

Biohazard Containment Facility (BCF) Safety and Operations Manual

Northwest Animal Facility (NAF)
University of California, Berkeley



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**NORTHWEST ANIMAL FACILITY
BIOHAZARD CONTAINMENT FACILITY SAFETY MANUAL**

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INTRODUCTION

The Northwest Animal Facility (NAF) contains an area that has been specially constructed to support the study of infectious disease agents in research animal models. This area is identified as the **Biohazard Containment Facility (BCF)** and can safely support work

with infectious agents classified by the Centers for Disease Control/National Institute of Health (CDC/NIH) as “biosafety level two & three” (BL2) & (BL3) as described in their publication: Biosafety in Microbiological and Biomedical Laboratories, 5th edition, December 2009. The BCF is further subdivided into BL2 and BL3 areas. Throughout this manual, “BCF” and “Facility” refer to both sections together, and “BL3” and “BL2” to their respective areas. It is the responsibility of everyone who uses the BCF to know, understand, and follow the practices described in the CDC/NIH document as they apply to the infectious agent(s) with which they work, and also to know, understand and follow the requirements that are specific to this Facility. All persons entering the BL3 area must use full BL3 practices and procedures at all times, including changing into scrub suits, regardless of the classification of the agent being used. Likewise, BL2 practices are followed at all times throughout the BL2 area. All area-specific requirements are described in their own sections of the manual.

Because the BCF contains both laboratory and animal housing facilities, both portions of the CDC/NIH document apply. Also, because of the biohazard use oversight provided by the campus Committee on Laboratory and Environmental Biosafety (CLEB), the committee also reviews the operation of the entire Facility and conducts its own periodic inspections.

The NAF Mitigation Monitoring Program (NAF-MMP), which addresses community concerns regarding the BCF, requires that each person using the BCF must undergo initial training regarding the use of the Facility. They must also complete an annual refresher training. Because this is a “shared-use” facility, courtesy and cooperation are a required part of normal operations.

GENERAL SAFETY PRINCIPLES

The purpose of an animal use BCF is three-fold:

- to protect humans from the agents being used intentionally
- to protect the animals from agents other than those used intentionally
- to protect the rest of the Facility and the outside community from the accidental release of infectious agents

BCF practices include the use of personal protective equipment (PPE) such as gowns, gloves, and eye protection; and other specialized equipment and procedures designed to prevent the spread of infection or contamination by aerosolization or vaporization, as well as by accidental self-inoculation or exposure through open wounds or mucous membranes. Training in the proper use of the equipment and procedures is an integral part of the requirements for using the BCF. Safe laboratory practices in the Facility include the safe handling of infectious agents and chemicals, and careful adherence to animal handling protocols as provided by the Office of Laboratory Animal Care (OLAC), the Animal Care and Use Committee (ACUC), the Committee on Laboratory and Environmental Biosafety (CLEB), as well as general laboratory safety. The specific guidelines and procedures outlined below are to be followed in addition to general safe laboratory practice. Good judgment and proper training should allow each worker in the Facility to recognize potentially hazardous situations and to react accordingly to avoid or correct them.

The containment concept of the BCF is that the hazard is primarily contained within the housing cages (micro-isolator type), secondarily in a biosafety cabinet and thirdly by maintaining proper airflow through the BCF. Therefore, all work involving infectious agents and any other work with the potential for generating a hazardous aerosol is to be done in a biosafety cabinet, or fume hood if appropriate. This concept is also reinforced by maintaining airflow moving from outside the Facility into the corridors and thence into the rooms, thereby providing a barrier to prevent any aerosolized infectious agent within a room from reaching a less protected area. Therefore:

ALL CORRIDORS AND COMMON AREAS MUST BE PROTECTED FROM INFECTIOUS MATERIALS AT ALL TIMES.

This is the rationale behind the careful disinfection procedures and PPE removal requirements when moving from room to corridor, regardless of destination, which are described below.

Additionally, the Cal/OSHA Aerosol Transmissible Disease standard (available at <http://www.dir.ca.gov/title8/5199.html>) applies to the BCF. All work with infectious agents that could generate an aerosol or splash **MUST** be performed within a functioning biosafety cabinet. All cage changing of animals within the BSL2 or BSL3 areas **MUST** be performed within a biosafety cabinet and used cages and water bottles must be bagged, disinfected, and autoclaved.

RECEIVING AUTHORIZATION FOR ENTRY

Access to the BCF is limited to authorized individuals only. Children (under 18 years of age) are prohibited at all times. Undergraduates are restricted from the NAF BL3 unless approved by both the Director of OLAC and the campus Biosafety Officer. Authorized individuals fall into two categories:

- 1) Authorized **users** are those persons trained in the necessary experimental and safety protocols and authorized by their principal investigator (PI) or the Facility supervisor to perform the protocols or provide care to the animals housed within the BCF. All persons using biohazardous agents must be listed on a **current** Biohazard Use Authorization (BUA) posted on each room where they will work. All persons using radioisotopes will be similarly listed on posted Radioisotope Use Authorizations (RUAs).
- 2) Authorized **entrants** are those who have a detailed knowledge of the safety requirements of the Facility but who will not handle infectious or toxic materials or animals housed in the Facility. This second category of individual is authorized to enter, **but not to use**, the BCF, and includes UC maintenance personnel and UC or other inspection personnel.

