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First Return of Reprocessed Intermediate Level Waste to Australia – Receipt and Transport to the ANSTO Interim Waste Store

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Abstract

The Hi-flux Australian Reactor (HIFAR) operated from 1958 to 2007, at the Australian Nuclear Science and Technology Organisation (ANSTO). Between 1999 and 2004, four shipments of HIFAR spent fuel were sent to La Hague for reprocessing, on the condition that assigned residues were sent back to Australia by 31 December 2015. The shipment of intermediate level vitrified residues and technological wastes from reprocessing left France mid-October 2015 and arrived in a port outside of Sydney in early December. This was the first time waste from reprocessing was received in Australia.

Due to the size and mass of the TN81 cask, a mobile crane was set-up on the wharf for the unload from the ship. A large security operation was required for the road transport of ILW from the port to the Interim Store at ANSTO.

This paper will discuss the

- Formation of an Inter-governmental Working Group of State and Federal agencies in support of the road transport of the ILW
- Regulatory approval frameworks in Australia for transport and storage of ILW from reprocessing
- Key aspects to consider when planning a transport of oversize, heavy cargo
- Communication strategy in the lead-up to and during the transport operation
- Engagement with local government and other non-government groups about the ILW, its origins and the need for its return

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Introduction

ANSTO signed a contract with AREVA NC (formerly COGEMA) in 1999 for the transport, reprocessing and return of residues from HIFAR spent fuel. Four spent fuel shipments were sent to France from Australia in 1999, 2001, 2003 and 2004. A total of 1288 spent fuel assemblies were

reprocessed. The return of residues was mandated to leave France by 31 December 2015. This paper describes the preparations undertaken in Australia in order to receive the return of intermediate level radioactive wastes from reprocessing for the first time.

Description of Returned Wastes

TN81 Package

Mass (with transport frame)	~123 tons
Length:	7.25 m
Diameter:	2.75 m

Twenty CSD-U canisters of intermediate level vitrified waste were placed within the TN81. The TN81 was in the T1 transport configuration and transported on a specially designed dual purpose maritime/road transport frame. Lifts of the TN81 included the transport frame.

DV-78 Package

Six cemented containers of intermediate level technological wastes were transported within a specially designed ISO container. The total mass of the package was approximately 24 tons.

Key operational aspects considered in the return of the wastes from reprocessing

Storage of the wastes

In 2012 it became apparent that the Australian Government would not have an operational National Radioactive Waste Management Facility in place by December 2015. The Australian Government requested that ANSTO take receipt of the intermediate level wastes from reprocessing of HIFAR fuel until a national facility was in operation. ANSTO did not have a facility equipped to manage the TN81 package so the Interim Waste Store was constructed and equipped with a 170t crane (dangerous goods rated) in order to lift the TN81 into its storage position. Construction occurred between 2014 and 2015.

Regulatory approvals required for the construction of the Interim Waste Store were obtained from a number of bodies, including:

- Public Works
- Environmental Protection and Biodiversity Conservation Act
- Australian Radiation Protection and Nuclear Safety Agency

Manufacture of the TN81

The contract for manufacture of the TN81 was executed in 2011 to ensure that the cask would be ready before the departure deadline. AREVA TN project managed the manufacture and ANSTO

engaged SVS to undertake independent third party audits of throughout the manufacture. AREVA TN was also engaged to manage the design of a dual purpose frame for maritime and road transport. ANSTO engaged Robatel to manufacture four-point and two-point lifting beams for the TN81. Interface tests between the TN81, transport frame and lifting beams were undertaken after cask manufacture and before loading waste to the TN81.

Receipt of the wastes

Port Kembla was selected for the receipt of the wastes due to the fact it could receive non-containerised cargo and was within a reasonable distance of the ANSTO Lucas Heights site. While the port had on-site cranes, a dual lift would have been required for the TN81 which is not standard practice for radioactive packages. Similarly for the ship which had two on-board cranes which were disabled for the maritime transport.

The timing of the ship's arrival was critical to the success of the security operation around the unload of the cargo and transport. A buffer was built into the estimated maritime transit time to guarantee that the ship would arrive on the designated date.

