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INTERIM WASTE STORE OPERATING LICENCE RADIATION PROTECTION PLAN

Document IWS-O-LA-D3

(Rev 0)

Prepared by

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1 PURPOSE AND SCOPE

1.1 Purpose

The purpose of this *Radiation Protection Plan* is to describe the organisational arrangements and procedures that are to be implemented for the purposes of controlling exposure to ionising radiation for the operation of the Interim Waste Store (IWS) at Lucas Heights, NSW.

This plan outlines the systems and the processes that will ensure compliance with standards and regulatory requirements on radiation protection and the application of optimisation of protection measures at the IWS.

This plan has been prepared to ensure safe management of the IWS and is part of the operating licence application made to ARPANSA. The plan is prepared in accordance with the ARPANS legislation **[12.1.9]** and regulations **[12.1.10]** and the ANSTO safety arrangements. It specifically covers the issues referred to in the ARPANSA guide relating to the review of plans and arrangements **[12.1.11]**.

This plan is compliant with current Australian National Standards and Codes and, also, the ARPANS Act and Regulations. The plan is consistent with international best practice and is in accordance with the International Atomic Energy Agency (IAEA) standards and guidelines on protection against the effects of ionising radiation (IAEA Safety Series No. 115, 1996 and Safety Guide No RS-G-1.1, ICRP 103).

1.2 Scope

This plan applies to all activities associated with the operation of the IWS. It includes the routine operation and maintenance tasks and also the initial setup works that need to be undertaken when the waste packages arrive in the IWS. An estimation of the radiation doses to the workers is also undertaken for these activities.

This plan should be read in conjunction with the other plans and supporting documents comprising the operating licence application.

2 RESPONSIBILITIES

The CEO of ANSTO is the applicant to ARPANSA for the operating licence authorisation being sought. The CEO of ANSTO, has delegated responsibility for the safe management of the IWS to the Facility Nominee; the Head, Nuclear Services.

The organisational arrangements, with organisational structure, roles, responsibilities and delegations, are described in detail in the *Effective Control Plan* IWS-O-LA-D1 **[12.1.4]**.

Only a summary relating to radiation protection is given in this plan.

2.1 Organisational Responsibilities for the IWS

All workers have responsibility to apply the ANSTO WHS (Work, Health and Safety) management system and to follow the related procedures and instructions such that radiation exposures are as low as reasonably achievable (ALARA) and are within the applicable limits and constraints.

2.1.1 Health Physicist and Radiation Protection Workers

ANSTO's Nuclear Services Division will provide Radiation Protection Services (RPS) workers, namely a Health Physicist (HP), Health Physics Surveyor (HPS) and related services for the operation of the facility. Throughout this plan and the supporting documentation, Health Physicist and Radiation Protection Advisor (RPA) are interchangeable.

The HP is an experienced professional trained in radiation protection who advises the workers for the operation of the IWS on radiation protection issues, safe working practices, relevant standards and the optimisation of radiation protection measures.

The HP assists workers with improvements in radiation safety by advising on the development, application and modification of IWS procedures, instructions and written work systems for all activities where radiological safety assessment is required for the operation of the IWS.

Monitoring programs and their implementation are advised upon and reviewed by the HP. Advice on licensed source handling and storage, the management of radioactive waste and the transport of radioactive material will also be available from the HP.

The HP will be supported, at an operational level, by the provision of HPS from ANSTO Nuclear Services Division. The HPS will perform radiation monitoring surveys of areas identified by the HP within the IWS (to an agreed schedule). The results of these surveys will be reported, for review as per Section **11** of this document, to the HP and to the Head, Nuclear Services, or their nominated delegates.

All IWS workers working in radiological classified areas will attend radiation safety training provided by ANSTO Nuclear Services Division. Further training in IWS specific hazards, the use of radiological instrumentation and applicable monitoring techniques will be provided to the IWS by RPS.

The HP and the HPS will have the authority to suspend work if the radiological conditions have significantly deviated from the expected operational levels and it is believed that these conditions present an intolerable risk to either staff or to members of the public.

3 RADIATION PROTECTION PRINCIPLES

ANSTO is committed to maintaining standards of radiation safety recommended by the International Atomic Energy Agency, (IAEA), the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), and through the application of its radiation safety management systems. ANSTO is committed to keeping all radiological exposures to As Low as Reasonably Achievable (ALARA), social and economic factors being taken into account.

