Australian Government | Ansto

Safe Work Method and Environmental Statement

AF-2315

Refer to AG-2397 Explanatory Notes to Safe Work Method & Environmental Statement (SWMES) before proceeding.

SWMES file No.:		**WO No:**		**Jobsite specific induction required?**	☑ Yes ☐ No
Location/ Building/ Area:	NCSS Oliphant Auditorium, Exhibition Space, Seminar Room and Education Laboratory. Australian Synchrotron Technical Floor.			**SAC Reference for Project or Work Area:**	☐ Yes ☐ No SAC Reference No:
Planned Start Date:	Ongoing			**Potential ionising radiation exposure:**	☑ Yes ☐ No
Activity Description:	ANSTO visitor tours and lab activities for school, community, general public and VIP groups.			**Radiation survey performed:**	☐ Yes ☑ No ☐ N/A
Responsible Officer:	Rod Dowler			**Radiation dose review level specified:**	☐ Yes ☑ No ☐ N/A
ANSTO Personnel:	Hock Ch'ng, Jasmine Davey, Rod Dowler			**Recommended dosimetry:**	☐ EPD ☐ TLD ☐ Extremity
Company Performing work:	PrimeSCI			**Radiation Protection Advisor:**	Hock Ch'ng
Contractors Personnel:	Megan Hough, Lydia Low, Sandra Marwick, Doris Seegets-Villiers, Luther Vasic, Zoran Vasic			**Work Health & Safety Advisor:**	Hock Ch'ng

Licences/ Qualification/ Tickets/ Training (National/ state legislated operational licence)**:**	**Chemicals/ Substances/ Materials** (SDS, storage, spill control, transport)**:**
Senior First Aid Qualifications Working with Children Check (VIC Working with Children Act 2005 & Working with Children Regulations 2016)	N/A
Permits required (SWP, isolation, excavation/penetration, confined space etc)**:**	**Plant/ Equipment** (Service certificates, registers, maintenance logs, pre-operational checks)**:**
N/A	Radiation monitors – within calibration. Mobile phones. Laboratory equipment: • High-voltage power supplies • Thomson tubes • Helmholtz coils

	• Microwave transmitters • Gas discharge tubes • Spectrophotometers • Lasers (532nm and 635nm) • Detector screens • Photoelectric effect kits • Desktop computers
Legacy Issues (Asbestos, Beryllium, Cadmium, Uranium, Electrical)	**References** (ANSTO standards/ practices, legislation, codes, standards)**:**
Hazards Register	ANSTO OHSE Management System Documents Safety and security arrangements at ANSTO (guide) AG 2382 Information for visitors (guide) AG 2384 Working alone (guide) AG 2523 First aid and emergency medical care (guide) AG 2487 Personal dosimetry (guide) AG 2521
Planning (notifying all affected staff, involving a planning committee, risk assessment, rescue, emergency, subject matter experts, health & safety, radiation protection, required isolations)**:**	**Consultation** (Toolbox talks, review by subject matter experts, health & safety, radiation protection etc)
Process reviewed with Discovery Centre Team Leader, Australian Synchrotron Head of Safety and PrimeSCI Senior Education Officers.	
Notes:	
*In case of emergency, contact the Control Room on extension **4123** (or **8540 4123** on mobile), or the Head of Safety on extension **4170** (or **8540 4170** on mobile).* *For security assistance, contact Security on extension **4120** (or **8540 4120** on mobile).*	

Identification of Safety Hazards If the process identified in this SWMES has any potential safety hazards listed below, please check the appropriate box and complete the appropriate risk assessment in the space below if the hazard is not previously addressed. Please note that this is not a comprehensive list and ALL hazards must be noted on your SWMES.

