Risk Assessment

Reference: **RA089993/1** **Sign-off Status:** **Planning**

1. Waste Management Activity

Description of Activity:	Waste managment, inculdes ensure the proper disposal of the follwoing type of hazardous waste, 1) Fumes and gases- mixtures 2) Fumes and gases - leaks, left over atmospheres from pressurised gas cylinders 3) Airborne infectious material 4) Liquid waste - mixtures and compounds 5) Liquid waste- Unused lab chemicals 6) Liquid Waste- infectious 7) Solid waste- hazardous chemicals 8) Solid waste - Infectious 9) Solid waste - contaminated other waste, gloves, plastic etc

Hazard 1. Unused hazardous substances

Picric Acid can dry out producing potential explosive crystals. We have X g and expected use is Y g. Opening date xx/xx/xx - Owner Lab Manager Triethanolamine – Chemical weapons precursor Schedule 3b. We have 500ml expected use 45 ml - owner Lab Manager Terazol-1-Acetic Acid Licence number XXXXXXX owner, Dr (PI name), end date of licence xx/xx/xx. Quantity licensed is 10g, expected use 10g Ethanethiol – Quantity owned is 5ml and expected use is 4.5ml, owner Dr (PI name)	**Existing Control Measures** Good lab practices used in the activity, see departmental procedures including waste attached (reference here) Elimination /Substitution - not possible Reduction of amount – Use of departmental stock of Picric Acid and Triethanolamine (or minimum purchase quantity defined). No waste expected. See lab and departmental risk assessment for waste management for these unused chemicals (RA number). Calculations show that the project will use all the Terazol-1-Acetic Acid. Waste to follow the licence requirements including recording the denaturing of the substance and then entry into the Lab smalls waste stream. Label to indicate Owner X. date Y amount Z and reference the recorded denaturing process Calculation show that the project will leave 0,5 ml Ethanethiol, so the smallest amount is sourced, based on supplier information Due to the smell/ odour of (name chemical) , waste cannot be allowed to volatilise via the fume cupboard nor trace quantities be placed in open waste containers. Denature via (document procedure) For any waste put to the sewer, see UCL standard for disposal

Hazard 2. Produced hazardous waste	
Waste organic solvent - Contaminated solvent - flammable and poisonous Wash acetone- flammable contaminated acetone	**Existing Control Measures** Experiment setup to collect solvent after use- glass container required, label with type of solvent, date and owner. After each 10 runs of the experiment take the container to the lab organic solvent container, and dispose off At the end of each experimental period, wash all the glass with acetone, using a bowl to catch the wash waste. Take waste acetone to the lab container and dispose off
Hazard 3. Waste created by an emergency	
Gas to be bubbled through solvent may escape - respiratory hazard Mixture created may be spilled or leak - corrosive and irritant	**Existing Control Measures** Normal lab spill kit will be suitable Due to gas risk perform experiment in fume cupboard- minimum velocity xx. Waste to be treated as solid hazardous waste bagged and labelled with the main containment / or any off the absolute hazardous material e.g. mercury. Containment PPE to be rinsed to minimise - to be treated as non-hazardous waste

Risk Level
With Existing Controls: Risk Level **B - Low / Tolerable**

2. Inculded in the assessment for each waste	
Description of Activity:	The experiment will utilise an impinging jet to measure the velocity profile of dispersed kerosene oil in tap water following these conditions:Dispersed drop flow rate fixed and continuous phase flow rate varied Dispersed flow rate varied and continuous phase flow rate fixed

