



# Inspection report

<b>Licence holder:</b> Australian Nuclear Science and Technology Organisation (ANSTO)	<b>Licence number:</b> F0309
<b>Location inspected:</b> Lucas Heights, NSW	<b>Date/s of inspection:</b> 2-3 September 2019
	<b>Report no:</b> R19/11756

An inspection was conducted as part of ARPANSA's 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 2018 (the Regulations), and conditions of facility licence F0309.

The scope of the inspection included an assessment of ANSTO Nuclear Medicine's (ANM) performance in the area of configuration management involving rear of cell activities related to transfer of radioactive materials between hot cells at ANM and between ANM and Waste Operations [Note: Handling of radioactive material at the Waste Operations Facility is not part of this inspection]. The inspection consisted of a review of records, interviews, and observation of transfer of spent uranium filter (SUF) cups from ANM to ANSTO Waste Operation facility (Building 41), and demonstration of inter-cell transfer of radioactive material at the ANM facility using PADIRAC flask.

## Background

ANM is used for large scale production of Molybdenum-99 (Mo-99). Mo-99 is the precursor of Technetium-99m (Tc-99m) which used in 80% of all nuclear medicine procedures. The production process involves various steps including dissolution, purification, evaporation, dispensing and packaging of the product (Mo-99 solution). On 21 June 2019, three staff members were exposed to extremity doses while handling an inner container, namely a Depleted Uranium (DU) container, of a Type B(U) transport package containing the Mo-99 product. The inner container was transferred from the packaging hot cell to a helium leak station prior to dispatching to Building 23 for manufacturing Technetium generators. Contamination was detected on the inner container at the helium leak station during a routine check for contamination, which is performed for all packages. The extremity dose to two operators exceeded the annual statutory limit of 500 mSv. Following the incident ANSTO undertook corrective measures to prevent recurrence of contamination incidents while transferring material from the hot through the cell face area. ARPANSA undertook inspections in the area of contamination control measures at the cell face area. The rear of cell activities include transfer of irradiated targets from OPAL reactor to ANM facility, transfer of SUF cups and intermediate level solid waste (ILSW) from ANM to ANSTO Waste Operations facility. ARPANSA undertook this inspection to monitor the configuration control arrangements in place for safe operation of ANM.

## Observations

In general, the management of safety at ANM was satisfactory. In some cases, however, there appeared to be room for improvement with respect to configuration management related to the procedure for equipment operation at the rear of cell at ANM.

## **Configuration management**

ANM applies relevant procedures to maintain the configuration of the operation of plant and equipment in the rear of cell operational activities. The following key procedures are followed for the rear of cell operational activities.

- Loading of Target Carrier and Transport of Mo-99 Flat Plate Targets from OPAL to ANM, I-50071 (rev. 2)
- Spent Uranium Filter Cup Loading into Spent Uranium Filter Flask I-50113 (rev. 3)
- Preparation, Transport, Load and Unloading of the SUF Flask, I-6582 (rev. 6)
- Intermediate Level Solid Waste Removal Using Retrievable Solid Waste Flask, I-50112 (rev. 3)
- PADIRAC Labelling and Lighting System, I-50270 (rev. 2)
- Solid waste Decay and Transfer Between Cells Using PDIRAC, I-5087 (rev. 3)
- Flask clearance for Accredited ANSTO Staff, P-3097 (rev. 0)

The inspectors observed the loading of SUF cups into SUF Flask and the transfer of SUF cups using the SUF Flask from ANM to ANSTO Waste Operations (Building 41) for further processing and management. The activities involving SUF cups at ANSTO Waste Operations is beyond the scope of this inspection. The inspectors confirmed that the loading of SUF cups into the SUF Flask at ANM and transfer of the SUF Flask from ANM to Waste Operations were performed by trained operators of ANM and ANSTO waste Operations following appropriate procedures (e.g. I-50113, I-6582). The SUF Cup transfer operation was supervised by a health physics surveyor and appropriate contamination clearance measures were implemented.

The inspectors found that the configuration management for the SUF cup transfer operation is consistent with the documented technical and administrative process.

The inspectors observed the demonstration of the PADIRAC operation for transfer of radioactive material between cells at ANM. For the demonstration of PADIARC operation, routine operating procedures were applied (e.g. I-50187, I-50270). The inspectors noted that ANM had initiated a project on the 'PADIRAC Flow Process' for further improvement in the area of configuration management. ANSTO will provide ARPANSA with the results of the 'PADIRAC Flow Process' project once completed.

The inspectors discussed the application of the flask clearance process used at various ANSTO facilities including ANM. ANSTO applies the procedure entitled 'Flask Clearance for ANSTO Accredited Staff, P-3097' for the purpose of flask clearance of the 1.2 Tonne, 2.4 Tonne and 7.5 Tonne flasks. This procedure describes the step by step process for accredited personnel to issue a Radiation Contamination Clearance Certificate (RCC). While identical processes are applied at various facilities, the procedure only applies to ANSTO's Health Products personnel.

In general, the applicable procedures for the rear of cell activities at ANM reflect the configuration management of the plant and material. However, the inspectors consider that the configuration management of the plant and material should be improved by revising the flask clearance procedure to incorporate all facilities where it is being employed and highlight which flasks accredited staff are able to clear. This is considered an area for improvement.

## **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 **area for improvement**:

1. Revision of the Flask Clearance Procedure

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

*No written response to this report is required*

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