

Australian Government

Australian Radiation Protection and Nuclear Safety Agency

REGULATORY ASSESSMENT REPORT

Assessment of Facility Licence Application A0292 from the

Australian Nuclear Science and Technology Organisation (ANSTO)

to operate the

Interim Waste Store (IWS)

Regulatory Services Branch R15/05147 7 May 2015

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Executive Summary

On 10 November 2014, the CEO of ARPANSA received an application (A0292) from the Chief Executive Officer (CEO) of the Australian Nuclear Science and Technology Organisation (ANSTO), for authorisation to operate a controlled facility, namely the ANSTO Interim Waste Store (IWS).

The proposed facility will be used for housing Intermediate Level Solid Waste (ILSW) returned from France following the reprocessing of HIFAR spent fuel. The facility will store one TN81 transport/storage shielded container and six cemented drums of technological wastes in a large ISO shipping container.

When considering the licence application and making a decision as to whether to issue a licence, the CEO of ARPANSA is required to take into consideration certain matters prescribed in the *Australian Radiation Protection and Nuclear Safety Act 1998* (the Act). The ARPANSA assessor prepared this Regulatory Assessment Report (RAR) for the CEO of ARPANSA to address these matters.

This RAR is based on the assessment of the information described in the application A0292, additional supporting material provided by ANSTO and discussions with facility representatives to clarify the application. The plans and arrangements for safety and other relevant information about the operation of the facility have been reviewed against applicable guidelines and principles in the ARPANSA *Regulatory Guideline for Plans and Arrangements*, ARPANSA *Regulatory Assessment Principles for Controlled Facilities* and *Regulatory Guide for Radioactive Storage and Disposal Facilities*. These regulatory documents are based on national and international recommendations and guidance for radiation protection and nuclear safety.

The application describes operational aspects of the facility, plans and arrangements for managing safety, construction of the facility, final safety analysis, operating limits and conditions, arrangements for commissioning, and arrangements for operation. In assessing the application, ARPANSA took into account relevant design and operational aspects of the proposed facility. This included the form of waste and similar practices in other countries. ARPANSA's assessment also considered the matters identified in the assessment of the siting and construction licence applications that were required to be addressed in the licence application to operate the facility.

Considering the plans and arrangements for managing safety, and the safety analysis, it is expected that the operation of the proposed IWS Facility at the ANSTO Lucas Heights Science and Technology Centre (LHSTC) will not result in the introduction of any significant risks.

The ARPANSA assessor finds that the application has satisfactorily addressed the matters that must be taken into account by the CEO of ARPANSA in deciding whether to issue a facility licence. He concludes that, based on the application, the facility may be operated without undue risk to the health and safety of the people and the environment.

The ARPANSA assessor recommends that the CEO of ARPANSA issue a facility licence to ANSTO authorising the operation of the proposed facility subject to the licence conditions set out in section 5.2 of this report.

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1. INTRODUCTION

Commonwealth entities that undertake activities involving controlled facilities, controlled apparatus or controlled material must comply with the requirements of the *Australian Radiation Protection and Nuclear Safety Act* (the Act) [1] and the Australian Radiation Protection and Nuclear Safety Regulations (the Regulations) [2].

The object of the Act is to protect the health and safety of people and the environment from the harmful effects of radiation.

Under the Act, a controlled person (which includes a Commonwealth entity) must not prepare a site for a controlled facility, construct, possess or control, operate, or decommission, dispose of or abandon a controlled facility unless the person is authorised to do so by a facility licence or is exempt.

A facility licence is a licence issued by the Chief Executive Officer (CEO) of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).

In the case of this application, the applicant, Dr Adrian Paterson, the CEO of ANSTO seeks a facility licence under sub-section 32(1) of the Act to construct the controlled facility known as the ANSTO Interim Waste Store (IWS).

The Act defines a controlled facility as either a nuclear installation or a prescribed radiation facility. The IWS facility is a nuclear installation as defined in regulation 7.

1.1 Receipt of Application

In accordance with the requirements of the Act, the CEO of ANSTO submitted an application for a facility licence on 10 November 2014. The application is in an acceptable form. The appropriate application fee has been paid.

As required by the Regulations, the CEO of ARPANSA published a notice in *The Australian* newspaper and in the *Australian Government Gazette* (C2014G02040) on 10 December 2014, notifying the receipt of a facility licence application from ANSTO and his intention to make a decision on the application.

Additional information subsequently obtained from the applicant forms part of the application.

1.2 Purpose and Format

The objective of this report is to document the assessment of information, by the ARPANSA assessor, contained in ANSTO's application against the criteria set out in the Act and Regulations, and to make recommendations to the CEO about a decision on the application.

The purpose of the review is to determine whether the conduct of operation can be carried out for its purpose while protecting health and safety of people and the environment from the harmful effects of radiation.

Consideration is given to the matters to be taken into account by the CEO under sub-section 32(3) of the Act, that is, international best practice in radiation protection and nuclear safety as it relates to the R15/05147 Page 7 of 48

application, those matters set out in regulation 41 and information obtained under Part 1 of Schedule 3 to the Regulations.

Section 2 of this report details the review of information contained in the application. The conclusions of the ARPANSA assessor appear in Section 4 and inform the assessment of matters to be taken into account by the CEO in making a decision on the application. Section 5 sets out the assessor's recommendations to the CEO regarding the issue of a licence and any licence conditions.

The assessor relied on the following documents and information in developing his recommendations to the CEO:

- The information contained in the initial application (A0292).
- Additional information obtained from the applicant following receipt of the application.
- Meetings and discussions with the applicant and/or their representatives.
- Other documents referred to in the body of this report.

1.3 Assessment Process

The following documents were used in the assessment of this application:

- Australian Radiation Protection and Nuclear Safety Act 1998[1]
- Australian Radiation Protection and Nuclear Safety Regulations 1999[2]
- Australian Radiation Protection and Nuclear Safety Agency, *Regulatory Guide: Plans & Arrangements for Managing Safety* v5 (RG) (May 2014) [3]
- Australian Radiation Protection and Nuclear Safety Agency, *Regulatory Assessment Principles for Controlled Facilities (RAPS)*, ARPANSA, RB-STD-42-00, Revision 1, October 2001 [4]
- ARPANSA, *Regulatory Guide: Licensing of Radioactive Waste Storage and Disposal Facilities*, v2, OS-LA-SUP-240L, March 2013 [5]

1.4 Legislative Framework

Under sub-section 30(1) of the Act, a controlled person must not prepare a site for a controlled facility, construct, possess or control, operate, or decommission, dispose of or abandon a controlled facility unless authorised to do so by a facility licence, or unless the controlled person is exempted in relation to the conduct concerned under the Regulations.

Sub-section 32(3) of the Act states:

"In deciding whether to issue a licence under subsection (1), the CEO must take into account the matters (if any) specified in the regulations, and must also take into account international best practice in relation to radiation protection and nuclear safety."

In addition to international best practice in radiation protection and nuclear safety, the CEO must also take into account the following matters listed in sub-regulation 41(3):

(a) whether the applicant includes the information asked for by the CEO; and

- (b) whether the information establishes that the proposed conduct can be carried out without undue risk to the health and safety of people and to the environment; and
- (c) whether the applicant has shown that there is a net benefit from carrying out the conduct relating to the controlled facility; and
- (d) whether the applicant has shown that the magnitude of individual doses, the number of people exposed, and the likelihood that exposure will happen, are as low as reasonably achievable, having regard to economic and social factors; and
- (e) whether the applicant has shown a capacity for complying with these regulations and the licence conditions that would be imposed under Section 35 of the Act; and
- (f) whether the application has been signed by an office holder of the applicant, or a person authorised by an office holder of the applicant; and
- (g) if the application is for a facility licence for a nuclear installation the content of any submissions made by members of the public about the application.

Sub-regulation 39(2) permits the CEO to request information from the applicant relating to the conduct for which the licence is sought. The following information (as listed in Part 1 of Schedule 3 to the Regulations) was requested by the CEO in guidelines published to assist a controlled person make an application for a licence to construct a controlled facility:

General Information

Item 1	The applicant's full name, position and business address					
Item 2	A desc	cription of the purpose of the facility that is to be authorised by the facility licence				
Item 3	A deta	ailed description of the controlled facility and the site for that facility				
Item 4	Plans and arrangements describing how the applicant proposes to manage the controlled facility to ensure the health and safety of people and the protection of the environment including the following information:					
	(a)	the applicant's arrangements for maintaining effective control;				
	(b)	the safety management plan for the controlled facility;				
	(c)	the radiation protection plan for the controlled facility;				
	(d)	the radioactive waste management plan for the controlled facility;				
	(e)	the security plan for the controlled facility;				
	(f)	the emergency plan for the controlled facility.				
Additional Inf	format	ion for Authorisation to operate a controlled facility				

Item 15 A description of the structures, components, systems and equipment of the controlled facility as they have constructed.

- Item 16 A final safety analysis report that demonstrates the adequacy of the design of the controlled facility, and includes the results of commissioning tests.
- Item 17 The operational limits and conditions of the controlled facility.
- *Item 18* The arrangements for commissioning the controlled facility.
- *Item 19 The arrangements for operating the controlled facility.*

2. REVIEW OF INFORMATION

This section describes the review of information provided in the application and subsequently received from the applicant with respect to the matters to be taken into account by the CEO, particularly:

- a. The letter from the CEO of ANSTO dated 10 November 2014
- b. ANSTO Facility Licence Application, A0292 (OS-LA-FORM-240C, NI v7)
- c. Documents listed in Appendix 1

2.1 General Information

2.1.1 Applicant information [Item 1]

Item 1 of Part 1 of Schedule 3 of the Regulations requires the applicant to provide details of the Applicant.

The application was made by the CEO of ANSTO, Dr Adrian Paterson, and signed on 5 November 2013. The person nominated to be in effective control of the facility is Mr Hefin Griffiths, Head, Nuclear Services.

Conclusion

The ARPANSA assessor considers that the applicant information described in the application is satisfactory.

2.1.2 Description of the purpose of the facility [Item 2]

Item 2 of Part 1 of Schedule 3 of the Regulations requires the applicant to provide a description of the purpose of the facility.

The facility will house the Intermediate Level Solid Radioactive Waste (ILSW) returned from France following the reprocessing of HIFAR used fuel assemblies. The IWS has been built to store the following ILSW packages

- TN 81 transport/storage shielded container and
- The technological wastes (i.e. CBF-C2 cemented drums) within an ISO shipping container, which together form an approved IP-2 Transport Package.

Conclusion

The description of the purpose of the facility described in the application is considered adequate by the ARPANSA assessor.

2.1.3 Detailed description of the facility and site [Item 3]

Item 3 of Part 1 of Schedule 3 of the Regulations require the applicant to provide a detailed description of the facility and the site for the proposed facility.

2.1.4 Facility History

The proposed facility is a new facility.

