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Foreign Animal Disease Diagnostic Laboratory Containment Standard

Office of Biohazard Containment and Safety
Science Branch
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Canada

CONTENTS - Foreign Animal Disease Diagnostic Laboratory Containment Standard

Glossary 3

Chapter 1

Introduction 4
1.1 Scope 4
1.2 Background 4
1.3 Diagnostic Testing 5
1.4 FAD Diagnostic Containment 5

Chapter 2

Physical Requirements 7
2.1 Location and Access 7
2.2 Surface Finishes and Furnishings 8
2.3 Laboratory Services 8
2.4 Containment Perimeter 9
2.5 Air Handling System 10
2.6 Biological Safety Cabinets (BSC): 11

Chapter 3

Operational Practices 12
3.0 General Requirements 12
3.1 Safety Manual/ Training 12
3.2 Entry Requirements 13
3.3 Practices in Containment 14
3.4 Decontamination/ Exit 16

Chapter 4

Facility Certification 18
4.1 Certification 18
4.2 Re-certification 18
4.3 Verification and Performance Testing 18
4.3.1 Surface Finishes 18
4.3.2 Communication Devices 18
4.3.3 Access Control/ Security Devices 19
4.3.4 Demonstration of Inward Directional Airflow 19
4.3.5 Autoclaves and Decontamination Systems 19
4.3.6 Emergency Generator Test Report 19
4.3.7 Biological Safety Cabinets 19
4.3.8 Standard Operating Procedures 19

Appendix A - Sample Receipt and Handling 20
Appendix B - Spill Kit 21
References 22

Glossary:

Anteroom: a room that separates the laboratory from the hallway in order to separate street clothing from dedicated facility clothing.

BSC: biological safety cabinet

CL: containment level

CSVF: Containment Standards for Veterinary Facilities

FAD: foreign animal disease

HEPA: high efficiency particulate air

LBG: Laboratory Biosafety Guidelines

NCFAD: National Centre for Foreign Animal Diseases

OBCS: Office of Biohazard Containment and Safety

PPE: personal protective equipment

SOP: standard operating procedure

Waste: any solid or liquid material generated from the facility that is to be disposed of

Chapter 1 Introduction

1.1 Scope

Provincial and university veterinary diagnostic laboratories are working with the National Centre for Foreign Animal Disease (NCFAD) and National Laboratory Operations in the Canadian Food Inspection Agency (CFIA) to increase foreign animal disease (FAD) testing capacity. This collaboration is intended to reduce the time needed to detect disease then initiate control measures. The diagnostic laboratories included will comprise the FAD Diagnostic Network Laboratories, hereafter known as the Network. This document describes the minimum physical requirements and operational practices for Network laboratories. The requirements are designed to prevent transmission of disease from the laboratory to animals or humans, and to prevent possible release into the environment. This document should be used in conjunction with the *Containment Standards for Veterinary Facilities* (CSVF)*, 1st edition 1996.*

1.2 Background

The *Containment Standards for Veterinary Facilities*, published in 1996 by Agriculture and Agri-Food Canada, provide guidance for those who design, build, operate or work in laboratories in which animal pathogens are handled. The *CSVF* describes the minimum physical requirements and operational practices for each containment level. Brief descriptions from the *Laboratory Biosafety Guidelines, 3rd Edition* of each containment level are included below for context.

Containment level 1 (CL1) requires no special design features, beyond those suitable for a well-designed and functional laboratory. Biological safety cabinets are not required. Work may be done on an open bench top, and containment is achieved through the use of practices normally employed in a basic microbiology laboratory.

Containment level 2 (CL2) applies to the laboratory that handles agents requiring containment level 2. The primary exposure hazards associated with CL2 organisms are through the ingestion, inoculation and mucous membrane route. The agents are not normally transmitted by airborne routes, but care must be take to avoid the generation of aerosols (aerosols can settle on bench tops and become an ingestion hazard through contamination of the hands) or splashes. Primary containment devices such as BSCs and centrifuges with sealed rotors or safety cups are to be used as well as appropriate personal protective equipment. Environmental contamination must also be minimized by the use to hand washing sinks and decontamination facilities (autoclaves).