The ANSTO WHS Radiation Safety Standard AS2310 **[12.1.3]** is applicable to the operation of the IWS that either introduce a radiological hazard (potential or otherwise) or where existing radiological materials have the potential to become an operational hazard (i.e. within radiological classified areas).

The ANSTO WHS Standard for Radiation Safety AS2310 **[12.1.3]** is implemented through the application of the guides and practices as listed in Section **12.2**.

3.1 Justification of Radiological Exposures

Radiological exposures are anticipated to be received by workers during the operation of IWS. The design and operation of the facility will be to provide safe storage of the waste arising from the overseas reprocessing of Australia's used nuclear fuel used during the 47 years of operation of HIFAR.

These exposures are considered to be justified on the basis that the Intermediate Level Waste (ILW) which will be stored in the IWS is the result of activities which yield significant net benefit to society in terms of radiopharmaceutical production, waste immobilisation, materials research, neutron beam research, silicon irradiation etc.

It is anticipated that the ILW stored in the IWS will be transferred to the National Radioactive Waste Management Facility (NRWMF) when it is operational, estimated to be in 2020.

3.2 Optimisation of Radiation Protection

ANSTO is committed to the fundamental radiation protection principle of optimisation, by keeping the magnitude of individual doses, the number of people who are exposed, and the likelihood of incurring exposures to radiation, As Low as Reasonably Achievable (ALARA), taking into account economic and social factors.

The ALARA principle will be formally applied, as appropriate, by:

- Use of dose constraints for individual tasks where radiological exposures have the potential to become significant (i.e. an effective dose in excess of a pro rata dose limit or dose constraint) due to operational activities.
- Identification of radiological hazards and optimisation and implementation of the associated controls within the safe work method and environmental statements (SWMES) and risk assessments used to manage operational activities for the IWS.

3.3 Radiation Dose Limits

Individual doses due to the combination of exposures from the IWS and all other ANSTO activities must not exceed the specified annual effective dose limits and equivalent dose limits recommended by the national standard, IAEA Basic Safety Standard, ARPANS Regulations and the International Commission on Radiation Protection (ICRP).

ANSTO is committed to ensure that, for all operational activities for the IWS, effective radiation

doses (including committed effective radiation doses) to occupationally exposed workers and members of the public do not exceed any dose constraints set by ANSTO. Doses received will be subject to the dose limits and constraints in accordance with the ANSTO WHS Radiation Safety Standard AS2310 **[12.1.3]** and is summarised in Table 1 of this plan.

Appropriate dose constraints across shorter time periods and for specific tasks will be defined by the HP in consultation with the Head, Nuclear Services, or their nominated delegate.

The plans and arrangements for managing potential environmental impacts identify the relevant discharge limits required to ensure that the exposure to members of the public remain below the relevant dose limits and dose constraints.

Table 1 Dose Limits and Constraints

Class	Occupationally Exposed Personnel	Public
Effective Dose Limit	• 20 $mSva^{-1}$, averaged over five consecutive years. • 50 mSv in any single year.	• 1 $mSva^{-1}$ effective dose.
Effective Dose Constraint	• 15 $mSva^{-1}$	• 0.3 $mSva^{-1}$ effective dose.
Equivalent Dose Limit	• *150 $mSva^{-1}$ to the lens of the eye. • 500 $mSva^{-1}$ to the hands and feet. • 500 $mSva^{-1}$ to the skin (average dose received by any one square centimetre of skin).	• 15 $mSva^{-1}$ equivalent dose to the lens of the eye. • 50 $mSva^{-1}$ equivalent dose to the hands and feet.
Investigation levels	• 1 mSv $month^{-1}$ effective dose • 40 mSv $month^{-1}$ for skin or hand doses	• N/A
ALARA Assessment	• 2$mSva^{-1}$	• 0.02$mSva^{-1}$

*Note the ICRP issued a statement on lowering the threshold for the eye lens on 21st April 2011. The statement is as follows: ***"For occupational exposure in planned exposure situations the Commission now recommends an equivalent dose limit for the lens of the eye of 20 mSv in a year, averaged over defined periods of 5 years, with no single year exceeding 50 mSv."*** ANSTO will work to this guidance.