2.1.4.1 Location of the Facility

Details of the location of the facility were assessed for the siting and construction licence and were found suitable. The results of assessment have been recorded elsewhere (R13/06576).

2.1.4.2 Description of the Facility

The IWS is a purpose built single storey building constructed for the interim storage of the intermediate level wastes arising from the reprocessing of used HIFAR fuel in France. The building has a floor area of approximately 845 m² with a height of 21 m. The perimeter walls are of precast concrete panels approximately 170 mm thick measuring 5 min height from the floor level and fixed to a structural steel portal. The rest of the perimeter walls which is fixed on top of the precast concrete panels have been constructed with 200 mm thick insulated sheet-metal sandwich panels with thermal insulation. The roof of the facility has been constructed from 150 mm thick sheet-metal sandwich panel. It has shutter doors for the entry and exit of the ILW consignments. The facility is located adjacent to other Radioactive waste Operations facilities such Nuclear Materials Store.

The IWS is equipped with the following services/systems:

- Ventilation system
- Compressed air system;
- · Helium gas cylinder and associated pipework;
- Building crane with a capacity of 140T Dangerous Goods Rated (DGR);
- Electrical power distribution/reticulation;
- Active drainage system;
- Fire detection and alarm system;
- Security access system; and
- Fixed radiation monitor(s) (gamma monitor)

Conclusion

The facility description includes the location of the facility, the layout and main components comprising the facility and the operating envelope of the facility. The ARPANSA assessor considers that the description of the facility is acceptable.

2.2 Plans and Arrangements for Managing Safety

Item 4 (Part 1 of Schedule 3 to the Regulations) of the general information that may be requested by the CEO refers to plans and arrangements for managing safety of the controlled facility to ensure the health and safety of people and protection of the environment.

The holder of an operating licence must ensure that activities comply with the plans and arrangements for managing safety. In general, this means that the licence holder is responsible for establishing and implementing procedures that ensure compliance with the Safety Analysis Report (SAR), as updated. This includes the Operating Limits and Conditions (OLC), which are part of the SAR by reference. The SAR is a main component of the licensing basis of the facility. It is the responsibility of the licence holder to keep it up-to-date.

Compliance with "plans and arrangements" (P&A) for managing safety is prescribed in Regulation 49. In essence, licensees must ensure that their implementing procedures reflect the Safety Analysis Report. Another licence condition, reflected in regulation 50, requires the licensee to review and update P&A periodically. This includes the SAR.

2.2.1 Arrangements for maintaining effective control [Item 4(a)]

In applying for a facility licence, the applicant may nominate a person or position that would control the conduct for which a licence is sought, and demonstrate how the nominee would maintain that control. The nominee must have appropriate responsibility, with adequate authority and control of material, human and financial resources to ensure safety of the conduct. Ultimate accountability remains with the applicant [3].

The arrangements for effective control have been assessed using the ARPANSA guidelines described in Section 1 of the RG [3] and the relevant regulatory assessment principles (RAPS) [4] as given below.

2.2.1.1 Statutory and regulatory compliance

The licence holder should demonstrate how statutory and regulatory compliance are achieved (RG 1.1-1.4) [3].

The CEO of ANSTO signed and submitted the application, and Mr Hefin Griffiths, Head Nuclear Services, is the nominee. The CEO has the ultimate responsibility to maintain effective control and for ensuring compliance with the Act and the Regulations. The nominee is responsible for day to day work and for assisting the CEO in ensuring compliance with legislative requirements. The IWS facility is part of ANSTO Waste Operations, which comes under Nuclear Services. In order to address the statutory and regulatory compliance Nuclear Services Business and Compliance Manual, G 5248, is followed. This manual outlines the processes and responsibilities for statutory and regulatory compliance. In addition, there is a Guide on ARPANSA Requirements (AG 5445) that sets out the roles and responsibilities and the process of demonstrating compliance with licence conditions.

The ARPANSA assessor considers that the information submitted in relation to statutory and regulatory compliance is acceptable.

2.2.1.2 Management commitment

The licence holder should show that management is committed to maintain both safe and secure operations and work environment (RG1.5-1.7) [3].

The Nuclear Services operate according to its Framework (G 2725) that sets the commitments of the management team and employees to ensure safe operations and work environment. This includes:

- Provision of a safe and healthy environment for all ANSTO employees and the general public
- Compliance with relevant statutory and regulatory requirements
- Regular management reviews to identify opportunities for continual improvement
- Appropriate training to ensure staff are competent to perform their tasks

The ARPANSA assessor considers that the information provided demonstrating management commitment for safe and secure operations are adequate.

2.2.1.3 Accountabilities and Responsibilities

The licence holder should describe accountabilities and responsibilities for key functions and operations (RG 1.8-1.11) [3], (RAPS 13-14)[4].

ANSTO provided the organisational structure that shows the clear lines of functions and responsibilities of Nuclear Services under which IWS will operate as part of Waste Operations. The details of accountabilities and responsibilities of key functions and operations are described in Nuclear Services Business Manual (G5248). For example,

- Head, Nuclear Services, who is also the Chief Nuclear Officer (CNO), is responsible for providing advice and is delegated by the CEO for ensuring regulatory compliance, and managing safety and security in day to day operations.
- Manager, Waste Management Services, reports to the Head Nuclear Services and is responsible for making appropriate plans and arrangements, implementing effective controls and provision of resources.
- Manager, Regulatory Affairs, reports to the CNO and supports him in implementing process for compliance with key regulatory requirements, and to facilitate ANSTO's interactions with government agencies, departments and regulators on regulatory matters.
- Licensing Officer, Waste Management Services, reporting to the Head Nuclear Services, is responsible for coordinating compliance with regulatory requirements in the controlled facilities and in dealings with controlled material and apparatus.

Delegation of management responsibilities are described in Section 2.2 of the Business Manual with reference to ANSTO's Delegation Manual.

For further details of accountabilities and responsibilities, ANSTO guide entitled WHS Accountabilities, Responsibilities and Authorisation Guide AG-2362 was referred to.

The ARPANSA assessor considers that the framework of accountabilities and responsibilities for key functions and operations are adequate.

2.2.1.4 Resources

The licence holder is responsible for ensuring adequate and appropriate resources are available (RG 1.12-1.16) [3].

Resourcing aspects were considered during the assessment of the siting licence and found acceptable (R13/06576).

ANSTO states that funding approval processes for facilities' on-going operation and maintenance works ensure there is sufficient funding available for the necessary equipment and human resources. In addition, Section 2.3 of the Business Manual describes budget and asset management where it states the Head, Nuclear Services and Section Managers are committed to prudential management of its financial affairs through annual budget, quarterly budget review and monthly 24 month forecast update processes in accordance with Forecast and Budget Planning Guidelines (AG 2689).

The ARPANSA assessor considers that the resourcing arrangements, including their allocation and control described in the application are acceptable.

2.2.1.5 Communication

The licence holder is responsible for ensuring effective communication including both vertical and horizontal approaches (RG 1.17-1.20) [3]

The application provides a flow diagram to depict the lines of communication that shows the communication lines between different levels and up to the ANSTO Board. ANSTO states that information is exchanged through the ANSTO CEO staff Forums, various meetings, toolbox talks, the intranet and other correspondences such as emails. Further, Nuclear Services participate in various internal committees, for example, the Safety Committee, Safety Assurance Committee and Environment Improvement Committee to review safety and environmental performance and assure the compliance of all activities undertaken by ANSTO. Nuclear services also takes part in external committees such as the ANSTO Health Safety and Environment Forum (chaired by an external stakeholder) to inform stakeholders of ANSTO's health, safety and environmental performance and promote discussion and implementation of potential improvements.

Staff are informed of any change in policy, legislations and regulations, or customer requirements, through information exchange, meetings or management review minutes.

The ARPANSA assessor considers that the mechanisms of communication are acceptable.

2.2.1.6 Process Implementation

The licence holder should have a clear system in place for implementation and control of operations, processes, functions or activities (RG 1.21-1.24) [3].

Nuclear Services has a system for Process and Product Planning and Control that defines the different stages of executing and controlling a process. Processes are planned and developed to meet the requirements of customers and other stakeholders within a statutory/regulatory framework. R15/05147 Page 14 of 48

Modifications to a process including changes to a facility, safety features, components or systems that may have significant safety implications are subjected to ANSTO internal review prior to submission for regulatory approval.

Nuclear Services activities are controlled by a range of standard operating procedures and detailed work instructions to ensure the provision of consistent products and services. Appropriate criteria are used to verify the efficacy of the processes, and appropriate procedures are in place to deal with non-conformances.

The ARPANSA assessor considers that the arrangements for process implementation are acceptable.

2.2.1.7 Documentation and Document Control

The licence holder should have an effective document management system (RG 1.25-1.30) [3]

The application states that Nuclear Services documents are developed in accordance with the ISO 9001 certification. Waste Operations is operating under a Business Management System (BMS) that comprises procedures and work instructions. The Nuclear Services Quality System is ISO 9001 and ISO 14001 accredited. The operational procedures and work instructions provide detailed instructions on how to carry out the tasks and they are categorised according to hierarchy. For example, according to ascending hierarchy work instructions is placed at the lowest level and Business Compliance Management Manual at the highest level; operational procedures and compliance procedures and Guidelines sit in between them. The procedures and instructions under the BMS are easily accessible and traceable through the intranet. This was verified during an inspection of Waste Operations in March 2015.

The ARPANSA assessor considers that the document management system of Nuclear Services is effective and in accordance with an appropriate quality system.

Conclusion

The application describes the lines of communication, responsibility and functions in maintaining control over all aspects of operation of the facility. Arrangements for effective control of technical, administrative and human factors, the ISO certified management system and adequate human, financial and material resources will be applied to the proposed conduct. The arrangements for maintaining effective control of the proposed conduct are acceptable to the ARPANSA assessor.

2.2.2 Safety management plan [Item 4(b)]

The application should include a safety management plan that demonstrates that safety management practices are in accordance with internationally accepted principles and practices and duty of care obligations [3].

The arrangements for managing safety in the facility have been assessed against the guidelines described in the RG [3].

2.2.2.1 Safety Policy and Objectives

The licence holder should outline overarching policies and objectives for safety (RG 2.1 – 2.5) [3].

Nuclear Services follow ANSTO Work Health and Safety (WHS) and Environment Policy, WHS management arrangement and WHS Standards and Practices. These documents clearly outline the objectives and work practices to be followed to ensure safety of all employees, the community and the environment. The ANSTO WHS and Environment Policy shows the commitment of the organisation to undertake its activities in a manner that:

- ANSTO strives to have a people-safe workplace and believe that no one should be harmed through ANSTO activities
- Promotes a positive safety culture and empowers its people for ownership of safety
- All ANSTO employees are responsible for environmental stewardship
- All ANSTO employees will work together to minimise ANSTO's environmental footprint through sustainable use of resources and by the prevention, minimisation and control of pollution
- Strives for continual improvement using a blame-free learning approach to meet ANSTO's commitments, a program of knowledge development and transfer, leadership, monitoring and auditing performance.

