authority (NOPSA)

- 1.3 Discussions have taken place with officers from the Department of Industry, Tourism and Resources about proposed transition arrangements for the transfer of radiation controls from the current regulatory authorities to the NOPSA.

2. Advice on Radiation Protection and Nuclear Safety

Comprehensive Test Ban Treaty – air sampling monitoring systems

- 2.1 As part of Australia's commitment to the Comprehensive Test Ban Treaty, ARPANSA continued to operate and maintain the five radionuclide air monitoring stations in Australia at Melbourne, Perth, Townsville, Darwin and the Cocos Islands. It also continued the testing and evaluation program for the station at Kavieng, Papua New Guinea. A proposal for the testing, evaluation and post-certification activities for the Australian mainland stations was submitted to the Comprehensive Test Ban Treaty Organisation (CTBTO) and subsequently accepted. A Request for Proposal for the installation of a radionuclide station at Mawson, Antarctica, and for the testing, evaluation and post certification activities for the Cocos Islands was received.

Nuclear Powered Warships

- 2.2 On 24 February two officers attended a meeting of the Visiting Ships Panel (Nuclear) (VSPN) in Canberra. Both officers had attended a port validation for Jervis Bay (HMAS Cresswell) the previous day.

Radiation Emergencies

2.3 *Expert Advice*

ARPANSA chaired a three-day meeting (14-16 February) of the working group revising the Recommendations on Interventions in Emergencies Involving Radiation to complete the response to public comment, and to produce a revised draft that incorporates these comments.

Stephen Solomon attended the National Chemical, Biological and Radiological working group meeting held 16-19 February to advise on issues associated with the malevolent use of radioactive materials

2.4 *Training*

The Health Physics Section produced and delivered a lecture on radiation aspects of malevolent use of radioactive material for an Emergency Management Australia CBR medical course on 10 February. The Section also produced and delivered a lecture on 24 March about ARPANSA arrangements for radiation emergency response as part of a training course produced by ARPANSA for New South Wales emergency service organisations.

2.5 *Planning*

The Health Physics Section contributed as the Asian regional member of the IAEA National Competent Authority Coordination Group to finalisation of the draft international action plan on *Strengthening the international preparedness and response system for nuclear and radiological emergencies*.

Conferences, meetings and technical advice

Medical Radiation Branch

- 2.6 David Webb attended the 11th meeting of the IAEA Secondary Standard Dosimetry Laboratory (SSDL) Scientific Committee (SSC-11) in Vienna on 2-5 March. The SSDL meets every two years and reviews the work program of the Dosimetry and Medical Radiation Physics Section, which manages the SSDL network. Recommendations were made for the 2006-2007 biennium.
- 2.7 Proceedings of the International Workshop on Recent Advances in Absorbed Dose Standards (ABSDos 2003) hosted by ARPANSA at Yallambie on 19-21 August 2003 continued to be assembled for publication on the ARPANSA website. 15 papers (12 presentations and three posters) have been published thus far and another seven papers are outstanding.

Non-Ionizing Radiation Branch

- 2.8 Information requests were received from the Cancer Council of Victoria (CCV), Western Australia Cancer Foundation, New Zealand Cancer Society, Queensland Cancer Foundation and the Cancer Council of South Australia. Information provided included solar ultraviolet radiation (UVR), altitude/planes and sunglasses and ozone depletion. The CCV Sunsmart team visited ARPANSA on 7 April to discuss aspects of UVR measurement and protection, and input into their educational campaigns.
- 2.9 Staff reviewed publications on static electric and magnetic fields and drafted sections of the WHO Health Risk Assessment of these fields. In addition, staff prepared an advisory document on the issue of mobile phone telephony and children for the April meeting of the Radiation Health and Safety Advisory Council.
- 2.10 Peter Gies, Colin Roy, John Javorniczky and Stuart Henderson co-authored this journal article (with Lilia Lemus-Deschamps and Colin Driscoll): *Global Solar UV Index: Australian Measurements, Forecasts and Comparison with the UK, Photochemistry and Photobiology*, 79:32-39, 2004.
- 2.11 Peter Gies and Colin Roy co-authored a chapter (with P Udelhofen): *Solar and Ultraviolet Radiation*, in *Prevention of Skin Cancer* (Eds. D Hill, JM Elwood and DR English), Kluwer Publishing, Dordrecht, pp.21-54, 2004.
- 2.12 As a member of ICNIRP Standing Committee III, Colin Roy contributed to the guidance: *Exposure to Static and Low Frequency Electromagnetic Fields, Biological Effects and Health Consequences (0-100 kHz)*, ICNIRP 13/2003, 500 pages (Part 1 Dosimetry and exposure assessment of static and time-varying electric magnetic fields up to 100 kHz).

Training and professional development

- 2.13 Two officers from Regulatory Branch, two from Medical Radiation Branch and one from Environmental and Radiation Health Branch completed the required units of study to qualify for the Certificate IV in Government (Statutory Investigation and Enforcement) through the Sydney Institute of Management Education. Other officers continued to work through the required distance learning modules.
- 2.14 Several Regulatory Branch officers received gamma mapping training as part of the ARPANSA emergency response program.

