



**Australian Government**



Nuclear-based science benefiting all Australians

HIFAR Facility Licence Application Part B(8)

Document ANSTO/06/749/2/FP-8



# **PLANS FOR THE SAFE STORAGE OF CONTROLLED MATERIAL AND MAINTENANCE OF THE HIFAR FACILITY**

(REV. 0)

**Prepared By**

**Australian Nuclear Science and Technology Organisation**

**May 2007**

Australian Nuclear Science & Technology Organisation  
 Plans for the Safe Storage of Controlled Material and Maintenance of the HIFAR Facility (rev 0)

<b>REVISION SHEET</b>		<b>Document ANSTO/06/749/2/FP-8</b>			
		Print name, date and sign or initial			
Revision Number	Description of Revision	Prepared	Checked/ Reviewed	Approved	Agreed
0	Original issue	Simon Bastin	Moazzem Hossain Pertti Sirkka Steve McIntosh	John Rowling	Con Lyras

**CONTENTS**

1	PURPOSE AND SCOPE .....	4
2	RESPONSIBILITIES .....	4
3	SAFE STORAGE OF CONTROLLED MATERIAL .....	4
4	MAINTAINING THE CONTROLLED FACILITY .....	5
4.1	Calibration, testing, inspection and general maintenance .....	5
4.2	Environmental control .....	5
5	INTERNATIONAL BEST PRACTICE .....	6
6	REFERENCES .....	7

## 1 PURPOSE AND SCOPE

The purpose of this document is to describe the organisational arrangements and procedures for the safe storage of controlled material and maintaining the HIFAR Facility during the Possess and Control period.

The ARPANS Act and Regulation 39 [1, 2] empower the CEO, ARPANSA to request some or all of the information in Part 1 of Schedule 3 of the ARPANS regulations. Items 13 and 14 of Part 1 of Schedule 3 of the regulations state:

*13. The arrangements for maintaining criticality safety during loading, moving or storing nuclear fuel and other fissile materials at the controlled facility.*

*14. The arrangements for safe storage of controlled material and maintaining the controlled facility.*

The CEO of ARPANSA has confirmed that since item 13 is not relevant to this licence application, it does not need to be addressed in these plans and arrangements. This plan addresses the requirements of item 14 and should be read in conjunction with other plans, specifically those relating to effective control, radiation protection and waste management.

## 2 RESPONSIBILITIES

ANSTO, as the licence holder, 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) during the period that this licence remains in force. The Operating Organisation for this period, with roles, responsibilities and lines communication of key personnel, is described in detail in the Effective Control Plan.

The General Manager, Technical Services and Facilities Management is the Licence Nominee for HIFAR and has overall responsibility for the maintenance of and safety of activities undertaken in HIFAR at all times, consistent with ANSTO policies and general arrangements. The Nominee is delegated to make, amend or vary the application in the name of ANSTO, pursuant to paragraph 34(a) of the ARPANS Act 1998 and regulation 39 of the ARPANS Regulations 1999.

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 (TSFM Procedure DHF 001 – “Quality Management Planning – De-fuelled HIFAR Facility” [3] and Procedure NHP 1.2 – “Organisation, Responsibilities and Authority”. [4]

## 3 SAFE STORAGE OF CONTROLLED MATERIAL

ANSTO's arrangements for safe storage of controlled material are as set out in OHSE document AG 2471, *Safe Management of Licensable Sources (Guide)*. These are implemented in HIFAR in the HIFAR QMS as described in the Effective Control Plan.

The use and control of radioactive sources for HIFAR operational use are covered by the provisions of HIFAR Procedure NHP 9.3.11 - Use and Control of Radioactive Sources.

The inventory of sources is maintained in accordance with the above procedure on NH343 - HIFAR Source Register. For each source, the Register gives details of the source type, intended purpose, encapsulation material, fixed, portable or mobile status, storage location, radionuclide identification, activity at the last date of activity measurement, manufacturer, serial number, physical form and chemical form.

The majority of the sources used in HIFAR during normal operations have become redundant since HIFAR was permanently shutdown. Some of these sources will be transferred to the Waste Operations licence under the arrangements of the operating licence and procedure NHP 9.3.11 (and associated instructions). Others will be transferred over the Possess and Control period, again in accordance with NHP 9.3.11.

The remaining sources will be check sources and some calibration sources, as shown on the current register NH343.

The majority of the activated or contaminated material in the HIFAR Facility will remain in the reactor block or No. 1 Storage Block for the period this licence remains in force. This provides more than adequate shielding and provides security due to the difficulty of removal.

Small amounts of activated or contaminated material will be handled in accordance with applicable HIFAR Procedures, including NHP 9.2.36 – “Management of HIFAR Waste” and NHP 9.2.21 – “Radiological Safety”.

## **4 MAINTAINING THE CONTROLLED FACILITY**

The arrangements for maintaining the facility are set out in the QMS. This is described under the Effective Control Plan [Part B (1) of this licence application].

### **4.1 Calibration, testing, inspection and general maintenance**

The maintenance of fire detectors and fire instrument panels, radiation monitors and active ventilation system will be detailed in a schedule to ensure that they are operational and in calibration.

