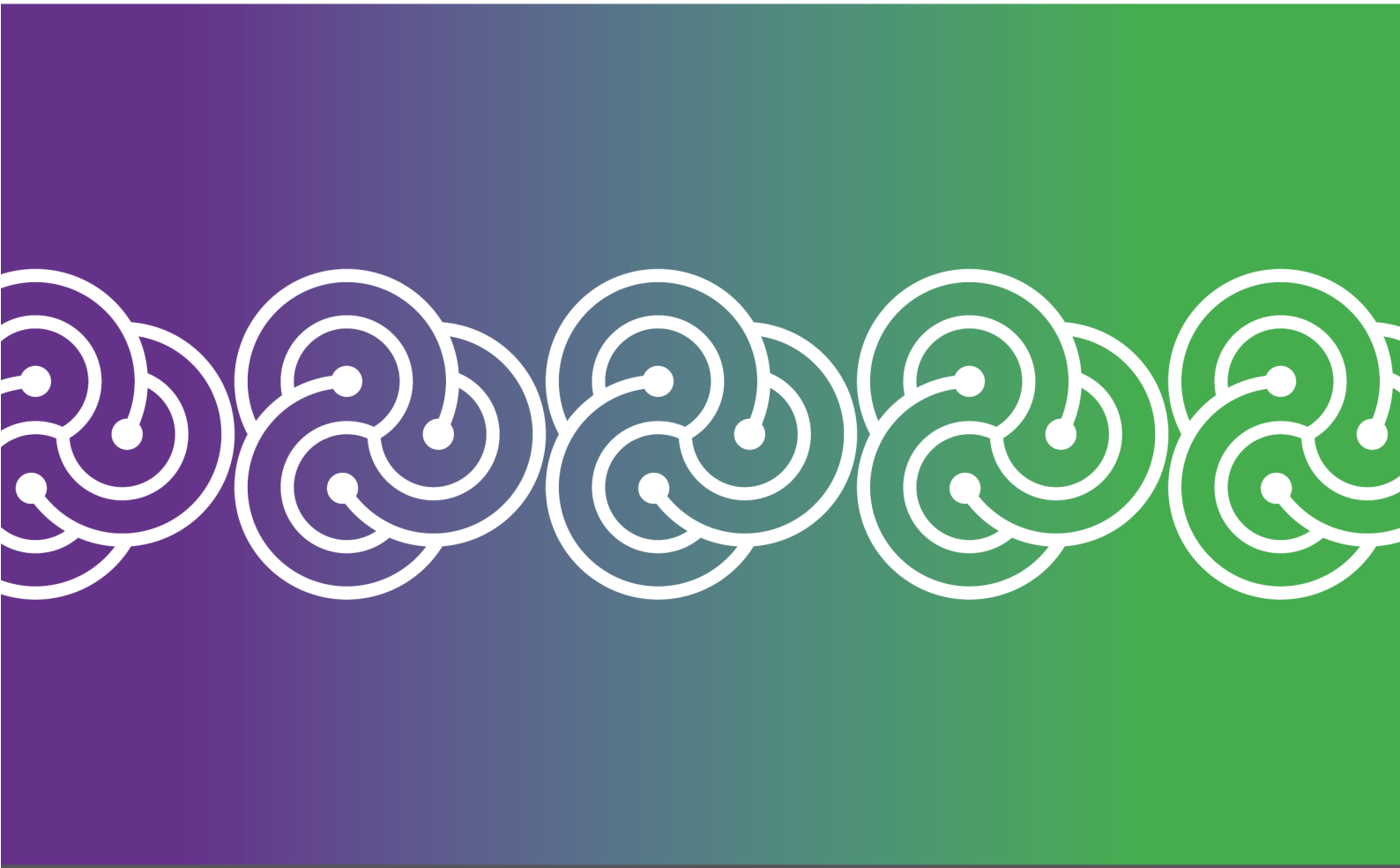
Australian Government

Australian Radiation Protection and Nuclear Safety Agency

arpansa

Statement of Reasons

Decision by the CEO on Facility Licence Application A0344 from ANSTO to Decommission the High Flux Australian Reactor (HIFAR)



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1. The licence decision

On 04 December 2024, I issued facility licence F0344 under section 32 of the *Australian Radiation Protection and Nuclear Safety Act 1998* (the Act[1]) to the Australian Nuclear Science and Technology Organisation (ANSTO), authorising the licence holder to decommission[2] a **controlled facility** at Lucas Heights, namely, the HIFAR Facility.