In addition, individuals who are either guests of PIs or non-UC maintenance personnel may be granted provisional or temporary entrance status:

- 3) Guests or short-term visiting scientists sponsored by a PI using the Facility may be granted provisional entrance status if they are continuously accompanied by the PI or their BCF lab safety officer during each use of the Facility. Please see visitor policy at <http://www.acuc.berkeley.edu/policies/visitors> for further information.
- 4) Temporary entrance status may be granted to maintenance personnel (e.g. FS) or contractors who are not UC employees. Contact the NAF Laboratory Safety Officer (NAF LSO), or the building manager, or the OLAC Director to arrange for the maintenance person(s) to be accompanied by one of them into the BCF. Explain the general contents of this manual to the person(s) prior to their entry. Confirm that they have no condition that would place them at added risk of illness or injury resulting from possible exposure to an infectious agent used in the BCF. Please review our Visitor policy at

<http://www.acuc.berkeley.edu/policies/visitors>

Entrance to the biosafety level 3 laboratories requires medical clearance and respirator fitting and training; therefore, allowing lead time to satisfy these requirements prior to entry is critical.

Consultation with your medical doctor is recommended or a visit to the UHS Occupational Health Clinic at the Tang Center (642-6891). No other persons will be allowed into the BCF who doesn't meet these requirements. Failure to comply with biosafety and safety guidelines can lead to immediate withdrawal of authorization to enter the Facility. Withdrawal and reinstatement of authorization may be made by the Director of OLAC, NAF LSO, CLEB, or the NAF Building Safety Committee.

It is the responsibility of the PI or departmental supervisor to ensure that anyone at high risk of adverse effects from accidental exposure to infectious or toxic materials be either excluded from using the BCF or advised of the particular hazards they face and provided with appropriate protective procedures and equipment if exclusion is not possible. It is the responsibility of ANYONE who works in this Facility to notify their supervisor of any personal condition that might place them at greater risk while using this Facility. See the section Use of Hazardous Materials within the BCF for details.

Only authorized users will be granted cardkey access into the Facility. Authorized **entrants** may, at the discretion of the Director of OLAC or NAF LSO, be issued access cards/codes. Personnel authorized to use the Facility shall not lend cardkeys to any unauthorized persons.

Evening or weekend work is not recommended, but if it is necessary, users are cautioned not to work alone. **If you use the Facility outside of normal working hours (8:00 AM-5:00 PM, Monday-Friday), you must sign in AND out at the security guard desk in the building entry hall.** Please indicate that you will be in the BCF in case of emergency response.

PERSONNEL TRAINING PROGRAM

All individuals authorized to enter the Facility, whether entrants or users, are required to review and follow the practices described in this SAFETY AND OPERATIONS MANUAL and to be familiar with all information contained within. In addition, all authorized persons will meet other requirements as listed:

- 1) Attend an introductory NAF Basic Safety training that includes an orientation to the BCF. These sessions are given almost monthly and are coordinated by the NAF LSO. Contact the NAF LSO, listed in Appendix A, when personnel are identified as needing this training so that they may receive it in a timely manner.
- 2) Completion of annual refresher sessions are also required for continued authorization. These are available online via the UCB Learning Center by logging onto (<http://blu.berkeley.edu>) or may be coordinated through the NAF LSO.
- 3) Each PI/lab group working in the BCF must have an approved Biological Use Authorization (BUA) that describes safety procedures used in conjunction with the research and each researcher must complete the “Introduction to Biosafety” training that is provided by the Campus Biosafety Program (<http://www.ehs.berkeley.edu/hs/71-biosafetyprogram.html>). This includes storage, handling and disposal methods for any infectious or hazardous materials or process, and also includes emergency procedures to follow should a mishap occur. If unusually hazardous materials are used, a copy of the Materials Safety Data Sheet (MSDS) for each material must be provided as well. If a material is new or proprietary, contact the NAF LSO for other ways to provide safety information. Researchers working in the NAF BL3 must also be trained on and follow the safety protocols for BL3 work as specified for the LKS and Hildebrand (in vitro) facilities.

PERSONNEL ENTRY AND EXITING PROCEDURES

The BCF is divided into the BL3 and BL2 areas by a door in the main corridor. **Except during an emergency, all movement between these sections is prohibited.** The door must remain closed at all times, but cannot be locked since it is an emergency exit for both sections. The door is connected to an emergency alarm which will sound if it is opened.

The procedures for entering and leaving the BL2 and BL3 areas are significantly different. **Specific requirements for entering and leaving each containment area are described in their own sections below.**

When leaving the housing, laboratory, or locker room areas, always washes your hands with soap as the last step before leaving the Facility.

ENTRY PROCEDURES FOR ANIMALS AND EQUIPMENT

- 1) Animals brought into the BCF must be approved by both OLAC and ACUC before entry. If necessary, they may be held in a quarantine area until the veterinary staff has determined that they carry no infectious agent that would threaten the existing populations.
- 2) Equipment must be surface decontaminated before being brought into the BCF if there is any possibility of it harboring animal pathogens. Equipment must also be capable of withstanding disinfection procedures if it might be removed later. Any equipment that cannot be so treated may be brought into the Facility only with the prior permission of the Director of OLAC or the NAF LSO. Clean caging may be brought in directly through the appropriate airlock without being enclosed in a biohazard bag or disinfected.