The polar crane will be required during the removal of redundant equipment from the Reactor Building but will then remain unused until the final dismantling activities. Thus the crane will be maintained as necessary during the preliminary dismantling and refurbishment activities and then will be given preventative maintenance during the rest of the Possess and Control period to ensure that it will be available for the final dismantling activities. The cranes that are retained in the Reactor Building will be maintained at appropriate intervals based on the usage and the need to ensure operation is possible at the end of the Possess and Control period.

The security doors and fire extinguishers will be maintained in the usual fashion as is done on the rest of the site. Maintenance activities of fire detectors and fire panels, ventilation systems, air-conditioning systems, cranes, lifting equipment, and security doors are undertaken by Facilities Management (within Technical Services and Facilities Management Division).

Maintenance activities of radiation monitors and fire extinguishers are undertaken by Safety and Radiation Services under a Service Level Agreement.

These services are provided by suitably qualified practitioners who are either ANSTO staff or reputable contractors selected and supervised by qualified ANSTO staff. The services conform to ANSTO and divisional procedures at standard intervals.

### **4.2 Plant environment control surveillance**

The main environment control for maintaining the facility is the use of the heating, ventilation and air-conditioning system to deliver air with controlled low levels of humidity so as to avoid possible water condensation on metal surfaces, and thus minimise possible corrosion or oxidation of surfaces.

This is not a direct safety issue but is required to maintain the integrity of the building and structures for the Possess and Control period and to minimise the possibility of generating loose corrosion products that may be radioactive.

Therefore, in addition to the general maintenance activities discussed in section 4.1 above, specific inspections will be required throughout the Possess and Control period as part of the maintenance and surveillance plan to monitor performance and plant status in relation to the building internal environment controls. This plan is consistent with the international best practice [5]. Recommended monitoring includes:

(a) Temperature and humidity: The temperature and humidity inside the reactor building will be controlled by the new HVAC (Heating, Ventilation and Air Conditioning) System and it will be continuously monitored by the HIFAR Monitoring System (Project E0927 – see the SAR [Part C of this licence application], and Part E of this licence application).

(b) Corrosion: The new HVAC system will maintain a temperature and humidity that will prevent condensation of water vapour on the internal surfaces of the reactor building and stack. Moreover, regular inspections of the building will be carried out to identify any possible onset of corrosion to metallic surfaces.

(c) Atmospheric Pollutant level: The HIFAR facility is located at Sydney's southern area, where air pollution is generally low. During its operational life, there was no sign of degradation or corrosive effects caused by air pollutants on the outer shell or other parts of HIFAR. Thus, it is expected that the air pollutants will have no significant effects during the Possess and Control period.

(d) Seismicity: There are two seismic monitors used to monitor vibrations due to earthquake. One of these is fixed to the reactor building wall, while the other is fixed to a solid bed of rock near the facility. These monitors will remain in operation during the Possess and Control period, although the monitor on the reactor building wall may be relocated to OPAL.

(e) Drainage: The drainage system of HIFAR will remain in place as it has been during its operational life. The inspection and maintenance services to the drainage system will be provided by TS&FM (Technical Service and Facilities Management). Regular inspections will examine floors, sumps and basement areas (access permitting) to check for water ingress or backup (e.g. due to a leaking water pipe or valve).

(f) Ventilation: The operation of the ventilation system will be monitored by the HIFAR Monitoring System (Project E0927). The regular inspection and maintenance services to the system will be provided by ANSTO TS&FM.

(g) Concrete Status: Regular inspection of the concrete structures in HIFAR will be carried out by TS&FM engineers. Maintenance services will be provided to the concrete if it becomes necessary. The shielding integrity of the reactor block will be frequently checked by health physics surveys. This would then clear the areas for the day's work by the active handling group and technicians. Fixed area monitors (gamma detectors and Tritium detectors) will complement such surveys.

(h) Material coating status: The majority of the structures inside the reactor building do not require any specific coating since they are constructed of stainless steel. Some ancillary structures of mild steel will require some inspection and upkeep to prevent corrosion.

#### 4.2.1 Surveillance frequency

The frequency of equipment maintenance and inspections is determined by the frequency used for any other facility on site.

The frequency of plant status surveillance and surveys during the Possess and Control period will initially be set as per IAEA guidance [5] as follows:

- Building inspection: initially every 6 months, gradually extended providing satisfactory results.
- Major structural survey: every 5 years.

Leak rate testing is of course not relevant to the HIFAR Facility in the possess and control period.

## 5 INTERNATIONAL BEST PRACTICE

The ongoing maintenance and surveillance plan for HIFAR during its Possess and Control period are consistent with the international best practice described in the IAEA Safety Reports on deferred dismantling and safe enclosure [5]. The surveillance program identified the wide range of elements and parameters that are to be monitored during the safe enclosure period. The program also specifically identifies the frequency of routine inspection and surveys of the HIFAR instruments, sensors, structures, building services, security operations etc to be carried out.

## 6 REFERENCES

- 1 Australian Radiation Protection and Nuclear Safety (ARPANS) Act 1998
- 2 Australian Radiation Protection and Nuclear Safety (ARPANS) Regulations 1999
- 3 TSFM Procedure DHF 001 (Rev. 0) – “Quality Management Planning – De-fuelled HIFAR Facility”
- 4 HIFAR Procedure NHP 1.2 (Rev. 11) – “Organisation, Responsibilities and Authority”
- 5 Safety Reports Series No. 26, Safe Enclosure of Nuclear Facilities during Deferred Dismantling, IAEA, 2002