I have imposed conditions on the licence as described in section 3 below.

2. Reasons for my decision

2.1 Receipt of application

On 28 April 2023 I received a licence application (A0344) from ANSTO to decommission the HIFAR Facility. Supporting documentation was submitted in accordance with the application form for nuclear installations[3], and the appropriate fee was paid.

2.2 Background

This Statement of Reasons builds on earlier licensing decisions. The previous decision, as it relates to HIFAR, authorised ANSTO to Possess or Control (PoC) the facility following its permanent shutdown on 30 January 2007. PoC is considered to mean the set of activities whereby a state of safe enclosure of the facility is achieved and maintained with the characterisation of the radiological inventory being conducted in preparation for ultimate dismantling. Further, safe enclosure is considered to mean that the parts of the facility that contain radioactivity are either processed or placed in such a condition that they can be safely stored and maintained until they can be decontaminated and/or dismantled to levels the permit release from regulatory control. This authorisation for PoC was granted to ANSTO on 15 September 2008.

Prior approval, from the CEO of ARPANSA, was required for any dismantling project or characterisation works under the F0184 licence. F0184 was revised in 2021 that also detailed reporting requirements for reporting on refurbishment of the facility and any dismantling that had occurred within the reporting period, the need for a review and report on the condition of the facility ever 10 years, compliance with limits and conditions, and notification of discharge levels.

In essence, the Possess or Control authorisation permitted ANSTO to prepare for the future decommissioning of the HIFAR facility.

The application made to decommission the HIFAR reactor facility is part of a staged approach. This will be split between Phase A and Phase B with each phase having separate stages that ANSTO will apply for individually, prior to work commencing. The application received only considers Phase A-I (the first of three

[1] Australian Radiation Protection and Nuclear Safety Act 1998 (legislation.gov.au)

[2] Decommissioning refers to administrative and technical actions taken to allow removal of some or all of the regulatory controls from a facility (except for a radioactive waste disposal facility, which is, by definition, subject to closure and not decommissioning). These actions involve decontamination, dismantling and removal of radioactive materials, waste, components and structures. They are carried out to achieve a progressive and systematic reduction in radiological hazards and are taken on the basis of planning and assessment to ensure safety during decommissioning operations. See Regulatory Guide - Decommissioning of Controlled Facilities (ARPANSA-GDE-1731)

[3] Regulatory Guide - Applying for a licence for a nuclear installation (ARPANSA-GDE-1795WEB) | ARPANSA

stages in Phase A) of decommissioning relating to utilisation equipment, neutron beam instruments and irradiation rig support equipment.

2.3 Documentary evidence and references

The evidence before me in reaching the decision was:

- the application and supporting documentation, including supplementary documentation provided on ARPANSA's request
- the Regulatory Assessment Report[4] (RAR) developed by the ARPANSA reviewers
- recommendations, codes, and standards representing international best practice (IBP)
- the Radiation Protection Series[5] (RPS) Codes and Guides developed to support and promote uniformity in radiation protection and nuclear safety policies and practices across Australian jurisdictions
- ARPANSA's regulatory guidance[6], developed for applicants and reviewers
- advice and submissions in relation to the application.

2.4 The Nuclear Safety Committee

The role of the Nuclear Safety Committee (NSC) is to advise the CEO of ARPANSA on matters relating to nuclear safety and the safety of controlled facilities, including developing and assessing the effectiveness of standards, codes, practices and procedures.

