Inspection report

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| **Licence holder:** Department of Defence and Australian Defence Force (Defence) | **Licence number:** F0113 |
| Location inspected: Radioactive Waste Storage Facility in South Eastern Australia | **Date/s of inspection:** 5 - 20 March 2019 |
| **Report no:** R19/02901 |
| 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 F0113.  The scope of the inspection included an assessment of Defence’s performance against the Facility Performance Objectives and Criteria (PO&Cs). The inspection consisted of a review of records, interviews, and physical inspection of the facility. Background The Radioactive Waste Storage Facility is used to store unrepairable and obsolete equipment, instruments, repair parts and consumables which contain low level radioactive materials. The radioactive waste is stored at the facility for an interim period pending the establishment of a National Radioactive Waste Management Facility.  The main codes and standards applicable to this facility are:   * Code for Radiation Protection in Planned Exposure Situations (2016) (RPS C-1) * [Code of Practice for the Security of Radioactive Sources (2019)](https://www.arpansa.gov.au/regulation-and-licensing/regulatory-publications/radiation-protection-series/codes-and-standards/rps11) (RPS 11) * Australian Standard - Safety in Laboratories - Ionizing Radiations (AS/NZS 2243.4:2018)  ObservationsPerformance reporting and verification Internal oversight relevant to radiation protection occurs at the local level and at the corporate level. The Radiation Manager is a member of WHS Committee for the base. These meetings are chaired by the Commander. This enables the reporting of radiation matters relevant to the facility through the chain-of-command. In conjunction with this, Defence also uses a technical control network. This provides a framework for the communication amongst the various Radiation Safety Officers within this part of the Defence organisation and affords an avenue for the transfer of information to the corporate level radiation safety working group.  The preparation of quarterly reports to ARPANSA is coordinated through a combination of the chain-of-command and the technical control network. The details requested are promulgated to all commands, Commanding Officers and key stakeholders. When received by the facility, a task is raised and a due date is set. The facility’s response is then elevated through the chain-of-command and reported back to ARPANSA as part of Defence’s corporate reporting system. Configuration management Defence uses a corporate hierarchical approach to documenting their arrangements for managing radiation protection. This consists of higher level framework documents that set out Defence’s approach. An example of this is the Radiation Safety Management System (RSMS). Below this, cascading to lower levels, are documents (such as the Radiation Safety Plan - RSP) containing more specific information relating to the activities that Defence undertakes with radiation sources and how they are done in an acceptably safe manner. Section 61 of the Regulations requires the holder of a licence to, at least once every 3 years, review and update their plans and arrangements. The RSMS had not been updated since 02 June 2014. A sample of the lower level local documents was reviewed. These documents had been routinely reviewed as required. However, the RSP refers to a document management system that has not existed for several years. Furthermore, the instructions within the Security Plan refer to specific protective security measures (if available) with no description of why they should or should not be present. This suggests that even when the reviews are conducted some deficiencies are not being identified.  The storage of radioactive waste is not permanent, and therefore is a temporary endeavour undertaken until a final endpoint is achieved/identified. No radioactive waste repository exists for Defence waste. Therefore, Defence is managing its own waste. Defence has a plan for the ultimate disposal of the facility. This commits to preparing a detailed plan of action after a decision is made to close, move or modify the facility. However, a draft decommissioning plan for the facility has not been prepared. This is not consistent with the expectations set out in IAEA GSR Part 6 *Decommissioning of Facilities* that recommends a decommissioning plan be prepared and maintained throughout the lifetime of the facility to show that decommissioning can be accomplished safely. This has previously been raised during the inspection of another radioactive waste storage facility held by Defence.  The waste has been prepared in a form to enable it to be transported to, and be potentially accepted by, a future waste repository. Each item is packed in a plastic bag, sorted by nuclide, and then placed in a waste container. The packing of each waste container is conducted until one of the following thresholds is reached: the design weight of the drum, the physical volume associated with the space inside the drum and the allowable activity that can be transported as a Type A container. By pre-packaging each item in a sealed plastic bag, Defence is leaving open the possibility that the waste can be re-packaged to meet the waste acceptance criteria of any future repository. Inspection testing and maintenance Defence has adopted a programmatic schedule for the routine testing and maintenance of ventilation equipment and electrical circuitry and outlets. However, gaps can emerge in association with equipment that is not identified on that schedule. An example of this is a safety shower that was installed adjacent to the exterior of the building. Although the workers did not understand why the shower was needed, it was routinely subjected to ‘operator level’ checks to ensure that it was functional. The shower, however, fell into a state of disrepair where the battery could not be properly charged. As the safety shower was not on the schedule of equipment at the facility, the workers were unable to have it repaired. As the workers did not see a reason for the presence of the safety shower, work at the facility continued without it.  Defence has some redundancy with the radiation measurement equipment available for use at the facility. This includes the measurement of the ambient gamma dose rate, alpha/beta contamination and tritium contamination. Where possible, the radiation detectors are sent away for calibration in a staggered fashion so as not to compromise the capability of the facility. However, occasionally, as happened last year, all detectors are sent away at the same time as it was known that no work would occur in that period. There is only one Liquid Scintillation Analyser (LSA) at the facility for measuring tritium contamination. However, in collaboration with another group at the same base, the absence of the LSA can be managed. Training Varying levels of training are provided to different parties. Everyone on the base is given radiation awareness training so they have a basic understanding of what radiation sources Defence has and who they should call if they have any further questions or issues. This is conducted annually. Similar sessions are conducted on ‘Workplace Health and Safety’ and ‘Security’. The workers in the facility have all participated in these annual awareness training sessions. The local emergency response workers are typically given a specific awareness session and tour of the facility to enable them to consider how they would address an emergency (e.g. a fire) at the facility. However, this did not occur in 2018 due to staffing limitations.  