



Biosafety Manual Requirements Checklist for Aquatic Animal Pathogen Containment (AQC) Facilities

Standard Operating Procedures must be facility specific and provide detailed descriptions on how all aspects of biosafety will be maintained. This checklist was developed to assist in the preparation of the Biosafety Manual for AQC2 and AQC3 facilities.

Items to consider include:

REQ: requirement as stated in the *Containment Standards for Facilities Handling Aquatic Animal Pathogens*;

REC: recommendations to promote good biosafety laboratory practices.

The items in this checklist are presented as a guide and are not meant to be exhaustive. Items not addressed in the checklist may be included in the Biosafety Manual of certain facilities depending on their design and program while other items may require some adaptation.

1. Executive Summary

Items to Consider	REQ	REC
Program Overview and Facility Description		
1. Program intent and goals.	√	
2. Agents manipulated.	√	
3. Agents stored.	√	
4. AQC lab area description and floor plan (including room numbers and door labels).	√	
5. Glossary of terms and abbreviations.		√



2. Standard Operating Procedures

Each procedure should include the following sections:

- a. Purpose – short summary of the procedure objectives;
- b. Glossary– list of acronyms, abbreviations and facility-specific terms with associated definition;
- c. Personnel Responsibilities – overview of roles and responsibilities for personnel implicated in the procedure;
- d. Safety – highlight important considerations to ensure the safety of personnel;
- e. Equipment and material required;
- f. Detailed Instructions – step by step instructions on protocol to follow ;
- g. References - list of information sources cited in the procedure.

Items to Consider	REQ	REC
Conditions of Access		
A) Medical Surveillance		
1. Confirmation that risk assessment was performed.	√	
2. Pre-employment and annual medical requirements.	√	
3. Immunizations requirements (if any).	√	
4. Symptoms to look for – reference to MSDS or provide list.	√	
5. Contact (i.e. Health Care Physician, OSH committee) in the event of an exposure.	√	
6. Special considerations for immuno-compromised and pregnant staff members.	√	
B) Training		
1. Training program must cover:		
▪ General knowledge of physical operation and design of facility.	√	
▪ General training requirements – see operational practices requirements in the <i>Containment Standards for Facilities Handling Aquatic Animal Pathogens</i> .	√	
▪ Read SOP Manual, and <i>Containment Standards for Facilities Handling Aquatic Animal Pathogens</i> .	√	
▪ Other regulatory requirements (i.e. WHMIS, TDG, etc.).	√	
2. Training program must include:		
▪ Evidence that training is understood (includes supervision period and/or dry-runs).	√	
▪ Employee training records signed by trainer, trainee and AQC facility supervisor.	√	
▪ Re-training requirements (annual frequency recommended).	√	



Items to Consider	REQ	REC
Entry and Exit		
A) Personnel		
1. Verification of systems prior to entry:		
▪ Verification of HVAC system gauges.	√	
▪ Verification of indicator lights.		√
▪ Verification of communication system.		√
2. Entry/exit logs:		
▪ Sign in/sign out (include visitors).		√
▪ HVAC system gauges reading.		√
3. Entry:		
▪ Entry must be limited to facility staff, maintenance staff and personnel with the appropriate training. Visitors and any untrained personnel must be escorted by trained staff.	√	
▪ Remove jewelry and access card.	√	
▪ Remove contact lenses (if applicable).		√
▪ List dedicated lab clothing (e.g. gloves, lab coats, boots, coveralls, eye protection, scrubs, and socks).	√	
▪ Full coverage and dedicated PPE must be worn in AQC3 <i>in vivo</i> facilities	√ AQC3	√
▪ Don additional layer of protective clothing (e.g. water resistant, impermeable full coverage clothing); must include where each item is donned.		√
▪ After entering AQC facility ensure that doors are shut properly.	√	
▪ Specific procedure must be in place when critical doors are not interlocked (i.e. lights, time lapse) to ensure that 2 doors are not opened at the same time.	√ AQC3	
4. Exit:		
▪ Decontaminate items that will be removed from AQC facility (including eyeglasses, if applicable).	√	
▪ Remove additional layer of protective clothing (e.g. water resistant, impermeable full coverage clothing) in a manner that prevents contamination; must include where each item is doffed.		√
▪ Remove dedicated lab clothing (e.g. gloves, lab coats, boots, coveralls, eye protection, scrubs, and socks).	√	
▪ Hands to be washed after gloves have been removed and before leaving the laboratory.	√	
▪ Foot baths must be used prior to exit from live animal holding units.	√	
▪ If aerosol exposure presents a risk, protocols must be in place to determine whether showering is required upon exit.		√
▪ After exiting AQC facility ensure that doors are shut properly.	√	
▪ Specific procedure must be in place when doors are not interlocked (i.e. lights, time lapse) to ensure that 2 doors are not opened at the same time.	√ AQC3	