The nuclear safety of the HIFAR facility has been under regulatory oversight by ARPANSA since the ARPANS Act came into effect in 1998, and thus I did not consider it necessary to seek advice on this submission from the NSC.

2.5 Consultation

In accordance with section 48 of the Regulations, ARPANSA published a notice in 'The Australian' newspaper on 5 October 2023 and on the ARPANSA website on 2 October 2023 acknowledging receipt of a facility application from ANSTO and the intention to make a decision on the application.

As the application was for a nuclear installation, the notice included an invitation for interested third parties to make submissions in relation to the application with a closing date of 12 December 2023. ARPANSA organised a public forum (virtual due to the COVID-19 pandemic) on 9 October 2023 to provide information on different aspects of the proposed facility and on ARPANSA's review and assessment of the application[7].

The submissions were made available on ARPANSA's website[8], unless a request for confidentiality had been made. Appendix 3 to the RAR provides an analysis of the submissions and addresses the issues raised. I also address key parts of the submissions in section 2.15.

[4] See R24/06541

[5] Radiation Protection Series | ARPANSA

[6] Regulatory guides | ARPANSA

[7] ARPANSA public forum on ANSTO licence application – High Flux Australian Reactor (HIFAR) Decommissioning Phase A - YouTube

[8] See https://consult.arpansa.gov.au/hub/hifar-phase-a-decommissioning/

2.6 Matters that must be taken into account when reaching a decision

Sub-section 32(3) of the Act requires the CEO of ARPANSA to consider international best practice in relation to radiation protection and nuclear safety when deciding whether to issue a licence, as well as matters outlined in section 53 of the Regulations that are specific for a facility licence.

2.6.1 International best practice

I consider that, although the ARPANS Act does not define the term international best practice (IBP), it is my view that IBP in relation to radiation protection and nuclear safety is articulated and reflected though the standards and guidance material that is published by various international organisation such as the International Atomic Energy Agency (IAEA), International Commission on Radiological Protection (ICRP), United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), Nuclear Energy Agency (OECD-NEA), etc. These publications articulate the latest scientific knowledge and reflect an international consensus on what constitutes a high level of nuclear safety and radiation protection for the purpose of protecting people and the environment from the harmful effects of radiation.

Upon careful consideration of the content of the application, the applicant has referred to, relied upon, consulted and considered applicable international safety standards and guidance material throughout the application both in the safety analysis report for the controlled facility and the plans and arrangements for ensuring safety of the controlled facility.

The applicant has demonstrated an on-going commitment to international best practice in relation to radiation protection and nuclear safety by proactively engaging with international organisations including the Danish DR3 decommissioning team so as to incorporate lessons learnt and best practice from the decommissioning experience of the DR3 reactor which is of a similar design to the HIFAR controlled facility.[9]

I conclude that the applicant has considered IBP in relation to radiation protection and nuclear safety.

2.6.2 Specific matters

Section 53 of the Regulations specifies matters that I must take into account in deciding whether to issue a facility licence. These are:

> (a) whether the application for the licence complies with subsection 46(1) of this instrument;
>
> (b) whether the applicant for the licence has given the information asked for by the CEO;
>
> (c) whether the application, together with the information (if any) given as described in paragraph (b), establishes that the conduct proposed to be authorised by the licence can be carried out without undue risk to the health and safety of people, and to the environment;
>
> (d) whether the applicant has shown that there is a net benefit from carrying out the conduct proposed to be authorised by the licence;
>
> (e) whether the applicant has shown that the magnitude of individual doses, the number of people exposed and the likelihood that exposure will happen are as low as reasonably achievable, having regard to economic and societal factors;
>
> (ea) whether the applicant has shown that the applicant has considered interactions between technical, human and organisational factors in the management of safety;
>
> (f) whether the applicant has shown a capacity for complying with this instrument and the licence conditions that would be imposed under section 35 of the Act;

[9] a sister DIDO reactor already undergoing decommissioning – as of 2022 they were preparing to demolish the reactor block with finalisation of decommissioning expected in 2026

(g) whether the application has been signed by an office holder of the applicant, a person authorised by an office holder of the applicant or, if the licence is for a Commonwealth entity mentioned in section 45 of this instrument, someone described in paragraph (b) of that section;

(h) if the application is for a facility licence for a nuclear installation—the content of any submissions made by members of the public about the application.

