Australian Government
Australian Radiation Protection and Nuclear Safety Agency

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Inspection report

Licence holder: ANSTO Ore Processing and Operations Facility (OPOF)	**Licence number:** F0245
Location inspected: Lucas Heights, NSW	**Date/s of inspection:** 25 & 27 February 2020
	Report no: R20/02295

An inspection was conducted as part of ARPANSA's baseline inspection program to assess compliance with the *Australian Radiation Protection and Nuclear Safety Act 1998* (the Act), the Australian Radiation Protection and Nuclear Safety Regulations 2018 (the Regulations), and conditions of facility licence F0245.

The scope of the inspection included an assessment of ANSTO's performance at OPOF against the Facility Performance Objectives and Criteria (POCs). The inspection consisted of a review of records, interviews, and physical inspection of the facility.

Background

The facility is used for research and development of processes involving the treatment of ores, concentrates and metallurgical intermediates which may contain uranium and thorium. The operation of the facility can be at the laboratory scale where small quantities of material are processed in a batch-wise fashion. Greater quantities of material are processed in pilot plants which are developed on an as needs basis and operated for a short period of time before the plant is dismantled. Low level solid and liquid waste is generated from these activities and is stored on site.

The main codes and standards applicable to this facility are those that appear in section 59 of the Regulations plus:

- Australian/New Zealand Standard: *Safety in laboratories Part 4: Ionizing radiations* (AS/NZS 2243.4:2018)

Observations

Performance reporting verification

ANSTO has an event reporting system that is used for all hazards (i.e. not just radiation). Unless the hazard is very low, a reported event is typically assessed by a triage officer and an investigator assigned. The data associated with events at this facility over the last four years were requested, and in particular, the details of the radiological events were reviewed. ANSTO has tried to use these events as a means to achieve continuous improvement. For instance, by strengthening the process associated with handover and handback of equipment, and developing a more robust means of programming radiation surveys has been adopted in recent times. In some instances, lessons have been learned and communicated to draw visibility to certain issues. In some instances this is done via the monthly WHS meetings, while in others the information is shared with specific stakeholders (e.g. area supervisors).

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Configuration management

The facility's laboratories may operate continuously. However, the pilot plants developed for processing greater quantities of material are operated on an as needs basis. Hence, constructing and dismantling these plants is normal for this facility. The construction of each plant is overseen by a project manager who documents the design and specifies the types of materials and flow rates etc. While the risks associated with the facility is bounded by the analysis in the Safety Analysis Report (SAR), specific hazards for each project are identified and risk assessed using the Safe Work Method and Environment Statement (SWMES) which involves the workers in the risk assessment.

ANSTO has a Building Code that aims to assist in the preparation of the design and requirements for construction, alteration or maintenance of infrastructure, including buildings. This provides details of the organisation's design principles. The facility occupies several buildings on site. These vary in age and type of construction. In particular, differences are observable in the various laboratories and whilst the Building Code provides some specific details, it does not try to replicate or replace the requirements of the Australian Standards. For example the laboratory standard (AS/NZS 2243.4:2018) requires that radioisotope laboratories be graded according to their intended purpose (e.g. the nuclides to be handled and the type of activities to be conducted). Staff were unaware of the grade of each laboratory within the facility. Furthermore, varying contamination control practices were observed to be in place. In some instances, plastic sheets were used to cover benchtops, while in others, absorbent cloth has been used. Likewise, spill trays were used in some instances. No standard practice was in place nor was it evident that tailored approaches had been adopted based upon the use of each laboratory.

Inspection, testing and maintenance

Maintenance works at ANSTO are managed through a commercially available computer program. This allows maintenance plans to be developed for specific items of plant. The program is powerful for managing maintenance activities, however, it is complex and frequent use is often required for users to achieve proficiency. In order to manage this, meetings are periodically held on a 2 monthly basis to track the completion of planned work, identify ad-hoc needs, and review and discuss outstanding items. As an example, a high efficiency particulate air (HEPA) filter was selected for consideration. This particular item is located in an area where crushing, grinding and pulverising of rock samples occurs. The activities associated with the maintenance plan for this equipment was examined and records demonstrating that the HEPA filter had been tested on an annual basis against specified acceptance criteria were present.

Training

ANSTO has a group of Radiation Protection Advisors (RPA) who provide technical advice to the organisation on radiological matters. This group identified their own training as a strategic objective and undertook a training gap analysis. A practical outcome of this analysis is that a number of the RPAs undertook a professional development course. Over a period of about a year, the participants completed assignments and submitted them by correspondence to a foreign university. This provided certification of their competency in the field of radiation protection. This is seen as a positive practice.

ANSTO developed a staff training package for this facility that is specifically tailored to the work that is performed and the hazards associated with naturally occurring radioactive material (NORM). This included a mixture of both theoretical and practical exercises and is based on a core curriculum of 8 modules that should be completed prior to any work being undertaken. This is seen as a positive practice. The records associated with this training is recorded on ANSTO's Learning Management System (LMS). In order to assess the training undertaken by workers at the facility, a sample of approximately 10% of the workforce was randomly selected. While this cohort of workers had all completed the radiation safety component of their training, it was identified that all of them had some assigned training outstanding. In one instance it had been overdue since 2015. Furthermore, it was identified that a small

number of staff had not completed the core modules. This is identified as an area for improvement below.

