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HIFAR Facility Licence Application Part B(4)

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RADIOACTIVE WASTE MANAGEMENT PLAN FOR THE HIFAR FACILITY

(REV. 0)

Prepared By

Australian Nuclear Science and Technology Organisation

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Australian Nuclear Science & Technology Organisation
Radioactive Waste Management Plan for the HIFAR Facility (rev. 0)

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1 PURPOSE AND SCOPE

The purpose of this Radioactive Waste Management Plan is to describe the organisational arrangements and responsibilities for the control, storage and transfer of the radioactive waste generated from HIFAR during the Possess and Control period. It details how solid and liquid radioactive waste generated by HIFAR during that period will be transferred to ANSTO's Waste Operations section. The systems and processes outlined in this document address current best practice, including waste minimisation principles, and are in line with IAEA guidelines for the safe management of radioactive waste.

This Plan has been prepared for the safe management of the facility and as part of the "Possess or Control" Licence Application to replace the existing HIFAR Operating Licence, following the permanent shutdown of the reactor (refer to Part A of the Application for further details).

This plan should be read in conjunction with other plans, specifically those relating to effective control, safety management and radiation protection.

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) from 1 May 2007 and throughout the period that this licence remains in force. The Operating Organisation for this period, with roles, responsibilities and lines of 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 (TS&FM Procedure DHF 001 – "Quality Management Planning – De-fuelled HIFAR Facility" [1] and Procedure NHP 1.2 – "Organisation, Responsibilities and Authority" [2]).

3 RADIOACTIVE WASTE MANAGEMENT ARRANGEMENTS

During the period that this licence remains in force, small amounts of low level solid waste may be generated (arising for example from routine monitoring, maintenance etc).

Furthermore, during the period that this licence remains in force, several refurbishment projects will be implemented and preliminary dismantling operations will be undertaken. These may also generate some low level waste, as although the items identified under Part E of this licence application for dismantling work are considered inactive, there may be some components with small amounts of either activation or contamination. These quantities are expected to be small. The majority of the waste generated during the period that this licence remains in force is expected to be cleared as exempt and recycled or sent for landfill.

This Radioactive Waste Management Plan has been developed to interface with and complement the Radiation Protection Plan and the Effective Control Plan. This plan interfaces with the existing ANSTO plans and arrangements. The plans and arrangements include the existing licensed Waste Operations (FO0044-4B) facilities and provide ANSTO with current best practice in transport, treatment, conditioning, packaging and storage of the radioactive wastes.

ANSTO OHSE radioactive waste management is implemented through the following OHSE guides:

- AG 2517 *Safe Management of Radioactive Waste (Guide)*
- AG 2518 *Safe Management of Radioactive Waste - Solid Wastes (Guide)*
- AG 2519 *Safe Management of Radioactive Waste - Liquid Wastes (Guide)*

AG 2520 *Safe Management of Radioactive Waste - Airborne Wastes (Guide)*

HIFAR has a Service Level Agreement with Waste Operations (WO) Section to accept, treat and condition waste, as required. Radioactive waste arising during the period that this licence remains in force will be managed in accordance with WO systems, which are in line with current best practice including:

1. IAEA guidelines on waste handling;
2. IAEA Safety Standards and Guidelines;
3. IAEA Codes of Practice;
4. Requirements from federal and state authorities; and
5. Waste minimisation principles.

WO has waste transportation, processing and storage capabilities and currently provides radioactive waste management and decontamination services to all ANSTO facilities, including HIFAR.

The HIFAR QMS describes overarching responsibilities, procedures and detailed work instructions on how radioactive waste is managed and transferred [3]. The QMS includes requirements for periodic review of procedures on handling, transport, treatment and storage of radioactive waste. It also identifies the process of records maintenance for inspection and environmental monitoring of stored radioactive waste. These are consistent with arrangements currently in place for WO.

3.1 Waste Minimisation - Design Systems and Processes

The likely amount and type of waste generated as a result of the activities to be undertaken during the period that this licence remains in force has been estimated in order to ensure appropriate selection of materials and methods of control. The estimates are provided in the Safety Analysis Report (Part C of this Licence Application). Technical and administrative controls are in place that will reduce the volume and activity of the waste generated.

In line with the implementation of ANSTO's Radioactive Waste Management Policy, comprehensive measures are in place for the minimisation of waste generation at all of ANSTO's licensed facilities.

