



**Australian Government**



Nuclear-based science benefiting all Australians

HIFAR Facility Licence Application  
Cover, Contents and Summary  
Document ANSTO/06/749/0 rev. 0



# **APPLICATION FOR THE FACILITY LICENCE, “POSSESS OR CONTROL” FOR THE HIFAR FACILITY**

(Rev. 0)

**Prepared By  
Australian Nuclear Science and Technology Organisation**

**May 2007**

Australian Nuclear Science & Technology Organisation  
HIFAR Facility Licence Application: Cover, Contents and Summary (rev. 0)

<b>REVISION SHEET</b>		<b>Document ANSTO/06/749/0 rev. 0</b>			
		Print name, date and sign or initial			
Revision Number	Description of Revision	Prepared	Checked/ Reviewed	Approved	Agreed
0	Original issue	Simon Bastin	Pertti Sirkka	John Rowling	Con Lyras

## **CONTENTS OF THE LICENCE APPLICATION**

SUMMARY OF THE APPLICATION

GLOSSARY

Part A: General information on the purpose and location of the Facility

Part B: The plans and arrangements for managing safety for the Facility

Part C: The Safety Analysis Report (SAR) for the Facility

Part D: The Limits and Conditions (LCs) for the Facility

Part E: The Planned Activities to be undertaken under the Licence

## SUMMARY

This document constitutes an application for a Facility Licence made by the Australian Nuclear Science and Technology Organisation (ANSTO\*) for the shutdown HIFAR Facility, in accordance with the requirements of the ARPANS Act 1998 and Regulations 1999, as amended. [1, 2]

This Application seeks to obtain a Facility Licence authorising ANSTO to Possess or Control the shutdown HIFAR Facility. This Facility is defined as a nuclear installation under the ARPANS Act.

The Application is sub-divided into parts as follows:

Part A: General information on the purpose and location of the Facility.

Part B: The plans and arrangements for managing safety for the Facility.

Part C: The Safety Analysis Report (SAR) for the Facility.

Part D: The Limits and Conditions (LCs) for the Facility.

Part E: The Planned Activities to be undertaken under the Licence.

Part B consists of eight plans consistent with Regulation 39(2) and requests from ARPANSA. These plans are as follows:

1. arrangements for maintaining effective control of the facility;
2. safety management plan for the controlled facility;
3. radiation protection plan for the controlled facility;
4. radioactive waste management plan for the controlled facility;
5. security plan for the controlled facility;
6. emergency plan for the controlled facility;
7. environmental management plan; and
8. arrangements for safe storage of controlled material and maintaining the controlled facility.

## PART A: GENERAL INFORMATION

### Background

The 10 MW (thermal) High Flux Australian Reactor (HIFAR) operated by the ANSTO was permanently shutdown on 30 January 2007 after approximately 50 years of operation.

ANSTO submitted a Preliminary Decommissioning Plan to ARPANSA on 1 May 2003. This Licence Application was prepared based on ARPANSA's response to the Preliminary Plan and subsequent communications between ANSTO and ARPANSA.

Since its permanent shutdown, the most significant radiological hazards have been removed from HIFAR to separately licensed facilities under the existing operating licence. These post-closure activities have been reported to ARPANSA separately.

### Facility Description

HIFAR is now a steel building containing the reactor block and shielding, the D<sub>2</sub>O primary circuit (D<sub>2</sub>O drained), including the Reactor Aluminium Tank, the core internals (excluding fuel), the graphite reflector and the Reactor Steel Tank. The existing Engineered Safety Provisions are also part of the facility although these have been disabled because they are no longer needed. OL&C surveillance requirements on these systems have also ceased.

The HIFAR facility is located at Building 15 and associated buildings in the Lucas Heights Science and Technology Centre, New Illawarra Road, Lucas Heights, New South Wales. The reactor is owned and controlled by ANSTO, the applicant.

---

\* Note that Definitions of the Terms and Acronyms used throughout this document are provided in Appendix .1

## Site Description

The Lucas Heights Science and Technology Centre is situated some 35 km south-west of the Sydney CBD on the Woronora Plateau at an elevation of about 150 m. HIFAR is located within a 70 ha fenced area which is surrounded by a 1.6 km radius buffer zone centred on HIFAR. No permanent residential development is permitted within the ANSTO buffer zone. The residential suburbs of Barden Ridge and Engadine are located in the north-east to south-east sectors adjacent to the ANSTO buffer zone boundary, while the suburb of Menai is located some 3 km further to the north-east.

