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*Great Lakes Forestry Centre  
Insect Production Services*

# **STANDARD OPERATING PROCEDURE**

**Number: IPS/033/002**

*Conducting Research in Insect Quarantine*



***Effective Date: 15 October 2013***

**Canada**



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**TITLE:** *Conducting Research in Insect Quarantine*

**APPROVING OFFICIAL:**

Manager, Insect Production Services (IPS) \_\_\_\_\_ DD / MM / YY  
\_\_\_\_\_ / \_\_\_\_ / \_\_\_\_

### **SIGNIFICANT CHANGES FROM PREVIOUS VERSION:**

This Standard Operating Procedure (SOP) has been modified for applicability to the newly constructed Great Lakes Forestry Centre (GLFC) Insect Quarantine (IQ) Facility. Changes include the following:

- The floor plan has been revised.
- The title "Insect Quarantine Officer (IQO)" has been revised to "Bio-Safety Officer (BSO)" to match terminology used by the regulatory authority (i.e., Canadian Food Inspection Agency - CFIA).
- Insect Production Services (IPS) personnel now have a separate entrance to the quarantine facility via the domestic rearing zone; all other personnel are restricted from using this entrance.
- When portions of the quarantine zone require heightened bio-safety measures, personnel working in those areas will be required to wear bunny suits, shoe covers, head covers and beard covers (if applicable), rather than lab coats as required elsewhere in the facility; notices will be posted in the change rooms and at affected research modules whenever heightened bio-safety measures are required.
- Personnel no longer have access to the entire quarantine facility, only to areas for which access was approved by the BSO.
- Lists of equipment available to facility users have been revised.
- Storage room C343 is no longer available to facility users.
- Facility users will be required to assist with splitting of log bolts when quantities are large or when the log bolts exceed the maximum size restriction.
- A central vacuum system, chemical fume hood and wireless phone system are now available to facility users.
- Rooms are fitted with alarms for air pressurization.

## **1.0 INTRODUCTION**

### **1.1 Purpose**

This SOP has been established to standardize methods and procedures for assuring the bio-safety of the IQ facility, to reduce the incidence and spread of pathogens and microbial contaminants within the facility, and to delineate responsibilities of users from those of the BSO.

### **1.2 Scope**



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This SOP shall be followed by all scientific personnel (GLFC, Canadian Forest Service – CFS or otherwise) conducting research and rearing activities with exotic and/or invasive forest insects within the GLFC IQ facility.

### 1.3 Definitions

*Biological Safety Cabinet (BSC)* – A class 2 containment cabinet designed for both worker and sample protection; room air is drawn into the front of the unit; the unit is designed in such a way that room air is HEPA filtered before blowing over the work area; air-borne hazardous particles coming off samples in the work area are pulled away from the worker and the air is vented back into the room after HEPA filtration; this type of unit is not suitable for worker protection from chemical fumes.

*Bio-Safety Manual* – A manual containing only those IPS SOPs that relate specifically to the IQ facility.

*Bio-Safety Officer (BSO)* – A member of IPS having supervisory authority over the daily operation of the IQ facility and who provides technical/research support to users of the facility.

*Controlled Copy* – A copy of an SOP distributed to select GLFC personnel having a unique copy number and dated signature of the IPS manager. Controlled copies are intended to ensure that GLFC personnel follow the most recent version of the SOP.

*Delta System* – Hardware/software system used by GLFC engineering personnel to program, monitor and track environmental conditions within the facility and to provide an alarm when tolerance limits are exceeded.

*Effective Date* – The date from which the procedures given in an SOP are to be implemented.

*Great Lakes Forestry Centre (GLFC)* – One of five Canadian Forest Service (CFS) research facilities in Canada.

*Insect Production Services (IPS)* – A GLFC work team consisting of the Insect Production Unit (IPU), the Quality Control Unit (QCU) and IQ personnel who perform insect rearing, quality control and quarantine activities in support of forest pest research activities internal and external to the CFS.

*Insect Production Services Manager* – The individual who has overall responsibility for activities of the IPS team.



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*Insect Production Unit (IPU)* – A work unit of IPS consisting of personnel who perform insect rearing, diet making and methods development activities at GLFC.

*Insect Quarantine (IQ)* – A general-use facility under the control of IPS used for rearing exotic forest insects and conducting associated research activities.

*Invasive Insects* – Insects that adversely affect the habitats and bioregions they invade economically, environmentally, and/or ecologically and have become newly established in that area. They can be domestic (i.e., native to Canada) or introduced (i.e., exotic, non-indigenous, alien).

*Movement Certificate* – A document issued pursuant to the Plant Protection Act and signed by an inspector that authorizes the movement of things within Canada or from Canada to a foreign destination.

*NIST Traceable Thermometer/Hygrometer* – A thermometer/hygrometer with a manufacturer's certificate of accuracy verifying that it was calibrated and tested against standards traceable to the National Institute of Standards and Technology (NIST).

*Permit to Import* – A document issued pursuant to the Plant Protection Act that authorizes the import of things into Canada.

*Principal Investigator (PI)* - An individual internal or external to GLFC who has the responsibility for the overall conduct of the phase(s) of a study performed within the IQ facility.

*Quality Control Unit (QCU)* – A work unit of IPS consisting of personnel who conduct routine production, process and product control testing and develop new QC methodology in support of IPU activities.

*Standard Operating Procedures (SOPs)* – Directives describing routine administrative or technical procedures conducted by IPS personnel or users of the IQ facility.

### 1.4 Safety

- 1.4.1 Personnel must exercise health precautions (e.g., proper lifting procedures) to minimize risk to themselves and to their co-workers.
- 1.4.2 Personnel shall have access to, and be familiar with, the MSDS for all chemicals used in the IPU facility.
- 1.4.3 Eating, chewing gum, drinking, smoking, storing of food or utensils shall not occur in the IQ facility.
- 1.4.4 Personnel who apply pesticides must be appropriately trained and protected.

### 1.5 Materials



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- 1.5.1 IPS Form Number 0106/002 (*Insect Quarantine Access Log*, Appendix 2).
- 1.5.2 IPS Form Number 0107/002 (*Insect Quarantine Incident Report*, Appendix 4).

