Appendix C

HAZARD MANAGEMENT – SAFE OPERATING PROCEDURE (SOP)

Only to be completed where required as a control measure under a Risk Assessment

NAME OF THE TASK/ACTIVITY	**SKYSCAN 1076 X-RAY MICRO-CT**	**DATE: 19/02/2020**
LOCATION	ADELAIDE MICROSCOPY, HELEN MAYO NORTH, NB38A	Insert photo (Optional)
RISK ASSESSMENT (RA) NAME	**Skyscan 1076 X-ray microCT**	
Residual risk rating on the RA	☒ **Low** ☐ **Medium** ☐ **High** ☐ **Very High**	
Hazards identified on the RA	**Contact with electricity or potential for electric shock** **Exposure to ionising radiation**	

PERSONAL PROTECTIVE EQUIPMENT

	Eye protection: ☒ Safety glasses ☐ Eye shields ☐ Safety goggles ☐ Other:
	Hand protection: ☐ Rubber ☐ Cut resistant ☐ Leather ☐ Vinyl ☐ Neoprene ☐ Nitrile ☐ Barrier creams ☐ Other:
	☒ Enclosed footwear: ☐ Footwear that is resistant to spills of hazardous substances ☐ Boots with steel caps ☐ Other:
	Protective clothing: ☐ Lab coat ☒ Gown ☐ Long sleeves ☐ Long pants ☐ High visibility ☐ Helmet ☐ Sun protection ☐ Other:

DESCRIBE, IN SEQUENCE, STEPS TO COMPLETE THE ACTIVITY SAFELY

Pre-operational checks

YOU MUST NOT USE THIS MACHINE UNTIL YOU HAVE HAD APPROPRIATE TRAINING BY TRAINED ADELAIDE MICROSOCPY STAFF. Unauthorised use may result in damage to the instrument.

Operational checks/steps to complete the activity from start to finish (including transport and waste disposal where relevant)

General

The Skyscan 1076 MicroCT is a computed tomographic (CT) scanner used to reconstruct X-Ray images of samples into 3D models. The scanner uses a fully enclosed and interlocked X-Ray source.

All new users must have undergo training in of the operation of the machine from a member of Adelaide Microscopy staff.
Users should operate the instrument in accordance with the manufacturer supplied operating instructions to avoid damage to the instrument.

Hazards

Contact with electricity or potential for electric shock
Exposure to ionising radiation

Risk Control Measures

Personal Protective Equipment:

The Skyscan 1076 is located in a PC2 facility so PPE including Gown, Enclosed Footwear and Safety Glasses must be worn at all times. An induction into the PC2 facility by Adelaide Microscopy staff is required before access into the facility is granted.

Engineering Controls:

The user operable parts on the Skyscan 1076 MicroCT are all accessible from the front of the instrument, and include the sample loading tray, and the computer (switch, mouse and keyboard). There is no risk involved in the operation of these parts. However, misuse of these parts can result in damage to the instrument. Users of the instrument should not remove any fixture or panel from the scanner or access the rear of the instrument.

The scanner has several inbuilt safety features to prevent exposure to ionizing radiation (X-Rays). These include lead shielding, and interlocked access which ensures the X-Ray source cannot operate when the sample chamber is open. This interlock cannot be overridden in any way.

There are no operator adjustable parts on the Skyscan 1076 and all instrument control is via a computer interface. This interface does not pose any safety problems but must be operated in accordance with the manufacturer supplied operating instructions to avoid damage to the instrument.

Procedural Controls:

Adelaide Microscopy has a designated Radiation Officer who holds a Radiation license from the EPA.

All new users must have a practical demonstration of the operation of the machine from a member of Adelaide Microscopy staff. Users should operate the instrument in accordance with the manufacturer supplied operating instructions to avoid damage to the instrument.

The user operable parts are all accessible from the operator's console; users of the instrument should not attempt to remove any fixture or panel from the instrument.

The Skyscan 1076 MicroCT is located in a PC2 facility and all users must undergo a PC2 induction prior to access.

Handling of biological material may present some safety problems and the safe operating procedure for handling animals and biological material must be followed.

The safe handling of general laboratory items is detailed in the Adelaide Microscopy laboratory general safety procedures.

Low stocks of consumable items (gloves, paper towel etc.) should be reported to a member of AM staff.

General Procedures:

Anaesthesia:

1. Animals will be anaesthetized with isoflurane (in an anaesthetic chamber) and placed in the machine where isoflurane anaesthesia is maintained via nose cone. For studies that require imaging of the face, mice will be injected with anaesthetic prior to placement into the machine.
2. Following the imaging session, animals are returned to their home cage and observed until they are able to move about the cage. Animals that display clinical signs of illness which place them at risk for anaesthetic death, will not be imaged.
3. Active anaesthetic scavenging will be employed to minimize personnel exposure to anaesthetic gases.

Biocontainment Procedure:

The PC2 lab is a common use area where there is potential for animals to become infected with pathogenic agents. The following procedures will be followed to prevent the dissemination of infectious agents.

1. Only Biosafety Level 2 pathogens or lower will be permitted in this facility.
2. All animals will be handled using Animal Handling Procedures.
3. Work surfaces and equipment (counter tops, imaging chamber, nose cones, anaesthetic equipment) inside and outside the machine will be disinfected before **and** after each imaging session using F10 solution followed by 70%ethanol/ 30% water solution which is provided.
4. Biohazardous waste will be placed in a biohazard container located within the room.
5. Any spills will be handled as potentially biohazardous.
6. All personnel involved with the animals will be gloved, and wear laboratory coats which will be laundered or replaced on a weekly basis.

Skyscan 1076 X-ray MicroCT Procedure:

1. Each person using the microCT imaging system must be specifically trained and authorized to use the equipment by an AM staff member.
2. Users must wear a lab coat and rubber gloves while working with animals.
3. Animals must be transported to and from animal rooms in suitable covered cages.
4. Animals will be returned to their home cage or a separate enclosed container and observed continuously during recovery from anaesthesia.
5. All surfaces and equipment (counter tops, the biosafety cabinet, imaging chamber, nose cones, dividers and anaesthetic equipment) must be disinfected before AND after each imaging session using F10 solution followed by 70%ethanol – 30% water solution.

6. Dispose of contaminated biohazardous materials in the biohazard container located within the room.
7. Wash hands after handling animals.
8. Personnel may not eat, drink or store food intended for human consumption in this area.

On completion of work – steps to make safe (including clean up, any waste disposal & service/maintenance requirements)

Following the imaging session on the Skyscan 1076, all work surfaces are to be disinfected after each imaging session using F10 solution followed by 70% Ethanol/ 30% water solution which is provided.

Biohazardous waste will be placed in a biohazard container located within the room.

Any spills will be handled as potentially biohazardous.

Emergency and Spill Procedures, Transport or storage requirements (where relevant), First aid/Medical

Any spills will be handled as potentially biohazardous and neutralised with 1% hypochlorite solution. Followed through with F10 and 70% ethanol. A spill response kit is located in the corridor within close vicinity of the PC2 labs.

Emergency shower and eye wash are located in the foyer of both PC2 labs.

A First aid kit is located in the corridor within close vicinity of the PC2 lab and First aid officers contact details are on the front.

Prepared by			
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This SOP must be reviewed after any incident/injury associated with this activity or when a Risk assessment is reviewed.