



Australian Government

**Australian Radiation Protection
and Nuclear Safety Agency**

QUARTERLY REPORT

OF THE

CHIEF EXECUTIVE OFFICER

OF ARPANSA

FOR THE PERIOD 1 OCTOBER TO 31 DECEMBER 2003



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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 The National Uniformity Implementation Panel ((Radiation Control) (NUIP (RC)) met twice during the quarter to progress development of uniform competency requirements for authorisations to use radiation for five occupations. The occupations to be included in this version of the National Directory were: chiropractors, medical radiographers, nuclear medicine technologists, veterinary surgeons and dental practitioners (including dental therapists and dental hygienists).

National Competition Policy Review of Radiation Protection Legislation

- 1.2 The Allen Consulting Group Pty Ltd completed the NCP review project three (Regulatory Styles) and is scheduled to complete project four (Third Party Certification) in the first quarter of 2004. Projects 12 (National Incidents Register) and nine (Advertising Restrictions) were also completed during the December quarter.

Proposed National Offshore Petroleum Safety Authority

- 1.3 ARPANSA staff met with officers from the Department of Industry, Tourism and Resources to discuss the establishment of the National Offshore Petroleum Safety Authority (NOPSA). The meeting was to discuss the potential for overlapping responsibilities in the regulation of radiation safety in the petroleum industry.

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, work continued on the construction and operation of radionuclide air monitoring stations. ARPANSA continued to operate and maintain the five 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. Proposals for the testing, evaluation and post-certification activities for the Australian mainland stations, and the one at Kavieng, were submitted to the Comprehensive Test Ban Treaty Organisation (CTBTO) and negotiated. Documentation and other preliminary work was undertaken to have the ARPANSA's Radionuclide Laboratory certified by the CTBTO and the National Association of Testing Authorities (to the ISO 17025 Standard) in 2004.

Nuclear Powered Warships

- 2.2 In late October staff attended a meeting of the Visiting Ships Panel (Nuclear) (VSPN). Staff also participated with other members of the VSPN technical working group in the biennial port assessment and validation of the nuclear powered warship anchorages in the Derwent River at Hobart.

Radiation Emergencies

- 2.3 ARPANSA provided a radiation expert as an Exercise Controller in support of the National Counter-Terrorism Committee sponsored Exercise "Fastball", held in Brisbane from 29 September to 3 October.
- 2.4 ARPANSA staff attended the National Chemical, Biological and Radiological Working Group meeting held 15-17 October to advise on issues associated with the malevolent use of radioactive materials.
- 2.5 ARPANSA organised and conducted training for 20 managers of NSW emergency response organisations at Lucas Heights in November. Similar courses will take place at regular intervals to ensure that response staff are well informed.
- 2.6 From 25-28 November, staff participated in a multi-agency exercise (PLAN SPRED) in Townsville to confirm standing operating procedures for use by the Australian space debris emergency search teams in support of the Australian contingency plan for radioactive debris.

Conferences, meetings and technical advice

Medical Radiation Branch

- 2.7 The biennial meeting of the National Measurement Laboratory, ANSTO and ARPANSA was held at the agency's Yallambie premises on 14 December. The meeting discussed the maintenance and dissemination of the Australian measurement standards for ionizing radiation. An officer of the Department of Industry, Tourism and Resources briefed the meeting on the creation of the National Measurement Institute from the National Measurement Laboratory, National Standards Commission and the Australian Government Analytical Laboratories.
- 2.8 Kevin Rafferty attended the following conferences to promote the ARPANSA Personal Radiation Monitoring Service:
- Australasian Radiation Protection Society, 26-29 October;
 - Australian Nuclear Association, 5-7 November; and
 - Laboratory Technician's Conference, 5 December.
- 2.9 David Webb and Lew Kotler attended the annual General Assembly of the Asia Pacific Metrology Program held in Singapore on 1-5 December. On the first two days the Technical Committee for Ionizing Radiation held a workshop chaired by David Webb. Reports from eight laboratories were presented and the programs for the comparison of national radiation measurement standards were discussed. Lew Kotler presented a paper titled *The Application of the ISO Guidelines for the Expression of Uncertainty in Measurements to Intercomparisons using X-Ray Qualities*.
- 2.10 As part of the Medical Physics program of estimating doses and risks to the Australian population from medical procedures, Keith Wise published a paper titled *Solid cancer risks from radiation exposure and implications for CT screening* in the Radiographer, Vol 50 (No 3), 2003. Also in the quarter, Keith Wise and Julian Thomson submitted a paper for publication in the same journal titled *Changes in CT radiation doses in Australia from 1994 to 2002*.

Non-Ionizing Radiation Branch

- 2.11 Staff reviewed, and provided comment on, the World Health Organization's draft EMF standards framework.
- 2.12 At the October Australasian Radiation Protection Society conference in Hobart, staff made these presentations:
- Peter Gies – 'Assessment of UVR Exposures of Outdoor Workers';
 - Stuart Henderson – 'Measurement of Solar UVR at Davis Station, Antarctica'; and
 - Michael Bangay – Detailed specific absorption rate measurements of

microwave oven leakage. He also spoke about current measurements and methodology around high frequency radio sources.