ANIMAL HOUSING, HANDLING AND MOVING PROCEDURES

- 1) All animals housed within the BCF must be within micro-isolator type caging since this serves as the first barrier to contain the hazardous agent. Any species that cannot be so housed must receive special clearance from OLAC prior to being brought into the Facility. Orange cage cards are available from OLAC and should be used to document all infection procedures, the date, agent used and route of administration.
- 2) All procedures that may generate an infectious aerosol must be performed within a biosafety cabinet. If there is no biosafety cabinet in the housing room where your animals are located, you must follow the transportation procedures described below to move them to a room containing a biosafety cabinet. The use of biosafety cabinets during cage changing is required under BL2 & BL3 level operations, but may be used under any conditions to isolate the worker from allergens. Standard biosafety cabinet disinfection protocols must be followed both before and after each procedure. This is a shared-use Facility, and disinfection of shared areas is of the utmost importance. All BCF fume hood exhaust air is centrally HEPA-filtered, so it is possible to use a fume hood for work with infectious agents **AS LONG AS** the work does not require keeping the materials free of contamination by room air. Contact the NAF LSO for further information before using a fume hood for infectious agent work.
- 3) All transport of animals within the Facility must be within micro-isolator type caging. For transport anywhere within the Facility, cages must be placed inside a biohazard bag which is then sealed. The outside of the bag is then thoroughly disinfected, as is any cart used for transporting the cage(s). Once this is done the cage(s) may be moved into the hall and the person transporting will remove their secondary layer of PPE as they would normally. Once at their destination the reverse process is followed (don secondary layer of PPE and then remove the cages from the bag(s) and work can proceed. Save the bag for re-use if appropriate.
- 4) All carcasses and animal tissues, bedding, caging, and dry waste used in conjunction with infectious agents must be handled as biohazardous waste. BL3 waste and carcasses is also

routinely autoclaved prior to disposal as biohazardous waste. Animal carcasses and tissues that have been frozen are to be moved to a Facility refrigerator 48-72 hours before autoclaving to ensure that the material is adequately thawed. Unless otherwise requested, dead animals found by OLAC staff over weekend or holiday periods will be red-bagged and left inside the room where found. If the PI or their staff requests it, the bag may be disinfected and placed in the refrigerator or freezer in room 183 (BL3 section) or 178 (BL2 section) for the PI to examine. Label all containers with the PI name and room # where found, at the minimum.

- 5) Should a spill of infectious agent occur, the affected area must be thoroughly treated to neutralize the release; generally 10% bleach is recommended for spills. If the release occurs within the BL3 area, all persons present in the room during the release must shower before leaving the Facility. See the section “IN CASE OF ACCIDENTAL RELEASE OF A TOXIC OR INFECTIOUS MATERIAL” for more details.

REMOVING WASTE, RESEARCH MATERIALS, AND ANIMALS FROM THE FACILITY

- 1) ALL waste from the Facility is considered hazardous by definition in the NAF Mitigation Monitoring Plan, even after autoclaving. Regardless, indicator strips or other positive confirmation of successful sterilization (indicator ink on biohazard bags is acceptable) must be incorporated with each autoclave run, only OLAC should be operating the autoclave. Should the indicator not change color to indicate a correct autoclave cycle, contact either the OLAC Laboratory Animal Supervisor II (LAS) or the NAF LSO immediately. OLAC personnel will perform a check of autoclave function at least monthly.
- 2) All Facility waste must be transported to the autoclaves in sealed, disinfected **red** biohazard bags contained within tightly closed barrels. Materials from either section that need to be autoclaved that are too big for a red barrel must be double-bagged, sealed, the outer bag surfaces disinfected, and then carefully carried to the appropriate autoclave and autoclaved immediately. If the autoclave is in use, place the materials in the holding bin near the autoclave, to be autoclaved during the next cycle.

Specific requirements for handling waste in each containment area are described in their own sections below.

- 3) Researchers are responsible for depositing waste into the red barrels and closing the lids. OLAC should use only the freight elevator nearest the autoclave for transporting biohazardous waste barrels to the cold room off the loading dock and return the barrels to the corridor by the autoclave when you are finished. It is the responsibility of research personnel to notify OLAC if they do not want items discarded after the autoclave is run. Anything removed from the autoclave by OLAC personnel will be treated as waste. Only trained OLAC personnel shall run the autoclave, following instructions posted near the unit. All autoclaved materials shall be removed through the autoclave door in the corridor OUTSIDE the Facility.
- 4) Supplies and equipment must also be disinfected prior to removal from any part of the BCF. Disinfection of large pieces of equipment or materials that cannot be autoclaved may take place in the room where used, immediately prior to removal.
 - a) Spray the equipment with an effective concentration of an appropriate disinfectant or as specified in your BUA and wipe with paper towels to completely decontaminate the surface. Wipe up any spray that reached the floor to prevent a slip hazard.
 - b) Take the equipment into the dirty side of the cage wash for normal cleaning.
 - c) Any equipment that cannot be easily treated must have the approval of the Director of OLAC or NAF LSO prior to use. Some equipment may require decontamination from an outside vendor prior to being removed from the BCF.
- 5) Infectious materials or animals being taken from either area of the BCF to other CLEB approved laboratories must be contained in a primary, unbreakable and leak proof container. This is sealed within a **red** biohazard bag whose outer surface is disinfected, and this in turn is placed in another opaque container (usually a cardboard box or small Styrofoam cooler.) Leave the opaque container just outside the door to the room where the work is being done. The opaque container also contains the name, lab address and lab phone # of the PI or responsible designee. The opaque container should not display outward evidence of containing biohazardous materials, but anyone opening the container should see a biohazard symbol inside it before opening anything else.

- 6) Any wanted chemicals or waste from the BCF requires special handling. Do not put them in biohazardous barrels as autoclaving volatile chemicals like formalin or ethanol can be dangerous.

If special permission is granted for work that differs from standard research with infectious agents in the BCF, all waste disposal procedures should be specified in writing prior to starting work. If there are any questions about these procedures, please contact the NAFLSO immediately.