Items to Consider	REQ	REC
B) Materials		
1. Routine items and equipment (e.g. animals, tanks, waste):		
<ul style="list-style-type: none"> ▪ Remove excess packaging before bringing into the AQC facility. 		√
<ul style="list-style-type: none"> ▪ Entry through autoclave conditional to autoclave having been previously cycled, and/or entry through pass-through conditional to pass-through having been previously decontaminated. 	√	
<ul style="list-style-type: none"> ▪ All materials taken out of the AQC facility must be decontaminated at the containment barrier. 	√	
<ul style="list-style-type: none"> ▪ Exit conditional to autoclave cycle, pass-through decontamination or dunk tank filled with appropriate disinfectant. 	√	
<ul style="list-style-type: none"> ▪ Leak-proof containers are to be used for the transport of pathogenic materials within facilities (i.e. between laboratories in the same facility). 	√	
2. Movement of large equipment through containment barrier (as applicable).		
<ul style="list-style-type: none"> ▪ How equipment is decontaminated and decontamination confirmed prior to removal. 	√	
<ul style="list-style-type: none"> ▪ How containment maintained and potential exposure reduced (e.g. decontaminate area, PPE, seal off area). 		
Infectious Material		
1. MSDS available inside and outside containment.		
	√	
2. Best practices must be emphasized and include the following (or a reference to <i>Containment Standards for Facilities Handling Aquatic Animal Pathogens</i> is acceptable) :		
<ul style="list-style-type: none"> ▪ SOP manual must be available to all staff (inside containment). 	√	
<ul style="list-style-type: none"> ▪ Eating, chewing gum, drinking, smoking, storing food, storing personal belongings, applying cosmetics, and inserting or removing contact lenses are prohibited. 	√	
<ul style="list-style-type: none"> ▪ Oral pipetting of any substance is prohibited in any laboratory. 	√	
<ul style="list-style-type: none"> ▪ Use of needles, syringes and other sharp objects should be strictly limited. Needles should not be bent, sheared, recapped or removed from the syringe; they should be promptly placed in a puncture-resistant sharps container. 		√
<ul style="list-style-type: none"> ▪ Work surfaces must be cleaned and decontaminated with a suitable disinfectant at the end of the day and after any spill of potentially biohazardous material. 	√	
<ul style="list-style-type: none"> ▪ Hands must be washed frequently (after handling infectious materials, after removing gloves, and before leaving the laboratory). 	√	
<ul style="list-style-type: none"> ▪ Open-toed and high-heeled shoes must not be worn in the laboratory. 	√	
<ul style="list-style-type: none"> ▪ Long hair is to be tied back so that it cannot come into contact with hands, specimens, containers or equipment. 	√	
<ul style="list-style-type: none"> ▪ Gloves must be worn when handling infectious materials. 	√	
<ul style="list-style-type: none"> ▪ BSC must be used for procedures with potential for producing infectious aerosols and with high concentrations or large volumes of zoonotic materials. 	√	
<ul style="list-style-type: none"> ▪ Centrifugation of infectious materials must be carried out in sealed safety cups of rotors that are loaded/unloaded in a BSC. 	√	



Items to Consider	REQ	REC
3. Storage and Inventory:		
▪ Agents should be stored inside the AQC facility.		√
▪ If stored outside the AQC facility, agents must be in leak-proof containers and kept locked with restricted access.	√	
▪ Regular inventory tracking.		√
4. Transportation within containment:		
▪ Use of closed container.	√	
▪ On a trolley/cart.		√
5. Shipping and Receiving:		
▪ Use of leak-proof containers (as per <i>Transportation of Dangerous Goods</i>).	√	
▪ Proper training requirements (as per <i>Transportation of Dangerous Goods</i>).	√	
Biological Safety Cabinets		
1. Start up procedures:		
▪ Preparation of BSC (e.g. turn on the fluorescent light and cabinet blower, if off, turn off UV light if in use, ensure sash is in the appropriate position, test the alarm, etc.).	√	
▪ Confirm inward airflow.	√	
▪ Loading of materials into the cabinet	√	
▪ Wait 5 minutes to purge airborne contaminants from the work area.	√	
2. Working in the cabinet		
▪ Donning and doffing of protective clothing and gloves as appropriate.	√	
▪ Layout of materials, equipment and waste within the cabinet		√
▪ Perform operations as far to the rear of the work area as possible.	√	
▪ Avoid movements of materials or excessive movement of hands and arms through the front access opening during use.	√	
▪ Do not work with open flames inside the cabinet, as they disrupt the airflow patterns.	√	
3. Completion of work		
▪ Allow the cabinet to run for 5 minutes with no activity.	√	
▪ Surface-disinfect objects before removal from the cabinet.	√	
▪ Remove contaminated gloves and dispose of them inside BSC; wash hands.	√	
▪ Disinfect interior surfaces of cabinet using a suitable non-corrosive disinfectant (e.g. 70% ethanol).	√	
▪ Turn off the fluorescent light and cabinet blower when appropriate (some cabinets must be left on at all times; if you are unsure, check with your cabinet certifier, safety officer or building maintenance personnel). It is recommended that the cabinet is left running (WHO, 2004).	√	
▪ Turn on the UV light, if appropriate (do not turn on when people are working close by); UV must be tested to ensure that it is emitting a germicidal wavelength (the recommended wavelength is 253.7nm, ask your cabinet certifier to perform this test).	√	



