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*Great Lakes Forestry Centre  
Insect Production Services*

# **STANDARD OPERATING PROCEDURE**

**Number: IPS/028/005**

## ***Air Sampling***



***Effective Date: 5 November 2013***

**Canada**



**TITLE: Air Sampling**

**APPROVING OFFICIAL:**

Manager, Insect Production Services (IPS) \_\_\_\_\_

DD / MM / YY

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**SIGNIFICANT CHANGES FROM PREVIOUS VERSION:**

- IPS Form Number 0060 has been revised to show the correct version number.
- Numerous editorial changes have been made.

## **1.0 INTRODUCTION**

### **1.1 Purpose**

This Standard Operating Procedure (SOP) describes procedures to be followed to ensure that air sampling within IPS facilities is conducted in a consistent manner.

### **1.2 Scope**

This SOP shall be followed by all Quality Control Unit (QCU) personnel when conducting airborne particle counts in IPS facilities using the ISO mode on the HandiLaz Mini Particle Counter.

### **1.3 Definitions**

*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.

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

*HandiLaz Mini Particle Counter* – a handheld, 3-channel, airborne particle counter for assessing micro-contamination levels in cleanrooms.

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



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

*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.

*Insectary* – A multi-species rearing facility under the control of IPS used exclusively by the IPU for maintaining insect colonies and preparing artificial diets.

*International Organization for Standardization (ISO) Cleanroom Classification* – Standards for classifying cleanroom air quality based upon number and size of airborne particulates in a given volume of air.

*Method Development (MD) Lab* – A research facility under the control of IPS used exclusively by the IPU for developing new rearing methods and for establishing new insect colonies.

*Quality Control (QC) Lab* – An analytical laboratory under the control of IPS used by the QCU for monitoring production, process and product control for all IPU insect colonies, and for developing new QC methods and procedures.

*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**

NA

#### **1.5 Materials**

- 1.5.1 HandiLaz Mini Particle Counter and USB cable.
- 1.5.2 Floor Plan of Air Sample Locations (Appendix 1).
- 1.5.3 IPS Form Number 0060/006, Air Sampling of IPS Facilities (Appendix 2).
- 1.5.4 Bleach working solution (refer to section 2.4).
- 1.5.5 Replacement batteries (4 x AA).

## **2.0 PROCEDURES**

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## **2.1 Collecting Air Samples**

- 2.1.1 Air sampling in IPS facilities shall be conducted on approximately monthly intervals prior to entering other labs in the building (typically on a Friday morning).
- 2.1.2 Ensure that the air particle counter, floor plan showing air sample locations (Appendix 1) and 4 spare AA batteries are placed inside the IPU pick-up window the day before air sampling is to be done (i.e., when conducting the sampling, enter the IPU prior to entering QC or IQ labs). The air particle counter shall be pre-cleaned using the bleach working solution (refer to section 2.4), a copy of the floor plan shall be taken directly from the printer (i.e., not from the QC lab), and the batteries shall be removed from their packaging.
- 2.1.3 Air samples shall be taken at each location identified on the floor plan (Appendix 1) in the sequence specified.
- 2.1.4 Endeavour to take samples when personnel are absent. When this is not possible, make a notation on the reporting form indicating which room was occupied during sampling.
- 2.1.5 At each location, take the number of sub-samples (called sample “points” by the air particle counter) specified on IPS Form Number 0060/006 (Appendix 2); i.e., each location has between 1 and 5 sample points pre-determined by the size of the room. The location of each sample point within the location shall be random.
- 2.1.6 Be prepared to change batteries mid-way through sampling when the low battery indicator symbol is illuminated. When doing so, sample point numbering starts over but no data is lost since the sequence of sampling is maintained.
- 2.1.7 Use the HandiLaz Mini Particle Counter as follows:
  - a) Press and hold the power button until the machine turns on, only when you are present at the first sample location and ready to take your first sample.
  - b) Use the *up* and *down* arrow buttons to move between options on the screen, followed by the <Enter> button to make your selection.
  - c) Clear any stored data by selecting *Data Processing*, select *Clear*, change *No* to *Yes* using the arrow button, press the <Enter> button (twice) when prompted “*Are you Sure?*”, return to the main menu using the <Prev> button.
  - d) Select *Measure Mode*, then select the *ISO* option.
  - e) Ensure that the device is set to store your data by ensuring that *Y* is indicated after the text *STR*.
  - f) Take your first sample by changing *NO* at the bottom right part of the screen to *OK* using the arrow button. As soon as you press the <Enter> key, the device will pause for 10 seconds then perform 3 successive 15 second measurements (called “Times” by the



instrument). The status of the 3 measurements will be indicated in the lower left portion of the screen. Hold the instrument steady during the conduct of the 3 measurements (it can be placed on a shelf or bench top).