Public communication activities

- 2.15 ARPANSA held a public forum on the National Radioactive Waste Repository (NRWR) licence application in the Adelaide Convention Centre on 25-26 February, to supplement the public submission process. Invited participants were able to expand on their first-round submissions before two independent panellists (George Jack and Emeritus Professor Ian Lowe), John Loy as Chair, assembled members of the public and media, and a number of ARPANSA staff. The event was recorded and an official transcript of proceedings was later posted on the ARPANSA website. John Loy committed himself to taking this record, and reports to him from both panellists, into account in his end decision-making.
- 2.16 Non-Ionizing Radiation (NIR) Branch staff continued to provide information to the public regarding electromagnetic emissions (EME) and health. Requests for information varied but residential exposure to high voltage powerlines and mobile phone base stations continued to dominate. Written advice was also provided regarding the levels of extremely low frequency (50 Hz) magnetic fields in office environments.
- 2.17 The ARPANSA Webmaster received numerous inquiries through the website feedback mechanism. All inquiries were assigned to ARPANSA Branches for appropriate action. The number of messages received through this channel is steadily increasing.
- 2.18 A sub-site featuring the Australian UV Index was added to the ARPANSA website (www.arpansa.gov.au/ausuv.htm). The UV Index indicates the maximum daily level of UVR received at ground level. The sub-site, developed by Alan McLennan and John Javorniczky, describes precautions that should be taken at various UV Index levels and provides a graphical representation of actual levels compared with levels predicted by a computer model for a clear sky day. Graphs are provided for the previous 24 hour period in Adelaide, Melbourne, Sydney, Newcastle, Brisbane and Townsville.
- 2.19 Information on the ARPANSA website regarding radioanalytical services was significantly upgraded in the quarter (www.arpansa.gov.au/rad_serv.htm). Sandra Sdraulig developed detailed descriptions of testing procedures and methods for accessing these services.

- 2.20 The Public Affairs Officer responded to numerous phone and email inquiries, from members of the public and journalists. Most commonly, people requested information about health issues concerning magnetic fields from such things as powerlines, transformers, substations, and meter boxes. Other topics of interest included the proposed National Radioactive Waste Repository, the possible health effects of mobile phones and base stations, cosmic radiation doses experienced by aircrews, and operations of the Australian Nuclear Science and Technology Organisation (ANSTO) at Lucas Heights.

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

Non-ionizing radiation

- 3.1 A collaborative study between ARPANSA and the Australian Cancer Society to measure the solar UVR protection provided by hats worn in primary schools was finalised. The results are being analysed and will be written-up for publication in a scientific journal.
- 3.2 NIR Branch staff began designing a pilot study for a Victorian survey of residential magnetic fields. This followed meetings with members of the Energy Supply Association of Australia and the Victorian Department of Human Services (Radiation Safety Program) in the previous quarter.
- 3.3 The collaborative project began comparing spectral measurements of solar UVR in Melbourne for 2001-2003 made by ARPANSA and the Bureau of Meteorology.

Medical radiation

- 3.4 The Medical Physics Section carried out the final round of data collection of its general radiology radiation dose survey. The calculation of patient doses from the survey continued, using the mathematical phantom and Monte Carlo techniques developed by Keith Wise prior to his retirement from ARPANSA. Trial calculations for the patient doses and statistical analysis of data collected up to that time was completed.
- 3.5 Keith Wise and Julian Thomson had a paper titled *Changes in CT radiation doses in Australia from 1994 to 2004* accepted for publication in *The Radiographer*. Study results emphasise the growth in CT usage and indicate that CT is now the dominant radiation dose to the population from medical exposures.

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

Calibration services

- 4.1 The Radiofrequency Calibration (RFC) Laboratory received 162 Separate requests for RF calibrations of which 158 were completed. These jobs consisted of 69 monitors and 89 RF badges.
- 4.2 The Ionizing Radiation Standards (IRS) Section dosimetry calibration service completed the calibration of six survey monitors, of which one was for the ARPANSA PRMS. Two therapy chambers were calibrated as reference standards for the National Radiation Laboratory of New Zealand. The calibration of a reference protection level device and electrometer were completed for another monitoring service.
- 4.3 Results were received from the IAEA for the reference irradiations of TLD material undertaken in December 2003 for the IAEA International Secondary Standard Dosimetry Laboratory and hospital radiotherapy audit programs. ARPANSA's stated doses of Cobalt-60 deviated by no more than 0.8 per cent from the measured values obtained by the IAEA – well within its uncertainty of 1.8 per cent (one standard deviation).
- 4.4 On 16-17 February a National Association of Testing Authorities (NATA) audit team reviewed the quality system of the IRS Section protection level calibration services for accreditation. Actions were being undertaken to address the conditions and observations made by NATA and a response was being prepared.

Fabric testing and labeling

- 4.5 Fabric ultra-violet protection factor (UPF) testing, licensing and labelling continued. 88 jobs were received, involving the testing of 331 fabric samples. Two pairs of sunglasses were tested for their UVR protection properties. In addition, 18 UPF trademark licences were completed and 402,000 UPF swing tags were issued.
- 4.6 The UPF Testing Service was assessed by NATA on 24 March. The assessment was positive and ARPANSA anticipates the UPF testing should be accredited after some minor corrective actions are made.

UVR data and hazard assessments

- 4.7 Phase two of research into the UVR exposures of Australia Post outdoor workers was completed in Sydney during March. The UVR sensitive badges worn by the workers were measured and analysed.

QA program for radiopharmaceutical products

- 4.8 All batches of radiopharmaceuticals tested in the quarter complied with specifications.

Surveillance of effluent discharges at ANSTO's HIFAR reactor

- 4.9 A total of 34 samples of liquid effluent discharges and filters used to monitor gaseous discharges were received and measured for their radioactivity during the quarter.

Measurement of radioactivity in drinking water

- 4.10 199 samples were tested against requirements of the Australian Drinking Water Guidelines.

Certification of radioactivity in exported foodstuffs

- 4.11 Measurements of the radioactivity content of 27 foodstuffs destined for export were carried out on request and three Radioactivity Certificates were issued for shipments of exported foodstuffs.

Personal Radiation Monitoring Service

- 4.12 The Personal Radiation Monitoring Service (PRMS) continued to offer a comprehensive radiation monitoring service for persons who may be exposed to ionizing radiation as a consequence of their occupation. A service is also provided for the measurement of radon and natural background radiation levels.
- 4.13 The results of the IAEA International Neutron-Gamma Intercomparison were received in January. These indicated that the assessment of Neutron Monitors is well within the claimed uncertainty for the radiation energies which the monitor can measure.
- 4.14 Results of the IAEA/RCA External Dosimetry Intercomparison (Phase 3) were received in March. These indicated that the assessment of monitors is well within the claimed uncertainty for the radiation energies which the monitor can measure.
- 4.15 The Request for Tender for the PRMS Application Development Project closed on 20 January. The submissions were evaluated and a recommendation was made to the ARPANSA Board of Management.

