SWP No: **Category:**	**Activity / Task**: Use of ionising radiation in non-clinical x-ray facilities for teaching purposes.

All users MUST review this SWP prior to use to:

- ensure safe practice for operator & equipment; and
- prevent injury to all workers

1) Personal Protective Equipment

- Personal monitoring device (PMD).
- Lead shield barrier.

Safety Warnings

Radiation

Trips

2) Hazard Summary (Residual Risk)

Risk Level	Potential Hazards	Control Measures
Very High		
High		
Medium		
Low	Exposure to ionising radiation	Monitoring: all staff and students in MRS must wear PMD. All staff and students complete a facility induction. Distance: No staff or student to remain in the main area of the xray room during radiation exposure, including simulated exposures. Shielding: All staff and students must remain behind console shielded area whilst ionising radiation exposure, including simulated exposure is undertaken. Shielding must be certified and appropriate for the facility. A maximum of three students (Wagga), 7 students (Port) plus one staff member to remain behind the shielded console. All other staff and students not behind the shielded console area must leave the room during radiation exposure, including simulated exposures. The xray room door must remain closed whilst the exposure is undertaken, including any simulated exposures. Ionising radiation equipment, including key interlocks are serviced and maintained annually by an appropriately licenced and registered contractor. The key interlock for the x-ray unit must be in the position to isolate radiation exposure for simulated activities. The key interlock for the x-ray unit is a key trap system only allowing the key to be removed when radiation exposure is isolated.

			Labelling for the key interlock controlling radiation exposure is unambiguous with etched plate, tamper proof labelling. Keys for the interlock controlling radiation exposure must be kept secure in a locked safe when not in use. DAP meters are installed on all output tubes of ionising radiation equipment not used in clinical settings.
	Low	Slips, trips, and falls	Avoid cables and wires running along the floor. Run cables and wires along the wall if necessary. Wear appropriate footwear that is non-slip as per the Faculty PPE Procedure and facility induction.
	Low	Use of electrical equipment	Facilities and equipment comply with appropriate Australian Standards and Regulations. Equipment is serviced and maintained in good working condition. Faulty equipment is reported, isolated, and not used until faults are rectified and it is safe to do so.

Please include all steps involved in the performance of the task.

NOTE: All PPE required must be listed and the minimum PPE for each chemical must be listed as per the relevant SDS

Task/Activity Step	**Possible Hazards**	**Safety Controls**
Before you start: These procedures must be followed for both real and simulated activities using fixed x-ray equipment in dedicated x-ray rooms. All teaching and research activities must be approved by the Radiation Safety Committee prior to work commencing. An appropriately qualified and AHPRA registered medical radiation science practitioner must approve and directly supervise activities involving ionising radiation exposure, including simulated radiation exposure. All staff, students and other workers (e.g. contractors) must complete a facility induction prior to work commencing. All contractors working directly on ionising radiation equipment, must have approval from the Radiation Safety Committee and Facility Manager through the completion of a clearance form prior to work commencing.		
1) Ensure the facility is secure and main entrance to the xray lab is only accessible via card entry.	Staff, students and workers could enter the lab without knowledge of safety and legislative requirements.	Main entry to the lab is accessible via key card entry only. Only authorised staff who have completed facility induction have card access to the facility. Students are supervised by an approved and appropriately radiation licenced person. Clear warning signs on the front door.
2) Health monitoring: Ensure all staff and students are wear a Personal Monitoring Device (PMD).	Staff or students could be exposed to ionising radiation.	PMD directly in front of door entry. Procedures are in place within radiation monitoring radmon@csu.edu.au for

		issuing PMDs, dosage readings, replacement of lost or damaged PMDs. Supervisor to check compliance prior to activities commencing.
3) Ensure key interlock controlling radiation exposure is in the isolated position and switch x-ray unit on at the wall.  Ensure key interlock is in isolated position: - between exposures, e.g. repositioning. - when console is not attended. - at the end of the activities.	Radiation exposure due to misuse or interlock failure.	Ionising radiation equipment, including key interlocks are serviced and maintained annually by an appropriately licenced and registered contractor. Labelling for the key interlock controlling radiation exposure is unambiguous with etched plate, tamper proof labelling. The key interlock for the x-ray unit must be in the position to isolate radiation exposure when not taking exposures and for simulated exposures. The key interlock for the x-ray unit is a key trap system only allowing the key to be removed with radiation exposure is isolated. Keys for the interlocks are stored securely in a safe when not in use.
4) Complete positioning of phantoms and equipment. Ensure: - All occupants in the room are behind the shielded console area. A maximum of three students (Wagga), 7 students (Port) plus one staff member to remain behind the shielded console. - All other staff and students not behind the shielded console area must leave the room during radiation exposure, including simulated exposures. - Doors to the x-ray rooms are closed. Supervisor will check everyone is behind the shield, doors are closed and key interlock is in the isolated position.	Radiation exposure due to failed shielding or Failed interlocks causing radiation exposure.	Ensure maximum number of people allowed behind console area during exposure is not exceeded. Shielding is certified and appropriate for use in x-ray rooms. Signage near console stating maximum number of people is displayed in console shielded area. Wall and floor marking to indicate all participants of safe working area.
5) Operate equipment as per manufacturer's instructions: Set up the equipment for a radiation exposure as per manufacturer's instructions. If the exposure is not simulated, switch the key interlock for radiation exposure on to the 'enabled' position.	Incorrect use of equipment: damage to equipment or accidental radiation exposure.	Only AHPRA registered medical radiation practitioners may supervise and instruct students undertaking operating equipment. All supervisors operating equipment will follow this SWP.

