Australian Government

Australian Radiation Protection and Nuclear Safety Agency

REGULATORY ASSESSMENT REPORT

Assessment of Facility Licence Application A0277 from the

Australian Nuclear Science and Technology Organisation (ANSTO)

to prepare a site for the

ANSTO Interim Waste Store (IWS) at Lucas Heights Science and Technology Centre

Regulatory Services Branch

R13/05519

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EXECUTIVE SUMMARY

On 16 April 2013 the CEO of ARPANSA received a licence application (application number A0277) from the CEO of ANSTO requesting approval to prepare a site for the nuclear installation known as the ANSTO Interim Waste Store (IWS) at the Lucas Heights Science and Technology Centre (LHSTC). The proposed nuclear installation is to be a purpose-built store for housing intermediate level solid radioactive waste returning from France, and potentially also from the United Kingdom (UK), following reprocessing of fuel assemblies used in the closed HIFAR research reactor. The application assumes that waste from the UK will be stored in the IWS, and assumes the waste will be in the bounding form, that is, in a cemented waste form. It is proposed that these wastes will be stored in the IWS until the National Radioactive Waste Management Facility (NRWMF) is constructed and operational at which time they will be moved to that facility.

The application describes the siting safety assessment of the IWS, plans and arrangements for managing safety, and other relevant information such as technical specifications for the radioactive waste and a geotechnical report of the site.

The radioactive waste returning from France will be immobilised in a vitreous form and transported/stored in an engineered shielded dual storage and transport container known as the TN81. In addition technological waste will be returned from France cemented within steel drums. The waste returning from the UK could be either in vitrified or cemented form. Discussions on the exact waste form returning from the UK are currently in progress with the UK and Scottish governments, and should be finalised by the end of 2013.

The proposed facility is an above-ground building called the Interim Waste Store. The application seeks approval for siting of the proposed IWS at the LHSTC between the existing building 64 and building 19, just to the north of building 61, and will require demolition of building 63.

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) and the Australian Radiation Protection and Nuclear Safety Regulations 1999 (the Regulations). ARPANSA assessors have prepared this Regulatory Assessment Report (RAR) for consideration by the CEO of ARPANSA in making such a decision.

This RAR is based on the assessment of the information described in application A0277. The plans and arrangements for safety and other relevant information about the siting of the facility have been reviewed against the requirements in the Act, the Regulations, and other relevant guidelines and principles such as:

- ARPANSA, Regulatory Assessment Principles for Controlled Facilities, ARPANSA, Rev 1, RB-STD-42-00, October 2001.
- ARPANSA, Regulatory Guide: Plans and Arrangements for Managing Safety (RG), ARPANSA, v4, OS-LA-SUP-240B, Jan 2013.

- ARPANSA, Regulatory Guide: Licensing of Radioactive Waste Storage and Disposal Facilities, ARPANSA, v2, OS-LA-SUP-240L, March 2013.
- Site Evaluation for Nuclear Installations, IAEA Safety Standards Series No. NS-R-3, 2003.
- Safety Aspects in Siting for Nuclear Installations, IAEA Draft Safety Standard DS433, 2012.
- ARPANSA Radiation Protection Series No 16 Safety Guide for Predisposal Management of Radioactive Waste (2008).

The ARPANSA assessor finds that the application has acceptably addressed the matters to be taken into account by the CEO of ARPANSA in deciding whether to issue a licence authorising ANSTO to prepare a site for the proposed IWS. The ARPANSA assessor concludes that the application includes suitable plans and arrangements to ensure that the nuclear installation may be sited without undue risk to the health and safety of people and the environment. The ARPANSA assessor recommends that the CEO of ARPANSA issues a facility licence to ANSTO authorising the preparation of a site for the proposed IWS facility at the LHSTC.

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1. INTRODUCTION

On 15 April 2013, ANSTO applied for a facility licence under subsection 32(1) of the Act to prepare a site at the Lucas Heights Science and Technology Centre (LHSTC) for a proposed Interim Waste Store (IWS). The proposed IWS is a nuclear installation as defined in regulation 7 and further described in Item 16(a) in Schedule 3A of the Regulations.

1.1 Purpose

The purpose of this report is to document the assessment of information contained in ANSTO's application against the criteria set out in the *Australian Radiation Protection and Nuclear Safety Act 1998* (the Act) [1] and the Australian Radiation Protection and Nuclear Safety Regulations 1999 (the Regulations) [2]. 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, and those matters set out in regulation 41 and Schedule 3 Part 1 of the Regulations.

1.2 Receipt of application

In accordance with the requirements of the Act, ANSTO submitted an application [3] for a nuclear installation licence on 15 April 2013 which was received by ARPANSA on 16 April 2013. A copy of the licence application is posted on the ARPANSA website, but excludes commercially sensitive information which relates to AREVA technology. The application is in an acceptable form and was accompanied by the appropriate fee.

As required by regulation 40 of the Regulations, the CEO of ARPANSA published a notice in the Australian Government Gazette No. GN 18 and the Australian newspaper on 8 May 2013, notifying the receipt of a facility licence application from ANSTO and of his intention to make a decision on the application.

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

1.3 Assessment process

The assessor has relied on the following documents and information:

- The information contained in the initial application.
- Information obtained from the applicant following receipt of the application.
- Information obtained at meetings and discussions with the applicant.
- Other documents referred to in the body of this report.

The following documents have been used in the assessment of this application:

- The Australian Radiation Protection and Nuclear Safety Regulations [2]
- ARPANSA, Regulatory Assessment Principles for Controlled Facilities, ARPANSA, Rev 1, RB-STD-42-00, October 2001 [4].
- ARPANSA, Regulatory Guide : Plans and Arrangements for Managing Safety (RG), ARPANSA, v4, OS-LA-SUP-240B, January 2013 [5].
- ARPANSA, Regulatory Guide: Licensing of Radioactive Waste Storage and Disposal Facilities, v2, OS-LA-SUP-240L, March 2013 [6].
- Site Evaluation for Nuclear Installations, IAEA Safety Standards Series No. NS-R-3, 2003 [7].
- Safety Aspects in Siting for Nuclear Installations, IAEA Draft Safety Standard DS433, 2012 [8].
- ARPANSA Radiation Protection Series No 16 Safety Guide for Predisposal Management of Radioactive Waste (2008) [9].

ARPANSA has kept the Nuclear Safety Committee[1] (NSC) informed of progress on this matter throughout the assessment process. The CEO of ARPANSA requested high level advice from the NSC on the ANSTO Interim Waste licence application. Formal advice was received from the NSC on 8 May and 22 November 2013.

2. REVIEW OF INFORMATION

2.1 General information

This section describes the review of information provided in the application and information subsequently received from the applicant.

2.1.1 Applicant information [Item 1]

Item 1 of Part 1 of Schedule 3 of the Regulations requires the applicant to provide the applicant's full name, position and business address.

[1] The Nuclear Safety Committee is established under the *Australian Radiation Protection and Nuclear Safety Act 1998* to inter alia "advise the CEO and the Council on matters relating to nuclear safety and the safety of controlled facilities'. Members are: the CEO of ARPANSA; a person to represent the interest of the general public; a representative of the Radiation Health Committee; a person to represent the local government or the local administration of an area affected by a matter related to the safety of a controlled facility; and up to 8 other members.

The application was made by Dr Adrian Paterson, CEO of ANSTO. ANSTO is part of the Department of Industry portfolio. Mr Con Lyras, General Manager, Engineering and Capital Programs is named as the nominee authorised by the CEO of ANSTO in relation to the application. The application also provides contact details of the applicant's Radiation Safety Officer.

The address of the proposed nuclear installation is Lucas Heights Science and Technology Centre, New Illawarra Road, Lucas Heights NSW. The nuclear installation will be located within the LHSTC between existing buildings 64 and 19, just to the north of building 61. It will require demolition of building 63.

Conclusion

The assessor considers that the information about the applicant, required under Item 1 of Part 1 of Schedule 3 of the Regulations [2], has been provided in the application.

2.1.2 Description of purpose of facility [Item 2]

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

The IWS facility is designed to hold one TN81 transport/storage container stored vertically. Floor space is also provided for the ISO container that will hold the technological waste in the form of six cemented drums in shielded over pack concrete containers. The available floor space is also adequate to manage Australia's intermediate level waste (ILW) returning from the United Kingdom (return timing to be renegotiated) should the National Radioactive Waste Management Facility (NRWMF) not be operational at that time.

Conclusion

The assessor considers that the purpose of the facility described in the application is adequate.

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 site for the proposed facility.

The proposed IWS is a temporary facility designed to house the ILW generated from the reprocessing of HIFAR used nuclear fuel. The definition of ILW is given in Annex 1 of the ARPANSA Radiation Protection Series No 20 Safety Guide for Classification of Radioactive Waste [10]. Annex 1 classifies the radioactive waste from the reprocessing of HIFAR used fuel as intermediate level solid waste. Eventually the ILW will be transported to the planned NRWMF. This facility is expected to be constructed and capable of receiving waste by 2020.

The proposed IWS facility will be approximately 840 m^2 in area, with a footprint of 28 metres by 30 metres, and 17 metres high and is described in ANSTO document IWS-C-LA-Ca [3], Interim Waste Store Facility Design Information. The perimeter walls will be precast concrete panels approximately 5 metres high fixed to a steel portal frame. The walls above the concrete panels, and roof, will be constructed with metal backed panels having good thermal insulation. The floor will be a concrete slab to withstand the rated loads. The facility will have road access from Dalton Avenue. A 140

tonne, dangerous goods rated, overhead crane will be provided to move loads to and from transport vehicles and within the building. The design of the facility is in accordance with the Building Code of Australia, other relevant Australian Standards and ANSTO specific guidelines.

The proposed IWS will be surrounded by other ANSTO buildings, and will be approximately 350 m from the southern-most point of the fenced site; 182 m from the fence at Gate 14; and 112 m from the nearest point on the fence.

The general site characteristics for the proposed nuclear installation are given in the Siting Safety Assessment: Site Characteristics and Site Related Design Bases, IWS-S-LA-Cab, Rev 2, March 2013 which can be found as part of the ANSTO licence application [3].

In summary the LHSTC is situated approximately 35 km south-west of the Sydney CBD on the Woronora Plateau at an elevation of 150 m above mean sea level. The LHSTC is approximately 2 km west of the Woronora River and 8 km south of the Georges River and is surrounded by bushland for several kilometres with no significant habitation in the north-west, west and south-west quadrants. The ANSTO laboratories, and some divisional laboratories of CSIRO, are located within a 70 ha fenced area which is surrounded by a 1.6 km buffer zone. The residential suburbs of Barden Ridge and Engadine are located in the north-east to south-east sectors adjacent to the ANSTO buffer zone while the growing suburban area of Menai is located approximately 3 km to the north-east. Residential development is also proposed to the north of the site.

Conclusion

The assessor concludes that, as required under items 2 and 3, Part 1 of Schedule 3 of the Regulations [2], the application provides a satisfactory description of the purpose of the proposed facility, its design and site, summarised in Sections 2.1.2 and 2.1.3 above, for the siting stage of the project.

2.2 Plans and arrangements for managing Safety

Item 4 of Part 1 of Schedule 3 of the Regulations [2] lists information that may be requested by the CEO on the applicant's plans and arrangements for managing safety of the controlled facility to ensure the health and safety of people and protection of the environment.

ANSTO's plans and arrangements for managing safety and other relevant information about the siting of the IWS facility have been reviewed against the ARPANSA Regulatory Guide: Plans and Arrangements for Managing Safety (RG) [5] and the ARPANSA Regulatory Assessment Principles for Controlled Facilities (RAPS) [4]. This section briefly describes the information provided by ANSTO on its plans and arrangements and assesses the information against the relevant guidelines.

2.2.1 Effective control arrangements [Item 4(a)]

In applying for a facility licence, the applicant may nominate a person or position that would exercise effective control of the conduct for which the 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 responsibility and accountability remains with the applicant.

The applicant must describe the organisational arrangements for managing the safety of the conduct and dealings to ensure the health and safety of people and the protection of the environment. This should include a description of responsibilities and lines of authority, and information on a quality system covering all activities that may impact on safety.

Accountability of applicant

The licence holder or applicant is responsible for maintaining control over all aspects of conducts and dealings for which licences are sought or held, and for ensuring compliance with all applicable requirements of the ARPANS Act and Regulations. The licence holder or applicant may authorise people to carry out certain actions associated with their responsibilities under the Act, but the licence holder or applicant remains ultimately responsible (RG 1.1-1.4 [5])

The effective control plan (IWS-S-LA-D1, revision 2, March 2013) [3] includes information in section 2 that describes how ANSTO management will ensure control over the siting of the IWS facility and safety of personnel and the environment during the construction. In addition, ANSTO has provided the following information in its application:

- ANSTO, through its CEO, is the applicant to ARPANSA for the siting licence authorisation being sought. The responsibility for maintaining effective control and for ensuring compliance with the ARPANS legislation during the siting of the facility has been delegated to the Nominee who is the General Manager (GM) of Engineering and Capital Programs (ECP). The Nominee is assisted by the Facility Officer for the IWS. During siting this role will be will be fulfilled by the Project Manager.

- ANSTO management will use several processes to remain informed and aware of safety during the project. Management will be informed by review of the siting licence applications and by the safety approval process for the project which is described in IWS-S-LA-D2 *Siting Safety Management Plan* [3]. The normal project reporting will include safety and this will be discussed at safety meetings. The event response system, described in the safety management plan, will rapidly inform management of safety incidents and accidents.

