







**HAZARD MANAGEMENT – SAFE OPERATING PROCEDURE (SOP)**

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

<b>NAME OF THE TASK/ACTIVITY</b>	<b>ANAESTHETIC MACHINE</b>	<b>DATE: 20/02/2020</b>
<b>LOCATION</b>	ADELAIDE MICROSCOPY, HELEN MAYO NORTH NG38A AND NG38B	Insert photo (Optional)
<b>RISK ASSESSMENT (RA) NAME</b>	Anaesthetic Machine	
<b>Residual risk rating on the RA</b>	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High <input type="checkbox"/> Very High	
<b>Hazards identified on the RA</b>	Exposure to toxic gases (Isoflurane)	
<b>PERSONAL PROTECTIVE EQUIPMENT</b>		
	Eye protection: <input checked="" type="checkbox"/> Safety glasses <input type="checkbox"/> Eye shields <input type="checkbox"/> Safety goggles <input type="checkbox"/> Other:	
	Respiratory protection: <input checked="" type="checkbox"/> Half face mask <input type="checkbox"/> Air-purifying respirator <input type="checkbox"/> Supplied air respirator <input type="checkbox"/> Other:	 <input type="checkbox"/> Full face mask
	Hand protection: <input type="checkbox"/> Rubber <input type="checkbox"/> Cut resistant <input type="checkbox"/> Leather <input type="checkbox"/> Vinyl <input type="checkbox"/> Neoprene <input checked="" type="checkbox"/> Nitrile <input type="checkbox"/> Barrier creams <input type="checkbox"/> Other:	
	<input checked="" type="checkbox"/> Enclosed footwear: <input type="checkbox"/> Footwear that is resistant to spills of hazardous substances <input type="checkbox"/> Boots with steel caps <input type="checkbox"/> Other:	
	Protective clothing: <input checked="" type="checkbox"/> Lab coat <input type="checkbox"/> Gown <input type="checkbox"/> Long sleeves <input type="checkbox"/> Long pants <input type="checkbox"/> High visibility <input type="checkbox"/> Helmet <input type="checkbox"/> Sun protection <input type="checkbox"/> Other:	
<b>DESCRIBE, IN SEQUENCE, STEPS TO COMPLETE THE ACTIVITY SAFELY</b>		
<b>Pre-operational checks</b>		
<p>YOU MUST NOT USE THIS MACHINE UNTIL YOU HAVE HAD APPROPRIATE TRAINING BY TRAINED ADELAIDE MICROSCOPY STAFF. Unauthorised use may result in damage to the instrument.</p> <p>Before using the anaesthetic machine prepare other equipment to be used in accordance with the operating procedures for that equipment. For example, if you are to use the IVIS imaging system ensure that the IVIS control software is running and configured and ensure that the anaesthetic manifold is set up in accordance with the operating procedures for the IVIS chamber. Also ensure that the animals are secure and being handled in accordance with the operating procedures for handling animals and biological material. Always wear gown, gloves, mask and if necessary eye protection.</p>		
<b>Operational checks/steps to complete the activity from start to finish (including transport and waste disposal where relevant)</b>		
<b>General</b>		
<p>The Anaesthetic Machine is attached to the IVIS Lumina XRMS Luminescence Imaging System. The machine is set up to use Oxygen and Isoflurane. Please go to ChemWatch for safety details of Isoflurane. To limit human exposure to the anaesthetic gases, this equipment is fitted with a scavenging system to recover the anaesthetic gas.</p> <p><b>All new users must have a practical demonstration of the operation of the machine from a member of Adelaide Microscopy (AM) staff.</b></p>		
<b>Hazards</b>		
Exposure to toxic gas (isoflurane)		
<b>Risk Control Measures</b>		
<p><u>Personal Protective Equipment:</u> Always wear gown, gloves, mask and if necessary eye protection.</p>		

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Engineering Controls:

The user operable parts on system are all accessible from the front of the instrument. There is no risk involved in the operation of these parts. However, misuse of these parts can result in damage to the instrument.

Oxygen sensors are fitted to the room to monitor the level of oxygen. Alarms will sound if oxygen levels drop below acceptable levels.