These include the minimisation of waste generation at the source by the implementation of systems that incorporate:

- Segregation of wastes,
- Waste classification and characterisation,
- Delay and decay,
- Recycle and reuse,
- Exempt level waste system,
- Improved decontamination facilities,
- Waste management optimisation – pre-treatment, treatment, conditioning, transportation, storage and disposal, and
- Ongoing education and training of operating staff.

ANSTO's certified Environmental Management System (EMS) provides the commitment to minimise ANSTO's environmental "footprint". The EMS is compliant with ISO 14001, and provides a structured approach to the identification of environmental aspects and the controls that limit the environmental impacts of ANSTO's activities. Within the EMS, there are defined objectives and targets that focus on effective management of airborne, liquid and solid wastes. The HIFAR management system is certified in accordance with ISO 14001 as an integral part of the ANSTO EMS certification.

3.2 Compliance with Appropriate Codes

There are a number of Codes of Practice relevant to waste management that have been utilised by ANSTO as part of its current arrangements. These include:

1. Code of Practice for the Disposal of Radioactive Waste by the User (1985);
2. Code of Practice for the Near Surface Disposal of Radioactive Waste in Australia (1992); and
3. Code of Practice for the Safe Transport of Radioactive Material (2001).

In addition, a Trade Waste Agreement is in place between ANSTO and Sydney Water for discharges of trade waste effluent to the sewer. WO is responsible for reporting on, and maintaining compliance with, the Trade Waste Agreement. ARPANSA is responsible for monitoring compliance with the Trade Waste Agreement.

3.3 Monitoring, Control, Segregation and Classification of Waste

Arrangements are in place that provide for the monitoring, control, segregation and classification of solid and liquid wastes and airborne emissions. These systems include stack sampling for tritium and active particulates.

3.4 Limiting Exposure to Radioactive Waste

The arrangements for minimising exposures to ionising radiation arising from radioactive waste are addressed as part of the Radiation Protection Plan and briefly under the following sections.

All credible exposure pathways for radioactive wastes are identified in ANSTO EMAP/TN/-01/2002 Pathways Analysis.

Dose is minimised in a number of ways including:

- Design and location of storage facilities (shielding and occupancy),
- Capture of wastes at source (eg dust collection when sample gathering),
- Delay and decay process,
- Radiation and contamination monitoring of waste items to ensure appropriate storage and segregation of waste items, and
- Appropriate shielding of transport containers.

3.5 Packaging and Containment of Radioactive Waste

Relevant packaging and containment procedures for HIFAR are consistent with established WO procedures.

3.6 Transport of Waste

The transport of waste from HIFAR is in accordance with the currently licensed arrangements existing at the LHSTC site. All solid waste leaving HIFAR receives Health Physics clearance and is moved in accordance with the same systems currently employed by WO as per AG2513 *Contamination Clearance Levels (Guide)* and AG2514 *Clearance of Radiation Classified or Radioactive Contamination (Guide)*.

3.7 Record Keeping

Records are kept of all relevant aspects of the generation, control and storage of radioactive waste as per AG2517, AG2518, AG2519, and AG2520.

3.8 Reporting of Releases

Transfers of solid and liquid waste from HIFAR, together with airborne emissions, are reported as part of the HIFAR QMS and in the quarterly reports submitted under the Waste Operations licence. This includes quarterly and annual reporting to ARPANSA as per the discharge authorisation [4]. In addition to routine reporting, any inadvertent generation of waste is reported if it gives rise to a release that exceeds notification levels.

3.9 Training of Personnel

In accordance with the current ANSTO Safety Management System, training is given to personnel involved with radioactive wastes to ensure they understand and comply with HIFAR procedures in place for the handling, treatment, transport, storage, and transfer or ultimate disposal of all radioactive waste. The Radiation Safety Standard and Practices of the OHSE system are also applicable.

4 SOLID WASTE

4.1 Solid Waste Characteristics

Activities undertaken in HIFAR may result in the generation of small amounts of solid waste. In line with IAEA guidelines, solid wastes are classified as low level solid waste (LLSW) or intermediate level solid waste (ILSW). No intermediate level solid waste is expected to be generated during the period that this licence remains in force.

4.2 Solid Waste Management System Description

This section details the measures that are in place to control and manage the solid waste streams arising from activities to be undertaken in HIFAR. The measures are fully consistent with those for which ANSTO is currently licensed.

In accordance with ANSTO's operating strategy, solid waste is segregated at the point of generation, and waste minimisation principles applied wherever practicable.

Segregation at source will produce two streams of solid wastes: Inactive or exempt-level, and LLSW.

