



Learning Lessons from Incidents at Other Facilities

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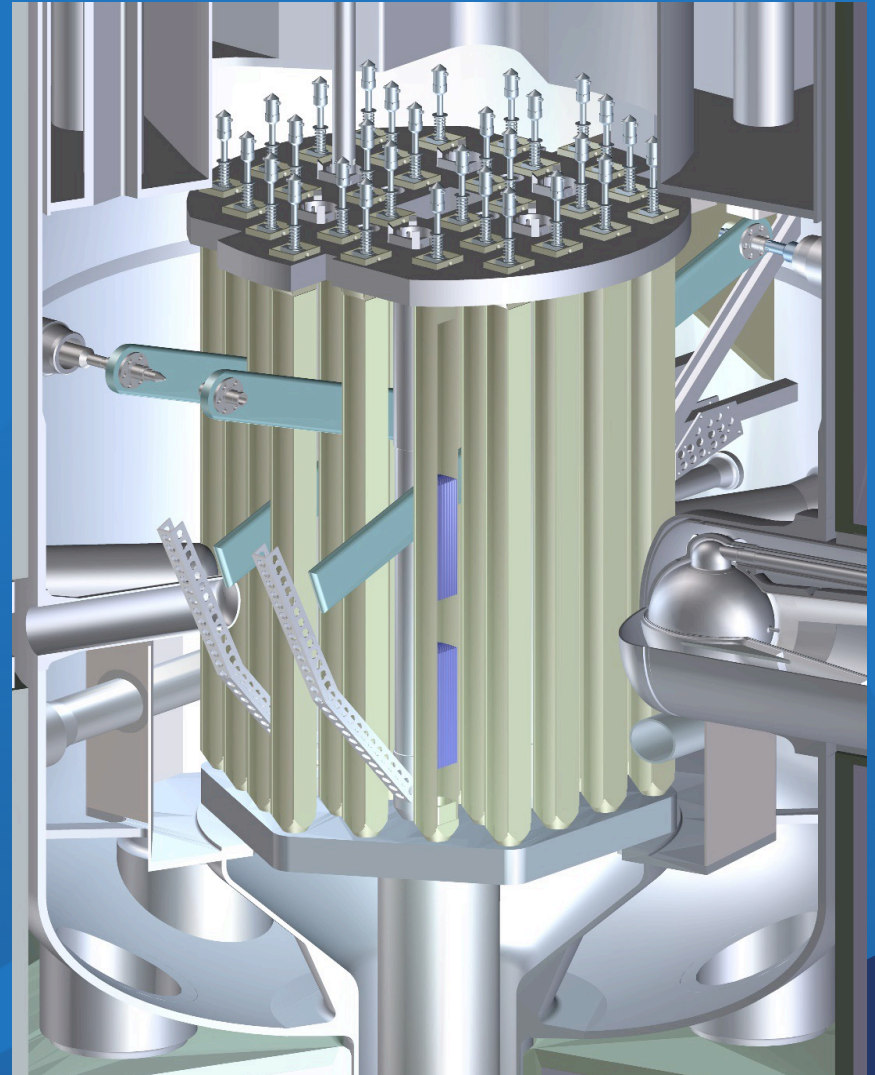
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Outline

- Summary of NBSR fuel incident
- Root causes identified
- ANSTO response
- Feedback from ANSTO toolboxes
- Cross-cutting themes
- Recommendations
- Summary and conclusions

Summary of NBSR Fuel Incident

- On 3 February 2021, the NBSR reactor was conducting a normal start up one month after the refuelling
- Approaching full power, a release of fission products occurred, indicating a fuel failure
- In-core video inspection revealed one fuel element had lifted out of its secured position, resulting in a lack of adequate cooling and eventual fuel failure.
- Investigation confirmed that the Direct Cause was an incorrectly latched fuel element.



Root causes identified

Root causes were identified by a NCNR TWG investigation:

1. The training and qualification program for operators was not on par with programmatic needs.
2. Procedures as written do not capture necessary steps in assuring elements are latched.
3. Procedural compliance was not enforced.
4. Inadequacies existed in the fidelity of latch determination equipment and tools
5. There was inadequate management oversight of refuelling staffing.

Additional root causes were identified by a subsequent SEC Subcommittee review:

6. Change management program needs improvement.
7. There was a culture of complacency, lack of staff ownership of continuous improvement.

ANSTO Response

- Following the public release of investigation reports, an incident was raised in the ANSTO incident reporting system
- Purpose was to capture the OPAL review and identify if there were any potential lessons to be learned.
- Review performed through a series of five toolbox sessions over a period of ten weeks involving staff from across all areas of Reactor Operations, including:
 - Shift staff from the Operations and Utilisation Groups
 - System engineers
 - Training Group staff
 - Technical Support Group

ANSTO Response

- Toolboxes facilitated by the Chair of the OPAL Reactor Assessment Committee, the internal independent safety committee
 - Senior manager with extensive research reactor knowledge and experience
 - Independent of OPAL line management
 - Able to ensure that contributions from participants were recorded anonymously
- Collated set of notes distributed to OPAL line management for consideration and/or implementation
- Lessons learned incorporated into existing initiatives as part of the ongoing Reactor Operations planning

Feedback from OPAL toolboxes

- The lessons learned in the OPAL toolboxes were in many areas similar to the root causes identified in the investigation into the NBSR fuel incident
- A number of opportunities for improvement (OFIs) were identified in relation to:
 1. The training of OPAL operating staff (both Reactor Operations Staff and Utilization Staff);
 2. The change management process;
 3. The resourcing of refuelling activities;
 4. Knowledge management; and
 5. Procedural compliance.
- Some OFIs were mirror images of the causal or contributing factors identified by the NBSR fuel incident investigation

Feedback from OPAL toolboxes

- Some positive feedback was also identified from the toolboxes:
 - Roundtable nature of the toolbox sessions themselves involving staff from across Reactor Operations was considered highly beneficial.
 - Many participants appreciative of the opportunity to provide input anonymously; this encouraged greater involvement and openness in the roundtable discussions.
- Overall, toolbox approach considered to be an appropriate method for communicating an incident from another facility to OPAL personnel and better than a simple lecture or presentation

Cross-cutting themes

- When comparing the root causes from the NBSR fuel incident investigation reports and the OPAL toolboxes, three cross-cutting themes were identified
 - Communication between designers and users
 - Procedural adherence and compliance and knowledge management
 - Staffing, resourcing and training
- None of these themes are considered to be unique to research reactors, or even the general nuclear industry
- Some recommendations for other organisations were identified

Recommendations

1. Organizations should try to maximize the opportunities for interaction and communication between the design or engineering groups and the operating groups.
2. The preparation, review and approval of procedures and instructions important to safety should always involve those charged with the responsibility of actually implementing them and should be written with that group in mind.
3. Operating organization are encouraged to consider the provision of appropriate mock-ups to facilitate the training of operating staff in tasks and activities that are difficult to perform on the real facility or are performed only rarely.

Summary and conclusions

- Following a fuel incident at the NBSR in February 2021, a detailed investigation of the incident was performed.
- ANSTO Reactor Operations undertook a series of staff toolbox sessions to what lessons could be learned for the OPAL reactor from this investigation.
- A number of deficiencies and opportunities for improvement were identified by the OPAL review
- Three generic cross-cutting themes and associated recommendations were also identified that other operating organization may wish to take into consideration.