## 2.0 PROCEDURES

### 2.1 Compliance with SOPs

Facility users who do not comply with this SOP or any other SOPs established for the IQ Facility will have their facility access privileges revoked.

### 2.2 Procedure to Enter Facility

(refer to the floor plan in Appendix 1)

- 2.2.1 All research and maintenance personnel (excluding IPU personnel) shall enter the IQ facility using the entrance on level one and:
  - (a) Personnel shall endeavor to schedule their work in the IQ facility for the start of each day prior to entering any other laboratory and/or handling of other insects, viruses, fungi, etc., thereby reducing the incidence and spread of pathogens and microbial contaminants within the facility.
  - (b) Personal belongings, including boots and coats, shall not be brought into the facility. These shall be left in the outer locker room AA106.
  - (c) Prior to entering anteroom AA106A, personnel shall document their entry on the *Insect Quarantine Access Log* (IPS Form Number 0106/002, Appendix 2), including printed name (visitors shall also include the name of their organization if they are not employed by GLFC), initials, purpose of the visit, current date and time of entry.
  - (d) Personnel entering the anteroom shall allow the door to close and the air pressure to stabilize before opening the door to the change room. Personnel are not to enter the containment zone in the event of an air pressure alarm. Doors shall never be propped open, nor opened with a grand master key (i.e., anteroom doors shall never be opened simultaneously) except in emergency situations (e.g., for the passage of a stretcher). In an emergency, contact the BSO manager of IPS, or facilities manager. When time does not permit, any other emergency exit door may be used.
  - (e) Upon entering the change room, personnel are required to don a lab coat. Disposable shoe covers shall also be applied when the floor in their proposed work area may become contaminated with infested plant material or soil (upon exit, these shoe covers shall



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be doffed in the work area/module where they were worn). Lab wear shall be selected from the applicable lockers and shall be worn over street clothing. Wearers shall ensure that they are fully buttoned and/or zipped. Personnel having recurring visits to the facility shall obtain garments from the locker previously identified by the BSO. IPU visitors to the IQ facility shall select lab wear from the locker labeled as “visitors”.

When heightened bio-safety measures have been requested by the BSO during the facility access authorization process (i.e., on the *Request to Use IQ Facility* form, SOP Number IPS/030) additional lab wear shall be applied upon entry to the work area specified. At the door to the applicable module/work area, the user shall remove his/her lab coat, hang it on the wall hook, then enter the module and apply the supplied lab wear e.g., bunny suit, shoe covers, head cover, and beard cover (if applicable).

- (f) Long hair is to be tied back so that it cannot come into contact with potentially contaminated material. Personnel shall select a wireless telephone from the charging station and may then enter the inner rooms of the facility. Do not pass through door AA129 at the same time someone is entering the change room via the anteroom (i.e., doors AA129 and AA122C shall never be opened at the same time).
- (g) Personnel shall not enter any room in the facility if the associated air pressure monitor is alarming.
- (h) Facility users shall only enter research modules and other work areas for which access was approved by the BSO during the facility access authorization process as specified in the current version of IPS SOP Number IPS/030. Notices will have been posted by the BSO in the change room and at each research module/work area requiring heightened bio-safety measures.

2.2.2 IPU personnel shall normally enter the IQ facility using the entrance on level two and:

- (a) IPU personnel shall endeavor to schedule their work in the IQ facility for the latter part of the day to avoid the necessity of going back to domestic rearing modules, thereby reducing the potential spread of pathogens and microbial contaminants.
- (b) Personal belongings, including boots and coats, shall not be brought into the IQ facility. These shall be left in the outer locker room AA209.
- (c) Prior to entering anteroom AA211C, personnel shall remove their lab coat and hang it on the supplied wall hook, then document their entry on the *Insect Quarantine Access Log* (IPS Form Number 0106/002, Appendix 2), including printed name (visitors shall also include the name of their organization if they are not employed by GLFC), initials, purpose of the visit, current date and





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time of entry. Wireless phones and footwear from the IPU shall not be brought into the IQ facility.

- (d) Personnel entering the anteroom shall allow the door to close and the air pressure to stabilize before opening the door to the change room. Personnel are not to enter the containment zone in the event of an air pressure alarm. Doors shall never be propped open, nor opened with a grand master key (i.e., anteroom doors shall never be opened simultaneously) except in emergency situations (e.g., for the passage of a stretcher). In an emergency, contact the BSO manager of IPS, or facilities manager. When time does not permit, any other emergency exit door may be used.
- (e) Upon entering the change room, personnel are required to don a lab coat. Disposable shoe covers shall also be applied when the floor in their proposed work area may become contaminated with infested plant material or soil (upon exit, these shoe covers shall be doffed in the work area/module where they were worn). Lab wear shall be selected from the applicable lockers and shall be worn over street clothing. Wearers shall ensure that they are fully buttoned and/or zipped. Personnel having recurring visits to the facility shall obtain garments from the locker previously identified by the BSO. IPU visitors to the IQ facility shall select lab wear from the locker labeled as “visitors”.  
When heightened bio-safety measures have been requested by the BSO during the facility access authorization process (i.e., on the *Request to Use IQ Facility* form, SOP Number IPS/030) additional lab wear shall be applied upon entry to the work area specified. At the door to the applicable module/work area, the user shall remove his/her lab coat, hang it on the wall hook, then enter the module and apply the supplied lab wear (e.g., bunny suit, shoe covers, head cover, and beard cover, if applicable).
- (f) Long hair is to be tied back so that it cannot come into contact with potentially contaminated material. Personnel shall select a wireless telephone from the charging station and may then enter the inner rooms of the facility. Do not pass through door AA244 at the same time someone is entering the change room via the anteroom (i.e., doors AA244 and AA238B shall never be opened at the same time).
- (g) Personnel shall not enter any room in the facility if the associated air pressure monitor is alarming.
- (h) Facility users shall only enter research modules and other work areas for which access was approved by the BSO during the facility access authorization process as specified in the current version of IPS SOP Number IPS/030. Notices will have been



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posted by the BSO in the change room and at each research module/work area requiring heightened bio-safety measures.