- 2.13 During December, staff gave an 80 minute presentation at LABCON 2003 hosted by Monash University. The conference was organised by the Science Teacher's Association of Victoria for Laboratory Technicians. John Javorniczky spoke about the various services provided by the UVR Section. Ken Karipidis talked about the RF calibration service, mobile telephony and ELF and powerlines.

Public communication activities

- 2.14 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. Microwave oven safety also emerged as a topic.
- 2.15 The ARPANSA Publications Committee progressed two significant projects in the quarter. Firstly, it released a final draft of the ARPANSA Publications Manual for comment by staff. The Manual provides clear guidance on how to produce publications and will ensure that they conform to the agency's style and quality requirements. The document includes templates and samples, along with a concise description of processes for authorisation and peer review. Secondly, the Publications Committee is developing public information content for the ARPANSA website. The project goal is to "provide information to the public on radiation protection and nuclear safety that is accurate, timely, accessible and professionally presented, focusing on the issues that meet audience needs." Target audiences are the Australian general public, teachers and students.
- 2.16 The Public Affairs Officer responded to numerous phone and email inquiries. 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, radiation leakage from microwave ovens, UVR exposure, 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 with Dr Cheryl Wilson of the Clothing and Textile Sciences Faculty of the University of Otago in Dunedin, New Zealand, continued. The aim is to systematically characterise the factors that ensure

clothing provides good protection against solar UVR, as well as those that provide poor protection. The study extends to high visibility clothing worn by outdoor workers.

- 3.2 NIR Branch staff met with members of the Electricity Supply Association of Australia and the Victorian Department of Human Services (Radiation Safety Program) to discuss the proposal for a Victorian survey of residential magnetic fields. The survey cost was recalculated, revealing a higher than anticipated project outlay. A decision on the outlay may occur in the next quarter.
- 3.3 The measurement phase of the survey of radiofrequency (RF) electromagnetic energy (EME) emissions around sixty mobile phone base stations around Australia was completed in the previous quarter. Analysis of reports continued. The project aims to measure base station RF EME levels at specified distances from the antenna and compare levels with the ARPANSA RF exposure limits and with predicted levels.
- 3.4 The collaborative study with the Menzies Centre for Population Health in Hobart and the National Centre for Epidemiology and Population Health at the Australian National University on the UVR exposure assessments of people with multiple sclerosis continued.
- 3.5 John Javorniczky visited Westmead Hospital, the Skin Cancer Foundation of Australia and Liverpool Hospital to undertake measurements and calibrations of four different UVB phototherapy cabinets. His findings should result in a paper on standardization of phototherapy doses.

Medical radiation

- 3.6 The Medical Physics Section continued its national survey on radiation doses from general diagnostic radiology. Data collection from the second group of randomly chosen participants was completed and preliminary analysis of the results was proceeding.
- 3.7 Irradiations of TLD material was undertaken for the IAEA as reference exposures for its international Secondary Standards Dosimetry Laboratory and hospital radiotherapy audit programs. TLD irradiations were also performed for the Medical Physics Section to provide normalisation data for the national survey of diagnostic radiography equipment.
- 3.8 In September the IRS Section began a bilateral comparison of air kerma and absorbed dose at Cobalt-60 with the Institute of Nuclear Energy Research (INER), Taiwan, by the exchange of secondary standards. Three NE2571 chambers from INER and one ARPANSA NE2571 chamber were measured for Cobalt-60 air kerma and absorbed dose in water. Three independent runs yielded consistent results. The three chambers were returned to INER and a measurement report prepared.

- 3.9 During 1-5 November the IRS Section was visited by Dr Jang Lyul Kim from the Korean Atomic Energy Research Institute (KAERI) in order to measure the megavoltage energy response of TLD pellets developed by the Institute. Several X-ray beams from the ARPANSA linac and from Cobalt-60 were used to irradiate the material. The responses were being assessed and the results will be of interest to the IRS therapy TLD audit program.

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

Calibration services

- 4.1 The Non-ionizing Radiation Branch Radiofrequency Calibration (RFC) Laboratory received the following requests for calibration jobs during the quarter:
- 50 monitors with 79 probes;
 - 30 personal dosimeters; and
 - three sensors.
- 4.2 Medical Radiation Branch's Ionizing Radiation Standards (IRS) Section dosimetry calibration service completed the calibration of a survey meter and several dosimeters for ARPANSA's Regulatory Branch, the calibration of a hospital reference dosimeter (which resulted in a review of differences in protocols used by Australian hospitals) and two protection level calibrations. Secondary standard calibrations were provided to the National Radiation Laboratory of New Zealand for both therapy and protection level equipment.
- 4.3 Batch three of the IRS national TLD therapy dosimetry audit was conducted for three centres during November and December. All results were favourable, with each centre's stated dose being within three per cent of the ARPANSA measured dose. Reports were sent to the participating centres.

Fabric testing and labeling

- 4.4 Fabric ultra-violet protection factor (UPF) testing, licensing and labelling continued. 72 jobs were received, involving the testing of 384 fabric samples. In addition, 10 UPF trademark licences were completed and 410,000 UPF swing tags were issued.