Two types of biohazardous waste bags are stocked in the BL2 & BL3 in various rooms. Red bags should be used for lab waste, carcasses, used PPE, etc. that will be removed by OLAC in barrels and disposed as biohazardous waste. Clear bags are also marked with biohazardous symbol but should only be used for reusable items like cages and water bottles. OLAC will spray down the outside of the clear bags and autoclave them prior to running them through the cage wash and reusing them.

ROOM DOOR SIGNAGE

- 1) Each room within the Facility that contains hazardous or infectious material must be posted with appropriate information. Door signs generated by the Campus Biosafety Officer from approved BUAs will indicate the approved PIs, infectious agents, biosafety level and any unique precautions on each door. If your work is not included on the door sign, immediately contact the NAF LSO.
- 2) General guidance including a list of personal protective equipment required for entry and emergency contact information is posted on the main entrance doors to the BL2 and BL3.
- 3) Post RUAs and chemical inventory door sign relevant to our work on the door to each room to which they apply. Contact the NAF LSO for additional signage, as needed.

USE OF HAZARDOUS MATERIALS WITHIN THE BCF

- 1) It is the **responsibility of the PI (for academic personnel) or department supervisor (for non-academic personnel)** to advise any employee or student who will be using the BCF of the particular hazards they face if accidentally exposed to infectious or toxic materials. Persons who are at increased risk of acquiring infection or suffering increased illness or injury from infection or exposure should be excluded from using the BCF. If exclusion is not possible, then the employee or student in question should be fully informed of and understand the risks. It is the responsibility of the PI or supervisor to assure that any additional appropriate protective measures and equipment are provided. It is the **responsibility of EVERYONE** who works in this Facility to notify their supervisor if they have any personal condition that may reasonably place them at greater risk of infection or adverse effects of infection while using this Facility. Such conditions include but are not limited to: pregnancy; some chronic, long-term infections (such as HIV, Hepatitis, and others); significant loss of sight or hearing (inability to recognize alarms); immunosuppressant conditions; and mobility limitations. Employees or students with particular concerns or conditions should be evaluated for questions regarding risk or exclusion by their personal health care provider/physician. PI's and supervisors with

questions about exclusion or risk may consult with the Occupational Health Clinic at (510) 642-6891.

- 2) All hazardous materials contained within the BCF must be recorded by the PI's staff into that PI's chemical inventory, accessible by computer through the EH&S web site (www.ehs.berkeley.edu). Open the link "Compliance Assistance" and then "Chemical Inventory", and follow the instructions from there. Update the quantities annually or when hazardous materials are introduced or removed.
- 3) Hazardous materials storage, use and disposal must conform to building requirements, PI standard operating procedures, and campus regulations. A Chemical Hygiene Plan must be posted in each laboratory where hazardous materials are used. Any material that is volatile or may generate a hazardous aerosol must be used within a fume hood. All BCF fume hood exhaust air is centrally HEPA-filtered, so it is possible to use a fume hood for work with infectious agents **AS LONG AS** the work does not involve keeping the materials free of contamination by room air. Contact the LSO for further information before using a fume hood for infectious agent work, or if you have questions about the Chemical Inventory or Chemical Hygiene Plan.
- 4) A copy of the MSDS for each hazardous material stored in the BCF should be in the location where the material is located for ready reference.
- 5) At this time, inventorying infectious agents is not required. It is possible that this may change in the future. The LSO will inform biohazard users of any new requirements. Agent use should be indicated on the room's door sign

EQUIPMENT CLEANING AND MAINTENANCE RESPONSIBILITIES

All authorized Facility personnel are responsible for keeping their laboratory and housing areas clean and safe. Facility maintenance requests are coordinated through OLAC. Please refer to **Appendix C** for information about working with and protecting campus maintenance personnel while in the Facility.

1) GENERAL RESPONSIBILITIES

All laboratory areas are to be cleaned daily when in use by research staff. Disinfect or decontaminate surfaces with appropriate materials, remove waste using appropriate procedures, and check that all hazardous or infectious materials are properly stored. OLAC staff is not responsible for maintaining laboratory areas or disposing of laboratory waste.

2) AUTOCLAVE OPERATION- Operation allowed by trained OLAC personnel only a)

Sweep out all debris from the bottom of the autoclave before each run.

b) Inspect and clean the chamber drain screen near the door prior to heating the unit.

c) Inspect the autoclave for leaks during startup and shutdown.

d) Always operate the autoclave in accordance with the manufacturer's instructions (posted on the control panel).

e) User Calibration Checks: For every autoclave run, the user shall check that the indicator ink on the autoclave bag(s) has correctly changed color.

f) If the indicator fails to change color properly, notify the OLAC supervisor or Animal Technician currently assigned to the BCF, or the NAF LSO immediately. Once the problem has been corrected, the materials from the failed run shall be re-autoclaved.

g) OLAC personnel will place a biological indicator test ampoule deep within a full load once monthly to monitor autoclave function. The result will be recorded in an autoclave log sheet.

h) Report any failure of autoclave function to the OLAC manager, or the NAF LSO immediately. They will obtain repair service at once.

3 FUME HOODS AND BIOSAFETY CABINETS

a) All fume hoods and biosafety cabinets must be used according to manufacturer's specifications for effective protection.

b) All hoods and biosafety cabinets are certified at least yearly by or through EH&S.

c) Report any failure of a hood or cabinet or components to the OLAC manager, or the NAF LSO immediately. They will obtain repair service at once.

