



INSPECTION REPORT

Licence Holder: Australian National University (ANU)	Licence Number: F0074
Location inspected: Heavy Ion Accelerator – ANU, Canberra, ACT	Date of inspection: 18 May 2011
	Report No: R11/14037

This 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 inspect the Heavy Ion accelerator at the ANU Department of Nuclear Physics.

The inspection consisted of discussions with several ANU Department of Nuclear Physics representatives, a physical inspection of the prescribed radiation facility and an inspection of the records and documentation associated with the management of the prescribed radiation facility.

Findings:

- Training records were produced which indicated that all relevant staff and students using the prescribed radiation facility, had been appropriately trained and briefed as part of the authorisation to use the facility.
- Evidence of appropriate personal dosimetry was produced, indicating that surplus TLDs and detection equipment were available and used with the facility.
- Entry and Exit to the prescribed radiation facility were clearly and appropriately labeled.
- Results from fixed position passive monitors (TLDs) are logged intermittently and their records tracked over time.
- The secondary shielding structures surrounding the beam hall had been modified without notifying ARPANSA.
- Based upon a 20 year operating history which has never exceeded an instantaneous or sustained dose rate of 100 $\mu\text{Sv/hr}$, and given the robustness of the integrated radiation protection system, the modifications to the secondary shielding structures did not have significant implications for safety.
- It was noted that in the target chamber of the Heavy Ion accelerator, a non-linear, and non-SI unit hand-held contamination probe was being used to measure dose rate. This detector also displayed a conversion chart loosely-affixed to its surface for operators of the detector to convert measurements to SI units, depending on the order of magnitude. The ARPANSA inspection officer found this is an impractical approach for the rapid operation of a radiation safety device which was unnecessary and avoidable.

Good Practices:

- A comprehensive radiation protection system would alarm, should the dose rate within the prescribed radiation facility elevate above 10 $\mu\text{Sv/hr}$. This radiation protection system is 'hard-wired' into the control room of the facility.
- Motion sensors, gamma radiation dose rate detectors, neutron radiation dose rate detectors and engineering interlock mechanisms are all integrated into the radiation protection system.

Recommendations:

- The Heavy Ion accelerator facility should harmonize and integrate their plans and arrangements with the other accelerator facilities within the Department of Nuclear Physics to ensure that one benchmark standard is being applied uniformly across the Department.
- The radiation detection equipment used in the Heavy Ion accelerator for measuring the dose rate of the target materials, after exposure to the heavy ion beam, should meet the following specifications; report measurements in SI units, have a linear energy response profile that does not require manual calculations to interpret, and be calibrated annually to ensure the accuracy and reliability of the detector.
- ANU Department of Nuclear Physics provides evidence that it has replaced the legacy detection equipment for the purpose of measuring beam exposed targets more practically.
- ANU Department of Nuclear Physics informs ARPANSA before making any structural changes to the shielding arrangement at the facility, in order to provide confidence that ANU has assessed the impact of such a change prior to implementation.

Conclusion:

No non-compliances to report.