5. Council and Committee Operations

Radiation Health and Safety Advisory Council

- 5.1 The Council did not meet during the quarter. Summaries of past meetings are available at <http://www.health.gov.au/arpansa/rhsac.htm>

Radiation Health Committee

- 5.2 The Radiation Health Committee (RHC) met on 17-18 March. A summary of the meeting is available at http://www.arpansa.gov.au/rhc_mt.htm
- 5.3 The RHC finalised and released a statement on compliance with the Australian and New Zealand Standard on Solaria for Cosmetic Purposes. The statement was forwarded to the Cancer Strategies Group of the Department of Health and Ageing and posted on the ARPANSA website at http://www.arpansa.gov.au/rhc_stat.htm

Nuclear Safety Committee

- 5.4 The Nuclear Safety Committee (NSC) met on 5 March in Sydney. A summary of the meeting is available at <http://www.arpansa.gov.au/nsc.htm>

Radiation Protection Series publication program

- 5.5 The draft *Code of practice for the safe use of portable density and moisture gauges containing radioactive sources* was approved as technically complete by the RHC and forwarded to the RHSAC to the CEO of ARPANSA for advice regarding its publication.
- 5.6 The draft *Code of practice for exposure of human subjects to ionizing radiation for medical research purposes* and the accompanying draft regulatory impact statement was released for public comment during the quarter. Further submissions were expected.

6. Regulation

Licensing

Licence Applications Received

- 6.1 No licence applications were received during the quarter.

Application Assessment and Licence Issuance

6.2

<i>Type of licence and authorisation</i>	<i>To</i>
Facility – Amendment to previously issued licence	ANSTO Safety and Radiation Science
Facility – Operation of the Bandiana Waste Storage Facility	Australian Defence Force and Department of Defence
Facility – Operation of the Materials Fabrication Bay	ANSTO Materials

Facility – Amendment to previously issued licence	CSIRO Minerals
Source – Amendment to previously issued licence	Australian Government Analytical Laboratories

- 6.3 Additional information was received from ANSTO Safety and Radiation Science in support of facility licence application F0044 (5Cc), Gamma Irradiation Suite. Two site visits were made during the quarter regarding this licence application. A Regulatory Assessment Report was completed.

National Radioactive Waste Repository – International Peer Review

- 6.4 At the invitation of the CEO of ARPANSA, from 18-27 January a five-member International Review Team from the IAEA with expertise in the storage and management of radioactive waste reviewed the NRWR licence application to advise him on a number of issues, including international best practice in radiation protection and nuclear safety. The review included discussion with the applicant, its technical consultants and ARPANSA staff, as well as visiting Site 40a. The draft summary of the draft International Review Team report was released on 29 January, and can still be downloaded from the NRWR page of the ARPANSA website (<http://www.arpansa.gov.au/reposit/nrwr.htm>).

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

- 6.5 The Regulatory Branch issued 94 Customs Prohibited Release permits for the importation of non-medical radioisotopes. These were comprised of 59 single-shipment, 31 urgent requests and four twelve-monthly permits.
- 6.6 The Radiopharmaceutical Section issued 116 Customs Prohibited Release permits for the importation of medical radioisotopes. These were comprised of 105 single-shipment permits, six twelve-monthly permits and five faxed permits. ARPANSA faxes permits directly to Customs when goods have already arrived at an airport and are required urgently by the customer. The customer then has one week to show the original permit to Customs.

Monitoring compliance under the ARPANS Act

ANSTO - Replacement Research Reactor Construction Licence

- 6.7 ANSTO submitted ten requests for approval (RFAs) by the CEO of ARPANSA for construction of items important for safety, in accordance with Regulation 54 and licence condition 4.6. Eight of these received CEO approval during the reporting period, in addition to five that were submitted in the previous quarter.
- 6.8 The CEO approved one relevant change under Regulation 51 during the quarter.

The change was associated with the Pneumatic Target Cooling System instrumentation.

ANSTO - HIFAR Reactor Operations

- 6.9 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 January and March. No new projects were identified during the quarter. Ten projects were in progress, while a further one had reached practical completion and one had reached final completion.
- 6.10 In February the CEO agreed to the HIFAR major shutdown schedule. ARPANSA requested a number of additional inspections associated with the Primary Cooling System.
- 6.11 ARPANSA continued reviewing an ANSTO proposal to amend a condition relating to plant staffing.
- 6.12 The CEO was satisfied that ANSTO had adequately addressed special licence condition 3.7(b) dealing with accident analysis. In accordance with paragraph 36(2) (b) of the ARPANS Act, the licence condition was removed.
- 6.13 ARPANSA assessment of an ANSTO proposal to change the operational safety limit relating to surface heat flux of irradiation rigs in the HIFAR reactor was completed.
- 6.14 Work commenced on the review of a safety submission for converting the HIFAR reactor from high enriched uranium fuel to low enriched uranium fuel.
- 6.15 ARPANSA was notified of seven abnormal occurrences at the HIFAR reactor facility in the quarter. All occurrences were of no safety significance and rated 0 on the International Nuclear Event Scale (INES). Abnormal occurrences are covered elsewhere in this report.
- 6.16 Regulatory Branch was reviewing licence condition compliance. The purpose of this was to assess the number of special licence conditions that have been satisfied and can thereby be removed from the licence by the CEO.

ANSTO Sources

- 6.17 A report was received from ANSTO Environment on 23 January for the period October to December 2003. Safe operation during the quarter was reported and only minor changes were made to the source inventory. Satisfactory progress was reported against special licence conditions.
- 6.18 A report received from Materials and Engineering Science on 30 January for the period October to December 2003 indicated safe operation during the quarter. No changes to the source inventory were reported. There was satisfactory compliance

with licence conditions. Suitable arrangements had been initiated to address matters raised for consideration as a result of the planned inspection conducted in the previous quarter.

