Australian Government
Australian Radiation Protection and Nuclear Safety Agency

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Inspection report

Licence holder: ANSTO	**Licence number:** F0157
Location inspected: OPAL Reactor, Lucas Heights, Sydney	**Date/s of inspection:** 3, 5 and 9 December 2019
	Report no: R19/13475

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 2018 (the Regulations), and conditions of facility licence F0157.

The scope of the inspection included an assessment of ANSTO's performance at the OPAL Reactor against the Performance Objectives and Criteria (PO&C) in Inspection Testing and Maintenance (ITM) and the Cross Cutting areas. The PO&C have been compiled in consideration of the requirements of the Act and international standards and best practices. This PO&C provides a comprehensive list of features, controls and behaviour that contribute to safety when managing ITM.

The inspection consisted of a review of records, interviews, and physical inspection of the facility.

Background

The OPAL facility is a multipurpose research reactor that provides a variety of services for nuclear medicine, research, and silicon irradiation.

Observations

The licence holder was found to be in compliance with the Act, the Regulations, and licence conditions with respect to ITM. The inspection also concluded that overall, the OPAL reactor continues to reflect the principles of the ITM PO&C in its controls, behaviours and management system.

Two Areas for Improvement (AFI) were identified in relation to OPAL Management determining a target figure for the Safety Conversation Safety Performance Indicator (SPI) and for consideration of independent assessment of the ITM program (recognising that the upcoming PSSR required under Licence Condition 10 of F0157 may be enough to satisfy this).

Key Observations

The AFI identified at the last OPAL ITM inspection in November 2017 has been addressed. This has been managed through the implementation of project E0098 for removal of pool debris and increasing surveillance on the relevant pool components through the SAP planning system.

The above project E0098 formed part of the response to actions from the last OPAL Periodic Safety Review (PSR). The ongoing management and completed actions from the PSR relating to improvement/development of the OPAL ITM program including the ageing management program were examined as part of this inspection.

This included review of the processes, inspection techniques, acceptance criteria and discussion of initial results from the In-Service Inspection (ISI) program under Project E0349 (covered under OEP 032-001 and associated procedures). This program is part of the maintenance strategies OMM 0100-001 and OMM 0600-001 and enables visual inspection to identify any irregularities or discontinuities in Reactor Pool (RPO), Service Pool (SPO) or in core components. The program was noted to have been developed in line with appropriate standards including AS 3978:2003 and IAEA TECDOC 1263. All Visual Inspection Leads have been formally trained in visual/optical inspection to the requirements of ISO 9712. Future methods currently under consideration include volumetric techniques for non-destructive testing (NDT) such as ultrasonic thickness testing and eddy current techniques. No significant issues were raised at the time of the inspection with the ISI or progress with this PSR action.

The progress made on the PSR action relating to commissioning of a facility for completion of the OPAL Materials Surveillance Program (RRRP-0410-3BEIN-078) was reviewed. This project is managed under a separate ANSTO facility licence from the OPAL Facility and has been delayed for various operational reasons. The 5-year surveillance coupons have consequently not been examined to date. However, at the time of the inspection, an application to the CEO of ARPANSA under section 63 of the Regulations for use of this facility had been made by the separate licence holder, and the majority of the integrated support provisions for sample transport, analysis and management were in place.

The PSR action covering ongoing development and optimisation of Maintenance Strategies and related ITM procedures was inspected against the OPAL Maintenance management procedure OP11. This included a review of the detailed Reliability Centred Maintenance (RCM) assessment (OMM-6800-001) which was conducted to produce the Service Pool Elevator strategy. No significant issues were raised.

A sample of records were examined for evidence that ITM work on safety significant plant had been properly authorised, documented and completed to schedule. The records included signed safe work permits, associated Operational Limits and Conditions (OLC) surveillance sign off and review forms (OOF-002 forms), Safe Work Method Statements (SWMES) and completed instruction paperwork. These were selected from key maintenance strategies and OLC surveillance requirements such as the global chemistry plan - OPAL Reactor Chemistry Control Plan (OCS 0000-001), Emergency Control Centre Ventilation and Pressure, Second Reactor Protection System Trip 2 Channel Functional testing and Pool Level Switches Function testing. These records included an example of where maintenance of redundant safety related equipment introduction had been scheduled to ensure adequate separation existed in the time between the work on each redundant item to avoid maintenance induced common mode errors. No significant issues were raised.