The three workers at the facility have also undertaken the Defence Ionising Radiation Protection Officer (DIRPO) Course. The two more senior workers also have Diplomas of Work Health and Safety while the more junior worker has also undertaken the three day Industrial Radiation Safety Officer Course provided by ANSTO. Defence has proactively organised a refresher course for some radiation workers. This includes the three workers at this facility. This will be a three day course that has been tailored to address the subject matter most relevant to Defence. Event protection International best practice in radioactive waste management is based on the Safety Assessment and Safety Case approach. This is reflected in ARPANSA’s guidance on *Radioactive Waste Storage & Disposal Facilities: Information for Stakeholders* (available on the ARPANSA website). This approach is used for predisposal management and disposal of radioactive waste and generally aligns with an expectation of documented safety assessment of hazards. This is articulated in paragraphs 3.1.17 and 3.1.18 of the Planned Exposure Code 2016 (RPS C-1). ARPANSA is still phasing in the requirements of RPS C-1, however, compliance will shortly be expected.  The building appears to be of sound construction. Although radioactive materials were stored off the ground, which would minimise the impact of roof leakage, there was no evidence of water ingress. Likewise, there was no evidence of animal access into the facility. This may partly be due to the baiting program conducted for pests. Lightning arrestors are in place above the facility, fire safety surveys are performed and lawn mowing is conducted. However, the workers were unsure whether these features and activities performed a radiation protection function. Similarly, there was uncertainty whether a Safety Analysis Report existed for the facility. Security Defence has arrangements in place to manage the security of the facility. This includes routine security patrols and a system in place to limit access to the key to the facility. The system can track who obtains the key, who returns the key and audit previous transactions. Defence has a security plan for the facility and has categorised the contents (radionuclides and activities) against the framework provided by RPS 11. A part of Defence, separate from the chain-of-command that operates the facility, has performed a semi-independent assessment and accreditation of the security of the facility. The outcome of this accreditation is considered adequate for the contents of the facility. However, no security drills have been conducted. Radiation protection There are three workers at the facility. They each use electronic personal dosimeters (EPD). The dose measured by each worker’s EPD is recorded for every day spent in the facility. These doses are summed on a weekly basis and a running cumulative tally kept over a twelve week period. The RSO routinely reviews and signs-off on the doses incurred. The EPDs used by each of the workers were found to be within calibration at the time of the inspection. The workers also wear passive personal dosimeters (Optically Stimulated Luminescence - OSL - monitors). The control monitor is held in the RSO’s drawer while each officer looks after their own badge. This is not consistent with Annex 8D of the Defence Radiation Safety Manual.  Defence conducts daily surveys for alpha and tritium contamination when performing works with the potential to spread radioactivity. The alpha surveys are conducted by holding the contamination probe adjacent to the surface area to be measured. The tritium surveys are conducted by wiping a dry swab on a known surface and then measuring the radioactivity on the swab with a LSA. Wipe tests rely on the transfer of contamination from the surface of the object under examination to the wipe itself for measurement. Common industry practice is to scale the measured value based on the conservative assumption that 10% of the radioactivity on the initial surface has been transferred to the wipe. Elsewhere, Defence has previously been made aware of guidance from the IAEA (*Safe Handling of Tritium: Review of Data and Experience - TRS 324*) which observes that higher sensitivity and reproducibility and fewer deceptively low readings is available when the wipes are wet rather than dry. However, this has not been reflected in a revision to the instruction that is used. Workers at this facility expressed the importance of following Defence instructions.  The contamination measurements are taken in broad areas that have been identified as having the potential for contamination to occur. Results are recorded on a series of forms to track contamination levels on a daily, weekly and monthly basis. Workers also survey themselves (i.e. gloves) for possible contamination and change gloves if even small amounts of radioactivity (i.e. a few counts per second) is identified. However, these minor events are not tracked or recorded in any way. Emergency preparedness and response The local emergency response organisation has been identified and assisted to prepare emergency response procedures. These procedures relate to the staffing levels and equipment to be brought to the facility, if needed, and provide a contact phone number, and alternate, to call for radiological advice as well as phone numbers for the duty officer and fire, hazmat and ambulance services.  The emergency responders have been provided with a radiation survey meter and instructed to establish a control boundary at the point where the measured dose rate is 10 µSv/h or 100 metres distance from the facility. In consultation with, and with explicit approval of the RSO, the minimum number of firefighters are to enter the building. They are to use breathing apparatus, protective clothing and spend the minimum amount of time in the facility needed to fight the fire. The firefighters are to minimise the amount of water used and establish control and containment of water run-off. All personnel and equipment on scene are to be monitored for contamination. Although these arrangements are quite thorough, no fire/emergency drills have been conducted to test the arrangements. However, some ad hoc evacuations have been conducted. Findings The inspection revealed the following potential non-compliance/s:   1. The RSMS had not been updated since 02 June 2014.   The inspection revealed the following **areas for improvement**:   1. A detailed review of plans and arrangements is required. 2. A review and revision of the existing document is required to reflect a decommissioning plan identifying the future endpoint of the facility and how it will be achieved. 3. Preparation or update of a safety assessment and safety case is required for the facility and all the operations associated with predisposal management of radioactive waste. 4. Staffing and workloads associated with ensuring safety functions are performed is required for the facility. 5. Development of a program of drills and exercises to test, evaluate and prepare for security and emergency situations is required. 6. Review and assess the health physics arrangements at the facility including dosimetry, contamination monitoring and event reporting.   It is expected that improvement actions will be taken in a timely manner. | |

*In response to any potential non-compliance, the licence holder must carry out its responsibilities under section 57 of the Regulations*

This report will be published on the ARPANSA website