- 6.19 A report received from Engineering Services on 23 January for the period October to December 2003 indicated safe operation during the quarter and advised no changes to the controlled apparatus or source inventory.
- 6.20 A report received from Safety and Radiation Science on 28 January indicated safe operation for the period October to December 2003. No change to the source inventory was reported, although some minor amendments to source details were noted. Satisfactory compliance with special licence conditions was reported.

ANSTO Inspections

- 6.21 As part of the compliance review of the licence to operate the HIFAR reactor, an inspection of the HIFAR Control Room Log was carried out. It indicated that the usual high standard of log keeping had been maintained.
- 6.22 As part of monitoring compliance with the licence for the RRR project, ARPANSA conducted 24 inspections during the quarter. The inspections were:
- Inspection of documentation and processes in sub-contractors premises for the manufacture of items important to safety;
 - Unannounced inspections of the site to monitor housekeeping issues and progress of the construction and installation of plant; and
 - The inspection of hold points specified by the CEO of ARPANSA.
- 6.23 Two Regulatory Branch officers visited Building 54 to discuss various issues related to airborne emissions from this facility.
- 6.24 A Regulatory Branch officer visited Radiopharmaceutical Operations and Waste Operations to obtain further information and to observe the present status of operation of these facilities.

ANSTO General Plans and Arrangements

- 6.25 Satisfactory progress was reported on compliance with special licence conditions in Part 2.3 of the ANSTO Licence Conditions Handbook.

ANSTO – Moata Research Reactor

- 6.26 As required by the conditions of licence, Moata supplied a quarterly report within 28 days from the end of the quarter that stated:
- There were no abnormal occurrences relating to the care and maintenance of the

Moata reactor;

- No modifications to plant and procedures were identified as necessary for the care and maintenance of the Moata reactor;
- Updating of the quality assurance documentation was continuing;
- The facility, including fuel storage, was inspected by Australian Safeguards and Non-Proliferation Office on 17 March. No relevant issues were identified.

6.27 Moata licence condition compliance was under review by Regulatory Branch. The purpose of this was to assess the number of special licence conditions that have been satisfied and can thereby be removed from the licence by the CEO.

ANSTO Fuel Operations

6.28 ANSTO Fuel Operations is licensed as a nuclear installation under facility licence F00044-4C. A quarterly report was received for the quarter covering the following areas:

6.29 *Licence Condition Compliance*

An annex was attached to the quarterly report updating the status of special licence conditions associated with licence F00044-4C. This annex was under review within ARPANSA Regulatory Branch. The purpose was to assess the number of special licence conditions that have been satisfied and can thereby be removed from the licence by the CEO.

ANSTO identified a change to the last quarterly report in that they are re-assessing the means of satisfying licence condition 3.7(h) that involved the installation of electro-chemical sensors for gas detection in the nuclear materials vault. Alternative methods of satisfying this licence condition were being investigated.

6.30 *Facility Modification*

A new racking system for the secondary containment of fissile oxide powder was installed in the Nuclear Material Store following approval by the CEO.

6.31 *Inventory Changes*

A detailed compilation of the inventory was in progress.

6.32 *Incidents/Non-conformance*

No non-conformances were raised in the quarter.

6.33 *Airborne Discharges*

Airborne discharges from Fuel Operations stacks were well below authorised notification levels (see also section on site airborne discharges).

6.34 *Personnel Doses*

Personnel doses for the quarter were well within local objectives and limits.

6.35 *Fuel Storage Pond Facility Maintenance*

The irradiation pond water chemistry was well within operational limits set for spent fuel operations. Recovery of the cropping pond from the contamination associated with the incident reported in previous quarterly reports is well underway and normal operations are planned for the near future.

Results of water sampling external to the pond liner continue to confirm the integrity of the cropping pond.

6.36 *Ground Water Bore Hole Monitoring*

Sampling of bore holes downstream of the ponds indicated that the alpha, beta and gamma levels were low, and comparable to other background values around the Lucas Heights Science and Technology Centre site.

ANSTO Waste Operations and Technology Development

6.37 ANSTO Waste Operations and Technology Development (WOTD) are licensed as a nuclear installation and is operated under Facility Licence FO0044-WOTD. The quarterly report for the period 1 January to 31 March, received on 28 April, addressed the following areas:

6.38 *Licence Condition Compliance*

The licence condition compliance was under review within ARPANSA Regulatory Branch to assess the extent of compliance in order to progress the number of special licence conditions that have been satisfied and thus can be removed by the CEO from the licence.

6.39 *Abnormal Occurrences*

No abnormal occurrences occurred during the quarter.

6.40 *Modifications*

The cementation plant and the drum drier units in Building 20B were commissioned as part of the completion of ANSTO's conditioning plant for low-level waste. A submission for operation of the plant was under ARPANSA review for approval.

6.41 *Airborne Discharges*

It was reported that the airborne discharges from stacks of WOTD remained below the quarterly notification level. The airborne discharges are also covered separately

elsewhere in this report.

6.42 *Liquid Discharges*

The quarterly report showed that the effluent plant discharges from ANSTO's Liquid Waste Treatment Plant were well within the Trade Waste Discharge Limit. The liquid discharge results are also covered separately elsewhere in this report.

6.43 *Inventories*

The updated inventories stored on the LHSTC site and all changes in stored inventories occurring in this quarter are presented in this quarterly report.

ANSTO Radiopharmaceuticals and Industrials

6.44 ANSTO Radiopharmaceuticals and Industrials (ARI) are licensed to operate four nuclear installations and three prescribed facilities under a single licence (F0044-5A, 5B, 5C). In addition a prescribed radiation facility, namely GATRI, is under the effective control of ARI and this facility is operated under a separate licence (FV0044-6C). The quarterly report for the period 1 January to 31 March, received on 23 April, addressed these areas:

6.45 *Licence Condition Compliance*

Licence condition compliance was under review within ARPANSA Regulatory Branch to assess the extent of compliance in order to progress the number of special licence conditions that have been satisfied and thus can be removed from the licence by the CEO.