Containment level 3 (CL3) applies to the laboratory that handles agents requiring containment level 3. These agents may be transmitted by the airborne route, often have a low infectious dose to produce effects and can cause serious of life-threatening diseases. CL3 emphasizes additional primary and secondary barriers to minimize the release of infectious organisms into the immediate laboratory and the environment. Additional features to prevent transmission of CL3 organisms are appropriate respiratory protection, HEPA filtration or exhausted laboratory air and strictly controlled laboratory access, BSCs are mandatory.

Containment level 4 (CL4) is the maximum containment available and is suitable for facilities manipulating agents requiring containment level 4. These agents have the potential for aerosol transmission, often have a low infectious dose and produce very serious and often fatal disease; there is generally no treatment or vaccine available. This level of containment represents an isolated unit, functionally and, when necessary, structurally independent of other areas. CL4 emphasizes maximum containment of the infectious agent by complete sealing of the facility perimeter with confirmation by pressure decay testing; containment in a positive pressure suit or containment of the pathogen in a Class III BSC line; and decontamination of air and other effluents produced in the facility.

1.3 Diagnostic Testing:

Containment level 2 is appropriate for facilities handling diagnostic samples that are not likely to be infected with a FAD. For example, routine diagnostic testing performed in a provincial veterinary diagnostic laboratory. Physical requirements and operational procedures should be in place to contain and protect staff in the event that a risk group 3 pathogen is detected.

Foreign animal disease agents may only be imported into, under the CFIA Animal Pathogen Importation Program, and manipulated within, a full containment level 3 laboratory certified by the Canadian Food Inspection Agency. Diagnostic tests that do not use positive FAD control material are not required to be conducted in a full level 3 laboratory. However, the possibility of dissemination and the potential for severe economic impact caused by an FAD outbreak requires that further biosecurity and biosafety measures beyond level 2 be implemented.

1.4 FAD Diagnostic Containment:

- FAD Diagnostic Containment is required for Network laboratories receiving, handling, and testing samples for FADs.
- FAD Diagnostic Containment does not allow for manipulation of live FAD agents; this work requires full containment level 3 or above. Diagnostic tests that do not require positive control material may be used in FAD Diagnostic Containment (eg. PCR, ELISA).
- Upon receipt of a suspect sample, no testing should be carried out by any other department until such time as the FAD testing is complete and the results are negative. A portion of the sample(s) can be stored until the FAD testing is complete and negative. The stored sample can then be retrieved and remaining tests can be carried out safely and at the appropriate containment level.
- When a FAD is detected, then the appropriate sample(s) will be sent to the NCFAD for confirmatory testing in compliance with the *Transportation of Dangerous Goods Regulations* (eg. for avian influenza, sample submission is described in the *NAI Hazard Specific Plan* and the *National Avian Influenza Laboratory Network Operating Policy and Procedures*) . All remaining tissues will be autoclaved or incinerated and the area will be thoroughly decontaminated. There will be no further manipulation or transfer of positive FAD material to other laboratories.

- There will be no amplification of known positive FAD material (eg. culture, egg inoculation). Although egg inoculation is used to test for avian diseases, when a positive FAD is identified then no further inoculations may occur and all positive material must be autoclaved or incinerated.

The following operational practices are required in addition to the general operational practices for containment level 2:

- Personnel will wear protective clothing (solid-front non-absorptive, back-fastening gowns with tight-fitting wrists, powder-free gloves, and N–95 respiratory protection) in accordance with the risk of exposure when handling specimens. The need for respiratory protection is determined by the laboratory.
- All work with potentially infectious material will be conducted in a certified biological safety cabinet (BSC) using level 3 operational procedures.
- All samples submitted are of a size that can easily be manipulated in a BSC (ie. blood, swabs, birds).
- All centrifugation of samples will be conducted in closed containers in sealed cups or rotors.
- All contaminated liquid and solid wastes must be decontaminated prior to disposal, preferably by autoclaving.

Chapter 2 Physical Requirements

The minimum physical requirements described below apply to Network laboratories testing for foreign animal disease agents. The *Containment Standards for Veterinary Facilities* and the *Laboratory Biosafety Guidelines* have been referred to in development of these requirements.