UVR data and hazard assessments

- 4.5 Two industrial UVR hazard assessments were completed. These involved solar UVR exposure through skylights in a Sydney workplace and hazard assessment of employee exposure to UVR in a printing firm.
- 4.6 A study of the UVR exposures of Australia Post staff commenced.

- 4.7 UVR data for Melbourne and Adelaide was provided to the RMIT Environmental Science Program. UVR data was also supplied to the Bureau of Rural Sciences for its *State of the Environment Report*.
- 4.8 Drafting of documentation to seek NATA accreditation of the UPF rating service was finalised and the application was submitted during December.

QA program for radiopharmaceutical products

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

Surveillance of effluent discharges at ANSTO's HIFAR reactor

- 4.10 A total of 35 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

- 4.11 230 samples were tested against requirements of the Australian Drinking Water Guidelines.

Certification of radioactivity in exported foodstuffs

- 4.12 Measurements of the radioactivity content of 35 foodstuffs destined for export were carried out on request and eight Radioactivity Certificates were issued for shipments of exported foodstuffs.

Personal Radiation Monitoring Service

- 4.13 The 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.
- 4.14 Neutron monitors issued as part of an IAEA International Neutron-Gamma Intercomparison were received for evaluation. The report on the doses was issued on 10 October. The results of the intercomparison were pending.
- 4.15 Expressions of interest for the PRMS Database Rewrite Project were requested in October and a Request for Tender was issued to the successful applicants on 12 December. An industry Request for Tender briefing was held on 17 December.

5. Council and Committee Operations

Radiation Health and Safety Advisory Council

- 5.1 The Council met on 28 November in Sydney. A summary of the meeting is at <http://www.health.gov.au/arpansa/rhsac.htm>

Radiation Health Committee

- 5.2 The Radiation Health Committee (RHC) met on 12-13 November. A summary of the meeting is available at http://www.arpansa.gov.au/rhc_mt.htm

Nuclear Safety Committee

- 5.3 The Nuclear Safety Committee (NSC) met on 20 October in Sydney. A summary of the meeting is available at <http://www.arpansa.gov.au/nsc.htm>

Radiation Protection Series publication program

- 5.4 The draft *Code of practice for the safe use of portable density and moisture gauges containing radioactive sources* and the accompanying regulatory impact statement were released for public comment in the quarter. 12 submissions offered substantive comment on the draft Code and will be considered in the finalising the draft Code and Regulatory Impact Statement for approval of the Radiation Health Committee and the Radiation Health and Safety Advisory Council to the CEO of ARPANSA regarding publication.

6. Regulation

Licensing

Licence Applications Received

6.1

<i>Type of application</i>	<i>From</i>
Facility – operate an X-ray container facility	Australian Customs Service

Application Assessment and Licence Issuance

6.2

<i>Type of licence and authorisation</i>	<i>To</i>
Source – amendment allowing licence holder to use up to a Class 4 laser product (previously licensed up to Class 3B)	ANSTO Environment
Source – amendment removing special licence conditions	CSIRO Livestock Industries
Source – amendment authorising dealings with an X-ray spectrometer	Department of Environment and Heritage – Australian Antarctic Division
Facility – possession and control of the Woomera Waste Storage Facility	Australian Defence Force and the Department of Defence
Facility – operation of the 2MV STAR Accelerator	ANSTO Environment

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

- 6.3 The Regulatory Branch issued 100 Customs Prohibited Release permits for the importation of non-medical radioisotopes. These comprised of 64 single-shipment, 33 urgent requests and three twelve-monthly permits.
- 6.4 The Radiopharmaceutical Section issued 110 Customs Prohibited Release permits for the importation of medical radioisotopes. These were comprised of 101 single-shipment permits, five twelve-monthly permits and four 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

- 6.5 ANSTO submitted seven 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. Five of these received CEO approval during the reporting period, in addition to six that were submitted in the previous quarter.
- 6.6 The CEO approved two relevant changes to the details of the design of the reactor as put forward in the licence application under Regulation 51 during the quarter. The first change was the inclusion of additional filters in the air intakes for the emergency control centre ventilation system. The second

change was that the control rod absorber plates are to be made of Hafnium instead of a mix of Silver-Indium-Cadmium as originally considered in the licence application.

- 6.7 The CEO imposed three additional licence conditions under Section 36(2) (a) of the ARPANS Act during the quarter. Two of the conditions were imposed to ensure the repairs to the reactor pool liner were carried out in conformance with the original approval. The third condition was imposed to enable the CEO to monitor the implementation of lessons learned from the pool liner incident.
- 6.8 Following a request from the Licence holder to vary the level of Magnetic Particle Testing from 100 per cent to 10 per cent for parts of the Secondary Cooling System, the CEO confirmed that the original approval parameters included the requirement of 100 per cent Magnetic Particle Testing.
- 6.9 The CEO also wrote to the Licence holder to set out his understanding of the scope of the Facility Licence F0118 to construct the Replacement Research Reactor. The existing facility licence authorises the Licence holder to undertake the conduct of construction up to, but not including, the loading of nuclear fuel.

