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Interim Waste Store Operating Licence Application

Document IWS-O-LA-DOP

(REDACTED VERSION)

INTERIM WASTE STORE OPERATING LICENCE - ARRANGEMENTS FOR OPERATING THE FACILITY

(Rev. 1)

Prepared By

Australian Nuclear Science and Technology Organisation

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1	Revised the document to incorporate comments from the SAC.	IWS Area Supervisor	Safety & Reliability Adviser	Head Nuclear Services

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1 PURPOSE AND SCOPE

The purpose of this document is to describe the arrangements that are in place to operate the the *Interim Waste Store (IWS)* at Lucas Heights Science and Technology Centre (LHSTC). The document, is being prepared in accordance with the ARPANS legislation [1,2] and the ANSTO business arrangements. This document highlights the steps and procedures that will be undertaken from the receipt and handling of the TN 81 transport/storage container to the setting up for monitoring whilst in interim storage at the IWS. Any maintenance activities surrounding the cask or the building during the operational phase of the facility are also described here.

This arrangement should be read in conjunction with the other plans and supporting documents comprising the IWS operating licence application, specifically IWS-O-LA-SAR: *Safety Analysis Report*.

2 WASTE PACKAGES

Two types of waste packages will be received and stored inside the IWS:

a) Type B(U)

TN-81 package is a Type B(U) transport and storage package containing up to 28 canisters of the reprocessed HIFAR spent fuel waste (CSD-U). Each canister (Figure 1) weighs around 550 kg when filled with 150 L of vitrified waste. In T1 transport configuration, the loaded package weighs up to 113,700kg. Figure 2 below depicts an exploded view of the TN-81 package in T1 transport configuration. The overall dimensions of the TN-81 in its transport configuration measures 7,215 mm (H) x 2,750 mm (D) and when set up in storage configuration measures 6,454 mm (H) x 2,780 mm (D).