## Strategy for ultimate decommissioning

The adopted strategy for ultimate decommissioning is outlined. The strategy and the plans and arrangements for managing safety are shown to be consistent with international best practice.

## PART B: PLANS AND ARRANGEMENTS FOR MANAGING SAFETY

ANSTO has in place plans and arrangements for the safe management of the facility during the period that this licence remains in force. These plans and arrangements include

- (a) arrangements for maintaining effective control of the facility;
- (b) safety management plan for the controlled facility;
- (c) radiation protection plan for the controlled facility;
- (d) radioactive waste management plan for the controlled facility;
- (e) security plan for the controlled facility;
- (f) emergency plan for the controlled facility,
- (g) environmental management plan for the controlled facility, and
- (h) arrangements for safe storage of controlled material and maintaining the controlled facility.

These plans and arrangements are provided in Part B of the licence application. The plans and arrangements are established in a hierarchical manner consisting of

- ANSTO policies;
- ANSTO Business Management System (ABMS) procedures and instructions; and
- HIFAR Quality Management System (QMS) procedures and instructions.

The HIFAR QMS procedures and instructions implement the ANSTO Occupational Health Safety and Environment (OSHE) requirements at the facility level consistent with good practice, and with statutory requirements.

ANSTO, as the licence holder and applicant, has responsibility for the management of the HIFAR facility. The Executive Director of ANSTO has delegated responsibility for the safe management of HIFAR to the General Manager, Technical Services and Facility Management (TS&FM) Division consistent with ANSTO policies and general arrangements.

The General Manager, Technical Services and Facilities Management has delegated responsibility for implementing these Plans to the Facility Manager. The Facility Manager is responsible for planning and managing resources to ensure the safety of activities undertaken in HIFAR and the effective maintenance and control of HIFAR.

A critical part of the ABMS is the Occupational Health, Safety and Environment Management System. This is a suite of standards, practices, guides and forms which set out the requirements for OHSE. These standards and practices comprehensively cover OHSE aspects, including radiation protection, and environmental aspects as well as conventional industrial and occupational safety aspects.

The ABMS also includes Standard Operating Procedures for managing incidents, accidents and emergencies.

Lines of communication, responsibilities and authorities, functions, duties and competencies associated with these activities are appropriately documented and administered through the HIFAR QMS.

The ANSTO Lucas Heights Science and Technology Centre is a secure site with access control to the whole site, in addition to specific controls for each building and area within the site.

## **PART C: SAFETY ANALYSIS REPORT**

The HIFAR Safety Analysis Report [3] shows that HIFAR can be maintained in a safe condition during the period that this licence remains in force, taking into account the activities planned for this period.

The SAR demonstrates that the radiological hazards are significantly reduced in this period when compared to the operational period, because the fuel elements and D<sub>2</sub>O have been removed from the facility. There are no criticality or nuclear safety issues involved. Radiological issues for personnel remain, since the facility contains radioactive items such as the reactor block, pipework, the storage block, etc. However, these items remain (and will continue to remain during the period that this licence remains in force) safely shielded within the reactor biological shield. Sample gathering for the purposes of inventory characterisation will take place during the period, but these practices will be carefully controlled and monitored.

## **PART D: LIMITS AND CONDITIONS**

The facility will be maintained within a safe envelope as specified in the Limits and Conditions. These Limits and Conditions evolved from the set of Operational Limits and Conditions (OLCs) applicable to HIFAR in its operational period [4].

The limits and conditions relate to

- Radiation Monitoring Instrumentation,
- Detection of Tritium,
- Normal and Active Extract ventilation,
- Rig Handling Requirements,
- Airborne Discharges,
- Air Activity in Building 15, and
- Hazardous Materials

## **PART E: PLANNED ACTIVITIES**

Four types of activities will be undertaken during the period that this licence remains in force:

1. Preliminary dismantling of essentially inactive systems no longer required for the operation or safety of HIFAR;
2. Refurbishment of some systems that are required during the period that this licence remains in force;
3. Sample gathering for inventory characterisation; and
4. Surveillance and Maintenance.