6.46 *Relevant Changes*

- ARI was preparing an ARPANSA submission for the redevelopment of Building 23 (B23 Masterplan). It mentioned that the current Safety Analysis Report for Building 23 will be updated to incorporate the ventilation upgrade and extension of the building.
- Construction of shielding on the roof of the Building 54 SIAM Room had been completed. This change is unlikely to have significant implications for safety and reporting of this change satisfies Regulation 52.
- The Molybdenum Target and Processing Project was being reassessed by ANSTO, and ARPANSA will be advised of the outcome in due course.
- The Production Manager took over the Molybdenum Target and Processing Project. Two Assistant Production Managers were appointed and were given responsibility of the day-to-day running of production, at the National Medical Cyclotron and Lucas Heights respectively. Such changes are unlikely to have significant implications for safety, and reporting of this change satisfies

Regulation 52.

- The frequency of monitoring the dose rate around the external perimeter of the cyclotron is planned to reduce from monthly to annually, based on the uniform results of the past 10 years. ARPANSA will review this change and carry out an inspection at the facility in due course.

6.47 *Incident*

The quarterly report mentions that following a scraping of paint during routine repainting of external walls in the GATRI area, a small amount of water leaked into the operator's annex. This incident will be taken into account in the next GATRI inspection.

6.48 *Effective Control*

A special licence condition requires that ARI maintains a current inventory of all controlled materials and controlled apparatus. The ARI quarterly report mentioned that the second stage of the Business Information System/System Analytical Program was implemented on 2 February.

6.49 *Safety Management Plan*

- A special licence condition requires formal accreditation of operators. The ARI quarterly report mentioned that all production and quality control staff would be completing the learning unit *Radiation Safety in Our Plant* within the next two months. On completion each staff member will be assessed and issued with a competency certificate. An operator passed a competency test for GATRI operation.
- A special licence condition requires the licence holder to consider external events including the seismic hazard, maximum inventory of radionuclides trapped in the HEPA and charcoal filters, and also the bases of decontamination factors used in the operational limits and conditions in the Safety Analysis Report (SAR). The quarterly report contained the SAR for Building 54. The SARs for Buildings 23, 23A, the National Medical Cyclotron and Building 54 were all being reviewed by ARPANSA.

6.50 *Radioactive Waste Management Plan*

A special licence condition requires the licence holder to develop and maintain procedures for management of radioactive wastes and characterisation of radioactive wastes. Monitoring of detritus from ARI facilities continued in the quarter.

ANSTO Environment

6.51 *Accelerators*

ANSTO Environment is licensed to operate the ANTARES Tandem Accelerator (F0044-6Ba), 3MV Van de Graaff Accelerator (F0044-6Bb) and a 2MV Tandem Accelerator (STAR Accelerator, F0134) as prescribed radiation facilities. A licence condition requires ANSTO Environment to submit quarterly reports to the CEO of ARPANSA. The quarterly report for the period 1 January to 31 March, received on 23 April, mentioned that:

- An abnormal occurrence involving persistent internal discharge creating electrons took place. No personnel were injured and no equipment was damaged due to this incident. Appropriate countermeasures were taken to prevent a recurrence. An incident involving high voltage discharges on the extremities of the high voltage vessel occurred again at the 2MV STAR Accelerator;
- A new gas handling plant was designed and manufactured to Australian standards and was ready for installation at the 3MV Van de Graaff Accelerator;
- Further implementation tests for the new computer control systems on ANTARES accelerator occurred during the quarter. A temporary restriction on use of the program to start the accelerator was being enforced to ensure staff present at the accelerator operating console were ready to intervene in case of a problem;
- A concrete pad was to be laid near the SF₆ gas storage vessels to facilitate safe decanting of the gas with the ANSTO mobile crane. In order to enhance security and safety, the wire fence near the SF₆ gas storage tanks will be moved to enclose the new concrete slab;
- There were no changes to the 2MV STAR Accelerator facility;
- No radioactivity was generated from the facilities;
- Recommendations made by the ANSTO Safety Assessment Committee for the SAR of the ANTARES Accelerator were incorporated and the SAR underwent final assessment by the ANSTO Safety Assessment Committee. The quarterly report added that the SAR for the STAR Accelerator was being finalised but was awaiting of radiation and magnetic field measurements that cannot be completed until some operational issues were resolved by the HVEE Engineer;
- A special licence condition requires the licence holder to review and exercise local emergency arrangements for the accelerator facilities. The quarterly report mentioned that such arrangements were being planned for May.

6.52 *Ore Processing and Operations Facility*

ANSTO Environment is licensed to operate its Ore Processing and Operations

Facility (F0044-7A) as a prescribed radiation facility. The quarterly report for the period 1 October to 31 December 2003, received on 23 January, mentioned that:

- The experimental work as described under SAC approval 1634/03, “Oxidising Ferrous Liquors in a Pipe Reactor Using Oxygen, Air and Sulphur Dioxide”, had commenced in Building 21H;
- No abnormal occurrences, incidents or accidents occurred during the quarter;
- No radioactivity was released to the environment.

6.53 *Radiotracer Facility*

ANSTO Environment is licensed to operate its Radiotracer Facility as a prescribed radiation facility. The quarterly report for the period 1 October to 31 December 2003, received on 23 January, indicated that:

- No abnormal occurrences, incidents or accidents occurred during the period;
- No radioactivity was released to the environment;
- No radiotracer studies were performed during the reporting period.

ANSTO Materials and Engineering Science – Actinide Suite

6.54 ANSTO Materials and Engineering Science are licensed to operate the Actinide Suite (F0044-8A) as a prescribed radiation facility. The quarterly report addressing all licence conditions for the period 1 October to 31 December 2003 was received on 23 January. Progress toward compliance with the outstanding special licence conditions was continuing.