The WHS management system covers a range of standards and practices, guidelines and procedures such as Risk Management, Hazardous Work, Radiation Safety, Nuclear Safety etc.

Appropriate administrative controls, for example safe work method statements (SWMES), are in place for radiation protection to reduce the likelihood and potential consequences of any hazardous situations.

ANSTO has given a commitment to the highest level of safety, and has in place mechanisms for consultation, contractor supervision, and communication of safety matters.

All policies and procedures are reviewed and updated according to an appropriate quality system.

The ARPANSA assessor considers that safety policies and objectives are adequately addressed in the application.

2.2.2.2 Monitoring and Measurement

The licence holder should have appropriate system in place to track and monitor its operations (RG 2.6-2.12) [3].

All events including near misses at Waste Operations are captured in the GRC (Governance, Risk Compliance and Assurance) Cloud system in accordance with the ANSTO Event Reporting Process. This ensures that all events are dealt with in an appropriate way to effectively manage safety and security in the facilities. The ARPANSA assessor reviewed the events that occurred in the past two years and found that the corrective actions taken following each event were satisfactory. WO management utilises the 'Action Tracker' system to ensure that all actions are followed up and completed. Open actions and event investigations are standing items on the weekly management meeting agenda. Abnormal occurrences and near-misses are reported. Events are triaged into categories based on consequence. Event outcomes are fed back to officers involved, weekly management meetings and various committees.

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Various key performance indicators are used by ANSTO to monitor operational performance. For example, for safety performance indicators Waste Operations uses the number of events (moderate and above), staff dose, completion of event investigation, number of personal contamination events and lost time injuries.

The application states that during operation of the facility, a minor level of radiation hazard (i.e. 0.1 – 1 mSv) will exist at the time of routine inspection of technological waste packages. Waste Operations uses SWMES (Safe Work Method and Environmental Statements) to ensure that staff and contractors know the radiation and other hazards and controls. This is reinforced by the toolbox safety talks with the work groups prior to the task. All of the working level arrangements for the control of hazards during operation of the facility are assessed and supplemented by the ANSTO internal SAC review and approval process, which was submitted as part of the application.

The ARPANSA assessor considers that the arrangements for monitoring and measurement are adequate.

2.2.2.3 Risk Assessment and Mitigation

The licence holder is should demonstrate effectiveness of risk assessment and mitigation strategies (RG 2.13-2.20) [3]

Nuclear Services uses the ANSTO Risk Analysis Matrix Guide, AG 2395, for risk assessment. The application is supported by a Safety Assessment of the IWS (ANSTO/T/TN/2012-03, rev 3) which details the risk assessment of the hazardous scenarios identified for the operation of the facility. Details of risk assessment are discussed in Section 2.3.3 of this report.

The ARPANSA assessor is satisfied that this aspect has been adequately addressed by ANSTO.

2.2.2.4 Managing Change

The licence holder should specify how changes are safely managed (RG 2.21-2.28) [3].

Nuclear Services categorise changes according to their safety implications according to WHS Categorisation of Activities Guide (AG 2525). All modification activities are approved by the line management and changes that come under category "A" require internal approval by SAC. Further, ANSTO has a procedure in place to determine the nuclear and radiological significance of any relevant changes having significant implications for safety. Details are described in AG 2395- Guidance for the Determination of Nuclear and Radiological Significance.

ANSTO states that the need for modifications/changes is determined by the Head, Nuclear Services in consultation with staff and ANSTO Support Services including Radiation Protection Services. Both normal operating experience and abnormal occurrences recorded in the event reporting system are considered in determining the need for modifications.

The ARPANSA assessor considers that the arrangements for managing change are acceptable.

2.2.2.5 Learning and Continuous Improvement

The licence holder should have a system in place learning from experience and continuous improvement (RG 2.29-2.34) [3].

ANSTO WHS and Environment Policy promotes continual improvement using a blame-free learning approach and maintaining a program of knowledge development and transfer, leadership, monitoring and auditing performance. Through Nuclear Services Business and Compliance Manual the Management gives commitment to regular management reviews to identify opportunities for continual improvement.

Nuclear Services has a system in place to include lessons learnt in operating instructions and work practices. For example, a section of lessons learnt was added to SWMES, and lessons learnt was to include a risk assessment in operating instructions. This was verified during an inspection of Waste Operations in March 2015.

The ARPANSA assessor considers that arrangements for lessons learnt and continuous improvement in safety are acceptable.

2.2.2.6 Training

The licence holder should have an appropriate training and education program (RG 2.35-2.40) [3].

Nuclear Services follow ANSTO Guide 2363 - Work Health and Safety Training, for specific safety competency. The application states that Waste Operations staff are trained in the areas of waste management and radiation protection, which is relevant to the routine inspection of the packages to be stored in the IWS. ANSTO states that they have comprehensive processes which collectively ensure that potentially hazardous work is performed and supervised by properly authorised and qualified staff. This starts with the recruitment process for staff and long-term contractors where the selection is based on the technical and personal selection criteria for the role. These criteria include the qualifications, knowledge and experience appropriate for the work

Further details of training are described in Section 5 of the Safety Management Plan (IWS-O-LA-D2).

Training records are maintained in the ANSTO Training Register.

The ARPANSA assessor considers that the training and education program is suitable for the operation of the facility.

Conclusion

The arrangements and procedures for managing safety described in the application are acceptable.

2.2.3 Radiation protection plan [Item 4(c)]

The applicant is responsible for ensuring that arrangements are in place for meeting their responsibilities towards radiation protection and nuclear safety [3].

The arrangements for radiation protection have been assessed against the guidelines described in section 3 of the RG [3] and the principles 57-62 of the RAPs [4].

2.2.3.1 **Principles** of Radiological Protection

The licence holder should ensure that conducts and dealings are justified, the radiation protection system is optimised, doses are within the statutory limits, there is net benefit from the conducts and dealings and doses are ALARA (RG 3.1-3.6) [3], (RAPs 57-62) [4].

The principles of radiological protection followed by ANSTO were assessed for the siting and licence and were found acceptable (R13/06576).

The application states that ANSTO is committed to ensure that, for all operational activities for the IWS, effective doses to workers and members of the public do not exceed any dose constraints set by ANSTO. Health Physicist in consultation with the Head Nuclear Services, or their nominated delegate will advise on the appropriate dose constraints across shorter time periods and for specific tasks.

Further, ANSTO gives commitment to work to lowering the threshold for the eye lens as recommended by the ICRP. On 21 April 2011, ICRP states:

"For occupational exposure in planned exposure situations the Commission now recommends an equivalent dose limit for the lens of the eye of 20 mSv in a year, averaged over defined periods of 5 years, with no single year exceeding 50 mSv"

The ARPANSA assessor considers that ANSTO's commitment to work in accordance with the ICRP recommendations will further strengthen the principles of radiation protection.

2.2.3.2 Radiation Safety Officer (RSO)

The licence holder is responsible to appoint a suitably qualified RSO as appropriate to undertake specific duties (RG 3.7-3.9) [3].

The provision of a RSO or equivalent and his/her roles and responsibilities, knowledge and skills was assessed for the siting and construction licence and found acceptable (R13/06576).

2.2.3.3 Radiation Safety Committee (RSC)

The licence holder is responsible to appoint a suitably qualified RSC as appropriate to undertake specific duties (RG 3.10-3.21) [3]

The provision for a RSC was assessed for the siting and construction licence and found acceptable (R13/06576).

2.2.3.4 Planning and Design of the Workplace

The planning and design of the workplace should ensure that planning and design take into account relevant codes and standards and international best practice to minimise the exposure to radiation. It is expected that appropriate engineering controls are in place to minimise the reliance on administrative controls (RG 3.22-3.24) [3].

The design features for engineering controls were assessed for the siting and construction licence and were found acceptable (R13/06576).

Design features are further considered in the assessment of the design of the facility in section 2.3.1 of this report.

The ARPANSA assessor considers that the engineering controls and the standards and codes considered in the design of the facility are acceptable.

2.2.3.5 Classification of Work Areas

It is expected that areas are classified in accordance with the levels of exposure involved, and there is appropriate delineation of areas by appropriate means. Accesses to the areas are controlled by local rules and procedures, use of personal protective equipment and appropriate warning signs are in place (RG3.25-3.37) [3].

The system for radiological classification of areas was assessed for the siting and construction licence and found acceptable (R13/06576).

Based on the dose estimation the application states that the anticipated area classification during the operation of the IWS is White contamination and White radiation.

However, the classification of various operational areas will be reviewed during and immediately following commissioning and thereafter periodically using measured radiological data.

The ARPANSA assessor considers that the arrangements for classification of work areas are acceptable.

2.2.3.6 Local Rules and Procedures

The licence holder is responsible for ensuring that local rules and procedures are in place and are implemented to provide an adequate level of protection, safety and supervision for controlled persons and visitors (RG 3.38 - 3.48) [3].

ANSTO has developed barrier rules according to AG 2510 - Entry to and Exit from Classified Radiation Areas (Guide), AG 2511- Clothing to be worn in Classified Radiation Areas (Guide) and AG 2512 - Clothing Change Procedures When Entering or Leaving Classified Areas (Guide).

Appropriate warning signs and notices are used regarding restrictions such as personnel are not allowed to eat, drink or smoke in radiologically classified areas. Depending on the task a working area may be upgraded or downgraded, and the warning notices and protective measures are modified to reflect such change.

The ARPANSA assessor considers that the provisions for local rules and procedures are acceptable.

2.2.3.7 Personal Protective Equipment

The licence holder is responsible for ensuring that there is provision of adequate and appropriate personal protective equipment (RG 3.49- 3.53) [3].

The application states that the personal protective equipment (PPE) shall be determined against the nature of the hazard and the work that is being undertaken. This PPE shall be supplied at the entrance barrier to any radiological classified area and following use shall be monitored, laundered and re-used or, for disposable PPE, passed to waste.

Considering the radiological classification of the area (White Radiation, White Contamination) it is expected that no special Personal Protective Equipment for working in the IWS is required.

The ARPANSA assessor considers that the provision for personal protective equipment is adequate.

2.2.3.8 Monitoring of Workplace

The licence holder should have a documented workplace monitoring program supported by procedures and rules (RG 3.54-3.61) [3].

The application states that routine workplace monitoring will be performed, to a survey program, by health physics surveyors for the purposes of:

- Confirmation that dose rates and contamination levels within and around the classified areas of IWS are within agreed parameters
- Confirmation of the area classifications within the IWS

The ARPANSA assessor notes that the facility will be equipped with area radiation monitors.

The health physics surveyor will undertake routine surveys as required, and task based radiological monitoring will also be undertaken at the IWS.

In Waste Operations the radiation monitoring equipment used in the facility consists of a combination of fixed and portable instrumentation designed to monitor the radiological conditions and the personnel throughout the facility. The radiation protection instrumentation used within the Waste Operations is subject to routine calibration.