A 350 Liebherr crane was erected at the port in order to remove the waste containers from the ship. Approvals from the port authorities were needed in order to set-up the crane and undertake the required lifts. Considerations were the footprint of the crane on the wharf, the outreach of the crane (lift at distance) and forces during the slew operation. All parties working on the port were required to undertake ANSTO and wharf safety inductions. An exemption was obtained from the port to exceed the 2 h unloaded dangerous goods limit at the berth.

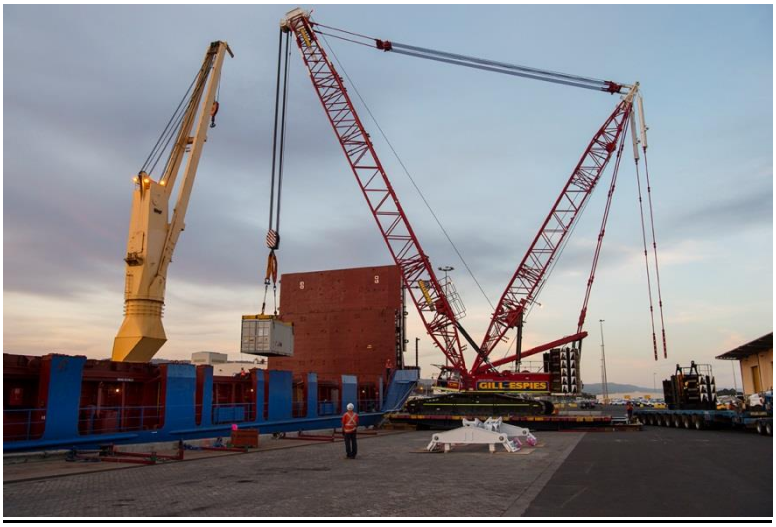

Figure 1 Mobile Crane at Port Kembla

Contamination and dose surveys were conducted on the TN81 and DV78 packages on arrival at the port prior to removal of the packages from the ship. Contamination surveys were conducted on

trailers and trucks prior to being loaded with the waste. Workers interfacing with the packages were issued with dosimeters.

Road Transport of the wastes

The TN81, due to its dimensions and contents was classified as a sensitive (radioactive), oversize, heavy cargo. A permit for the route and load configuration was required before transport. Key aspects to consider were road loading limits, road width, turning circle of load, bridge and/or overpass heights and loading limits, need for road closures (security and safety measure), time of transport – low traffic density.

A 12-axle Nicolas platform trailer was required to spread the load appropriately and the trailer was fronted by two heavy duty block trucks and tailed by one or two heavy duty block trucks, depending on conditions. The TN81 was fixed to the trailer through the use of spreader plates at each end of the transport frame and chains from fixed points on the transport frame. Chains were also deployed around the base of the transport frame.