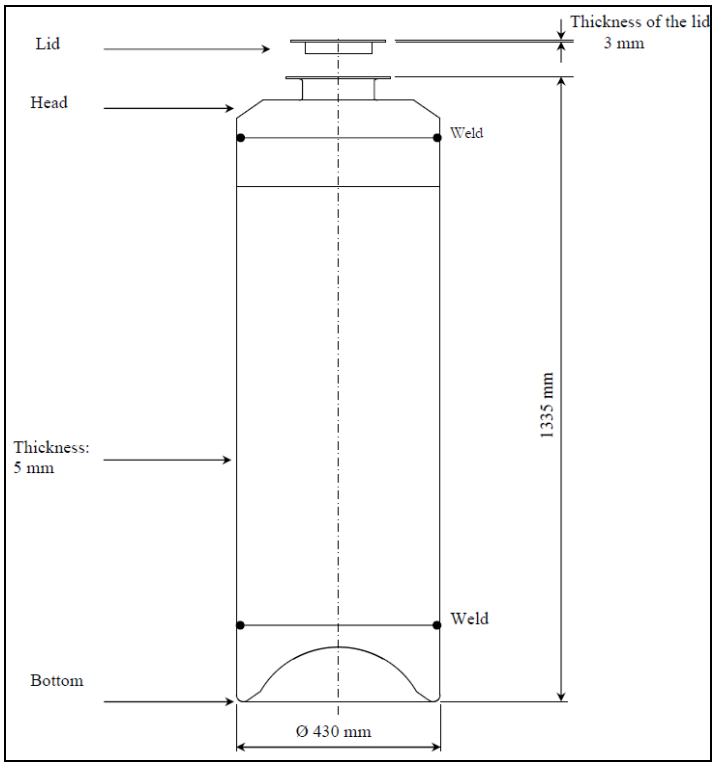

Figure 1: Schematic of a CSD-U canister

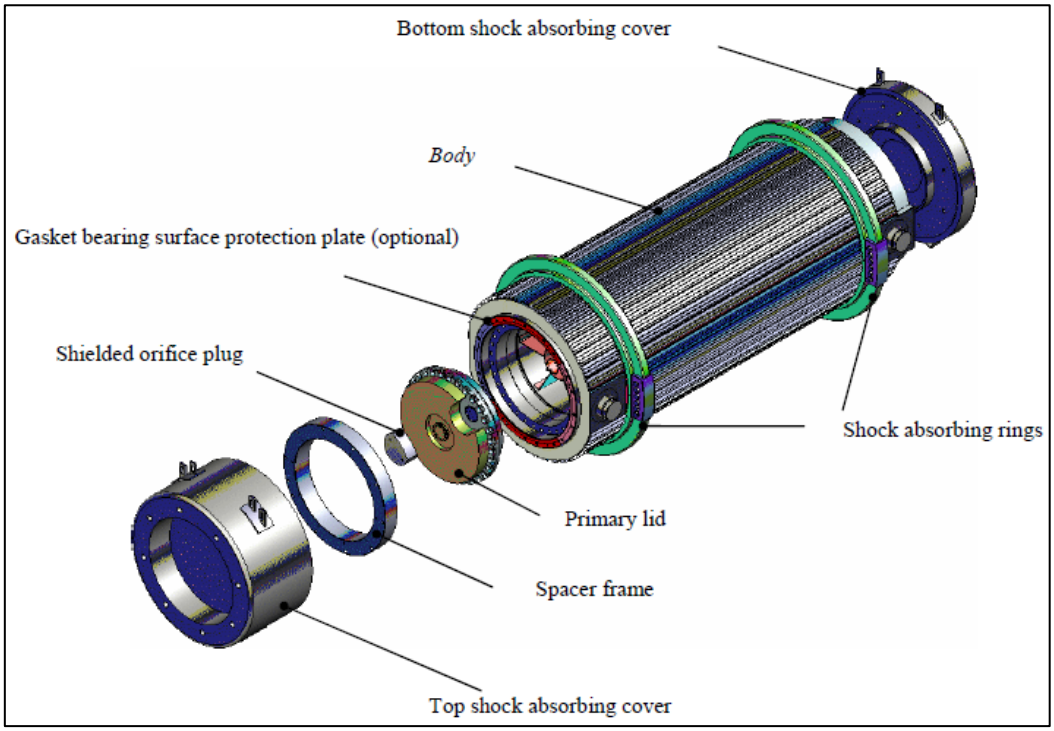

Figure 2: An exploded view of the TN-81 cask in T1 transport configuration.

b) IP2

The DV78 container, an IP2 package, is used to hold the technological wastes generated during the vitrification process of the HIFAR spent fuel assemblies. The overall dimensions of the DV78 are 6,058mm (L) x 2,438mm (W) x 2,591 mm (H), weighing 4,300kg when empty. (Figure 4)

The internal fittings of the DV78 container consist of a single storage rack which forms a partitioned frame for placement of up to six (6) individual CBF-C2 cylinders. This rack is attached by screws onto the DV78 via eight (8) base plates welded at the bottom of the rack. A maximum of six (6) CBF-C2 cylinders of not more than 18,600kg can be loaded giving a maximum loaded weight of the DV78 of 24,000kg.

The CBF-C2 type fibre-reinforced concrete cylinder (Figure 3) has a nominal dimension of 1000mm x 1500mm (H) and a maximum mass of 4,000 kg each.