- ANSTO states that it follows the ARPANS legislation requirements for reporting to ARPANSA, including annual and quarterly reports and the requirement for immediate reporting in the event of an accident.

The assessor considers that the application contains adequate information to satisfy the accountability guidelines 1.1 to 1.4 of the RG [5].

Organisational arrangements

An organisational structure, showing clear lines of authority and responsibility for all activities, particularly those relating to safety, training, radiation protection, operations, maintenance, modifications, quality management, radioactive waste management, security, emergency planning and emergency preparedness (RG 1.5 [5]).

The effective control plan includes organisation charts for ANSTO (Figure 1, IWS-S-LA-D1)[3]; ECP Division (Figure 2, IWS-S-LA-D1)[3]; structure and accountability of the Head of Nuclear Services and Chief Nuclear Officer (Figure 3, IWS-S-LA-D1)[3]; and the IWS project (Figure 4, IWS-S-LA-D1)[3].

The siting of the IWS facility will be managed as a project within ANSTO using a matrix project organisation structure with staff drawn from ECP and other divisions. The project organisation is shown in Figure 4 of the effective control plan. The Project Manager has formed the project team and is executing the project following the MPDO procedures and with funds approved by senior management.

ANSTO has also provided the following information in its application:

- Ultimate responsibility for the IWS facility rests with the CEO of ANSTO who has delegated responsibilities to senior managers. The GM, ECP is both the delegated Nominee for IWS and capital projects, including the IWS siting project. When completed, ANSTO Waste Operations will operate the facility. The Head Nuclear Services has a dual role as Chief Nuclear Officer and is also Chair of the Safety Assurance Committee (SAC).

This dual role of the Chief Nuclear Officer has been assessed previously by ARPANSA and found to be acceptable.

The assessor considers that the application contains adequate information to satisfy guideline 1.5 of the RG [5].

Communication network

A communication network from management to staff, and the feedback system to management, showing how it will result in an open exchange of information at and between all levels of the organisation (RG 1.6 [5]).

The communication network and feedback system from management to staff will follow usual lines of responsibility within a hierarchical organisation like ANSTO. This can be seen in the organisational charts shown in Figures 1 to 4 of the effective control plan. Communication between management and staff actively involved in the siting phase of the IWS facility will be governed by the matrix project structure.

Under the Project Manager is the ILW Store and Road Works project manager who will act as construction supervisor with site responsibility for the siting and construction activities once construction has been approved. The Project Manager is also the Facility Officer and will report to the Nominee and Licensing Officer on ARPANSA licensing issues. Support and indirect supervision is provided by the Radiation Protection Adviser (RPA) and other specialists. RPA, Health Physics Surveyor (HPS) and Work Health and Safety (WHS) support staff provide guidance and advice but are not shown on the project organisation chart because they report through their line management in Nuclear Services and Human Resources and Work Health and Safety. Note, however that they are expected to provide monitoring, dose survey and other regular reports to the project.

The assessor considers that the application contains adequate information to satisfy guideline 1.6 of the RG [5].

Responsibilities

Defined responsibilities and lines of communication with other parts of the organisation and with external organisations, under all operating conditions (RG 1.7 [5]).

The organisational chart for the IWS facility project is given in Figure 4 of the effective control plan (IWS-S-LA-D1)[3]. This chart shows the relationships and lines of communication between the IWS Steering Committee, the Project Manager, the Procurement and Security Operations Managers, Manager Nuclear Services, Regulatory Manager, Facility and Roadworks including the principal contractor, Communications and Public Liaison, Logistics and Procurement, and Regulatory and Engineering.

The assessor considers that the application contains adequate information to satisfy guideline 1.7 of the RG [5].

Delegations

Appropriate delegations in relation to operational and financial matters (RG 1.8 [5]).

The ANSTO project management and approval processes for projects ensure there is sufficient funding available for the necessary equipment and people resources. The funding is allocated by the ANSTO Capital Investment Committee (CIC) comprising of senior management; and the projects are monitored throughout their lifecycle by the CIC.

On approval the funds are made available to the project manager and staff. All external purchases of items and services, including additional training, are through the ANSTO Procurement Section and follow the requirements of the Government Procurement Guidelines.

The assessor considers that the application contains adequate information to satisfy guideline 1.8 of the RG [5].

Deputising arrangements

Deputising arrangements for key safety personnel in their absence (RG 1.9 [5]).

In response to further information requested by ARPANSA, ANSTO has stated that it has a delegations manual approved by the board and CEO. When a nominated individual is selected to deputise for another individual, all the key delegations are transferred to that individual. Furthermore, arrangements will ensure that the person deputising is suitably qualified and experienced to undertake the duties for which they are deputising.

The assessor considers adequate information is provided to satisfy guideline 1.9 of the RG [5].

Control and supervision of contractors

Defined responsibilities and lines of communication relating to the control and supervision of contractors (RG 1.10 [5]).

ANSTO has supplied information in its application that contractors will report through their supervisor/manager to the construction supervisor who is an accredited Contractor Supervisor as per ANSTO's WHS Management System.

The assessor considers that the application contains adequate information to satisfy guideline 1.10 of the RG [5].

Defined roles and responsibilities

A description of the precise roles of individual positions, particularly those relating to radiation protection and nuclear safety, as defined in job descriptions, profiles or similar documents (RG 1.11 [5]).

In section 3 of the effective control plan (IWS-S-LA-D1)[3] ANSTO defines the roles, responsibilities and accountabilities of Head Nuclear Services and the Chief Nuclear Officer. The Radiation Protection Services group has the specialist Radiation Protection Advisers (RPAs) who have developed the construction and commissioning Radiation Protection Plan (IWS-S-LA-D3)[3] and have input to other plans where radiation safety is involved. The group also provides Health Physics Surveyors (HPS) who conduct radiological surveys and provide close support to the work teams. The dosimetry services are also within this group. The Chief Nuclear Officer is also Chair of the Safety Assurance Committee (SAC) which is the review and approval body for all safety significant changes and projects.

Although job descriptions have not been provided for specific roles, the assessor considers there are adequate descriptions provided for the key roles of the Head Nuclear Services and Chief Nuclear Officer who have responsibility for the areas of radiation protection and nuclear safety through the SAC.

The assessor considers that the application contains adequate information to satisfy guideline 1.11 of the RG [5].

Key safety positions

A statement of responsibilities for key safety positions and the required training, accreditation, authorisation for individuals to adequately fulfil these positions (RG 1.12 [5]).

The training of key safety positions is described in section 3 of the safety management plan (IWS-S-LA-D2)[3]. The Radiation Protection Advisers are recruited with the necessary knowledge, skills and experience or are trained within ANSTO, and are authorised within ANSTO. The Health Physics Surveyors are given comprehensive theoretical and practical training and are authorised within ANSTO.

The Health and Safety Services section within Human Resources and Work Health and Safety coordinates, manages and maintains all WHS related courses onsite including all inductions required for staff and contractor access.

Workers entering construction work areas must hold a WorkCover issued White Card and be inducted to the site. Visitors must be escorted by an authorised ANSTO worker or contract partner

who must provide a local area induction and the required personal protective equipment (PPE) required for entry.

The assessor considers that the application contains adequate information to satisfy guideline 1.12 of the RG [5].

Defined interfaces

The activities and interfaces between different individuals or groups involved in a single process are planned, controlled and managed in a manner that ensures effective communication and clear assignment of responsibilities (RG 1.13 [5]).

The organisational chart for the IWS facility project is given in Figure 4 of the effective control plan (IWS-S-LA-D1)[3]. This chart shows the relationships and lines of communication between the IWS Steering Committee, the Project Manager, the Procurement and Security Operations Managers, Manager Nuclear Services, Regulatory Manager, Facility and Roadworks including the principal contractor, Communications and Public Liaison, Logistics and Procurement, and Regulatory and Engineering.

Section 3 of the effective control plan describes the matrix staffing arrangements for the IWS Project, and describes responsibilities of the project teams.

The assessor considers that the application contains adequate information to satisfy the guideline 1.13 of the RG [5].

Performance evaluation

Systematic evaluation of staff performance benchmarked against achievable goals (RG 1.14 [5]).

ANSTO has a process for establishing performance expectations through its Annual Performance and Effectiveness Appraisals (APEA) process. This process establishes goals and expectations for the year ahead, and provides formal 6 monthly and annual performance reviews against the agreed goals and expectations. Safety behaviour is one of the key aspects of the APEA process.

The assessor considers that adequate information has been provided to address guideline 1.14 of the RG [5].

Periodic review

Periodic review of the adequacy of the organisational structure, including staffing and resources related to conducts and dealings (RG 1.15 [5]).

The IWS facility siting project has been established in a matrix project organisation structure with staff drawn from ECP and other divisions. The Project Manager has formed the project team and is executing the project following the Major Projects Delivery Office procedures and with funds approved by senior management. These organisational arrangements are reviewed periodically.

In addition, section 5 of the effective control plan states that the ANSTO project management and approval processes for projects ensures there is sufficient funding available for the necessary

equipment and people resources. The funding is allocated by the ANSTO Capital Investment Committee (CIC) comprising senior management and the projects are monitored throughout their lifecycle by the CIC.

The assessor considers that the application contains adequate information to satisfy guideline 1.15 of the RG [5].

Change management

A defined process to ensure that implementation of organisational change is planned, controlled, communicated, monitored, tracked and recorded in such a way that safety is not compromised. Organisational change is evaluated and classified according to safety importance. (RG 1.16 & 1.17 [5]).

Organisational changes with a potential impact on safety are referred to the Safety Assurance Committee (SAC) for review. To ensure communication of changes, ANSTO staff forums are held, and information is posted on the ANSTO intranet. In addition, information is exchanged at toolbox talks and monthly management meetings.

The assessor considers that adequate information has been provided to address guidelines 1.16 and 1.17 of the RG [5].

Legislative compliance

Established liaison with ARPANSA and other statutory authorities for the purposes of considering, understanding and achieving compliance with the requirements of respective legislation, licence conditions, and any obligations of Australia under international treaties (RG 1.18 [5]).

Section 3 of the effective control plan states that there will be ongoing liaison with the regulators including ARPANSA through the Regulatory Affairs Manager from the Governance, Risk and Compliance Group within the Office of the CEO.

Section G of the application states that ANSTO will adopt relevant safety requirements and guidelines, particularly the IAEA's Safety Guide for Storage of Radioactive Waste (WS-G-6.1, 2006) [11] and IAEA Safety Requirements for Safe Transport of Radioactive Material (TS-R-1, 2009) [12]. ANSTO states it is also committed to protecting the environment, and this is demonstrated through its certification to the international environmental management system standard, ISO 14001.

The assessor considers that the application contains adequate information to satisfy guideline 1.18 of the RG [5].

Information & knowledge management

Provision for management of organisational information and knowledge (RG 1.19 [5]).

Section 10 of the safety management plan (IWS-S-LA-D2) [3] states that project information and documentation is stored on ANSTO computer servers and in relevant paper files. Project staff have the appropriate access to this information.

The ANSTO safety arrangements are within the ANSTO AS/NZS ISO 9001:2008 (ISO 9001) certified systems and this is important to ensure that there is appropriate reporting and storage of records. General requirements for safety records are given in S-P-003 Control of Records [3] which details the storage locations, retention periods and responsibilities for maintaining the records. These records include design and operational information, dosimetry records, survey results, safety assessments, safety training records and event reporting as examples.

The assessor considers that the application contains adequate information to satisfy guideline 1.19 of the RG [5].

Maintenance of corporate knowledge

An adequate level of corporate knowledge is maintained within the organisation (for example: with regard to staff retirement and resignation) (RG 1.20 [5]).

ANSTO operates a Business Management System (BMS) which is accredited to ISO 9001. Management of records is a key component of the BMS. In addition, a project has been initiated within ANSTO known as the Managing Knowledge Initiative which is aimed at managing knowledge as a strategic resource, improving information sharing and improving record management processes.

Although ANSTO's response does not actually address staff resources or succession management, the assessor considers that the intent of guideline 1.20 of the RG [5] is adequately addressed.

Management system

The licence holder or applicant is responsible for ensuring that a management system, consistent with current AS/NZS ISO standards and IAEA Safety Standards, and commensurate with the type of controlled facility, controlled apparatus or controlled material is developed, implemented and maintained (RG 1.21 - 1.25 [5], RAPS 13-14 [4]).

Section 4 of the effective control plan [3] describes the ANSTO management system and how it has policies to cover all aspects of its operations, including Occupational Health, Safety and Environment, which are periodically reviewed. The policies are available on the ANSTO intranet and accessible to all staff. There are regular staff forums held by the CEO and the divisions at which safety issues are discussed to reinforce the policies. Safety training programs further expand and explain the intent of the policy.

Project documents are developed in accordance with ISO 9001. The effectiveness of the management systems is monitored and maintained by the audit programs for the ISO certifications.

The assessor considers that the application contains adequate information to describe the applicant's management system to satisfy guidelines 1.21 - 1.25 of the RG [5] and RAPS principles 13- 14 [4].

Resources

The licence holder or applicant is responsible for ensuring that adequate and appropriate human, financial and material resources are provided to effectively implement the plans and arrangements

for radiation protection and nuclear safety and to maintain effective control over conducts and dealings (RG 1.26 - 1.30 [5]).