4) HEPA FILTERS

All air leaving the BCF is HEPA (High Efficiency Particulate Air) filtered. There are magnehelic (differential pressure) gauges for the Facility's HEPA filters above the door of room 173, and these should never be "pegged" to the right. If either of these gauges is

pegged, or if any failure or problem associated with these filters occurs, report the problem to the OLAC manager, or the NAF LSO immediately. They will obtain repair service at once.

5) NEGATIVE AIR PRESSURE MONITORING

The BCF's air pressure gradient is designed to be negative with respect to the outside hallways, and the rooms are to be negative relative to the corridor (air flows from outside the Facility through the corridor and into each room.) Air should NEVER flow from any room into the corridor, or from the corridor to the outside hallway. BCF users should visually check for appropriate airflow on a routine basis. A simple test to see if a room's pressure is negative to the corridor is to hold a piece of tissue paper roughly 1/2" x 6" in the narrow gap created by holding the room's door slightly ajar. The paper should be pulled into the room by the airflow. The airflow monitors on the fume hoods should always register in the green zone as indicated by the small colored lights.

Please report any alarms or significant change in Facility or room to corridor airflow to the OLAC Supervisor, OLAC MSO or the NAF LSO at once.

If a fume hood monitor moves into a red zone, CLOSE THE SASH AND DO NOT USE THE HOOD until the problem is corrected. Some biosafety cabinets have airflow monitors similar to the fume hoods, others do not. If the monitor alarm sounds or if you think the biosafety cabinet is malfunctioning, report the problem immediately as above.

EMERGENCY PROCEDURES

Because of the isolated nature of the BCF and the stringent access and containment requirements that govern the use of it, emergency procedures within the Facility are different from those in other areas of the NAF.

1) SUDDEN ILLNESS OR INJURY

- a) GET HELP IMMEDIATELY. Call 911 if it is an emergency, and call out for help from anyone else in the Facility. If you are alone, call the OLAC emergency number 3-8387

(3VETS) for help. There is a telephone located in the BL3 area corridor at the north inner airlock door (room 187) that can be used to reach 911 or another campus number, but not any off-campus number. **In an emergency, you may go through the door separating the BL2 and BL3 areas in order to use the phone.** You will need to communicate via phone what the nature of the emergency is, and whether it is safe for others to enter. If you cannot call, activate the fire alarm. If you pull the fire alarm, the building must be evacuated and help may be slightly delayed; but this is an effective alternative if you cannot reach a phone.

- b) Give any needed first aid if possible or appropriate. There is a first aid kit located in room 180 (the autoclave room). Because of the isolated nature of the BCF it is very strongly recommended that you DO NOT work alone in the Facility.

2) FIRE

- a) Fire extinguishers are located throughout the facility. Only try to put out the fire yourself if you have already called 911 and you will not endanger yourself by doing so (read the general fire safety procedures in the NAF Building Safety Manual).
- b) If you have not been trained to use a fire extinguisher or it is unsafe to fight the fire yourself, leave the room, close the door, and pull the fire alarm. Leave the BCF as usual an evacuation, but you must identify yourself to the emergency coordinator (the person in the orange hat outside the NAF) as being the activator of the alarm and offer whatever information you can to firefighters when they arrive.

3) MAJOR EARTHQUAKE

- a) **PLAN AHEAD.** For each room, know where you will go during an earthquake. Remember that you will probably lose power at least temporarily and be in total darkness (unless you have equipped your lab with an emergency light or carry a working penlight) so known where your protected area is and go to it at once.
- b) When the building stops shaking, if you or someone else is injured, give first aid if possible, and either transport the victim or send others for help. **It may be impossible to clearly tell whether moving an injured person (which could result in more severe**

injury), or leaving them where they are and sending for help, is the better choice. All you can do is use your best judgment and decide. The most important things to accomplish are to safely evacuate as many people as possible from the building, and to know who, where, and in what condition, any remaining people are, so that help can reach them quickly. If you are alone and injured, use whatever means available to get assistance. (i.e., yell for help, use a telephone or pull the fire alarm)

- c) **Your primary responsibility is your own safety.** If your safety is threatened, leave the BCF **AT ONCE**, removing PPE as you go. Maintaining containment is only of secondary importance. If it is safe to remain long enough to do so, check to see if any infectious or toxic material has spilled, and if so, quickly decontaminate or neutralize it. If inactivation is not possible, try to contain the spill so that it doesn't get to a floor or sink drain, and then leave the area and remove your PPE as you normally would.
- d) **Never remove any animals from the facility during an emergency situation.**

ACCIDENTAL RELEASE OF A TOXIC OR INFECTIOUS MATERIAL

One of the primary requirements of occupancy in the NAF is that you create, post, and follow standard procedures for spill or release control. There is a general spill control cart in room 114 (lower level lecture room), but each laboratory must have decontamination/inactivation materials readily available to neutralize a spill of their specific hazardous material(s) should one occur.

- 1) IF THE SPILL IS LARGE OR IF THE RELEASE ENDANGERS YOU OR OTHERS WITHIN THE FACILITY, ACTIVATE **and the** FIRE ALARMS IN ORDER TO BEGIN A BUILDING-WIDE EVACUATION. IF POSSIBLE, NOTIFY ALL OTHER BCF OCCUPANTS OF THE DANGER, AND LEAVE THE BUILDING. **REPORT TO THE EMERGENCY COORDINATOR SO THAT YOU CAN GUIDE EMERGENCY RESPONSE PERSONNEL.**
- 2) Contain and clean-up small spills by following the standard operating procedures for your lab (usually 10% bleach is most effective). Contact the NAF LSO for specific waste

disposal instructions, and to find out if any further action is required. Many spills require that some form of documentation be completed in order to dispose of cleanup materials.