3.4 Defence in Depth

The IWS will incorporate in-depth defensive measures into the design and operating procedures of its facility and sources to compensate for potential failures in protection or safety measures. This includes use of multiple barriers to contain radiation and radioactive material, and redundancy and diversity in safety control and monitoring systems where necessary and as appropriate to the hazard.

The defence in depth measures applied at the IWS, when operational, are described in, but not limited to the ANSTO WHS Radiation Safety Standard AS2310 **[12.1.3]**.

3.5 Safety Culture

A strong Safety Culture within ANSTO will contribute towards radiation protection. This will be done by demonstrating a commitment towards the following elements:

- ANSTO Radiation Safety Standard
- Well-defined nuclear safety roles and responsibilities
- Nuclear safety performance monitoring and reporting
- Motivation and commitment by management and employees
- Conservative decision-making
- Review and application of operational experience

4 RADIOLOGICAL HAZARDS AND CONTROLS

The IWS is designed to provide safe storage of the waste generated from the reprocessing of used nuclear fuel used during the 47 years of operation of HIFAR. This reprocessing occurred at facilities in France.

The waste generated from the reprocessing in France consists of a TN81 container containing up to twenty eight stainless steel canisters that contain vitrified ILW waste (i.e. CSD-U) as well as an ISO container containing six cemented drums (i.e., CBF-C2) in shielded over pack concrete containers containing “technological waste”.

The transport containers for each of the returned waste packages will act as storage containers and provide a level of shielding such that the surface dose rates are essentially close to background levels. There is no intention to open the storage containers while stored at ANSTO.

The types of ILW, their transport and storage containers, how they will be stored and managed in the IWS and an assessment of the hazards are described in detail in *Safety Analysis Report of the Interim Waste Store,* IWS-O-LA-SAR **[12.3.1]** and *Interim Waste Store Safety Assessment,* ANSTO-T-TN-2012-03 rev 3 **[12.3.2]**.

A detailed dose assessment is displayed in Appendix A of this plan. The annual collective dose for the operation of the IWS, which includes the one off set up of the TN 81 and ISO container, is estimated to be between 400 and 500 µSv.

It is therefore not necessary to have any specific design features of the building, other than provision of a suitable crane, in relation to the safe storage of the ILW. The main workplace layout is simply to provide adequate space in the building for inspections and other activities.

5 RADIOLOGICAL CLASSIFICATION OF AREAS

The Classification of Contamination and Radiation areas shall be done according to the process described in **[12.2.6]** and in compliance to the ANSTO WHS Radiation Safety Standard AS2310 **[12.1.3]**. These define the system of radiological classification of areas employed to control, prevent, limit and review occupational exposure (actual or potential) to ionising radiation. This system of radiological classification ensures that occupational dose limits and dose constraints are not exceeded, and is part of the process of ensuring that doses to individuals are kept ALARA.

5.1 Initial Classification of Areas

The initial area classification for the operation of the facility will be determined by the HP in consultation with the Facility Officer and the Area Supervisors. It will conform to the ANSTO methods as outlined in Section **5** above. These classifications shall be based on calculated results as well as operational experience obtained from similar activities. Where relevant, the planned occupancy times of workers in those areas during normal operation will be taken into account.

The anticipated area classification during the operation of the IWS is White Contamination and based on the dose assessment that appears in this plan, White Radiation.

5.2 Reclassification of Areas

The area classification for the various operational areas will be reviewed during and immediately following commissioning and thereafter periodically. It may be adjusted if needed. Such changes would be determined by the HP in consultation with the Area Supervisors.

This will be done by reviewing radiological data obtained from installed and portable monitoring equipment and the final occupancy factors. This review may result in changes in area classification to either higher or lower categories. Areas may be temporarily reclassified to reflect temporary changes in radiological conditions, with the changes in classifications and application of controls being commensurate with the temporarily changed conditions. Certain operations in classified areas may raise or lower the hazard and potential radiation exposure for workers. A temporary upgrade or downgrade in classification may be considered.

Warning notices and protective measures are modified accordingly to reflect this upgrade or downgrade, with any associated changes in work practices required shall be briefed to workers and proper notifications shall be made.