Section 5 of the effective control plan [3] describes how the ANSTO project management and approval processes ensure that there is sufficient funding available for necessary equipment and human resources. In addition, this funding is reviewed during the life of the project by the Capital Investment Committee.

The assessor considers that the application contains adequate information to describe the applicant's management of resources to site the IWS facility to satisfy guidelines 1.26 – 1.30 of the RG [5].

Conclusion

The assessor concludes that the application contains adequate information to describe the effective control arrangements during the siting of the IWS facility.

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.

Safety approvals system

A summary of the ANSTO safety approvals system is given in section 5.6 of the Preliminary Safety Analysis Report (PSAR) of the construction licence application IWS-C-LA-Cd [3] which was received at the same time as the siting licence application. The ANSTO Safety Assurance Committee reviewed and approved the plans and arrangements for the siting of the IWS facility in SAC 1932 on 27 March 2013 [3].

Safety culture

The licence holder or applicant is responsible for establishing safety as the organisation's highest priority, consistent with international best practice in radiation protection and nuclear safety and overriding, if necessary, the demands of production or project schedules (RG 2.1 – 2.19 [5], RAPS 1,3, 6-9 [4]).

ANSTO provides information on safety culture in section 2 of the safety management plan (IWS-S-LA-D2) [3].

The safety culture during pre-operational phases is important to the ultimate safety of the operational facility. The initial design and subsequent changes or compromises made during construction can impact on the safety of the operating plant. At a high level ANSTO has sought to isolate safety policies from commercial pressures by funding being provided by the Capital Investments Committee (CIC) and safety approvals being given by the separate Safety Assurance Committee (SAC). This is important as it insulates the project from the production and project pressures that it will invariably encounter.

ANSTO has an immediate challenge to establish a cross-organisational safety culture in a project which will have a high reliance on contractors during the construction phase. Safety culture focus should cut across direct construction safety to quality management to ensure that the facility can be operated safely through meeting high standards and specifications. ANSTO has shown the capacity to achieve this through projects such the decommissioning of the MOATA reactor. Regulatory oversight during construction can be applied to verify that this capacity remains and is applied to the IWS.

In regard to leadership for safety, many aspects are difficult to gauge from the application due to the characteristics of safety leadership rather than a weakness in the application itself i.e. some leadership attributes are better observed than prescriptively written. It is stated in the application that an important aspect of safety culture is for people to have a questioning attitude and adopt a prudent approach to work with conservative decision making. Appropriate training and awareness is instilled by safety briefings, toolbox talks, safety inspections and use of the STAR principle (Stop, Think, Act, Review). This principle is well established among ANSTO staff and ANSTO has been successful previously at promoting it to other workers.

The ECP Business Management System (BMS) monitors safety indicators, for all projects, that are designed to improve operational safety performance. The safety policy and arrangements are readily available to all staff via the intranet, and are subject to regular review. All safety events/incidents can be captured, reported, and investigated if necessary by the ANSTO Event Management Process. This system is well-developed and provides an effective mechanism for workers to raise issues including safety and quality to management. This system links into ANSTO organisational learning and change management systems and will be accessible to both ANSTO staff and contractors.

Finally, safety issues and learning are communicated to staff in several ways. Toolbox talks are the main forum for the siting of the facility itself. Feedback to the Major Projects Delivery Office (MPDO) and ECP management will occur through the Project Manager both informally and through project reports. There is also a direct route to management for safety related issues.

ANSTO states that at the organisational level, the CEO holds regular forums for all staff and promotes a safety theme.

It is considered by the assessor that there is adequate information to satisfy guidelines 2.1 – 2.19 of the RG [5] and RAPS principles 1, 3, 6-9 [4].

Administrative arrangements

The licence holder or applicant is responsible for ensuring that the organisation has recognised its responsibility for ensuring the health and safety of people and the protection of the environment (RG 2.20 – 2.29 [5]).

Administrative arrangements to help ensure the health and safety of people and the protection of the environment are described in section 3 of the safety management plan (IWS-S-LA-D2) [3].

Following a request for further information, ANSTO provided additional material on administrative arrangements for ensuring the health and safety of people and protection of the environment. In

particular, additional information on the exposure of young people and pregnant employees was provided.

The assessor considers that the applicant has provided adequate information in the safety management plan to satisfy guidelines 2.20 – 2.29 of the RG [5].

Safe premises, buildings and equipment

The licence holder or applicant is responsible for ensuring that management has recognised their obligations to provide a safe working environment (RG 2.30 – 2.37 [5], RAPS 10-12 [4]).

Section 4 of the safety management plan (IWS-S-LA-D2)[3] describes aspects of safe premises, building and equipment. It is stated that the building will conform to the Building Code of Australia, and that ANSTO will adopt relevant safety requirements and guidelines, particularly the IAEA Safety Requirements NS-R-3 Site Evaluation for Nuclear Installations [7], and the IAEA Safety Guide WS-G-6.1 Storage of Radioactive Waste [11]. Safe entry and exit from the site are described in the site security plan (IWS-S-LA-D5)[3]. It is stated that during the siting phase no radioactive material or radiation will be present other than normal background, that during the siting and construction phases only those persons with requisite training and need will be granted access to the IWS construction site, and a list will be kept by the construction supervisor of all who access the site. A safe work permit system will be employed so that specific tasks such as excavation and electrical isolations will be controlled.

The assessor concludes that the information provided adequately addresses guidelines 2.30 - 2.37 of the RG [5] and RAPS principles 10 -12 [4].

Competency, training and supervision

The licence holder or applicant is responsible for ensuring that arrangements are in place and implemented, for identifying and transferring the knowledge and skills needed by controlled persons to ensure that all conducts and dealings are performed or supervised by competent and authorised staff. In addition the licence holder or applicant is responsible for ensuring that visitors who may be exposed to any radiation arising from conducts and dealings receive appropriate supervision and instruction (RG 2.38 – 2.55 [5]).

Section 5 of the safety management plan (IWS-S-LA-D2) [3] provides details of competency, training and supervision. ANSTO has processes which ensure that potentially hazardous work is undertaken and supervised by appropriately trained staff. This begins at the recruitment stage where staff are selected with the technical and professional experience for the role. Health Physics Surveyors are given comprehensive theoretical and practical training and are authorised at ANSTO. Workers who are assigned to do specialised tasks will be provided with task-specific training prior to undertaking the task.

As well as radiation safety training, conventional work, health and safety training is provided to staff by the Health and Safety Services section. Workers entering a construction work site must possess a WorkCover issued white card, and must be inducted to the site. All records of training are kept in the ANSTO training management system.

The assessor concludes that adequate information is provided to satisfy guidelines 2.38 – 2.55 of the RG [5].

Control of visitors, contractors and other persons

The licence holder or applicant is responsible for ensuring that duty of care obligations have been met with regard to the safety of anyone entering a workplace where a conduct or dealing is undertaken. This includes contractors, their employees and visitors (RG 2.56 – 2.63 [5]).

Section 6 of the safety management plan (IWS-S-LA-D2) [3] states that ANSTO recognises it has a duty of care to all workers, not only employees but also other categories e.g. contractors and visitors. Under WHS legislation contractors have the same status as employees. Only staff with appropriate safety training and supervision will be given access to the site. All PPE required for work areas will be provided at a suitable location near to the entry to the area where the PPE is required. Within work areas, signage exists specifying the PPE required. Entry into radiation/contamination areas is through barriers. Only staff and contractors with the appropriate training will be be given access to these areas.

The assessor considers that adequate information to satisfy guidelines 2.56 – 2.63 of the RG [5] is provided.

Control of hazards

The licence holder or applicant is responsible for ensuring that all hazards associated with the conducts and dealing are appropriately controlled (RG 2.64 – 2.69 [5]).

Section 7 of the safety management plan states that the main processes within ANSTO for control of hazards is through the Safe Work Method and Environmental Statements (SWMES) prepared for individual tasks and the overall review of projects by the Safety Assurance Committee (SAC). These ensure that external consultants and safety committees are involved in the internal safety review process, the hazard identification process and developing arrangements for their control.

The assessor considers that the application provides adequate information to satisfy guidelines 2.64 - 2.69 of the RG [5].

Deviations, anomalies, incidents and accidents

The licence holder or applicant is responsible for ensuring that arrangements are in place and are implemented for dealing with deviations, anomalies, incidents and accidents arising from the conducts and dealings. The licence holder or applicant is also responsible for ensuring that these arrangements are regularly reviewed and updated in accordance with best international practice (RG 2.70 – 2.74 [5]).

Section 8 of the safety management plan describes how deviations, incidents and accidents are captured in the WHS system. The event reporting systems are described in the ANSTO guide AG-2372 Event Management Process Guide. This also captures near misses. This involves a follow-up process with initial investigation and a later review by management. In addition, ANSTO also has

requirements to report to ARPANSA, and these are described in their internal guide AG-2376 Routine Reporting to ARPANSA.

The assessor considers there is adequate information to satisfy guidelines 2.70 – 2.74 of the RG [5].

Audits and reviews

The licence holder or applicant is responsible for ensuring that arrangements are in place and are implemented for the assessment of all aspects of the safety management system through audits and reviews to ensure compliance with the ARPANS legislation and consistency with international best practice (RG 2.75 – 2.79 [5], RAP 41 [4]).

Section 9 of the safety management plan describes arrangements within ANSTO to undertake audits and reviews in the Work Health Safety and radiation protection services areas. The Work Health Safety maintains ISO 9001 accreditation which requires regular management reviews and audits.

The radiation protection arrangements for the project are described in IWS-S-LA-D3 [3], the radiation protection plan. The project team will monitor the effectiveness of this plan, taking into account dose, contamination, dosimetry and survey results and update the plan accordingly.

The assessor considers the information provided to be adequate to satisfy guidelines 2.75 – 2.79 of the RG [5] and RAP 41 [4].

Records and reporting

The licence holder or applicant is responsible for maintaining and retaining records relevant to health and safety information associated with conducts and dealings (RG 2.80 – 2.85 [5]).

Section 10 of the safety management plan describes the arrangements for record keeping and reporting. The ANSTO safety arrangements are within the ANSTO certified ISO 9001 system which ensures there is appropriate reporting and storage of records. The requirements for safety records and reporting are described in the Work Health Safety quality manual. General arrangements for safety records are given in the document S-P-003 Control of Records [3] which details storage locations, retention periods and responsibilities for maintaining the records.

Medical records associated with injuries are maintained confidentially by the ANSTO Health Centre.

The assessor considers the application provides adequate information to satisfy guidelines 2.80 to 2.85 of the RG [5].

Conclusion

The assessor concludes that the application contains a safety management plan and this and other documents contained within the application contain adequate information to describe the safety management practices during the siting of the IWS facility. Further, the assessor concludes that the safety management practices are in accordance with internationally accepted principles and practices and duty of care obligations.

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 (RG 3 [5], RAPS 57-62 [4]).

Principles of radiological protection

The licence holder or applicant is responsible for ensuring that plans and arrangements are in place and implemented for the safe management of conducts and dealings in accordance with international best practice in radiological protection (RG 3.1 – 3.6 [5]).

Sections 3.1, 3.2, and 3.3 of the radiation protection plan (IWS-S-LA-D3) [3] provide adequate information on justification, optimisation and limitation of exposures in siting the IWS and thus satisfy guidelines 3.1 – 3.4 of the RG [5]. Section 7.4 of the radiation protection plan describes arrangements for monitoring the environment, and states that during the siting phase of the IWS there are no identifiable radiation exposure pathways to wildlife in their natural habitats. The assessor concludes that guideline 3.5 of the RG [5] is satisfied.

The assessor concludes that adequate information has been provided to satisfy guidelines 3.1 – 3.6 of the RG [5].

Radiation safety officer

The licence holder or applicant is responsible for ensuring that arrangements are implemented for a suitably qualified Radiation Safety Officer (RSO) to be appointed as appropriate to undertake specific duties to ensure that the licence holder or applicant's responsibilities for radiation protection and nuclear safety are met (RG 3.7 – 3.9 [5]).

Section 2.1.1 of the radiation protection plan provides information regarding the Health Physicist, which the assessor has confirmed with ANSTO to be equivalent to the RSO. The Health Physicist is a trained radiation protection professional who can advise on radiation protection matters, standards and optimisation measures.

The assessor concludes that adequate information has been provided to satisfy guidelines 3.7 to 3.9 of the RG [5].

Radiation safety committee

The licence holder or applicant is responsible for ensuring that arrangements are implemented for a suitably qualified Radiation Safety Committee (RSC) to be appointed as appropriate to undertake specific duties to ensure that the licence holder or applicant's responsibilities for radiation protection and nuclear safety are met (RG 3.10 – 3.21 [5]).

The radiation protection plan does not discuss a Radiation Safety Committee, but the effective control plan and safety management plan describe the Safety Assurance Committee (SAC) which reviews and approves the plans and arrangements for the siting of the IWS facility.

The assessor has confirmed that the SAC performs the functions of the Radiation Safety Committee and considers that guidelines 3.10 - 3.21 of the RG are satisfied by the information that is collectively

described in the effective control plan, and safety management plan regarding the responsibilities and functions of the SAC.

Planning and design of workplace

The licence holder or applicant is responsible for ensuring that arrangements are in place and are implemented to ensure that the planning and design of any workplace where conducts and dealings are undertaken is optimised for radiation protection and that the design is in compliance with relevant national and international standards and codes (RG 3.22 – 3.24 [5]).