- (i) When required, IPU personnel may enter the IQ facility on level one following the procedures specified in 2.2.1

### 2.3 Procedure to Exit Facility

2.3.1 All personnel (excluding IPU) shall exit the IQ facility on level one. IPU personnel shall exit the IQ facility on the same level from which they entered (normally level two).

2.3.2 All personnel shall exit using the following procedures:

- (a) Upon exiting an area of heightened bio-safety, personnel shall examine themselves for hitch-hiking insects, then remove their lab wear and hang it on the wall hook within the work area; immediately upon exiting the module, personnel shall apply a lab coat before proceeding through the facility.
- (b) Prior to entering the change room, peer through the viewing window on the door (i.e., door AA129 or door AA244) to ensure that the door to the anteroom is closed (i.e., both doors shall never be opened at the same time).
- (c) Hands must be washed in the change room prior to passing through the door to the anteroom.
- (d) Prior to removing lab wear, personnel shall use the mirror in the change room to examine themselves to ensure that there are no hitch-hiking insects on the garments. When more than one individual is present, they shall examine each other. Personnel shall remove their lab wear and return it to the applicable locker; damaged or soiled garments shall be placed in the hamper and replacement garments may be obtained from the supply locker; booties (if applicable) shall be placed in the hamper for decontamination before disposal. Personnel shall return the wireless phone to the charging station. Personnel shall remove their shoes and leave them in the change room.
- (e) Upon entering the anteroom, personnel shall use the mirrors to examine themselves again for hitch-hiking insects, and also to allow the air pressure to stabilize before proceeding through to the facility exit.
- (f) Upon exit from the facility, personnel shall document their departure time on the *Insect Quarantine Access Log* (IPS Form Number 0106/002, Appendix 2).
- (g) IPU personnel may return to the domestic rearing zone but may not enter any of the rearing modules until the next day, after returning home, showering and changing clothing.

### 2.4 Facility Room Allocation





Refer to the *Floor Plan of Insect Quarantine Facility* (Appendix 1) and to the table for *IQ Facility Room Allocation* (Appendix 3).

### 2.5 Facility Equipment and Supplies

2.5.1 The IQ facility is equipped with basic laboratory equipment, instruments and supplies. Users shall check with the BSO for availability of specific items at the start of their activities in the facility. Users are responsible for provision of consumables (e.g., rearing containers) applicable to their work and for any instruments/equipment not currently available in the facility. The BSO will provide the materials identified in 2.5.2 and 2.5.3.

2.5.2 General work spaces within the IQ facility are equipped with:

- pass-through autoclave
- biological indicators
- steam indicator strips
- dishwasher
- reach-in environmental chamber
- cold room
- analytical balance
- chainsaw (electric)
- computer (with scanner)
- dissecting microscopes (x2)
- freezer (upright with manual defrost)
- refrigerator (with frost-free freezer)
- log splitter
- magnifying lamps (x2)
- oven/incubator
- plant lights
- central vacuum cleaning system (HEPA filtered)
- alcohol burner
- autoclave bags
- ethanol (70%)
- killing jars (ethanol)
- lab instruments (e.g., forceps, scissors, loops, etc.)
- office supplies (e.g., markers, pens, pencil, tape, labels, etc.)
- paper towels (autoclaved)
- sanitation/janitorial supplies, including bleach working solution (refer to 2.18.1).
- vials for insect samples
- thermometers/hygrometers (NIST traceable)
- sleeved cages



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- 2.5.3 Each research module within the IQ facility is equipped with:
- alcohol burner
  - BSC, class 2 (i.e., provides worker and sample protection)
  - reach-in environmental chamber
  - walk-in environmental chamber
  - autoclave bags
  - ethanol (70%)
  - killing jars (ethanol)
  - lab instruments (e.g., forceps, scissors, loops, etc.)
  - office supplies (e.g., markers, pens, pencil, tape, labels, etc.)
  - paper towels (autoclaved)
  - sanitation/janitorial supplies, including bleach working solution (refer to 2.18.1).
  - steam indicator strips
  - thermometers/hygrometers (NIST traceable)
  - vials for insect samples

### 2.6 Environmental Chambers and Rooms

- 2.6.1 Users of the chambers/rooms shall be cognizant of the environmental conditions within a unit every time it is accessed (either by doing a visual check of the NIST thermometer/hygrometer or by the feel of the environment) and shall notify the BSO when problems are detected (outside of normal work hours, the user shall notify the contact individual identified on the door of the unit). The memory function of these NIST instruments is not to be reset by the facility user.
- 2.6.2 Users of the facility are not permitted to change environmental settings for chambers/rooms. Changes shall be requested through the BSO who may facilitate programming changes when there are no conflicting requirements of other users.
- 2.6.3 Users of the facility are expected to maintain order in the units and to clean up spillage. Floors shall be cleaned using the facility central vacuum system. Refer to section 2.11.
- 2.6.4 The following procedures are the responsibility of the BSO but are listed here to assist facility users with their research activities:
- a) Each environmental chamber/room is posted with a form prepared by the BSO identifying the environmental parameters that are set for the unit, including:
    - chamber/room identifier;
    - date that the environmental parameters are initiated;
    - environmental parameters that are set for the unit, including upper and lower acceptable limits;



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- description of alternate environmental conditions (including duration, if applicable) that are suitable for temporary storage of unit contents in the event of a mechanical breakdown;
  - prioritized list of individuals to be contacted after hours in the event of mechanical breakdown of the unit.
- b) Each environmental chamber/room has:
- connection to the GLFC Delta System so that environmental conditions are monitored on a continuous basis;
  - NIST traceable thermometer/hygrometer that is located in a position easily viewed by personnel each time they open/enter the unit;
  - alarm system that is activated at both the engineer's station, main security desk, and desk of BSO whenever environmental tolerance limits are exceeded.
- c) Environmental conditions are reviewed daily (except holidays and weekends) by the BSO using the facility Delta System to ensure that tolerance limits have not been exceeded since the last time they were checked. Facility users will be notified by the BSO whenever tolerances have been exceeded. Records of hourly tracking of temperature, relative humidity and light conditions within each unit are printed weekly by the BSO and are available to users of the facility upon request.
- d) Equipment failure/repair actions and monthly verification of the accuracy of the Delta System are initiated and documented by the BSO. Historical records/logbooks of these activities are available to users of the facility upon request.
- e) Routine weekly and annual cleaning of each environmental chamber/room is conducted by the BSO, in addition to vacuuming performed as needed by the facility user.