6 SAFETY HAZARD NOTIFICATION

Any potential safety hazards, including radiological, present within areas of the IWS during operation, are identified and illustrated graphically on hazard notice boards in areas. The hazard notice boards are prominently posted at the entrance to any classified area in the IWS and display the radiological classification of the area, potential hazards by colour code, contamination and radiation hazard pictograms, along with contact details for the responsible officers.

All radiation areas classified blue/red are subject to area and personnel monitoring programs as specified in Section **7** of this plan.

6.1 Personal Protective Equipment

Personal Protective Equipment (PPE) for working in radiological classified areas shall be supplied and worn according to the guidelines given in **[12.2.8]** and **[12.2.9]**.

The PPE shall be determined against the nature of the hazard and the work that is being undertaken. This PPE shall be supplied at the entrance barrier to any radiological classified area and following use shall be monitored, laundered and re-used or, for disposable PPE, passed to waste. Entry and exit to these areas shall be done according to **[12.2.7]**.

No special Personal Protective Equipment for working in the IWS is required for the operation of the IWS due to the radiological classification of the area being White Contamination and White Radiation.

7 RADIATION MONITORING PROGRAMS

The types of monitoring programmes that may be implemented at the facility, but not limited to, are:

- Workplace and Area Monitoring,
- Individual Monitoring,
- Monitoring of the Environment,
- Radiation Monitoring Instrumentation.

Monitoring is the collection of information about radiological conditions in the workplace and the evaluation of this information (workplace and area monitoring). This, together with information on exposures to individuals (dosimetry results), assists in confirming that safe working practices and engineering standards have been successfully implemented and that the radiological hazards are under effective control.

The monitoring programs that demonstrate adequate protection and optimisation of those protection measures are described in two parts. The first is based on measurements ('radiological surveys') taken in the workplace. The second is based on measuring individual exposure to radiation using personal dosimetry.

7.1 Workplace Monitoring

Routine workplace monitoring will be performed, to a survey programme, by HPS workers for the purposes of:

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

As described in Section **11** of this plan, the results of these assurance surveys will be reviewed by the Facility Officer and by the HP.

The survey programme will be based on an assessment of the radiological hazards within the facility with the frequency of survey being based upon the magnitude of the hazard, the potential for exposure of an operator or member of the public and the potential for the conditions to change. The survey programme will require that all of the radiological classified areas as per Section **5** are subject to independent monitoring by HPS and that, on a lower frequency; non-radiological classified areas are also monitored.

Task based radiological monitoring will also be performed within the IWS; this monitoring will principally be performed by trained staff from the IWS following agreed procedures and with clear 'pass/fail' criteria (as defined by the HP). The radiological monitoring performed by non-HPS workers will be restricted to measurements with limited radiological implications, i.e. they will principally be the confirmation of expected radiological conditions within defined areas during routine operations. Training in the use of the radiological instrumentation and in the specific measurements to be undertaken will be provided by HPS from ANSTO's Nuclear Services division (and appropriate training records maintained).

For monitoring operations where a higher level of competence or independence is deemed to be required, HPS from ANSTO's Nuclear Services division will be utilised.

The instrumentation used to perform radiological measurements is described in Section **7.3**.

7.2 Monitoring of Individuals

Individual monitoring (dosimetry) is the measurement, assessment and evaluation of radiological exposure to an individual. Occupationally exposed employees will be monitored, in accordance with **[12.2.13]**, as part of the routine dosimetry program. This will include the supply of dosimetry, analysis of Interim dosimetry and a dose record keeping service provided by RPS.

Routine external monitoring using Thermo luminescent Dosimeters (TLDs) for the measurement of effective dose (β/γ exposure to the whole body) and to the extremities (β/γ) will be carried out. Individual monitoring using electronic dosimetry (for occupational dose control) will also be carried out. The TLD issue/assessment period for each occupationally exposed worker will be defined based on their potential exposure and are either monthly or quarterly.

Task and special external individual monitoring may be warranted for ALARA assessment purposes, for incident / event assessment or for assessment of non-uniform exposures. Such monitoring programs would be developed by the HP in conjunction with the Facility Officer and facility workers.

