



**Australian Government**

**Australian Radiation Protection and Nuclear Safety Agency**

## INSPECTION REPORT

<b>Licence Holder:</b> ARPANSA Medical Radiation Services (MRS)	<b>Licence Number:</b> F0046
<b>Location inspected:</b> Yallambie, VIC	<b>Date of inspection:</b> 10 – 11 November 2015
	<b>Report No:</b> R15/15628

An 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 assess compliance with the Act, applicable regulations, and licence conditions. The inspection was conducted as part of ARPANSA's baseline inspection program.

The scope of the inspection included an assessment of MRS's performance across all areas identified in the facility licence Performance Objectives and Criteria in its management and operation of:

- The Elekta Synergy linear accelerator
- The calibration facility housing the Cs-137 and-Co60 sources used for calibration.

The inspection consisted of a review of records, interviews, and a visit of both facilities.

A Queensland Health Inspector participated in the inspection to provide additional independence.

### Background

The Elekta Synergy linear accelerator provides megavoltage photon and electron beams, in the range 4 -25 MeV. The Co-60 source and a Cs-137 source are used to maintain primary standards and provide calibration services. These sources cover both kilovoltage X-rays and megavoltage photons. Sealed radiation sources, and accelerator equipment pose potential radiation hazards to personnel.

### Observations

In general, the safety and security of the facilities were found to be satisfactory. In particular, performance reporting verification, inspection testing and maintenance, training, event protection, security, and emergency response and preparedness were found to be good.

Quarterly reports in the previous 12 months had been submitted by MRS in a timely manner and contained relevant information on compliance.

Personnel dosimetry records for the previous 12 months were examined, and the maximum annual effective dose recorded for an individual was 168  $\mu$ Sv which is less than 1% of the annual dose limit for an occupationally exposed person. Radiation doses received by MRS staff have historically been low.

Training records were up-to-date, although it was noted that there was no electronic database of training courses undertaken.

The preventative maintenance schedule of items requiring regular calibration and maintenance is managed via an electronic database which provides alarms when maintenance is due. The database was reviewed and current maintenance records were observed to be up-to-date.

Measures have recently been taken to fully implement the RPS 11 *Code of Practice for the Security of Radioactive Sources (2007)*. The security arrangements for Category 3 sources comply with RPS 11.

With regards to configuration control, it was noted that the safety case for operation of the facilities has not been reviewed and updated, recently. In particular, the Safety Analysis Report (SAR) did not accurately describe current operations. For example:

- The current SAR (version2, June 2010) includes information relating to the Vickers linear accelerator, which has been decommissioned and removed.
- Radiation surveys around the Elekta linear accelerator bunker were reviewed. However, inspectors were unable to determine if the measured dose rates were acceptable because the current SAR does not indicate what the design target dose rates are for the various areas where surveys are undertaken.

Regarding radiation protection, improvements could be made to the following two areas:

- The area radiation monitor outside the teletherapy laboratory did not provide dose rate readings in SI units.
- Wipe test measurements were made in  $\mu\text{Sv}/\text{hour}$ . The recommended standard for wipe tests is ISO 9978:1992 Sealed Radioactive Sources – Leakage Test Methods. This standard requires the activity measured in the wipe test to be less than 200 Bq to demonstrate that the source is leaktight. However, inspectors noted that there was not a clear relationship in the current wipe test measurements between dose rate ( $\mu\text{Sv}/\text{hour}$ ) and activity detected (Bq) for the range of sources used in the facility.

More attention should be paid to housekeeping. In general, the workplace environment in both the teletherapy laboratory and linear accelerator areas were cluttered. Poor housekeeping has the potential to pose hazards to basic work, health and safety. For example:

- There was a lack of adequate shelving for safe storage, and items were spread on the floor.
- There was redundant electronic equipment or spare parts located on the floor of the facilities.

## Findings

At the time of inspection, it appeared that the licence holder complied with the Act, applicable regulations, and licence conditions.

MRS's performance may be improved by addressing the following performance deficiencies in the areas of configuration control and radiation protection.

### Performance Deficiencies:

1. The review and update of plans and arrangements for the safe operation of the linear accelerator has not always been effective in ensuring an accurate description of the current operations.
2. The wipe test method used does not demonstrate that sources meet the leak tight criteria as specified in the ISO 9978:1992 Sealed Radioactive Sources – Leakage Test Methods.