- g) The unit will beep upon completion of the 3 measurements and will prompt you for “*NEXT POINT*”. Ensure that you are at the next sample location or sample point before you press the <Enter> button since the next set of 3 measurements will start immediately.
- h) Proceed with taking measurements at all sample locations and sample points in the order specified on the Floor Plan of Air Sample Locations (Appendix 1).
- i) If you wish to erase a set of 3 measurements at a sample point, you can do so by selecting *Erase Data*, then selecting *Yes*. This will remove only the last 3 measurements in storage.
- j) Once measurements have been taken at every sample point, select *FINISH* from the menu.
- k) Press the *PREV* button to return to the main menu, then press and hold the *POWER* button to turn the instrument off.
- l) If the unit turns off during the sample taking process due to low battery power, install 4 new AA batteries and continue taking samples where you left off starting from step 2.1.7(a) but do not clear data as specified in 2.1.7(c).

## 2.2 Uploading Data

- 2.2.1 Upon collection of all required air samples, data will need to be uploaded to the computer in the QC lab where the required software is located.
- 2.2.2 Connect the HandiLaz Mini Particle Counter to the QC computer using the USB cable. Press and hold the *POWER* button of the instrument to turn it on.
- 2.2.3 Select *DATA PROCESSING* from the main menu, then select *UPLINK*.
- 2.2.4 Open the Data Retrieval Software that is located on the computer desktop. Choose the *ISO* tab, select *01* for Address, select *com3*, then select *Read Data List* (this will show the date that the data was collected).
- 2.2.5 Double-click on the date. The raw data list will get populated.
- 2.2.6 Select the *Save all Records* button.
- 2.2.7 Save the raw data in an appropriate file on the QC network drive (use the date of data collection in the file name). Close the Data Retrieval Software.
- 2.2.8 Transfer the results to an EXCEL spreadsheet as follows:
  - a) Locate and open the raw data file on the QC network drive.
  - b) Highlight and copy all text/data from “Point 1” through to the last line of data.
  - c) Locate and open the EXCEL spreadsheet from the previous month.



- d) Paste the newly acquired data on top of the same data cells from the previous month, revise the date of sampling, then select *SAVE AS* and give the file a new name which includes the date the air sampling was conducted. As soon as the new data is pasted into the EXCEL spreadsheet, Sheet 2 of the file (i.e., IPS Form Number 0060/006) will automatically become populated with a grade of "PASS" or "FAIL" for each sample location by first calculating sample means for each location and comparing them to the *ISO Air Classification Table (ISO 14644-1: 1999)* for each particle size.
- 2.2.5 The QCU supervisor shall meet with the IPS manager on a periodic basis to determine if the required air classification established for each sample location is still appropriate for the work being done there. This SOP shall be revised as specified in Section 5.0.

### **2.3 Documentation and Reporting**

- 2.3.1 An electronic copy of the completed EXCEL spreadsheet [i.e., IPS Form Number 0060/006, Air Sampling of IPS Facilities (Appendix 2)] shall be maintained on the QC network drive and a hard copy shall be printed and filed in the QC lab for expedient retrieval.
- 2.3.2 An electronic copy shall be sent by email to the IPU supervisor, Insectary and IPS manager in a timely manner.

### **2.4 Calculations**

- 2.4.1 The bleach working solution for 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 adding 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 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]*

## **3.0 DISTRIBUTION AND ARCHIVING**

### **3.1 Distribution**

This SOP shall be distributed by the IPS manager to applicable QCU personnel.

### **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 QCU supervisor shall ensure that a historical file is maintained for air sampling results (i.e., IPS Form Number 0060/006).

### **3.3 Destruction of Outdated SOPs**

When a new version of this SOP is available for distribution, IPS personnel shall ensure that the retired version is returned to the IPS manager upon request.

## **4.0 ASSURING SOP VALIDATION AND COMPLIANCE**

### **4.1 Responsible Individual**

- 4.1.1 The QCU supervisor is responsible for assuring that this SOP is valid.
- 4.1.2 The QCU supervisor is responsible for assuring that this SOP is followed by QCU personnel and that these persons have been appropriately trained in the use of this SOP.
- 4.1.3 QCU personnel 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 QCU supervisor is responsible for assuring that this SOP is current. If necessary, the QCU supervisor 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.

## **6.0 CONTINGENCIES**

When QCU personnel find circumstances that do not permit compliance with this SOP, the QCU supervisor 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**

*ISO Air Classification Table (ISO 14644-1: 1999).*

## **9.0 APPENDICES**

Appendix 1: Floor Plan of Air Sample Locations



*Great Lakes Forestry Centre  
Insect Production Services*

## **STANDARD OPERATING PROCEDURE**

*Air Sampling*

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Appendix 2: IPS Form Number 0060/006, Air Sampling of IPS Facilities.