ANSTO – Secondary Standards Dosimetry Laboratory

6.55 A report for the period 1 October to 31 December 2003 was received on 28 January. It noted a change in nominee with Cait Maloney’s appointment as Director, Safety and Radiation Science. Administrative changes continued to reflect the transfer of documentation from the former Physics Division to Safety and Radiation Science.

6.56 Satisfactory progress was reported against the special licence condition.

Abnormal Occurrences at ANSTO’s Nuclear Installations

6.57 ARPANSA is notified of all abnormal occurrences at ANSTO’s nuclear installations. It reports in detail only on those classified as Level 1 or above on the International Nuclear Event Scale (INES).

6.58 *HIFAR*

ARPANSA was notified of seven abnormal occurrences in the quarter. All of them were rated as INES Level 0, i.e. of no safety significance.

HIFAR reported a breach of the surveillance requirements for Operating Limits and Conditions. The breach occurred when personnel did not carry out a D₂O (triated heavy water) Plant Room inspection before reactor start-up. On 12 March a worker was contaminated with D₂O, during major shutdown maintenance activities. The highest committed effective dose was assessed to be 2.33 mSv (millisievert). ARPANSA requested a copy of the report on the incident and the circumstances.

ANSTO Airborne Radioactive Discharges

6.59 Regulatory Branch received a report from ANSTO on 13 February 2004 about all airborne radioactive discharges from the Lucas Heights Science and Technology Centre between 23 September and 21 December 2003. The report showed that discharges remained less than the quarterly notification levels under the licence authorisation, with the exception of Xenon-133 emissions from Building 54. This noble gas is a by-product of radiopharmaceutical production, and the amount discharged increased in the quarter. This resulted in one four-weekly notification level, as well as the quarterly notification level being reached. ANSTO instigated, and was continuing, an investigation into what caused the increased emissions.

6.60 The radiation dose at 1.6km from the HIFAR reactor from all airborne discharges for the quarter was less than two microsieverts – compared to the Airborne Discharge Authorisation dose objective of 20 microsieverts per year. ARPANSA concluded that ANSTO complied with the Airborne Discharge Authorisation for the quarter.

ANSTO Liquid Radioactive Discharges

6.61 Regulatory Branch received reports from ANSTO on 29 January and 3 March about radioactive liquid emissions discharged from the Lucas Heights Science and Technology Centre during December 2003 and January 2004 respectively. It was found that these discharges complied with the Trade Waste Agreement of 30 July 2003 between Sydney Water and ANSTO, with all measured values at most a few per cent of the relevant limit.

ARPANSA Melbourne – Medical Radiation Branch

6.62 ARPANSA's Medical Radiation Branch is licensed to operate a linear accelerator and teletherapy facility as prescribed radiation facilities under the licence F0046. ARPANSA received a quarterly report covering these areas:

6.63 *Quality system*

Both facilities are covered by a quality system consistent with ISO/IEC 17025. It was mentioned that as the Ionizing Radiation Section accreditation program proceeds, the documentation will be brought into line in accordance with the

ARPANSA Quality Manual. An internal audit of some procedures in the C0-60/Cs-137 irradiation laboratory was undertaken.

6.64 *Training, accreditation and authorisation*

The quarterly report mentioned that criteria were established and documentation was being updated with the quality system – scheduled for completion by July (and not February as reported previously).

6.65 *Safety tests, inspections and reviews*

It was reported that procedures exist and documentation is being updated with the quality system and the target date of completion is July (and not March as reported previously).

6.66 *Emergency arrangements*

It was reported that emergency arrangements are in place and testing of interlocks is undertaken routinely. The development of suitable exercises for biennial review was in progress.

6.67 *Operating limits and conditions*

The report mentioned that further clarification on operating limits and conditions was progressing.

6.68 *Radiofrequency exposure levels*

It was also reported that the radiofrequency levels were measured but no significant levels were detected. This is evident from the submitted results. The next review of radiofrequency exposure is scheduled for February 2005. This report also addressed the licence conditions of Schedule 1 of the licence and was acceptable to ARPANSA.

CSIRO

6.69 All source inventory information has been updated and quarterly reporting is becoming routine for most divisions. As noted in previous reports, however, there is still some inconsistency in the provision of reports from across the organisation.

6.70 A copy of the CSIRO Occupational Health, Safety and Environment Annual Report for 2003 was received. Although this was not specified as being provided in compliance with regulation 50, the report appeared to meet the requirements of the regulation. This states that the holder of a licence must review and update plans and arrangements at least once every 12 months and provide the CEO with information on the results.

6.71 The report outlined significant recent improvements in Occupational Health, Safety and Environment arrangements including: risk review, hazard-specific surveys and

audits, changes in management structure; as well as proactive initiatives such as formation of a project team to improve Occupational Health, Safety and Environment culture. Radiation is specifically identified as a potential hazard in some divisional overviews; in others it is not.

6.72 Full implementation of an environmental management system consistent with AS/NZS ISO 14001 is targeted for December 2004. The management of radiation risks was identified as a component of this. Particular mention was made of the revised Radiation Safety Manual, of a successful strategy for management and storage of surplus radioactive sources and of monitoring low level waste materials.

6.73 *Neutron Accelerator Facility (F0137)*

A report for the December quarter was received on 23 December 2003. Further discussions regarding future research and development and a potential requirement for additional neutron generating capacity prompted a letter from the Chief Research Scientist at the site. This drew the CEO's attention to perceived anomalies in the regulation of neutron generators and the associated licence charges. An ARPANSA assessment of the hazards presented by the new class of accelerator driven neutron generators was being concluded.

