**Workplace Safety Orientation & Training Needs Assessment & Record**

**MCML 26 Growth Chamber Facility Training Guide**

**Faculty of Land and Food Systems**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Start Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

End Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Position:

[ ]  Volunteer

[ ]  Undergraduate

[ ]  Visiting Faculty/Student

[ ]  Graduate Student

[ ]  Postdoctoral Fellow

[ ]  Faculty Member

[ ]  Laboratory Assistant

[ ]  Research Assistant

[ ]  Lab Manager

[ ]  Research Associate

[ ]  Staff

[ ]  Other:

Supervisor:

 Name: Phone#: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Department: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Email address: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

As a new member in the Faculty of Land and Food Systems, you must be provided sufficient information to safely work in our facilities and know how to safely work in the growth chamber facility. Please make sure you have already read and signed off the LFS General Guide – a comprehensive document that reviews UBC health and safety policies and procedures for all UBC workers.

This Growth Chamber Facility Training Guide serves to supplement the LFS General Guide for students, staff and faculty that will be working in a growth chamber facility. All sections in this guide must be read and signed off by both the individual and his/her supervisor or principal investigator (PI) before accessing the growth chamber facility in LFS.

Are you planning on using:

[ ]  MCML 26 Growth Chambers (PIEE/Castellarin)

[ ]  MCML 218 LFS Growth Chambers

If you are only using one chamber, please pay special attention and you may only review the specific information for the chambers you will be using.

1. **General Features in Growth Chamber Facilities**

Currently LFS has two growth chamber facilities.

1. The PIEE/Castellarin Growth Chambers are located in MCML 26. It contains four growth chamber units manufactured by Biochambers. The growth chambers monitor and control: CO2, light, temperature, humidity.

[ ]  I have been provided an orientation to the Growth Chamber Facility at MCML 26 and am aware of the general features and the associated risks working in this space.

1. The LFS Growth Chambers are located in MCML 218. It contains 5 growth chamber units manufactured by Conviron. The growth chambers monitor and control: light, temperature, humidity.

[ ]  I have been provided an orientation to the Growth Chamber Facility at MCML 218 and am aware of the general features and the associated risks working in this space.

1. **Important Contact Information**

 Important emergency contacts at UBC

1. Call 911 for Emergency
2. RCMP Non-Emergency

Phone: 604-224-1322

1. Campus Security

Phone: 604-822-2222

1. AMS SafeWalk

Phone: 604-822-5355

1. First Aid

Phone (Students and Visitors): 604-822-2222

Phone (Faculty and Staff): 604-822-4444

For immediate assistance at LFS, please contact

1. Andy Jeffries

Email: Andy.Jeffries@ubc.ca Phone: 604-603-1619

1. Wayne Tamagi

Email: Wayne.Tamagi@ubc.ca Phone: 604-822-5694

1. Jimmy Kyu Baik Ha (for MCML 26)

Email: hgbhgb01@mail.ubc.ca or mdrhyh207@hotmail.com

For support directly from the manufacturer, please contact

1. Ronnie Sugden at Biochambers

Email: ronnie.sugden@biochambers.com

1. Craig Leung – Account Manager at Conviron

Email: convironservice@conviron.com Phone: 1-204-291-5097

[ ]  I have read and understood all the important emergency contact information provided and felt confident to handle any potential circumstances that may happen while working in the Growth Chamber Facility.

1. **General Operations and Safety in the Growth Chamber Facility**
2. Shared Space Etiquette and Safety
* Always maintain cleanliness in the space.
* Remove any unnecessary clutter and garbage from the space as needed.
* Materials that must be kept in the room should be labelled with researcher name, date and organized to prevent tripping hazards.
* Do not remove any shared equipment from the space.
* If you notice something is broken or showing signs of wear, place a sign on the affected growth chamber, and notify:
	1. Andy Jeffries

Email: Andy.Jeffries@ubc.ca Phone: 604-603-1619

* 1. Wayne Tamagi

Email: Wayne.Tamagi@ubc.ca Phone: 604-822-5694

* 1. Lewis Fausak

Email: Lewis.Fausak@ubc.ca Phone: 604-806-5641

[ ]  I have read and understood the Shared Space Etiquette and agreed to keep the space clean and organized.