The ARPANSA assessor notes that the records of the surveys and any radiological incidents are kept within ANSTO electronic systems. Trends in the surveys, and incidents, are tracked by the Radiation Protection Advisor and may instigate an investigation.

The ARPANSA assessor considers that the arrangements for workplace monitoring area acceptable.

2.2.3.9 Monitoring of individuals

The licence holder should have arrangements to monitor individuals including visitors and contractors and to record the results of monitoring and report abnormal dose results if there are any (RG 3.62-3.72) [3].

The application states that occupationally exposed employees will be monitored, in accordance with AG 2521 Personal Dosimetry (Guide), as part of the routine dosimetry program (with the supply of dosimetry, analysis of returned dosimetry and dose record keeping service provided by Radiation Protection Services). Other staff, contractors and visitors who are not on the routine dosimetry program will be monitored by electronic dosimeters when required.

For individual external routine measurement of effective dose thermoluminescent dosimeters (TLDs) will be used. In addition, electronic dosimeters will be used for individual monitoring.

The application states that workers exiting controlled areas will be required to perform self-monitoring for contamination and appropriate training will be provided for self-monitoring. R15/05147 Page 21 of 48 The ARPANSA assessor considers that arrangements for individual monitoring are adequate.

2.2.3.10 Monitoring the Environment

The licence holder is responsible for ensuring appropriate arrangements for monitoring the environment (RG 3.73-3.78) [3].

Considering that the facility will be used for storage of ILSW in containers there are no practical routes of radioactive discharges into the environment.

The application states that during the operation of the IWS, there are no identifiable exposure pathways to wildlife in their natural habitats.

The ARPANSA assessor considers that this aspect has been adequately addressed.

2.2.3.11 Transport

The licence holder is responsible for ensuring appropriate arrangements for on-site and off-site transport of radioactive material in accordance to legislative requirements (RG3.83-3.97) [3].

Nuclear Services follows ANSTO Guide AD 2515- safe Movement of Radioactive Material for onsite movement of radioactive material. However, the facility will not involve any process activities and only be used for storage of one TN81 container and six-drums of technological waste in concrete over-pack placed in an ISO container.

The ARPANSA assessor notes that the transport of the waste from France will be subject to separate ARPANSA approval in accordance with the Code of Practice for Safe Transport of Radioactive Material 2014, Radiation Protection Series C-2.

The ARPANSA assessor considers that the arrangements for transport of controlled material are adequate.

Conclusion

The application describes relevant arrangements for radiation protection including principles of radiation protection, engineering controls considered in the design and radiation monitoring programs to be in place. The ARPANSA assessor considers that the arrangements for radiation protection for the operation of the facility are acceptable.

2.2.4 Radioactive waste management plan [Item 4(d)]

The arrangements for managing radioactive waste have been assessed against the guidelines of section 4 of the RG [3] and the principles 68, 69, 73-76 of the RAPs [4].

2.2.4.1 Management of Radioactive Waste

The applicant must provide arrangements to protect the health and safety of people and to protect the environment from hazards arising from the handling, treatment, storage, discharge and disposal of any radioactive waste expected to arise from any conduct. The arrangements should address appropriate codes and standards the physical, chemical and radiological characteristics of the waste; methods of

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minimising the volumes and activities of radioactive wastes generated; the treatment, storage, disposal and discharges of radioactive wastes; and the control, monitoring, recording and reporting of wastes (RG 4.1-4.18) [3], (RAPS 68, 69, 73-76) [4].

The ARPANSA assessor notes that the key feature of this facility is that it will not involve process operation inside the facility. Therefore, there will be minimal waste generation from the operation of this facility.

Only non-active waste will be generated during the operational phase of the facility. These will be general wastes arising from routine building maintenance and repair activities. There will be some minor chemical wastes from the general housekeeping activities of the store (e.g. mopping of floor), and these wastes will be managed by the established procedures of Waste Operations.

The ARPANSA assessor considers that the provisions for management of radioactive waste are acceptable.

2.2.4.2 Limiting Exposure to Radioactive Waste

The licence holder is responsible for limiting the exposure to workers and members of the public during handling, treatment, transport, storage and transfer or ultimate disposal of radioactive waste (4.19-4.31) [3]

The application states that the ANSTO WHS Standard for Radiation Safety AS-2310 provides guides on radiation protection and control measures to minimise the risks of radiological hazards associated with the radioactive waste stored in the IWS. This standard is implemented through the application of the guides and practices provided in the ANSTO WHS Management System.

In order to limit exposure to the workers and members of the public the following controls will be in place:

- Appropriate passive shielding on the TN 81 container including the high density resin in the aluminium profile
- Closure system (primary and secondary lids) of the TN 81 container
- The fibre concrete containers for the technological wastes which are then placed inside an IP-2 certified ISO container (DV78)
- Additional shielding (or barrier) around the DV78 package, if required upon arrival of the package inside the IWS
- Area radiation monitor(s) inside the IWS;
- Epoxy coated floor with drainage system connected to the B-line;
- Routine HP survey inside the IWS
- Administrative controls such as training, procedures, Instruction Manuals provided by AREVA, etc.;
- Use of suitable equipment and personal protective equipment, as necessary;
- Effective work planning to minimise the dose received by staff members;
- Access control to the IWS

The ARPANSA assessor notes that transport of the waste to the IWS facility from France is subject to a separate approval from ARPANSA.

The ARPANSA assessor considers the provisions for limiting exposure to workers and members of the public during handling, transport and storage of radioactive waste are acceptable.

2.2.4.3 Packaging and Containment of Radioactive Waste

The licence holder is responsible ensure that radioactive waste arising from all conducts and dealings is packaged and contained so as to minimise potential for migration or dispersion of radionuclides and to limit external dose rate to within acceptable limits (4.32- 4.38) [3]

Noting that the operation of the IWS will not involve any processing of waste, certain items will be generated from the routine operations and maintenance consisting of potentially contaminated gloves, papers, PPE and smears from wipe tests. These items will be bagged, labelled and collected by Waste Operations as part of the normal waste collection service and will be treated as potential low level solid waste (LLSW) and subject to the routine characterisation processes for such waste. All wastes assessed as being below the relevant exemption criteria will be disposed of as general waste.

The ARPANSA assessor considers that this aspect has been adequately addressed.

2.2.4.4 Interim Storage of Radioactive waste

The licence holder is responsible for appropriate arrangements for interim storage of waste (RG 4.39-4.46) [3]

The IWS facility itself is an interim storage facility, which is designed and constructed incorporating appropriate design features and standards and codes. The suitability of design and construction was considered in the assessment of licence application for siting and construction and found acceptable (R13/06576).

In addition, operation of the facility will not generate any waste that requires interim storage.

The ARPANSA assessor considers that this aspect has been adequately addressed.

2.2.4.5 Documentation of Radioactive Waste

The licence holder is responsible for ensuring that documentation detailing the nature of any radioactive waste is appropriately maintained (RG 4.47-4.51) [3].

ANSTO Waste Operations uses the Business and Compliance Management System of the Nuclear Services that provides a framework to effectively maintain and control waste documentations and records. Waste Operations use standard operating procedures and work instructions for preparing, reviewing and approval for the handling, transport, characterisation, treatment and storage of radioactive waste. Radioactive waste Tracking System is used to capture waste details, including waste characteristics, chain of custody, identification, storage location. Nuclear Services is accredited to ISO: 9001 and this is subject to routine surveillance by both internal and external auditing functions and routine re-certification by an external party.

The ARPANSA assessor considers that the arrangements for documentation of radioactive waste are adequate.

2.2.4.6 **Routine Discharge of Radioactive Waste to the Sewer**

The licence holder is responsible for ensuring safe disposal waste to be discharged to the atmosphere (RG 4.52-4.59) [3].

The operation of the facility will not involve routine discharge to the sewerage system. The ARPANSA assessor notes that any discharge from the site is managed by ANSTO Waste Operations Facility licence (F0260) and is subject to statutory discharge limits.

2.2.4.7 Routine Discharge of Radioactive Waste to the Atmosphere

The licence holder is responsible for ensuring safe disposal waste to be discharged to the atmosphere (RG 4.60-4.63) [3].

No radioactive gaseous waste will be generated during operation of the facility.

2.2.4.8 Routine Discharge of Solid Radioactive Waste to Municipal Tip

The licence holder is responsible for ensuring safe disposal waste to be discharged to the municipal tip (RG 4.64-4.68) [3].

ANSTO does not discharge solid radioactive waste to the municipal tip. Free-release waste is managed as a site-wide matter. All free-release waste is thoroughly checked and cleared by ANSTO Waste Operations and radiation protection staff before leaving the site. Also, there is a vehicle gate monitor at the exit gate which is the final check point for radiation monitoring of all wastes/equipment or vehicles leaving the ANSTO site.

2.2.4.9 Routine Discharge of Radioactive Waste by Incineration

The licence holder is responsible for ensuring safe disposal waste to be incinerated (RG 4.69-4.73) [3].

This does not apply to this facility.

Conclusion

The ARPANSA assessor notes that the key feature of this facility is that it will not involve process operations inside the facility. Therefore, there will be minimal waste arising during set up of the TN 81 container and the DV 78 container. Only non-active waste will be generated during the operational phase of the facility. These will be general wastes arising from routine building maintenance and repair activities. The arrangements for managing radioactive waste described in the application are adequate.

2.2.5 Security plan [Item 4(e)]

The arrangements for security have been assessed against relevant guidelines of section 6 of the *Regulatory Guide: Plans & Arrangements for Managing Safety v3* (October 2011) [3] and the provisions of the *Code of Practice for the Security of Radioactive Sources* (2007) (RPS 11).
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2.2.5.1.1 Security Procedures

The licence holder or applicant is responsible for ensuring arrangements are made and implemented for the security of controlled facilities, controlled apparatus and controlled material, to prevent unauthorised access, damage, theft, loss or unauthorised use. The arrangements should include administrative and physical controls and barriers to ensure that the control of these items is not relinquished or improperly transferred, taking account of any relevant requirements imposed by the ARPANS legislation and, where applicable, the Australian Safeguards and Non-proliferation Office (RG 6.1 – 6.9 [3]).

Security advisers from the Security and Community Safety Section (S&CS) of ARPANSA assessed the Operating Licence Security Plan (IWS-O-LA-D5) endorsed and submitted by the ANSTO Head of Nuclear Services, Mr Hefin Griffiths.

The security plan outlines ANSTO's principles of security such as the importance of security culture, including the ANSTO CEO and senior management's endorsement of their security awareness and training strategy and program. The security plan objectives describe those areas that ANSTO have considered will address the identified threats as provided by ASIO threat assessment and the security risk assessment undertaken for the ANM Mo-99 project (noting the IWS threat context was considered during the ANM Mo-99 security risk assessment, having similar risks and given the IWS Facility bounds the ANM Mo-99 Facility).