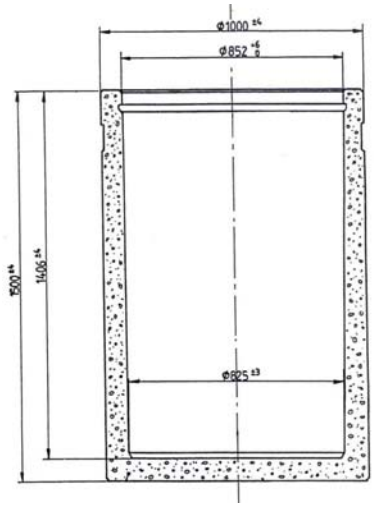

Figure 3: CBF-C2 type fibre-reinforced concrete cylinder

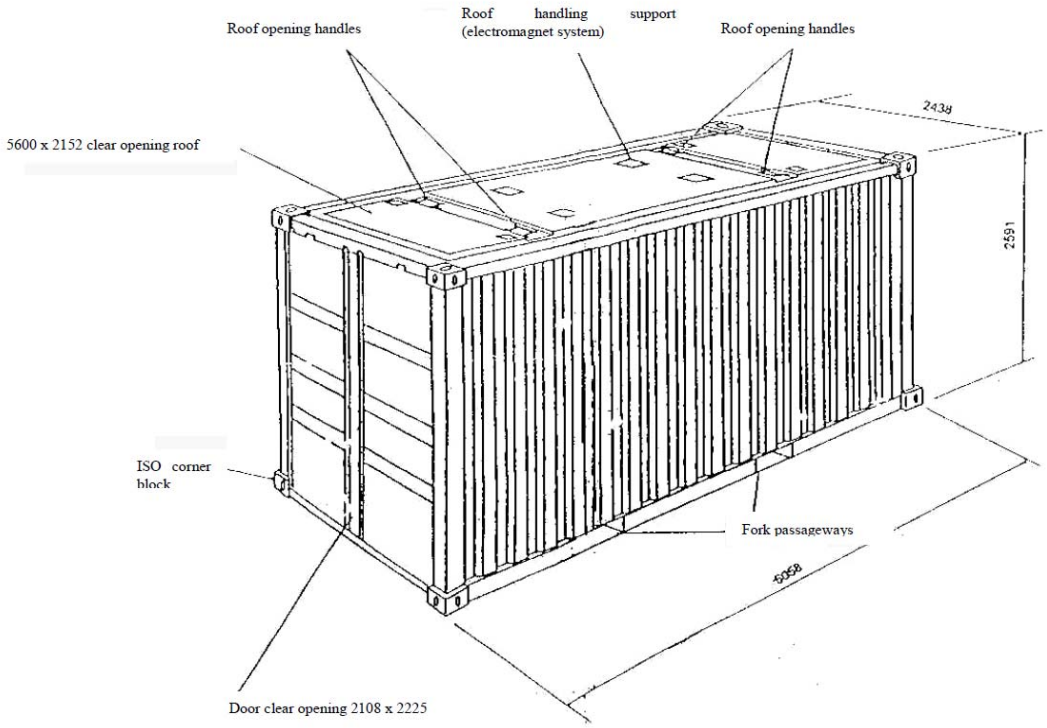

Figure 4: DV78 Container for housing the six CBF-C2 cylinders of technological waste

Upon receipt of these two waste packages at the Lucas Heights site, they will be set up for interim storage within the IWS. Instruction manuals details the steps required to prepare each package for interim storage as well as the monitoring and maintenance required for the storage period [6, 8,12]. The complexity of the set up process varies greatly between the two packages by virtue of the waste-form and package design. Ongoing monitoring and maintenance for both packages are minimal. The subsequent section provides an overview of the arrangement to be undertaken for the receipt, set up, monitoring and maintenance of both waste packages during the interim storage period within the IWS.

Note: The majority of the shipping container depicted will be occupied by packaging and waste containment materials. The actual volume of returning waste is in fact only equivalent to one-third of a shipping container.

3 Arrangements for TN 81 transport/storage container

3.1 Receipt and Set up for Interim Storage

The steps required to set up the TN 81 for interim storage are listed below. The general and special handling specifications for the TN 81 package and its components are covered by Item 5 of the Instruction Manual (IM) [8].

The numbers in the parenthesis ( ) refer to the component or item number listed in the list of materials document provided by AREVA [22].

The setup tasks will be carried out in compliance with the ANSTO WHS Management System and with the assistance and supervision of experienced personnel from similar waste storage facilities overseas. Also, ANSTO Radiation Protection and WHS Advisors will be involved while undertaking these tasks.

Steps	References
1. <u>Receipt of the package</u>	
1.1 Check for the presence of seals on the top shock absorbing	• IM, Item 3, Section 5,

Steps	References
cover and the labelling of the package. 1.2 Visually inspect the condition of the package and of its transport frame and trailer. 1.3 Perform a radiological check on both the waste package and trailer will be performed as per the Transport Documentation File (TDF). 1.4 Remove the top and bottom shock absorbing covers. 1.5 Lift and tilt the package into the vertical position and transfer it to the preparation area within the IWS where the scaffold system has been set up.	p9-14 [6] • IM, Item 5 [8] • ANSTO-specific TDF [20]
2. <u>Mounting of the secondary lid</u> 2.1 Visually inspect the aspect and cleanliness of the gaskets, seats and grooves of the secondary lid and the monitoring orifice cover. 2.2 Verify the leak tightness of the monitoring system. Install the monitoring system and the monitoring orifice cover fitted with its gasket, on the secondary lid. 2.3 Remove the test plugs (431) from the secondary lid. 2.4 Fit the gaskets (421 and 422) of the secondary lid using a new metallic gasket (421) after inspecting the state and the cleanliness of the gaskets, their seats and grooves. Fit the elastomer gasket in the external groove of the secondary lid. 2.5 Mount the secondary lid. 2.6 Grease the screws (411) of the secondary lid and screw the fixing screws (411) of the secondary lid. 2.7 Pre-tighten the screws (411) to a sufficient torque level to ensure the contact steel-steel between the secondary lid flange (41) and the shell (11). 2.8 Tighten the fixing screws (411) of the secondary lid to the defined torque, allowing a delay of one hour between pre-tightening operations and the final tightening. 2.9 Check the absence of the quick coupling (444) and mount the coupling element (3670) with a new metallic gasket (3650).	• IM, Item 3, Section 8, p15 [6] • IM, Item 5, 7 and 8 [8,10,11]
3. <u>Mounting of the monitoring system</u> The monitoring system is equipped with 3 pressure transmitters and a pressurised chamber. The pressure transmitters are attached to terminals inside a junction box from which an 8-wire temperature resistant braided cable terminates into a Harting connector for hook up to the site surveillance system. 3.1 Mount the monitoring system with the monitoring orifice cover (3640). 3.2 Grease the screws (3660) of the monitoring orifice cover in compliance with the procedure described in paragraph 1 of the present document and screw the fixing screws (3660) into the secondary lid. 3.3 Pre-tighten the monitoring orifice screws (3660) to a sufficient	• IM, Item 3, Section 8, p17 [6] • IM, Item 8 [11]