ANSTO - HIFAR Reactor Operations

- 6.10 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. One new project was identified during the quarter. The new project is not identified to be safety significant. 16 projects were in progress, while a further two had reached practical completion and one had reached final completion.
- 6.11 ARPANSA assessment of an ANSTO proposal to change the operational safety limit relating to the surface heat flux of irradiation rigs in the HIFAR reactor was still underway.
- 6.12 ARPANSA continued reviewing an ANSTO proposal to amend a condition relating to plant staffing.
- 6.13 Regulatory officers reviewed two reports to address special licence condition 3.7 dealing with accident analysis.
- 6.14 Regulatory officers reviewed a report to address special licence conditions 3.6(a) and 3.6(c) on seismicity and the response of HIFAR reactor structures - using the revised response spectrum for the Lucas Heights Science and Technology Centre.
- 6.15 Regulatory officers conducted a planned inspection of the HIFAR reactor

facility. Documentation associated with plant maintenance and abnormal occurrences was reviewed. The inspection verified that the Licence holder has implemented arrangements to comply with the standard conditions of licence. The report recommended that the CEO accept the arrangements implemented to comply with the licence conditions.

- 6.16 Routine contact visits by Regulatory Branch staff to monitor HIFAR reactor operations and maintenance continued during the quarter. These provided the opportunity for officer to officer discussions on licensing and other regulatory issues.

ANSTO Sources

- 6.17 Following the reissue of a single source licence to ANSTO during the previous quarter, all superseded source licences were surrendered.
- 6.18 ANSTO advised a change in nominee for Safety and Radiation Science.
- 6.19 A report was received from ANSTO Environment for the period 1 July to 30 September indicating that the division had operated safely during the quarter without event or incident and that there had been only minor changes to the source inventory during that time.
- 6.20 A report was received from Materials and Engineering Science for the period 1 July to 30 September indicating safe operation during the quarter and providing an update of the source inventory.
- 6.21 A report was received from Engineering Services for the period 1 July to 30 September indicating safe operation during the quarter and advising no changes to the source inventory in the reporting period.
- 6.22 Safety and Radiation Science provided a report for the period 1 July to 30 September indicating safe operation and no change to source inventory, although noting some minor amendments to source details. Satisfactory compliance with special licence conditions was reported.
- 6.23 The Bragg Institute also provided a report for the period 1 July to 30 September. This indicated safe operation during the quarter and provided an updated source inventory.
- 6.24 There were six site visits during the quarter by the Regulatory Branch officer responsible for monitoring the licensing of ANSTO sources.

ANSTO Inspections

- 6.25 A planned inspection of ANSTO Materials and Science was conducted. A preliminary inspection report was prepared and issued by the Regulatory

Branch. This indicated that the inspectors would recommend a finding of satisfactory compliance with licence conditions.

- 6.26 A planned inspection was conducted at Building 54 which is operated under Licence F0044-5A, 5B and 5C.
- 6.27 A Regulatory Branch officer visited Building 54 in response to an incident on 20 November involving the release of noble gases. ANSTO temporarily halted production of Molybdenum in the building, notified ARPANSA, and issued a media release the same day.
- 6.28 A Regulatory Branch officer visited Buildings 23, 20B, 22 and Little Forest Burial Ground to obtain further information about these facilities.

ANSTO General Plans and Arrangements

- 6.29 Professor Helen Garnett advised of her departure from ANSTO in early October. Responsibility for all ANSTO licences was reassigned to Acting Executive Director Dr Ron Cameron.
- 6.30 ANSTO reported its compliance with organisational special licence conditions. Compliance has been satisfactorily demonstrated for the majority of licence conditions. An acceptable schedule has been nominated for completion of the few remaining licensing actions.

ANSTO – Moata Research Reactor

- 6.31 As required by the conditions of licence, Moata supplied a quarterly report within 28 days from the end of the quarter (received on 21 January 2004) that stated:
- No abnormal occurrences occurred in relation to the care and maintenance of Moata;
 - No modifications to plant and procedures were identified as necessary for the care and maintenance of the Moata reactor during the quarter;
 - Updating of the quality assurance documentation was continuing;
 - The facility, including fuel storage, was inspected by Australian Safeguards and Non-Proliferation Office staff on 14 November. No issues were identified.

ANSTO Fuel Operations

- 6.32 The quarterly report for the period 1 October to 31 December, received on 21 January 2004, indicated compliance with licence conditions.
- 6.33 Progress in satisfying Special Licence Condition 3.7(e) in the Facility

Licence No. FO0044-4C reached the point where ANSTO completed o-ring replacements in double contained fissile material containers during the IAEA inspection on 23-25 July. A new racking system for storing these containers in the Nuclear Materials Vault Store is being designed. Work also commenced to provide electro-chemical sensors for gas detection in the Nuclear Material Vault Store in order to address Special Licence Condition 3.7 (h).

