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 Victoria | **Date/s of inspection:** 27 September 2018 |
| **Report no:** R18/12176 |
| 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 against the Source Performance Objectives and Criteria (PO&Cs). The inspection consisted of a review of records, interviews, and a physical inspection of sources. BackgroundDefence requires the capability to perform integrity inspections and maintain aircraft in order to ensure their airworthiness. As part of this maintenance, non-destructive testing (NDT) sources are employed which will allow for the detection of internal, surface or subsurface discontinuities and fatigue throughout the structure via the use of industrial radiographic methods. This allows images to be generated so that issues may be resolved prior to failure.The main codes and standards applicable to these sources are: * *Code for Radiation Protection in Planned Exposure Situations* (RPS C-1)
* *Code of Practice for the safe use of Industrial Radiography Equipment* (RHS 31)
* Australian Standard *Safety in Laboratories: Ionizing Radiations* AS 2243.4 (1998)

ObservationsPerformance Reporting and Verification It is a requirement that Defence submit reports to ARPANSA which outline various matters relating to their use of radiation and other radiation safety matters. Defence produces these reports quarterly, in a timely manner, and as such there has been no recent radiation incidents at the site.Configuration ManagementRadiography takes place in either a specifically designed enclosed site (manufactured to suit a 300 kV unit) or an open site. Hard copies of annual surveys of the Enclosed Site were shown to inspectors during the physical inspection. Dose rates presented for surveys conducted in 2016 highlight consistently low doses well below the 25 µSv/h limit as prescribed by RHS 31. However the surveys do not specify the radiation monitor used to perform the survey. The open site appeared to have been surveyed once. The open site surveys do not include a survey point to measure the ambient dose rates at the operator’s position. Currently there is only one operator available. Open site requirements dictate the need for two operators. As such, no open site radiography is performed unless a second person (either Defence personnel or contractor) can be made available. Currently, approximately one exposure per year is being conducted in an open site.The specified rating of the enclosed site in the Radiation Safety Plan (RSP) is inconsistent with the exposures that are performed during annual surveys. Defence should reconsider their shielding rating or alternatively, reconsider their method to validate annual surveys. The X-ray beam, in the enclosed site, is generally fired in a vertical fashion (either directed into the ground or up into the air). However, there is a possibility that the beam may need to be fired horizontally and if this occurs the beam will be aimed into a shielded wall. Though the majority of all exposures will have the beam directed into the ground, there is no formalised arrangements to initiate a risk assessment (and therefor an additional survey) if the exposure were to take place horizontally.The unit also has multiple obsolete pieces of equipment which are not currently in use. However there is no plan in place to manage these items for potential repair and return to service or ultimate disposal. Inspectors did not observe any equipment labels indicating that items were unserviceable as required by their NDT quality manual.RHS 31 requires that a Radiation Source Movement Record Book is kept so that an up-to-date record of the location of all sources is always available. While the record book is available, it is currently not fully being used for its intended purpose Inspection, testing and maintenanceOn-site, Defence has multiple components to perform industrial radiography. The main two components are the control panel and the tube head. The RSP states that repairs may only be conducted by those who are appropriately qualified and approved to do so. The only inspection which takes place on the equipment is conducted by a contractor and occurs with annual periodicity and is largely visual in nature with the exception of the application of lubricant. Section 7.3.7 of RHS 31 requires periodic inspection to ensure all interlocks, shutters and control mechanisms operate effectively and that no components are unacceptably worn or damaged. The visual inspection methodology may be insufficient to ensure adherence to the requirements of RHS 31. The equipment is not actually technically serviced by the contractor and the only record of the maintenance is in the form of an invoice. Section 10.1.2 of RHS 31 requires the maintenance of records of inspection reports and details of repairs of x-ray units. The level of detail contained in the contractor’s invoice may not meet these requirements. Inspectors were supplied with copies of the quality manual for NDT as well as the base radiation safety management plan with both documents identifying the requirements for maintenance. The documentation establishes a requirement for a maintenance schedule with a series of documents which covers routine inspection and testing along with corresponding records. Currently no maintenance schedule or strategy exists.TrainingCurrently there is only one NDT operator available to perform industrial radiography. All training requirements have been met as the operator has completed the qualification to become a Defence Ionising Radiation Safety Officer (DIRPO), and has recently been recertified as a level 3 NDT technician and has completed the annual radiation safety training. Any other personnel, whether from within Defence or a contractor, must be certified to perform radiography and have their radiation safety training completed before they are able to conduct any work involving the use of radiation. All personnel who have been involved are certified as being at either level 2 or 3 with the revalidation period being 1 year and 5 years respectively. The inspectors found that the training arrangements were satisfactory.Event protectionFor ionising apparatus, specific radiation safety arrangements required due to potential external events were not considered credible. The inspectors were satisfied with this assessment.SecuritySecurity arrangements in place for Defence at the site, including access controls specifically for the dealing being inspected, were considered to be appropriate.Radiation protectionThe division being inspected currently has two RSPs. One which deals with conducting radiography in an enclosed site and the other at an open site. Within the open site RSP, a statement considers that both partially enclosed and enclosed sites are considered the same as an open site. As all three of these sites have different requirements, inspectors highlighted that Defence’s definition or understanding was inconsistent with RHS 31.Other inconsistencies within the documentation were highlighted including the description of action levels for reporting and the inclusion of key procedures which are applied to ensure the safety of the facility and the equipment. Defence should consider the appropriateness of maintaining two separate RSPs.AS 2243.4 (1998) requires that calibration of all monitoring instruments be performed at annual intervals and be traceable to a national standard. Various radiation monitoring instruments were available and have been calibrated by the same contractor who performs the visual inspections of the NDT equipment. However, no evidence was provided that these calibrations were traceable to the Australian standard. Emergency preparedness and responseBoth RSPs include emergency procedures that are specific to either being in an enclosed site or an open site. However, they only detail how to turn the equipment off and a standard 5-step procedure to make the area safe. However, no notification arrangements were described should there be an accidental exposure to workers or the public.FindingsThe inspection revealed the following potential non-compliance:1. Australian Standard *Safety in Laboratories: Ionizing Radiations* (AS 2243.4:1998) – the licence holder is required to calibrate their radiation monitoring instruments at annual intervals and be traceable to a national standard.

The inspection revealed the following **areas for improvement**:1. practices surrounding performing and recording surveys
2. inconsistency within documentation and structured periodic reviews
3. implementation of the annual maintenance strategy
4. use of the Radiation Source Movement Record Book
5. development of accident/incident notification arrangements.

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

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

This report will be published on the ARPANSA website