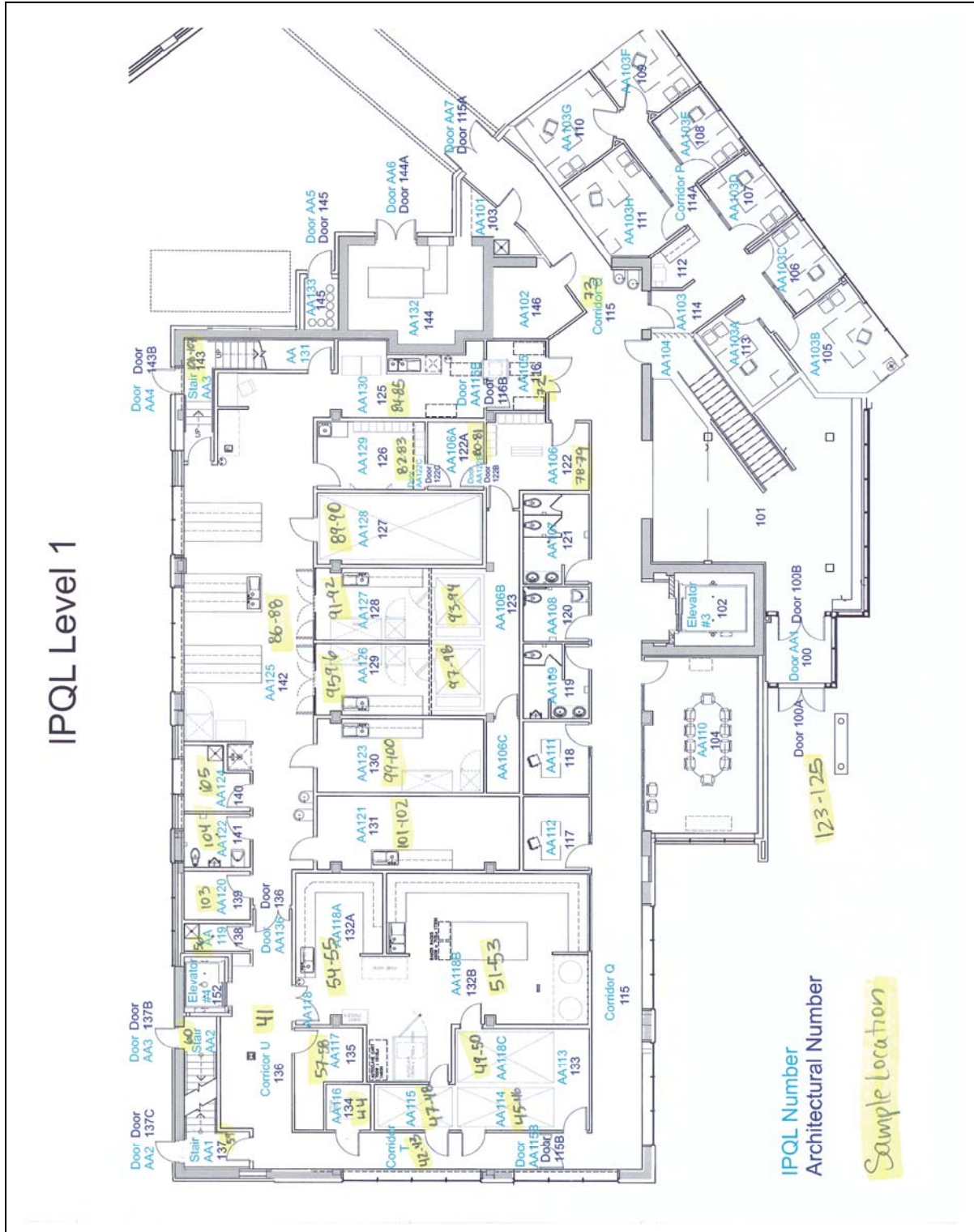




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## Appendix 1 Floor Plan of Air Sample Locations