1. Working Alone in the Growth Chamber Facility

Individuals are **NOT** permitted to work alone unless they have completed the required training courses. The following guidelines will be applied if a worker must work alone or after hours (evenings and weekends) in the growth chamber facility:

* Call 911 in case of an emergency
* Worker must have a contact number of a research colleague, supervisor

etc. readily available. Use the UBC Vancouver Safe App to set up a notification system.

* Worker must set up a buddy or check-in system, so that another person

 is working nearby or they are able to contact regularly to ensure safety of the worker in the facility. The buddy or check-in system must also be provided the facility location (Room #26 or #218, 2357 Main Mall) and the Campus Security number 604-822-2222 and to activate help immediately if contact was lost with the worker for a sustained period of time.

* Worker must be well aware of all the risks associated with working in the Growth Chamber Facility and know what to do in each situation.

[ ]  I have read and understood the Work Alone Guidelines and agreed to keep a robust buddy system in place in case of emergency.

1. Operation of Growth Chambers **(Biochambers)**
* Growth chambers may malfunction for any of the following reasons. It is important to understand what leads to the malfunctions and ways to

troubleshoot. Please read the below very carefully and reach out to LFS contacts in Section B if anything is not understood.

* 1. Random shutdown of entire unit
		+ This issue has occurred when the units were first installed due

to condensation accumulation around wires near the drainage

system. The problem is now fixed by having additional drainage holes and insulating wires.

* + - When shutdown occurs, open the fan doors at the bottom of theunit to ensure there is no water leakage. If water is observed,

dry the area and turn on the unit. If problem persists, contact

Biochambers.

* 1. Control panels become non-responsive
		+ This is mainly a software issue, often due to windows updates.
		+ If this occurs, turn off the panel and turn it back on, disable

windows updates, and run the Biochambers monitoring

software. If problem persists, contact Wayne Tamagi for

assistance.

* 1. Random trigger of alarms which lead to shutdown of chamber

functions

* + - The alarm gets triggered if the door is left open for a sustained period of time.
		- When sampling is complete, worker must check the Alarms

option on the monitoring software and clear any alarms. Failureto do so may results in shutdown of chamber functions.

* 1. Failure to retain CO2 level at set point (unrelated to depleted CO2

tanks)

* + - Chamber sensor for CO2 level in the chamber and the set point

does not match. To investigate, place a calibrated external CO2 sensor in the chamber and check CO2 level after 10 min.

1. If external sensor reading matches that of the chamber,

chamber sensor is functional. Check for depleted CO2 tank

or a gas leak. If none is the culprit, then the CO2 delivery

system has a malfunction, check regulator, solenoid valve or other parts. Clear any triggered alarms on the software, wait few minutes and see if function resumes. If problem persists, contact Biochambers for assistance.

1. If external sensor reading matches that of the set point, thechamber sensor malfunctions. You must turn off the unit

and stop all experiments in the unit since the lack of

functioning chamber sensor will lead to continual increase inCO2 being pumped into the chamber to reach set point. You must contact Biochambers for assistance.

[ ]  I have read and understood the potential issues arisen from operating the growth chambers and am confident to troubleshoot or reach out to appropriate help whenever they occur.

1. Operation of CO2 gas tank.
	* It is important to note the potential risk of CO2 tank leak. Ventilation is not optimal in the room. It is at risk of a dangerous CO2 level when doors are

closed while a leak occurs. Excess CO2 can lead to loss of consciousness and death at very high levels.

* It is important to ensure that gas tank is properly secured by the wall and away from flames.
* When a tank is depleted of gas, the pressure gauge should read below

500 psi. A standard tank can usually last up to a month (based on a CO2

setting of ~ 450 ppm/ambient).

* If a tank is unusually dropping pressure quickly (e.g. down to only 500 psi in few days), or when chambers are failing to keep CO2 at set points,

suspect a leak and inspect.