I discuss these specific matters below, taking IBP into consideration where relevant. My decision is also informed by ARPANSA's ongoing oversight and regulatory experience with ANSTO. Further, considerations contained in this Statement of Reasons follow the intent and principles outlined in ARPANSA's Regulatory Activities Policy.[10]

For the purpose of this Statement of Reasons, health and safety refers to *protection of people and the environment from harmful effects of ionising radiation*[11] and includes consideration of radiation (radiological) protection and safety, nuclear safety, waste safety, transport safety, physical protection and security, and emergency preparedness and response. Safety as it relates to other matters, e.g., as covered in work health and safety legislation, is outside of my mandate.

2.7 Does the application for the licence comply with subsection 46(1) of the Regulations?

Subsection 46(1) lists the following documentation that must be included in any application for a facility licence:

(a) the applicant's full name, position and business address

(b) a description of the purpose of the facility to which the licence is to relate

(c) a detailed description of the facility and the site of the facility

(d) the applicant's plans and arrangements (P&As) for managing the facility to ensure the health and safety of people and the protection of the environment, including the following:

(i) arrangements for the applicant to maintain effective control of the facility

(ii) the safety management plan for the facility

(iii) the radiation protection plan for the facility

(iv) the radioactive waste management plan for the facility

(v) the security plan for the facility

(vi) the emergency plan for the facility

(vii) the environment protection plan for the facility

(viii) the decommissioning plan for the facility

(e) for each activity to be authorised by the licence—a safety analysis report (SAR) that is as complete as possible.

[10] Regulatory Activities Policy | ARPANSA

[11] Section 3 of the Act specifies its object; *"… to protect the health and safety of people, and to protect the environment, from the harmful effects of radiation".*

2.7.1 Considerations

ANSTO has provided information relevant to all items specified in sub-section 46(1) of the Regulations.

Additional to the information above, the underlying safety assessments developed to support the SAR have also been provided.

The information encompassing the submission is considered to be of sufficient quality. All submitted information is derived from living documents which are reviewed and updated within legislated and/or internally approved periods (by the licence holder) where no legislated requirement is set, or when necessary. Safety assessments have been developed that strictly relate to the activities as part of Phase A-I and are based on previous studies and characterisation work undertaken at ANSTO and are consistent with ANSTO's risk/safety assessment methodology. Although clarification regarding the submission was requested, all queries have been resolved and considered appropriate.

It is expected that each living document will be reviewed and updated for the next phase of HIFAR decommissioning.

2.7.2 Conclusions

I conclude the application contains appropriate and relevant information and documents and meets the requirements of what must be included in the application and subsection 46(1) of the Regulations.

2.8 Has the applicant given the information asked for by the CEO?

Sub-section 46(2) of the Regulations specifies documentation that the CEO may require from an applicant for a facility licence, noting the CEO may only request some of the listed documentation and/or request other relevant documentation in addition to what is listed.

In relation to the decommissioning of any controlled facility, the only item listed as per sub-section 46(2)(a) is the schedule for decommissioning.

2.8.1 Considerations

ANSTO has provided a schedule for decommissioning, as per the above requirement, which has been incorporated into their decommissioning plan. Since the time of submission, the schedule has since been altered and provided to ARPANSA. Changes to the schedule only relate to periods within a calendar year that approvals were expected to be granted and items of work carried out. No other change has occurred.