Electronic Dosimetry will be worn by workers entering the radiological controlled areas. These dosimeters are to be used by the IWS workers to ensure operational control of exposures; dose rate and integrated dose alarms for the dosimeters will be defined / implemented by the IWS in conjunction with the HP taking into account the various work tasks / operational areas and the associated radiological hazard.

Workers exiting controlled areas will be required to perform self-monitoring for contamination. Training as per **[12.2.7]** will be provided to workers required to perform self-monitoring. Instrumentation will be provided at the relevant change areas. This monitoring will be used to identify personal contamination events (of the workers' exposed skin, personal clothing or of the discarded PPE).

7.3 Radiation Monitoring Instrumentation

The radiation monitoring equipment to be used in the IWS will consist of a combination of fixed and portable instrumentation designed to monitor the radiological conditions and the workers throughout the facility.

The following radiological monitoring equipment will be present and will be selected based on the operational radiological conditions anticipated within the IWS.

Radiation monitoring equipment for use in the IWS will be:

- Installed Gamma Radiation Monitors
- Portable Dose Rate Instrumentation
- Portable Contamination Instrumentation
- Electronic Personal Dosimetry

7.3.1 Fixed Radiation Monitoring Instrumentation

Installed area instrumentation measures and registers external gamma dose rates in relevant areas. This instrumentation provides real time data to the RPS personnel through intelligent, digital, software operated detector arrays. This data includes logging the level, status and alarms from all the area radiation monitors. These radiation monitors have local displays, and trigger visual and audible alarms if dose rates are higher than pre-determined values that can be set up independently for every location.

7.3.2 Portable Radiation Monitoring Instrumentation

In order to reduce the possibility of contamination spread, measurement of potential external contamination of personnel is routinely performed as close as possible to the contamination source by means of portable equipment.

Portable monitors are used to complement/validate the information provided by fixed detectors and to survey specific operations or procedures, including gamma and neutron dose rate and surface and airborne contamination monitors.

Portable instruments are also used to measure items leaving areas where contamination is expected, as well as to release material to users outside the IWS.

Potentially contaminated surfaces are surveyed using portable instruments or applying smear sampling techniques and remote assessment.

7.3.3 Maintenance of Instrumentation

All fixed and installed radiation monitoring instrumentation are subject to a maintenance program that includes calibration.

The maintenance programs for components are outlined in the maintenance manuals for specialist pieces of equipment. Commercial or 'off-the-shelf' equipment is maintained as recommended by the manufacturer.

Radiation protection instrumentation used within the IWS shall be subject to routine calibration (at an appropriate frequency) by ANSTO's Nuclear Services division.

7.4 Monitoring of the Environment

There are no identifiable routes of discharge of radiological material into the environment for the operation of the IWS.

During the operation of the IWS, there are no identifiable exposure pathways to wildlife in their natural habitats.

A radiological survey of the IWS site has been performed which will serve as a baseline for future surveys of the site as well as the benchmark conditions for the future decommissioning of IWS.

See also the *Waste Management Plan* IWS-O-LA-D4 **[12.1.6]** *and the Preliminary Safety Analysis Report of the Interim Waste Store,* IWS-O-LA-Cd **[12.3.1].**

8 TRAINING

Basic training in Radiation Safety is carried out in accordance with ANSTO WHS Standards and Practices. Training in the IWS, is commensurate with the responsibilities of the role an individual is performing. The minimum requirement for training of a radiation classified worker at ANSTO is the Basic Radiation Safety course and the Radiation Protection Workshop. Health physics monitoring in the IWS is performed by HPS, and hence, the level of training for those workers is more detailed than that for other workers. Other workers working at the IWS is provided radiation safety training in line with the current training programs at ANSTO.

All HPS at ANSTO undergo a training program that includes theoretical and practical training. This training program is concluded with an assessment to determine if the individual is competent to perform the duties of a HPS. HPS will be trained in the operations, instrumentation and radiological requirements of the IWS.

9 TRANSPORT AND MOVEMENT OF RADIOACTIVE MATERIALS

The movement of radioactive materials onsite and within the IWS will be carried out in accordance with the Safe Movement and Transport of Radioactive Material (Guide) AG 2515 **[12.2.12]**. Items and waste products leaving the facility or moving between contamination controlled areas require health physics monitoring and clearance. That clearance is recorded on the ANSTO Contamination Clearance Certificates and/or the Waste Operations service forms.