* To test for a leak, spray soapy water at the joints that connect the tank to regulator and piping; bubbles can be observed where a leak exists.
* It is highly recommended that the gas tank pressure gauge be checked

minimum once a week to ensure proper function of the growth chambers.

* It is recommended to have few external and calibrated CO2 sensors in the facility but outside the growth chambers in order to monitor CO2 level

reliably.

[ ]  I have read and understood the risks associated with operating a CO2 compressed gas tank in an enclosed space.

[ ]  I have read and understood what to do if a gas leak is suspected and the safety precautions needed to ensure safety of myself and others.

1. Maintenance Guidelines

**General:**

* Use cleaning, sealing, lubricating agents that do not cause harm to plants, cultures, or insects in the growth chambers. Call 911 in case of an emergency
* All changes and updates to the growth chambers must be logged in the growth chamber maintenance log book located within the room.
* Maintain general tidiness of the room by sweeping and mopping regularly.

**Cleaning the chamber (required after every experiment):**

* Vacuum and/or sweep the growth chamber to remove any debris.
* Remove grates, then vacuum growth chamber drainage area to remove any debris
* Use germicidal, grease cutting detergent (e.g. dawn dish soal) and a microfibre cloth to wipe down the inside of the chamber, the rubber seals on the door frame, outside of chamber, and door handles.
* Spray down the chamber with a hose and spray nozzle. Use a squeegee to remove excess water.
* Treat all surfaces of the chamber with 10 % bleach
* Use ammonia based window cleaner to clean viewing ports and wipe down touch panel.
* Warm the chamber up to its maximum temperature and keep it there for one day. Be sure to open the fresh air and exhaust ports during this sterilization period.

**Chamber Maintenance:**

* Drains: inspect drains and re-seal with epoxy coating if worn or leaking.
* Doors: adjust hinges, latches, and frame to make them light, gas, and air tight.
* Gas caps: inspect gas caps and replace worn or cracked caps.
* Spray nozzles: Inspect spray nozzles for wear or buildup, and wipe down with cleaner. Record humidity levels monthly.
* CO2 sensors: inspect CO2 sensors for wear, buildup, and record ambient levels monthly.
* Temperature sensors: inspect sensor and record ambient levels monthly.
* Lights: Inspect lights and record light intensity monthly. Clean light bulbs and ballasts with a damp rag when needed.
* Condenser: Inspect condenser monthly for signs of wear and accumulation of debris.
* Replace water filters (external to chambers) and in each chamber every 6 months to prevent carbonate buildup.
* Use germicidal, grease cutting detergent and a microfibre cloth to wipe down the inside of the chamber, the rubber seals on the door frame, outside of chamber, and door handles.
* Spray down the chamber with a hose and spray nozzle. Use a squeegee to remove excess water.
* Use ammonia based window cleaner to clean viewing ports and wipe down touch panel.
* Periodically dust the interior control panel area as needed with a dry microfiber cloth.

**Preparation of all chambers for Storage:**

* Clean chambers as above.
* Ensure system is free of water.
* Leave door slightly ajar to prevent moisture buildup.
* Cover condenser with tarp to protect from dirt and rain.

[ ]  I have read and understood the maintenance protocols and agree to maintaining the chambers as directed by my supervisor.

After reading through the above, meet with your supervisor or PI to discuss any points that are unclear. If necessary, consult with a member of the LST or any LFS contacts listed in Section B.

<https://my.landfood.ubc.ca/operations/health-safety/>

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[ ]  I understand the items that were discussed on this form, the basics of working safely, and the specific safety requirements that must be followed to work in the Growth Chamber Facility.

[ ]  I understand that The LFS General Guide (<https://my.landfood.ubc.ca/new-to-lfs/>) must be read and signed off, in addition to this form.

**New member:**

Name (print): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Supervisor/Designate:**

Name (print): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Upon completion of this form, please upload the LFS General Guide, as well as an electronic version of this signed form to** <https://training-report.landfood.ubc.ca>**.**