☐ Chemical Hazards	☐ Fall From Height	☐ Noise & Vibration
☐ Confined Spaces	☐ Falling Objects	☑ Non Ionising Radiation
☐ Consultation	☐ Fissile Materials/Criticality	☐ Plant & Equipment
☐ Construction Work	☐ Hazardous Manual Tasks	☑ Pressure/ Vacuum Equipment
☐ Demolition Hazards	☐ Heat Stress or Cold Environments	☐ Radiation Contamination
☐ Diving	☐ Isolations	☐ Radiation Dose
☑ Electrical Hazards	☐ Lifting Loads	☐ Vehicles or Mobile Plant
☐ Excavations & Penetrations	☐ Needlestick	☐ Working Alone or Out of Normal Hours

Identification of Environmental Hazards (If the process identified in this SWMES has any potential environmental hazards listed below, please check the appropriate box and complete the appropriate risk assessment in the space below if the hazard is not previously addressed.

Where potential environmental hazards are identified, the responsible officer in consultation with the relevant Local Environmental Coordinator (LEC) shall submit an Environmental Aspects Identification Form AF 2092 to the ANSTO EMS Manager/Coordinator for entry to the ANSTO Environmental Aspects Register. If the operations are for proposed for a definite time-scale, this must be included within the Environmental Aspect Identification submission.

☐ Pollutant entering drains	☐ Potential for groundwater contamination	☐ Abnormal excessive noise or vibration
☐ Dust generation - crushing, grinding	☐ Airborne emissions - radiological or non-	☐ Cryogenics - particularly helium and specialties
☐ Use of ozone depleting substances/synthetic GHG	☐ Use of chemicals with hazard code H400 - H420	☐ Abnormal electricity use
☐ Excessive lighting requirement at night	☐ Abnormal potable water use	☑ Excessive paper/packaging use
☐ Risk of sediment displacement	☐ Risk to flora/fauna	☐ Significant alteration to stormwater flows

Activity Detailed steps of the job/ task being undertaken	**Hazard** What hazards are present from work and location at each step of the process?	**Risk Rating** Use AG-2395	**Controls** Implemented safety controls to reduce the risk associated with each hazard. Use AG-2407	**Risk Rating** With control	**Responsible** Person(s) responsible for implementing control measure(s)
Preparation					
Tour group representative advised of site security and safety requirements.	Visitors not prepared for site safety and security requirements: ☐ Enclosed footwear ☐ Loose clothing ☐ Identification and prohibited items ☐ Special permission for visitors under the age of 16 years	Min x L **LOW**	Information available on website. Information pack delivered (electronically or mailed) to tour group representative. Requirements verbally advised at time of booking. Group tours to provide name listing of participants. Approval sought from Andrew Peele (Australian Synchrotron Director) for any visitors under the age of 16 years.	Min x U **VERY LOW**	Tour booking staff (PrimeSCI) Events Officer, Australian Synchrotron
	Visitors with implanted medical devices exposed to high magnetic fields.	Sev x L **HIGH**	Information available on website. Information pack delivered (electronically or mailed) to tour group representative. Requirements verbally advised at time of booking. Requirements checked with	Sev x HU **MEDIUM**	Tour booking staff (PrimeSCI) Events Officer, Australian Synchrotron Australian Synchrotron Safety Team

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			visitors before entering Australian Synchrotron technical floor.		Education Officers
Small tour groups booked	EO's working alone.	Mod x VL **MEDIUM**	Notification given to Security. EO to use mobile phone to maintain communication.	Min x HU **VERY LOW**	Education Officers
Auditorium and/or seminar room prepared for size of group. Chairs arranged.	Manual handling	Mod x VL **MEDIUM**	Keep seminar room set up to minimise necessity of moving furniture. Use a trolley where available. Allocate two people to task. Remind all participants of current manual handling guidelines.	Mod x VU **LOW**	Education Officers
Laboratory equipment set up and tested.	Electrical hazard from use of computers and laboratory equipment, particularly high-voltage power supplies.	Sev x U **HIGH**	All equipment and wiring to be regularly certified. Education Officers to visually inspect plugs and cables before use. Minimum two person task EO to ensure power off before any setup or rewiring of apparatus. Use one hand only when connecting wires. Appropriate fire extinguisher to be in place in the lab. Location of mains switch known to Education Officers so that power can be turned off rapidly in an emergency. In case of electric shock, power to be switched off before touching the injured person.	Sev x VU **MEDIUM**	Education Officers
	Laceration hazard from handling	Maj x U	Gas discharge tubes to remain	Maj x HU	Education Officers