The decommissioning plan (DP), when authorisation for PoC of the facility was granted, was not a legislated requirement. The DP considers ANSTO's options for decommissioning, the final recommendation and subsequent strategy. To further support their recommendation several factors were listed in the justification. The DP also contains reference to items found within the suite of P&A documentation.

It is considered that the plan and the associated schedule predominantly reflect Phase A-I decommissioning rather than the decommissioning of HIFAR as a whole. Given the staged approached to decommissioning, such an approach is considered appropriate and acceptable. However, it is also considered that these documents will require a review and update so that they reflect the current status of the facility as decommissioning progresses.

2.8.2 Conclusions

It is considered that the application complies with the requirements of subsection 46(2) of the Regulations as all required documentation has been submitted.

The information provided is at a level which is considered adequate and appropriate for the purposes of the Phase A-I decommissioning of HIFAR. However, future submissions relating to the decommissioning of HIFAR will require this documentation to be updated in order to reflect the current status of the facility and the work to be undertaken.

I conclude that the applicant for the licence has given the information asked for by the CEO.

2.9 Does the application establish that the proposed conduct can be carried out without undue risk to the health and safety of people, and to the environment?

2.9.1 Considerations

I have considered whether the applicant has demonstrated that risks have been identified, assessed, and mitigated; and that the management system provides reasonable assurance that the facility can be decommissioned safely.

The application established plans and arrangements (P&A) to ensure that the decommissioning proposed by the licence can be carried out without undue risk to the health and safety of people, and to the environment. These P&A form an essential element for control of risks associated with the decommissioning activities. The P&A set out arrangements for each item at the facility to be decommissioned/dismantled to require its own safety assessment. These safety assessments consider the consequences and likelihood of postulated events and categorise the risk as per ANSTO's risk matrix.

The application sets out the Safety Analysis Report (SAR) for the decommissioning activities. The SAR is complete as possible for decommissioning activities and establishes that Phase A-I decommissioning activities can be safely undertaken with the risks to human health and the environment sufficiently mitigated by the identified controls. The SAR concludes that the "*…the residual radiological risks of the various fault sequences during Phase A-I are 'low' or 'very low'*".

2.9.2 Conclusions

It is considered that the work to be conducted as represented through the submission can be undertaken without undue risk given the application of known controls.

I conclude that the application establishes that the conduct proposed to be authorised by the licence can be carried out without undue risk to the health and safety of people, and to the environment.

2.10 Has the applicant shown that there is a net benefit from carrying out the proposed conduct?

2.10.1 Considerations

I have carefully considered the contents of the application and whether the applicant has shown that carrying out the proposed decommissioning would do more good than harm resulting in a net benefit.

I have considered the fact that the HIFAR reactor has been in a shutdown state for more than 18 years and as such, the residual radioactivity continues to decay. The applicant has provided information highlighting that any further radioactive decay would only see a slight reduction in exposure risk to radiation dose. However, the delay in the commencement of decommissioning activities could negatively impact the proposed works due to an ever-increasing risk in loss of experience and knowledge whilst the facility continues to age/degrade over time.

I am of the view that carrying out decommissioning activities with the objective of reaching a safe end-state for the facility where the hazards associated with the facility are safely managed, in accordance with

applicable safety standards, prior to further decay of radioactivity in the facility structures and loss of critical experience and expertise, will result in more good than harm.

2.10.2 Conclusions

It is considered that the applicant has provided sufficient justification in relation to the decommissioning of the HIFAR facility.

I conclude that the applicant has shown a net benefit from the in carrying out the proposed conduct.

2.11 Has the applicant shown that the magnitude of individual doses, the number of people exposed and the likelihood that exposure will happen are as low as reasonably achievable, having regard to economic and societal factors?

2.11.1 Considerations

The International Commission on Radiological Protection (ICRP) defines the principle of optimisation as "The likelihood of incurring exposure, the number of people exposed, and the magnitude of their individual doses should all be kept as low as reasonably achievable (ALARA), taking into account economic and societal factors".[12]

The ICRP furthers this by stating that, in a planned exposure situation, restrictions should be placed on individual doses and risks through the use of constraints[13]. The constraint value is therefore much lower than the dose limit and to stay within the bounds of that value, protection is considered optimised.