- 6.34 An upgrade of the Building 23 spent fuel storage pond purification system was in progress. The Safety Analysis Report for the Cropping Irradiation Pond was provided to ARPANSA for review.
- 6.35 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. The gross alpha and beta results for the irradiation pond remained below notification levels and the water chemistry was well within operational limits. Remedial work on cleanup of the pond included the installation of an in-situ mixer and particulate filter system. Results of water samples from the pond liner area continue to confirm the integrity of the cropping/irradiation ponds.
- 6.36 Discharges from stacks associated with Fuel Operations during the quarter were well below authorised limits and doses to personnel were well within local objectives and limits. No non-conformances were raised in the quarter.
- 6.37 A shipment of 344 spent fuel rods went overseas for reprocessing in the final week of October. Regulatory requirements for the transport of spent fuel are stringent. ARPANSA formally approved the transport plan for the shipment submitted by ANSTO and, in conjunction with French, Danish and German nuclear authorities, assessed and approved the design of the cask containing the rods. Details of the transport convoy's timing and route along major Sydney roadways were not announced in advance in order to satisfy the IAEA's Convention on the Physical Protection of Nuclear Material.
- 6.38 ANSTO recommended the services of a United States expert as the preferred international criticality expert to conduct an independent criticality review. This was accepted by ARPANSA.

ANSTO Waste Operations and Technology Development

- 6.39 ANSTO Waste Operations and Technology Development (WOTD) is licensed as a nuclear installation and is operated under Facility Licence FO0044-WOTD. A licence condition requires ANSTO Nuclear Technology to submit quarterly reports to the CEO of ARPANSA. The quarterly report for the period 1 October to 31 December, received on 21 January 2004,

addressed the following areas:

6.40 **Safety Analysis**

- A special licence condition requires the licence holder to submit the final safety analysis reports for the facilities of WOTD. The licence holder submitted four safety analysis reports during the quarter, which were under ARPANSA review.

6.41 **Abnormal Occurrences**

- No abnormal occurrences occurred during the quarter.

6.42 **Modifications**

- Building 20B was being extended for future expansion of waste services. Cementation plant was being installed within the building and undergoing pre-commissioning tests. Design of a new Waste Minimisation and Decontamination unit for Building 20B was in progress. A submission for additional operations within the Treatment and Packaging Facility was submitted to ARPANSA and is under review.

6.43 **Airborne Discharges**

- The airborne discharges are covered elsewhere in the ARPANSA Quarterly Report at paragraph 6.62.

6.44 **Liquid Discharges**

- The liquid discharge results are covered elsewhere in the ARPANSA Quarterly Report at paragraph 6.64.

6.45 **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

- 6.46 ANSTO Radiopharmaceuticals and Industrials (ARI) is licensed to operate four nuclear installations and three prescribed facilities in 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). Licence conditions require ARI to submit quarterly reports to the CEO of ARPANSA. The quarterly report for the period 1 October to 31 December, received on 30 January, addressed these areas:

6.47 **Modifications**

- ARI took possession of a Nordion Gammacell 220 self-shielded laboratory irradiator which was previously owned by and licensed to CSIRO Animal Health Laboratories in Melbourne. The current source activity is approximately 339 TBq of Cobalt-60. The Gammacell is housed and operated in the east annex of the GATRI facility. The irradiator will be used for dosimeter calibration and small sample irradiations. Plans and arrangements for operating and maintaining the irradiator will be incorporated into the existing Quality System for GATRI. The quarterly report stated that the Gammacell is designed for use in a general laboratory environment and this modification is not considered to have any significant implications for safety. ARPANSA is reviewing the regulatory implications of this action.

6.48 **Relevant changes**

- Under Regulation 51 the CEO approved the upgrading of the Building 23 ventilation system. The quarterly report received indicated:
 - Construction works were progressing to schedule. New plant room for the primary filtrations system was constructed and new chillers were positioned;
 - The chilled water piping installation had commenced;
 - Electrical works for the Building 23 control and management works had begun;
 - Construction works were being carried out in accordance with the ANSTO safety and security regulations; and
 - Health physics measurements were in place.

An ARPANSA officer visited Building 23 to observe construction work.

- Construction of shielding on the roof of the Building 54 SIAM room commenced, to minimise the radiation dose from the SIAM filter.

6.49 **Changes in Operational Limits and Conditions**

- The quarterly report mentioned the intention of amending the maximum activity levels of various radionuclides used in Buildings 76 and 19. This desired amendment to the operational limits and conditions of the ARI licence (F0044-5A, 5B and 5C) requires approval by the CEO of ARPANSA.

6.50 **Effective Control**

- A special licence condition requires maintaining a current inventory of all controlled materials and controlled apparatus. The ARI quarterly report mentioned that the second stage of the BIS/SAP system was in its final stages and would be implemented on 2 February 2004. Prior to this there

would be an extensive inventory stock take.

6.51 **Safety Management Plan**

- A special licence condition requires formal accreditation of operators. The ARI quarterly report mentioned that all operators had completed the accreditation program for GMP and it is envisaged that the next learning unit, *Radiation Safety in Our Plant*, will be completed by first quarter of 2004.
- A special licence condition requires the Licence holder to consider in the Safety Analysis Report 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. The quarterly report contained the Safety Analysis Reports for Buildings 23 and 23A, and the Camperdown facility. All were undergoing review by ARPANSA.

6.52 **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. The quarterly report mentioned that the procedures will be written and implemented in line with the new BIS/SAP system.

