



Australian Government  
Australian Radiation Protection  
and Nuclear Safety Agency



# FACILITY LICENCE APPLICATION

## Nuclear installation

REGULATORY SERVICES

ARPANSA-FORM-1802 v9.4

June 2021

## Section A: Applicant information

|                                                                                                                                                                                                                                                                                              |                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>Department or Commonwealth body:</b>                                                                                                                                                                                                                                                      | ANSTO                                         |
| <b>Portfolio:</b>                                                                                                                                                                                                                                                                            | Department of Industry, Science and Resources |
| <b>Person making the application: (Department Secretary, CEO or other authorised delegate<sup>1</sup>)</b><br>NAME: Shaun Jenkinson<br>POSITION: ANSTO Chief Executive Officer<br>BUSINESS ADDRESS: Locked Bag 2001 Kirrawee DC NSW 2232<br>PH: 9717 9079<br>EMAIL: sjn@ansto.gov.au<br>FAX: |                                               |
| <b>Nominee (where applicable):</b><br>NAME: Con Lyras<br>POSITION: ANSTO Chief Engineer<br>BUSINESS ADDRESS: Locked Bag 2001 Kirrawee DC NSW 2232<br>PH: 9717 3382<br>EMAIL: cly@ansto.gov.au<br>FAX:                                                                                        |                                               |
| <b>Radiation Safety Officer (or contact person)</b><br>NAME: Andrew Popp<br>POSITION: Manager Radiation Protection Services<br>BUSINESS ADDRESS: Locked Bag 2001 Kirrawee DC NSW 2232<br>PH: 9717 9664<br>EMAIL: aop@ansto.gov.au<br>FAX:                                                    |                                               |

### Declaration (to be signed by the person making the application)

I hereby declare that the information provided on this form and in support of this application is, to the best of my knowledge, complete and true in every particular.

Signed:



Date: 28<sup>th</sup> April 2023

Print name: Shaun Jenkinson

<sup>1</sup>A copy of the instrument of authorisation must accompany the application if it has been signed by an authorised delegate.

## Section B: Kind of nuclear installation & type of authorisation

Indicate the kind of nuclear installation and type(s) of authorisation for which a licence is sought