Steps	References
torque level to ensure the contact steel-steel between the monitoring orifice cover (3640) and the secondary lid (41). 3.4 Tighten the fixing screws (3660) into the secondary lid to the defined torque, allowing a delay of one hour between pre-tightening operations and the final tightening. 3.5 Check the tightening torque on the screws. 3.6 Connect the monitoring system.	
4. <u>Perform Leak Tightness Tests</u> The leakage rate measured corresponds to the sum of the leakage rates for the internal gasket of the secondary lid and the internal gasket of the secondary lid monitoring orifice cover. The maximum leakage criterion being 10^{-8} $Pa.m^3.s^{-1}$ 4.1 Perform a leak tightness test of the secondary lid inner gasket. 4.2 Fill the inter-lids space with helium at 6.5 bars absolute at ambient temperature. 4.3 Perform a leak tightness test of the metallic gasket of the monitoring system cover. 4.4 Fill the space under the monitoring cover with helium to 6.5 bar abs. 4.5 Fit the test plugs (431) on the secondary lid and its cover. 4.6 Connect the three pressure transmitters individually to a measuring device to ascertain uniformity of the output signals which will be recorded. 4.7 Conduct the radiological inspections and measure the temperature of the accessible surfaces of the package.	• IM, Item 3, Section 8, p17 [6] • IM, Item 4, 7 & 8 [7,10,11]
5. <u>Storing of the Package</u> 5.1 Prepare the anti-air crash cover and fit it over the package, ensuring that the monitoring system cables pass through the purpose-built groove. 5.2 Connect the monitoring system cables to the site cask surveillance system ensuring proper signals are received. 5.3 Perform a radiological survey of the surrounds of the package and the storage site.	• IM, Item 3, Section 8, p17 [6] • IM, Item 5 & 8 [8,11]

3.1 Monitoring and Maintenance

Under normal storage conditions, the maintenance operation is minimal as the TN 81 package is not subjected to loading nor mechanical or thermal variation. The thermal variations caused by the daily and seasonal temperature fluctuation and from the decreasing residual power of the CSD-U canisters pose little impact since the changes occur very slowly and with low amplitude. Beyond the six (6) monthly visual examinations of the external surfaces of the package and the pressure monitoring system with remote display unit and alarm for the inter-lid pressures connected to the Site Control Centre, no further monitoring is required.

Monitoring *[Frequency]*	Conditions of Non-conformity	Repair procedure

Monitoring *[Frequency]*	Conditions of Non-conformity	Repair procedure
Visual Inspection *[6 monthly]*	• Degradation of silicone between the profiles • Deterioration of paint of the external surface of the cask	IM, Item 9, section 3.2 & 3.3 [12]
Pressure monitoring *[Continuous 24/7]*	• Daily pressure gradient greater than -0.5 bar. • Inter-lid pressure less than 4 bar abs or greater than 7 bar abs.	IM, Item 9, section 3.4 [12]

4 Arrangements for DV78

4.1 Receipt and Set up for Interim Storage

The DV78 will be driven on a back of a truck in the horizontal position into the IWS. As the DV78 container is derived from an ISO 20-foot container, unloading procedures is as per standard ISO container using a lifting frame and the building crane. The DV78 will be lifted off the back of the truck and transfer to its storage location within the IWS. The content inside the DV78 will not be unloaded, keeping the tamper-proof seal of the package intact.

4.2 Monitoring and Maintenance

Minimal monitoring and maintenance is required for the DV78 package as it is not being loaded or unloaded, nor used as a transport package. It will be stored undercover inside the IWS which is a secure storage facility with limited personnel access.