### **2.7 Storage**

- 2.7.1 Materials and supplies approved by the BSO for entry into the facility shall be stored in locations designated by the BSO.
- 2.7.2 Bulk quantities of materials and supplies (e.g., rearing containers, lids, etc.) destined for use in the IQ facility shall be stored outside of the facility (e.g., basement) where they are protected from deterioration or contamination (i.e., they are not to be stored in other GLFC laboratories/facilities where they may be exposed to pathogens).
- 2.7.3 Smaller quantities of materials and supplies may be stored in the IQ facility in enclosed cupboards/shelves or in bins designated by the BSO. These shall be stored in a manner that will maintain their cleanliness and the cleanliness of the facility.

### **2.8 Movement of Exotics**



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Import and/or movement of live exotic forest insects into or out of the IQ facility shall be conducted as specified in the current version of SOP Number IPS/031 (*Movement of Exotic Forest Insects*).

### 2.9 Materials and Supplies Entering Facility

- 2.9.1 Only those items previously identified by the PI and approved by the BSO may be brought into the facility [refer to the current version of SOP Number IPS/030 (*IQ Facility Authorization*)]. Other items may be brought into the facility upon subsequent approval by the BSO.
- 2.9.2 The BSO shall be notified in a timely manner as to the arrival of live insects at the IQ facility. Insects must not be brought into the facility without prior authorization by the BSO as specified in the current version of SOP Number IPS/031 (*Movement of Exotic Forest Insects*).
- 2.9.3 Plants and plant materials shall be inspected by the user before being brought into the IQ facility to ensure that they are relatively free of unexpected insects, fungi, etc.
- 2.9.4 Soils and peat moss (excluding potted plants) shall be autoclaved (i.e., using pass-through autoclave in room A105) prior to entering the IQ facility, even when the material has been advertised as already being sterilized. These materials must be subjected to two 60-minute sterilizations (separated by 48h) and shall be stored in a sealed container (e.g., Rubbermaid tote) that has been sterilized prior to use [i.e., sprayed with a bleach working solution (refer to 2.18.1), followed by wiping with sterile paper towel after at least 10 minutes of contact time].
- 2.9.5 Materials and supplies shall be removed (where feasible) from their original packaging boxes outside of the IQ facility access door.
- 2.9.6 Equipment and instruments entering the facility shall be autoclaved by the BSO if possible (i.e., using pass-through autoclave in room AA105). If not, they shall be sprayed with a bleach working solution (refer to 2.18.1) where feasible, followed by wiping with sterile paper towel after at least 10 minutes of contact time. These items must remain in the facility until removal is authorized by the BSO as specified in 2.10.
- 2.9.7 Paperwork entering the facility from other administrative areas in the building shall be kept to a minimum. It is recommended that users of the facility make required documentation available on the GLFC computer system that can be accessed using the IQ computer. Paperwork from other research laboratories must not enter the IQ facility.
- 2.9.8 Where possible, researchers shall endeavor to restrict the size of log bolts entering the facility to a maximum dimension of 20" long and 12" diameter to facilitate splitting at the termination of the experiment.



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Researchers are responsible for cutting log bolts to a size that will fit into the log splitter.

### **2.10 Materials Exiting the Facility**

- 2.10.1 No material of any kind shall be removed from the IQ facility until the rearing and/or the experiment is complete, the facility is sufficiently sanitized as specified in 2.11, and these items have been inspected by the BSO. Upon request, the BSO may grant approval for the removal of items at other times after sufficient sterilization and inspection.
- 2.10.2 Procedures specified in the current version of SOP Number IPS/031 (*Movement of Exotic Forest Insects*) shall be followed for the removal of live exotic forest insects from the facility.
- 2.10.3 Materials for discard shall be placed in garbage containers lined with autoclave bags and left for autoclaving and discard by the BSO. Insects for disposal shall either be placed in an escape proof vented container for immediate autoclaving by the BSO, or be placed in a vial containing either methanol or ethanol (minimum 70%) for at least 24 hours. The BSO shall be notified whenever larger items (i.e., log bolts) or large quantities of items need to be discarded, and when garbage containers become full. Upon request by the BSO, facility users shall assist with the splitting and autoclaving of log bolts.
- 2.10.4 Facility users conducting research in modules requiring heightened bio-safety measures (as specified in the current version of IPS SOP Number 0030) shall not remove any materials from the module they have been authorized to work in, unless approved by the BSO (exception: contaminated or potentially contaminated glassware used in the module shall be placed in sealed containers and provided to the BSO for autoclaving prior to being washed by the user).

### **2.11 Sanitation**

- 2.11.1 Users of the IQ facility shall keep it meticulously clean and free of clutter.
- 2.11.2 Work areas (e.g., bench tops) shall be cleaned after each use by spraying with the provided bleach working solution (refer to 2.18.1) and allowing 10 minutes of contact time before wiping with sterile paper towel. Surfaces can be sprayed with Windex and wiped with sterile paper towel to remove residue left by the cleaning solution.
- 2.11.3 Facility users shall clean the floors of their assigned work areas (including reach-in and walk-in chambers) whenever they become visibly soiled. Floors shall never be swept or dry mopped. They shall be vacuumed using the facility central vacuum cleaning system.