Hazard 1. Prolinged Ultrasound exposure	
Prolonged or high-intensity acoustic exposure, especially from ultrasound and AE devices, can pose risks to the researcher. High-intensity sound waves can cause hearing damage or discomfort, and in extreme cases, physical harm to tissues	**Existing Control Measures** -Sound wave intensity is within the safe range specified by the supervisor, obey the procedure -Lab rules mandate that the lab cannot be used after a certain time (7 pm); avoids working over-time -A PhD student will be present who is trained on using ultrasonic doppler
Hazard 2. Ergonomic Risks	
Prolonged experiments or the need to handle bulky or heavy equipment can lead to ergonomic issues such as strain injuries or repetitive stress injuries.	**Existing Control Measures** - Specified lab lone working hours will be followed -User is taught not to lift heavy loads -Supervisor and lab staff will be informed in an event where there is a heavy load needed to be lifted
Hazard 3. Equipment Failure	
The failure of acoustic equipment, especially under continuous operation or at high intensities, can lead to sudden loud noises or the release of high-pressure components. This can pose physical hazards to personnel and potentially damage other laboratory equipment.	**Existing Control Measures** Follow the Pre use checks Reports any issues or suspected issues before using PPE is provided as required y the UCL Standards - Addtional PPE inculdes suitable hearing protection to be checked before allowed to carry out the experiment Emergency contacts and first aiders are available Emergency evacuation process has been taught Performer of the experiment has been given a guideline for the operation time and flowrates
Hazard 4. Electricity	
Elelctric shock, / electical burns / iginition for fire	**Existing Control Measures** All equipment is uder PAT regime It is checked that there is no spillage/water around cables every time prior to and post experiment Cable condition and labels for testing are checked prior to usage Hands are dried and gloves are worn before ouching sockets

Hazard 5. Trip Hazard	
Trailing cables, low steps, etc A common hazard within laboratory and industrial settings stems from inadequate housekeeping practices, particularly regarding the management of cables and equipment. Cables that are not properly secured or left dangling and equipment that is not stowed away when not in use can present significant tripping hazards	**Existing Control Measures** -Cables will be tied with cable tie wrap -Excellent house-keeping will be implemented and any rubbish will be disposed of -Spill kits will be used to avoid trip in case of a liquid spill on the floor
Hazard 6. Chemcial Agents - Kerosene	
Kerosene oil poses several hazards, primarily due to its flammability and potential health effects. As a highly flammable liquid, kerosene can ignite easily, presenting significant fire and explosion risks, particularly in areas where it is stored or used near open flames or sparks. Inhalation of kerosene vapors can lead to respiratory issues, dizziness, headaches, and nausea, while prolonged skin contact may cause irritation or dermatitis. Ingesting kerosene is extremely dangerous, potentially causing severe gastrointestinal distress, lung damage, or even death if aspirated into the lungs. Absoute Hazardous Waste	**Existing Control Measures** PPE will be used for all uses that may reult in splash or spill risk - gloves have lower time when working with kerosen and will need regualr changing Chemicals will be stored iin the fume cupboard assinged by the lab mangers, all containers to be labelled with chemcial date of use and the group contact. flammable chemical will be followed-to be stored in fume cupboart Containers will be kept closed after using the chemical Emergency contact list is available in case of an emergency and a copy lodged with the Lab manager All kerosene waste to treated as Lab Smalls and the group is reponsible for subbmitting a request for removal at least once week and whenn 500ml of waste kersone in collected - Glass bottle with screw top required.
Hazard 7. Spillage of chemcials or other harmful material	
Spread of chemical or harmful material into drains may not be permitted to be disposed of into the drain and may cause a breach of UCL water permit. Damage to watercourses, land and flora/fauna may result.	**Existing Control Measures** There is a designated storage location for flammable chemicals that the user is aware of correct fume cupboard use for chemical waste has been stated and the user is made aware Work station will be cleaned and containers will be closed after using the chemical Oil Spill kit is required- Kept as close to the fumecupbaord as possible with out increase trip hazards - all people to be trianined Waste from the kit to be treated as soid hazardous waste. double bag and labbel with Spill kit used for Kersone date and group details

Risk Level
With Existing Controls:

Risk Level	B - Low / Tolerable

Hazard Group 2 Risk Assessment

1. INITIAL ASSESSMENT

1.1 Overview of the Hazard Group 2 biological agent

Description of the Hazard Group 2 pathogen(s) including name(s) and strain(s): RML scrapie, a prion strain adapted to rodents

Give the source of the pathogen(s), for example, internal to UCL, samples from the field, another UK institution, UK commercial supplier or supplied from outside the UK.