I consider that the applicant echoes the principle of optimisation within their plans and arrangements for safe management of the facility and through their application will ensure that the overall number of people exposed, and the likelihood of that exposure will be as low as reasonably achievable.

The applicant has demonstrated, whilst under the previous authorisation, that the arrangements in place have ensured that no worker has received an annual dose greater than 0.5 mSv. Given the proposed works, the applicant, in accordance with local guidance, has set an annual dose constraint for the facility of 1.6 mSv. I find such a value appropriate as this is a fraction of the applicable annual statutory dose rate for occupational exposure. In addition, should this constraint be exceeded, mechanisms for review and action prior to proceeding are in place.

2.11.2 Conclusions

It is considered that the applicant has applied the optimisation principle to the proposed conduct.

I conclude that the applicant has arrangements in place and has shown that the magnitude of individual doses, the number of people exposed and the likelihood that exposure will happen are as low as reasonably achievable, having regard to economic and societal factors.

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[12] 2007 P103 The 2007 Recommendations of the International Commission on Radiological Protection (sagepub.com)

[13] The Planned Exposure Code (RPS C-1 Rev 1), ARPANSA 2020, Code for Radiation Protection in Planned Exposure Situations (arpansa.gov.au) defines dose constraint as "a prospective and source related value of individual dose (dose constraint) or of individual risk (risk constraint) that is used in planned exposure situations as a parameter for the optimisation of protection and safety for the source, and that serves as a boundary in defining the range of options in optimisation. For occupational exposures, a constraint on individual dose to workers used by Responsible Persons to set the range of options in optimising protection and safety for the source. For public exposure, the dose constraint is a source related value established or approved by the relevant regulatory authority, with account taken of the doses from planned operations of all sources under control."

2.12 Has the applicant shown that the applicant has considered interactions between technical, human and organisational factors in the management of safety?

2.12.1 Considerations

I have carefully considered the content of the application and how the applicant has shown that the applicant has considered interactions between technical, human and organisational factors in the management of safety.

Section 2 of the Plans and Arrangements sets out the Safety Management Plan (SMP) which details the safety management system, including responsibilities, policies and procedures that are in place within ANSTO, to assure that all activities conducted at the HIFAR Facility are carried out safely and in compliance with regulatory requirements.

The SMP considers and sets out details about how safety is managed for the technical factors such as premises, building and equipment, human factors such as training and competencies and organisational factors such as good communication, financial arrangements for safety, promoting a positive safety culture.

The SMP provides and overview of how these technical, human and organisational factors in the management of safety interact with each other and how they are linked to other plans and arrangements to ensure that all activities conducted at the HIFAR Facility are carried out safely and in compliance with regulatory requirements.

2.12.2 Conclusions

I conclude that the applicant has considered interactions between technical, human and organisational factors in the management of safety in the management of safety.

2.13 Has the applicant shown a capacity for complying with the Regulations and the licence conditions that would be imposed under section 35 of the Act?

2.13.1 Considerations

I have considered, upon review of the submission, that the applicant has demonstrated a commitment to ensuring compliance with ARPANS legislation. This is evident by the:

- Delegated hierarchical structures for management and responsibilities associated with HIFAR that have been put in place
- Staff and monetary resources necessary to safely manage the facility and meet ARPANSA requirements are approved by ANSTO, and
- ISO certified business management system

HIFAR also has a small non-compliance footprint which provides assurance that ANSTO have capacity to comply with legislation. HIFAR has only experienced four instances of non-compliance which occurred between 2011 and 2018, one was self-reported and the other three either had minor or no safety implications.