Radioactive materials leaving the site will be transported in accordance with the ARPANSA Radiation Protection Series RPS No.2 **[12.1.2]**.

10 SUPPLEMENTARY INFORMATION

This plan should be read in conjunction with the other plans and supporting documents comprising the operating licence application.

11 REVIEW AND AUDIT OF THE RADIATION PROTECTION PLAN

11.1 Performance Indicators

11.1.1 Occupational Exposure

Reference levels for occupationally exposed workers are defined in the form of Investigation Levels in accordance with The ANSTO WHS Radiation Safety Standard AS2310 **[12.1.3]** and is summarised in Table 1 of this plan. Dose results will be reviewed at an appropriate periodicity (taking into account the issue period for dosimetry) and will be compared to dose constraints and to these investigation levels.

The Investigation Levels have been defined to ensure that, where pro rata doses suggest a dose constraint may be challenged, a formal investigation is performed by the HP. The results of such investigations and associated recommendations for future management of exposure will be discussed with the Facility Officer, IWS.

11.1.2 Monitoring Results

The HP will review the radiological conditions within the facility, as measured during routine or special surveys and, where the conditions suggest that either:

- The Radiological Classification of the Area is incorrect
- There is a trend towards increasing radiation or contamination levels in an area
- There is a specific radiological concern

The HP will make recommendations for any rectifications required to the IWS.

11.1.3 Event / Incident Reports

Events that are assessed as incidents or events against the ANSTO Event System (AG2372) **[12.2.1]** will be investigated by the IWS Facility Manager (with additional expertise made available from ANSTO LHSTC, as required). The frequency and magnitude of radiological events will be considered an indicator of the effectiveness of this plan (and its' implementation).

12 REFERENCES

12.1 Standards, Regulations and Plans

Ref No	Doc No	Document Title
12.1.1	ARPANSA Radiation Protection Series RPS No.1	Recommendations for Limiting Exposure to Ionizing Radiation and National Standard for Limiting Occupational Exposure to Ionizing Radiation; 2002
12.1.2	ARPANSA Radiation Protection Series RPS No.2	Safe Transport of Radioactive material
12.1.3	AS 2310	ANSTO Radiation Safety Standard
12.1.4	IWS-O-LA-D1	Interim Waste Store – Effective Control Plan
12.1.5	IWS-O-LA-D2	Interim Waste Store – Safety Management Plan
12.1.6	IWS-O-LA-D4	Interim Waste Store – Waste Management Plan
12.1.7	IWS-O-LA-D5	Interim Waste Store – Security Plan
12.1.8	IWS-O-LA-D6	Interim Waste Store – Emergency Plan
12.1.9	ARPANS Act 1998	Australian Radiation Protection and Nuclear Safety (ARPANS) Act 1998
12.1.10	ARPANS Regulation 1999	Australian Radiation Protection and Nuclear Safety (ARPANS) Regulations 1999
12.1.11	OS-LA-SUP-240B	ARPANSA Regulatory Guide: Plans and Arrangements for Managing Safety, v4.

12.2 Guidelines and Process Documents

Ref No	Doc No	Document Title
12.2.1	AG 2372	Event Response Process (Guide)
12.2.2	AG 2505	ALARA Assessment (Guide)
12.2.3	AG 2506	Risk Assessment and ALARA Cost-benefit Analysis
12.2.4	AG 2471	Safe Management of Licensable Sources (Guide)
12.2.5	AG 2508	Derived Air Concentrations and Annual Limits on Intake of Common Radionuclides (Guide)
12.2.6	AG 2509	Classification of Radiation and Contamination Areas (Guide)
12.2.7	AG 2510	Entry to and Exit from Classified Radiation Areas (Guide)
12.2.8	AG 2511	Clothing to be worn in Classified Radiation Areas (Guide)
12.2.9	AG 2512	Clothing Change Procedures When Entering or Leaving Classified Areas (Guide)

12.2.10	AG 2513	Contamination Clearance Levels (Guide)
12.2.11	AG 2514	Clearance of Radiation Classified or Radioactive Contamination (Guide)
12.2.12	AG 2515	Safe Movement and Transport of Radioactive Material (Guide)
12.2.13	AG 2521	Personal Dosimetry (Guide)