A comprehensive assessment of source characterisation and facility design is provided in the security plan where the security systems (Type 1 SAS, electronic access control system and CCTV surveillance system) are included together with the safety and emergency systems (compressed air system, active drainage system, fixed radiation gamma monitor for example). This integration demonstrates that the safety and security interface has been well considered by ANSTO, resulting in a positive assessment. This interface is further realised and enhanced where the safety, security, integrity and containment of the reprocessed waste relies on multiple layers of defence-in-depth, such as AFP armed guard force, perimeter detection systems, high integrity welded stainless steel CSD(U) canisters, neutron and gamma shielding built into the TN81 container and access control monitored by CCTV.

The security accountability, responsibilities and emergency response (communications strategy) elements are adequately described within the security plan for this type of facility and, as appropriate, should be exercised at the earliest opportunity following commissioning of the facility.

The assessment of the protective security measures implemented, as described in the security plan, at the IWS facility concludes that the measures described provide an adequate level of protection against the identified threats (including the technically competent and trusted insider). The performance of the described system, from a theoretical perspective, should meet the objectives as described on the security plan.

Conclusion

The assessor considers that the Operating Licence Security Plan provides adequate information to satisfy the Plans and Arrangements Guide [3] and is in accordance with the ARPANSA Radiation Protection Series No 11 Code of Practice for the Security of Radioactive Sources during the IWS operational phase.

2.2.6 Emergency plan [Item 4(f)]

The applicant must have emergency plans and procedures that address all foreseeable emergencies to ensure the protection of personnel, the public and the environment. Adequate facilities and equipment must be available and an appropriate state of preparedness maintained [3].

The emergency plans related to the proposed conduct have been assessed against the guidelines of the RG [3] and principle 54(d) of the RAPs [4].

2.2.6.1 Emergency plans

The licence holder is responsible for providing detailed emergency plans based on the assessment of consequences of reasonably foreseeable accidents aiming to minimise the consequences and ensuring the protection of on-site personnel, the public and the environment (RG 7.1-7.21) [3].

The application states that ANSTO site emergency plan for the LHSTC (ANSTO-LHSTC Emergency Response Plan, AG 2466) apply and shall remain in effect within the new facility throughout the operational phase. The plan clearly defines the roles and responsibilities of ANSTO personnel and Emergency Service Organisations including the NSW Fire Brigade, Police Force, Ambulance Service and NSW Health Department. Communication networks utilised in an emergency include ANSTO's site public address systems, telephone/radio-network and site control centre.

The safety analysis of the IWS identifies the risks associated the operation of the facility based on the postulated accident scenarios. The results of ANSTO safety assessment are described in safety assessment of the IWS (ANSTO/T/TN/2012-03 rev 3), which forms part of the application. Details of risks and accident analysis are described in Section 2.3.2 of this report.

The emergency response actions will be used in training, drills and (if such arises) real emergencies. Results of the emergency drills will be used in revision of the emergency response.

The application also states that during the operating phase of the facility, the IWS Building Warden and a Deputy is responsible for marshalling evacuees and securing the facility. There will be a trained deputy for this role. The Health Physics Surveyor (HPS) and Radiation Protection Adviser (RPA) have roles in radiation incidents as part of the ANSTO's emergency management arrangements and these are described in the next section.

The ARPANSA assessor considers that the emergency plans for the operation of the facility are acceptable.

2.2.6.2 Emergency procedures

The licence holder is responsible for ensuring that comprehensive procedures are prepared according to the emergency plan (RG 7.22-7.35) [3]

The application states that if an incident or accident occurs which necessitates the need for an escalated emergency response, ANSTO LHSTC emergency response arrangements will apply. Central to these arrangements is the ANSTO Site Operations Centre (ASOC) which is manned 24/7 by the Australian Federal Police (AFP) and is the focal point for communications in an emergency. Apart from the security

alarms, all safety alarms are monitored and all calls to the ANSTO emergency number are directed to this centre.

The arrangements described in AG 5945- ANSTO Emergency Management Primary Plan will also apply that describes ASOC may initiate a local response and ANSTO Emergency Team (ERT) is the first responder. The ERT will initiate contact with external emergency services as required. This next level of emergency response is managed by an on-call role known as the ANSTO Incident Controller (IC). If necessary, the IC can seek support from the Emergency Operations Manager (EOM) or senior management through the arrangements described in ANSTO Guide, AG 5945.

Further, ANSTO Radiation Protection Services section maintains 24/7 on-call health physics support for radiation incidents.

The ARPANSA assessor considers that the emergency procedures are in line with the emergency plan.

2.2.6.3 Emergency preparedness

The licence holder is responsible for ensuring that all relevant agencies are prepared for such emergencies and adequate facilities and equipment are available and maintained (RG 7.36-7.42) [3], (RAPS 16, 54(d), 123)[4].

The arrangements and contact numbers of all emergency personnel during normal working hours and outside normal working hours are described in ANSTO Guide, Operational Arrangements for Control of Accidents and Incidents (AG 2463).

The ANSTO ASOC, which is the emergency communications point, is manned 24/7 and there are always back-up officers at the site. The IC, EOM and the on-call HPS roles are rostered 24/7 and any absences are covered by alternates.

The site emergency response exercises are undertaken in accordance with ANSTO Guide, Building Emergency Exercise (AG 2361) including preparation, arranging and conducting the emergency exercise. Debriefing following the exercise evaluates the effectiveness of the emergency procedure, resources, equipment and communication systems.

The ARPANSA assessor considers that the arrangements for emergency preparedness are acceptable.

Conclusion

The ARPANSA assessor considers that the plans and procedures described in the application taking into account the accident scenarios during routine operation of the IWS and anticipated occurrences are acceptable.

2.3 ADDITIONAL INFORMATION FOR AUTHORISATION TO **OPERATE**

2.3.1 Description of the facility as constructed [Item 15]

Item 15 of part 1 of Schedule 3 of the Regulation requires the applicant to provide a description of the structures, components, systems and equipment of the controlled facility as they have been constructed.

The IWS is a steel structure building with a foot print of 28.2 metres by 30 metres. The building is 21 metre high to enable the lifting of the TN81 container in a vertical position.

The perimeter walls consist of precast concrete panels approximately 170 mm thick measuring 5 m in height from the floor level and fixed to a structural steel portal. The rest of the perimeter walls which is fixed on top of the precast concrete panels have been constructed with 200 mm thick insulated sheet metal panel. The roof of the facility has been constructed from 150 mm thick insulated sheet-metal sandwich panel.

The IWS is equipped with a 140 tonnes DGR (Dangerous Goods Rated) crane. It contains various building services such as mechanical ventilation, fire alarm, area radiation monitor, lighting system, drainage system, security system etc. Vehicle access and exit will be through two roller shutter doors.

The application refers to relevant standards and codes applied in the construction of the facility.

The IWS will house one TN81 transport/storage cask containing a maximum of 28 canisters of vitrified waste (CSD-U) and six technological waste cemented drums placed within concrete over-pack inside an ISO container.

TN 81 Transport/Storage container

The TN 81 transport/storage container (Figure 1) is a dual purpose container that is used for both transport of radioactive waste and for storage of radioactive waste. It is manufactured from a thick steel forged cylindrical vessel, a welded bottom end made of forged steel and two lids (primary and secondary) made of forged steel.

The container is of cylindrical shape and has the following overall dimensions:

- length: 6,454 mm (including anti-crash cover); and
- diameter: 2,780 mm (around trunnion shielding plugs)

The above data defines a cylindrical cavity with a 1,350 mm diameter and a minimal length of 5,120 mm.

The TN 81 container contains up to 28 stainless steel canisters.





Figure 2: CBF-C2 concrete over-packs

Figure 1: TN 81 Transport/Storage container

Technological waste and CBF-C2 containers

The technological waste is generated from the reprocessing of the used fuel (e.g. process material and equipment, protective clothing, laboratory equipment etc.) is compacted and compacted in steel drums. The cemented drummed waste is then placed inside concrete over packs or CBF-C2 containers (Figure 2 above). There will be six (6) CBF-C2 containers arranged in a metal frame which will be placed in an IP-2 certified ISO shipping container (also called DV 78 container).

The DV78 container is removable-top type shipping container with the following dimensions:

- Length: 6 058 mm
- Width: 2 438 mm
- Height: 2 591 mm

Each CBF-C2 container has the following features:

- Overall dimensions: Diameter 1,000 mm x height 1,500 mm
- Gross mass: 4,000 kg

The facility comprises the following systems and equipment:

Crane

The key operational aspect of the facility will involve installation of the TN-81 container and infrequent movement of this container if required within the IWS. Therefore, the 140 tonnes DGR crane will perform the key safety function in the facility.

The IWS overhead crane has a total capacity of 175 tonnes, which is designed to the requirements of *Australian Standards 1418- Cranes Hoists and Winches*. ANSTO has commissioned the crane as part of IWS construction.

The crane has the following safety features:

- Limit switches to control the vertical travel of the hoist- this will prevent over travel of the crane
- Remote control operation with an additional pendant (backup) and is fitted with an electronic data logging unit- this will keep records of lifting frequency, loads and duration of operations
- Secondary brakes (Note: addition of this safety feature exceeds the requirement of AS 1418)- any failure of the primary brake will not result in loss of control of the load

Ventilation system

The IWS contains both natural and mechanical ventilation systems. When the room ambient temperature exceeds 28 ° C, the mechanical ventilation system will be automatically activated and the booster fans (8 off) will be operated automatically.

Area radiation monitors

The IWS will be equipped with fixed area radiation monitors to monitor any increase level of radiation.

Inter-lid pressure monitoring system

There will be a monitoring system (three pressure sensors) which measures the gas pressure continuously in the inter-lid space between the primary and secondary lid of the TN81 Transport/Storage Container. The pressure data will be displayed on monitors located in the control room.

Other services

Other services in the IWS facility include:

- Nitrogen and helium gas supply system
- Fire-fighting system
- Active drainage system
- Security systems and alarms interfaced with existing ANSTO site wide system

Conclusion

ARPANSA assessor notes that no processing activities will be undertaken at the IWS facility; one TN81 cask and six drummed wastes in concrete over-pack placed in an ISO container will be stored in the facility. Considering the nature of what is to be undertaken at the facility the ARPANSA assessor considers that the systems and equipment comprising the facility are suitable for its operation. ANSTO has applied suitable standards and codes for the construction of these systems and equipment. Further details of construction of the structures, systems and components of the facility were considered in the assessment of licence application for siting and construction of the IWS facility and found acceptable (R13/06576).

2.3.2 Final safety analysis report [Item 16]

Item 16 of part 1 of Schedule 3 of the Regulation requires the applicant to provide a final safety analysis report that demonstrates the adequacy of the design of the controlled facility, and includes the results of commissioning tests.