- 3) If the spill is an infectious agent and occurs in the BL3 area, you must shower before you leave the locker room.
- 4) Try to keep any spills from reaching the sewer, either by floor drain or down the sink. If a release should reach the sewer, IMMEDIATELY call the office upstairs (2-9232 and contact EH&S at 642-3073.

INSPECTIONS

Periodically and by prior arrangement with the users, the LSO is required to inspect the housing and laboratory spaces within the Facility to ensure that safety procedures are being properly followed. There must be documentation of these inspections and their results. If you have questions, please discuss them with the LSO when arrangements for the inspection are being made, or at any time they arise.

- 1) Self-inspect laboratory facilities annually. Each PI or safety officer needs to complete a Laboratory Self-Inspection Form, which is provided by the OLAC MSO or your departmental safety coordinator (DSC). The NAF LSO may be present during an inspection upon request.
- 2) File a copy of each completed Self-Inspection form with EH&S. Additional blank forms are available from the LSO if needed.
- 3) Correct deficiencies found during inspections as soon as possible. If the inspection uncovers a problem, the LSO will coordinate with you to help correct it. Only under the most extraordinary circumstances would the LSO take immediate action, and part of the purpose of this process is to prevent such action from ever being needed.

CONCLUSION

Despite the many constraints placed upon those who work within the Biohazard Containment Facility, every attempt has been made to minimize the impact of those constraints. The operation of the Facility is subject to change, and your suggestions for improvements are always welcome. Please contact the NAF LSO with your comments or suggestions. When changes occur, both written notice and additional training will take place to document that the necessary persons have been properly notified.

PROCEDURES SPECIFIC TO THE BL2 AREA

ENTERING THE BL2 AREA

Enter through the south airlock and get your PPE from the wall-mounted cabinet in the hallway. **A gown, gloves and shoe covers are the minimum requirements for BL2 access.** The cabinet contains disposable gowns and surgical masks, gloves, hair covers, eye protection, and shoe covers. It is very important that PPE be removed before leaving the BL2 hallway- **the airlock must be protected from accidental contamination by infectious agents. As a reminder door sign on the entrance to the BL2 lists required and optional PPE.**

If any items of protective clothing appear to be in short supply, please notify the OLAC Facility staff or the NAF LSO for re-supply.

EXITING THE BL2 AREA

Everyone will always exit the Facility through their own area's airlock, except during an emergency.

When leaving a BL2 hallway, spray the barrel lid with disinfectant and discard your gloves and other PPE. Gowns may be discarded or hung up for re-use (but re-use is acceptable only if it is for later the same day, do not keep them overnight.) Protective eyewear may be disinfected, washed, dried, and stored in a resalable plastic bag, or discarded. Wash your hands with soap in the south airlock before leaving the facility.

DISPOSING OF BL2 AREA WASTE

OLAC personnel will take the red barrels within the BL2 facility and the carcass containers to the biohazard cold room. Bags in the BL2 section containment rooms shall be sealed and disinfected as described previously and returned to the red barrel in the BL2 containment room. The barrel itself shall be closed tightly, the outside surfaces disinfected, and then wheeled just outside the containment room door. De-gown as usual and wheel the barrel

directly to the red plastic tip-bin just inside the door to the dirty side of the cage wash (room 166) just outside the BL2 area airlock, place a new biohazard bag in the barrel, and return the barrel to the room. Please do not put carcass bags in the tip bin because they may sit for a day or more decomposing, making autoclave use extremely unpleasant. You need not don PPE to push the barrel back into the BL2 area room as long as you don't enter the room yourself. Bags from the BL2 section MAY NOT be taken to the BL3 autoclave and they MAY NOT be left anywhere in any corridor or on any floor. OLAC will routinely clean and disinfect the barrels and carts used for transport of materials into and out of the BL2.

Always wash your hands in the ante-room before exiting.

Reusable items such as cages and water bottles must be bagged using clear biohazard bags within the BCF and will be removed by OLAC staff and autoclaved.

PROCEDURES SPECIFIC TO THE BL3 AREA

ENTERING THE BL3 AREA

ENTERING THE BL3 AREA WITHOUT PROPER PPE IS STRICTLY PROHIBITED.

Medical clearance, respirator training and fitting, and an initial tour is REQUIRED prior to entering the NAF BL3.
Contact the NAF LSO to coordinate access.

Enter through the locker room (room #193) adjacent to the north airlock's outer door. Take a scrub suit, and primary layer of personal protective equipment (PPE) (fit-tested N95 disposable respirator or PAPR*, hair cover, face shield, gloves, and shoe covers) from the shelves in the locker room entry hallway and proceed into the locker room. This PPE is required for all staff (OLAC and researchers) before entering the BL3 area.

Change into a scrub suit. **You cannot wear the scrub suit over your street clothes;** you must remove all street clothes (except for undergarments, socks, and shoes). If you are entering the BL3 corridor, but not one of the containment rooms, you must still wear a scrub suit and the primary layer of PPE. Because the locker room is unisex, changing cubicles are provided to allow privacy for changing into scrubs. If you need a locker for storing clothes, you may use any empty locker in the locker room; you will need to provide your own lock.

Once inside the BL3 corridor, you must put on the secondary layer of PPE (gown, 2nd pair of gloves, 2nd pair of shoe covers) prior to entering any of the containment rooms. The gown must be tied closed behind you. The cuffs of the inner pair of gloves should be inside the gown's cuffs, and the outer gloves' cuffs outside the gown's cuffs.