| ITEM | KIND OF NUCLEAR INSTALLATION AND TYPE OF AUTHORISATION REQUIRED                                                                                                                                                                                                                    | CHECK                               |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 1    | Preparing a site for a nuclear reactor designed:<br>(a) for research or production of radioactive materials for industrial or medical use (including critical and subcritical assemblies); and<br>(b) to have maximum thermal power less than 1 megawatt                           | <input type="checkbox"/>            |
| 2    | Constructing a nuclear reactor designed:<br>(a) for research or production of radioactive materials for industrial or medical use (including critical and subcritical assemblies); and<br>(b) to have maximum thermal power less than 1 megawatt                                   | <input type="checkbox"/>            |
| 3    | Possessing or controlling a nuclear reactor:<br>(a) for research or production of radioactive materials for industrial or medical use (including critical and subcritical assemblies); and<br>(b) with maximum thermal power less than 1 megawatt                                  | <input type="checkbox"/>            |
| 4    | Operating a nuclear reactor:<br>(a) for research or production of radioactive materials for industrial or medical use (including critical and subcritical assemblies); and<br>(b) with maximum thermal power less than 1 megawatt                                                  | <input type="checkbox"/>            |
| 5    | Decommissioning, disposing of or abandoning a nuclear reactor that:<br>(a) was used for research or production of radioactive materials for industrial or medical use (including critical and subcritical assemblies); and<br>(b) had maximum thermal power less than 1 megawatt   | <input type="checkbox"/>            |
| 6    | Preparing a site for a nuclear reactor that is designed:<br>(a) for research or production of radioactive materials for industrial or medical use (including critical and subcritical assemblies); and<br>(b) to have maximum thermal power of at least 1 megawatt                 | <input type="checkbox"/>            |
| 7    | Constructing a nuclear reactor that is designed:<br>(a) for research or production of radioactive materials for industrial or medical use (including critical and subcritical assemblies); and<br>(b) to have maximum thermal power of at least 1 megawatt                         | <input type="checkbox"/>            |
| 8    | Possessing or controlling a nuclear reactor:<br>(a) for research or production of radioactive materials for industrial or medical use (including critical and subcritical assemblies); and<br>(b) with maximum thermal power of at least 1 megawatt                                | <input type="checkbox"/>            |
| 9    | Operating a nuclear reactor:<br>(a) for research or production of radioactive materials for industrial or medical use (including critical and subcritical assemblies); and<br>(b) with maximum thermal power of at least 1 megawatt                                                | <input type="checkbox"/>            |
| 10   | Decommissioning, disposing of or abandoning a nuclear reactor that:<br>(a) was used for research or production of radioactive materials for industrial or medical use (including critical and subcritical assemblies); and<br>(b) had maximum thermal power of at least 1 megawatt | <input checked="" type="checkbox"/> |
| 11   | Preparing a site for a plant for preparing or storing fuel for use in a nuclear reactor of a kind mentioned in any of items 1 to 9                                                                                                                                                 | <input type="checkbox"/>            |
| 12   | Constructing a plant for preparing or storing fuel for use in a nuclear reactor of a kind mentioned in any of items 1 to 9                                                                                                                                                         | <input type="checkbox"/>            |
| 13   | Possessing or controlling a plant for preparing or storing fuel for use in a nuclear reactor of a kind mentioned in any of items 1 to 9                                                                                                                                            | <input type="checkbox"/>            |
| 14   | Operating a plant for preparing or storing fuel for use in a nuclear reactor of a kind mentioned in any of items 1 to 9                                                                                                                                                            | <input type="checkbox"/>            |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                          |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 15 | Decommissioning, disposing of or abandoning a plant that was used for preparing or storing fuel for use in a nuclear reactor of a kind mentioned in any of items 1 to 9                                                                                                                                                                                                                                                                                            | <input type="checkbox"/> |
| 16 | Preparing a site for:<br>(a) a radioactive waste storage facility that is designed to contain controlled materials with an activity greater than the applicable activity level prescribed by section 10 of the Regulations; or<br>(b) a radioactive waste disposal facility designed to contain controlled materials and have an activity greater than the applicable activity level prescribed by section 11 of the Regulations                                   | <input type="checkbox"/> |
| 17 | Constructing:<br>(a) a radioactive waste storage facility designed to contain controlled materials and have an activity that is greater than the applicable activity level prescribed by section 10 of the Regulations; or<br>(b) a radioactive waste disposal facility that is designed to contain controlled materials and have an activity greater than the applicable activity level prescribed by section 11 of the Regulations                               | <input type="checkbox"/> |
| 18 | Possessing or controlling:<br>(a) a radioactive waste storage facility that contains controlled materials that has an activity greater than the applicable activity level prescribed by section 10 of the Regulations; or<br>(b) a radioactive waste disposal facility that contains controlled materials that has an activity greater than the applicable activity level prescribed by section 11 of the Regulations                                              | <input type="checkbox"/> |
| 19 | Operating a controlled facility, being:<br>(a) a radioactive waste storage facility that contains controlled materials that has an activity greater than the applicable activity level prescribed by section 10 of the Regulations; or<br>(b) a radioactive waste disposal facility that contains controlled materials that has an activity greater than the applicable activity level prescribed by section 11 of the Regulations                                 | <input type="checkbox"/> |
| 20 | Decommissioning, disposing of or abandoning:<br>(a) a radioactive waste storage facility that formerly contained controlled materials and had an activity greater than the applicable activity level prescribed by section 10 of the Regulations; or<br>(b) a radioactive waste disposal facility that formerly contained controlled materials and had an activity that was greater than the applicable activity level prescribed by section 11 of the Regulations | <input type="checkbox"/> |
| 21 | Preparing a site for a facility to produce radioisotopes, that is designed to contain controlled materials and have an activity greater than the applicable activity level prescribed by section 12 of the Regulations                                                                                                                                                                                                                                             | <input type="checkbox"/> |
| 22 | Constructing a facility to produce radioisotopes, that is designed to contain controlled materials and have an activity greater than the applicable activity level prescribed by section 12 of the Regulations                                                                                                                                                                                                                                                     | <input type="checkbox"/> |
| 23 | Possessing or controlling a facility producing radioisotopes and containing controlled materials that has an activity greater than the applicable activity level prescribed by section 12 of the Regulations                                                                                                                                                                                                                                                       | <input type="checkbox"/> |
| 24 | Operating a facility producing radioisotopes and containing controlled materials that has an activity greater than the applicable activity level prescribed by section 12 of the Regulations                                                                                                                                                                                                                                                                       | <input type="checkbox"/> |
| 25 | Decommissioning, disposing of, or abandoning a facility that formerly produced radioisotopes, contained controlled materials and had an activity greater than the applicable activity level prescribed by section 12 of the Regulations                                                                                                                                                                                                                            | <input type="checkbox"/> |