Sections 3.1 – 3.8 of the Preliminary Safety Analysis Report (PSAR) (IWS-C-LA-Cd) [15] describe how the design of the IWS will be compliant with current Australian Standards. These standards will cover radiological, chemical, industrial and fire safety and reflect international standards and codes.

The assessor considers that the application provides adequate information to satisfy guidelines 3.22 – 3.24 of the RG [5].

Classification of work areas

The licence holder or applicant is responsible for ensuring that arrangements are in place for the classification of work areas associated with conducts and dealings involving ionising radiation in accordance with ARPANS legislation, national and international standards and codes (RG 3.25 – 3.37 [5]).

Radiological classification and reclassification of work areas is described in sections 5.1 and 5.2 of the radiation protection plan. The classification of areas will be done in compliance with ANSTO WHS radiation safety standard AS2310. The provision of Personal Protective Equipment (PPE) and monitoring equipment appropriate to the classification of work areas is described in sections 6.1 and 7 of the radiation protection plan.

The assessor considers that adequate information is provided in the radiation protection plan to satisfy guidelines 3.25 – 3.37 of the RG [5].

Local rules and procedures

The licence holder or applicant 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 [5]).

During the siting phase there is no radioactivity present, and hence the radiation protection plan does not provide local rules or procedures due to the absence of supervised and controlled areas.

However, the assessor considers that there is adequate information provided in the radiation protection plan to protect controlled persons and visitors during the siting phase. Development of detailed local rules will be required for the operating licence application when supervised and controlled areas will need to be well defined. It is the assessor's judgement that the applicant has extensive experience in developing local rules and procedures for such situations, and is capable of doing so adequately for the operational phase.

The assessor considers that the applicant can provide an adequate level of protection, safety and supervision for controlled persons and visitors, and is able to satisfy guidelines 3.38 – 3.48 of the RG [5] for preparing a site and future conducts.

Personal protective equipment

The licence holder or applicant is responsible for ensuring that plans and arrangements are implemented for the provision of adequate and appropriate personal protective equipment (RG 3.49 – 3.53 [5]).

The use of PPE for working in radiological classified areas is described in section 6 of the radiation protection plan (IWS-S-LA-D3) [3]. No PPE for working in radiological classified areas is required for the siting phase of the IWS.

The assessor considers that guidelines 3.49 – 3.53 of the RG [5] are adequately satisfied in the radiation protection plan for the purposes of the siting licence application. Also the assessor considers that the applicant is able to satisy the guidelines 3.49 – 3.53 for the operational phase when radiological materials are present.

Monitoring of the workplace

The licence holder or applicant is responsible for ensuring that plans and arrangements are in place and are implemented for regular radiation and contamination monitoring of the workplace (RG 3.54 – 3.61 [5]).

Monitoring of the workplace is described in section 7.1 of the radiation protection plan. Radiation monitoring will not be required for the siting phase of the IWS.

The assessor considers that adequate information is provided in the radiation protection plan to satisfy guidelines 3.54 – 3.61 of the RG [5] for the siting phase. In addition the assessor considers that the applicant can satisfy the guidelines 3.54 – 3.61 for the operational phase when radiological materials are present.

Monitoring of individuals

The licence holder or applicant is responsible for ensuring that plans and arrangements are in place and are implemented for individual monitoring and assessment of exposure to controlled persons and visitors (RG 3.62 -3.72 [5]).

Section 7.2 of the radiation protection plan describes arrangements for monitoring of individuals. Routine monitoring of occupationally exposed ANSTO employees is undertaken via the ANSTO personal dosimetry service using TLDs. Electronic Personal Dosimeters will also be worn by workers entering radiological controlled areas. Workers exiting contamination controlled areas are required to self-monitor for contamination. According to section 5 of the safety management plan, visitors must be escorted by an authorised ANSTO worker who must wear the appropriate dosimeter.

Although no information is supplied regarding assessment of non-ionising radiation exposure or assessment of internal ionising radiation exposure, the assessor does not consider these to be

relevant as no sources of non-ionising radiation or contamination will be present in the siting phase of the IWS.

The assessor considers that the application contains adequate information to describe the individual radiation monitoring arrangements to help ensure people are protected against radiation hazards and is able to satisfy guidelines 3.62 – 3.72 of the RG [5] for the siting phase. In addition the assessor considers that the applicant can also satisfy guidelines 3.62 – 3.72 for the operational phase when radiological materials are present.

Monitoring of the environment

The licence holder or applicant is responsible for ensuring that plans and arrangements are in place for monitoring of the environment where appropriate (RG 3.73 – 3.78 [5]).

Section 7.4 of the radiation protection plan states that there are no identifiable routes of discharge of radioactive material into the environment during the IWS siting phase, nor exposure pathways to wildlife in their natural habitats. In addition section 9.9 of the Preliminary Safety Analysis Report (IWS-C-LA-Cd) [15] submitted with the construction licence application states that the IWS would have no environmental impact for ongoing operations with no potential exposure pathways to the natural environment.

The assessor considers that guidelines 3.73 – 3.78 of the RG [5] are adequately addressed in the radiation protection plan for the siting phase.

Protection of wildlife

The licence holder or applicant is responsible for ensuring that arrangements are in place to demonstrate the (ionising) radiation protection of wildlife (plants and animals) in their natural habitats is consistent with international best practice (RG 3.79 – 3.82 [5]).

Since no exposure pathways have been identified for the IWS siting phase, no specific arrangements are necessary to protect wildlife. Furthermore, as in *Monitoring of the Environment* above, no exposure pathways have been identified for the operational phase.

The assessor considers that guidelines 3.79 – 3.82 of the RG [5] are adequately addressed in the radiation protection plan for the siting phase of the IWS. In addition, the assessor considers the applicant is able to satisfy guidelines 3.79 – 3.82 for the operational phase when radiological materials are present, and hence no wildlife protection measures are necessary.

Transport

The licence holder or applicant is responsible for ensuring that arrangements are implemented for the safe transport of controlled apparatus and controlled material, both on and off site, in compliance with the ARPANS legislation and international standards and codes (RG 3.83 - 3.97 [5]).

Section 9 of the radiation protection plan contains information regarding transport and movement of radioactive materials. It is stated that transport of radioactive materials onsite and within the IWS will be carried out in accordance with the ANSTO guide AG 2515 Safe Movement and Transport of Radioactive Material. In addition, it is also stated that all materials leaving the site will be

transported in accordance with ARPANSA Radiation Protection Series No 2 Code of practice for the Safe Transport of Radioactive Material [13]. In addition, section 5 of the Summary Safety Case (IWS-SC-LA-SCS) [3], provided with the construction licence application at the same time as the siting licence application, states that shipment and road transport of the ILW to the IWS at LHSTC will be the subject of a separate submission for approval by ARPANSA.

Since no radioactive materials will be transported onsite or offsite during the IWS siting phase the assessor considers that the application contains adequate information to describe the radiation protection arrangements during transport activities. In addition, the assessor considers the applicant is able to satisfy guidelines 3.83 – 3.97 for the operational phase of the facility.

Conclusion

The application contains a radiation protection plan (IWS-S-LA-D3) [3] and this and other documents contained within the application contain adequate information to describe the radiation protection practices during the siting of the IWS facility.

In view of the fact that there will be no radioactive materials involved in the siting phase of the IWS, the assessor concludes that the application contains adequate information to satisfy the radiation protection plan guidelines in the RG [5]. Furthermore the assessor considers that the applicant is able to provide an adequate radiation protection plan for the operational phase of the facility when radiological materials are present.

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

The licence holder or applicant is responsible for ensuring that all radioactive waste (including gaseous and liquid discharges) arising from conducts and dealings, existing and anticipated, is appropriately managed. The licence holder or applicant is also responsible for ensuring that appropriate plans and arrangements are in place for the safe handling, treatment, transport, storage and transfer or ultimate disposal of any such waste (RG 4 [5], RAPS 73 – 77 [4]).

Section 2 of the ANSTO radioactive waste management plan (IWS-S-LA-D4) [3] describes the ANSTO Radioactive Waste Management Policy and Safe Management of Radioactive Waste AG 2517, and the purpose of the IWS.

Section 3 describes limiting exposure to radioactive waste. It states that no radioactive waste will be generated during the siting phase. In addition, there will be no gaseous discharges to the atmosphere, liquid discharges to the sewer or solid discharges to the municipal tip during the siting phase. Also there will be no incineration of wastes, and ANSTO Waste Operations currently does not employ incineration as a means of waste disposal. Furthermore, sections 6.2-6.4 of the Preliminary Safety Analysis Report [15] state that no airborne discharges, liquid or solid wastes are expected to be generated during the operational phase of the IWS.

Guideline 4.39 of the RG [5] requires:

- The store is sited to minimise the impact of natural or man-made hazards.
- The store is sited above groundwater level (where practicable) and not in a flood plain.

Although the radioactive waste management plan (IWS-C-LA-D4) does not explicitly address these guidelines they are addressed elsewhere e.g. section 3 of the Siting Safety Assessment (IWS-S-LA-Cab) [3] addresses the design for natural and man-made hazards such as regional and local flooding, bushfires and aircraft crash, respectively. In addition, section 3 also states that the layout of the facility will be designed to accommodate heavy rainfall, and local external flooding and storm water drainage will be considered as part of the detailed design.

Conclusion

The assessor concludes that the application contains a radioactive waste management plan and this and other documents contained within the application contain adequate information to describe the radioactive waste management practices during the siting of the IWS facility. Design issues associated with radioactive waste management in the siting phase of the IWS are addressed adequately in the Siting Safety Assessment (IWS-S-LA-Cab) [3]. The assessor also concludes that the applicant can satisfy the guidelines 4.1 – 4.73 of the RG [5] for the operational phase of the IWS.

2.2.5 Security plan [Item 4(e)]

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 [5]).

The security advisers from the Security and Community Safety Section (S&CS) of ARPANSA reviewed and assessed the security plan for the siting licence application (IWS-S-LA-D5) [3]. The initial assessment concluded that the plan did not meet ARPANSA's protective security requirements. ANSTO were advised to submit a revised security plan that addressed all expectations in the RG [5].

The revised siting and construction security plan provided by ANSTO demonstrates compliance with ARPANSA's nuclear security expectations and details the integration of ANSTO-wide security plans and arrangements. S&CS security advisers further considered the potential impact on existing facilities during the siting and construction phases. It was assessed that the protective security measures detailed within the revised security plan during these transitional phases demonstrate an adequate level of protection for personnel, information and physical assets surrounding the proposed site.

Conclusion

The assessor considers that the revised site security plan provides adequate information to satisfy the RG [5] during the IWS siting and construction phases. However, a more comprehensive site security plan will need to be submitted and endorsed for the operating licence to incorporate the specific security requirements for radioactive materials in accordance with the ARPANSA Radiation Protection Series No 11 Code of Practice for the Security of Radioactive Sources [18].

2.2.6 Emergency plans [Item 4(f)]

The licence holder or applicant is responsible for providing detailed emergency plans for any conduct or dealing which could give rise to a need for emergency intervention. This plan should be based on the assessment of the consequences of reasonably foreseeable accidents, and should aim to minimise the consequences and ensure the protection of on-site personnel, the public and the environment (RG 7.1 – 7.21 [5], RAPS 54(d) [4]).

Section 2 of IWS-C-LA-D6 [3] describes the emergency plan for the siting phase of the IWS. It is stated that the project engineers are responsible for ensuring emergency arrangements are in place and that all personnel involved are appropriately trained.

The assessor concludes that adequate information has been provided to satisfy guidelines 7.1 -7.21 of the RG [5] for the siting phase of the IWS.

Emergency procedures

The licence holder or applicant is responsible for ensuring that comprehensive emergency procedures are prepared in accordance with the objectives of the emergency plan for any conduct or dealing which could give rise to the need for emergency prevention (RG 7.22 – 7.35 [5]).

Section 3 of the emergency plan describes the procedures in the event of an emergency. It is stated that the IWS will be covered by the LHSTC emergency arrangements, AG 2466 ANSTO – LHSTC Emergency Response Plan, July 2012 [3]. In the event of a site wide emergency the ANSTO Site Control Centre which is manned 24/7 by the Australian Federal Police will be the focal point for communications. The next level down of emergency response will be managed by the on-call Duty Safety Co-ordinator (DSC). This is described in the ANSTO Guide AG 2973 Duty Safety Co-ordinator.

During the siting phase of the IWS there are no major activities occurring, and therefore no significant hazards that could cause a risk to people outside the facility. There will be no major nuclear or radiation hazards in the vicinity of the facility and a health physics survey will be conducted to ensure this.

The assessor concludes that adequate information has been provided to satisfy guidelines 7.22 – 7.35 of the RG [5] for the siting phase of the IWS.

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 [5], RAPS 16, 54(d), 123 [4]).

All staff with a role in emergency response are trained in emergency response procedures and are familiar with existing emergency arrangements and escalation processes. Emergency response drills will be conducted before construction and commissioning of the proposed facility commences. The higher level response arrangements involving all of ANSTO's emergency response resources are exercised periodically and involve external emergency services. There is ongoing review of the emergency arrangements, including updating of the contact lists and safety alarm responses.

During siting of the IWS, there will be no major activities and therefore no significant hazards in the IWS location that could credibly cause a risk to people outside the facility.

During the operating licence phase, ANSTO will develop and implement detailed planning and preparedness for the IWS in accordance with ARPANSA Radiation Protection Series No. 7 [16].