**General Procedures:**

**Operation for use with IVIS imaging system**

1. Prepare induction chamber. Wipe inside surfaces with F10 solution followed by 70% ethanol – 30% water solution and place liner paper in bottom of chamber.
  2. Check the level of isoflurane in the sight glass. The level should be between the two arrowed lines. If required fill the isoflurane container (see attached instructions).
  3. Open the valve on the oxygen cylinder located on the wall (to the right of the computer), the gauge on the cylinder regulator should read greater than 350kpa/50psi.
  4. Turn GREEN oxygen valve to ON.
  5. “Unlock” the isoflurane vaporiser and set the regulator setting to between 2.
  6. Place the animal(s) in the induction chamber and close lid securely.
  7. Open the chamber on/off valve on the induction chamber panel. Set flow rate to 2L/min turning control knob on bottom of flow gauge (clockwise reduces flow).
  9. Wait until the animal is unconscious.
  8. Close the chamber on/off valve on the induction chamber panel.
  9. Open the induction chamber at arms length and remove the animal(s). There is the potential to breath the anaesthetic gas mix at this point – take care to avoid this.
  10. Place the animal(s) into the imaging chamber.
  11. Open the IVIS flow on/off valve on the IVIS manifold panel. Set flow rate to 1.0 L/min (turning control knob on bottom of flow gauge clockwise reduces flow).
  12. Complete your imaging procedure as per your experimental requirements and the operating instructions for the IVIS Lumina XRMS.
  13. Turn OFF gas flow to animal via the IVIS flow on/off valve on the IVIS manifold panel.
  14. Remove animals to recovery container.
- NOTE: For Multiple groups of animals repeat steps 8 to 17.

15. Turn OFF isoflurane regulator.
16. Close the IVIS flow on/off valve.
17. Turn GREEN oxygen valve to OFF.
18. Turn OFF pump (on evacuation panel).
19. Remove all nose cones, separators, plugs and protective mats from imaging chamber and clean with F10 solution followed by 70% ethanol – 30% water solution.
20. Discard any material in induction chamber and clean all surfaces with F10 solution followed by 70% ethanol – 30% water solution.
21. Wipe all surfaces with F10 solution followed by 70% ethanol – 30% water solution.
22. Notify a member of Adelaide Microscopy staff of any irregularities or low stocks of consumables.

**Operation for use with systems other than the IVIS imaging system**

1. Prepare induction chamber. Wipe inside surfaces with F10 solution followed by 70% ethanol – 30% water solution and place liner paper in bottom of chamber.
2. Check the level of isoflurane in the sight glass. The level should be between the two arrowed lines. If required fill the isoflurane container (see attached instructions).
4. Open the valve on the oxygen cylinder, the gauge on the cylinder regulator should read greater than 350kpa/50psi.
5. Turn ON the pump on the evacuation panel.
6. Turn GREEN oxygen valve to ON.
7. “Unlock” the isoflurane vaporiser and set the regulator setting to 2.
8. Place the animal(s) in the induction chamber and close lid securely.
9. Open the chamber on/off valve on the induction chamber panel. Set flow rate to 2L/min (turning control knob on bottom of flow gauge clockwise reduces flow).
10. Wait until the animal is unconscious.
11. Close the chamber on/off valve on the induction chamber panel.
12. Open the induction chamber at arms length and remove the animal(s). There is the potential to breath the anaesthetic gas mix at this point – take care to avoid this.

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NOTE: For Multiple groups of animals repeat steps 8 to 12.

13. Turn OFF isoflurane regulator.
14. Close the IVIS flow on/off valve.
15. Turn GREEN oxygen valve to OFF.
16. Turn OFF pump (on evacuation panel).
17. Close valve on top of oxygen cylinder.
18. Remove all nose cones, separators, plugs and protective mats from imaging chamber and clean with 70% ethanol – 30% water solution.
19. Discard any material in induction chamber and clean all surfaces with F10 solution followed by 70% ethanol – 30% water solution.
20. Wipe all surfaces with F10 solution followed by 70% ethanol – 30% water solution.
21. Notify a member of Adelaide Microscopy staff of any irregularities or low stocks.

**Filling the isoflurane vaporiser**

1. Get isoflurane bottle and filling attachment from storage area.
2. Remove knurled, silver screw cap from isoflurane vaporiser filling port.
3. Screw filling attachment onto anaesthetic bottle of isoflurane and fit filling attachment (hole side down) to anaesthetic machine below screw cap.
5. Pour the isoflurane from the bottle into the anaesthetic machine.
6. Fill vaporiser until the anaesthetic level is just below the upper arrowed line in the sight glass at the side of the vaporiser filling port.
7. Remove the filling attachment and replace the silver screw cap from isoflurane vaporiser filling port. Close firmly but do not overtighten.
8. Remove the filling attachment from the anaesthetic bottle and screw the cap securely back onto the anaesthetic bottle.
9. Return isoflurane bottle and filling funnel to storage area.
10. If isoflurane stock is low notify a member of Adelaide Microscopy staff so that additional stock can be obtained.

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

Following the imaging session on the Skyscan 1276, 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**

People involved in the drafting of this SOP	Agatha Labrinidis Ruth Williams Aoife McFadden		
Person authorising the SOP	Name:	Angus Netting	Signature 
	Position:	Director, Adelaide Microscopy	

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

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