## Section C: Facility details

### *Address of the nuclear installation*

New Illawarra Road, Lucas Heights, NSW, 2234

### *Detailed description of the purpose of the nuclear installation*

The purpose of this application is to seek approval from the Chief Executive Officer (**CEO**) of ARPANSA for a licence to decommission the High Flux Australian Reactor (**HIFAR**). HIFAR is a 'controlled facility' as defined under the *Australian Radiation Protection and Nuclear Safety Act 1998* (ARPANS Act). As such, the Australian Nuclear Science and Technology Organisation (**ANSTO**) are seeking a decommissioning licence from ARPANSA pursuant to section 32(1) of the ARPANS Act. HIFAR was operational between 26 January 1958 and 30 January 2007. It was a multi-purpose nuclear reactor used for:

- Production of radioactive isotopes for Australian nuclear medicine and industry;
- Materials testing;
- Neutron beam experiments;
- Silicon irradiation; and
- General research purposes.

HIFAR was permanently shut down on 30 Jan 2007, after 49 years of operation, when the OPAL reactor, which was commissioned in 2006, replaced it. HIFAR moved from an operational licence (FO0044-4A) to a Possess or Control (PorC) licence] on 15 September 2008 (F0184). This licence allowed ANSTO to commence characterisation and decommissioning planning in preparation for HIFAR's transition from a PorC licence to a decommissioning licence.

### *Detailed description of the nuclear installation and the site*

The HIFAR research reactor is located within the grounds of ANSTO's Lucas Heights address 32km's southwest of the Sydney CBD. HIFAR was operational between 1958 and 2007 as a 10 MW heavy water moderated and cooled research reactor belonging to the DIDO class of reactor design. It was initially fuelled using highly enriched uranium but was later converted to enable fuelling by low enriched uranium. Permanent shut down of HIFAR occurred in 2007 and it has subsequently been managed under a Possess or Control Licence.

Following its shutdown, a program of closure works commenced, the reactor fuel was fully unloaded, heavy water drained, control arms removed, and operational staffing ceased. Additionally, several dismantling and refurbishment projects was undertaken to remove redundant non-radioactive items of plant and equipment from HIFAR to reduce maintenance overheads and allow the facility to be held under a PorC Licence (F0184) period.

The facility was characterised during the PorC period, and a characterisation report produced (HIFAR Characterisation Part 1 and Part 2). The information provided in the characterisation report provides detailed information of radiological hazards allowing for risk informed planning, risk assessment and safety analysis.

## Section D: Safety Analysis Report

*For each type of authorisation sought a reference must be given to a Safety Analysis Report (SAR). Provide a reference in the space provided to the SAR with the full title and version or edition or (the approval) date of the report. The report must be as **complete as possible** for each type of authorisation required.*

*Where a space is not applicable as the authorisation is not required as part of this application mark it as 'N/A'. If applying to prepare a site and construct in the same application then a reference to the SAR must be included under both headings.*

### **Prepare a site**

N/A

### **Construct**

N/A

### **Possess or control**

N/A

### **Operate**

N/A

### **Decommission**

Decommissioning safety principles, process, and hazard and protection systems are discussed in the HIFAR Safety Analysis Report (ACS248156) in support of this application.

Annexure B: ACS248156 – HIFAR Safety Analysis Report – Rev 0

### **Dispose of or abandon**

N/A

## Section E: Plans & Arrangements

*Describe the plans and arrangements for managing the facility and any associated sources in the space provided or provide clear references to where this information may be found within accompanying documentation.*

## **1. Effective control arrangements**

The Effective control arrangements are described in section 1 of the HIFAR Plans & Arrangements G-8212, provided with this application.

