



Australian Government

Australian Radiation Protection and Nuclear Safety Agency

INSPECTION REPORT

Licence Holder: Department of Defence and Australian Defence Force (Defence)	Licence Number: F0252
Location inspected: A Defence establishment in regional South Australia	Date of inspection: 21-29 September 2015
	Report No: R15/13129

An inspection was conducted under Part 7 of the *Australian Radiation Protection and Nuclear Safety Act 1998* (the Act). The purpose of the inspection was to assess compliance with the Act, applicable regulations, and licence conditions.

The inspection was conducted as part of ARPANSA's baseline inspection program and the scope included all areas defined by the facility licence performance objectives and criteria. The inspection consisted of a review of records, interviews, and a visit to the facility.

Background

The Defence establishment houses a 1.2-3 MeV linear accelerator (linac) which is used for radiographing explosive ordnance and weapons.

Observations

In general, the management of the facility appeared to have a sound appreciation for the importance of safety and a positive safety culture. In some cases, however, there appeared to be room for improvement. These are identified below.

The Radiation Safety Plan includes a statement that doses will be kept as low as reasonably achievable (ALARA). Furthermore, the procedure detailing personal dosimetry controls (document number C2_4_001P) sets an action level for a daily dose received by a worker. However, a constraint has not been set for doses specifically due to this facility. Dose constraints are a useful tool in the optimisation process of radiation protection to restrict individual doses and allow for an ongoing, cyclical process of evaluation. Defence were unable to provide evidence that this process had been implemented. However, it is noted that annual reviews of worker doses have been occurring.

Two examples of dose rate surveys were obtained. It was observed that the same form had been completed differently in each case. Furthermore, the dose rate at one of the 'optional measurement locations' differed by approximately a factor of ten from one survey report to the other. Although the measured dose rate values were low, and well within the limit allowed by the relevant Code of Practice (RHS 31 *Code of practice for the safe use of industrial radiography equipment*), it suggested that the form for recording the dose rate measurements could be improved in order to enable values measured at different points in time to be compared against each other. Furthermore, it was observed that the same individual had signed off as both the Defence Ionising Radiation Protection Officer (DIRPO) and the Facility Manager.

The emergency stop buttons located around the facility were not labelled in a manner which would indicate their safety function. Further to this, although the linac bore a trefoil as part of a warning to indicate that the machine produces ionising radiation it was not consistent with the Australian Standard for warning signage (refer to AS1319:1994 *Safety signs for the occupational environment*).

A copy of the Work Instruction for Emergency Evacuation (document number P3_8_007W) was provided. This document described the steps to be taken in the event that an evacuation was needed. It was observed that the final page of this document was visibly posted within the facility. However, there was not a step to (if possible) make the radiation source safe, or otherwise advise the Chief Warden of the hazard within the facility (i.e. radiation) that may affect the manner in which response team members approach the facility in the event of an emergency.

Personnel at the facility specifically sought specialist advice when purchasing handheld radiation detectors for the site. A need was identified for a second radiation detector to provide for redundancy when the first detector is being repaired or calibrated. During the process of acquiring the new detector, personnel at the facility were provided with a choice of two radiation detectors. Neither of these were the same type of detector as originally purchased, nor did they provide the same range of radiation dose rate measurement. Therefore, it was not a 'like-for-like' replacement. However, the personnel at the facility assessed the available options and chose the detector deemed to be most suitable. Subsequent to this, the original detector became unserviceable. As a consequence, the facility's capacity to measure the radiation produced by the linac may be limited. For instance, in the event of an emergency, a first responder may not be able to approach the linac with confidence that they will not be exposed to unacceptable levels of radiation.

Findings

At the time of inspection, it appeared that the licence holder complied with the Act, applicable regulations, and licence conditions.

Defence's performance may be improved by addressing the following performance deficiencies:

Performance Deficiencies:

1. A dose constraint had not been set specifically for the facility, nor had an ongoing process of evaluating doses due to the facility been documented.
2. The form used for recording dose rate survey measurements did not facilitate the comparison of values measured at different points in time.
3. Warning signage was not in accordance with the best practice.
4. The evacuation procedures do not explicitly address the management of the radiological hazard of the facility if an event occurs at the site.
5. The radiation detectors used at the facility at the time of the inspection are generally regarded as not being suitable for use when measuring unattenuated radiation fields produced by a linac.

Good Practice

The following good practice/s were identified during the inspection:

1. It was observed that Defence had a system in place to manage control over access to the key to operate the linac. This system limits access to the key cabinet, as well as limiting who can sign-out this particular key. The system recorded who signed-out which key, and for how long. This enables the system to be audited at a later date if needed. Furthermore, the system can issue an alert if a particular key is missing or otherwise not returned on time.