A 12-monthly radiological survey will be carried out on the package as part of the building's radiological and contamination survey. A visual inspection of the package for the overall condition, including the integrity of the tamper-proof seal, regulatory identification, labels and paintwork, will be at a lesser frequency of 24-month. The DV 78 inspection and maintenance program will be in accordance with ANSTO Packaging Approval Officer's recommendations [23].

5 Arrangements for the Facility

5.1 Receipt and Set up for Interim Storage

The facility will be equipped with a 140 T DGR building crane to lift the TN 81 package from the transporter to its vertical storage location within the IWS. A scaffold structure will be set up for personnel access to the top of the TN-81 to install the secondary lid, perform a leak tightness test, and mount the leak monitoring system and anti-aircraft crash cover as described in Section 3.1 above.

The test equipment required to perform the leak tightness test is outlined in IM, Item 4 [7] which include in part nitrogen and helium gas supply, helium detector, rotary vane pump, thermometer etc. The tools and equipment required for the installation of the secondary lid, leak monitoring system and anti-aircraft crash are listed for each step in IM, Item 1 [5], which include hand tools, the building crane and associated lifting equipment.

5.2 Monitoring and Maintenance

Area radiation monitors will be installed in the building to inform of the ambient dose rate near the packages. A 12 monthly radiation dose and contamination survey will be carried out for the

work areas. The Radiation Protection Plan [18] provides further detail on routine radiation monitoring requirement for the facility.

The general building monitoring and maintenance requirements will be overseen by Facilities Managements. A description of the structures, components, systems and equipment for the facility is given in [17].

Maintenance Tasks	Frequency
Exit/Emergency lights testing	6 monthly
Portable appliance testing (in control room)	5 yearly
Fans/air-conditioner maintenance (in control room)	6 monthly
Building crane maintenance	Quarterly
Housekeeping	6 monthly
Fire panel test	Annually
Electrical Switchboard	Annually
IT equipment	Annual
Public Announcement system	6 month
Alarm testing	Annual

6 REFERENCES

1. Australian Radiation Protection and Nuclear Safety (ARPANS) Act 1998
2. Australian Radiation Protection and Nuclear Safety (ARPANS) Regulations 1999.
3. Storage Safety Analysis Report (TSAR) for the TN 81 Transport and Storage Packaging at Lucas Heights Site. Chapter 8, 9 12.
4. DV 78-IP2 Certificate of Conformity for a Model IP-2 Package
5. TN-81 Instruction Manual EXP-13-00096013-001-E Item 1 Data Sheet and Functional Drawings
6. TN-81 Instruction Manual EXP-13-00096013-003-E Item 3 Specification for Interim Storage
7. TN-81 Instruction Manual EXP-13-00096013-004-E Item 4 Leak Tightness Specification
8. TN-81 Instruction Manual EXP-13-00096013-005-E Item 5 General Handling and Storage Specifications
9. TN-81 Instruction Manual EXP-13-00096013-006-E Item 6 Tie Down Specification
10. TN-81 Instruction Manual EXP-13-00096013-007-E Item 7 Gasket Replacement Specification
11. TN-81 Instruction Manual EXP-13-00096013-008-E Item 8 Cask Components Tightening/Loosening Specifications
12. TN-81 Instruction Manual EXP-13-00096013-009-E Item 9 Maintenance of the Cask During Storage
13. TN-81 Instruction Manual EXP-13-00096013-010-E Item 10 Setting in Transport Configuration After A Storage Period
14. TN-81 Instruction Manual EXP-13-00096013-011-E Item 11 Setting in Transport Configuration After An Interim Storage

15. TN-81 Instruction Manual EXP-13-00096013-012-E Item 12 Specification for Unloading Operations
16. EXP-05-00015633-100 Rev. 4 Instructions for the DV78 Container
17. IWS-O-LA-FD Description of the As-Built Structures, Components, Systems and Equipment of the Controlled Facility
18. IWS-O-LA-LA-D3 IWS Radiation Protection Plan
19. EXP-06-00031106-601 Rev. 7 Appendix 6A-1 Conformity File DV 78
20. Transport Documentation File – Vitrified Transport to ANSTO
21. SPI-12-00062061 Rev.1 Procedure for Repairing a Partially Torn Fin.
22. AREVA TNI, SPI-06-00040322-100 Rev. 03, List of Components and Materials, October 2009.
23. DV 78 IP-2 Transport Package Inspection and Maintenance. Document number 146767.