**Inspection report**

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| **Licence Holder**: Department of Defence and Australian Defence Force (Defence) | **Licence Number:** S0042  |
| **Location inspected:** A Defence base in Queensland | **Date/s of inspection:** 07/03/2018 and 14/03/2018 |
| **Report No:** R18/03107 |
| 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 1999 (the Regulations), and conditions of Source Licence S0042. The scope of the inspection included an assessment of Defence’s performance at the Tritium Repair Facility (TRF) against the Source Performance Objectives and Criteria (PO&C). The inspection consisted of a review of records, interviews, and physical inspection of sources. BackgroundDefence uses Gaseous Tritium Light Sources (GTLS) in military devices, such as compasses, to enable their use in low light conditions. The GTLS provides a reliable self-powered light source that does not rely upon batteries. However, if the GTLS is broken, or if the level of illumination is inadequate, the device is sent to the TRF for repair. The TRF is a purpose built laboratory designed specifically for the repair of these devices. Defence has engaged a contractor to perform the works within the TRF. The main codes and standards applicable to these sources are:* Code for Radiation Protection in Planned Exposure Situations (2016) (RPS C-1)
* Australian Standard Safety in Laboratories – Ionizing Radiation (1998) (AS 2243.4-1998)

Observations**Performance reporting and verification**Defence are required to report incidents to ARPANSA on a quarterly basis. Defence uses an incident management system for the internal notification, reporting of incidents, and where appropriate, investigation of incidents. Defence provided summaries of all events, including WHS events, which have occurred. Three radiological events at the TRF were listed in the incident management system. This correlated with the quarterly reporting made by Defence to ARPANSA. The quarterly report stated that no common cause for the three incidents existed. However, when these reports were requested, Defence was unable to provide them. **Configuration management**During development of the Radiation Safety Plan (RSP) existing documents were used as stop gaps until further documentation was developed. These stop gap documents describe the technical details associated with some elements of the operation of the TRF. The transition from the older documents to the revised versions has been anticipated since circa 2014. The RSP states that the TRF has security enhanced sources. This is incorrect and is presumed to be a misunderstanding in the wording of the RSP. The term ‘security enhanced sources’ refers to category 1, 2 and 3 sources as outlined by RPS 11 (Code of Practice for the Security of Radioactive Sources). This category determination is based on ‘D-Values’ which is defined as an amount of a radioactive material that if left uncontrolled, could result in death or injury of an exposed person.Defence is licenced to handle GTLS sources containing varying amounts of radioactivity and TRF frequently deals with all of them. The risk assessments attached to the RSP only identifies the GTLS containing smaller amounts of radioactivity. Whilst this may be an oversight in the documentation, it is not apparent whether the higher activity sources were considered during the risk assessment. **Inspection testing and maintenance**The air conditioning system for the TRF is isolated from the rest of the building. It was specifically designed to include a capacity to purge the air within the TRF. This is to be used if a GTLS is a broken during repair. Inspectors were informed that the system is routinely tested, but upon request of the records, were informed that these could not be produced as they are held by a contractor. Contamination monitoring is performed in the TRF and the rest of the building within which it is situated. This includes checks for cross contamination between ‘dirty’ and ‘clean’ areas. Areas that are checked are air conditioning outlet vents, door handles, the bathroom, fridge, and entrance doors. The records of those surveys are maintained. The frequency of contamination monitoring is based on the frequency of work (i.e. reduction in compass repair and lack of use has seen monitoring reduced). In the event that a GTLS breakage occurs contamination monitoring is performed after the air has been purged and personnel have returned to the area. **Training**There are three Radiation Safety Officers (RSO) with oversight of the TRF. One is a Defence employee, while the other two are employed by the contractor. One of the Defence contractors undertook a three day course in 2011. Defence policy states that whilst the person stays in the job, they continue to hold their level of qualification, but the level of qualification drops if they are away from radiation work for a significant period of time. While the competence of the individual is not questioned, this system does not clearly identify the specific re-training needs of the RSO. Defence has established levels of radiation safety training for their employees. Contracted staff must meet the same standard or demonstrate that an equivalent level of training has been completed. All staff complete an annual refresher as a part of their continuation training and keep an attendance record. **Event protection**Defence is in the process of revising the Building Emergency Response Plan (BERP) that addresses numerous external events such as fire, civil unrest, loss of utilities and explosions. The BERP has a generic section covering a chemical/hazardous material emergency. However, this does not address the radiological hazard associated with the TRF. **Security**Security at the TRF appears to be sound. Multiple layers of security in depth are used. For instance, access to the base is managed, access to the building housing the TRF is limited, and ultimately, access into the TRF is further controlled so that only authorised personnel can actually enter. Collectively, this ensures that only those that have a need to access the area are able to. A second Defence contractor is on-site. This contractor is involved in the transportation of devices containing GTLS to the TRF. A pass-through hatch has been designed into the building. The devices are placed inside the hatch. This delineates the responsibilities of the two contractors and demonstrates that access to the TRF is in practice restricted. **Radiation protection**Personnel working inside the TRF are required to wear PPE such as gloves. The used PPE is initially stored in dedicated radioactive waste bins within the TRF. Although, Defence has a radioactive waste storage facility, when the bins have become full, the waste has been sent to a waste removal company rather than the waste store. Defence has a document describing the disposal of waste with very low levels of radioactivity. This document argues that if the items being handled, whilst wearing the PPE, are less than a certain level of surface contamination, it can be assumed that the PPE has less than that level of radioactivity on it. Hence, it can be disposed of accordingly. However, no tests have been performed to characterise the waste prior to disposal to confirm that the material is less than the exempt concentrations specified in the ARPANS Regulations and the levels required for user disposal to a landfill. Furthermore, no re-evaluation of the logic and assumptions set out in this Defence document published in July 2008 has occurred. Defence has a document detailing the surface contamination measurement method. This instructs the user to use a ‘dry’ wipe. It has been reported in the IAEA Technical Reports Series 324 - Safe Handling of Tritium: Review of Data and Experience (TRS 324) that although adequate sensitivity is available with dry wipes, wet wipes are sometimes used for higher sensitivity and reproducibility. It also warns that significant losses may occur when using dry wipes if the paper is not quickly inserted into the liquid in the counting vial. Moreover, it also suggests that the vial be allowed to stand for 10-20 minutes before counting. These factors that may affect the measured value have not been addressed in the Defence document. **Emergency preparedness and response**The Defence RSP mandates actions to be taken in the event that a GTLS is broken. The contractor has built upon this with further details for handling foreseeable radiation emergencies. These are detailed in the Radiation Safety Management Plan and Radiation Emergency Protection Procedure. This covers GTLS breakage and decontamination, receiving in appropriate bagged broken GTLS, liquid spill clean-up, contamination of personnel, etc. **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. Access and oversight arrangements for internal reports and tests.
2. Training needs assessment for Radiation Protection Officers.
3. Re-evaluation of the logic and assumptions used in the characterisation of radioactive waste.
4. Review practices used for measuring radioactivity.

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