Although the wording may differ slightly from the *CSVF*, CL2 requirements have been included below to allow for comparison with FAD Diagnostic Containment requirements.

These requirements may be amended by the Office of Biohazard Containment and Safety (OBCS), however, changes will be made in consultation with NCFAD and Network laboratories. The OBCS will make any changes or updates available via its website, email, mail or other.

Key: ● Mandatory
❍ Recommended

		CL2	FAD DX
PHYSICAL REQUIREMENTS			
2.1	**Location and Access**		
	Dedicated and controlled access to be limited to authorized personnel into the laboratory zone.	●	●
	Access to be controlled within the laboratory zone.	❍	●
	Doors to the containment laboratory to be lockable.		●
	Laboratory doors to have appropriate signage (i.e. hazard identification, name and phone number of contact person, entry requirements).	●	●
	Anteroom to laboratory zone to be provided with clothing change area to separate personal clothing from laboratory clothing dedicated to that zone.		●
	Anteroom can be considered as a change room and a single change room can include both a clean and dirty change area with a line demarcating the difference.		●

	Office areas to be located outside of laboratory zone.	●	●
	Dedicated clerical work stations within the laboratory work areas to be segregated from hazardous materials.	●	●
	Laboratory support services (ie. storage, receiving, shipping, etc.) to be provided adjacent or at close proximity to the containment facility to minimize the potential for cross contamination.		●
2.2	**Surface Finishes and Furnishings**		
	Doors and frames to be non-absorptive and have solid finishes (ie. unfinished wood is not acceptable); hollow doors must be sealed.	❍	●
	Interior surfaces (ie. floors, walls, benches, casework, etc.) must be non-absorptive and able to withstand decontamination methods.	❍	●
	Interior coatings to be cleanable.	❍	●
	Interior surfaces to be continuous (flooring with welded seams is acceptable).	❍	●
	Surfaces to be continuous and compatible with adjacent and overlapping materials to maintain adhesion and a continuous perimeter.	❍	●
	Surfaces to be scratch, stain, moisture, chemical and heat resistant in accordance with function.	●	●
	Bench tops to be continuous (no open seams).	●	●
	Interior surfaces to provide impact resistance in accordance with laboratory function.		●
	Floors to be slip-resistant.	●	●
	Hooks to be provided for solid-front gowns at the exit (street clothing to be separated from laboratory clothing).		●
2.3	**Laboratory Services**		
	Exposed laboratory services piping with stand-offs for maintenance and cleaning.	●	●
	If used, portable vacuum pump to be dedicated to the laboratory.		●

	Hand washing sink to be provided with "hands-free" capability.	❍	●
	Hand washing sinks to be located near the point of exit from the lab or in the anteroom.	❍	●
	Emergency eyewash facilities to be provided in accordance with lab activities and applicable regulations (i.e. ANSI Z358.1 *Emergency Eyewash and Shower Equipment* (2004)).	●	●
	Emergency shower equipment to be provided in the in the laboratory area in accordance with laboratory activities and applicable regulations (i.e. ANSI Z358.1 *Emergency Eyewash and Shower Equipment* (2004)).	●	●
	Power system circuit breakers to be located outside containment perimeter.	❍	❍
	Circuit-breakers and controls to be appropriately labelled.	●	●
	Life-safety systems, lighting, biological safety cabinets, and other essential equipment to be supported by normal emergency power.	●	●
	HVAC systems to be supported by normal emergency power.		●
	Communication system (e.g. intercom, telephone) to be provided between laboratory area and outside laboratory zone.		●
	System (eg. fax, computer) to be provided for electronic transfer information and data to outside containment.		●
2.4	**Containment Perimeter**		
	All mechanical, electrical and service piping penetrations to be sealed with non shrinking sealant at containment perimeter.		●
	Window to be designed to be integrated with (HVAC) - no condensation, wetting and/or frost build-up.	●	●
	Windows positioned on containment perimeter to be sealed and to provide required level of security.	●	●
	Door openings to allow passage of required equipment.	●	●
	Double door autoclave located on the containment perimeter or autoclave within containment perimeter.		❍