Annexure C: G-8212 - HIFAR Plans & Arrangements (Decommissioning Phase A) – Rev 0

## **2. Safety management plan**

The Safety Management plans are described in section 2 of the HIFAR Plans & Arrangements G-8212, provided with this application.

Annexure C: G-8212 - HIFAR Plans & Arrangements (Decommissioning Phase A) – Rev 0

## **3. Radiation protection plan**

The Radiation protection plans are described in section 3 of the HIFAR Plans & Arrangements G-8212, provided with this application.

Annexure C: G-8212 - HIFAR Plans & Arrangements (Decommissioning Phase A) – Rev 0

## **4. Radioactive waste management plan**

The Radioactive waste management plans are described in section 4 of the HIFAR Plans & Arrangements G-8212, provided with this application.

Annexure C: G-8212 - HIFAR Plans & Arrangements (Decommissioning Phase A) – Rev 0

## **5. Security plan**

The Security plans are described in section 5 of the HIFAR Plans & Arrangements G-8212, provided with this application.

Annexure C: G-8212 - HIFAR Plans & Arrangements (Decommissioning Phase A) – Rev 0

## **6. Emergency plan**

The Emergency plans are described in section 6 of the HIFAR Plans & Arrangements G-8212, provided with this application.

Annexure C: G-8212 - HIFAR Plans & Arrangements (Decommissioning Phase A) – Rev 0

## **7. Environment protection plan**

The Environment protection plans are described in section 7 of the HIFAR Plans & Arrangements G-8212, provided with this application.

Annexure C: G-8212 - HIFAR Plans & Arrangements (Decommissioning Phase A) – Rev 0

## 8. Decommissioning plan

The Decommissioning of the HIFAR Nuclear Installation is described in the HIFAR Phase A Decommissioning Plan (ACS248144), provided with this application.

Annexure C: ACS248144 – HIFAR Phase A Decommissioning Plan – Rev 0



## Section F: Extra information

Complete the section(s) below corresponding to each type of authorisation required

### 1. Prepare a site for a nuclear installation

Provide a detailed site evaluation establishing the suitability of the site for the facility

N/A

Describe the characteristics of the site, including the extent to which the site may be affected by natural and human events

N/A

Provide information about any environmental impact statement requested or required by a government agency, and the outcome of the environmental assessment

N/A

### 2. Construct a nuclear installation

Describe the design of the controlled facility, including ways in which the design deals with the physical and environmental characteristics of the site

N/A

Describe any fundamental difficulties that will need to be resolved before any future authorisation is given

N/A

Describe the construction plan and schedule

N/A

Describe the arrangements for testing and commissioning safety related items

N/A

### 3. Possess or control a nuclear installation

Describe the arrangements for maintaining criticality safety during loading, moving or storing nuclear fuel and other fissile materials at the facility

N/A

Describe the arrangements for safe storage of controlled material and maintaining the facility

N/A

#### 4. Operate a nuclear installation

*Describe the structures, components, systems and equipment of the facility as they have been constructed*

N/A

*Describe the operational limits and conditions of the facility*

N/A

*Describe the arrangements for commissioning the facility*

N/A

*Describe the arrangements for operating the facility*

N/A

*Describe the results of a field exercise to respond to a scenario that involves an emergency and has been agreed with the CEO*

N/A

#### 5. Decommission a nuclear installation

*Describe the schedule for decommissioning the facility*

The decommissioning strategy for HIFAR is provided in the HIFAR Phase A Decommissioning Plan (ACS248144) included in this application (Annexure D). To summarise, the decommissioning of HIFAR will be conducted in two phases (Phase A and B), with the option to return to a Possess or Control licence at the completion of Phase A. Phase A will be decommissioning HIFAR's peripheral plant and equipment and Phase B will be decommissioning the reactor block and containment building.