Originally from natural goat/sheep scrapie isolates. Adapted to rodents. In house prion strain.

2. NATURE OF THE WORK TO BE CARRIED OUT AND REVIEW OF CONTROL MEASURES

2.1 Will any of the procedures carried out generate aerosols or splashes? (If "Yes" give details of procedures)

Yes☐ ?? No☑

No aerosols will be generated. Splashes could happen if the cell culture dish is dropped. However, with procedures in place this should not happen. For transfer between CL2 labs 3.02 and SB04, cell culture dishes will be placed on a paper tissue in a clean, transparent carrier box, sealed with a lid. When dishes are carried in the labs, the dishes are placed on a large petri dish to avoid spillage. When dishes are loaded into the microscope, they are kept on a tray with blue roll to avoid spillage. The top plate attached to the microscope is carefully clamped onto the dish with uninfected or scrapie-infected PK1 cells while on the tray, safely secured and then the assembled dish and plate are moved onto the microscope on top of the lens and fasten. The visualisation of cells and recording of cell response is thereafter performed by control of the computer. Before, the cells are transferred to SB04, the cell media in the dishes will be exchanged for CO2 independent media in a safety cabinet in 3.02. This mean that very little, if any, infectivity will be accumulated in the media in the dishes during the time they will be kept in SB04 for assessment (2h)

2.2 Describe the principal means of containment. (Tick all those that apply)	Safety Cabinet☐ ?? Isolator☐ ?? Contained Equipment☑ ?? Other☐
Give details of the containment or the other means of containment	When infected cells are handled in 3.02 they will be handled in a safety cabinet. In SB04, the cell culture dishes will only be without containment when loaded in the microscope, otherwise it will be in a large petri dish with cover or in a transparent plastic box with lid. When loaded into the microscope, the cell culture dish with lid is placed on a stable plastic tray covered with blue roll. The cover of the dish is briefly taken off and the top plate attached to the microscope is clamped onto the dish and will thereafter act as a lid. The top plate is not touching infected material.
2.3 Will any of the procedures carried require the use of sharps? (If "Yes" give details of control measures)	Yes☐ ?? No☑ None
2.4 Give details of the scale of the activity(volumes, titres etc.)	A cell culture dish contains 1ML of cell culture medium. Typically, for one experiment we may use 8 cell culture dishes that will be kept in a binder incubator in SB04 in a large petri dish with lid when not assayed in the microscope. The cells are intrinsically producing prions and no infected material have been added to the dishes. Before, the cells are transferred to SB04, the cell media in the dishes will be exchanged for CO2 independent media. This mean that very little, if any, infectivity will be accumulated in the media in the dishes during the time they will be kept in SB04 for assessment (2h). Please indicate the maximum culture volume(s) and if propagating a viral vector, indicate the maximum virus titre that will be handled. If viral vector is to be used in vivo, indicate maximum volume to be injected at any one time.

2.5 Give details of the arrangements in place for the disinfection and disposal of waste (tick more than one box if required, but give details of type of waste)