Event protection

The facility has a SAR. This was prepared in October 2013 and is currently under revision. ANSTO previously used a Safety Assurance Committee (SAC) as an internal review and approval process for radiological, chemical and other hazards that are dealt with on site. The SAC was abolished and a new process was implemented on 25 February 2020. ANSTO was unable to provide copies of any internal approvals provided by the SAC.

The SAR has a section that addresses the safety analysis for external events such as loss of offsite power, earthquake, flooding, and building fire etc. With the exception of a building fire, most of the external initiating events are qualitatively discounted. The radiological impact of a building fire was analysed and the reported doses are negligible. The analysis for the remaining initiating events refers to another document (*Lucas Heights Science and Technology Centre - Site Description*) to describe the site characteristics. This is document was written in 2012.

Security

ANSTO has a security section that works with Building Managers to identify and manage security risks. This can involve things such as performing trustworthiness checks of staff coming into the organisation and monitoring the physical security systems in place. In accordance with a commitment to continuous improvement, the security section is in the process of assessing the maturity of the Plans and Arrangements that exist for the various facilities, and is facilitating improvements where necessary. However, ANSTO was unsure if a security risk assessment of the facility had been performed. This is identified as an area for improvement below.

ANSTO has means of controlling who has access to which building or area. This has benefits from both a security perspective and a WHS perspective. Access to each is building is controlled by the Building Manager who works with security to ensure that only the appropriate personnel can access the building or area. Reviews of access lists are undertaken sporadically. In the context of this facility, two buildings were assessed in 2015 and 2016 respectively, but no subsequent assessments had been performed. This is identified as an area for improvement below. No security incidents have occurred at the facility. However, the facility staff and the security staff were able to describe the process for reporting a security incident and how it would be investigated should it occur.

Radiation protection

ANSTO systematically identifies areas where there is an external radiation field or where contamination may be present. Areas are then categorised as one of three levels (white, blue or red) to identify both the radiation and contamination hazard present. All areas that constitute this facility are categorised as being both a white radiation hazard and white contamination hazard. This is the lowest level of hazard within the system. The ANSTO guide (2013) that describes how this assessment is performed refers to another guide (also published in 2013) which uses data from the *Recommended limits on radioactive contamination on surfaces in laboratories (1995)* (RHS 38) which has been superseded. Furthermore, the ANSTO guide does not provide data for the nuclides present in this facility.

Workers in ANSTO facilities are generally encouraged to perform their own surveys, and the equipment needed to measure external radiation fields and contaminated surfaces are available in most work areas. This facility has a small number of instruments suitable for performing radiation and contamination surveys and also has access to the broad cache of equipment held by the organisation. In addition to this, the facility has access to a pool of Health Physics Surveyors who perform assurance surveys of the work areas. The results of a number of surveys were provided. These indicated that the vast majority of the

points surveyed had very low levels of radiation or contamination present. Greater dose rates or contamination levels are occasionally recorded in areas where work with radioactivity is occurring or sources are in storage. While it is understood that ANSTO generally tries to have a workplace free from contamination, it was observed that the survey results do not provide an expected dose rate or contamination measurement based on previous surveys, or a point of comparison against the upper limit for that category of radiation area (i.e. white, blue, red).

As the work areas within the facility have been designated a white radiation and white contamination area, workers are not required to wear personal dosimetry (e.g. TLDs) or undertake internal dosimetry assessments. However, a small number of workers have chosen to do these things. The measurements and the assessments show that doses for these workers are very low and well within the chosen constraint. However, the facility has proactively adopted the approach of inviting the RPA to the monthly Workplace Health and Safety (WHS) committee meetings. At these meetings the doses incurred by staff are presented and discussed along with any other initiatives to control radiological risks.

Emergency preparedness & response

ANSTO has an overarching emergency management plan for all sites that broadly covers any emergency (e.g. fire, medical, or building related issue). This is supported by a plan that has been specifically prepared for the Lucas Heights site. The facility has designated an individual to be the Building Manager. This person has an allocated safety role for the building, and amongst other things, is expected to assist in an evacuation, update emergency contacts details, and participate in the assessment of bushfire preparedness. A number of emergency exercises are scheduled over the course of a calendar year. These test the organisation's preparedness in responding to specific scenarios. In addition, real events that occur within the facility are occasionally used and documented like an exercise. No specific radiological exercises have been conducted at this facility in recent times as the radiation risk often gets picked up with the other hazards involved.

Findings

The licence holder was found to be in compliance with the requirements of the Act, the Regulations, and licence conditions.

The inspection revealed the following **areas for improvement**:

1. The ANSTO process for identifying, undertaking, and tracking the conduct of security risk assessments and access controls for facilities.
2. The oversight of completion of safety related training.

It is expected that improvement actions will be taken in a timely manner.

No written response to this report is required

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