	Autoclave located at the perimeter should be equipped with an interlocking mechanism to prevent both doors from opening at the same time.		❍
	If it is not possible to locate the autoclave at or within the containment perimeter, then strict waste control procedures must be implemented for the transport of waste and equipment in leakproof and impact resistant containers to a suitable autoclave within the facility.		●
	Autoclave to be equipped with a cycle log recorder (time, temperature, and pressure).	●	●
	For materials that cannot be autoclaved other accepted technologies for decontamination, (eg. incineration, chemical dunk tank) to be provided at or within the containment perimeter.		❍
	If not possible to install other accepted technologies on the perimeter or inside, then strict waste control procedures must be implemented for the transport of waste to such systems.		●
	Laboratory zone to be proofed against entry or exit of vermin, insects or birds.	●	●
2.5	**Air Handling System**		
	Exhaust from the laboratory to provide a minimum of 10 air changes per hour under normal operations.	●	●
	HVAC air distribution designed to minimize dead air spaces within the laboratory.	●	●
	Supply & Exhaust diffusers located to provide convection patterns that ensure airflow away from lab entrance.	●	●
	Supply and exhaust diffusers, biological safety cabinets and fume hood locations must be taken into consideration.	●	●
	Inward directional airflow to be maintained across the containment perimeter. Note: Positive pressurization is acceptable in PCR rooms, where samples have been treated in such a way that they are non-infectious.	●	●
	Visual pressure monitoring devices at the laboratory entrance to monitor pressure between containment zones For diagnostic laboratories, simple visual indicators are acceptable (e.g. ribbon, ball).		●

2.6	**Biological Safety Cabinets (BSC)**		
	BSCs or other primary containment devices to be provided.		●
	Certification of biological safety cabinets by NSF accredited certifier in accordance with CSA Z316.3-95, *Biological Containment Cabinets: Installation and Field Testing* (1995) or *NSF 49-2002 Class II (Laminar Flow) Biohazard Cabinetry*.	●	●
	BSC to be located away from high traffic areas, doors and air supply/ exhaust ducts that may interrupt air flow patterns.	●	●
	BSC to have minimum clearance of 30 cm provided between exhaust outlet on top cabinet and overhead obstructions.	●	●
	A 30 cm clearance to be provided on each side of the cabinet to allow for access.	❍	❍

Chapter 3 Operational Practices

Facility personnel and laboratory staff handling infected, or potentially infected samples could be exposed to infectious agents through accidental inoculation, cuts or punctures with contaminated instruments, contact with open wounds, contact with mucous membranes and/or accidental ingestion.

Biosafety practices must be written and implemented for FAD diagnostic laboratories (refer to Chapter 4: Standard Operating Procedures).

3.0 General Requirements

General laboratory practices are required when working in any containment laboratory. These can be referred to in the *Containment Standards for Veterinary Facilities* and the *Laboratory Biosafety Guidelines.*

The following operational practices describe those that must be implemented in addition to the general practices mentioned above.

		CL2	FAD DX
OPERATIONAL PRACTICES			
3.1	**Safety Manual/ Training**		
	Laboratory reference material should be kept in the laboratory zone.	❍	❍
	Employees working in the containment area must have a general knowledge of the physical operation and design of the facility (e.g. air pressure gradients between zones, directional air flow patterns, alarm signals for air pressure failure, containment perimeter.	●	●
	A Respiratory Protection Program must be in if respirators are used as personnel protective equipment. (CSA Z94.4-02 Selection, Use, Care of Respirators)		●
	General protocols must be supplemented with protocols specific to each project in progress. Those protocols must be read and understood by personnel.	●	●
	Entry/exit protocols for persons, animals, equipment, samples, waste, etc. must be written and followed.	●	●