Type of waste		Treatment used	Detail (eg. concentration of disinfectant used, autoclave cycle used and final disposal route)
Solid waste	Cell culture plastic will be disposed of in 3.02, CL2 lab according to IOPD SOP CL2 1.0. Check! Non contaminated blue roll and gloves will be disposed of in autoclave bags in SB04 and when full taken out and autoclaved according to CL2 lab according to IOPD SOP CL2 1.0. Contaminated gloves and blue roll will	Autoclave☑ Chemical☑ Incineration☐	Solid waste is soaked in 1M NaOH for 1h, then rinsed with water and autoclaved using Program 2 of the autoclave (121oC for 15 min). Temperature and time of each autoclave run is monitored and recorded. Yearly twelve- point thermocouple testing is used for regular

	be taken in a sealed plastic bag to 3.02 CL2 lab and decontaminated by soaking them in 1M NaOH for 1h and then autoclaved. This would in reality actually only happen upon a spillage	validation
Liquid Waste	Cell culture media	Autoclave ☐ Chemical ☑ Incineration ☐ Contaminated media is decontaminated in 1M NaOH final concentration for at least 1 h and is washed down the sink with copious amounts of water. This will be done in CL2 3.02.

2.5.1 If using an autoclave, give the following details: (If not applicable continue to the next section.)	Location	Paul O'Gorman 3rd floor autocalve room
	Location of alternative autoclave (in the event of breakdown or other emergency arrangements)	Paul O'Gorman 4th floor Autoclave room
	If relevant, means of transport to autoclave	autoclave bag inside break-proof carrier tub - See CL2 Code of practice for full waste transfer procedure
	Means of validation	Automated autoclave validation protocol, automated autoclave validation receipt and validation strips (Albert Brown Ltd type 6 cycle verification indicators that will change colour from yellow to purple upon correct completion of the autoclave's Program 2). Receipt signed to validate success of cycle. Yearly twelve-point thermocouple testing is used for regular validation.

2.5.2 If using chemical disinfectant provide details of validation. (by reference to literature, manufacturers data and any in-house tests)	1M NaOH is used as a disinfectant to decontaminate prion-infected waste.

2.6 Other biological risks

2.6.1 Will the work involve the use of any other biological material which may present a risk of infection? (if "Yes" indicate material to be used and the likelihood of contamination)	Yes ☐ ?? No ☑

2.6.2 Describe any additional control measures:	

2.7 Occupational health considerations

2.7.1 Would the nature of work prevent anyone who is more susceptible to infection or other ill-health from carrying it out? (If "Yes" give details)	Yes☐ ?? No☑
2.7.2 Will the pathogen(s)/organism(s) be taken outside the laboratory (If so please describe method of containment to be used during the transport process)	Yes☑ ?? No☐ In preparation for transport between CL2 labs, dishes will be placed on a paper tissue in a clean, transparent carrier box, sealed with a lid. The box will carefully be carried, and by using the lift, taken to SB04, the AFM microscope room. After checking that no spillage occurred in the box during transport, the box is opened and the cell culture dishes taken out and placed in a large petri dish in the binder incubator

2.8 Spillage and Emergency Procedures

2.8.1 Describe spillage and emergency procedures (including fumigation procedures if relevant):	UCL PPE standard for Wet lab will be follwed inculded lab coat, eye protection and gloves . The blue roll onthe tray will be placed in the transparent carrier box together with the blue roll used to wipe up the spillage as well as contaminated gloves. The box is sealed and taken to CL2 lab 3.02 where the waste is decontaminated in 1M NAOH for 1 hour and the plastic box decontaminated by wiping carefully with 1M NaOH and thereafter cleaned with water. The spillage location on the tray will be covered with 1M NaOH for 1 hour and then wiped with absorbent paper and thereafter wiped with water twice. All contaminated material after decontamination with NaOH will be disposed of via the clinical waste route i.e. autoclaved using program 2 of the autoclave (121oC for 15 min) and incinerated according to code of practice for working within CL2 laboratories (specified in IOPD SOP CL2 1.0). Temperature and time of each autoclave run is monitored and recorded (See 2.5.1). Yearly twelve-point thermocouple testing is used for regular validation. Generic spill procedure in the Codee of Practice inculding the training and refresher required by eveyone working in the CL2 lab

Risk Level

With Existing Controls:

Risk Level: B - Low / Tolerable