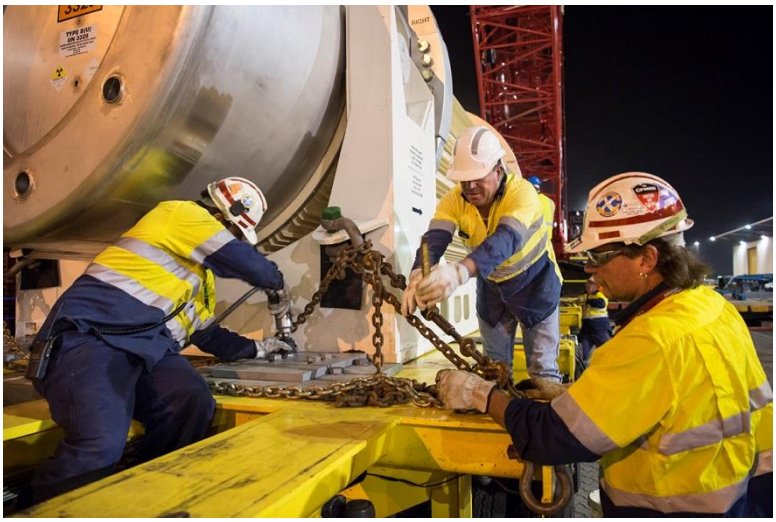

Figure 2 Securing the TN81 to the transport trailer

A traffic management company was employed to direct traffic on alternate routes or hold traffic for necessary for road and other closures. The traffic management company applied for road occupancy licences for required contraflow activities; closed roads and diverted traffic via alternative routes during the convoy operation; covered speed signs when appropriate; provided around thirty (30) variable message signs along the route for prior notifications of road closures and diversions; manned up to ten (10) traffic points (pinch points and road diversions) so that the convoy could proceed unimpeded.

The safety of the convoy was ensured through the removal of traffic travelling in the same direction

as the convoy for certain parts of the route, the use of experienced and licenced heavy haulage drivers and the slow speed of the convoy. Emergency responders comprised a secondary convoy travelling closely behind the primary convoy containing the cargo and essential back-up vehicles.

The lead convoy consisted of:

- 2 x pilot vehicles
- Vehicles carrying the cargo
- Spare vehicles for redundancy
- A mechanic's vehicle with Logistics Supervisor
- ANSTO security
- Australian Federal Police
- Other police specialised vehicles escorts both car and motorcycle

The support convoy was led by NSW Command vehicle and included:

- Police Rescue Vehicle
- NSW Fire and Rescue
- Ambulance

A heavy duty tow truck with 120 tonne towing capacity was stationed along the route to remove any unexpected vehicles or obstacles that might otherwise impede progress. A light duty tow truck travelled ahead of the convoy to remove any vehicles that might impede progress.

Prior to the transport, traffic density studies were conducted and a weekend night of least traffic density was chosen for the transport. Necessary road closures were notified via variable messaging systems along affected roadsides and the Roads and Maritime Services traffic notification website, more than a week in advance of the transport.

Receipt at ANSTO

On arrival at ANSTO the 12-axle trailer was exchanged for a 7-axle trailer to permit navigation of the site roads. A gantry lift system was used to lift the TN81 from the 12-axle trailer. The smaller trailer was then positioned underneath and the TN81 lowered upon it. The gantry lift system was operated by specialist licenced operators, monitored by the ANSTO Contract Supervisor.

Figure 3 Gantry crane lift of TN81

A study was done of the ANSTO internal route to identify where placement of spreader plates was necessary to appropriately spread the load over service conduits, etc.

Prior to the receipt of the TN81, operational readiness activities were conducted to:

- Increase familiarity / awareness of the unload and storage preparation processes; To-scale mock-up items built and exercises conducted
- Communicate responsibilities & manage expectations: all internal and external stakeholders involved
- Train staff at Zwilag facility through witness of TN81 handling (NOTE: subject matter experts invited to ANSTO during unload activities)
- Review work instructions prior to day of operation