	Employees must certify in writing that they have understood the material in the protocol	●	●
	Emergency procedures for entry/exit, spill clean-up, air handling/biosafety cabinet failure, fire, animal escape and other emergencies written and followed in the event of life-threatening emergencies.	●	●
	Exit protocols must be established whereby routine procedures can be bypassed. A reporting area must be identified where further steps must be taken (e.g. disinfecting footwear, changing) prior to leaving.	●	●
	Personnel must receive training on the potential hazards associated with the work involved and the necessary precautions to prevent exposures to zoonotic agents and release of non-indigenous agents. Personnel must show evidence that they understood the training provided. Training must be documented and signed by both the employee and supervisor.	●	●
	All persons (including visitors, maintenance staff, etc.) entering the containment area must be trained and follow all relevant protocols for the project in process. Trainees must be accompanied by a trained staff member.	●	●
	Laboratory personnel must be trained in and follow the safe use of laboratory equipment, biological safety cabinets, procedures to minimize the production of aerosols, decontamination and emergency response.	●	●
	Personnel must demonstrate proficiency in microbiological practices and techniques (e.g. experience in handling infectious organisms or cell cultures).		●
	A health and medical surveillance program must be provided as recommended by Health Canada.	●	●
3.2	**Entry Requirements**		
	Staff or visitors must agree, before entering the laboratory, not to have contact with susceptible species for a period of five (5) days.		●
	Entry must be restricted to laboratory staff, animal handlers, maintenance staff and other persons on official business.	●	●

	Only persons meeting specific entry requirements (e.g. immunization, serum screening) may enter containment laboratories unless the facility has been appropriately decontaminated.	●	●
	Persons entering the containment facility must be well prepared and bring all materials they will need with them. If something has been forgotten, traffic patterns must still be adhered to (ie. do not go back to get it; either phone for someone to bring it or exit via proper protocols).		●
	Open-toed and high-heeled shoes must not be worn in the laboratory.	●	●
	Long hair should be tied back so that it cannot come into contact with hands, specimens, containers, or equipment.	❍	❍
	Traffic flow patterns from clean to dirty areas must be established and adhered to (i.e. move from least to most contaminated areas).	●	●
	Personal items such as purses and outdoor clothing must be kept outside the laboratory.	●	●
	A containment check must be performed prior to entering the laboratory zone (ie. verify negative lab pressurization as designed).		●
	Smoke testing (i.e. with a smoke pencil) should be done periodically by laboratory staff to verify correct airflow.	❍	❍
	Personnel entering the laboratory zone must remove street clothing and jewellery, and change into dedicated laboratory clothing and shoes. Note: jewellery also includes body piercings; both exposed and covered by PPE.		●
3.3	**Practices in Containment**		
	A second layer of protective clothing (ie. solid-front non-absorptive, back-fastening gowns with tight-fitting wrists, powder-free gloves) must be worn over dedicated laboratory clothing when directly handling potentially infectious materials (e.g. dedicated for use at the biological safety cabinet). Laboratory workers should wear respiratory protection in accordance with the risk of human exposure when handling specimens. The need for staff to wear respiratory protection is determined by the laboratory.		●

	Powder-free gloves (e.g. intact vinyl or latex) must be worn when handling potentially infectious materials and should be of a length to ensure no skin or gown cuff is exposed. Metal mesh gloves can be worn underneath the latex or vinyl glove to provide protection from sharps and needles.	●	●
	Eye and face protection must be worn when it is necessary to guard against splashing hazardous materials, flying particles, and harmful light or other rays.	●	●
	Hands should be washed frequently (after handling infectious materials, after removing gloves, and before leaving the laboratory).	●	●
	Open wounds, cuts, scratches and grazes must be covered with waterproof dressings. Dressings must not be worn out of lab and should be removed prior to washing up on exit from the laboratory.	❍	●
	Eating, chewing gum, drinking, smoking, storing food, and applying cosmetics are prohibited.	●	●
	Where the perimeter autoclave is used to pass materials into the laboratory, the autoclave must have been cycled prior to opening the outer "clean side" door.		●
	All activities with infectious materials are conducted in a biological safety cabinet.		●
	Centrifugation of infectious materials must be carried out in closed containers placed in sealed cups or rotors that are unloaded in a biological safety cabinet.		●
	All spills, accidents, overt or potential exposures to infectious materials, and losses of containment (e.g. lab positive pressurization) must be reported immediately to the laboratory supervisor. Written records of such incidents must be maintained.	●	●
	A biohazard spill kit must be kept within the laboratory and be easily accessible. Examples of what should be included in the spill kit can be found in Appendix B.	❍	●
	Work areas containing hazardous materials should be kept free from materials not pertinent to the work and that cannot be easily decontaminated (e.g. journals, books, correspondence). Paperwork and report writing should be kept separate from such work areas.	❍	❍

