



# Inspection report

<b>Licence holder:</b> Department of Defence and Australian Defence Force (Defence)	<b>Licence number:</b> S0042
<b>Location inspected:</b> A Defence Base in South Eastern Australia	<b>Date/s of inspection:</b> 7 March 2019
	<b>Report no:</b> R19-02838

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 Source Licence S0042.

The scope of the inspection included an assessment of Defence's performance against the Source Performance Objectives and Criteria (PO&Cs). The inspection consisted of a review of records, interviews and physical inspection of sources.

## Background

Defence employ the use of radioactive sources in order to calibrate their portable radiation detection equipment. The sources at this site were previously held under facility licence F0116 as a prescribed radiation facility (PRF). When activity decayed below the threshold for a PRF the sources were transferred to Defence's source licence and the facility licence surrendered in 2017.

Defence currently engage a contractor to manage the operation of the facility which makes use of the sources for calibration purposes.

The main codes and standards applicable to these sources 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 and verification

Like many licence holders, Defence has its own event management system within which its staff can report any accidents/incidents, including those involving radiation. While the contractor is performing a function on Defence's behalf, they are technically not Defence staff. Having said that however, they have been given the means to report incidents through the Defence event management system. Those reports then filter their way through the relevant chain of command to the appropriate Defence members. In regard to the inspected sources, there have been no radiation incidents.

The use of the source held at the facility is not entirely unique as other units within Defence have virtually identical sources for the purposes of calibration of radiation detection equipment. While direct communication with other units/groups can often be quite complicated to achieve, inspectors noted there had been efforts made recently to open the lines of communication between the staff at the site being inspected and another group in order to share lessons learned.

Previous inspections had noted an essentially defunct radiation working group. During the inspection the situation surrounding this working group was clarified whereby two working groups existed: one for the dealings within the local jurisdiction in which the sources being inspected resided and a wider group encompassing all the jurisdictions (inclusive of the dealing being inspected) underneath the banner of a specific Defence branch. Defence's internal regulatory function is also invited as part of the latter. The former group was eventually dissolved. Radiation safety also has a standing agenda item on this jurisdiction's Work Health and Safety (WHS) committee.

### **Configuration management**

Two sources fell under the scope of this inspection: a High Intensity Calibrator (HIC) and a Low Intensity Calibrator (LIC). While the HIC is routinely in use, it is worth noting that the LIC has not been used for calibration purposes for approximately 3-4 years. A previous inspection of a different Defence group, with a virtually identical HIC, highlighted ARPANSA's guidance surrounding recommended working life (RWL) of a source and wipe testing. The source had exceeded its recommended working life and Defence expressed their desire to dispose of the source. This has carried across to the sources within the scope of this inspection. These sources have also exceeded their RWL and Defence have highlighted that their intention is to progress actions for ultimate disposal. The details surrounding such a disposal are yet to be determined.

ARPANSA's guidance also requires RWL to be included in a licence holder's source inventory workbook. Inspectors noted that this information was absent. Inspectors were then informed that following the aforementioned previous inspection, Defence is to undertake an audit of the information that sits within their inventory and address any discrepancies.

During the desktop inspection, inspectors noted several inconsistencies within the plans and arrangements that apply to the sources. This included the incorrect use of the terms limit and constraint in relation to dose as well as a misalignment with values previously set in a higher level defence manual, remnants of a temporary limit which exceeded what is quoted in the AS/NZS 2243.4 in reference to external dose rates and occupancy, and misaligned references (i.e. unwarranted PPE, an annual site analysis that hasn't yet been required to be performed, an incorrectly framed natural disaster procedure and a miswritten purpose of a plan covered by a separate document).

### **Inspection, testing and maintenance**

The HIC and LIC are quite simplistic in their design and as such only have a few mechanically functional components. Wipe tests are completed annually in accordance with procedure and records are maintained. Written procedure also dictates that a monthly functional test be performed to ensure all mechanical interlocks are in working order. No maintenance strategy has been required for either the HIC or LIC. If malfunctioning, the calibrators would cease to be used until they have been repaired. Though results of wipe tests indicate that the sources are not leaking, in the event of a leak, staff would lock and isolate the calibrator, shut-down the facility and await the results of an investigation to determine the appropriate response.

In terms of the building, the staff conducting the calibration work are tenants of a Defence group who manage its property and infrastructure. It is this group's responsibility to manage the maintenance of the building and any auxiliary equipment.