6.74 *Heavy Ion Accelerator Facility (F0060)*

A report for the December 2003 quarter was received on 9 February. It provided further information on staff changes within the division. The accelerator engineer ceased work mid-December 2003 and the accelerator has remained shut down since then pending a decision on its future. ARPANSA understands that the highly skilled site Radiation Safety Officer will retire in July, so a watching brief will be kept on steps to replace him (See also Exploration and Mining Source Licence S0061).

6.75 *Inspections*

Regulatory Branch officers conducted an inspection of the CSIRO neutron radiography scanner – PRF F0137 – in advance of a proposal to operate the scanner as a partially enclosed radiography site.

CSIRO Divisions

6.76

Land and Water S0009	<i>Comments</i>
The report from Land and Water on its sources in the December 2003 quarter was received on 6 February.	The source inventory was updated. A Division-wide risk assessment of all work, including radiation work, was completed during December 2003. The Division is considering improvement initiatives arising from the reviews, and a risk profile for the Division will be developed. Risk associated with radiation work is well controlled at all sites.
Textile and Fibre Technology S0010	<i>Comments</i>
The report from Textile and Fibre Technology on its sources in the March quarter was received on 30 March.	The source inventory included information on a newly constructed piece of equipment incorporating a radiofrequency plasma. Regulatory Branch requested further information of the Radiation Safety Officer, as the current source licence for the CSIRO TFT may not include this type of controlled apparatus.
Corporate Property S0013	<i>Comments</i>
The report from Corporate Property on its sources in the December 2003 quarter was received on 12 January.	The source inventory indicated that the environmental audit initially scheduled for May 2003 and subsequently expected to take place sometime between August and October was now planned for January 2004.
Molecular Science S0016	<i>Comments</i>
The most recent report from Molecular Science on its sources was for the September 2003 quarter and received on 22 October 2003	Regulatory Branch sent a further reminder by email.
Entomology S0017	<i>Comments</i>
The report from Entomology on its sources in the December 2003 quarter was received on 11 February.	An updated source inventory was included.
Sustainable Ecosystems S0018	<i>Comments</i>
The report from Sustainable Ecosystems on its sources in the December 2003 quarter was received on 23 January.	An updated source inventory was included.
Marine Research S0019	<i>Comments</i>

The report from Marine Research on its sources in the December 2003 quarter was received on 23 January.	The source inventory was unchanged.
Plant Industry S0021	<i>Comments</i>
The report from Plant Industry on its sources in the December 2003 quarter was received on 1 March.	An updated source inventory was included.
Livestock Industries S0022	<i>Comments</i>
The report from Livestock Industries on its sources in the December 2003 quarter was received on 3 February.	An updated source inventory was included. Due to reorganisation and relocation, some source inventory details still required review and correction.
Food Science Australia S0023	<i>Comments</i>
The report from Food Science Australia on its sources in the December 2003 quarter was received on 23 February.	An updated source inventory was included.
Energy Technology S0025	<i>Comments</i>
The report from Energy Technology on its sources in the December 2003 quarter was received on 4 February.	An updated source inventory was included.
Petroleum Resources S0030	<i>Comments</i>
The report from Petroleum Resources on its sources in the December 2003 quarter was received on 5 January.	An updated source inventory was included. As signalled in the previous Quarterly Report of the CEO of ARPANSA, a CT apparatus was being relocated from Sydney to Perth. A request for the CEO's permission to recommence operation of the apparatus in the new purpose-built accommodation was received, as required by Regulation 51. Further information was requested and then under review by Regulatory Branch.
Health Sciences and Nutrition S0038	<i>Comments</i>
The report from Health Sciences and Nutrition on its sources in the December 2003 quarter was received on 23 January.	An updated source inventory was included.
Forestry and Forest Products S0054	<i>Comments</i>

<p>The report from Forestry and Forest Products on its sources in the December 2003 quarter was received on 11 February.</p>	<p>The source inventory was unchanged. Notification was received of a proposed new dealing involving modifications to a laser product. The laser does not appear on current inventories of controlled apparatus. Regulatory officers arranged a planned inspection of the laboratories for April.</p>
<p>Atmospheric Research S0059</p>	<p><i>Comments</i></p>
<p>The report from Atmospheric Research on its sources in the December 2003 quarter was received on 8 January.</p>	<p>An updated source inventory was included.</p>
<p>Exploration and Mining S0061</p>	<p><i>Comments</i></p>
<p>The report from Exploration and Mining on its sources in the December 2003 quarter was received on 9 February.</p>	<p>An updated source inventory for the December 2003 quarter was received on 19 January. Further information on staff changes within the Division was provided. All staff, with the exception of the Radiation Safety Officer (RSO), had been relocated from the North Ryde site. It is intended that the RSO will cease work in July. This raises the question of continuity of effective control of sources on the site, particularly those in storage pending eventual disposal (See also Facility Licence F0060).</p>
<p>Minerals S0064</p>	<p><i>Comments</i></p>
<p>The report from Minerals on its sources in the December 2003 quarter was received on 23 December 2003.</p>	<p>Regarding the new work with mineral sands at Waterford reported in the previous Quarterly Report of the CEO of ARPANSA, an occupational health and safety assessment of work form was provided. This accompanied a letter from the Chief of Division requesting prior permission for a relevant change under Regulation 51 and a variation of licence conditions relating to training.</p> <p>An inspection of work using unsealed materials was conducted. A number of recommendations were made to the CEO relating to control of the source inventory.</p>
<p>Manufacturing and Infrastructure Technology S0066</p>	<p><i>Comments</i></p>

<p>The report from Manufacturing and Infrastructure Technology on its sources in the December 2003 quarter was received on 11 March.</p>	<p>An updated source inventory for the December 2003 quarter was also received on 11 March. This included an additional Cobalt-57 source identified as a component of an existing item of equipment. Damage to the fluoroscope due to a flood at the Preston site was determined to present no radiological hazard.</p>
<p>Telecommunications and Industrial Physics S0125</p>	<p><i>Comments</i></p>
<p>The report from Telecommunications and Industrial Physics on its sources in the December 2003 quarter was received on 2 February.</p>	<p>Eight new class 3B lasers were added to the source inventory. No other changes were noted.</p>
<p>The report from Telecommunications and Industrial Physics on its sources in the March quarter was received on 29 March.</p>	

Australian Institute of Marine Science

6.77 The source inventory update for the December 2003 quarter was received on 3 February.

Australian Antarctic Division

6.78 The report for the December 2003 quarter was received on 5 March. This indicated that radioisotopes have been used in the laboratories at Davis and on the Aurora Australis without any significant changes, problems or incidents.