Inactive wastes are recycled or disposed of directly through the municipal waste management system. Exempt level wastes are processed through the existing ANSTO exempt level waste clearance system. Where practicable, exempt waste is routed through recycling schemes.

LLSW are classified in accordance with the ANSTO classification system. Radioactive solid waste packages are managed in accordance with existing procedures.

4.2.1 Coarse Control Arms

The coarse control arms and control rods activated during the operational period of HIFAR were initially stored in the Number 1 Storage Block in HIFAR after removal from the core. These are now being progressively transferred to Waste Operations under the existing Operating Licence. Some movements of the control rods and coarse control arms to Waste Operations may continue during the period that this Possess or Control licence is in force.

4.2.2 Radioactive Sources

During the operational period of HIFAR, some radioactive sources were used for checking and calibration of instruments etc. The use and control of these sources for HIFAR operational use are covered by the provisions of HIFAR Procedure NHP 9.3.11 - Use and Control of Radioactive Sources.

Many of these sources have become redundant. Obsolete or redundant radioactive sources, including past legacy sources, will be transferred to Waste Operations waste source store in accordance with the provisions of the existing HIFAR Procedure NHP 9.3.11. See also the plan for safe storage of controlled material in Part B(8).

5 LIQUID WASTE

Small quantities of liquid discharges may be generated from preliminary dismantling activities (e.g. from decontamination work) and discharged to the "B" or "C" lines subject to the limits specified in ANSTO OHSE AG 2519 Safe Management of Radioactive Waste - Liquid Wastes (Guide). Discharge to the sewer will be in accordance with Trade Waste Agreement limits set with Sydney Water and monitored by ARPANSA.

6 AIRBORNE WASTE

Details of airborne waste are described in the Safety Analysis Report. This section is a summary of that.

Airborne emissions may be derived from evaporating tritiated heavy water remnant in parts of the primary circuit; from emissions of tritium (present as tritiated hydrogen gas) de-adsorbing from the graphite space and from any dusts generated in sample gathering for waste characterisation.

Dusts arising from specific activities will be controlled using appropriate local containment methods when undertaking any work that might generate dusts. Dusts that escape this local containment would be removed from the airstream by HEPA filtration prior to discharge via the stack

The likely potential pathways of exposure to staff from airborne waste are:

- inhalation of airborne radioactive materials present in the workplace; and
- ingestion of radioactive materials in particulate form in the workplace.

Tritium monitoring within Building 15 will continue until the hazard is determined to have passed. Particulates will be monitored by air samplers, as deemed necessary through risk assessments.

In addition to the above arrangements, HIFAR has local procedures interfacing with the site-wide WO arrangements and procedures. These arrangements and procedures will be used, as applicable, during the period that this licence remains in force. The local HIFAR Procedures will be amended in future, as required. These arrangements and procedures are listed under Requirement 32 (Radioactive Waste Management Arrangements) in the draft Index of Documents [5].

Since the period that this licence remains in force will not involve decommissioning of the HIFAR facility, only very small volumes of radioactive wastes will be generated, with negligible safety implications. The above arrangements and procedures are, therefore, considered more than adequate to address any radioactive waste management issues arising during this phase.

ANSTO complies with and will continue to comply with the relevant discharge limits/authorisation, such as, the LHSTC Trade Waste Agreement with Sydney Water and the applicable ARPANSA-issued airborne discharge authorisation [4].

7 INTERNATIONAL BEST PRACTICE

The waste management plan includes the existing licensed Waste Operations (FO0044-4B) facilities at ANSTO. The plan is consistent with current best practice in transport, treatment, conditioning, packaging and storage of radioactive wastes as per IAEA safety standards and guidelines on pre-disposal management of low and intermediate level radioactive wastes (WS-G-2.5). The effectiveness of this plan was demonstrated in previous licence applications submitted to ARPANSA for other facilities in ANSTO.

8 REFERENCES

- 1 TSFM Procedure DHF 001 (Rev. 0) – “Quality Management Planning – De-fuelled HIFAR Facility”
- 2 HIFAR Procedure NHP 1.2 (Rev. 11) – “Organisation, Responsibilities and Authority”
- 3 HIFAR Procedure NHP 9.2.36 (rev 1) – “Management of HIFAR Waste”
- 4 ANSTO Discharge Authorisation (currently in ARPANSA Licence Conditions Handbook, Part 2, RB-STD-24-01, Revision 1, 31 May 2001)
- 5 Index of Documents (Draft) demonstrating compliance with licence conditions