For each of the principal stages in the life of a controlled facility and as part of its regulatory assessment process, ARPANSA requires the applicant to submit a safety case with the licence application. The safety case includes the design information for the facility, the operational limits and conditions within which the facility must operate, and a safety analysis, documented in a final safety analysis report (FSAR) (RAPS 17-25) [4], [5].

2.3.2.1 Hazard categorisation of systems, structures and components

The safety analysis should take into account the categorisation by safety significance of structures, systems and components and the rigour of the safety analysis is consistent with that categorisation.

Section 3.3 of the Safety Analysis Report (SAR) (IWS-O-LA-SAR) describes the categorisation of systems, structures and components (SSCs) of systems related to radiological safety following ANSTO Guidance on Page 31 of 48

Safety Categorisation of Systems, Structures and Components ANSTO/T/TN/2008-11. The safety analysis is supported by Safety Assessment of the IWS (ANSTO/T/TN/2012-03 rev 3) that describes the details of safety categorisation of structures, systems and components.

The categorisation of the SSCs was also considered in the assessment of the application for siting and construction of the IWS facility and was found acceptable (R13/06576).

No item was identified as safety category 1 and 2. All items were identified as safety category 3¹, which are listed below:

- TN 81 Transport/Storage Container shielding
- Technological waste drums (cemented waste)
- Inter-lid gas pressure monitoring system
- Ventilation alarms
- Radiation monitor
- Building crane
- Fire detection system
- Fire hose reels and portable fire extinguishers

2.3.2.2 Safety Analysis

The safety analysis has considered routine operational conditions and potential accident scenarios, which is supported by ANSTO Safety Assessment of the IWS, ANSO/T/TN/2012-03. ANSTO risk assessment included a detailed hazard identification using the HAZOP technique with the participation of officers from Waste Operations.

Details of safety analysis are presented in Section 9 of the IWS SAR. The safety analysis has taken into account the hazard controls in place. These include:

- Radiological hazard control
- Industrial hazard control

The key routine safety issues considered in the IWS include routine radiation exposure to personnel from CBF-C2 cemented waste and TN-81 transport/storage container.

Appropriate controls are in place to deal with the above hazards and details are described in Section 9.3 of the SAR. These controls include both engineering and administrative controls. The controls described in the Safety Analysis Report are considered suitable by the ARPANSA assessor.

¹ Safety category 3: Items whose failure could lead to radiological exposure exceeding 5 mSv but not exceed 20 mSv (0.25 mSv for a member of the public), taking into account other protective measures, with some degradation

In terms of internal abnormal events ANSTO identified the following accident scenarios in the HAZOP process and these accidents were subjected to safety assessment. The following ten scenarios have been identified with risks associated radiological consequences related to the operation of the IWS:

- i. Accidental dose from possible damage to TN81 Transport/Storage container
- ii. Damage to the seals of the TN81 Transport/Storage container
- iii. TN81 Transport/Storage container tip over
- iv. Burying of TN81 Transport/Storage container
- v. Accidental radiation exposure from technological waste (CBF-C2)
- vi. Inter-lid gas pressure monitoring failure
- vii. Vehicular incident causing radiological hazard
- viii. Failure of radiation monitors
- ix. Radiological contamination hazard
- x. Fire in the store

Considering the likelihood of the accidents and the controls in place ANSTO analysis show that the risks associated with the postulated accident scenarios related to the operation of the IWS have been assessed to be very low. ANSTO safety assessment resulted in three recommendations for further risk reduction - use of barricading and/or shielding around the technological wastes, erecting bunds on the floor around the perimeter and providing a dedicated moveable set of steps to facilitate access to all sides of the TN 81 cask. ANSTO states that they considered these recommendations and will be implemented after installation of the containers. ARPANSA will follow it up after commissioning of the facility.

The ARPANSA assessor considers that scenarios considered in the safety analysis are consistent with the design, construction and operation of the facility.

The safety analysis has also considered relevant external events impacting on the safety of the facility which were considered in the assessment of the licence application for siting and construction of the facility and were found acceptable (R13/06576).

2.3.2.3 Hazard categorisation

The safety analysis for the facility did not identify any scenario with significant radiological consequences outside the facility and therefore, ANSTO characterised the IWS as hazard category F1² according to ARPANSA Regulatory Assessment Principles [4].

² Hazard category F1: where there is no potential for significant consequences outside the facility

Conclusion

The ARPANSA assessor considers that the FSAR has adequately addressed the hazard categorisation of systems, structures and components, operating limits and conditions, routine operational conditions and potential accidental conditions. The safety analysis of the facility shows that the hazard category of the facility is F1. This is considered acceptable to the ARPANSA assessor.

2.3.3 Operational limits and conditions [Item 17]

Item 17 of part 1 of Schedule 3 of the Regulation requires the applicant to provide operational limits and conditions of the controlled facility.

It is expected that the Safety Analysis Report (SAR) includes the numerical values for the operational limits and conditions, and the proximity to the relevant safety limits, for conditions of normal and abnormal operation (RAP 22) [4], [5].

The key aspects considered to derive the operational limits and conditions (OLCs) include parameter limits, the functional capability and the performance levels of safety related items, and personnel.

They key limiting parameters related to the waste items will be;

- Number of TN81 cask and the number of canisters in this cask: One TN 81 cask with a maximum of 28 canisters
- Number of cemented technological waste drums (CBF-C2) in an IP2- ISO container : Six drums
- Cumulative radionuclide inventory specified in the licence application

The ARPANSA assessor sought clarification from ANSTO for including TN81 cask surface dose rates, pressure limits for the seal, TN81 cask surface temperature as part of OLCs. ANSTO stated that these aspects will be considered as routine monitoring parameters and as part of routine surveillance.

ANSTO safety analysis considered a conservative estimate of radionuclide inventory to determine the safety envelope of the facility. It states that the exact inventory will be available just prior to the loading of the waste in transport container in France and this inventory will be provided to ARPANSA once available.

The ARPANSA assessor notes that the TN81 cask and its operational parameters including the radioactive contents and the number of canisters will be subject to separate ARPANSA approval for transport and storage.

Conclusion

The ARPANSA assessor considers that is imperative that the OLCs are derived from the detailed safety analysis of the facility following systematic considerations of parameter limits, the functional capability and the performance levels of equipment and personnel. Further, referring to the IAEA Safety Guide: Storage of Radioactive Waste (IAEA WS-G-6.1, 2006), the ARPANSA Radioactive Waste Guide [5] recommends to consider specification of waste packages and their content, surface dose rates of packages, radioactive inventory, surveillance requirements and other relevant parameters as part of OLCs.

Therefore, the ARPANSA assessor considers that the OLCs for the facility should address the following parameters and submit the updated OLCs to ARPANSA for approval:

- One TN 81 transport/storage container containing up to 28 canisters of vitrified waste
- Six (6) CBF-C2 containers in an IP-2 ISO container
- · Maximum radionuclide inventory used in the safety analysis for the facility
- Maximum thermal load of 48.5 kW for each canister of vitrified waste
- Maximum surface dose rate of 1.3 mSv/h for CBF-C2 container
- Maximum external surface temperature of TN 81 container of 112 °C
- The standard helium leak rate (SHL) does not exceed the value of 10⁻⁸ Pa m³/s
- Maximum surface contact dose rate of 335 µSv/h for TN81 container

Though the exact inventory is not available at the time of assessment, ANSTO used a bounding inventory in the safety analysis for the facility and this is considered acceptable to the ARPANSA assessor. Further, ANSTO gave commitment to provide the list of inventory that will be available prior to the loading of the waste into transport container in France. The ARPANSA assessor considers that ANSTO should be advised to provide the exact inventory of radionuclides in a timely manner following the loading of waste into the transport containers.

The ARPANSA assessor considers that the information submitted to the OLCs are acceptable subject to the following condition:

The licence holder must ensure that the facility complies with the Operational Limits and Conditions (OLCs) approved by the CEO.

2.3.4 Arrangements for commissioning [Item 18]

Item 18 of Part 1 of Schedule 3 of the Regulation requires the applicant to provide the arrangements for commissioning the facility.

The application is supported by a document entitled 'Arrangements for Commissioning' (IWS-O-LA-COM). ANSTO states that there are no equipment or plant items that perform process operation or activities in the store. One TN81 cask and six fibre-concrete (CBF-2) containers will be stored at the facility. The following systems and services will be tested and commissioned:

- (a) Building crane
- (b) Inter-lid pressure monitoring system (TN81)
- (c) Helium gas pipework (TN81)
- (d) radiation alarm
- (e) fire alarm
- (f) ventilation alarm
- (g) occupancy sensors
- (h) lighting and electrical systems
- (i) drainage system
- (j) security devices- CCTV

No systems/items will require hot commissioning, that is, involving radioactive material. However, the use of sealed radioactive sources to commission gamma monitors is covered under ANSTO source licence (S0045) and therefore, does not require further regulatory approval.

TN81 transport/storage container

TN81 cask is designed with appropriate passive safety features so that it is maintenance free, and does not contain any moving parts. The cask will not involve any commissioning at the IWS as it will contain the reprocessed waste while it is transported to the site. However, ANSTO has employed a third party to oversee the manufacture of the TN81 cask according to the strictest quality assurance.

Building crane

ANSTO states that the building crane has been procured from a reputable supplier and it will be commissioned according to the plan provided by the crane manufacturer and approved by the ANSTO Lifting Equipment Approval Officer (LEAO). This crane is a 140 tonnes Dangerous Goods Rated (DGR) crane, and has a total capacity of 175 tonnes, which is 25% more than the design load. ANSTO LEAO has reviewed the crane design and approved it. ANSTO will perform the following major testing and commissioning activities:

- Crane load capacity test including crane deflection test
- Overload protection (i.e. overload safety setting)
- Hoist upper and lower work limit
- Long and cross travel limit
- Hoist, long and cross travel speeds

Inter-lid pressure monitoring system

AREVA will test and commission this device and will supply results to ANSTO. ANSTO will install the monitoring following the AREVA Instruction Manual. After installation, the commissioning of the system involves checking whether the signals from three pressure sensors represent the gas pressure in the inter-lid space and they are displayed on the monitor accurately.

Helium gas pipework

Commissioning of this item will involve visual check and pressure test. The test result will be approved by the Piped Gas System Approval Officer (PGSAO).

Radiation alarm

Fixed radiation monitors will be commissioned using calibration and test sources in consultation with the RPA.

Fire alarm

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ANSTO states that the commissioning of fire detectors, fire instrument panels will be undertaken by the contractor using expertise and staff from ANSTO.

Lighting and electrical systems

ANSTO Site Services Engineer (Electrical) staff and the contractor will verify the commissioning and testing of lighting and electrical systems.

Drainage system

The commissioning of building drainage system will be undertaken by the contractor using expertise and staff from ANSTO Support Services group and Waste Operations.

Testing and commissioning criteria

ANSTO has described the criteria to be used to test and commission the items at the IWS including the activities involved in commissioning, success criteria and the holding points.