Australian Quarantine Inspection Service

6.79 The source inventory update for the December 2003 quarter was received on 27 January. This indicated no changes to source holdings. The source inventory update for the March 2004 quarter was received on 24 March. This also indicated no changes to source holdings.

Australian Customs Service

6.80 Customs continued to operate three container examination facilities at Fisherman Island, West Melbourne and Matraville. An application to operate an accelerator to inspect containers at Fremantle was received from Customs. A Regulatory Branch officer visited the facility as part of the regulatory assessment of the application.

6.81 The source inventory update for the December 2003 quarter (S0092) was received

on 7 January and indicated a number of minor changes.

Parks Australia North

6.82 A report for the December 2003 quarter was received on 7 January. On request from Parks Australia North, Environmental and Radiation Health Branch provided comments on an initial review of containment options.

Australian National University

6.83 The licence holder reported on compliance for the period November 2003 to January 2004 in February that:

- Radioactive releases and disposal of trace radionuclides from laboratories were in accordance with national codes of practice and plans and arrangements as described in the original licence application;
- Changes to source inventories were minor. An updated source inventory for eight schools, two faculties and one department was included;
- There were no safety improvements and minor modification to controlled apparatus and procedures; and
- There were no abnormal occurrences with significant safety consequences. There were two abnormal occurrences at the university that were investigated, reported and appropriately dealt with in accordance with internal safety policies and procedures.

Department of Defence

6.84 Regulatory Branch officers met with a number of departmental representatives on 6 February to discuss radiation safety and progress on special conditions attached to Department of Defence licences. The Australian Defence Organisation has made significant progress in radiation safety management since additional resources were employed during the previous quarter. The next meeting was scheduled for 7 May.

6.85 The details of possible aircrew exposure to radiofrequency radiation while in transit from RAAF Edinburgh to Darwin were passed onto Comcare.

6.86 An officer from ARPANSA visited the new Defence Science and Technology Organisation site at Fisherman's Bend at the request of DSMA.

6.87 A licence to operate a waste storage facility at Bandiana was issued to Defence on 19 January.

6.88 Defence provided an updated inventory to ARPANSA as part of the conditions of licence S0042.

6.89 A number of incident reports and 'near misses' were provided to ARPANSA during

the quarter.

Office of the Supervising Scientist

- 6.90 A report for the December 2003 quarter, and updated source inventory, were received on 27 January. There were no items of note.

Australian Government Analytical Laboratories

- 6.91 The Analytical Laboratories are licensed to deal with a number of ionizing and non-ionizing sources (S0142). A report detailing the handling of these sources during the December 2003 quarter was received on 19 February. No incidents or accidents occurred during the reporting period and no radiation was discharged to the environment.

7. International Liaison

- 7.1 From 12-14 January Alan Melbourne attended an IAEA working group meeting in Vienna to resolve issues in the drafting of safety guide 161 (DS161) *Application of the concepts of exclusion, exemption and clearance*.
- 7.2 Peter Colgan attended a technical meeting of the IAEA from 12-16 January to participate in drafting an International Action Plan for the Safety of Transport of Radioactive Material in accordance with the IAEA General Conference resolution (GC(47)/RES/7C). The Action Plan addressed a range of issues of particular interest to Australia including denial of shipments, transport of naturally occurring radioactive material, communication, emergency response, and liability. The IAEA Board of Governors approved the Action Plan in March.
- 7.3 David Tredinnick attended an IAEA technical meeting to develop internationally harmonized guidelines for the import and export of radioactive sources in accordance with the requirements of the current *Code of Conduct on the Safety and Security of Radioactive Sources* in Vienna on 16-20 February.
- 7.4 John Loy attended an expert group meeting in Vienna from 9-11 February that drafted an action plan for the IAEA on protection of the environment from ionizing radiation. This was a follow-up to the international conference on this topic held in Stockholm in October 2003 and reflects the view that there needs to be specific assessment of the impact of radiation on non-human species.
- 7.5 Stuart Woollett attended the 2nd Research Coordination meeting on the Application of Safety Assessment Methodologies for Near Surface Disposal Facilities (ASAM) at the IAEA in Vienna on 9-13 February. Progress of the five working groups involved in the program was reported. The meeting also served to determine tasks and responsibilities for accomplishing the program's objectives.
- 7.6 Geoff Williams attended an IAEA consultant's meeting on Safety Assessment Driving Radioactive Waste Management Solutions (SADRWMS) in Vienna on 16-

- 20 February. The meeting developed the scope, objectives and work program for the project, and prepared for the first coordination meeting of the project in November.
- 7.6 From 15-19 March, Neil Morris attended the IAEA/Regional Cooperation Agreement (RCA) Final Project Review Meeting on External Dosimetry Intercomparison in Tokai, Japan, as the Australian representative.
- 7.7 From 22-26 March Alan Melbourne (RASSC) and Geoff Willaims (WASSC) attended the RASSC/WASSC meetings in Vienna, to participate in the development of IAEA radiation and waste safety publications. The Australian position on DS161 (which took account of industry concerns) was accepted and the draft was approved for presentation to the IAEA Commission on Safety Standards.
- 7.8 Non Ionizing Radiation Branch staff prepared a report for the New Zealand Interagency Committee on the Health Effects of Electromagnetic Fields February meeting on activities in Australia related to the issue. The Committee convenes twice a year and it is envisaged that an ARPANSA representative will attend one of these meetings each year.

John Loy
CEO
28 June 2004