The assessor concludes that adequate information has been provided to satisfy guidelines 7.36 – 7.42 for the siting phase. In addition the assessor is confident that the applicant is able to develop detailed emergency planning and preparedness procedures for the operating phase.

Conclusion

The assessor concludes that the application contains an emergency plan and this and other documents contained within the application contain sufficient information describing adequate emergency management practices for preparation of the site for the proposed IWS facility.

2.3 Authorisation for preparing a site

2.3.1 Detailed site evaluation [Item 5]

Item 5 of Part 1 of Schedule 3 of the Regulations [2] requires the applicant to provide a detailed site evaluation establishing the suitability of the site.

Section 3 of the Siting Safety Assessment (IWS-S-LA-Cab) [3] provides a detailed site evaluation to determine facility design criteria for site characteristics such as seismic activity, extreme weather events, geological events and bushfires. This evaluation concludes in section 5 that, on the basis of the site characteristics and specific site-related design basis considerations, the site does not have any negative features for siting of the IWS.

Following a request for further information, ANSTO provided information on how the IWS site at LHSTC was selected. Several locations were considered on the ANSTO LHSTC site, and the preferred location within the Radioactive Waste Management Zone was selected. No detailed consideration was given to any sites external to LHSTC since these sites could have been subject to political and legal challenge as being inconsistent with the intent of the *National Radioactive Waste Management Act 2012.* In addition, it was considered that given the timescale for the return of the vitrified waste from France in December 2015 there would be insufficient time to establish a new greenfield site with appropriate infrastructure.

Design-basis accident and risk assessment

It has been concluded from the bounding accident in the PSAR [15] that it is not credible to have significant exposure to people outside the facility. Hence the preliminary hazard category of the

facility is F1[2]. As a consequence, there is no requirement for a Reference Accident to be considered as defined in the Regulatory Assessment Principles Section 4.8 [4].

However, details of the risk assessment for the IWS in accident situations which could give rise to radiological exposures on-site are presented in the Safety Assessment of the IWS at Lucas Heights (ANSTO/T/TN/2012-03 rev 2, April 2013) [3]. Section 7 presents the results of the radiological risk assessment which includes:

- Accidental dose from possible damage to TN81 container.
- Damage to the seals of the TN81 container.
- TN81 container tip over.
- Radiation from the technological waste.
- Accidental dose from MOSAIK-like cask.
- Failure of radiation monitors.
- Radiological contamination hazard.
- Contamination hazard with cemented UK wastes.
- Fire in the store.

The radiological risk assessment predicts that the likelihood of radiation exposure for all the foreseeable accidents ranges from incredible to unlikely, with corresponding frequencies $<10^{-6}$ per annum to 0.01 – 0.1 per annum respectively. The predicted radiation exposures for the radiological accident scenarios range from minor to moderate with radiation doses 0.1 – 1 mSv and 1 – 20 mSv respectively. In all cases the risk posed by radiation exposure on-site in accident scenarios is considered tolerable.

The outcomes of the risk assessment resulted in recommendations to improve radiation and nuclear safety eg construction of bunds around the perimeter of the store floor, and for calculations to be performed to ascertain whether the TN81 Transport/Storage container could tip-over during a severe seismic event. The recommendations from the risk assessment have been accepted by the SAC for implementation.

[2] Principle (20) of the ARPANSA Regulatory Assessment Principles [4] defines a facility as Hazard Category F1 if there is no potential for significant consequences outside the facility

Conclusion

The assessor considers that the application provides adequate information establishing the suitability of the site for the purposes of siting the proposed IWS at LHSTC, as required under Item 5 of Part 1 of Schedule 3 of the Regulations.

2.3.2 Site characteristics [Item 6]

Item 6 of Part 1 of Schedule 3 of the Regulations [2] requires the applicant to provide site characteristics for the proposed facility, including the extent to which the site may be affected by natural and man-made events.

Site characteristics should not be such as to impact unacceptably on the safety of the design and operation of the proposed facility or on the feasibility of any arrangements for emergency response RAP 54 [4].

Section 2 of the Siting Safety Assessment (IWS-S-LA-Cab) [3] provides characteristics of the site such as local geography, demography, geology, and site services and section 3 provides information on the extent to which the site may be affected by natural and man-made hazards.

More details of the supporting information provided in the application are given below.

Geography

Details of the surrounding geography of the LHSTC site are provided in section 2.1.3 above.

From the viewpoint of food production, very little farming is undertaken in the vicinity of LHSTC, but there are a number of poultry, dairy and goat farms to the north-west of the site 10 – 15 km distant. Further information on food production and consumption, of relevance to radiological consequence modelling was given in the OPAL Safety Analysis report. Although this information is now dated, it is considered that food production in the area has decreased rather than increased.

Demography

The population data and its geographic distribution surrounding the LHSTC were presented in the OPAL Safety Analysis Report. This was updated in a separate submission for the ANSTO Nuclear Medicine Molybdenum-99 facility reference accident, but it was not considered necessary to include this data for the IWS siting application since there are no postulated accident scenarios that can pose any conceivable risk to the surrounding population.

Meteorology

Meteorological data are recorded at the LHSTC meteorological laboratory (Building 44) and data recorded from 1991 to 1999 are discussed in Section 2.3 of the Siting Safety Assessment (IWS-S-LA-Cab) [3]. This information is used in design specification of facilities at the LHSTC and in atmospheric dispersion modelling. Also, atmospheric dispersion around the LHSTC and the Woronora Valley has been studied using atmospheric tracers. These results have been used to confirm the validity of the atmospheric dispersion models for transport of airborne materials from the LHSTC.

Hydrology

Geophysical and hydrogeological investigations of the LHSTC have been undertaken from time to time, the most significant having been undertaken for the OPAL reactor site during the site assessment. The investigation work was completed in June 1998. The investigations comprised of drilling at five locations to a maximum depth of 45 metres, and installing deep and shallow piezometers, groundwater sampling, water analysis and hydraulic parameter testing at three locations.

The principal surface stream immediately adjacent to the LHSTC on the side from which the proposed facility would be sited is the Woronora River which has incised deeply into the sandstone terrain. Australian Water Technologies Pty Ltd discharge data for the period mid-1992 to August 1997 shows an average discharge rate of 36.8 megalitres per day.

Notwithstanding these investigations, the Siting Safety Assessment for the IWS (IWS-S-LA-Cab) [3] does not identify any credible mechanism for release of radioactivity from the returned waste.

Geology

The regional and local geology of the site of the proposed facility and the region has been discussed in detail in geotechnical and geophysical studies for the OPAL reactor siting application.

In the Lucas Heights region the sandstone is approximately 192 metres thick. Although faulting was not expected in the general area around Lucas Heights, during excavations for the OPAL reactor two fault strands were revealed. However, intensive investigations demonstrated that there had been no fault movement for at least the last five million years, and it was concluded that the faults were not capable.

Seismology

LHSTC is located on a sandstone plateau in the Sydney Basin in a low seismic hazard area. No seismically active geological structures have been identified and there are no major capable faults within 35 km of LHSTC.

A design requirement is that the waste shall remain safe under the effects of severe ground motions without causing an unacceptable release of radioactivity. Severe ground motion is taken to be that expected to occur at the site with a frequency of occurrence less than or equal to 10^{-4} per annum. An extensive site study was undertaken for the siting of the OPAL reactor which found a peak horizontal ground acceleration of 0.37 g corresponds to this frequency.

Protection of the waste will rely on a combination of cask design and design of the building.

Review of this information concluded that the proposed facility could be designed to be acceptably safe with respect to seismology.

External natural events

Section 3.2 of the Siting Safety Assessment (IWS-S-LA-Cab) [3] examines a range of natural events which could be experienced at the IWS site, including high winds, hail, lightning and extreme

temperatures. The assessment states that the design of the facility will be able to accommodate the extremes of these weather events.

In particular, the risk of large bushfires is addressed. The location of LHSTC is such that large bushfires can be expected every 8 – 12 years. These fires have the potential to burn to the site boundary. Risk of bushfire in the vicinity of the site increases during dry weather and peaks on days of high temperature, low humidity and strong winds. The proposed location of the store within the site is approximately 350 m from the southern-most point of the fenced site (Gate 13); 182 m from the fence at Gate 14; and 112 m from the nearest point on the fence with little vegetation in the vicinity.

The management of bushfire risk during these periods is further described in the IWS Preliminary Safety Analysis Report [15]. The main consideration for minimising hazards from bushfire include compliance with relevant Australian building standards; the use of appropriate construction materials; appropriate design to avoid collection of combustible material on or near buildings; and maintaining recommended fire hazard reduction distances from bushland. The facility will be required to withstand the smoke and hot debris that may fall onto the building during a bushfire. The smoke effects will be included in the design analysis.

Human induced external events

The following human induced external events have been considered:

- Road and rail transport accidents.
- Aircraft crash.
- Nearby industrial activities.
- Military activities, including impact by a stray artillery shell.

The Siting Safety Assessment states that rail routes carrying dangerous goods are sufficiently far away to have no significant impact on the LHSTC site in the event of an accident.

For road accidents, a series of bounding scenarios has been considered, including tanker explosions containing chlorine, LPG, ammonium nitrate, and petrol. The analysis concludes that such accidents would have no significant effect on the safe storage of the waste.

The Siting Safety Assessment also concludes that an aircraft crash is considered beyond design basis for the facility. In any case, the TN81 cask is rated and tested for safe containment of waste in the event of severe impact. Similar casks have undergone tests equivalent to impact by a jet fighter aircraft[3].

[3] Section 3.3.2 Siting Safety Assessment – Site Characteristics and Site Related Design Bases (IWS-S-LA-Cab, March 2013, Revision 2) [3]

An examination of nearby industrial activities has not identified any threats to the safe storage of the waste.

The impact of a stray shell from nearby military activities is considered beyond-the-design basis for the facility.

Section 5 of the Siting Safety Assessment concludes that the site does not exhibit any negative characteristics which would prevent the IWS from being sited at LHSTC [3].

Conclusion

The assessor considers that the application provides satisfactory information on the site characteristics required under Item 6 of Part 1 of Schedule 3, including the extent to which it may be affected by natural and man-made events. The assessor also considers that the site characteristics can be satisfactorily accounted for in the design and operation of the proposed facility to provide adequate protection of people and the environment.

2.3.3 Environmental impact statement [Item 7]

Item 7 of Part 1 of Schedule 3 of the Regulations [2] requires the applicant to provide an environmental impact statement requested or required by a government agency, and the outcome of the environmental assessment.

On 28 September 2012 ANSTO submitted a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC). On 29 October 2012 DSEWPaC informed ANSTO of its decision that construction of the IWS at LHSTC was not a controlled action under the EPBC Act, and therefore no environmental assessment was required. A copy of the DSEWPaC correspondence can be found in Appendix 1. It is also in the ANSTO application [3] and on the DSEWPaC website at:

http://www.environment.gov.au/epbc/notices/assessments/2012/6564/2012-6564-referral-decision.pdf

Conclusion

The assessor notes that no environmental impact statement is required for the siting of the IWS.

2.4 Assessment against Waste Guide

The ARPANSA Regulatory Guide: Licensing of Radioactive Waste Storage and Disposal Facilities [6] (Waste Guide) is based on international best practice, including the IAEA Safety Requirements for Site Evaluation of Nuclear Installations No. NS-R-3 [7] and the IAEA Draft Safety Standard DS433 Safety Aspects in Siting Nuclear Installations [8].

Section 2.3 of the Waste Guide [6] describes the requirements to prepare a site for a radioactive waste storage or disposal facility. These include items 5 - 7 of Part 1 of Schedule 3 of the Regulations [2] which are addressed in sections 2.3.1 – 2.3.3 above.

Section 2.3 [6] also states that the following should be provided in addition to the site characteristics:

- The waste (form, volume, radionuclide inventory, chemical composition and all other physical, chemical and radiological characteristics that are relevant for reviewing the safety of the facility) currently in store that is destined for the facility.
- The waste (as above) anticipated for the facility during its operational life-time, whether the facility is a store or a disposal facility.
- The transport system to and from the facility (modes of transport, transport routes, distances involved, current traffic/transport infrastructure conditions and usage and projected future traffic flows/usage for the life of the project and risk analysis thereof, and related safety and security considerations).
- For a waste store: operational life span, plans covering the final disposal including transport to the disposal facility and contingency plans for delays in establishment of such a facility.
- Availability of resources over the lifetime of the proposed waste facility, including for decommissioning or closure as appropriate.
- The intended periods of institutional control (active and passive).

Waste form and inventory

The radioactive waste arising from reprocessing of the used HIFAR fuel will be immobilised in a vitreous form (borosilicate glass) within sealed stainless steel canisters and transported/stored in the TN81 container. The TN81 container will hold between 23-28 stainless steel canisters – see section 4.3 of the PSAR [15].

Table 1 below provides the average source term for the main radioelements which account for over 99% of the activity in a single canister:

TABLE 1

Main radioelements	Activity (TBq/canister)
Am-241	1.38
Sr-90/Y-90	236/236
Cs-137	43.5

The approximately seven cubic metres of technological ILW waste consists of contaminated protective clothing and mechanical components (such as pumps, piping and valves) produced from reprocessing of the HIFAR used fuel assemblies. The technological waste will be cemented within steel drums and placed in six concrete shielded transport/storage over packs. The mean activity supplied for the technological waste packages indicates that the total activity in the technological waste will be less than 1% of the inventory of the vitrified waste in the TN81 cask.