OLAC will provide scrub suits, PPE, and towels. If any items of protective clothing appear to be in short supply, please notify the OLAC Facility staff or the NAF LSO for re-supply. If you wish to use the shower there is adequate space within the shower room to both shower and change. You may wish to bring your own toiletries, as the only soap provided by OLAC is liquid hand soap.

* The only disposable respirators that can be used in the BL3 are the N-95 type(s) with two elastic straps and usually (but not always) an exhalation valve. All respirators must be medically cleared by the Occupational Health Clinic and fit-tested by EH&S prior to use. Dust or hand tied surgical masks are ABSOLUTELY unacceptable, and should never be found in the BL3 area. PAPR's are also acceptable for entry in to the BL3, but users **MUST be medically cleared and trained by EH&S and PAPR disinfection procedures (see attached) must be followed.**

EXITING THE BL3 AREA

Everyone will always exit the Facility through their own area's airlock, except during an emergency.

When leaving a BL3 area room, the following procedure must be followed:

1. Any animals or equipment being taken out of the room are bagged and disinfected as described above and set outside the door.
2. Before leaving animal or procedure room, take off secondary PPE layer. This includes top shoe-covers, top gloves, and protective gown. Dispose of items in receptacle in room. DO NOT remove respirator. Exit room. (NOTE: In case of gross contamination due to a spill, please follow the "Emergency Procedures for Gross Contamination" when exiting the room.)
3. If entry into a second room is necessary, or if re-entering the same room, put on new secondary layer before entering room. This includes gloves, shoe-covers and blue protective gown.
4. When exiting the BL3 facility, enter the airlock and take off primary layer. This includes bottom pair shoe-covers, face shield, bonnet, and respirator. Take off gloves last. Dispose of all items in receptacle inside airlock. Wash hands in airlock bathroom sink.
5. Enter locker room. Shower if desired or if needed due to gross contamination from a spill. Change into street clothes or back into uniform. Wash hands before leaving locker room.
6. Exit locker room through room 193.

DISPOSING OF BL3 AREA WASTE

- 1.) Wearing “primary layer” of PPE, bring the bin from the autoclave room of the BL3 to just outside the door.
- 2.) Put on “secondary layer” of PPE and enter the room with a replacement red biohazard bag.
- 3.) Remove waste bag from barrel, tape it closed, and disinfect the outside of the bag with spray bottle of disinfectant.
- 4.) Still wearing “secondary layer”, place the disinfected bag into the bin just outside the room door and close lid tightly.
- 5.) Place the new bag into the empty barrel in the room.
- 6.) Finish work if necessary and remove the “secondary layer” of PPE before leaving the room.
- 7.) Wearing “primary layer” of PPE, wheel the bin back to the BL3 autoclave room.
- 8.) Leave the bag in the bin for OLAC personnel to run through the autoclave. Only trained OLAC staff are authorized to run the autoclave.

For items too large to autoclave, please contact the Laboratory Safety Officer for special procedures. **Volatile chemicals and flammable materials like formalin and ethanol should never be put into the red barrel waste and autoclave. Please contact the NAF LSO to coordinate disposal as chemical waste.**

ANIMAL/MATERIALS ROOM-TO-ROOM TRANSPORT PROCEDURE

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1. **Move cart (if desired) to location just outside the room door.**
 2. **Place animals (in their filter top cages) or other biohazardous materials inside a biohazard bag and tape it closed.**
 3. **Disinfect the outer surface of the bag with spray disinfectant.**

4. Place the bagged cage or materials onto cart waiting outside of room, or place on the floor just outside.
 5. Before leaving the room, remove “secondary layer” of PPE.
 6. Take the animals or materials to the desired room and place them just outside the door.
 7. Put on new “secondary layer” of PPE before entering the new room. Repeat process when returning animals to housing.
 8. Put on new “secondary layer” of PPE before entering the new room. Repeat process when returning animals to housing.
 9. For transport of animals or other infectious materials outside of the BL3 facility, please contact one of the people listed below for special instructions.
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NORTHWEST ANIMAL FACILITY SAFETY PERSONNEL

FACILITY DIRECTOR

Greg Lawson, Director	203B NAF	3- 9567
Quig Driver, Manager, alternate	203A NAF	2- 9232

OLAC FACILITY PERSONNEL

Sarah Laraway, NAF Supervisor	159 LKS/102 NAF	4-4918
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NAF LABORATORY SAFETY OFFICER (NAF LSO)

Chips Hoai, EH&S	317 University Hall	849-7142
	Alternate phone	2- 3073
Biosafety Officer, EH&S, alternate	317 University Hall	3- 6562
	Alternate phone	2- 3073

NAF BUILDING SAFETY COMMITTEE ROSTER

Greg Lawson Director, OLAC	203 NAF	3 -9567
Quig Driver, Manager, OLAC	203 NAF	2- 4598
Chips Hoai, NAF LSO, EH&S	317 University Hall	849-7142

Yuka Minton, Helen Wills Neurosciences Int.	275 LKS	2-8063
Amanda Larson, OLAC	102 NAF	2 -6603
Jose Carmena, Professor, Electrical Engineer	517 Cory Hall	3-2430
Sang Wei Lu, School of Public Health	16 Barker	3-4986

MAINTENANCE AND SERVICE PROCEDURES GUIDE

INTRODUCTION

This Guide describes procedures to follow when service or maintenance is required within the NAF Biohazard Containment Facility (BCF or “Facility”). The foremost goal of these procedures is the safety of service/maintenance personnel, followed by the dual goals of minimal interruption of normal facility operations, and successful completion of the service or maintenance work. Because of the foremost goal, it is imperative that all Facility users understand and agree to these procedures. If at any time there are concerns or questions about these procedures, please contact the NAF Laboratory Safety Officer (NAF LSO) or OLAC Manager for assistance. Because there may be time or materials costs associated with arranging access to the BCF, those costs are the responsibility of the investigator or department requesting the service.