ANSTO Environment

6.53 **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, and formerly called Tandetron) 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 October to 31 December, received on 15 January 2004, mentioned that:

- No abnormal occurrences, incidents or accidents occurred in relation to the ANTARES and Van de Graff accelerators. However, an abnormal occurrence involving high voltage discharge occurred at the STAR accelerator. No personnel were injured and no equipment was damaged due to this incident. Relevant countermeasures were taken to prevent a recurrence;
- There were no modifications to plant and procedures for the Van de Graff and STAR accelerators. However, implementation of the new EPIC software for the computer controls of the ANTARES accelerator

continued, with high success;

- No radioactivity was generated from these facilities;
- As in the September quarter, the Safety Analysis Report (SAR) of the ANTARES accelerator was undergoing final assessment by the ANSTO Safety Assessment Committee. The report also mentioned that the SAR for the STAR accelerator was being prepared for review by the ANSTO committee, prior to completion.

6.54 **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, received on 23 January 2004, 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.

6.55 **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, received on 23 January 2004, 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 Division – Actinide Suite

6.56 The quarterly report addressing all licence conditions for the period 1 October to 31 December was received on 23 January 2004. Progress toward compliance with the outstanding special licence conditions is continuing.

6.57 An abnormal occurrence arose on 2 November during the monthly rotation of the main exhaust fans in Building 56. The standby fan failed to start and the previous fan failed to restart. The supply air to the building remained on, creating positive room pressures in the Actinide Suite laboratories for 24 hours. The continuous alpha air monitors did not detect any release, and the

dosimetry results for the reporting period were within acceptable levels. The problem was investigated by ANSTO, the faulty part identified, and a replacement part ordered. These investigations will be confirmed by an ARPANSA officer in a visit to the facility.

ANSTO – Secondary Standards Dosimetry Laboratory

- 6.58 A report was received for the period 1 October to 31 December that noted a change in nominee with Cait Maloney's appointment as Director, Safety and Radiation Science. No other significant changes to plant or personnel were reported.
- 6.59 Satisfactory progress was reported against the special licence condition.

Abnormal Occurrences at ANSTO's Nuclear Installations

- 6.60 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).

6.61 **HIFAR**

ARPANSA was notified of seven abnormal occurrences in the quarter. All of them were rated as INES Level 0. Human error was identified as the cause of a number of the abnormal occurrences.

ANSTO Airborne Radioactive Discharges

- 6.62 The Regulatory Branch review of all airborne radioactive discharges reported by ANSTO for the period 23 September to 21 December showed that discharges remained less than the quarterly notification levels under the licence authorisation, with the exception of Xe-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 is continuing, an investigation into what caused the increased emissions.
- 6.63 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 authorisation for the quarter.

ANSTO Liquid Radioactive Discharges

- 6.64 The Regulatory Branch conducted a review of ANSTO's reports of liquid radioactive discharges from the Lucas Heights Science and Technology Centre from 30 September to 30 December. It was found that these

discharges complied with the Trade Waste Agreement of 30 July between Sydney Water and ANSTO, with all measured values at most a few per cent of the relevant limit.

ARPANSA Melbourne – Medical Radiation Branch

6.65 ARPANSA's Medical Radiation Branch is licensed to operate a linear accelerator and teletherapy facility as prescribed radiation facilities under the licence F0046. A licence condition requires the Licence holder to submit quarterly reports to the CEO of ARPANSA. ARPANSA received a report in the December quarter covering these areas:

6.66 **Quality system**

- Both facilities are covered by a quality system consistent with ISO/IEC 17025. It is mentioned that as the Ionizing Radiation Section accreditation program proceeds, the documentation will be brought into line in accordance with the ARPANSA Quality Manual. The target completion date for the program is by the end of 2004.

6.67 **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 February 2004.

6.68 **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 March 2004.

6.69 **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 is in progress.

6.70 **Operating limits and conditions**

- The report mentions that further clarification on operating limits and conditions is progressing.

6.71 **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.

ARPANSA Source Licence Inspections

6.72 A planned inspection of the inventory and dealings associated with source licences held by the Medical Radiation Branch and the Environmental and Radiation Health Branch in Melbourne was conducted on 10-11 December.

CSIRO

6.73 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.

6.74 **Neutron Accelerator Facility**

A report for the December quarter was received, and provided notice of CSIRO's intention to acquire additional 'spare' accelerator components.

With regard to radiological issues affecting the facility, review of occupational health and safety is provided by the ANSTO Safety Assessment Committee. Its approval, SAC 1243, was renewed without change.

A review of the operations of the facility against NHMRC Radiation Health Series No 24 *Code of Practice for the design and safe operation of non-medical irradiation facilities (1988)* was submitted in compliance with a special condition of licence.

6.75 **Heavy Ion Accelerator Facility**

A report for the September quarter was received on 15 October. It noted proposed staffing changes and the potential effect on occupational health and safety which will be kept under review.

The Radiation Safety Officer identified that there would be insufficient staff trained to operate the facility, so he asked the engineer to place the accelerator in a "safe" state by degassing it prior to his departure in mid-December.

CSIRO Divisions

6.76

Land and Water S0009	<i>Comments</i>
The report from Land and Water on its sources in the September quarter was received on 4 November.	The source inventory was unchanged.