Activity Detailed steps of the job/ task being undertaken	Hazard What hazards are present from work and location at each step of the process?	Risk Rating Use AG-2395	Controls Implemented safety controls to reduce the risk associated with each hazard. Use AG-2407	Risk Rating With control	Responsible Person(s) responsible for implementing control measure(s)
	and operation of low-pressure glass Thomson tubes and gas discharge tubes	MEDIUM	on laboratory bench at all times. Safety glasses to be worn in the lab at all times.	LOW	
	Radiation exposure to low-energy UV light and x-rays while gas discharge tubes are operating.	Neg x VL LOW	Exposure minimised by switching off discharge tubes when not in use.	Neg x U VERY LOW	Education Officers
	Inhalation of hydrogen/helium gas in the event of a broken discharge tube	Min x U VERY LOW	Gas discharge tubes to remain on laboratory bench at all times. Exit laboratory immediately in the event of a broken discharge tube.	Min x HU VERY LOW	Education Officers
	Optical hazard from use of class 2 and 3 (532nm and 635nm) lasers	Sev x U HIGH	EOs briefed on laser safety. Appropriate eye shielding available. Screens used to shield laser reflections	Sev x HU MEDIUM	Education Officers
	Physical injury from moving apparatus, particularly long optical rails.	Min x U VERY LOW	Optical rails stored at front of laboratory EOs to be mindful of surroundings when moving optical rails. Two person task.	Min x HU VERY LOW	Education Officers
Implementation					
Visitors arrive and park in carpark in front of NCSS, overflow carpark across the road from NCSS, or in bus bay between Synchrotron and NCSS.	Vehicles and pedestrians using the same area.	Maj x U MEDIUM	VIC road rules apply. Speed limited to 20km/h. Marked pedestrian crossings available between overflow carpark, Synchrotron building and NCSS building.	Mod x U LOW	Facilities Maintenance Building Managers
Visitors walk to NCSS building	Vehicles and pedestrians using the same area. Vehicle incident.	Maj x U MEDIUM	VIC road rules apply. Speed limited to 20km/h. Marked pedestrian crossings	Mod x U LOW	Facilities Maintenance Building Managers

Activity Detailed steps of the job/ task being undertaken	**Hazard** What hazards are present from work and location at each step of the process?	**Risk Rating** Use AG-2395	**Controls** Implemented safety controls to reduce the risk associated with each hazard. Use AG-2407	**Risk Rating** With control	**Responsible** Person(s) responsible for implementing control measure(s)
			available between overflow carpark, Synchrotron building and NCSS building.		
	Slips, trips and falls	Mod x L **MEDIUM**	Roads and pathways kept in good condition. Regular housekeeping inspections of building, fittings and equipment. All walkways kept clear and in good condition.	Mod x U **LOW**	Facilities Maintenance Building Manager Education Officers
Visitors enter NCSS and walk through exhibition space	Visitors inadvertently copying incorrect actions of EOs. (particularly children)	Mod x VL **MEDIUM**	Education Officers to always be mindful that they are setting an example for visitors, especially children. Every activity undertaken, whether crossing a road, operating a piece of equipment or entering a building or area, is closely observed by visitors. What EO's do, how they act, what they wear and say all sends a clear message to all visitors that this behaviour is acceptable. EO's must therefore ensure they are setting a good example. EO's must always be appropriately dressed, with fully enclosed proper footwear, always cross the road using marked pedestrian crossings where they are available, always ensure the areas entered and equipment demonstrated is safe for others to touch.	Mod x VU **LOW**	Education Officers