2.13.2 Conclusions

I conclude that, given this history and ANSTO's commitment to compliance with legislation, there is no indication that ANSTO would have compliance issues. As such, there is reasonable assurance that ANSTO, in relation to HIFAR, has the capacity to comply with the Act, Regulations and licence conditions.

2.14 Has the application been signed by an officer of the applicant, a person authorised by an office holder of the applicant or, if the licence is for a Commonwealth entity mentioned in section 45 of the regulations, someone described in paragraph (b) of that section

2.14.1 Considerations and conclusions

ANSTO made the application on 28 April 2023 and was signed by Mr Shaun Jenkinson, Chief Executive Officer (CEO) of ANSTO. In accordance with sub-section 45(b) of the Regulations, as the CEO of ANSTO, Mr Jenkinson is authorised to submit the application.

Persons covered by the licence are the licence holder[14], employees of the licence holder, Commonwealth contractors, employees of Commonwealth contractors, and Permitted Persons.

As the CEO is the authorised signatory, this requirement is considered to be met.

2.15 Content of submissions about the application

It is a requirement of the Regulations (section 53(h)) that the CEO must consider the content of any submission made by members of the public about the application of nuclear installations.

2.15.1 Considerations and conclusions

The process for consultation was briefly outlined in section 2.5 of this Statement of Reasons. Only two submissions were received with a number of comments and queries in each.

I wish to thank the individuals and, where relevant, their parent organisations for the time and effort in expressing their views on the application submitted by ANSTO. Consultation enables informed decision-making and ARPANSA recognises the value of consultation and stakeholder engagement in enhancing institutional strength-in-depth[15].

I conclude that, following careful consideration of the content of the submissions made by members of the public, the authorisation for decommissioning can still be granted.

3. Licence conditions

I have decided at the time of issuing the licence to impose, under section 35 of the Act, the conditions of licence that normally apply to facilities of this kind. These standard licence conditions are included as:

Facility Licence F0344, Schedule 2: Licence conditions 1 - 2

These set out the obligations around compliance with licence conditions, practices and procedures to be followed and ensuring that the licence holder understands the obligation to report on a quarterly basis compliance with the Act, Regulations and conditions of licence.

[14] For the purposes of this licence, the licence holder is the 'responsible person' as defined in the *Code for Radiation Protection in Planned Exposure Situations* (2020) RPS C-1 (Rev. 1) Radiation Protection Series C-1 (Rev. 1) | ARPANSA. Responsibility for ensuring the safety of the ILWCI Facility lies collectively with the CEO and senior management team of ANSTO.

[15] *Ensuring Robust National Nuclear Safety Systems, Institutional Strength-in-Depth*, INSAG (International Nuclear Safety Group) 27, IAEA 2017, P1779_web.pdf (iaea.org)

Facility Licence F0344, Schedule 2: Licence conditions 3 - 7

These conditions relate to compliance with limits and conditions and the reporting of airborne tritium discharges emitted from the HIFAR facility to ARPANSA. These were previously included under the previous Possess or Control authorisation (F0184).

I have also imposed specific conditions on F0344:

Facility Licence F0344, Schedule 2: Licence condition 8

The extent to which decommissioning activities may be carried out is limited by this condition. Should the applicant wish to go beyond Phase A-I, such activities will require prior written approval of the CEO of ARPANSA.

4. Conclusions

The information submitted with the application addresses the requirements under the legislation and meets the intent behind the regulatory guidance issued by ARPANSA. A review of the documentation has been undertaken by ARPANSA's regulatory officers who have determined that there is reasonable assurance that this stage of HIFAR's decommissioning can be undertaken safely.

In addition, as required by the legislation, I invited members of the public to make submissions in relation to the proposed activity. While I consider the concerns raised within those submissions to be valid, they appear to relate to decommissioning in general rather than the specifics of this application.

I have assessed all information before me and, on the basis of my review, I conclude that the facility can be decommissioned in a way that protects people and the environment from the harmful effects of radiation.

Gillian Hirth, AO
CEO of ARPANSA