Textile and Fibre Technology S0010	<i>Comments</i>
The report from Textile and Fibre Technology on its sources in the September quarter was received on 23 October. One for the December quarter was received on 22 December.	The source inventory was unchanged according to both reports.
Corporate Property S0013	<i>Comments</i>
The report from Corporate Property on its sources in the September quarter was received on 9 September.	The source inventory was unchanged. The report also indicated that the environmental audit first scheduled for May (and later expected between August and October) had not been undertaken. Further delay until late January 2004 was anticipated. The Licence holder's representative was informed that any amendments to regulatory conditions must be formally negotiated in advance between the Licence holder and the CEO.
Molecular Science S0016	<i>Comments</i>
The report from Molecular Science on its sources in the September quarter was received on 22 October	An updated source inventory was included.
Entomology S0017	<i>Comments</i>
The report from Entomology on its sources in the September quarter was received on 20 October.	An updated source inventory was included.
Sustainable Ecosystems S0018	<i>Comments</i>
The report from Sustainable Ecosystems on its sources in the September quarter was received on 20 October.	The source inventory was unchanged.
Marine Research S0019	<i>Comments</i>
The report from Marine Research on its sources in the September quarter was received on 5 November	The source inventory was unchanged.
Plant Industry S0021	<i>Comments</i>
The report from Plant Industry on its sources in the September quarter was received on 31 October.	An updated source inventory was included.

Livestock Industries S0022	<i>Comments</i>
The report from Livestock Industries on its sources in the September quarter was received on 7 November.	An updated source inventory was included. The report also formally responded to a special licence condition requiring the provision of any sealed source certificates. After receipt of this information, and notification of transfer of ownership of a 960TBq gamma source in the previous quarter, the source licence was amended. Special licence conditions that either had been met or were only applicable to this specific source were removed.
Food Science Australia S0023	<i>Comments</i>
The report from Food Science Australia on its sources in the September quarter was received on 3 November.	An emailed report from the newly appointed Radiation Safety Officer on 27 October indicated the source inventory was unchanged and stated that a letter to that effect was on its way to the CEO from the Chief of Division.
Energy Technology S0025	<i>Comments</i>
The report from Energy Technology on its sources in the September quarter was received on 20 October.	The source inventory was unchanged.
Petroleum Resources S0030	<i>Comments</i>
The report from Petroleum Resources on its sources in the September quarter was received on 10 October.	The source inventory was unchanged. The report also discussed issues related to the proposed relocation of computed tomography (CT) apparatus from Sydal to Perth. The Radiation Safety Officer was advised that the CEO's prior permission would be required for a relevant change such as this which could have significant implications for safety.
Health Sciences and Nutrition S0038	<i>Comments</i>
The report from Health Sciences and Nutrition on its sources in the September quarter was received on 10 October.	An updated source inventory was included. The report also notified the transfer of ownership of one UV source.

Forestry and Forest Products S0054	<i>Comments</i>
The report from Forestry and Forest Products on its sources in the September quarter was received on 31 October.	The source inventory was unchanged.
Atmospheric Research S0059	<i>Comments</i>
The report from Atmospheric Research on its sources in the September quarter was received on 9 October.	The source inventory was unchanged.
Exploration and Mining S0061	<i>Comments</i>
The report from Exploration and Mining on its sources in the September quarter was received on 31 October.	An updated source inventory was included.
Minerals S0064	<i>Comments</i>
<p>Notification was received of the receipt of X-ray fluoroscopy apparatus for evaluation.</p> <p>Preparations were well advanced for new work with mineral sands at Waterford.</p> <p>ANSTO Safety Assessment Committee approval, SAC 1497, was renewed without change.</p>	<p>Initial tests indicated little of radiological concern. Final test results will be provided to ARPANSA as part of the occupational health and safety, and environmental, assessment.</p> <p>At the Lucas Heights site, review of occupational health and safety connected with radiological issues is provided by the ANSTO Safety Assessment Committee</p>
Manufacturing and Infrastructure Technology S0066	<i>Comments</i>
The report from Manufacturing and Infrastructure Technology on its sources in the September quarter was received on 21 October.	The source inventory was unchanged.

Telecommunications and Industrial Physics S0125	<i>Comments</i>
<p>Formal notification of arrangements for the replacement of the Laser Safety Officer was received 2 October.</p> <p>The report from Telecommunications and Industrial Physics on its sources in the September quarter was received 10 November.</p>	<p>An updated source inventory was included. Furthermore, a visit from the Radiation Safety Officer for Exploration and Mining resulted in the transfer of waste thoriated material as well as some lightly contaminated material (below exemption level) to the radiation store at North Ryde.</p>

Australian Institute of Marine Science

6.77 The site Radiation Safety Officer notified ARPANSA that there had been no relevant changes in the quarter. This information is yet to be provided formally by the licence holder.

Australian Antarctic Division

6.78 An amendment to the source licence was issued authorising use of an additional kind of controlled X-ray apparatus.

Australian Customs Service

6.79 Customs continued to operate three Container Examination Facilities – at Fisherman Island, West Melbourne and Matraville. The licence holder reported that:

- Discussions were held regarding an additional X-ray container facility to be installed in Fremantle. This is to be of a slightly different design to the three existing facilities; and
- An updated source inventory for the source licence was received 21 October, and indicated a number of minor changes.

Parks Australia North

6.80 A report for the September quarter was received 7 October. This reported ongoing implementation of risk management actions at the three existing Gunlom Land Trust containments, noted that a final draft of Part A of the rehabilitation plan for the area had been reached, and requested comments on an initial review of containment options.