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			EO's must provide clear and concise warnings and explanations to all tour participants.		
Education Officer behaviour during tour.	Voice strain	Min x L **LOW**	Use of microphone when presenting in auditorium to a large audience.	Neg x VU **VERY LOW**	Education Officers.
Information session given in NSCC auditorium or seminar room	Emergency access and egress	Sev x L **HIGH**	Exits to be kept clear at all times. Exits marked with emergency lighting. Automatic fire detection equipment in place across the entire facility. Trained Building Wardens. Annual evacuation drills and inspections. Regular housekeeping inspections.	Sev x VU **MEDIUM**	Designated Building Wardens Education Officers
	Security unaware of tour group coming to Synchrotron technical floor.	Neg x VU **VERY LOW**	Education Officers request access and provide paperwork ahead of the tour. Participants to be accompanied by EO at all times. Loose clothing and enclosed shoes required (boots can be provided to visitors without appropriate footwear) EO has name list of all tour participants with tour paperwork.	Neg x HU **VERY LOW**	Education Officers Security
Transport participants between NCSS building and Synchrotron.	Pedestrian/vehicle incident	Maj x U **MEDIUM**	EO to lead participants using footpaths and pedestrian	Maj x HU **LOW**	Education Officers

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			crossings.		
	Slips, trips and falls	Mod x L **MEDIUM**	Use provided walkways and pedestrian crossings. Roads and pathways kept in good condition. EO to caution visitors about wet and possibly slippery walkways in wet-weather conditions. Avoid stairs where possible. Slip resistant material on steps. Use handrails where available. EO to warn participants about stairs. Elderly or mobility impaired persons may choose to avoid staircases. Regular inspections.	Mod x U **LOW**	Education Officers Facilities Maintenance
	Weather/sun exposure	Min x L **LOW**	Minimise time spent in exposed locations. EO to choose areas where protection from sun and weather is provided by awnings or inside. Participants advised to bring own sunscreen/hat with initial info if significant time outdoors is required.	Neg x VU **VERY LOW**	Education Officers
	Trips and Falls	Mod x L **MEDIUM**	Avoid stairs where possible. Slip resistant material on steps. Use handrails where available. ANSTO EO to warn participants about stairs. Elderly or mobility impaired persons may choose to avoid staircases.	Mod x U **LOW**	Education Officers
	Operational hazards with active beamlines (ionising radiation)	Maj x U **MEDIUM**	Restricted access to beamline areas during operations. Signage present for restricted	Ins x R **VERY LOW**	Education Officers Facilities Maintenance

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			areas.		
Access to Synchrotron Technical Floor	Magnetic equipment may interfere with pacemakers or other implanted medical devices.	Sev x L **HIGH**	Signage is present in hazardous areas EO to advise of hazard and identify people that may be at risk prior to entering the area.	Sev x VU **MEDIUM**	Education Officers Facilities Maintenance
	Emergency access and egress	Sev x L **HIGH**	Exits to be kept clear at all times. Exits marked with emergency lighting. Automatic fire detection equipment in place across the entire facility. Trained Building Wardens. Annual evacuation drills and inspections. Regular housekeeping inspections.	Sev x VU **MEDIUM**	Designated Building Wardens Education Officers
	Slips, trips and falls	Mod x L **MEDIUM**	Use provided walkways. EO to caution visitors about trip hazards when crossing onto different sections of flooring. Slip resistant material on steps. Use handrails where available. EO to warn participants about stairs. Elderly or mobility impaired persons may choose to avoid staircases. Regular inspections.	Mod x U **LOW**	Education Officers Facilities Maintenance

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	Collision/trip hazards from dark laboratory room.	Mod x VL **HIGH**	Lights only switched off when necessary for activities. Students to remain at laboratory benches while lights are off. Student bags to be stored away from walkways. Education officers to point out trip hazards at start of lab session.	Mod x U **LOW**	Education Officers
Laboratory Activities: “Synchrotron and its Applications”	Electrical hazard from use of computers and laboratory equipment, particularly high-voltage power supplies.	Sev x U **HIGH**	All equipment and wiring to be regularly certified. Education Officers to visually inspect plugs and cables before use. EO to ensure power off before any setup or rewiring of apparatus. Students instructed to use one hand only when connecting wires. Appropriate fire extinguisher to be in place in the lab. Location of mains switch known to Education Officers so that power can be turned off rapidly in an emergency. In case of electric shock, power to be switched off before touching the injured person.	Sev x VU **MEDIUM**	Education Officers
	Laceration hazard from handling and operation of low-pressure glass Thomson tubes and gas discharge tubes	Maj x U **MEDIUM**	Education officers to move Thomson tubes from storage cupboard to laboratory bench and back again. Gas discharge tubes to remain	Maj x HU **LOW**	Education Officers