ANSTO expects to make three separate submissions to ARPANSA with respect to the following Phase A decommission and dismantling activities at HIFAR.

| Phase | Submission                   | Rationale                                                                                                                                                                                                                                                     | Relevant Activities                                                                                                                                                                              |
|-------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A.I   | Facility Licence Application | HIFAR is a 'controlled facility' as defined under the <i>Australian Radiation Protection and Nuclear Safety Act 1998</i> (ARPANS Act). The decommissioning of a controlled facility must be authorised by licence pursuant to section 32(1) of the ARPANS Act | Activities relating to peripheral plant and equipment, including decommission and dismantling of HIFAR's: utilisation equipment; neutron beam instruments; and irradiation rig support equipment |
| A.II  | Section 63 Approval          | Request for CEO's approval to authorise certain changes under section 63 of the ARPANS Regulation 2018                                                                                                                                                        | Activities to decommission and dismantle main reactor ancillary circuits                                                                                                                         |

|       |                     |                                                                                                        |                                                                                         |
|-------|---------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| A.III | Section 63 Approval | Request for CEO's approval to authorise certain changes under section 63 of the ARPANS Regulation 2018 | Activities to decommission and dismantle items stored in HIFAR's number 1 storage block |
|-------|---------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|

This application pertains to the DLA Phase A.I only. The section 63 submissions supporting the Phase A.II and A.III will each require their own respective safety assessments and will be submitted for approval in accordance with the schedule defined herein. The overall schedule milestones for the Phase A work are presented in the table below:

| Task                                                                                                                                                                         | Estimate of Completion Date |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Environmental Protection and Biodiversity Conservation (EPBC) Referral/Public Works Committee approvals                                                                      | Q2 2023                     |
| Decommissioning Licence Approval (Phase A.I) <ul style="list-style-type: none"> <li>○ ARPANSA review</li> <li>○ Public submission</li> <li>○ Approval</li> </ul>             | Q4 2023                     |
| Work Completion (Phase A.I) <ul style="list-style-type: none"> <li>○ Neutron beam instruments</li> <li>○ Irradiation rig equipment</li> <li>○ Mezzanine platforms</li> </ul> | Q2 2024                     |
| Main ancillary circuits - section 63 (Phase A.II) <ul style="list-style-type: none"> <li>○ Preparation/SRA Approval</li> <li>○ ARPANSA approval</li> </ul>                   | Q2 2024                     |
| Storage Block contents - section 63 (Phase A.III) <ul style="list-style-type: none"> <li>○ Preparation/SRA Approval</li> <li>○ ARPANSA approval</li> </ul>                   | Q4 2024                     |
| Work Completion (Phase A.II and Phase A.III) <ul style="list-style-type: none"> <li>○ Main ancillary circuits</li> <li>○ Storage block contents</li> </ul>                   | Q4 2025                     |
| PorC application/approval (or Phase B Decommissioning Licence Application)                                                                                                   | Q1 2026                     |

## 6. Abandon a nuclear installation

*Describe the results of decommissioning activities at the facility*

N/A

*Provide details of any environmental monitoring program proposed for the site*

N/A

## Section G: Associated sources

Is there controlled material and/or controlled apparatus used in connection with the facility?

NO - proceed to Section H

YES – describe in the space below

If yes, identify the codes and standards relevant to the source(s) and describe how compliance will be achieved

N/A

## Section H: Source details

Complete the Excel Spreadsheet known as the Source Inventory Workbook (SIW) for any sources used in connection with the facility [Click here for template](#)

Note: For sealed sources, a copy of any sealed source certificate should accompany the application as per item 1(d) of the table in subsection 47(2) of the Regulations.

## Section I: Matters to be taken into account by the CEO

### International best practice in radiation protection and nuclear safety

Describe how international best practice in radiation protection and nuclear safety will be considered with respect to the kind of facility and type of authorisation(s) sought

The planning for radiation protection during Phase A has been documented in the Radiation Protection Plan section of Annexure C: HIFAR Phase A Plans and Arrangements (ACS261210). Key to this document are the primary principles of radiation protection, which are:

- Justification of Practice
- Optimisation of Protection
- Dose Limitation
- Defence in depth
- Safety culture (appropriate classification, PPE, monitoring programs)

These principles are discussed in detail in the HIFAR Phase A Radiation Protection Plan and have been drawn primarily from ANSTO's radiation protection documentation Radiation Safety Standard (AE-2310) and Radiation Safety Best Practice guide (AG-6288).