Australian National University

- 6.81 In November the licence holder reported on compliance for the period August 2002 to October 2003 that:
- There were no abnormal occurrences with significant safety consequences;
 - There were safety improvements and minor modification to controlled apparatus and procedures;
 - 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; and
 - Changes to source inventories were minor. An updated source inventory for eight schools, two faculties and one department was included.

Department of Defence

- 6.82 Significant changes to staffing of the Defence Safety Management Agency occurred during the quarter, including changes to the position of Defence Safety Management Agency (DSMA) Director and the Deputy Director of Radiation. In addition there was approval to employ two extra technical persons to be involved in radiation protection activities across the department. Due to this staff turnover and recruitment process, the regular meeting with ARPANSA and DSMA officers set for November was postponed until February 2004.
- 6.83 Additional information was obtained for the Defence National Store Distribution Centre Facility Licence application during the quarter. Defence has decided to contract out the operations of Defence Storage and Distribution Centre, including the operations covered by the licence application. This will necessitate changes to the application and evidence that the contract includes provisions for the maintenance of radiation safety provisions at the facility.
- 6.84 With regard to the alleged incident reported in the September quarter - where personnel on a flight may have been exposed to RF radiation when a radar unit became misaligned – ARPANSA still awaited a full explanation from the department, including a copy of incident notification to Comcare.

Office of the Supervising Scientist

- 6.85 A report for the September quarter, and updated source inventory, was received 23 October. A minor amendment was made to the latter.

Australian Government Analytical Laboratories

- 6.86 A planned inspection of the laboratories was conducted. Regulatory Branch prepared and issued a preliminary inspection report, indicating that the inspectors would recommend a finding of satisfactory compliance with licence conditions.

7. International Liaison

- 7.1 From 21-23 October the Public Affairs Officer attended the third workshop to be staged by the OECD Nuclear Energy Agency Committee on Radiation Protection and Public Health (CRPPH) at the Paul Scherrer Institute outside Villigen, Switzerland, and Chaired a session. Titled *Stakeholder Participation in Decision Making Involving Radiation: Exploring processes and implications*, the event attracted participants from 12 different countries and generated lively discussions about what the key process features of successful stakeholder participation are in this context.
- 7.2 Keith Dessent participated as an expert member of the International Physical Protection Advisory Service (IPPAS) mission to the Philippines sponsored by the IAEA. The mission took place from 10-21 November and its five members came from Australia (Mr Dessent), the United States, Canada, Austria and France. The purpose of the mission was to advise the Philippine regulatory body on security aspects pertaining to high activity radioactive sources and nuclear material.
- 7.3 Various IAEA draft publications were released to member states for comment during the quarter. ARPANSA sought comment on these draft publications from radiation regulators and relevant industry bodies. Consultation has continued with mineral industry representatives regarding a further draft of draft safety 161 (DS161) *Application of the concepts of exclusion, exemption and clearance* in preparation for the IAEA working group meeting in January 2004.
- 7.4 Comments were also sought from radiation regulators on safety guides relating to Regulatory Control of Radiation Sources (DS67) and Strategies for Monitoring Radionuclides in the Environment (DS62).
- 7.5 Geoff Williams attended a meeting of the IAEA on radioactive waste safety (WASSC) in Vienna from 29 September to 3 October. Alan Melbourne attended a meeting of the IAEA committee on radiation safety (RASSC) in Vienna at the same time. A joint session considered a draft of the proposed safety guide *Application of the concepts exclusion, exemption and clearance*.
- 7.6 The Joint Convention on the Safety of Spent Fuel Management and Radioactive Waste Management was held from 3-14 November at the IAEA in Vienna. 33 contracting parties attended the convention, including one late ratifier (Japan) that attended with the agreement of the others. The contracting parties were divided into five working groups and six days were given over to reviews of country reports within these groups on policy and practice within each country. The Australian delegation (led by the Australian Ambassador) included Peter Burns and David Tredinnick of ARPANSA, and Tony Irwin from ANSTO.
- 7.7 In late October a Regulatory Branch officer successfully completed a course in health physics technology run by the United States Nuclear Regulatory Commission, Technical Training Center at Chattanooga, Tennessee.

- 7.8 In November a Regulatory Branch officer visited the FRM-II reactor owned by the Technical University Munich (TUM). The reactor is a pool type reactor of 20 MW power and has a number of other similarities to the ANSTO Replacement Research Reactor. The reactor and its cold neutron source were undergoing “cold commissioning” before the loading of fuel. Commissioning and operational arrangements were the main interest. Information was also received on staffing levels, control room design, and the interfacing of the cold neutron source commissioning with that of the reactor. The role of organisations, such as TUV Rheinland/Berlin-Brandenberg, as third-party consultants or independent experts on behalf of the German state regulators was also discussed.
- 7.9 In December a Regulatory Branch officer attended two meetings in Paris of the OECD’s Nuclear Energy Agency Committee for Nuclear Regulatory Activities (CNRA) and the Committee for the Safety of Nuclear Installations (CSNI). The meetings provided information on the range of working group activities and reports on nuclear safety matters that are of current international interest.

John Loy
CEO
23 March 2004