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- 2.11.4 Materials shall be handled in a manner that minimizes dispersion of particulates through the air. The BSC shall be used when there is risk of particulates becoming air-borne.
- 2.11.5 Maintain a garbage bag (i.e., autoclave bag) within the rear part of the chamber when working in the BSC. Do not discard materials in containers outside of the cabinet. Avoid movement of materials or excessive movement of hands and arms through the front access opening during use. When personnel must enter or exit the cabinet, do so from straight on and allow the cabinet to stabilize before resuming work.
- 2.11.6 The complete interior of the BSC or chemical fume hood shall be cleaned by the user after each session using the method specified in 2.11.2. (The bench-top access panel of the cabinet is removed and cavity below cleaned by the BSO on a weekly basis).
- 2.11.7 Users of environmental chambers shall clean up spillage as it occurs as specified below. Additional cleaning/sanitation actions are performed by the BSO on a routine basis. Contents shall be removed from the storage compartment as requested by the BSO for cleaning/sanitation of the unit. The user shall clean up spillage by:
  - a) collecting all insects as per 2.12.10, or rendering them non-viable as per 2.10.3;
  - b) accounting for all insects as per 2.12.8;
  - c) placing waste materials in garbage containers as per 2.10.3;
  - d) vacuuming the floor as per 2.11.3;
  - e) sanitizing the unit as per 2.11.2.
- 2.11.8 Personnel using the facility sinks shall ensure that screens are always positioned in the drains.
- 2.11.9 Additional weekly cleaning/sanitation actions are performed in the IQ facility on a routine basis by the BSO.
- 2.11.10 Facility users are responsible for cleaning their own glass/lab ware. Small quantities of dirty glass/lab ware may be held in closed bins until it is convenient to clean them. Glassware that is contaminated or potentially contaminated must be autoclaved (by the BSO) prior to washing.

### **2.12 Bio-safety Containment Procedures (handling of invasive insects)**

- 2.12.1 Conditions for handling/rearing exotic forest insects must be complied with as specified by the CFIA on the *Movement Certificate* or *Permit to Import*. All insects approved by the BSO for entry into the IQ facility shall be handled as though they are exotic, even if they are native to Canada (e.g., mountain pine beetle).
- 2.12.2 The BSO shall be notified upon arrival of insects at the IQ facility as specified in 2.9.2.





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- 2.12.3 Packages/containers of insects shall be opened as instructed by the BSO. This involves:
- Ensuring that the door to the room is closed and the air pressure monitor is not in alarm (i.e., inward directional air flow is maintained). Post sign on door indicating “do not enter, transfer in process”.
  - Examining packages/containers to ensure that containment has been maintained. If containment has been breached, determine if insects have escaped by comparing numbers remaining with numbers shipped (if available). If insects have escaped (or if unknown), report the occurrence verbally to the BSO who will determine corrective action and notify the appropriate authorities. Document the occurrence on an *Insect Quarantine Incident Report* (IPS Form Number 0107/002, Appendix 4) and provide it to the BSO in a timely manner. Ensure that corrective actions taken include measures to prevent recurrence of the incident.
  - Opening small packages/containers within a sleeved cage and/or BSC.
  - Opening large packages/containers in a room where there are no other insect handling operations being performed.
  - Opening packages slowly; where feasible, use forceps to transfer insects and count insects before and after the transfer.
- 2.12.4 Disposable shipping packages/containers shall be placed in autoclave bags, sealed and stored in the autoclave chamber for autoclaving/discard by the BSO. Autoclave bags are not to be overfilled. The BSO shall be notified when disposable shipping packages/containers require autoclaving so that she/he can perform the sterilization and document the occurrence. Re-useable containers (e.g., Rubbermaid bins) shall be examined for the presence of insects, washed with soapy water, sprayed with the provided working solution (allowing 10 minutes of contact time), rinsed with tap water, then removed from the facility as soon as possible (following approval/inspection by the BSO).
- 2.12.5 Any plant materials, soil, etc. accompanying a shipment must be destroyed by autoclaving when they are no longer required.
- 2.12.6 Voucher specimens of exotic and domestic invasive insects shall be provided to the BSO for archiving as soon as they become available (this may be several months if materials are held in cold storage prior to use). Specimens shall be placed into vials containing 70% ethanol and shall be labeled with the name of the insect species and *Movement Certificate/Permit to Import* number.
- 2.12.7 Insect handling and experimentation shall only be conducted in the areas previously authorized by the BSO (refer to the current version of SOP Number IPS/030, *IQ Facility Access Authorization*).
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- 2.12.8 Experimental protocols and data sheets developed/used by researchers in the facility shall include methods for maintaining an ongoing inventory of their insects, thereby accounting for the whereabouts of each and every insect during its entire life cycle. Users of the facility are accountable for being excruciatingly stringent in correlation of actual numbers of insects with those identified/expected on the data sheets. Data sheets shall be made available to the BSO upon request for confirmation of these numbers. It is unacceptable to have missing insects. They must be found or accounted for before experimentation can proceed.
- 2.12.9 Original versions of data sheets may not be removed from the facility until the rearing and/or the experiment has been completed and the facility has been sufficiently sanitized. When required sooner, datasheets may be scanned and saved to a common/personal drive where they can be retrieved by the user from outside of the facility.
- 2.12.10 Personnel shall take immediate corrective action to prevent actual or potential escape of insects resulting from incidents that occur in the IQ facility as follows:
- Place a patch on broken holding cage, if applicable, and arrange for permanent repair when time permits.
  - Cease other insect handling operations in the area until free insects have been collected.
  - Close the door to the affected area and post the area as being off limits.
  - Collect all of the free insects using applicable collection devices (e.g., forceps, insect nets, etc.), or render non-viable (e.g., sticky traps).
  - Count the number of insect collected to ensure that all are accounted for (refer to 2.12.8).
  - Document the occurrence in an *Insect Quarantine Incident Report* (IPS Form Number 0107/002, Appendix 4) and provide it to the BSO in a timely manner. Ensure that corrective actions taken include measures to prevent recurrence of the incident.
- 2.12.11 Personnel who become aware of any breach in the security/access of the IQ facility shall immediately notify the BSO.
- 2.12.12 Personnel who become aware of any break in the insect containment envelope (e.g., broken door seals) of the IQ facility shall immediately notify the BSO. Air supply or exhaust ducts with damaged insect screens shall immediately be sealed using the nearby blast gates. Insect handling operations shall cease in the affected area and the BSO shall be notified immediately.
- 2.12.13 Personnel who find unintentionally introduced organisms (e.g., other insects, parasitoids, hyper-parasitoids, pathogens, nematodes, etc.) during the conduct of their rearing/experimentation with regulated materials imported from another country shall render them non-viable



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(e.g., autoclave or killing jar, as applicable) as soon as they are found. Researchers intending to keep these unintentional insects or nematodes viable within our facility or to send pathogens to a level 3 facility for further experimentation (exotic pathogens may not be maintained in our level 2 facility) must notify the BSO, who will obtain approval from the CFIA. Facility users shall comply with bio-safety requirements specified by the BSO.