The assessor considers that the waste inventory information supplied is adequate for the siting licence application. For an operating licence application, full detailed inventories will require to be supplied for both the TN81 vitrified waste and the technological waste.

Waste anticipated in operational lifetime

ANSTO indicated, in Section C of the application [3], that the waste to be stored in the facility during its operational lifetime is a single TN81 storage/transport container returning from France, and approximately 7m^3 of technological waste cemented within steel drums and placed in concrete shielded transport/storage over packs. In addition, it is stated that the waste returning from the UK may be required to be stored at the IWS if the National Radioactive Waste Management Facility is not available. Since the form of the waste returning from the UK is not yet finalised, for the purposes of the design of the IWS it is assumed to be in the most demanding form, that is, 51 cemented drums, which is the most demanding form in terms of spatial storage requirements.

The assessor considers that adequate information has been supplied with respect to the waste anticipated for the facility during its operational life-time. Since the characteristics of the waste to be repatriated from the UK are not finalised, the assessor recommends that, if the NRWMF is not available in time for the UK waste return and it is to be stored in the proposed IWS, ANSTO submits a request for approval to store the UK waste. This is a matter for consideration in the review of subsequent licence applications rather than the licence to prepare a site for the IWS.

Transport of waste

Following a request for further information on the transport system to and from the facility, ANSTO provided further information on 25 June 2013. The additional information indicated that there is likely to be only two transport actions to the facility, one for the French waste and possibly one for the UK waste. In any event, each of these transport actions would be subject to separate regulatory approval as indicated in Section 5 of the Summary Safety Case (IWS-SC-LA-SCS Rev 2, March 2013) [3] provided with the construction licence application, which was submitted at the same time as the siting licence application. It is also stated that once the NRWMF is established it is likely that there will only be one transport action from the IWS to the NRWMF, and that due to the low number of transport actions and the robust nature of the packages[4], the risk is considered to be low.

[4] See section 2.6.1

The assessor concludes that the application contains adequate information at this siting stage regarding transport systems to and from the IWS facility.

Operational lifespan and contingency plan

It is not explicitly stated in the application what the expected operational lifespan of the IWS will be, but instead it is stated that the IWS will house the waste returning from France, and possibly the UK until the NRWMF becomes available which is estimated to be 2020. Following a request for further information from ANSTO on 12 June 2013 on its final disposal and contingency plan, ANSTO provided the response that final disposal of waste will be in line with Australian Government national policy. Currently it is anticipated that the ILW will be transferred to the NRWMF for storage pending identification and implementation of the final disposal option for Australia. ANSTO states that the current anticipated time for establishment of the NRWMF is 2020. In the event this is delayed, the contingency is the 40 year life of the transport/storage package, which covers safe storage until 2055.

The assessor expects the NRWMF will be commissioned before this date and is satisfied that ANSTO has provided an adequate contingency plan in the event that the NRWMF is delayed.

Decommissioning

Decommissioning of the IWS is described in Section 10 of the PSAR (IWS-C-LA-Cd) [15] which was provided with the construction licence application. The decommissioning strategy is outlined, although it is clearly stated that operation of the IWS is unlikely to generate a significant amount of radioactive waste.

The assessor concludes there is adequate information provided in the application to describe decommissioning.

Resources

Section G of the licence application [3] states that ANSTO has adequate funding from the Australian Government to oversee the return of the ILW from France during interim storage and future relocation to the NRWMF.

The assessor considers that adequate information has been provided to ensure ARPANSA of availability of resources over the lifespan of the facility.

Period of institutional control

Although no reference is made in the application to the period of institutional control for the IWS, the assessor does not consider that this requirement is applicable, since the IWS site will remain under institutional control whilst the LHSTC site remains under institutional control as required by the licences for other existing facilities on the site.

Safety and the safety case

Section 3.4 of the Waste Guide [6] states that a safety case shall be submitted to ARPANSA as part of a licence application. Section 4 of the Waste Guide [6] states that a summary of the application and

the supporting safety case should be provided, in plain non-technical language. In addition Section 2.4 of ARPANSA Radiation Protection Series No 16 *Safety Guide for Predisposal Management of Radioactive Waste (2008)* [9] requires a safety assessment to be undertaken and a Safety Assessment Report to be produced.

To meet this requirement a summary safety case was provided with the construction licence application. This document, *Summary of the Safety Case For the Interim Waste Store at the LHSTC* (IWS-SC-LA-SSC Rev 2, March 2013)[3], is discussed below.

The main components of the safety case for siting and construction of the IWS are:

- The Preliminary Safety Analysis Report (IWS-C-LA-Cd, March 2013) [3].
- The Safety Assessment [3].
- The Safety Assessment Report of Site Characteristics and Site Related Design Bases [3].
- The plans and arrangements [3].
- Supporting drawings, documents, certificates, reports etc [3].

All the above documents have been supplied by ANSTO in the siting and construction licence applications and are assessed in this Regulatory Assessment Report, primarily Sections 2.2 and 2.3.

Section 4.2 of the Summary Safety Case (IWS-SC-LA-SSC Rev 2) [3] in particular provides information from the Safety Assessment of the IWS. For the intermediate level waste derived from reprocessing the used HIFAR fuel, returning from France, the defence-in-depth features include:

- Immobilised vitrified waste form.
- High-integrity welded stainless steel CSD(U) canisters.
- Protective copper baskets.
- Type B(U) robust forged steel TN81 Transport/Storage Container.
- Neutron and gamma shielding built into the TN81 container.
- Access to controlled building.
- Secure site.

In addition, the TN81 is an internationally accepted robust container that is designed for wastes with significantly higher activities and heat loading than the Australian waste. The TN81 has undergone a strict regime of testing including; drop test, impact tests and thermal/fire tests as required for a type B transport package. Similar cask types have undergone more severe impact test deemed equivalent to the impact of a jet fighter aircraft.

The technological waste is cemented in a specially formulated cement mix and contained in a fibre concrete container which has undergone a strict regime of tests similar to the TN81 cask. Six

cemented waste drums will be arranged in a housing rack which is then fastened in an ISO IP2 transport container. Production and testing of the technological waste is carried out in accordance with the AREVA Quality Assurance programme.

Both the TN81 Transport/Storage container and the ISO IP2 transport container conform to the IAEA Transport Regulations requirements.

Section 4.2.2 of the Summary Safety Case describes the intermediate level waste returning from the UK in cemented form, and the potential use of the MOSAIK Transport/Storage container.

The assessor considers that the applicant has fulfilled the requirements of the relevant sections of the Waste Guide [6], in particular sections 3.4 and 4.

Dose constraints

Section 3.3.2 of the Waste Guide [6] describes the process of setting dose constraints and risk targets. It is stated that it is the expectation of the CEO of ARPANSA that the dose constraint for occupationally exposed personnel would not exceed 5 mSv per annum for a waste store or disposal facility.

Initially the effective dose constraint for occupationally exposed personnel provided in the ANSTO application was 15 mSv per annum. Further information was requested by ARPANSA on 12 June 2013, and in response ANSTO stated that this was the general LHSTC site wide dose constraint. It was expected that the dose constraint for the facility would be much lower, not more than 5 mSv per annum and this would be finalised in the operating licence application. The assessor considers this is adequate for the siting licence application assessment where no radioactive materials are involved.

In addition section 3.3.2 of the Waste Guide [6] states that the public dose constraint should be of the order “of a few tens of µSv”. The initial dose constraint proposed by ANSTO was 300 µSv per annum, but following a request for further information by ARPANSA, ANSTO stated that the estimated exposure to the hypothetical critical group was less than 5 µSv per annum, and that a lower dose constraint of 10 µSv per annum would be applied. The assessor considers that the dose constraints set out in the ANSTO responses to ARPANSA’s questions of 12 June 2013 are adequate for the purposes of the IWS siting licence application assessment.

Following a request for further information on 12 June 2013, ANSTO indicated that radiological baseline monitoring will occur before construction of the store.

Conclusion

The assessor concludes that the application meets the requirements of the Waste Guide [6].

2.5 Other matters for consideration

Section 32 of the Act requires the CEO to take into account certain matters specified in the Regulations in deciding whether to issue a facility licence. These matters are prescribed in sub-regulation 41(3) of the Regulations. The matters are:

(a) whether the application 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.

Information asked for by the CEO

The applicant has provided all of the required information asked for by the CEO in the application, and therefore matter (a) is satisfied.

Undue risk

The applicant must demonstrate that the radiation risks arising from the proposed conduct have been considered, including the probability and magnitude of potential exposures arising from accident scenarios or abnormal occurrences.

During the IWS siting phase there are no major activities to be undertaken, and therefore there are no significant hazards in the IWS location. See section 4 of the Siting Emergency Plan (IWS-S-LA-D6) [3]. In addition, there will be no nuclear or radiation hazards in the vicinity.

The assessor considers that the application has provided sufficient evidence to show that there is minimal radiological risk or consequence to both people and the environment from the siting of the IWS facility. The assessor concludes matter (b) is satisfied.

Net benefit

The applicant must demonstrate that the proposed conduct produces sufficient benefit to individuals or to society to offset the radiation harm that it might cause, that is, the conduct must be justified, taking into account social, economic and other relevant factors.

The applicant describes the net benefit from the proposed conduct in Section G of the application. The net benefit is to meet Australia's international obligation to take receipt of the ILW generated from the reprocessing of HIFAR fuel assemblies. This benefit is linked to the operation of the HIFAR reactor for approximately 49 years to produce radioisotopes for medicine and industry. Since the public dose constraint for the IWS facility is set at 10 µSv per annum as described in section 2.3 above, the radiation harm is negligible.

The assessor agrees with this assessment and concludes that matter (c) is satisfied.

ALARA

The applicant must show 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.

Section 3.2 of the radiation protection plan (IWS-S-LA-D3) [3] discusses optimisation of exposures and states that the ALARA principle will be formally applied by use of dose constraints, identification of hazards, and implementation of controls to optimise exposures.

The assessor accepts this argument for the siting phase of the IWS and concludes that the applicant has satisfied matter (d).

Capacity to comply

The applicant must demonstrate a capacity to comply with the regulations and any conditions likely to be imposed on the licence. This should include sufficient financial, material and human resources to manage the proposed conduct.

Section G of the application addresses the applicant's capacity to comply with the regulations and licence conditions. The applicant states that the IWS facility will be managed by the ANSTO Waste Operations section which has held ARPANSA licences for several years, and has demonstrated its capacity to comply. In addition, it is stated that ANSTO has adequate funding from the Australian Government to oversee the return of the ILW from overseas.

The assessor concludes that the applicant has addressed matter (e) adequately, and considers that the applicant has the capacity to comply with the regulations and any licence conditions.

Authorised signatory

The application must be signed by an office holder of the applicant or a person authorised by an office holder of the applicant, and in the latter case, an instrument of authorisation must be provided.

The application [3] was signed by Dr Adrian Paterson, CEO of ANSTO on 14 April 2013. The CEO of ANSTO is an authorised signatory, and thus matter (f) is satisfied.

Public submissions

In accordance with Regulation 40, Public submissions were invited by ARPANSA on the IWS siting and construction licence applications.

ARPANSA published notices in the following media, inviting submissions:

- Australian Government Gazette No 18, 8 May 2013.
- The Australian Newspaper, 8 May 2013.
- The ARPANSA website.

- The St George and Sutherland Shire Leader newspapers from 8-16 May 2013.
- The Liverpool Leader, 8 May 2013.

Submissions were also extracted from the transcript of the proceedings of the ANSTO licence applications Community Information Session held in Engadine Community Centre on 16 May 2013 [14].

In summary, ARPANSA received 30 submissions, 10 of which were relevant to the siting and construction of the IWS at LHSTC.

The submissions on the IWS raised the following issues:

- The timeliness of the establishment of the NRWMF.
- Demographic changes.
- Bushfire risks.
- Potential deferral of return of radioactive waste to Australia.
- Permanent storage of radioactive waste at LHSTC.
- Inventory of radioactive waste returning from France and the UK.

Submissions by the public have been assessed by ARPANSA. Issues raised, responses by ANSTO and comments by ARPANSA are presented in Appendix 2 of this report. These matters will be considered further in the licence applications to construct and operate the facility.

The assessor is satisfied that adequate consideration has been given to submissions by the public in relation to the application for a licence to prepare a site for the proposed IWS.

2.6 International Best Practice

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.

2.6.1 International use of the TN81 transport/storage casks for vitrified residues

The safety case of the TN81 cask is considered to underpin the safety case of the IWS, and hence international use of the TN81 cask was examined.

Following a request for additional information on the use of the TN81 cask, ANSTO provided information on the use of the TN81 cask at the ZWILAG facility in Switzerland where 3 casks have been loaded and stored at the ZWILAG site.

The information supplied describes the design evolution of the TN81 cask by AREVA to accommodate high burn-up spent fuel, capable of up to 56 kW. It should be noted that the decay heat of the ILW returning from France has a predicted decay heat of less than 11 kW, substantially less than the cask limit. The TN81 is the original version of the TN85 cask.

In 1998 an application was made in both France and Germany for the TN85 cask against the 1996 IAEA Transport Regulations. In order to demonstrate that the cask could meet the IAEA requirements in accident conditions, a 1/3 scale model was manufactured for drop test purposes.

A total of eight drops were performed on the test cask, with the majority of drops from 1 m onto a punch, and a 9m drop onto an unyielding target. The resulting values of leak tightness demonstrated were excellent relative to the requirements of the IAEA Transport Regulations.