There are two basic kinds of work that need to be performed, facility and equipment. Facility work is usually done by campus employees who have been trained in the safety concerns of the facility. Less often, outside contractors will need to do work, and providing them access requires special procedures. Because of the nature of the work done in the Facility, all users must take every precaution possible to protect these outside contractors and service people from accidental contact with hazardous materials or agents. They should have no condition that would place them at added risk of infection or injury prior to entering the Facility. You must contact the building manager or NAF LSO and receive permission before allowing these persons to enter and a Visitor Policy Advisory Form must be completed and provided to OLAC for recordkeeping.

Facility maintenance can often be done in corridors or common areas, in which case no PPE is needed for the BL2 portion of the BCF, and only the primary layer of PPE (bonnet, respirator, fit tested respirator, scrubs, gloves, shoe covers) is needed if entering the BL3 corridor section. The most serious concern is when a “break in containment” is required. FS personnel have been trained NOT to enter the BCF without the LSO, the Campus Biosafety Officer, or a fully trained OLAC staff member present to provide guidance.

DEFINITION OF A “BREAK IN CONTAINMENT”

A “break in containment” is defined as any penetration of a wall, ceiling or floor that opens an area outside the epoxy surface of the room to the contaminants otherwise contained by that surface. In simple terms, if a hole is drilled, a fixture (water or electrical) is removed, or a ceiling access panel is opened, containment is broken. Special decontamination procedures are required before this kind of work is done.

WORK NOT REQUIRING A “BREAK IN CONTAINMENT”

Service personnel are required to follow all restrictions for entry into the BCF, and must be escorted either by the person who requested the service, the NAF LSO, or a designated safety officer. **If at all possible, the item requiring service should be decontaminated, removed, and serviced outside the Facility.** All service-related items (tools, parts, etc.) must be decontaminated before they can be removed from the containment room. Service personnel must be made aware of this requirement before they start work.

PROTECTION OF ANALYTICAL SERVICE EQUIPMENT

Service personnel will occasionally need to use electronic diagnostic equipment. These can pose a particular problem because decontamination procedures can destroy them. The best compromise currently available is to envelop the equipment in a clear plastic bag and seal the opening where the power cord and test leads enter the bag with duct tape (bags and tape are available from OLAC). When the work is done, the bag surface and wires can be decontaminated with liquid disinfectant, and the equipment removed from the room and unwrapped in the corridor. The bag and tape are then placed in a red barrel inside a room and the equipment removed as normal. If for any reason this procedure is unworkable, the

NAF LSO or alternate MUST be contacted before the equipment is taken into the Facility in order to determine how to preserve containment while getting the work done.

IF A “BREAK IN CONTAINMENT” IS REQUIRED

There are two possible ways to handle a break in containment. If the break is small and will be closed quickly (less than one workday) the creation of a plastic sheet “tent” may be possible. The area surrounding the planned break is enclosed in a plastic sheet tent that connects to the room door, which is sealed to the walls, floor and ceiling with duct tape. The inside of the area is decontaminated, creating a “cold zone”. This will include the room doorway, so that service personnel can move in and out as needed. At completion of the work, the “tent” is taken down from inside the cold zone, and the plastic and tape are discarded in the room’s red barrel, or separate red bag(s) as needed.

In many cases the above procedure will not be possible, and the room will have to be emptied of animals or equipment and completely decontaminated by spraying all surfaces liberally with liquid disinfectant. Arrangements for relocating animals must be made with OLAC. Do not move animals from room to room under these circumstances without OLAC approval.

Users of the Facility should be aware that two rooms currently in the containment area are particularly vulnerable to requiring full disinfection. The BCF fume hood and room air HEPA filters are located above the ceiling of rooms 169 and 173 respectively, and need occasional replacement. The replacement process is lengthy and noisy, and the rooms may need to be emptied and disinfected before this work can proceed. Investigators with animals housed in these rooms may be contacted by OLAC at any time regarding the need for their animals to be temporarily relocated.

PROVIDING ACCESS FOR SERVICE PERSONNEL

Because the BCF is a secured area, **non-university** service personnel cannot leave and reenter at will. You MAY NOT loan your keycard to service personnel. If the service work can be done quickly and cannot be done outside of containment, the person requesting the service must stay with the service personnel until the work is done. If the

work cannot be done quickly, a keycard may be signed out from OLAC only after the NAF LSO or alternate are satisfied the personnel understand and can comply with the facility containment rules. This will require that the service person acknowledges their understanding of the restrictions and that their health status complies with the requirements for working in the facility. These requirements are for the protection of the service personnel; to prevent accidental contamination of other research work; and to prevent the release of hazardous or biohazardous materials outside the facility. ***ABSOLUTELY NO EXCEPTIONS TO THIS POLICY CAN BE ALLOWED.***

Service personnel who are campus employees are required to attend training sessions on BCF operations similar to those attended by all other Facility users. When trained, their access status is the same as other approved entrants of the facility, and requires no escort, although guidance with the use of personal protective equipment may be necessary.

CONCLUSION

This manual describes methods by which service, repair and maintenance personnel can safely gain access to the NAF BCF in order to perform their work, and their safety must be the prime goal of anyone who requires their services. While some of the procedures may be cumbersome and time consuming, they are the best methods currently available. Remember that access costs are the responsibility of the investigator or department requesting the service. Any questions about these procedures should be directed to the NAF LSO.