	Agents stored outside the laboratory must be kept locked in leakproof containers.		●
	Laboratory doors must be kept closed as required by the facility design.	●	●
	The laboratory zone must be kept locked.		●
	An effective pest (rodent, insect, etc.) control program must be maintained.	●	●
3.4	**Decontamination/ Exit**		
	All contaminated work surfaces must be decontaminated.	●	●
	Contaminated equipment leaving the laboratory for servicing or disposal must be appropriately decontaminated.	●	●
	All contaminated waste materials leaving the laboratory zone must be decontaminated, preferably by autoclave. If an autoclave is not present within the laboratory zone then strict waste control procedures must be implemented for the transport of waste and equipment in leakproof and impact resistant containers to a suitable autoclave within the facility.		●
	Heat sensitive materials that cannot be autoclaved must be decontaminated by other effective means.		●
	All reusable equipment that is contaminated must be decontaminated (eg. autoclaved) before it is cleaned for reuse.	●	●
	Sample submission containers must be decontaminated by autoclaving prior to being sent back into the field.		●
	Contaminated clothing must be decontaminated prior to laundering (unless laundering facilities are within the laboratory zone and have been proven to be effective in decontamination of the microorganisms likely to be encountered).	●	●
	Efficacy monitoring of autoclaves using biological indicators must be done at least weekly, depending on the frequency of use of the autoclave, and records of the results kept on file. Cycle log records (i.e. time, temperature and pressure) must be kept on file.	●	●
	Where a known or suspected aerosol exposure has occurred, (e.g. dropping infectious materials) personal protective equipment must be removed and decontaminated.		●

	Protective clothing must be removed on exit from the laboratory.	●	●
	Eye glasses to be disinfected at the containment perimeter.		●

Chapter 4 Facility Certification

4.1 Certification

The Office of Biohazard Containment and Safety will perform an initial certification of each FAD diagnostic laboratory and bi-annual re-certifications. The critical containment components to be verified during initial certification are provided in section 4.3**.** A floor plan of the facility with specifications of surfaces should be submitted for review. Operational protocols must also be established and submitted for review before FAD diagnostic testing can be carried out. Training of personnel is a critical aspect of this process and may involve initial work with non-infected tissue. Training must be documented and signed and should include, but is not limited to the user's understanding of the physical operation and design of the facility (pressure gradients, directional airflow, alarm signals) in addition to laboratory procedures. Training must cover a respiratory protection program, (if respirators are used), standard operating procedures (SOP), including entry and exit protocols, emergency procedures, safe use of laboratory equipment, and proficiency in microbiological practices and techniques. Detailed records of the certification process and test reports must be maintained and submitted to the OBCS, CFIA. A site visit will be required.

4.2 Re-certification

Re-certification must be carried out every two years. Detailed records of test procedures must be maintained. Before program changes are implemented, operational procedures must be submitted for review. The re-certification submission consisting of verification and performance test results should be sent at least two months prior to the certification due date.

4.3 Verification and Performance Testing

Surface Finishes

Benches, casework, walls and floors to be visually inspected to determine whether they are cleanable and can withstand decontamination methods. Surfaces to be continuous and compatible with adjacent and overlapping material to maintain adhesion. Penetrations to be sealed to allow for thorough cleaning and decontamination.

Communication Devices

Communication and electronic paper transfer systems (e.g. intercom, telephone, fax) to be verified to ensure that systems will operate as specified.

Access Control/ Security Devices

Security systems (e.g. controlled access) to be verified to ensure that systems will operate as specified.

Demonstration of Inward Directional Airflow

Inward directional airflow to be visually demonstrated at all critical doors (e.g. by holding a smoke pencil or other visual air at each door leading to adjacent area). Provide a labelled plan with arrows, indicating the directional airflow for each door tested.

Autoclaves & Decontamination Systems

All treatment systems (e.g. autoclaves, etc.) to be verified for operation as specified and to be tested using representative loads.

Biological indicators must be used to ensure inactivation of loads and positive control must be from the same lot number.

All other decontamination systems (e.g. dunk tanks) to be verified for operation as specified. A description of the procedure to be followed must be provided.