ANSTO has provided the commissioning schedule of the above systems and services. The schedule shows that commissioning of these items is expected to be completed in July 2015.

Conclusion

The ARPANSA assessor considers that the arrangements for commissioning described in the application are acceptable.

2.3.5 Arrangements for operation [Item 19]

Item 19 of Part 1 of Schedule 3 of the Regulation requires the applicant to provide the arrangements for operating the facility.

The application is supported by a document entitled IWS-Arrangements for operating the facility, IWS-O-LA-DOP. This document describes the arrangements in place to operate the IWS facility including the steps and procedures that will be undertaken from the receipt and handling of the TN81 cask to the setting up for monitoring whilst in storage for interim period. The arrangements also describe the surveillance and maintenance activities during the operation the facility.

The ARPANSA assessor notes that the operation of the facility will not involve any processing activities including unloading and reloading of wastes from the cask and into the cask.

Section 3.1 of the 'operating arrangements' describe the detailed steps involved in the following operations related to TN 81 cask [Note: TN81 is a Type B (U) transport and storage container]:

- Receipt of the package
- Mounting of the secondary lid
- Mounting of the monitoring system
- Leak tightness tests
- Storing of the package

Monitoring and maintenance activities for TN81 are described in section 3.2 of the document. R15/05147 Page Section 4.1 of the 'operating arrangements' describe the procedures for set up the DV78 container, which is an IP2 package derived from an ISO 200-foot container. The DV78 consists of a single storage rack which forms partitioned frame for placement of up to six (6) individual CBF-C2 cylinders containing technological waste.

Section 4.2 of the document describes monitoring and maintenance of DV 78.

The arrangements for the facility including the building systems and equipment are described in section 5 of 'operating arrangements'. Section 5.2 of this document describes the maintenance tasks and frequency of maintenance.

Conclusion

Considering that the IWS will house one TN81 container and a DV78 container, the arrangements for operation of the facility described in the application are acceptable. The ARPANSA assessor notes that ANSTO will provide the results of the receipt and set up of these containers as part of hot commissioning of the facility.

2.4 Other Matters for Consideration

2.4.1 Whether the information establishes that the proposed conduct can be carried out without undue risk to the health and safety of people, and to the environment [paragraph 41(3)(b) of the Regulations]

The application to operate the IWS Facility has included information that establishes acceptable controls by identifying the hazards and assessing the safety and risks of the proposed activities. The application has been assessed against the relevant matters to be taken into account by the CEO, as described in sections 2.1 to 2.3 of this report.

Based on this assessment, the ARPANSA assessor is of the opinion that the information contained within the application establishes that operation of the IWS facility can be carried out without undue risk to the health and safety of people, and to the environment and therefore will satisfy the requirement of Regulation 41(3)(b).

2.4.2 Whether there is a net benefit from the conduct [paragraph 41(3)(c) of the **Regulations**]

The HIFAR reactor was used for about 49 years for producing radioisotopes for industry, radiopharmaceuticals for diagnostic and therapeutic uses, irradiation of high quality silicon ingots for the electronics industry, materials research, scientific research in relation to neutron beam work etc. Australia is obliged by international contracts and agreements to accept the reprocessed waste from HIFAR used fuel assemblies and store the waste for an interim period.

It is expected that the operation of the facility may involve low level of exposure, below the annual public exposure limit of 1 mSv, but the benefit that millions of patients received from radiopharmaceuticals during the operation of the HIFAR reactor will outweigh the risks associated with the operation of the facility.

The ARPANSA assessor considers that operation of the facility will provide a net benefit.

2.4.3 Whether the doses are as low as reasonably achievable, having regard to economic and social factors [paragraph 41(3)(d) of the Regulations]

The dose constraint for operators of the facility is 15 mSv/year. In addition, ANSTO has an annual ALARA objective of 2 mSv as part of further optimisation of radiation protection. Considering the tasks involved in the operation of the facility the estimated dose to the operator will be below the annual public exposure limit of 1 mSv. Therefore, the ARPANSA assessor considers that the doses are ALARA.

2.4.4 Whether the Applicant can comply with the regulations and the licence conditions [paragraph 41(3)(e) of the Regulations]

The applicant is the CEO of ANSTO. ANSTO is licensed by ARPANSA to operate numerous nuclear installations and prescribed radiation facilities and it has been proven that ANSTO is capable of complying with the ARPANS Act and Regulations and licence conditions. In addition, compliance with licence conditions is verified by ARPANSA inspection.

2.4.5 Whether the Application has been signed by an authorised person [paragraph 41(3)(f) of the Regulations]

The application was signed by Dr Adrian Paterson, the CEO of ANSTO.

2.4.6 If the Application is for a facility licence for a nuclear installation - the content of any public submissions [paragraph 41(3)(g) of the Regulations]

Regulation 40 requires the CEO of ARPANSA to advertise receipt of the licence application for the IWS Facility and to invite submissions from the public in the Australian Government Gazette and a national newspaper. ARPANSA published the following notices in accordance with regulation 40:

- A notice in the Australian Government Gazette on 10 December 2014.
- A notice on the ARPANSA website 10 December 2014.
- A notice in The Australian newspaper on 10 December 2014.

A copy of the operation licence application submitted by ANSTO was made available to the public along with the advice on to how make a submission.

In making a decision on the licence application, paragraph 41(3)(g) of the Regulations requires the CEO of ARPANSA to take into account any submissions received from the public about the application.

ARPANSA received three (3) submissions related to the operating licensing application for the facility as described below:

Submission 1: Lack of time for public submission

This submission states that the proposal for a National Radioactive Waste Repository in South Australia was the best option, and the duration for public submission was inadequate. The submission requested for extension for consultation period.

ARPANSA comment: ARPANSA granted extension as per request until 13 February 2015 but no further submission was received. National Radioactive Waste Repository is related to Government's policy.

Submission 2: Recommendation to approve the operation of the IWS Facility

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This submission recommends approving the operating licence to ANSTO to operate the IWS Facility.

ARPANSA comment: In granting a licence to operate a controlled facility, ARPANSA undertakes rigorous assessment of the plans and arrangements for managing safety and of the SAR that demonstrates the appropriate application of defence in depth principles.

Submission 3: Development and operation of a long term solution for ANSTO's and Australia's nuclear waste and expedited the establishment of a National Radioactive Waste Repository

ARPANSA comment: Establishment of a National Radioactive Waste Management Facility is contingent on Government policy and the eventual submission of a license application (in the first instance likely to be to prepare a site for the NRWMF) from the Department of Industry and Science. When and if received, the application will be thoroughly reviewed by ARPANSA.

2.4.7 International Best Practice

Sub-section 32(3) of the Act requires the CEO, in making a decision on a facility licence, to take into account international best practice in relation to radiation protection and nuclear safety.

ARPANSA has developed a set of Guidelines [3], Principles [4] and a Radioactive Waste Guide [5] which are based on international standards and recommendations, particularly those of the International Atomic Energy Agency (IAEA), and the contemporary practices in the radiation and nuclear safety industries of developed countries. The IAEA standards and recommendations have been developed by consensus of member countries and represent the distillation of best practice of their cumulative radiation and nuclear safety experience.

The ARPANSA assessor notes that reprocessed waste is stored for an interim period, using similar transport/storage containers, in other countries such as Switzerland, Japan and Germany.

To address sub-section 32(3) of the Act, the assessor took into account assessments of the application against the Guidelines [3], Principles [4] and Regulatory Waste Guide [5].

The dose limits considered in the siting of the facility are in accordance with the RPS 1 (Radiation Protection Series No. 1) [6], which is based on the 1991 Recommendations of the International Commission on Radiological Protection (ICRP) in its Publication 60 [7], superseded by ICRP Publication 103 [8]. RPS 1 is currently being revised to take into account ICRP Publication 103 [8] and IAEA Safety Requirements [9]; the changes are not material to the review of this application. Further, ARPANSA's Fundamentals: Protection against Ionising Radiation [10] is based on internationally accepted framework and safety principles [8, 11].

Conclusion

The information contained in the application refers to ICRP recommendations (ICRP Publication 103) [8] and relevant IAEA safety Standards (GSR Part 3, BSS) [9]. The facility has incorporated internationally applicable principles in the operation of the facility. Storage provisions are practised in other countries including Switzerland, Japan and Germany. The ARPANSA assessor considers that the adoption of international best practice in design and technology, operation and radiation protection as described in the application is acceptable.

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3. ARPANSA CONSIDERATION OF MATTERS IDENTIFED IN THE SITING AND CONSTRUCTION ASSESSMENT

In the CEO's statement of reasons for issuing a siting and construction licence the following matters were requested to consider by ANSTO as part of the application for a licence to *operate* the IWS Facility.

- Radionuclide inventory
- Contingency planning
- Further development of the safety case

The application has addressed the above matters and their assessments are described below.

3.1 Radionuclide inventory

ANSTO has considered a conservative estimate of the radionuclide inventory in the safety analysis for the facility, and the exact inventory would be available just prior to the loading of the waste into transport containers in France. ANSTO gave commitment to provide ARPANSA with the exact inventory of radionuclide once available. Further the form and the radionuclide inventory of the waste returning from the UK has been provided to ARPANSA. It is expected that the form of the waste returning from the UK will be in vitrified form. However, the scope of the current licence does not include the UK waste. In the event the waste returning from the UK is stored in the IWS Facility, it will be subject to a relevant change under Regulation 51.

The ARPANSA assessor considers that this aspect has been adequately addressed.

3.2 ANSTO Contingency Plan

It is expected that the contingency plan should include the management of reprocessing waste returned from the UK taking into account the specific time frames. ANSTO submitted a contingency plan, and the assessment of this plan is presented below.

3.2.1 Lifetime and future use of the facility

ANSTO refers to the Government plans to construct and operate the National Radioactive Waste Management Facility (NRWMF)³ which may be operational by the end of the decade (2020). In this case the waste returning from France (TN 81 Transport/Storage container and the six cemented waste drums) will be transferred from ANSTO IWS to the NRWMF.

ANSTO has considered options in the contingency plan in the event there is delay beyond the current plan, which are described in the following sections.

The conservative design life considered is 40 years. However, should an extension of the IWS facility be required, ANSTO would undertake an assessment of the integrity of the structure. In the event an

³ National Radioactive Waste Management Act 2012

assessment suggests closure of the facility, ANSTO would initiate the construction of a new store, which would require separate regulatory approval.

3.2.2 Long term storage of waste and final disposal

ANSTO states that the waste returning from France will be transferred from the IWS to the NRWMF once NRWMF becomes operational. The waste returning from the United Kingdom may go directly to the NRWMF if it is operational, or may go to the IWS for interim storage if the NRWMF is not operational by the time the waste returns from UK.