12.3 Supplementary Information

Ref No	Doc No	Document Title
12.3.1	IWS-O-LA-SAR	Safety Analysis Report of the Interim Waste Store
12.3.2	ANSTO/T/TN/2012-03 rev 3	Interim Waste Store Safety Assessment
12.3.3	IWS-O-LA-FD	Description of IWS Structures, Components, Systems and Equipment
12.3.4	IWS-SC-LA-SUM	IWS Licence Application Summary

13 APPENDIX A

Task	Frequency (per year)	# people	time required (hrs)	Distance from source	dose rate (µSv/hr)	total dose per year (µSv)
TN81 Set Up						
Reception						
Visual inspection of package and transport frame	1	1	0.5	2	0.50	0.25
Removing aluminium rings	1	2	1	0	2.13	4.26
Removing shock absorbing covers	1	2	1	0	2.13	4.26
Installing the shielding rings	1	2	1	0	2.13	4.26
Transfer to preparation area	1	1	0.5	2	0.50	0.25
Preparation area						
Fit the shielding plugs on the bottom trunnions	1	1	0.5	1	2.00	1.00
Mount the seconday lid	1	3	1	1	2.00	6.00
Perform a leak test on the secondary lid	1	1	1	2	0.50	0.50
Measure the temperatures on the accessible surfaces	1	2	0.75	2	0.50	0.75
Perform radiological inspections of the package	1	2	0.75	2	0.50	0.75
Transfer to the transfer area	1	1	0.5	2	0.50	0.25

Task	Frequency (per year)	# people	time required (hrs)	Distance from source	dose rate (µSv/hr)	total dose per year (µSv)
Load onto the transfer vehicle	1	3	1	2	0.50	1.50
Transfer to the storage area	1	3	1	2	0.50	1.50
Storage Area						
Unload the transfer vehicle	1	3	1	2	0.50	1.50
Install the anti crash lid	1	2	1	1	2.00	4.00
Connect the monitoring system	1	2	0.5	2	0.50	0.50
Fit the shielding plugs on the top trunnions	1	1	0.5	1	2.00	1.00
					Total	**32.53**
ISO Container Set Up						
Reception						
Visual inspection of package	1	1	0.5	2	1.00	0.50
Transfer to preparation area	1	1	0.5	2	1.00	0.50
Preparation area						
Measure the temperatures on the accessible surfaces	1	2	0.75	2	1.00	1.50
Perform radiological inspections of the package	1	2	0.75	2	1.00	1.50
Transfer to the transfer area	1	1	0.5	2	1.00	0.50
Load onto the transfer vehicle	1	3	1	2	1.00	3.00
Transfer to the storage area	1	3	1	2	1.00	3.00

Task	Frequency (per year)	# people	time required (hrs)	Distance from source	dose rate (µSv/hr)	total dose per year (µSv)
Storage Area						
Unload the transfer vehicle	1	3	1	2	1.00	3.00
					Total	**13.50**
TN81 & ISO Container Routine Maintenance						
Visual Inspection TN 81	2	1	1	1	2.00	4.00
Pressurisation of the helium tank	0.03	2	1	0	2.13	0.11
Visual Inspection ISO	2	1	1	1	5.00	10.00
					Total	**14.11**
IWS Building Maintenance						
Crane Maintenance	4	2	3	1	5.00	120.00
House Keeping	2	1	1	1	5.00	10.00
Fire Panel Maintenance	1	1	4	1	5.00	20.00
Electrical Switchboard Maintenance	1	2	4	1	5.00	40.00
IT Maintenance	1	1	2	1	5.00	10.00
PA Maintenance	2	2	1	1	5.00	20.00
Alarm Testing	1	2	1	1	5.00	10.00
Exit/Emergency Lights testing	2	2	2	1	5.00	40.00
Portable Appliance Testing - Offices	0.2	1	5	1	5.00	5.00
Portable Appliance Testing - Workshop	2	1	4	1	5.00	40.00
Fans A/C Maintenance	2	2	2	1	5.00	40.00

Task	Frequency (per year)	# people	time required (hrs)	Distance from source	dose rate (µSv/hr)	total dose per year (µSv)
					Total	368.33
Total Annual Collective Dose						428