Activity Detailed steps of the job/ task being undertaken	Hazard What hazards are present from work and location at each step of the process?	Risk Rating Use AG-2395	Controls Implemented safety controls to reduce the risk associated with each hazard. Use AG-2407	Risk Rating With control	Responsible Person(s) responsible for implementing control measure(s)
			on laboratory bench at all times. Students instructed not to lift apparatus off the bench. Students instructed not to tighten Helmholtz coils around glass Thomson tubes. Safety glasses to be worn in the lab at all times.		
	Radiation exposure to low-energy UV light and x-rays while gas discharge tubes are operating.	Neg x VL **LOW**	Exposure minimised by switching off discharge tubes when not in use.	Neg x U **VERY LOW**	Education Officers
	Inhalation of hydrogen/helium gas in the event of a broken discharge tube	Min x U **VERY LOW**	Gas discharge tubes to remain on laboratory bench at all times. Students instructed not to lift apparatus off the bench. Students directed to exit laboratory in the event of a broken discharge tube.	Min x HU **VERY LOW**	Education Officers
	Emergency access and egress	Sev x L **HIGH**	Exits to be kept clear at all times. Exits marked with emergency lighting. Automatic fire detection equipment in place across the entire facility. Trained Building Wardens. Annual evacuation drills and inspections. Regular housekeeping inspections.	Sev x VU **MEDIUM**	Designated Building Wardens Education Officers
	Collision/trip hazards from dark laboratory room.	Mod x VL **HIGH**	Lights only switched off when necessary for activities. Students to remain at	Mod x U **LOW**	Education Officers

Activity Detailed steps of the job/ task being undertaken	Hazard What hazards are present from work and location at each step of the process?	Risk Rating Use AG-2395	Controls Implemented safety controls to reduce the risk associated with each hazard. Use AG-2407	Risk Rating With control	Responsible Person(s) responsible for implementing control measure(s)
			laboratory benches while lights are off. Student bags to be stored away from walkways. Education officers to point out trip hazards at start of lab session.		
Laboratory Activities: “Interactions of Light and Matter”	Optical hazard from use of class 2 and 3 (532nm and 635nm) lasers	Sev x U **HIGH**	EOs to brief students on laser safety. Appropriate eye shielding to be made available to students. EOs to ensure lasers point towards walls of laboratory and not towards other benches. Screens used to shield laser reflections Students instructed not to alter direction of laser beam.	Sev x HU **MEDIUM**	Education Officers
	Physical injury from moving apparatus, particularly long optical rails.	Min x U **VERY LOW**	Education Officers to set up lab space beforehand if possible. Education Officers to supervise all moving of equipment.	Min x HU **VERY LOW**	Education Officers
	Electrical hazard from use of computers and laboratory equipment.	Sev x VU **MEDIUM**	All equipment and wiring to be regularly certified. Education Officers to visually inspect plugs and cables before use. Appropriate fire extinguisher (carbon dioxide) to be in place in the lab. Location of mains switch known to Education Officers so that power can be turned off rapidly in an emergency. In case of electric shock, power to be switched off before	Sev x EU **LOW**	Education Officers