ANSTO considers that in the unlikely event that the NRWMF is not built within 40 years, ANSTO would make a submission to ARPANSA to amend the licence to extend it for a defined period of time. This approach is in line with the international practice as the approach being assessed by the Swiss Interim Storage Facility (ZWILAG) and other countries (such as Germany) that store vitrified and other HLW in similar waste containers. In that case ANSTO will undertake ANSTO appropriate assessment to meet regulatory requirements. ANSTO also considered reloading the waste into a new TN81 cask, and the reloading operation will be undertaken in a purpose-built facility subject to regulatory approval.

Noting that the Government is currently inviting nominations of sites for the NRWMF, possibly involving co-location of a near surface disposal facility for Low Level Waste (LLW) and an above ground store for Intermediate Level Waste (ILW) it is feasible that the NRWMF will cater for the long term above ground storage (approximately 100 years) of Intermediate Level Waste including the waste reprocessed in France and the United Kingdom. ANSTO states that a final disposal strategy will be subject to Australian Government policy including monitoring of best practice disposal for such waste worldwide.

3.2.3 Contingency options

In the scenario of the unavailability of the NRWMF, ANSTO has identified the following options for contingency.

3.2.3.1 Permanent disposal of returned ILW residues at ANSTO

As mentioned above the permanent disposal option will be determined by the Government policy. Further, the ANSTO Act precludes "premises on which the Lucas Heights Research Laboratories are situated to become a national nuclear waste repository for wastes generated from the activities of others." Therefore, ANSTO has not considered this option further.

3.2.3.2 Retention of the returned residues at ANSTO until the availability of a final disposal **option**

ANSTO refers to the Government's planning for siting and construction of the NRWMF which will be a near surface disposal repository for low level waste (LLW), co-located with an above ground store for ILW. This plan will have the provision for ILW storage above ground for approximately 100 years. The Government will continue to explore final disposal options including geological disposal over this period taking into account international best practice of disposal of such waste.

3.2.3.3 Retention of the returned residues at ANSTO until the availability of the NRWMF for storage

ANSTO's application is predicated on a 40 year operating life for the IWS. The actual storage period of the returned residues is anticipated to be much shorter, based on the anticipated programme for the construction of the NRWMF, subject to regulatory approval. If the NRWMF were to be delayed beyond the 40 years, ANSTO would undertake actions to support an extension of the facility and container, or the safe transfer to another approved dual usage container.

3.2.3.4 **Return of residues**

According to international agreements with the UK and France, Australia has obligation to receive the reprocessed residues as the country of origin, and this is line with the IAEA Joint Convention on Spent Fuel and Radioactive Waste Management. ANSTO was advised by AREVA that France will be exercising their contractual right to return the reprocessed residues by the end of 2015. Therefore, ANSTO has not considered this option further.

3.2.3.5 Transfer to another licensed facility for interim storage

Since there is no licensed facility for interim storage ANSTO has not considered this option further.

Conclusion

It appears that there are some uncertainties regarding establishment of the NRWMF. ANSTO has referred to credible plans and dealt with contingencies in an acceptable manner for the purpose of operation of the facility. The ARPANSA assessor notes that though the facility is for interim storage, the licence is not time-limited. Considering uncertainty related to the waste to be returned from the UK, the ARPANSA assessor recommends a licence condition for submission of plans to the CEO of ARPANSA for the removal of waste stored in the IWS facility by 30 June 2020. Such plans should address operational experience, plans for future operations and transfer to the NRWMF.

The ARPANSA assessor considers that ANSTO's contingency plans are acceptable subject to the following condition:

The licence holder must submit to the CEO, no later than 30 June 2020 and in a form acceptable to the CEO, plans for the removal of waste stored in the facility.

3.3 The safety case

In the CEO's statement of reasons for issuing a siting and construction licence, ANSTO was requested to consider additional elements in the safety case for the application to operate the IWS Facility. These include transport, maintenance, demographic issues and the timeline for safe storage, and further handling of the waste post the life-time of the facility.

In order to address this matter ANSTO submitted a separate document entitled 'Interim Waste Store Operating Licence Summary Safety Case' (IWS-O-LA-SC, Rev 4). The document refers to various key aspects including SAR, safety assessment, plans and arrangements for managing safety, safety

assessment of site characteristics and site related design bases, topical SAR for TN 81 cask (prepared by AREVA) and supporting drawing, documents, reports etc. for detailed analysis. ANSTO states that in preparing the safety case the following documents have been considered:

- ARPANSA Waste Guide [5]
- IAEA Draft Safety Guide DS284: The Safety Case and Safety Assessment for Predisposal Management of Radioactive Waste

Transport of the waste packages: The application has addressed the safety issues associated with the transport of TN81 container and DV78 ISO container. The ARPANSA assessor notes that transport of the waste packages will be subject to separate regulatory approval. If the NRWMF eventuates the next transport of the waste packages would be from LHSTC to the NRWMF, which will also be subject to future regulatory approval. However, the proposed infrastructure associated with the facility will be adequate to support the next stage of transport from LHSTC.

Maintenance: The maintenance aspect has been assessed under 'Arrangement for Operation' in section 2.3.5 of this report and found adequate.

Demographic issues: ANSTO safety assessment of the IWS that supports the safety analysis has considered the detailed aspect of the site characteristics including the surrounding population and the projected population to 2021. Considering the design safety features and operational controls of the facility, form of the waste and the safety features of storage packages, ANSTO analysis shows that there is no radiological impact on the population around the ANSTO site from the operation of the facility.

Timeline for safe storage: ANSTO states that the facility is designed for 40 years and the TN 81 package has a design life of 40 years. It is expected that the waste will be transferred to the NRWMF when it becomes operational. ANSTO has prepared a contingency plan for the wastes if the construction of the national facility is delayed or cancelled by the Federal Government as described above under contingency plan.

Further handling of the waste post the life-time of the facility: ANSTO estimated that the IWS will initially have a conservative design life of 40 years. If the NRWMF does not eventuate within that time-frame and should a licence extension be required, engineering assessments would be carried out to assess the integrity of the structure. If that assessment finds that the IWS requires closure, ANSTO would initiate the construction of a new store subject to regulatory approval. Further details are described above under contingency plan. The ARPANSA assessor considers that this aspect has been adequately addressed.

Conclusion

The ARPANSA assessor considers that the issues identified in the CEO's statement of reasons for granting the siting and construction licence of the IWS facility have been adequately addressed subject to the recommended licence condition related to submission of plans for removal of waste stored in the facility by 30 June 2020 as described above.

4. CONCLUSIONS

The matters set out in sub-regulation 41(3) that the CEO is required to take into account in making a licensing decision, have been described in this report in section 2.5 Other Matters for Consideration. The application and information provided in support of the application provide evidence that:

- The application was in a form approved by the CEO under sub-regulation 39(1), including payment of the relevant application fee (section 1.1).
- The applicant included all of the information required by the CEO under section 34 of the Act (sections 2.1 to 2.3).
- The information establishes that operation of the IWS Facility poses no undue risk to the health and safety of people or to the environment; this has been considered for both anticipated normal operation and potential accident scenarios if the facility is approved for operation in the future (section 2.4.1).
- The applicant has shown a net benefit from operation of the IWS Facility (section 2.4.2)
- Reasonably achievable efforts have been proposed to optimise protection taking into account available information of the magnitude of individual doses, the number of people exposed and the likelihood that exposure will occur (section 2.4.3).
- The applicant has shown a capacity for complying with the regulations and licence conditions (section 2.4.4).
- The application was signed by the requisite office holder (section 2.4.5).

The contents of public submissions were considered in section 2.4.6 of this report.

The regulatory review documents relied on in the licence assessment and preparation of this report (section 1.3) reflect current international best practice in relation to radiation protection and nuclear safety. Further, the standards and practices considered in the preliminary design of the facility and the existing operating practices have also been considered as part of international best practice.

5. **RECOMMENDATIONS**

5.1 Issue of Licence

It is recommended that Facility Licence F0292 be issued to ANSTO in respect of licence application A0292 authorising the operation of a controlled facility, namely the IWS Facility, subject to the licence conditions listed below.

5.2 Licence Conditions

- The licence holder must provide to the CEO of ARPANSA within twenty-eight (28) days of the end of each quarter, and in a form acceptable to the CEO, information about compliance for the previous quarter year.
- The licence holder must update the Safety Analysis Report (SAR) of the facility at least once in every three (3) years to ensure that the SAR reflects the current status of the facility.

- The licence holder must assess the safety and security of the facility at least once in every ten (10) years and document the results of such assessment, taking into account recent operating experience and international best practices.
- The licence holder must ensure that the facility complies with the Operational Limits and Conditions (OLCs) approved by the CEO.
- The licence holder must submit to the CEO, no later than 30 June 2020 and in a form acceptable to the CEO, plans for the removal of waste stored in the facility.

Assessor										
NAME: Samir Sarkar	SIGNATURE:	ORIGINAL SIGNED	DATE: 7 / 5 / 2015							
Branch Head										
NAME: Jack Dillich	SIGNATURE:	ORIGINAL SIGNED	DATE: 7 / 5 / 2015							

6. **REFERENCES**

- [1] Australian Radiation Protection and Nuclear Safety Act 1998
- [2] Australian Radiation Protection and Nuclear Safety Regulations 1999
- [3] Australian Radiation Protection and Nuclear Safety Agency, *Regulatory Guide: Plans & Arrangements for Managing Safety v5* (May 2014)
- [4] Australian Radiation Protection and Nuclear Safety Agency, *Regulatory Assessment Principles for Controlled Facilities*, RB-STD-42-00, Revision 1, October 2001
- [5] Australian Radiation Protection and Nuclear Safety Agency, *Regulatory Guide: Licensing of Radioactive Storage and Disposal facilities v2* (march 2013)
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APPENDIX-1

- 1. ANSTO Interim Waste Store Operating Licence Application
- 2. Interim Waste Store Operating Licence, Effective Control plan, IWS-O-LA-D1
- 3. Interim Waste Store Operating Licence, Safety Management Plan, IWS-O-LA-D2
- 4. Interim Waste Store Operating Licence, Radiation Protection plan, IWS-O-LA-D3
- 5. Interim Waste Store Operating Licence, Waste Management Plan, IWS-O-LA-D4
- 6. Interim Waste Store Operating Licence Security Plan, IWS-O-LA-D5
- 7. Interim Waste Store Operating Licence, Emergency Plan, IWS-O-LA-D6
- 8. Interim Waste Store Operating Licence, Description of the Structures, Components, Systems and Equipment, IWS-O-LA-FD
- 9. Interim Waste Store Operating Licence, Safety Analysis Report, IWS-O-LA-SAR
- 10. Interim Waste Store Operating Licence, Operational Limits and Conditions, IWS-O-LA-OLC
- 11. Interim Waste Store Operating Licence, Arrangements for Commissioning, IWS-O-LA-COM
- 12. Interim Waste Store Operating Licence, Arrangements for Operating the Facility, IWS-O-LA-DOP
- 13. Safety Assessment of the Interim Waste Store, ANSTO/T/TN/2012-03 rev 3
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