The Safety Performance Indicators (SPI) as per OI 27 continue to be reported to ARPANSA on a quarterly basis. No significant issues have been raised with the ones related to ITM. A new SPI was added to the reporting to reflect the implementation of the OPAL Safety Conversation initiative which was introduced to encourage further engagement by management and staff with personnel conducting work at OPAL. At the time of the inspection the roll out and monitoring of the conversations was considered to be well managed. An area for improvement was raised to update OI 27 to reflect SPIs currently reported on and to determine a target figure for the safety conversations now that the program has been established. It was noted that this program was being rolled out to other ANSTO facilities as it was considered to be a useful tool for initiating engagement about safety in the workplace.

A number of GRC events related to the OPAL ITM process were examined from November 2017 for evidence that the causes of unexpected failures and performance issues continue to be investigated appropriately and/or if actions from learning opportunities are raised and implemented in a timely manner. These included updating instructions to capture improvements to ITM methodology, increased surveillance and/or frequency of ITM following a number of separate events and actions taken to improve contractor management. Examples of investigation work when a system was found to have unexpected failures and/or performance issues were also sighted. The ongoing actions for continuous

improvement of heavy water sampling (covered in the ARPANSA Radiation Protection Inspection in March 2019) were followed up. No significant issues were raised.

Contractor management continues to be in line with the AP 2303 Safe Management of Contractors and associated procedures (which are the ANSTO arrangements in place to ensure that work undertaken by contractors is properly supervised and meets required standards).

Additional controls applied at OPAL are the requirement for all contractors to complete the OPAL Induction training. In addition to the induction, additional training is now also required for contractors using a graded approach. A sample of training records was reviewed as evidence. No issues were raised.

The two internal audits conducted since the last ITM ARPANSA Inspection were examined. The scope of both of the audits covered whether contractors conducting work on key safety systems continued to follow the requirements of the maintenance contract and work in accordance with both the ANSTO supplier assurance process (Barringtons system) and Reactor Operations OP 26 Supplier Assurance Process. No significant issues were raised with the findings.

The OPAL Ageing Management program is integrated with the OPAL Asset Management Plan OM12 and the OPAL Maintenance Management OP11 process. Evidence of ongoing obsolescence management was reviewed including the application of the in-house IEEE Class 1 E equivalent standard qualification program. This program had been applied five times since its introduction in 2018 to ensure ongoing qualification of Safety Category 1 equipment items (including the PAM amplifier and chart recording and FRPS seismic switches). In addition, the OEM 7600-001 OPAL Reactor Facility Asset Renewal Plan was examined. This plan documents the OPAL SSCs and identifies the timeline for renewal and or upgrade of each system into the future based on obsolescence and change in standards, etc. The upgrade of some recent items was noted to have been managed under the OPAL change configuration procedure. No significant issues were raised.

The Periodic Safety and Security Review (PSSR) required under licence condition 10 of F0157 is due to be submitted to ARPANSA by December 2021. The content of the review has been planned to align with ARPANSA Guide REG-COM-SUP-2701 v2 and therefore will cover a review of parts of the OPAL ITM program including ageing management and will also be subject to international peer review.

Discussions were held at the time of the inspection regarding whether the PSSR would cover the intent of an ‘independent assessment’ of the ITM program and the ageing management program. Parts of IAEA Guidance IAEA SSG-10 and IAEA NS-G-42 suggest that the organisation should consider whether such an independent assessment would be beneficial. An AFI was raised to capture the outcomes of these discussions in that following the PSSR review, OPAL will determine whether further independent assessment of the ITM process, including the ageing management program, would be beneficial. It is expected that this AFI will be a longer term action.

The ARPANSA Inspectors viewed part of the ITM work being conducted under project E0346 to replace three Safety Category 1 systems and Engineered Safety Feature (ESF) Containment Energy Removal System (CERS) air-cooled water chillers with new units as the current chillers are nearing the end of their maintainable life. The work was confirmed as being conducted under OP11 with a SWMES, had been authorised by the OPAL Shift manager prior to starting, and was under a Safe Work Permit (SWP 121095). The tag out and lock box system was also noted to be in place. No significant issues were raised with the ITM witnessed by the inspectors.

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 areas for improvement:

1. OI 27 should be updated to reflect the current OPAL Safety Performance Indicators (SPI) being reported to ARPANSA quarterly and include a target figure for the OPAL Safety Conversations now that the program has been established.
2. To capture discussion held at the time of the inspection - following the next PSSR, OPAL should consider whether further independent assessment of the ITM program (including ageing management) by an independent organisation as suggested in parts of IAEA Guidance IAEA SSG-10 and IAEA NS-G-42 would be beneficial.

It is expected that improvement actions will be taken in a timely manner, noting that AFI 2 may be a longer term action.

No written response to this report is required

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