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	**NIKON A1R SCANNING CONFOCAL MICROSCOPE**	**DATE: 13/02/2020**
LOCATION	ADELAIDE MICROSCOPY WAITE FACILITY AFW WEST (BUILDING 19) ROOM G5	Insert photo (Optional)
RISK ASSESSMENT (RA) NAME	**Confocal Nikon A1R_RA_Waite**	
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 of eyes to the Laser beam.** **Exposure to non-ionising radiation (UV light)** **Mercury lamp breakage and vapour or liquid leak**	

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 Nikon A1R scanning confocal is a fluorescence microscope in which lasers are used to image thin optical sections of biological samples. Dyes in the samples fluoresce and the emitted light passes through a very fine pinhole to detectors. Detectors are connected to a computer which builds up the image. UV light is also used to locate specimens using wide-field fluorescence.

The Nikon A1R confocal uses both UV light and lasers as sources of illumination. The instrument utilises Class3B Lasers, including an Argon laser (providing 457, 488, 514 excitation wavelengths), and solid state 405, 561 and 640 lasers. UV light is provided by a Nikon Intensilight C-HGFI-E pre-centred mercury lamp.

Hazards

Potential for electric shock if a user were to remove panels from the microscope.

Exposure of eyes to the Laser beam can cause blindness.

Exposure of eyes to UV light can cause eye damage.

Breakage of the hot or cold lamp may release mercury vapour or liquid.

Risk Control Measures

Engineering controls:

The user operable parts on the Nikon A1R scanning confocal microscope are all accessible from the front of the instrument, and include the upright light microscope and controller, the automated stage controller, 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 microscope or access the rear of the instrument.

The microscope has several inbuilt safety features to stop people injuring themselves with the laser or the mercury lamp.

The laser beams are contained and shielded in boxes which cannot be opened accidentally. An Interlock must be manually switched off in the computer software before the lasers can be used; the Interlock prevents laser light entering the binocular eyepieces. When the lasers are in operation it is only possible to view the sample on the computer screen (it is not possible to view the sample down the microscope binocular).

There are low risks to the user associated with use of the Intensilight UV lamp. The microscope has several inbuilt safety features to stop people injuring themselves with the UV lamp.

The Nikon Intensilight C-HGFIE lamp is pre-centered and requires no alignment, reducing the risk of overheating and explosion.

The UV light source is contained and shielded in a box which cannot be opened accidentally. To allow the UV light to the specimen, the operator must manually operate a button on the computer software and/or a shutter on the Intensilight controller. The UV light may also be turned on and off via a shutter on the microscope.

An external orange filter guards the user's eyes from the stage area. The only way to be exposed to UV or laser light at the microscope stage is to deliberately remove the guard or reach around behind the guard.

The lifetime of the Intensilight C-HGFI-E pre-centered mercury lamp is 2,000 hours, which is monitored by a counter on the front of the lamp housing. There is no risk of incorrectly aligning a pre-centred lamp. The lamp does not have overpressure when cool.

Procedural controls:

Only trained users to operate the instrument. All new users are to be given practical training in instrument operation by a member or Adelaide Microscopy staff. Users must also follow guidelines in the manual and safe operating procedures for operation of the microscope and UV light source.

Users must not tamper with the instrument such that they can look directly into a laser beam or a reflection of a laser beam. Users must not introduce any reflective objects into the laser beam path – e.g. micromanipulators

Refer to risk assessment and safe operating procedure for mercury lamps. Do not use the lamp beyond its life expectancy. If the lamp is used over the life expectancy, or is damaged, there is a risk that the lamp may burst and leak mercury vapour. A cold lamp may accidentally be broken during replacement. In the unlikely event that a mercury lamp breaks immediately evacuate everyone from the room and shut the door. Notify the OH&S officer immediately. Mercury is most dangerous in the vapour form, but in the solid form it can be cleaned up under supervision with relative safety. As part of the maintenance schedule for this instrument Adelaide Microscopy staff only are to replace the C-HGFI-E lamp after 2,000 hours.

The Intensilight UV light source requires a warmup and cooldown time. Do not turn on a warm mercury lamp until it has cooled. The lamp should be left on if it is to be used again the same day, to reduce the risk of damaging a warm lamp.

Users must not tamper with the instrument in any way such that they can look directly at the UV light.

Handling of biological material may present hazards; the safe operating procedures for handling biological material must be followed. The handling of other laboratory items (for example, sharps, clearing agents and chemicals) must follow the relevant safe operating procedures.

General Procedures:

Users should operate the instrument in accordance with the manufacturer supplied operating instructions under the instruction of a member of Adelaide Microscopy staff.

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

Follow the shut down procedure in the manual.

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

In the event of an injury, please advise an Adelaide Microscopy staff member and first aid officer for treatment and the local HSW representative to report the incident.

Prepared by			
People involved in the drafting of this SOP	Gwen Mayo Astrud Tuck		
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.