Items to Consider	REQ	REC
Decontamination		
1. List of disinfectants (effective against pathogens in use) including:		
▪ Purpose	√	
▪ Concentration	√	
▪ Contact time	√	
▪ Shelf life	√	
2. Decontamination of exposed surfaces following splashing or spillage of contaminated water or debris in the laboratory or live animal holding areas.		
3. Decontamination Systems (as applicable)		
▪ Autoclave	√	
▪ Liquid Effluent Treatment	√	
▪ Dunk Tank	√	
▪ Pass Through	√	
▪ Full room decontamination		√
▪ Other Decontamination System	√	
4. Validation and Verification of Decontamination Systems (for each system, as applicable):		
▪ Description of criteria for each agent (e.g. time, temperature, concentration)	√	
▪ Description of content for each standard load used for validation	√	
▪ Description of type and placement of BIs (i.e. top-middle-bottom inside an autoclave bag, placement in room)	√	
5. Types of waste to be treated		
▪ Liquid waste treatment (e.g. biologicals, liquid cultures, biologically-contaminated chemicals and radioisotopes, etc.)	√	
▪ Solid waste treatment (e.g. lab waste, PPE, paper waste, etc.),	√	
▪ Sharps	√	
Biological Spills Protocols should be based on local risk assessments		
1. Emergency response plan for:		
▪ Small and large volumes inside and outside BSC.	√	
▪ Inside centrifuge and inside sealed safety cups.	√	
▪ Outside containment area (if applicable).	√	
2. Procedure (for each response plan, as applicable) including:		
▪ For each type of spill (based on volume, type of exposure, location), determine level of spread /contamination and the necessary response (i.e. PPE change, evacuation with or without shower, full room decontamination).	√	
▪ Informing laboratory supervisor or biosafety officer.	√	
▪ Posting of appropriate signage.		√
▪ Appropriate time (e.g. 30 minutes, 1 hour) to allow aerosols to settle.		√
▪ PPE clothing required for clean up (e.g. gloves, protective clothing, face and eye protection). Where each item is donned and doffed.		√
▪ List appropriate disinfectant(s) including concentration and contact time.	√	



Items to Consider	REQ	REC
<ul style="list-style-type: none"> ▪ Procedure to safely contain and clean up spill. 		√
<ul style="list-style-type: none"> ▪ Procedures for the disposal of contaminated materials (e.g. broken glass, absorbent material used for cleaning, PPE). 		√
<ul style="list-style-type: none"> ▪ Exposed persons should be referred for medical attention (WHO, 2004). 		√
Emergency Procedures		
1. Response to medical emergency within containment.	√	
2. Response to BSC failure.	√	
3. Response to power failure.	√	
4. Response to fan (supply/exhaust) failure.	√	
5. Response to other alarms.	√	
6. Response to other situations (i.e. fire, earthquakes, floods, etc.).	√	
Incidents and Accident Reporting		
1. Must be reported to lab supervisor (or other).	√	
2. Forms/records to be completed.	√	
3. Investigation and risk assessment.		√
4. Follow-up (communication of results to staff).		√
5. New recommendations to mitigate future risk.		√
Use and Maintenance of Equipment		
1. PPE.	√	
2. Autoclave.	√	
3. Dunk tank (if applicable).	√	
4. Pass-through (if applicable).	√	
5. BSC.	√	
6. Spill kits.	√	
7. Other (if applicable).		√
Housekeeping and Facility Maintenance		
1. List of tasks (daily, weekly, monthly, and annually).		√
2. Periodic inspections of the containment zone must be made by facility staff to check for inward directional airflow (if applicable), faults and deterioration.	√	
3. Water seals must be maintained in drainage traps (e.g. through regular drain usage and/or by sufficiently filling of traps in areas that are not being used).	√	
4. Safety equipment (eyewash station, spill kits, etc.).	√	
5. Insect/rodent control.	√	
6. Verification and performance testing requirements (for annual re-certification).	√	



Items to Consider	REQ	REC
Aquatic Animals (may be a separate manual and training program)		
1. For animal care, refer to Canadian Council for Animal Care	√	
2. Procedures for receiving infected aquatic animals and subsequent decontamination of transport equipment.	√	
3. Animal escape (prevention through animal holding units and response).	√	
4. Bites and scratches (prevention and treatment).	√	
5. Proper handling techniques (i.e. restraint mechanisms).		√
6. Gloves must be worn when handling dead or live animals and animal parts.	√	
7. Animal handling equipment must be dedicated to individual tanks or to a series of tanks containing aquatic animals of identical origin or treatment.	√	
8. Specific protocols for post-mortem/ necropsy areas	√	
9. Carcasses and tissues must be incinerated or processed using technologies proven to effectively decontaminate all tissues. Where such materials must be transported for decontamination outside the containment perimeter, this must be done using leak-proof and impact resistant containers labeled appropriately.	√	
10. Disaster / Incident Response Plan, including:		
▪ Animal Care (e.g. available supplies, staff)		√
▪ Relocation, evacuation, or euthanasia		√
▪ Animal triage		√