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			touching the injured person.		
	Laceration hazard from handling and operation of low-pressure gas discharge tubes	Maj x U **MEDIUM**	Gas discharge tubes to remain on laboratory bench at all times. Students instructed not to lift apparatus off the bench. Safety glasses to be worn in the lab at all times.	Maj x HU **LOW**	Education Officers
	Radiation exposure to low-energy UV light and x-rays while gas discharge tubes are operating.	Neg x VL **LOW**	Exposure minimised by switching off discharge tubes when not in use.	Neg x U **VERY LOW**	Education Officers
	Inhalation of hydrogen/helium gas in the event of a broken discharge tube	Min x U **VERY LOW**	Gas discharge tubes to remain on laboratory bench at all times. Students instructed not to lift apparatus off the bench. Students directed to exit laboratory in the event of a broken discharge tube.	Min x HU **VERY LOW**	Education Officers
	Emergency access and egress	Sev x L **HIGH**	Exits to be kept clear at all times. Exits marked with emergency lighting. Automatic fire detection equipment in place across the entire facility. Trained Building Wardens. Annual evacuation drills and inspections. Regular housekeeping inspections.	Sev x VU **MEDIUM**	Designated Building Wardens Education Officers
Conclusion					
Return to NCSS	Vehicles and pedestrians using the same area.	Maj x U **MEDIUM**	VIC road rules apply. Speed limited to 20km/h.	Mod x U **LOW**	Facilities Maintenance Building Managers

Activity Detailed steps of the job/ task being undertaken	**Hazard** What hazards are present from work and location at each step of the process?	**Risk Rating** Use AG-2395	**Controls** Implemented safety controls to reduce the risk associated with each hazard. Use AG-2407	**Risk Rating** With control	**Responsible** Person(s) responsible for implementing control measure(s)
			Marked pedestrian crossings available between overflow carpark, Synchrotron building and NCSS building.		
	Slips, trips and falls	Mod x L **MEDIUM**	Roads and pathways kept in good condition. Regular inspections. All walkways kept clear and in good condition.	Mod x U **LOW**	Facilities Maintenance Building Managers
Any hazards noted throughout tour	Ongoing hazards to other users of area.	Mod x L **HIGH**	Report any hazards identified to relevant Area Supervisor, Building Manager or via ANSTO Event Reporting System on INFRA as soon as possible.	Mod x HU **VERY LOW**	Education Officer
Emergency / Rescue Scenarios					
Respond to site emergency	Evacuation and egress required	Sev x L **HIGH**	EO to follow instructions advised by site PA system in case of an emergency. EO's to be aware of Muster Point locations of all visited areas (local induction may be required) EO carries name listing of all tour participants allowing head count of persons present at evacuation point. All EO's to carry mobile phone, with Site Control number stored in phone	S x VU **MEDIUM**	Education Officers Site Control Centre Building Wardens
Respond to medical emergency	First aid required	Sev x L **HIGH**	All EO's to have First Aid training. All EO's to carry mobile phone, with Site Control number stored	S x VU **MEDIUM**	Education Officers Site Control Centre Site Nurse

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			in phone. EO's carry a hard copy of the ANSTO Event Report Form to record details of any incident.		

The SWMES is to be signed by all participants in the work. Signing acknowledges that the work methods proposed will be followed.

⚠ While locked, all data prior to this point will be inaccessible. Entries into the following sections require that the form be locked.

The prepared SWMES has been approved by the Responsible Officer who will ensure that it is signed by all participants involved in the work.

Name	Position	Signature	Date Locked
Rod Dowler	Discovery Centre Team Leader /Responsible Officer	roddowler	28/07/2017

Prepared by

Name	Position	Signature	Date

Reviewed by

Name	Position	Signature	Date

For guidance on risk scoring and risk rating refer to AG-2395 Risk Analysis Matrix.

Lock Form for Signatures

Locking the form will enable the electronic signatures and will prevent modification of the form except for the “Prepared by” and “Reviewed by” sections. The document should be in its final format with Tracked Changes and Comments removed

Unlock Form for Revision

Unlocking the form for revision will allow all sections to be edited but will result in the erasure of all entries and signatures in the “Approval” and “Participant” sections. ***NOTE:*** *Before unlocking the form, ensure that a copy of the previous final version (including signatures) has been saved as a record for future reference.*

Risk Analysis Matrix (AG-2395)

Revision 10. Effective Date 24/05/2016.