If the exposure is simulated, keep the key interlock for radiation exposure in the 'isolated' position. Take an exposure. Ensure the key interlock for radiation exposure is in the 'isolated' position before leaving the shielded console area.		Equipment manuals are located in the facility. Equipment, including interlocks are serviced and maintained. All faults and incidents are reported to the facility manager and Radiation Safety Committee.

When activities using x-ray equipment have completed:

- Ensure the room is vacant and no one remains unsupervised.
- Equipment is switched off at the wall.
- The key interlock for radiation exposure is in the isolated position. Keys are removed from the interlock and stored securely in the safe.
- Students remove their PMD and attach to the board at the facility entrance.

Ensure facility is secure and doors locked when leaving.

3) In the event of Incident or Emergency:

In the event of medical emergency or facility evacuation:

Follow emergency procedures as per facility induction.

In the event of equipment malfunction

Turn off equipment using the console and ensure the key for radiation exposure is in the isolated position.

Action and notification as required by the Radiation Management Plan.

Incident is reported through Protect and notify facility manager.

- Responsibilities:

The Facility Manager is responsible for:

- Ensuring all operators are inducted and trained prior to use.
- Ensuring this SWP is reviewed and kept up to date.
- Maintaining training records.
- Ensuring maintenance and repair of equipment.
- Ensuring appropriate PPE is available for use.

The Supervisors are responsible for:

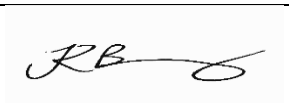
- Completing a facility induction by the Facility Manager or delegate
- Maintaining registration and licence conditions to operate equipment.
- Providing facility induction to students prior to classes commencing.
- Ensuring activities have been approved by the Radiation Safety Committee.
- Supervising students in the facility and operating equipment.
- Reporting accidents and incidents that occur during teaching/research activities.
- Reading and being signed off on this SWP and ensure these procedures are followed.
- Ensuring nearby personnel are aware of any potential hazards.
- Ensuring students are wearing PMD.

The Students are responsible for:

- Completing facility induction prior to commencing work.
- Being trained by a proficient user.
- Being assessed as proficient by a proficient user.

- Wearing appropriate PPE, including a PMD. - Reporting any issues with the facility or equipment to the Supervisor.
4) References (including manuals, Standards or Acts)**:** 1. Radiation Control Act 1990 2. Equipment Manuals 3. Radiation Management Plan 4. Faculty PPE Procedure

SWP Assessment Control *(please insert digital signatures)*

Assessed By	**Recommended By**	**Approved By**
 Name: Clare Singh Date: 22/02/2023	 Name: Assoc. Prof. Kelly Spuur Date: 24.02.2023	 Name: Kym Barry (Radiation Safety Committee Chair) Date:5/3/24
 Name: Caroline Nabasenja Date: 7/6/23	Charmaine Carlisle Digitally signed by Charmaine Carlisle DN: cn=Charmaine Carlisle, o=Charles Sturt University, ou, email=ccarlisle@csu.edu.au, c=AU Name: Charmaine Carlisle Date: 7/6/23	
 Name: Emelyn Smith Date: 5/3/24	Kylie Kent Digitally signed by Kylie Kent Date: 2024.03.05 14:21:26 +11'00' Name: Kylie Kent Date:	

Risk Assessment Matrix

Evaluate the level of risk associated with the hazard identified

TWO VARIABLE RISK MATRIX - Identify the likelihood and consequence to calculate the risk rating

Consequence	Likelihood				
	1 Rare	2 Unlikely	3 Possible	4 Likely	5 Almost Certain
5 Extreme (Death or permanent injury)	Medium	High	Very High	Very High	Very High
4 Major (Hospitalisation)	Medium	Medium	High	Very High	Very High
3 Moderate (Medical treatment)	Low	Medium	Medium	High	High
2 Minor (First Aid)	Low	Low	Medium	Medium	Medium
1 Insignificant (No treatment)	Low	Low	Low	Low	Low

Rating	Likelihood	Indicative frequency of occurrence
1	Rare	Less than 5% chance of occurring
2	Unlikely	5% to 30% chance of occurring
3	Possible	30% to 50% chance of occurring
4	Likely	51% to 90% chance of occurring
5	Almost Certain	Greater than 90% chance of occurring

Risk level	Actions
Low	Undertake the activity with the existing controls in place.
Medium	Additional controls may be needed.
High	Controls will need to be in place before the activity is undertaken.
Very High	Consider alternatives to doing the activity. Significant control measures will need to be implemented to ensure safety.