All these activities will be managed in accordance with the HIFAR project management procedures and instructions. Activities will obtain internal approval, where appropriate, prior to commencement, in accordance with the OHSE Standard on Safety Approval. Some activities will require regulatory approval, which will be sought in accordance with ARPANS Regulation 51. Further details on these activities may be found in Part E of this application.

**Preliminary dismantling** will be restricted to essentially inactive systems and equipment. It is neither practicable nor desirable to generate large amounts of radioactive waste prior to the establishment of the Commonwealth Radioactive Waste Management Facility. Therefore, radiological issues will not be significant for these activities. Nevertheless, appropriate health physics coverage and radiation monitoring will apply while these activities are undertaken.

**Refurbishment of some systems** such as the power supply system and the active extract ventilation systems will be needed to keep the facility in a state of safe enclosure, particularly given that the facility will not be manned on a 24 hour basis.

**Sample gathering for inventory characterisation** will be used towards the end of the period that this licence remains in force to support and confirm inventory modelling and inventory estimation from similar facilities. Radiological safety issues will be relevant to this activity and will be controlled by good planning, independent review by the Safety Assessment Committee of proposed tasks, in-situ dust and/or gas collection where appropriate, health physics coverage and appropriate radiation monitoring.

## GLOSSARY

### ACRONYMS

<b>AAEC</b>	Australian Atomic Energy Commission
<b>ALARA</b>	As Low As Reasonably Achievable, economic and social factors being taken into account
<b>ANSTO</b>	Australian Nuclear Science and Technology Organisation
<b>ARPANSA</b>	Australian Radiation Protection and Nuclear Safety Agency
<b>ASNO</b>	Australian Safeguards and Non-Proliferation Office
<b>EPSS</b>	Electrical Power Supply System
<b>HAZOP</b>	Hazard and Operability Study
<b>HEU</b>	Highly Enriched Uranium
<b>HIFAR</b>	High Flux Australian Reactor
<b>HSD</b>	HIFAR Safety Document (effectively the safety analysis report for HIFAR in its operating state)
<b>HVAC</b>	Heating, Ventilation and Air-conditioning
<b>IAEA</b>	International Atomic Energy Agency
<b>ICRP</b>	International Commission on Radiological Protection
<b>INES</b>	International Nuclear Event Scale
<b>LEU</b>	Low Enriched Uranium
<b>LHSTC</b>	Lucas Heights Science and Technology Centre
<b>OHSE</b>	Occupational Health, Safety and Environmental
<b>QMS</b>	Quality Management Systems
<b>RAT</b>	Reactor Aluminium Tank
<b>SAR</b>	Safety Analysis Report
<b>SCADA</b>	Supervisory Control and Data Acquisition System
<b>SCC</b>	Site Control Centre
<b>UKAEA</b>	United Kingdom Atomic Energy Authority
<b>WO</b>	Waste Operations

### DEFINITIONS

**Abnormal Occurrence** - Any deviation from routine operating conditions.

**Accident** - A safety event rated Level 4 and above on the International Nuclear Event Scale

**Controlled Facility** Means (a) a nuclear installation; or (b) a prescribed radiation facility, as defined under ARPANS Act

**Controlled Material** Means any natural or artificial material, whether in solid or liquid form, or in the form of a gas or vapour, which emits ionising radiation spontaneously, as defined under ARPANS Act.

**Controlled Source** - Any Controlled Material, either in sealed or unsealed form, or Controlled Apparatus covered by the ARPANS Act.

**Facility Licence** - A licence for a Controlled Facility issued under Section 32 of the ARPANS Act.

**Possess and Control period** The period for which the Possess or Control licence will remain in force.

**Relevant Change** Means a change as defined in ARPANS Regulations 51 and 52.

**Safe Enclosure** Means a strategy in which a facility or site is placed into a safe condition and in which decontamination and dismantling are delayed for some years (known as the safe enclosure period). During this time, a surveillance and maintenance programme is implemented for the facility.

## REFERENCES

- 1 Australian Radiation Protection and Nuclear Safety (ARPANS) Act 1998
- 2 Australian Radiation Protection and Nuclear Safety (ARPANS) Regulations 1999
- 3 Safety Analysis Report (SAR) for the de-fuelled HIFAR Facility (Rev. 0, 2007)
- 4 HIFAR Operational Limits and Conditions (NTD/TN 212)