- 2.12.14 There are no restrictions (beyond those specified in Section 2.13) for working with unintentionally introduced organisms (e.g., other native insects, parasitoids, hyper-parasitoids, pathogens, nematodes, etc.) found during the conduct of rearing/experimentation with regulated materials brought to the IQ facility from elsewhere in Canada via a *Movement Certificate*.
- 2.12.15 The use of automated watering systems should be avoided within the IQ facility.
- 2.12.16 Alcohol burners are not to be used within BSCs since air flow patterns may be disrupted and/or the HEPA filter may become damaged.
- 2.12.17 The following procedures shall be followed during the routine handling, feeding and maintenance of insects to maintain containment:
- Always maintain insects in sealed chew-proof containers/cages.
  - Whenever opening containers/cages, ensure that the door to the room is closed and the air pressure monitor is not in alarm (i.e., inward directional air flow is maintained).
  - Open containers/cages in a BSC whenever feasible; however, working on a bench top is permissible when working with small numbers of insects and taking care not to allow any to escape; if insects enter the mechanical areas of the BSC, contact the BSO to remove the appropriate access panel to capture them; if this isn't feasible, leave the unit running for 48 hours with the door closed and a note to keep it turned on (this will render the insect non-viable due to desiccation).
  - Avoid opening cages/containers when insects are in the immediate vicinity of the opening/lid.
  - When opening containers/cages, minimize the length of time in which the container is open; take care not let insects escape into the BSC or room.
  - When reaching into a cage or container, ensure that insects do not enter your lab-wear by having elasticized cuffs or by wearing sleeve protectors; inspect your sleeves frequently for hitch-hiking insects.
  - Insects shall be counted/verified (as per 2.12.8) each time they are transferred to a new container (e.g., during diet changes) and at the termination of experimentation or rearing.
  - Any material being removed from the container/cage shall be autoclaved by the BSO prior to washing or disposal.
  - Sanitization procedures specified in Section 2.11 shall be followed.



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- 2.12.18 Each time an electrical cord is removed from a wall outlet, a plastic outlet cap shall immediately be inserted.

### **2.13 Working with Pathogens/Parasitoids in IQ**

- 2.13.1 Personnel intending to conduct experimentation with insect pathogens/parasitoids must be pre-authorized to do so by the BSO, thereby minimizing the potential for conflicting activities.
- 2.13.2 Extreme care must be taken to avoid contamination of other areas of the facility.
- 2.13.3 Containers of pathogens or those housing infected insects must only be opened within the BSC.
- 2.13.4 Dosing of insects with pathogens must be conducted within the BSC.
- 2.13.5 Materials used for the venting of rearing cages/containers housing infected insects must have smaller pore sizes than the size of the pathogen.
- 2.13.6 Pathogens are to be stored in sealed, break-resistant containers such as screw top vials. Pathogens are to be clearly identified and dated.

### **2.14 Provision of Assistance by the BSO**

- 2.14.1 Rearing activities and experimentation conducted within the IQ facility are the responsibility of the facility user.
- 2.14.2 Upon request, the BSO may be available to assist facility users during times of excessive work load. Assistance may be provided when sufficient notice is given, however researchers should not expect this service unless it was agreed upon prior to commencement of the project.
- 2.14.3 The BSO will not be available to provide vacation leave replacement, however, with sufficient notice the BSO will perform basic maintenance of rearing operations (e.g., misting cages, etc.) during these absences. The BSO will not take responsibility for experimental conduct.
- 2.14.4 The BSO will strive to be available to assist facility users during periods of unavoidable leave (e.g., illness).

### **2.15 Contingency for Fire or Chemical Spill Alarm**

- 2.15.1 Upon hearing the fire or chemical spill alarm, personnel shall close all open insect containers and shall vacate the facility immediately following routine exit procedures. When danger is imminent (e.g., visible smoke or chemical odor), routine exit procedures shall be omitted (i.e., use any door for exit, do not change clothing, do not sign out).
- 2.15.2 When a user of the facility is also an IPS Emergency Floor Monitor, that individual shall do a sweep of the facility prior to vacating it.



- 2.15.3 The BSO is responsible for ensuring that GLFC emergency personnel are aware of IQ practices described in 2.15.1 and 2.15.2 and that during an alarm situation they should not enter the IQ facility.

## **2.16 Power Outage**

- 2.16.1 All essential systems in the IQ facility (i.e., environmental chambers/rooms, air handling systems, alarms, etc. are connected to the emergency back-up generator.
- 2.16.2 IQ facility users who determine (prior to being notified by the BSO) that a power failure has occurred shall immediately:
- a) Determine the status of their insects housed in the environmental chambers/rooms.
  - b) Do a visual check of the NIST thermometer/hygrometer that is located in the environmental chamber/room to ensure that parameters have not been exceeded.
  - c) Notify the BSO who will reset/reprogram the chamber and the NIST thermometer/hygrometer, if required.
- 2.16.3 In the event of failure (power or otherwise) of the BSC or chemical fume hood during use, IQ facility users shall immediately seal any containers of pests, pathogens, etc. to prevent escape into the room or to the outside. An immediate visual inspection shall be conducted of the cabinet and surroundings to ensure that biological containment has been maintained. The interior of the cabinet shall be cleaned as specified in 2.11.6. Gloves are to be removed within the cabinet and the sash is to be closed. A sign shall be posted on the BSC/hood warning others to not use it. The BSO must be notified and the cabinet/hood must not be used until the unit is fully functional.