The HIFAR Decommissioning Phase A project is committed to enabling a positive safety culture by:

- Conducting works in accordance with the Codes of Practice and standards listed in Appendix A of the Annexure D: HIFAR Phase A Decommissioning Plan (ACS248144)
- Utilising experience gained in previous decommissioning projects such as the decommissioning of the MOATA reactor, decommissioning of hot cells, cyclotron and target station equipment at the NMC, Camperdown
- Conducting workshops to identify the best decommissioning approach

- Employing the experience gained in optimising radiation protection during the extensive characterisation of the HIFAR reactor
- Using best available techniques in radionuclide detection/analysis with the ANSTO-developed CORIS360 gamma imaging equipment
- Enabling collaboration with safety and radiation experts
- Communication with the Danish DR3 project team – a sister DIDO reactor decommissioning project
- Supporting a questioning attitude and fostering a collaborative project team
- Providing relevant training and awareness for all personnel working on HIFAR decommissioning activities
- Utilising safety briefings, toolbox talks, safety inspections and use of the STAR (Stop, Think, Act, Review) principle all encourage a positive safety culture
- Effective communication, consultation and cooperation
- Involving internal/external risk assessment specialists

To ensure all risks to the health and safety of ANSTO staff and the community are reduced as far as is reasonably practicable, the project will be committed to any requirements made from the Safety and Reliability Assurance (SRA) process.

## Information asked for by the CEO

*Confirm that all information asked for by the CEO has been provided*

The following Documents have been included in this application:

Annexure A: HIFAR Facility Licence Application (This document)

Annexure B.1: HIFAR Safety Analysis Report (ACS248156)

Annexure B.2: HIFAR Safety Analysis Report (ACS248156) (Redacted)

Annexure C.1: HIFAR Plans and Arrangements (Phase A Decommissioning) G-8212

Annexure C.2: HIFAR Plans and Arrangements (Phase A Decommissioning) G-8212 (Redacted)

Annexure D.1: HIFAR Phase A Decommissioning Plan (ACS248144)

Annexure D.2: HIFAR Phase A Decommissioning Plan (ACS248144) (Redacted)

Supporting Documentation:

Annexure E: HIFAR Phase A Dose Assessment (ANSTO/RPS/TN/2021-22)

Annexure F: Decommissioning Execution Plans for Neutron Beam Instrument Shielding

Annexure F.1: Ausans (ACS248150)

Annexure F.2: MRSCD (ACS248151)

Annexure F.3: Longpol (ACS248155)

Annexure F.4: TAS (ACS248153)

Annexure F.5: MRPD (ACS248152)

Annexure F.6: Neutron Reflectometer (ACS248154)

Annexure F.7: X193 (ACS248148)

Annexure G: Decommissioning Execution Plans for Irradiation rig support equipment (ACS248149)

Annexure H: Decommissioning Execution Plans for Removal of utilisation equipment

Annexure H.1: HIFAR Control Room (ACS256348)

Annexure H.2: Fuel Assembly Station (ACS256345)

Annexure H.3: Silicon Transfer Flasks (ACS256347)

Annexure H.4: Silicon Storage Blocks (ACS261237)

Annexure H.5: Fuel Element Transfer Flasks (N1 & N2) (ACS261236)

Annexure I: Safety Assessments for Beam Instruments

Annexure I.1: AUSANS (ANSTO/T/TN/2021-08 rev 0)

Annexure I.2: MRSCD (ANSTO/T/TN/2021-09 rev 0)

Annexure I.3: Longpol (ANSTO-T-TN-2021-12 rev 0)

Annexure I.4: TAS (ANSTO-T-TN-2021-10 rev 1)

Annexure I.5: MRPD (ANSTO-T-TN-2021-13 rev 0)

Annexure I.6: Neutron Reflectometer (ANSTO-T-TN-2021-11 rev 0)

Annexure I.7: X193 (ANSTO-T-TN-2021-14 rev 0)

Annexure J: Safety Assessment for Irradiation rig support equipment: Rigs (ANSTO-T-TN-2021-31 rev 0)

Annexure K: Safety Assessments for removal of utilisation equipment (ANSTO-T-TN-2021-32 rev 0)

Annexure L: AF-2321 HIFAR Phase A Decommissioning Project Safety Control Evaluation Checklist

Annexure M: Independent Safety and Reliability Review

Annexure N: SRA Endorsement

### ***Undue Risk***

*Provide information to show that there is no undue risk from radiation associated with the facility*

During the planning phase of the HIFAR decommissioning, hazards were identified and the potential risks were assessed.

