Australian Government
Nuclear Safety Committee

Reference: D1413984

18 August 2014

Dr Carl-Magnus Larsson
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ARPANSA
PO Box 655
Miranda NSW 1490, Australia

Nuclear Safety Committee

Advice to the CEO of ARPANSA

Dear Dr Larsson

I refer to your letter dated 17 July 2014 bearing reference D1413983 requesting the Committee provide you with advice on the ANSTO OPAL Periodic Safety Review (PSR), particularly with respect to:

- the ANSTO after-action program;
- the integrated approach to safety management systems
- the proposed regulatory guidelines on conducting a PSR
- regulator-operator accountabilities and responsibilities; and
- lessons learned for Australia and the international community.

The Committee's advice relating to these and other matters that the Committee considers relevant is attached below. This advice has been prepared with support from the ARPANSA secretariat.

Yours sincerely,

Jordan Cook

P.P.

Dr Tamie Weaver
Chair of the Nuclear Safety Committee

NSC advice to the CEO of ARPANSA

ANSTO OPAL Periodic Safety Review (PSR)

PSR After-Action Program

One of the most important safety outcomes arising from undertaking the PSR is the after-action program. This is the proponent's systematic program for making improvements and changes to the reactor's operations following the PSR. At the 28 February 2014 meeting of the NSC, the Committee highlighted the important distinction between 'lessons-to-be-learned' and 'lessons-learned' (Meeting Minutes Item 7.1., *pp*. 5; Reference D144269). The PSR provides a program or plan of 'lessons-to-be-learned'. However, it is important that these become lessons actually learned (i.e. tangible changes made to procedures, practices and operations). ARPANSA should be satisfied that the after-action program is appropriate and also hold ANSTO to account for ensuring that the program is adequately followed through and monitored. There are several regulatory instruments that can be used to do this, for example Regulation 49 of the *Australian Radiation Protection and Nuclear Safety Regulations 1999* or amending the licence under Section 36 of the *Australian Radiation Protection and Nuclear Safety Act 1998*. As CEO of ARPANSA, you are best placed to decide how best to administer the ARPANS Act and Regulations.

The Committee recommends that whichever instrument is applied, it must give sufficient power to ARPANSA to hold ANSTO to account on the implementation of the after-actions program.

Integrated Approach to Safety Management Systems and Safety Culture

As there are no specific criteria for research reactors on how to conduct a PSR, ARPANSA and ANSTO reached an agreement to use the criteria of the IAEA safety standard series NS-G-2.10 Periodic Safety Review of Nuclear Power Plants ('NS-G-2.10') published in 2003 (see also http://www-pub.iaea.org/books/IAEABooks/6725/Periodic-Safety-Review-of-Nuclear-Power-Plants-Safety-Guide). This Guide has "14 PSR safety factors [that] have been selected on the basis of States' experience" (*pp*. 6) and which are used to assess the reactor in terms of the: Plant, Safety Analysis, Performance and Feedback of Experience, Management, and Environment.

It is important to examine the interaction and interdependence between the 14 factors of the PSR. These factors have an effect on one another, for example, the influence of culture on procedures and maintenance, and vice-versa. Adopting a systemic approach improves understanding of the strengths and vulnerabilities of the reactor's operations. This enables improvement measures to be better tailored and targeted. NS-G-2.10 and the updated NS-G-2.10 guidance, the Periodic Safety Review for Nuclear Power Plants Specific Safety Guide SSG-25 (SSG-25)[1] refer to these types of systemic or holistic assessments as a 'global assessment': "Interactions between safety factors, individual shortcomings and corrective actions and/or safety improvements, including compensatory measures, should be considered in assessing the overall plant safety" (*pp*. 22, NS-G-2.10).

[1]This Guidance was published in 2013. See also http://www-pub.iaea.org/books/IAEABooks/8911/Periodic-Safety-Review-for-Nuclear-Power-Plants

The Committee recommends, in line with the holistic or system safety approach, that ANSTO's PSR and ARPANSA's assessment of it places greater emphasis on examining interrelationships and interdependence between the 14 individual factors assessed. This will help ensure the analysis is comprehensive and addresses all key aspects of safety.

In discussing the 14 PSR safety factors, Members consider it worth noting that none specifically deals with safety culture, an element which underpins all safety aspects of the operation of a facility such as OPAL. Instead, safety culture is addressed indirectly under Safety Performance (Factor 8); Organization and Administration (Factor 10); the Human Factor (Factor 12); and also in introductory remarks: "Quality assurance (QA) and safety culture are not considered to be separate safety factors because they should be an integral part of every activity affecting safety" (*pp.* 7).

The assessment ARPANSA has conducted of the PSR would be strengthened by more explicitly examining the effect and influence of safety culture on the operation of the reactor. The Committee is of the view that the IAEA's intention was for this to be a central part of a PSR. This view is supported by SSG-25 which more specifically highlights culture as a key safety factor:

"Safety factors relating to management
(10) Organization, the management system and *safety culture* (emphasis added);
(11) Procedures;
(12) Human factors;
(13) Emergency planning" (*pp.* 6).

The Committee recommends ARPANSA encourage ANSTO to devote a more significant portion of the PSR to discussing the influence and impact of safety culture on the operation, maintenance and management of OPAL; this is important given that the updated IAEA guidance acknowledges the influence of safety culture, and its importance is recognised across all high hazard industries.

Drafting and Publication of PSR Guidelines

ARPANSA is currently in the process of drafting Guidelines which outline the regulatory expectations and principles for undertaking a PSR. Publishing this guidance will help:

- ensure important safety elements are being taken into account by the licence holder; and
- provide clarity and transparency of the regulator's expectations.