Subsequent to these tests the French regulatory authorities granted approval of the cask design in March 2005, and the German authorities in March 2006. The granting of the German Certificate of Approval required additional factors to obtain the site storage licence, including:

- Analysis of accidental drop during handling.
- Analysis of consequences of a fire.
- Thermal requirements.
- Dose rate requirements (100 µSv/hr gamma and 250 µSv/hr neutron).

The assessor has examined reports and data on the usage of the TN81 cask for storage/transport of vitrified waste in France, Germany and Switzerland. The assessor concludes that the use of the TN81 cask for the safe storage and transport of vitrified waste has been successfully demonstrated internationally.

2.6.2 International Best Practice in radiation protection and nuclear safety

Section G of the application states that ANSTO will adopt all relevant safety requirements and guidelines, particularly the IAEA Safety Requirements for Site Evaluation for Nuclear Installations (IAEA NS-R-3) [7], IAEA Safety Guide for Storage of Radioactive Waste (WS-G-6.1, 2006) [11] and IAEA Safety Requirements for Safe Transport of Radioactive Material (TS-R-1, 2009) [12].

In addition, the IWS will be designed to meet the relevant standards for buildings containing nuclear materials and high levels of activity and in line with the relevant ARPANSA Safety Guides.

The assessor considers that by meeting the requirements of the relevant IAEA Standards and ARPANSA Safety Guides the applicant has taken into account international best practice.

It is noted that interim storage is not considered international best practice. Nevertheless Australia has international obligations under the IAEA Joint Convention on the Safety of Spent Fuel Management and Safety of Radioactive Waste Management to take back its radioactive waste. Moreover ANSTO has contractual obligations with France and the UK to take the waste back within specified time frames. Hence interim storage is considered the best practical option. LHSTC is also considered the best location with existing and proven infrastructure and resources. It is also noted that section 5 of the ANSTO Act (1987) [17] states that ANSTO cannot host a permanent storage facility for radioactive waste.

3. CONCLUSIONS

The assessor considers that the application and information submitted in support of the application provide satisfactory evidence that:

1. The application was in a form approved by the CEO, including payment of the relevant application fee (section 34 of the Act).
2. The applicant included all of the information asked for by the CEO (sub-regulation 39(2) and paragraph 41(3)(a) of the Regulations).
3. The information establishes that siting of the ANSTO IWS facility poses no undue risk to the health and safety of people or to the environment (paragraph 41(3)(b) of the Regulations).
4. The applicant has shown a net benefit from siting of the ANSTO IWS facility (paragraph 41(3)(c) of the Regulations).
5. The magnitude of individual doses, the number of people exposed and the likelihood that exposure will happen have been shown to be as low as reasonably achievable (paragraph 41(3)(d) of the Regulations).
6. The applicant has shown a capacity for complying with the regulations and licence conditions (paragraph 41(3)(e) of the Regulations).
7. International best practice in radiation protection and nuclear safety has been taken into account (sub-section 32(3) of the Act).
8. The application was signed by the requisite office holder (paragraph 41(3)(f) of the Regulations).

4. RECOMMENDATIONS

4.1 Issue of Licence

It is recommended that a Facility Licence be issued to the Australian Nuclear Science and Technology Organisation (ANSTO) in respect of licence application A0277, authorising the preparation of a site for a nuclear installation, namely the Interim Waste Store situated at Lucas Heights Science and Technology Centre.

As indicated in Section 2.4 of this report, if the NRWMF is not available in time for return of the UK waste, ANSTO will need to submit a request for approval to amend the licence to store the UK waste.

Assessor NAME: Jim Scott	SIGNATURE:	*ORIGINAL SIGNED*	DATE: 22 / 11 / 2013
Branch Head NAME: Martin Dwyer	SIGNATURE:	*ORIGINAL SIGNED*	DATE: 22 / 11 / 2013

5. REFERENCES

[1] Australian Radiation Protection and Nuclear Safety Act 1998.

[2] Australian Radiation Protection and Nuclear Safety Regulations 1999.

[3] ANSTO IWS application on the ARPANSA website http://www.arpansa.gov.au/Regulation/Branch/iws.cfm

[4] ARPANSA, Regulatory Assessment Principles for Controlled Facilities, ARPANSA, Rev 1, RB-STD-42-00, October 2001.

[5] ARPANSA, Regulatory Guide: Plans and Arrangements for Managing Safety, ARPANSA, v4, OS-LA-SUP-240B, January 2013.

[6] ARPANSA, Regulatory Guide: Licensing of Radioactive Waste Storage and Disposal Facilities, v2, OS-LA-SUP-240L, March 2013.

[7] Site Evaluation for Nuclear Installations, IAEA Safety Standards Series No. NS-R-3, 2003.

[8] Safety Aspects in Siting for Nuclear Installations, IAEA Draft Safety Standard DS433, 2012.

[9] ARPANSA Radiation Protection Series No 16 Safety Guide for Predisposal Management of Radioactive Waste (2008).

[10] ARPANSA Radiation Protection Series No 20 Safety Guide for Classification of Radioactive Waste (2010).

[11] Storage of Radioactive Waste, IAEA Safety Standards Series No. WS-G-6.1, 2006.

[12] Regulations for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-R-1, 2009.

[13] ARPANSA Radiation Protection Series No 2 Code of Practice for the Safe Transport of Radioactive Material (2008 Edition).

[14] Public consultation webpage on the ARPANSA website

http://www.arpansa.gov.au/Regulation/Branch/consultation.cfm

[15] Interim Waste Store - Preliminary Safety Analysis Report, March 2013 (Revision 2) IWS-C-LA-Cd.

[16] ARPANSA Radiation Protection Series No 7 Recommendations for Intervention in Emergency Situations Involving Radiation Exposure, 2004.

[17] The Australian Nuclear Science and Technology Organisation Act (1987).

[18] ARPANSA Radiation Protection Series No 11 Code of Practice for Security of Radioactive Sources (2007).

APPENDIX 1

Australian Government
Department of Sustainability, Environment, Water, Population and Communities

Mr Lubi Dimitrovski
Manager, Waste Operations
Australian Nuclear Science and
Technology Organisation (ANSTO)
Locked Bag 2001
KIRRAWEE DC NSW 2232

Dear Mr Dimitrovski

Decision on referral
Interim Waste Storage Facility, Lucas Heights, NSW (EPBC 2012/6564)

Thank you for submitting a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This is to advise you of my decision about the proposed action to construct an interim nuclear waste storage facility at Lucas Heights, New South Wales.

As a delegate of the Minister for Sustainability, Environment, Water, Population and Communities, I have decided that the proposed action is not a controlled action, provided it is taken in accordance with the manner described in the enclosed decision document. This means that, provided that the action is undertaken in that way, it does not require further assessment and approval under the EPBC Act before it can proceed.

A copy of the document recording this decision is enclosed. This document will be published on the department's website.

Please note that this decision relates only to the specific matters protected under Chapter 2 of the EPBC Act.

This decision does not affect any requirement for separate state or local government environment assessment and approvals of the proposed action.

Please notify this department immediately if you are unable to undertake the proposed action in accordance with the measures described. Penalty provisions may apply if the referred action is undertaken in a different way to the manner specified.

Otherwise we would appreciate receiving your written advice:

- within two weeks of the date of this letter - confirming that the action will be undertaken in the manner set out in the enclosed decision, and
- within three months of the date of this letter - reporting on your progress in implementing the measures.

The department has an active audit program for proposals that have been referred under the EPBC Act. The audit program aims to ensure that there is a high degree of compliance with decisions made in relation to those proposals. Please note that your project may be selected for audit by the department at any time and all related records and documents may be subject to scrutiny. Information about the department's compliance monitoring and auditing program is enclosed.

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The department notes that in a meeting with ANSTO on 14 September 2012 your staff indicated that road transportation of the container containing reprocessed material from the ship to LHSTC would not be referred because an ANSTO internal assessment had concluded that it was unlikely that there would significant impacts under the EPBC Act, due to the robustness and integrity of the TN81 container.

The department also notes that on 18 October 2012 you indicated that road transportation of the TN81 container was a routine operation in Europe where no accidents or releases of radioactive material have occurred and that ANSTO had previously safely used road transport to move radioactive material for shipping overseas.

Please be aware that the decision not to refer road transportation of reprocessed material is a decision made solely at ANSTO's discretion. In the event that significant environmental impacts result from the transportation, ANSTO may be subject to compliance and enforcement action under the EPBC Act.

If you have any questions about the referral process or this decision, please contact the project manager, Mr Mark Jenkins, by email to mark.jenkins@environment.gov.au, or Telephone 02 6274 1558 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

James Tregurtha
Assistant Secretary
South-Eastern Australia Environment Assessments
29 October 2012

Australian Government
Department of Sustainability, Environment, Water, Population and Communities

Notification of
REFERRAL DECISION – not controlled action if undertaken in a particular manner

Interim Waste Storage Facility, Lucas Heights, NSW (EPBC 2012/6564)

This decision is made under sections 75 and 77A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Proposed action

person named in the referral	Australian Nuclear Science and Technology Organisation (ANSTO) ABN: 47956969590
proposed action	The construction and operation of an interim nuclear waste storage facility at Lucas Heights Science and Technology Centre (LHSTC) on New Illawarra Road, Lucas Heights, NSW (See EPBC Act referral 2012/6564).

Referral decision: Not a controlled action if undertaken in a particular manner

status of proposed action	The proposed action is not a controlled action provided it is undertaken in the manner set out in this decision.

Person authorised to make decision

Name and position	James Tregurtha Assistant Secretary South-Eastern Australia Environment Assessments
signature	
date of decision	29/10/2012

APPENDIX 2

Responses to questions and comments from public submissions re: IWS, ANM Mo99 and SyMo applications

Question/comment	ANSTO Response	ARPANSA Comment
1. Of primary concern is a mixture of highly radioactive fission products ('molywaste') generated from ^{99}Mo is stated by ANSTO to comprise the majority of radioactivity to be stored at Lucas Heights, surprisingly more than spent fuel rods and considerably more than the waste returning from France. Molywaste, particularly in its liquid form represents the most hazardous material at Lucas Heights, both for ANSTO workers and surrounding residents.	The licence applications do not make this statement. The OPAL reactor at Lucas Heights is designed for 20MW with 300 days operating time per year. This requires burning 6.3Kg of U-235 per year with the corresponding fission products. The ANM Mo-99 plant running at its design capacity will use only 0.35Kg of U-235 per year generating a correspondingly significantly smaller amount of fission products.	ARPANSA assessor considers that ANSTO comment is acceptable as it relies on the proposed purpose and corresponding design. ARPANSA will consider further details when assessing the licence application for construction and operation of the facility.
2. Why has ANSTO not evaluated non-fission alternatives to avoid generation of molywaste? Serious consideration should be given to alternatives that use accelerators to produce 99Mo or 99Tc-m by selective reaction without fission-product waste.	ANSTO has evaluated non-reactor alternatives for the production of Mo-99 and Tc-99m. Such evaluation has also been undertaken by international bodies, in particular the OECD Nuclear Energy Agency (NEA). The NEA report (http://www.oecd-nea.org/med-radio/reports/Med-Radio-99Mo-Prod-Tech.pdf) noted that no such alternative technologies are currently in use anywhere in the world, and expressed strong doubts as to whether they could ever substitute for reactor technologies. Given that, it would be grossly irresponsible for ANSTO to risk the health of Australians on unproven technology.	The application is for production of Mo-99 in commercial scale. Based on the available information on production of Mo-99 in the literature ARPANSA assessor notes that accelerator production of Tc-99m is not used for any commercial scale production facilities.

3. Little has been said about the alternate proliferation risk of plutonium created as a by-product of 99Mo production and potentially separable from molywaste by altering the chemical treatment of the waste stream.	In a typical production year, the ANM Mo99 facility operating at capacity will produce approximately 6.2 g of Pu-239, which is less than 1/1000 of the amount that would be of significance from a safeguards perspective. Furthermore, that Pu-239 will be mixed with other materials and will therefore be unusable for any purpose. Further, the facility will be under IAEA safeguards, including regular inspections, to ensure that any material of concern could not be diverted from the declared activities. We also note that sub-section 5(2) of the ANSTO Act provides: "The Organisation shall not undertake research or development into the design or production of nuclear weapons or other nuclear explosive devices".	ARPANSA will consider sampling requirements and possible OLCs in this regard.
4. Insufficient details have been given to assess whether the quantity of Pu239 in accumulating molywaste is likely to be a proliferation concern. The isotope ratio is likely to be weapons-compatible.	See response to question 3.	See 3 above
5. Just how much plutonium will be produced in the waste stream for the new facility? ANSTO is requested to publish an accurate calculation of the mass of 239Pu created for each batch of 99Mo and the mass to thus accumulate over the course of the planned 99Mo production program.	See response to question 3.	See 3 above

6. ANSTO is asked to provide a long term road map for the development of non-fission based methods for the production of 99Tc-m regardless of the outcome of the current application.	See response to question 2.	See 2 above
7. There is concern that the proposed radioisotope production facility might potentially facilitate nuclear weapons development at Lucas Heights.	See response to question 3.	See 3 above
8. If the Synroc system is so safe then why have there been so many successful legal challenges to moving the waste from Lucas Heights to a permanent repository?	There have been no successful legal challenges to moving the waste from Lucas Heights to a permanent repository. There is currently an unresolved court case (in which ANSTO is not involved) regarding the nomination of Muckaty Station in the Northern Territory as a possible site for a National Radioactive Waste Management Facility (NRWMF), but that case is based around provisions of the Land Rights Act, not any hazard which might be posed by radioactive waste. In any event, the waste to be stored in the IWS is not in synroc form but the majority of the waste is vitrified and a small amount of waste is cemented (i.e. technological wastes). The waste from the IWS will be moved to a NRWMF when it becomes available.	ARPANSA is not aware of any legal challenge in transferring waste from Lucas Heights.
9. Is Synroc being used anywhere else in the world? If it is successful in dealing with nuclear waste why did we need to transport our waste overseas if we had this technology at the time?	Synroc is being investigated by many governments around the world and it has been shown to be cost effective for certain wastes. The Synroc HIP technology has been chosen by the UK for Pu-wastes and in the USA for calcined waste in Idaho.	