Emergency Generator Test Report

Verify that all critical systems are on emergency power. Please provide load testing results verifying that the generator can pick up and carry the load when required.

Biological Safety Cabinets

Testing and certification of BSCs shall be performed in accordance with CSA Z316.3-95: *Biological Containment Cabinets (Class I and II): Installation and Field Testing* or *NSF 49-2002: Class II (Laminar Flow) Biohazard Cabinetry*.

Interlocks (i.e. Class II Type B2 BSC internal cabinet supply fan and exhaust fan) to be tested in accordance with the applicable NSF standard.

Standard Operating Procedures

SOPs for facility must be submitted for review initially and following any changes or updates.

Appendix A - Sample Receipt and Handling

PCR	Samples must be unpackaged and verified in a biological safety cabinet under FAD Diagnostic Containment. Samples (eg. swabs in transport media, 10% tissue emulsions) must be centrifuged within sealed cups or rotors. The samples will be processed into the RLT Buffer or phenol based reagent (ie: Tripure, Qiazol) whilst under FAD Diagnostic Containment. Once the samples are within the solutions, the virus is no longer deemed infectious and the PCR extraction could be performed in a level 2 laboratory if required.
ELISA	Samples must be unpackaged and verified in a biological safety cabinet under FAD Diagnostic Containment. The samples must be surface decontaminated and centrifuged within sealed cups or rotors. Following centrifugation, if samples are to be processed under: - FAD Diagnostic Containment:: Cups or rotors must be opened within the BSC where sera must then be decanted. Serum dilution and application to plate may be performed on the bench or within the BSC as desired. - Level 2 Laboratory: Cups or rotors must be opened within the BSC in the FAD Diagnostic laboratory. Samples can be placed in racks and transferred to a level 2 laboratory where the samples must be decanted inside a BSC. Serum dilution and application to plate may be performed on the bench or within the BSC as desired.
SOPs	Standard operating procedures to describe work flow and ensure appropriate decontamination of samples/ racks must be written and followed. Sample SOPs may be obtained from NCFAD.

Appendix B - Spill Kit

□ Paper towels
□ Plastic backed absorbent towelling e.g Versablot
□ Biohazard Sharps containers
□ Biohazard autoclave bags- various sizes
□ Disposable Nitrile gloves (all sizes)
□ Disposable Tyvek boot covers
□ Disposable Tyvek long-sleeved gown
□ Disposable Tyvek long-sleeved coveralls- all sized
□ Large forceps
□ Polypropylene dustpan, scoops, scrapers
□ Polyester brush/ handles - 12" and 24" (disinfect- DO NOT autoclave)
□ Magnetic clips/ tape (for sign posting)
□ Biohazard tape
□ **Biohazard** sign (plastic)
□ **Do Not Enter** sign
□ **Contaminated** sign
□ **Do Not Open** sign
□ Safety glasses
□ Respirator (N95 or higher protection)
□ Falcon tubes with appropriate disinfectant (e.g. 20 grams of Virkon)
□ Plastic bottle to make up disinfectant
□ 3M Air Mate head cover or hood
□ 3M Air Mate breathing tube
□ 3M Air Mate belt-mounted PAPR assembly
□ 3M Air Mate battery changer

References

Collins CH. 1993. *Laboratory Acquired Infections.* Third Edition. Butterworth-Heinemann Ltd. Oxford.

Containment standards for veterinary facilities. Ottawa: Agriculture and Agri-Food Canad, Minister of Supply and Services Canada, No. 1921/E, 1996. http://www.inspection.gc.ca/english/sci/lab/convet/convete.shtml

Laboratory Biosafety Guidelines. Third Edition. Health Canada, Minister of Health Population and Public Health Branch, Centre for Emergency Preparedness and Response, No. 4252, 2004. http://www.phac-aspc.gc.ca/publicat/lbg-ldmbl-04/index.html

Selection, Use, Care of Respirators. CSA Standard Z94.4-02. Toronto: Canadian Standards Association, 2002.

The Transportation of Dangerous Goods (TDG) Act (1992). Transport Canada http://www.tc.gc.ca/acts-regulations/general/t/tdg/act/tdg.htm