## **2.17 Facility Maintenance and Repair**

- 2.17.1 Damaged/malfunctioning equipment, facilities, etc. shall be reported immediately to the BSO.
- 2.17.2 The BSO is responsible for ensuring IQ equipment and facilities are maintained in good working order. Requests for Work Orders shall be completed and submitted by the BSO or IPS manager.

## **2.18 Calculations**

- 2.18.1 The bleach working solution for general cleaning shall have a final sodium hypochlorite concentration of 0.3%. Bleach stock material with a 5.25% sodium hypochlorite concentration (e.g., Javex<sup>®</sup>) shall be diluted by combining 60ml bleach and 940ml water (i.e., 6% dilution). Bleach stock material with a 6.0% sodium hypochlorite concentration (e.g., Ultra Javex<sup>®</sup>) shall be diluted by adding 53ml bleach and 947ml





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water (i.e., 5.25% dilution). If another brand of bleach is used, volumes may need to be adjusted to provide a 0.3% sodium hypochlorite working solution.

[Note: minimum contact time of 10 minutes is required for effective sanitation]

### 2.19 Documentation and Reporting

- 2.19.1 Compliance to this SOP shall include completion of the following forms:
- IPS Form Number 0106/002 (*Insect Quarantine Access Log*, Appendix 2)
  - IPS Form Number 0107/002 (*Insect Quarantine Incident Report*, Appendix 4).

## 3.0 DISTRIBUTION AND ARCHIVING

### 3.1 Distribution

This SOP shall be distributed by the IPS manager to IPS personnel who are required to work in the IQ facility and to any other potential facility users (e.g., GLFC personnel) who request a controlled copy. Controlled copies are monitored for chain of custody to ensure that current versions are distributed timely and that outdated versions are destroyed. A current version of this SOP may be viewed in the *Bio-Safety Manual* maintained within the IQ facility or through the GLFC intranet.

### 3.2 Archiving

- 3.2.1 The IPS manager shall maintain a historical file of this SOP when it is replaced by a new version.
- 3.2.2 The BSO shall maintain historical files of *Insect Quarantine Access Logs* and *Insect Quarantine Incident Reports*.
- 3.2.3 The BSO shall maintain a historical collection of voucher specimens of exotic forest insects brought into the IQ facility.
- 3.2.4 Facility users shall maintain records of insect inventories (as specified in 2.12.8) for a period of at least 3 years.

### 3.3 Destruction of Outdated SOPs

When new versions of this SOP are available for distribution, all persons in possession of a controlled copy shall ensure that the retired version is returned to the IPS manager.

## 4.0 ASSURING SOP VALIDATION AND COMPLIANCE

### 4.1 Responsible Individual

- 4.1.1 The BSO is responsible for assuring that this SOP is valid.
- 4.1.2 The BSO is responsible for assuring that this SOP is followed by anyone conducting research in the GLFC IQ facility and that those persons have been appropriately trained in the use of this SOP.





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- 4.1.3 IQ facility users are responsible for complying with procedures specified on a *Controlled Copy* of this SOP and shall never use non-controlled copies which could be outdated.

### **5.0 REVISION OF THE SOP**

#### **5.1 Responsible Individual**

The BSO is responsible for assuring that this SOP is current. If necessary, the BSO shall initiate the revision process.

#### **5.2 Revision Schedule**

This SOP shall be revised when its provisions no longer agree with current practices or GLFC policies, and shall be approved by the IPS manager and the CFIA Office of Biohazard Containment and Safety.

### **6.0 CONTINGENCIES**

When facility users find circumstances that do not permit compliance with this SOP, the BSO shall be consulted.

### **7.0 CONFIDENTIALITY**

IPS SOPs are not considered to be confidential documents and may be distributed to outside parties. *Controlled Copies* shall not be reproduced.

### **8.0 REFERENCES**

- a) *Bio-Safety Manual*
- b) Current version of SOP Number IPS/030 (*IQ Facility Access Authorization*)
- c) Current version of SOP Number IPS/031 (*Movement of Exotic Forest Insects*)

### **9.0 APPENDICES**

- Appendix 1: Insect Quarantine Facility Floor Plan  
Appendix 2: IPS Form Number 0106/002 (*Insect Quarantine Access Log*)  
Appendix 3: IQ Facility Room Allocation  
Appendix 4: IPS Form Number 0107/002 (*Insect Quarantine Incident Report*)