## Training

Annual general awareness training is completed for all staff at the base. This training encompasses a range of areas including WHS, security and radiation safety, and is delivered to staff irrespective of whether they are occupationally exposed or not, a Defence member or a contractor.

Those who are responsible for the dealing within the facility have either completed a Defence ionising radiation protection course or an ANSTO radiation safety course. Inspectors were informed that the radiation safety officers will also undergo specific radiation safety refresher training which will be tailored towards Defence needs.

Training in the use of the calibrators is performed on-the-job and because of this there are no training records. Furthermore, there are no procedures or instructions which could be considered training material. It is worth noting that those who conduct the training and those performing calibrations have years of experience at the facility. While there is almost no staff turnover for the facility and there is a plan under development for eventual disposal of the sources, Defence staff recognised that the development of a training regime would be appropriate and put in place if the need arose.

## Event protection

Given the location of the facility within the Defence base as well as the location of the base itself, a natural disaster in the form of bushfire is deemed to be the most likely external hazard. Inspectors assessed that the barriers in place to prevent or mitigate such an external event are in place and are appropriate.

## Security

Additional security upgrades are planned for the facility and it is expected that ARPANSA will discuss these with Defence in the near future.

The facility is part of the wider base's security patrol and as such the accountancy of the sources, as a requirement of RPS 11, will be determined by the level of alert at which the base is set. Standard physical security measures for a Defence base including a security gate, perimeter fencing and guard service, among others, are all in place.

Placement on an authorised access list is a requirement for entry to the facility and is only approved based on a demonstrated requirement for work. Staff can only access the keys necessary for the completion of their duties based on the authorised access list. This is managed through multiple stages of verification with all transactions being logged.

All visitors are escorted, entry and exit is logged.

## Radiation protection

The calibrators themselves, while robust, are simplistic pieces of equipment. The sources are encapsulated and housed within lead shielding and have a series of attenuators which allow the user to control the exposure of radiation detection equipment. Equipment is mounted on a rig inside the calibrator and is able to be positioned at known distances from the source. The design of this equipment ensures that exposure is mechanically controlled and therefore attenuators may not be removed from their closed positions, leaving only a very minor dose rate in the order of tens of microsieverts ( $\mu\text{Sv}$ ) per hour within the exposure area while staff are setting up another piece of equipment for calibration on the rig.

Positioned at the entrance to the facility are records of the visitor logs, along with electronic dosimeter readings from each person who has entered the facility and the entry/exit survey performed each day. In

line with common industry practice, staff completing the surveys include radiation detection equipment information (make of radiation detection equipment used, the serial number to identify specific equipment and when that equipment is next due for calibration). However, a specific point on the survey is solely for the daily recording of dose rates for the HIC and is performed using a different dose rate meter. This information is not recorded.

Inspectors noted during the physical inspection that while multiple instances of proper radiation signage were on display around the facility, an additional transport label in conjunction with hazchem signage was being used to communicate the hazard to the emergency response team. Although the label displays the correct image, a black trefoil symbol on a yellow background, it is being used for a purpose other than intended.

Dosimetry records are checked on a quarterly basis. Staff who work in the facility are required to maintain and complete their own electronic dosimeter records which are reviewed by the radiation safety officers. Passive dosimetry (OSL), as supplied by ARPANSA, is also reviewed at the same frequency. Recently however, the results of one of the OSL's had been returned with what is believed to be a spurious reading. Inspectors were informed that the OSL had belonged to a staff member who had left the area prior to the dosimeter arriving at the facility and as such had not been in use and stored with the control monitor. Upon receiving the results it was reported that the OSL had been exposed to 180 Sv. At the time of the inspection this had not been reported back as an anomaly.

### Emergency preparedness and response

The Defence base has its own emergency response team (ERT) who will respond to any incident on the base. The ERT provide firefighting training to Defence personnel as well as receive basic radiation safety training to ensure that they are aware of the hazards on-site. While the response to a fire may differ depending on location and size, ERT are alerted regardless.

Firefighting drills occur multiple times a year with a debrief provided to personnel afterwards to ensure lessons learned are carried forward. These drills occur at the specific building level rather than just an all-of-site level. Other additional security exercises are performed throughout the year.

Visitors to the site are provided an emergency response induction prior to entry to the base.

### 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. Proper use of radiation warning signage**
- 2. Implementation of a more structured approach to training**
- 3. Review the details documented when performing radiation dose rate surveys**
- 4. In-depth review of plans and arrangements**

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

*No written response to this report is required*

THIS REPORT WILL BE PUBLISHED ON THE ARPANSA WEBSITE