	The *Environment Protection and Biodiversity Conservation Act 1999* and the *Australian Radiation Protection and Nuclear Safety Act 1998* prohibit the development of nuclear fuel reprocessing facilities in Australia. It is therefore not possible to use Synroc in fuel re-processing.	
10. A cost/benefit appraisal of Synroc and its reliability are missing from the public information.	A cost/benefit appraisal was developed in preparing the business case for the ANM projects. This has been subject to detailed scrutiny through the Cabinet process and the subsequent application to the Public Works Committee (PWC).	
11. Are we still going to transport any waste overseas for reprocessing?	Spent fuel from the OPAL reactor will be returned either for reprocessing in Europe or for permanent storage in the US. There is no current intention to send any wastes arising from the ANM facility overseas for reprocessing.	Any such conduct will be subject to ARPANSA scrutiny.
12. What are the risks of transportation of radioactive waste?	The safety record of the transport of radioactive material is very strong. The international regulations ensure the protection of people and the environment in all credible accident scenarios.	The safety of transport packages is assessed against the requirements of the ARPANSA Code of Practice for the Safe Transport of Radioactive Material 2008 (RPS 2) which is based on the IAEA Regulations for the Safe Transport of Radioactive Material. The transport containers are heavily engineered and extremely robust. This, coupled with the immobilised nature of the waste make the risks associated with transport of radioactive waste extremely low.
13. ANSTO may be given the go ahead to produce more	One of the fundamental principles of radioactive waste	ARPANSA has in the decision requested ANSTO

nuclear waste than may be necessary.	management is that of waste minimisation and ANSTO is committed to this principle. A strong factor in the selection of the Synroc process is that it minimises the volume of waste for later handling and storage. There are also comprehensive features in the ANM Mo99 plant for safely handling and minimising gaseous and other wastes.	to further detail their waste management plan and contingencies.
14. There is no information on the cost of the expansion of the production facilities, the IWS or the decommissioning of HIFAR.	We are not sure how this is relevant to the safety and security of the facilities. This application is not relevant to the decommissioning of HIFAR.	
15. State Emergency Services are already suffering a lack of resources. Does ANSTO contribute to the need for increased services? Is this included in the costs?	ANSTO has long established liaison arrangements with the NSW Emergency Services. These include joint meetings and joint exercises. In terms of the requirements for support and cooperation with these services, the new ANM Mo99 and Synroc facilities are similar to the existing facilities on the ANSTO Lucas Heights site which include the OPAL reactor, the existing Mo99 production facility and waste facilities. There will be no need for changes to these arrangements.	
16. Security has not been adequately addressed.	ANSTO has a comprehensive security system, based on Australian and internationally required standards, to guard its nuclear materials, radioactive sources and facilities. All people and vehicles entering the site are subject to inspection by Australian Federal Police (AFP) Protective Service officers, who guard the site 24 hours a day. AFP and ANSTO officers also regularly patrol the entire site and the buffer zone. There are regular reviews by expert agencies, including the Australian Security Intelligence Organisation	Assessment of arrangements for Security has been assessed as required by Item 4(a) of Part of Schedule 3 of the Regulations. The results of assessment are presented in Section 2.2.5 of this report.

	and the Australian Safeguards and Non-Proliferation Office, to ensure security continues to meet the stringent national and international physical security protection standards. In addition, agency inspectors from the Australian Radiation Protection and Nuclear Safety Agency can require access to ANSTO's sites at any time to conduct security inspections. ANSTO's security risk assessments are supported by information provided by the Australian Security Intelligence Organisation and other government departments and agencies. The Australian Federal Police are on site to provide an armed, high level and professional service that deters, prevents and effectively manages security threats through a proactive, flexible, robust and intelligence driven approach. The Australian Federal Police have a 24 hour presence at ANSTO with support from NSW Police and the Australian Defence Force as appropriate. Whilst armed Australian Federal Police is a strong deterrent there are a range of other of other sophisticated security controls involving people, technology, operations and processes. For each transport of radioactive materials a security transport plan is developed in conjunction with law enforcement agencies who provide security support to such movements.	
17. There is no legal compensation commitment for public health, property or environmental damage resulting from a serious accident.	On the issue of legal liability, ANSTO's liability would flow in accordance with usual legal principles of negligence applicable in NSW. This means that if ANSTO is proven to have caused personal injury or death to persons or property damage or environmental damage due to a release of	

	ionising radiation, whether directly or indirectly, or due to other negligence, then it will be legally liable to compensate such persons or owners of such property. ANSTO has commercial insurance in place to cover this potential liability, as well as supplementary cover under a Deed of Indemnity from the Commonwealth of Australia. The commercial insurance policy covers liability arising out of ANSTO's responsibility for: (a) managing, storing and conditioning Ionising Radiation (as defined) emitting material and waste; (b) transporting nuclear waste and materials for disposal both within Australia and overseas; and (c) transporting radioactive materials including radioisotopes.	
18. Why is such an industry supported when the scientific research community is crying out for funds for non-invasive and safe treatments?	The beauty of nuclear medicine is that it is indeed non-invasive and safe – which is recognised by doctors and by organisations such as the Cancer Council. ANSTO supplies some 10,000 doses of radioisotopes per week for use in nuclear medicine procedures across Australia. One in two Australians in their lifetime will receive a nuclear medicine treatment from OPAL. ANSTO-produced radioisotopes are used for the diagnosis of heart disease and a range of cancers and skeletal injuries both in Australia and internationally.	
19. Why is ANSTO producing Mo-99 beyond Australia's needs that are for overseas distribution, as the wastes to be generated from the excess production will be	The Global supply of nuclear medicine is currently under threat, with reactors responsible for around 70 per cent of the world's current Mo-99 production due to close between	This matter has been considered in the decision and ANSTO is requested to further develop their waste management plan including

stored at ANSTO Lucas Heights Facility?	2015 and 2020. Further with medical modernisation in developing countries, global demand for Mo-99 is increasing by up to 10 per cent a year. The production of Mo-99 is dependent on highly specialised infrastructure e.g. a reactor and Mo-99 production facility. As a result, every country cannot be expected to produce its own supply. Australia has benefited from international cooperation in the past when we needed to rely on imports of Mo-99 and has also contributed to world supply during shortages. Australia is well placed to help meet the increasing demand for Mo-99 and as a member of the community of nations and a significant player in the region has a responsibility to do so. Australia is also in a unique position of being able to produce Mo-99 exclusively using low enriched uranium (LEU). Currently, most of the global Mo-99 supply is produced in reactors fuelled by highly enriched uranium (HEU) and using HEU targets. HEU can be used in nuclear weapons. Consequently, alternative manufacturing processes are highly desirable. For example, the US has put measures in place to favour Mo-99 produced in reactors fuelled by proliferation proof LEU, such as that used in Australia's OPAL reactor. The development of ANSTO's new Mo-99 facility will therefore	contingencies

	contribute to global nuclear security and non-proliferation, and was identified by the former Prime Minister at the 2012 Nuclear Security Summit as a major contribution by Australia to global nuclear security. Importantly, the co-located Synroc waste treatment plant will use the Australian innovation, Synroc, to convert the necessary waste into a stable, synthetic rock suitable for transportation to the National Radioactive Waste Management Facility for long term storage once it is operational. The new Synroc plant will reduce the volume of nuclear byproducts by 90 to 95 per cent compared to existing waste treatment methods, resulting in a smaller volume of waste being temporarily stored at ANSTO's Lucas Heights campus. The costs of waste treatment will be included in the price charged for Mo-99, meaning that there will be no subsidy to overseas patients.	
20. Where and when is a 'National Radioactive Waste Management Facility' going to be constructed?	There is bipartisan support for a NRWMF and it will be the Government who decides its location. The site currently under study is Muckaty station in the Northern Territory, however other sites may be considered. It is expected that a facility will be available by the end of the decade.	The *National Radioactive Waste Management Act 2012* makes provision to site, construct and operate a NRWMF subject to environmental and radiation protection regulatory approvals. The Department of Resources, Energy and Tourism (RET) has responsibility for management of the Commonwealth's radioactive waste and as part of this responsibility is implementing the

		Government's policy to establish a permanent facility.
21. The analysis given at 2.2.1 of "Siting Safety Assessment. Site Characteristics and Site Related Design Bases" about population around LHSTC looks really superfluous. There is a reference to quite out-dated "OPAL Safety Analysis Report (INVAP/ANSTO 2004)" (which is not provided) whereas the analysis about population density and population distribution is required.	As stated in the Siting Safety Assessment (section 2.2.1), there are no credible accident scenarios that could cause any conceivable risk to the surrounding population. It was thus considered unnecessary to include such population data in this application. However, ANSTO has developed decade projections of population from the ABS 2006 Census data, and the NSW Department of Planning data for another licence application	For the three ANSTO licence applications, the projected population out to 2046 has been considered by ARPANSA; in particular, in its analysis of the Reference Accident of ANM Mo99 Facility.
22. The general requirement of the IAEA is low density area around a waste storage site. A multimillion population urban area in Sydney metro area cannot be considered low density. Location near the Woronora River, a major water supply, adds to the hazards.	That is not correct. The siting process is a risk-based one. To cite text from IAEA, the siting of nuclear installations "…is concerned with the evaluation of those site related factors that have to be taken into account to ensure that the site–installation combination does not constitute an unacceptable risk to individuals, the population or the environment over the lifetime of the installation." IAEA Safety Requirements No. NS-R-3, Nov 2003. Given the robust nature of the transport / storage containers and the immobilised nature (vitrified and cemented) of the waste, the risks associated with storage at Lucas Heights are negligible. Although the Woronora River is a water supply source, Lucas Heights is well downstream of the Woronora Dam. In any case, this is not relevant as there are no liquid, gaseous, or soluble wastes to be stored in the facility and therefore no credible release scenario is considered.	For the three ANSTO licence applications the projected population out to 2046 has been considered by ARPANSA; in particular, in its analysis of the Reference Accident of ANM Mo99 Facility.

23. The risks of possible large bushfire are too high (every 8 – 12 years). The deserted location looks much better.	Extensive studies have been undertaken in relation to the bushfire risk to the OPAL reactor. This has led to a detailed analysis of the different pathways that would constitute a risk to the public or to the environment. It has been concluded that there is no credible risk of the release of radiation from the OPAL reactor. The IWS is well enveloped within the risk assessment for the OPAL reactor. There is much less radioactive material associated with the IWS, and the TN81transport/storage container in which the vitrified waste will be housed is rated to withstand temperatures of 800°C for 30 minutes. Hence there is no credible radiation risk from the IWS as a result of bushfire.	
24. What is to become of the decommissioned reactor? Is it to be cut up and buried at Lucas Heights?	This is a separate issue, and its regulatory approval process will be dealt separately but when the permanently shut-down reactor HIFAR is decommissioned, it will be dismantled in a safe manner. The radioactive waste arising from the decommissioning operation will be appropriately conditioned, packaged and sent to the NRWMF.	Decommissioning of HIFAR reactor is subject to ARPANSA regulatory approval.
25. I was required to sign an indemnity for the Australia Government before I could buy my house and when I raised that issue at the information session my veracity was challenged. So what is it that ANSTO is trying so hard to conceal? Whatever happened to transparency?	ANSTO is not aware of the basis for this statement, and cannot comment without seeing the document referred to. The applications for this facility – like ANSTO's operations generally - are open and transparent.	
26. ANSTO and the Government should negotiate deferral of planned return shipment until a suitable national	Any attempt to renegotiate the time scale for return of the waste could damage Australia's international reputation in relation to our global nuclear obligations. It is important to	

repository is available.	meet our obligations to France otherwise it raises uncertainty and may have negative financial impacts on future reprocessing services.	
27. What assurances are there that Lucas Heights will not become a permanent waste store?	The ANSTO Act prevents that occurring.	The *ANSTO Act 1987* prohibits the permanent storage of radioactive waste at ANSTO.
28. I understand that the waste returning from France and the UK will carry the same amount of radioactivity as the original material sent from Australia.	This fact has been public since the 1990s.	This is correct, however there is a substitution contract for the waste from the UK, which means that the cement waste will remain there and an equivalent amount of more stable and lesser volume of vitrified waste will be returned.
29. Is there any high level waste resulting from decommissioning of HIFAR?	There will be no high level waste resulting from the decommissioning actions of HIFAR. ANSTO does not generate High Level Waste.	
30. What is the impact on the increased local population?	The safety assessment of the IWS (ANSTO/T/TN/2021-03 Rev 2) concluded that there are no credible scenarios which could impact on people or the environment.	The projected population until 2046 has been considered in ARPANSA analysis of the reference Accident of the ANM Mo99 Facility. ARPANSA analysis shows that there are no significant radiological risks to the people and environment.