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:** 08/03/2018 and 14/03/2018 |
| **Report no:** R18/03296 |
| 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 the Source Licence S0042. The scope of the inspection included an assessment of Defence’s performance against the Source Performance Objectives and Criteria (PO&C). The inspection consisted of a review of records, interviews, and physical inspection of the source. BackgroundDefence provides health care for uniformed personnel. This is achieved with the aim of ensuring they are prepared for future operations. This includes dental care. It is common practice in dentistry to obtain radiographic images in order to diagnose dental issues that are not visible to naked eye. This can include obtaining extra-oral X-rays (i.e. X-rays taken outside the mouth) through the use of an Orthopantomogram (OPG). The OPG is able to produce a panoramic view of the mouth in its entirety in a single X-ray. The main codes and standards applicable to these sources:* Code for Radiation Protection in Planned Exposure Situations (2016) (RPS C-1)
* Code of Practice for Radiation Protection in Dentistry (2005) (RPS 10)

ObservationsPerformance reporting and verification In recent years, Defence has implemented a new incident management system. This is used for reporting of all incidents, including WHS incidents, within Defence. The Defence Unit inspected has not needed to report a radiological incident. However, if an incident had occurred it would also have been raised at a departmental meeting. These meetings occur on a fortnightly basis and include a standing agenda item for the review of all workplace incidents that may have occurred. Upon inspection of the Source Inventory, it was noted that the data for the OPG as reported to ARPANSA was incorrect. This had not been identified internally at the local, group or corporate level. This was remedied during the inspection. Configuration managementThe OPG also has a Cephalometry unit attached to it. It is understood that this has never been used and that there is no intention to make use of this controlled apparatus in the future. It appears that in the procurement of the OPG, Defence acquired a controlled apparatus that it is not licensed to deal with. Defence has previously requested ARPANSA issue an exemption from the requirement to provide personal monitoring for all staff involved in dental radiography. In July 2015, based upon the safety assessment provided by Defence, ARPANSA granted an exemption, unless the staff member is, or potentially could be, pregnant. This arrangement is highlighted in the local level documentation but is absent from the group level documentation.Inspection testing and maintenanceThe OPG is used in conjunction with two other key pieces of equipment. These are the phosphor plate reader and the film printer. Technical maintenance inspections had been carried out on the OPG every six months. Details are shown in the Records Book for Service Equipment. Non-technical inspections had, however, lapsed. Furthermore, both the plate reader and film printer were last tested in November/December 2015. Maintenance on these items should be conducted on a six monthly and an annual basis respectively. The equipment continued to be used until February 2017 even though the maintenance had lapsed. TrainingThe centre provides induction training for new staff as well as annual continuation training. The continuation training is provided through a Radiation Safety Annual Awareness Brief where a PowerPoint presentation is given. All dental staff must sign a record sheet demonstrating that they have either attended the brief or have viewed the presentation. The centre Defence Ionising Radiation Protection Officer (X-ray) (DIRPX) has developed a questionnaire based on the presentation which is provided to staff to confirm their understanding of what was presented. However, there is no formal mechanism for feedback to enable the continuous improvement of the training.Event protectionDefence has a Building Emergency Response Plan (BERP) that addresses numerous external events but the plan does not give any instructions as to whether personnel should, if possible, make their equipment (i.e. X-ray machines) safe during those events. SecurityThe security arrangements applicable to the OPG are considered appropriate to the hazard of the equipment. The OPG is located in a building with defined lock/unlock procedures. Security is also implemented through a range of access control measures and was considered to be adequate.Radiation protectionThe plans and arrangements identify appropriate storage of lead aprons used in dentistry for the purposes of radiation protection. They are to be either laid flat or hung vertically, to avoid any folds which may incur damage to the lead and potentially reduce their effectiveness. It was observed that a lead apron hanging rack had been mounted onto the wall of the OPG room. Two lead aprons were hanging from this rack. However, the design of one of the aprons, prevented it from easily be hung on the rack, and as such, it had been draped over the top of the rack. This has the potential to damage the apron. The Defence Unit inspected also performs intra-oral dental radiography. Defence engaged a consultant to perform a radiation shielding assessment. This assessment was for dental surgeries using intra-oral X-ray machines operating at 70 kVp and 7 mA rather than an OPG operating at 85 kVp and 16 mA. Despite this, the OPG did pass the compliance testing requirements specified by the local State radiation safety regulator. These compliance tests include the measurement of radiation external to the OPG room. The Defence Unit inspected follows the instructions and guidance published at a higher level in Defence. Iterations of this document have existed for several years. The chapter on Dental Radiation Safety Management has a section on Quality Assurance (QA) suggesting that QA processes for dental radiography are under development. However, at the time of the inspection they were still not available. Emergency preparedness and responseThe local documentation did not address what to do in the event of a radiological incident, such as constant generation of X-rays or misfire, involving the OPG. Whilst this is a very low probability occurrence, it has happened in the dental industry.FindingsThe inspection revealed the following potential non-compliance:* Referring to the Cephalometry attachment to the OPG - Breach of 31(1)(a) of the ARPANS Act 1998 – A controlled person must not deal with controlled material or controlled apparatus unless the dealing is authorised by a source licence

The inspection revealed the following **areas for improvement**:* Oversight of source inventory details.
* Inconsistencies between high level and local documentation and absence of certain details from the documentation.
* Equipment was in use even though the self-prescribed inspection, testing and maintenance programme had lapsed.
* Review of radiation protection arrangements including shielding and QA programme.

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 Regulation 45*

This report will be published on the ARPANSA website