Medium	High	High	Very High	Very High	Very High	Very High	6	Catastrophic	Impact
Low	Medium	Medium	High	High	Very High	Very High	5	Severe	
Low	Low	Medium	Medium	High	High	Very High	4	Major	
Very Low	Very Low	Low	Low	Medium	Medium	High	3	Moderate	
Very Low	Very Low	Very Low	Very Low	Low	Low	Medium	2	Minor	
Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	1	Negligible	
A	B	C	D	E	F	G			
Extremely Unlikely	Highly Unlikely	Very Unlikely	Unlikely	Likely	Very Likely	Almost Certain			
Likelihood									

Likelihood

Likelihood Levels	Likelihood Description	Probability Intervals *(for general risk assessments)*	Nominal frequency *(for specific risk assessments)*	Range *(for specific risk assessments)*	Likelihood Explanation
G	**Almost Certain**	*90% - 100%*	3/year	> 1 / year (> 1 pa)	# *The event is expected to occur in most circumstances* / happens quite frequently (significant chance) # Historical records of greater than one occurrence per year at ANSTO in a similar situation # Well publicised occurrences in other similar facilities # Mathematically, the expected (or mean) frequency f is such that $f \geq 1\ y^{-1}$ (i.e. happens more often than once each year)
F	**Very Likely**	*75% - 90%*	1/3 years	1/10 years to 1 / year (0.1 pa to 1 pa)	# *The event will probably occur in most circumstances (very good chance)* / central estimate is once every 3 years # Has occurred a couple of times at ANSTO # Mathematically, the expected (or mean) frequency f is such that $1 > f \geq 0.1\ y^{-1}$ (i.e. happens less often than once each year, but more often than once each ten years).
E	**Likely**	*55% - 75%*	1/30 years	1/100 years to 1/10 years (0.01 pa to 0.1 pa)	# *The event could occur at some time (realistic chance)* / central estimate is once every 30 years # May have occurred at ANSTO # Known in similar facilities and industries # Mathematically, the expected (or mean) frequency f is such that $0.1 > f \geq 0.01\ y^{-1}$ (i.e. happens less often than once each ten years, but more than once each hundred years)
D	**Unlikely**	*35% - 55%*	1/300 years	1/1,000 years to 1/100 years (10^{-3} pa to 0.01 pa)	# *The event could occur (reasonable chance)* # Mathematically, the expected (or mean) frequency f is such that $0.01 > f \geq 0.001\ y^{-1}$ (i.e. happens less often than once each hundred years, but more than once each thousand years)
C	**Very Unlikely**	*15% - 35%*	1/3,000 years	1/10,000 years to 1/1,000 years (10^{-4} pa to 10^{-3} pa)	# *The event could occur in certain circumstances (moderate chance)* / central estimate is once every thousand years # Mathematically, the expected (or mean) frequency f is such that $0.001 > f \geq 10^{-4}\ y^{-1}$ (i.e. happens less often than once each 1000 years, but more than once each 10,000 years)
B	**Highly Unlikely**	*5% - 15%*	1/30,000 years	1/100,000 years to 1/10,000 years (10^{-5} pa to 10^{-4} pa)	# *The event could occur in exceptional circumstances (remote chance)* # Mathematically, the expected (or mean) frequency f is such that $10^{-4} > f \geq 10^{-5}\ y^{-1}$ (i.e. happens less often than once each 10,000 years, but more than once each 100,000 years)
A	**Extremely Unlikely**	*0% - 5%*	1/300,000 years	1/million years to 1/100,000 years (10^{-6} pa to 10^{-5} pa)	# *The event could occur in very exceptional circumstances only (very remote chance)* # Mathematically, the expected (or mean) frequency f is such that $10^{-5} > f \geq 10^{-6}\ y^{-1}$ (i.e. happens less often than once each 100,000 years, but more than once each 1,000,000 years)