The assessment conservatively assessed that the residual radiological and non-radiological risks were 'medium' risk or lower. Critical controls have been identified to ensure adequate management of risks. Decommissioning safety principles, process, and hazard and protection systems are discussed in the Annexure B HIFAR Safety Analysis Report (ACS248156) in support of this application.

### ***Net benefit***

*Provide information that demonstrates a net benefit from the proposed conduct*

A 2005 options study for HIFAR recommended its decommissioning be completed in three stages:

1. De-fuel, removal of the heavy water inventory etc.
2. Characterisation.
3. Final dismantlement.

One option was a deferred dismantlement strategy of 30 years, however given that decreases in radiation levels would be modest beyond 10 years post shut down, the study recommended early decommissioning. This would: meet with international best practice; utilise exiting knowledge of HIFAR within the operation and decommissioning teams; and align with previously made public commitments.

### ***Optimisation of protection***

*Provide information in relation to the proposed conduct to show 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 social factors*

A dose assessment (Annexure M: HIFAR Decommissioning Phase A Dose Assessment ACS264019) has been performed for the decommissioning activities proposed and is provided with this application. The radiation protection plan (described in section 3 of the Annexure C: HIFAR Plans & Arrangements G-8212, provided with this application) further describes the organisational arrangements and procedures for the control of exposure to ionising radiation during all activities. The plan outlines the decommissioning and dismantling activities to ensure compliance with standards and regulatory requirements regarding radiation protection.

### ***Capacity to comply***

*Provide information to show that the applicant has the capacity to comply with the Regulations and any licence conditions that may be imposed*

HIFAR's decommissioning plan operates within ANSTO's well established procedures for the management of controlled facilities. The HIFAR Plans & Arrangements G-8212 (Annexure C) section 1 identifies the effective controls in place to facilitate compliance. The project will be utilising experience gained in previous decommissioning projects that imposed licence conditions, such as the decommissioning of the MOATA reactor, decommissioning of hot cells, cyclotron and target station equipment at the NMC and the characterisation of Camperdown

### ***Authorised signatory***

*Confirm that the application has been signed by an office holder of the applicant or a person authorised by an office holder of the applicant*

This licence application has been signed by the Chief Executive Officer of the applicant (ANSTO).



## CHECKLIST

| Item                                                                                                                                                                                                                   | Check                               | N/A                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|
| 1. Completed and signed Section A – Applicant information                                                                                                                                                              | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 2. Instrument of authorisation for authorised person                                                                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 3. Organisational chart showing nominee                                                                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 4. Completed Section B – Kind of facility & type of authorisation                                                                                                                                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 5. Completed Section C – Facility Details                                                                                                                                                                              | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 6. Documents to support Section C                                                                                                                                                                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 7. Completed Section D – Safety Analysis Report                                                                                                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Documents to support Section D                                                                                                                                                                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 9. Completed Section E – Plans and Arrangements                                                                                                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 10. Documents to support Section E                                                                                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 11. Completed Section F – Extra Information                                                                                                                                                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Documents to support Section F                                                                                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 13. Completed Section G – Associated Sources                                                                                                                                                                           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 14. Documents to support Section G                                                                                                                                                                                     | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 15. Completed Section H – SIW                                                                                                                                                                                          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 16. A copy of any sealed source or special form certificates                                                                                                                                                           | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 17. Completed Section I – Matters to be considered by the CEO                                                                                                                                                          | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 18. Documents to support Section I                                                                                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 19. A version of the application suitable for public review<br><i>NOTE: The applicant must include alternative format of all documents (besides pdf) to satisfy Australian Government Web Accessibility guidelines</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 20. Appropriate application fee                                                                                                                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

### ***Submitting the application***

Send application form and all supporting documents to [licenceadmin@arpansa.gov.au](mailto:licenceadmin@arpansa.gov.au)

### ***Application fee***

Applicants should refer to section 49 of the Regulations to determine the appropriate application fee. The fee should be paid by cheque or EFT and must be received before the application can be assessed.