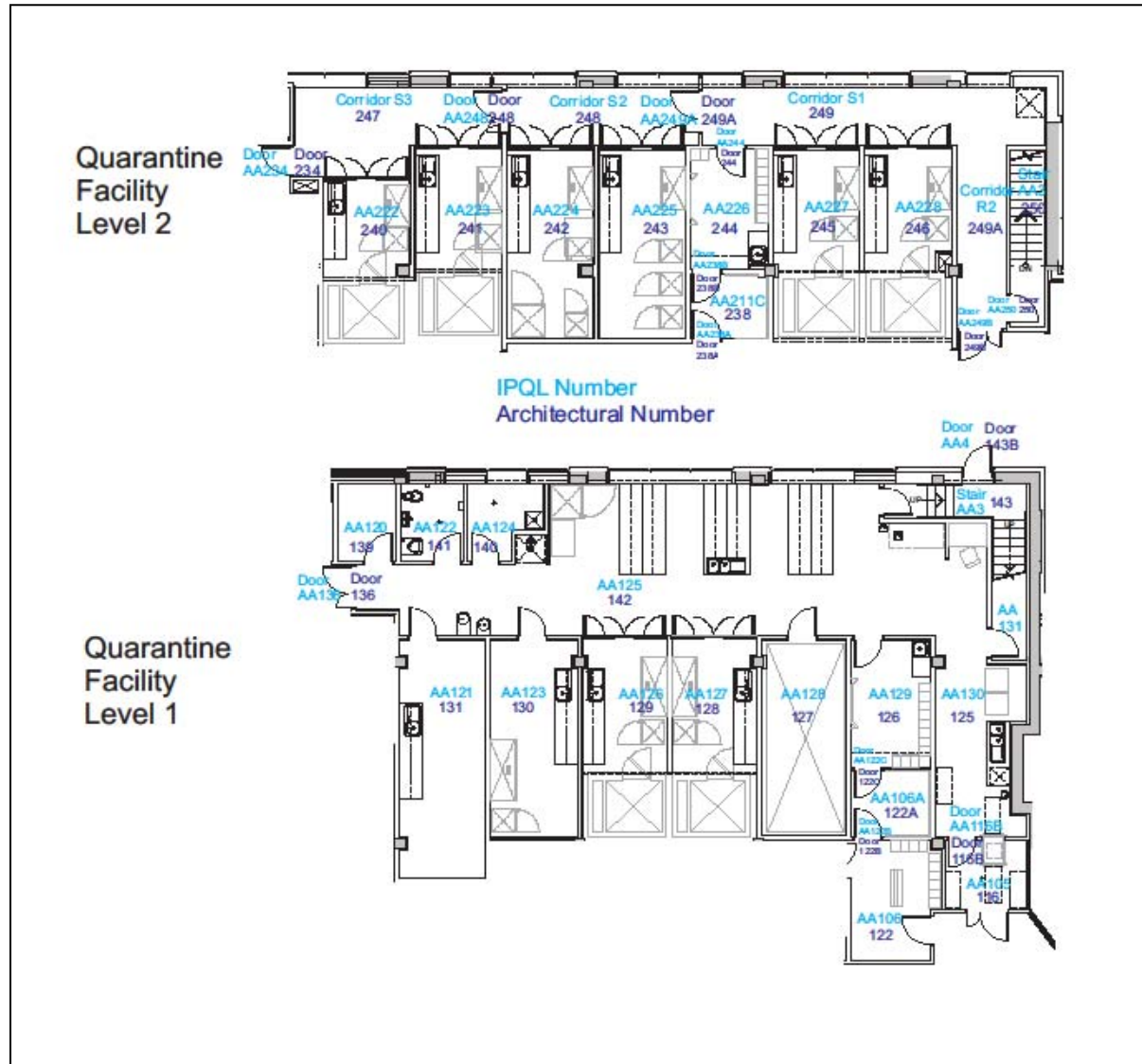
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## Appendix 1





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## Appendix 2 (Level 1)

Insect Quarantine Access Log (Level 1)

| Printed Name<br>(Visitors shall include organization name) | Initials | Purpose | Date<br>(DD/MM/YY) | Time In | Time Out |
|--|----------|---------|--------------------|---------|----------|
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### Appendix 3

#### IQ Facility Room Allocation

| Room # | Room Name                               | Description/Activity   |
|--------|---|--|
| AA105  | Autoclave Cleanout                      | -removal of sterilized waste from IQ facility  |
| AA106  | Locker Room                             | -store personal belongings<br>-entry/exit log book for facility users and visitors                               |
| AA106A | Anteroom                                | -controlled facility access  |
| AA106B | Service Core                            | -access to mechanical components of walk-in chambers, cold room and IT closet                                    |
| AA106C | IT Room                                 | -control room for building management system   |
| AA130  | Cleanup Area                            | -dish washing<br>-autoclaving  |
| AA129  | Change Room                             | -apply/remove lab garments<br>-hand washing<br>-air curtain at anteroom door                                     |
| AA128  | Cold Room                               | -storage of diapausing insects   |
| AA127  | Research Module                         | -assigned to scientific personnel for research activities  |
| AA126  | Research Module                         | -assigned to scientific personnel for research activities  |
| AA123  | Research Module (Electrophysiology Lab) | -assigned to scientific personnel for research activities<br>-laboratory with environmental controls             |
| AA121  | Research Module (Flushing Room)         | -assigned to scientific personnel for flushing insects from log bolts<br>-laboratory with environmental controls |
| AA120  | Log Splitter Room                       | -splitting log bolts; central vacuum cleanout  |
| AA122  | Janitor Room                            | -janitor room dedicated to IQ facility<br>-storage of tools and parts for facility maintenance personnel         |
| AA124  | Wash Room                               | -personal activity   |
| AA125  | General Work Area                       | -multi-user research area<br>-computer facilities<br>-access to level 2  |
| AA211C | Anteroom                                | -controlled IQ facility access for IPU personnel only<br>-entry/exit log book for facility users and visitors    |
| AA222  | Future IQ Research Module               | -to be assigned to scientific personnel for research activities when more IQ space is required                   |



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|       |                           |   |
|-------|---------------------------|---|
| AA223 | Future IQ Research Module | -to be assigned to scientific personnel for research activities when more IQ space is required          |
| AA224 | Future IQ Research Module | -to be assigned to scientific personnel for research activities when more IQ space is required          |
| AA225 | Future IQ Research Module | -to be assigned to scientific personnel for research activities when more IQ space is required          |
| AA226 | Change Room               | -for IPU personnel only<br>-apply/remove lab garments<br>-hand washing<br>-air curtain at anteroom door |
| AA227 | Research Module           | -assigned to IPU personnel for colony establishment   |
| AA228 | Research Module           | -assigned to IPU personnel for colony establishment   |





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## Appendix 4

### Insect Quarantine Incident Report

| SECTION A – TO BE COMPLETED BY THE FACILITY USER                            |  |
|---|--|
| Description/Explanation of Incident:  |  |
| Likelihood of Insect Escape:  |  |
| Date of Incident _____<br>(DD/MM/YY)  |  |
| Corrective Action Taken:  |  |
| Success of Corrective Action:   |  |
| Form Completed by:  |  |
| Printed Name _____  | Signature _____ Date _____<br>(DD/MM/YY) |
| SECTION B – TO BE COMPLETED BY THE BIOSAFETY OFFICER                        |  |
| CFIA notification: Yes <input type="checkbox"/> No <input type="checkbox"/> |  |
| BSO Signature _____   | Date _____<br>(DD/MM/YY)                 |

IPS Form Number 0107/002

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