Consequence

Impact Level	Impact Description	Financial	Project Schedule	Operations	Injury or Disease	Patient Safety	Radiation (whole body - worker dose)	Radiation (whole body - public offsite dose)	Environment (Refer to AG-5342 Environmental sub-category risk consequence description for detailed guidance)	Security	Legal / Compliance	Information Technology Services	Reputation	Government Relations	Human Resources
6	Catastrophic	>$15m	>18 months	Total loss of production / operations untenable in near to mid term	Multiple fatalities or serious permanent injuries	Death of a patient	>1000mSv or severe dose to multiple people	>50mSv or severe dose to multiple people	Very long-term damage (>10 yrs.) or a nationally significant impact or release	Cessation of all operations / multiple fatalities / major criminal or terrorist event	Cancellation, permanent suspension of site license / repeal of ANSTO Act / Board and/or CEO removal / senior officers barred from office under CAC Act	Complete loss of all services for greater than 5 days	Prolonged international and national condemnation	Loss of government support for agency operations as a whole	Agency-wide strike action
5	Severe	$5m - $15m	12 - 18 months	Critical operations seriously affected > 6 months	Death, permanent disability or permanent ill health	General customer health problem that could attract public interest	100 mSv - 1000mSv	10 - 50 mSv	Long-term damage (3-10 yrs.) or a regionally significant impact or release	Impact on all operations (>24 hours) / shutdown / single fatality / crime or terrorism attempt	Prolonged regulatory suspension of operating license/s / major restriction of core activities / major compensation payable / prosecution (civil/criminal) or other serious administrative action for legislative breaches / large fines	Complete loss of all services for less than 5 days	International and national criticism	Extraordinary government enquiries called or examination into agency operations as a whole	Strikes at several facilities
4	Major	$2m - $5m	8 - 12 months	Critical operations seriously affected 1-6 months	Long term illness or serious injury, but recovery probable	Customer/ community health problem causing significant backlog of patients or non-treatment / Possible adverse drug reaction due to a product quality issue	20 - 100 mSv / >500 mSv (skin extremity dose)	1 - 10 mSv	Medium-term damage (1-3 yrs.) or an impact or release confined to Buffer Zone	Impact on some operations (>24 hours) / regulatory impact / injuries / negative media attention	Medium compensation / work suspension orders / regulatory directions	Loss of critical service(s) for more than 1 day	Very negative national criticism	Loss of government support for specific agency operations or projects	Strike at one facility
3	Moderate	$500k - $2m	4 - 8 months	Limited damage to equipment and/or facility / loss of production <1 month / Report to Regulator	Medical attention / several lost time days	Customer/ community health problem causing significant delay of treatment / Possible product recall situation	1 - 20 mSv / 40 - 500 mSv (skin extremity dose)	0.05 - 1 mSv	Short-term damage (<1 yr.) or an impact or release confined to the ANSTO-site	Impact on some operations (>24 hours) / regulatory impact	Limited compensation / minor fines / major administrative complaint	Loss of critical service for less than 1 day	Adverse national public attention	Extraordinary government enquiries called or examination of specific agency operations or projects	Organised stay aways
2	Minor	$20k - $500k	2 - 4 months	Insignificant damage to equipment / short interruption to some operations (hours)	First aid	Customer/ community health problem causing delay/rebooking of some treatments	0.1 - 1 mSv / 4 - 40 mSv (skin extremity dose)	0.02 - 0.05 mSv (20 - 300 µSv)	Anomalous impact or release confined to work-area with negligible ongoing effects	Impact on some operations (<24 hours)	Civil litigation / arbitration / minor administrative complaint / regulatory compliance notices	Loss of non-critical service for more than 1 day / critical service degradation more than 1 hour	Local attention from media / NGO / public	Minister called on to publicly support agency	Disputes / Grievances
1	Negligible	<$20k	<1 month	Superficial damage to equipment / no loss of production	Minimal effects / very small injury not requiring treatment	No delay in treatment	< 0.1 mSv / <4 mSv (skin extremity dose)	<0.02 mSv (< 20 µSv)	Within routine operational conditions, but may be an environmental aspect with potential for improvement	No regulatory or operational impact	Reportable minor incident / minor breach of legal duty/obligation	Loss of non-critical service for less than 1 day / critical service degradation less than 1 hour	Public concern restricted to local complaints	Additional oversight of operations required by Department	Complaints / dissatisfaction amongst staff

This table should not be construed to mean that different consequences at the same level are equivalent. For example, it is not meaningful or desirable to attempt to equate serious injury or death to financial costs.