In drafting this Guidance, the Committee recommends ARPANSA have regard to the following:

- *in the time between PSRs (usually 10 years), there may be significant changes in approaches to safety and safety assessment and reporting[2]. It is important that all licence holders use the most up-to-date international best practice to undertake the PSR;*
- *the Guide should clearly outline what will be considered by the regulator as a 'complete' PSR as opposed to one that has been 'submitted' but is not considered by the regulator as satisfactory;*
- *the importance of examining the interrelationship between key safety factors and the focus on human and organisational factors; and*
- *any other points raised in this letter, such as, but not limited to, the after actions program.*

[2] For example, NS-G-2.10 was published in 2003 and was superseded by SSG-25 in 2013

Regulator-Operator Accountabilities and Responsibilities, Sampling, Limitations of Assessment

ARPANSA should clearly outline the limits of its assessment of ANSTO's PSR: that ARPANSA has not conducted the PSR itself but has only conducted an assessment of the PSR by taking a risk-informed sampling approach. Discussion of this will help highlight the differences between regulator and licence holder accountabilities and responsibilities. For example, the licence holder is primarily responsible for safety[3]:

"The primary responsibility for conducting a PSR and reporting its findings lies with the operating organization of the plant" (NS-G.2.10, *pp.* 22).

The regulator, on the other hand, is responsible for setting the principles or expectations that should be met:

"The regulatory body has the responsibility of specifying or approving the requirements for a PSR, reviewing the conduct and conclusions of the review and the consequential corrective actions and/or safety improvements, and taking appropriate licensing actions. It is also responsible for reporting the outcome of the PSR to the national government and the general public" (NS-G.2.10, *pp.* 22-23).

Highlighting the limits of ARPANSA's assessment and the differences between the regulator and licence holder helps make accountability clear, which is beneficial to safety. Other industries have applied different, but in the Committee's view, unsuccessful approaches to regulation. For example, at one extreme, licence holders set the standards against which they themselves should be assessed. The other extreme is overly prescriptive where the regulator takes full responsibility for safety. International best practice points towards a balance between these two approaches using principle-based regulation, which ARPANSA has adopted.

The Committee suggests ARPANSA emphasise the limits of its assessment, and the fact that it involves risk-informed sampling, to help highlight this principle-based approach.

Lessons Learned for Australia and the International Community

The Committee considers that the PSR is a good, worthwhile process that is beneficial to safety at OPAL. Being the first time a PSR has been undertaken at a modern research reactor, it is important that both regulator and operator learn lessons to assist future PSR processes. Some of these lessons can be reflected in proposed PSR Guidance and other comments discussed above.

Additionally, the Committee recommends ARPANSA share these lessons with the international community, helping to contribute to best practice in research reactor safety. As an example, the proposed ARPANSA PSR Guidance may be useful to the IAEA and other international regulatory or safety bodies to develop international guidance for PSRs of research reactors, thus presenting a unique opportunity for Australia to take a lead role in nuclear safety.

[3] This is also made clear in IAEA Fundamental Safety Principles SF-1 (*pp.* 6)

Additional Advice

Ensuring Plans and Arrangements and Safety Analysis Report are Current

An important element of the PSR is to review whether the plans and arrangements (e.g. the Business Management System (BMS) and the Safety Analysis Report (SAR)) are current. Where plans and arrangements are found to be out-of-date, or not in line with current plant operations, a plan of action should be drafted to ensure they are made current. This is especially important since the PSR may have found that with several years of operational experience, documents written at the time of design or initial operation are now incongruent with current practice. The importance of having these plans up-to-date is a key element of the PSR as SSG-25 makes clear:

"The PSR and associated corrective actions and/or safety improvements will invariably necessitate changes to plant documentation. Therefore, the plant operating organization should update all plant documentation including, for example, the safety analysis report, operating and maintenance procedures and training materials to reflect the outcomes of the PSR" (*pp.* 35).

The Committee recommends that:

- *the currency of documentation is thoroughly assessed as part of the PSR process; and*
- *documentation identified as out-of-date (such as the SAR and BMS) be updated and given high priority as part of the after-actions program (discussed previously).*

The Overall Conclusion – Is the Plant Safe?

The overall purpose of conducting the PSR is to make an assessment of whether the plant is safe. There needs to be a statement which clearly justifies and judges whether the reactor, in its current state of operations, is suitably safe to continue to operate. This is a requirement of SSG-25:

"The objective of the PSR global assessment is to arrive at a judgement of the nuclear power plant's suitability for continued operation on the basis of a balanced view of the findings from the reviews of the separate safety factors. This judgement should take account of the safety improvements considered in the global assessment as necessary (which may relate to the plant, or to the operating organization) together with any positive findings (strengths) identified in the safety factor reviews" (*pp.* 51).

The Committee recommends ARPANSA make a statement to this effect, clearly outlining whether it is ***of*** *the view that the OPAL reactor is sufficiently safe to continue to operate.*

Communication of the PSR Assessment

Radiation and nuclear issues usually generate a great deal of interest, both positive and negative, in the wider community. Recent examples include Fukushima, Muckaty station and new facilities licenced at ANSTO. Unfortunately, information available on the internet is not always accurate or objective. The by-product of this is that the public often form views on the safety of proposed or current facilities based on this inaccurate information. While ARPANSA cannot regulate the internet, it can ensure that information regarding the safety of facilities under its control is made available to the public. Given the PSR is effectively a reassessment of the safety of the OPAL reactor, ARPANSA should ensure that its decision regarding whether or not the OPAL reactor is safe to continue to operate is clearly, easily and readily accessible by the public.

The Committee recommends ARPANSA identify a suitable strategy to communicate the results of the PSR review. The strategy should ensure that the information is easily and readily accessible to the general public.