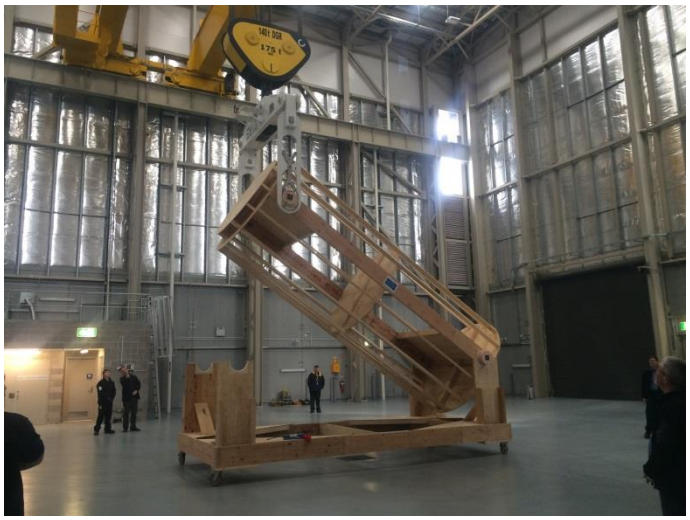

Figure 4 Crane lift of TN81 mock-up

Formation of an Intergovernmental Working Group

ANSTO briefed the Federal Minister for Industry, Innovation and Science on the need for a Working Group including State agencies. The Federal Minister approached the Premier of New South Wales who then approached the NSW Police Commissioner to render assistance. The Intergovernmental Working Group of State and Federal agencies was formed 1 year in advance of transport operation to oversight the road transport of the intermediate level wastes and had representatives from Roads and Maritime Services, Traffic Management Centre, Fire and Rescue NSW, Ambulance NSW, NSW Health, Port Authority of NSW, NSW Ports, NSW Police, Australian Federal Police and ANSTO.

Regulatory Approvals

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) provided the validation of Certificate of Compliance for the TN81 and contents; the Import Permit on behalf of Customs for the radioactive contents; Shipment Approval (permitting transport of the TN81 Type B container on roads and including the Transport Safety Plan); approval of the Transport Security Plan commensurate with the aggregate radioactivity of waste as a Category 1 source and the Facility Licence for the Interim Waste Store at ANSTO

Approval was also required under the Environmental Protection and Biodiversity Conservation Act 1999 which explicitly mentions that transporting spent fuel or radioactive waste products arising from reprocessing constitutes a nuclear action. The Australian Maritime Safety Authority provided validation of the Certification of Compliance for the TN81 and contents and conducted inspections of the ship on arrival at the port. The Road and Maritime Services issued a permit for the transport route and contents of the shipment.

Communications

A comprehensive communications plan was conducted, addressing internal (ANSTO) and external stakeholders, including the Government, the public and issue motivated groups. The risks to ANSTO that were addressed in the communications plan were the perception of safety about the transport of the ILW , the concern that the ILW would be permanently stored at ANSTO, and the need for continuing Government support for ANSTO operations, including the ILW return.

Government Briefings

A series of briefs were prepared over the lifetime of the project to advise ANSTO's Minister and involved Ministers (Minister for the Environment, Minister for Foreign Affairs) of upcoming regulatory approvals or project milestones. These briefs addressed the need for the ILW return, provided information on the specifics of the ILW and how safety would be ensured during all phases of the transport exercise.

Public communications

The public communications campaign was designed keeping the following perceptions and facts in mind: that Australians think nuclear waste is unsafe; Lack of general trust in the nuclear industry; People don't know what ANSTO is and the benefits of nuclear science; Few people understood how nuclear science & technology helps them. The two communication themes run in parallel promoted

- Outcomes and benefits of nuclear science and ANSTO's work with a focus on nuclear medicine and
- Transparency about the waste returning from France

Regular updates were posted on the ANSTO website about the ILW return including a series of Frequently Asked Questions designed to address concerns of the public and other groups. Fact sheets were sent to local MPs and other stakeholders, informing them of the upcoming shipment and how they could obtain further information. Briefing sessions were also held with local councils and government. A joint communication strategy with AREVA was agreed to for shipment announcements, which were also posted on the ANSTO website. A media conference was held in the Interim Waste Store after arrival of the TN81.

ANSTO actively engaged with representatives from issue motivated groups, conducting on-site briefing sessions where possible. Information about the waste content, the choice and design of the dual purpose transport/storage container, TN81 and interim storage at ANSTO was discussed. Additional careful negotiations took place with these groups to facilitate access to secure areas of the port. This allowed careful controls to be placed on their protest activities while providing an opportunity for them to obtain footage of the transport vessel entering the port, without interfering on the progress of the operation. Ongoing communications between NSW Police and Police media, ANSTO Communications, ANSTO Government Liaison and the project team was essential for this outcome.

Conclusions

Careful planning, taking into consideration where the waste would be stored in Australia, what type of container would be most appropriate for the transport and storage phases, transport logistics, security and communications around the shipment, resulted in the successful return of waste from reprocessing to Australia for the first time. The close relationships established with the Australian logistics provider, AREVA NC, AREVA TN and Intergovernmental Working Group participants including NSW Police ensured this successful outcome.

Acknowledgments

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