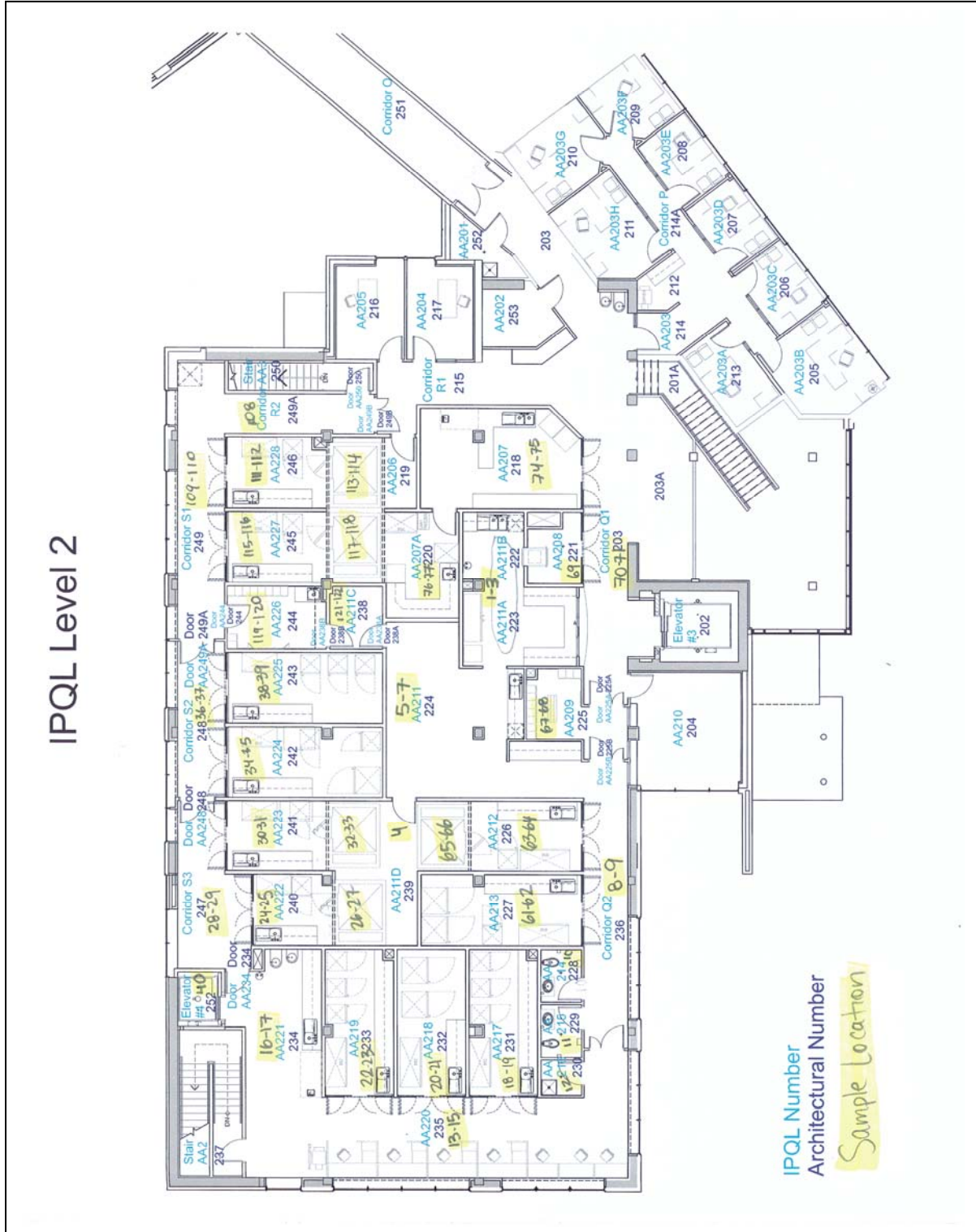




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Effective Date: 5 November 2013

## Appendix 1 (Continued)





# STANDARD OPERATING PROCEDURE

## Appendix 2. IPS Form Number 0060/006 (Air Sampling of IPS Facilities).

Date of Test:		Air Sampling Results		
Sample Location	Location Description	Sample Point #	ISO CLASS	PASS/FAIL
1-3	AA211A + AA211B (Distribution and cleanup)	1-9	8	
4	AA211D (Service Core)	10-12	8	
5-9	AA211 (Training Room) + Corridor Q2	13-27	8	
10	AA214 (♀ Washroom)	28-30	8	
11	AA215 (♂ Washroom)	31-33	8	
12	AA216 (Janitor Room)	34-38	8	
13-17	AA220 (Admin/Records) + AA221 General Work Area	37-51	8	
18-19	AA217 (Module-Co/Cpp)	52-57	7	
20-21	AA218 (Module-Da)	58-63	7	
22-23	AA219 (Module-Da)	64-69	7	
24-25	AA222 (Module-DCf)	70-75	7	
26-27	AA222 (Chamber #AA22201)	76-81	7	
28-29	Corridor S3	82-87	8	
30-31	AA223 (Module DCf)	88-93	7	
32-33	AA223 (Chamber #AA22301)	94-99	7	
34-35	AA224 (Module-ND Cf)	100-105	7	
36-37	Corridor S2	106-111	8	
38-39	AA225 (Module-OI)	112-117	7	
40	Elevator #4	118-120	8	
41-43	Corridor U + Corridor T	121-129	8	
44	AA116 (Steam generator)	130-132	8	
45-46	AA114 (Diapause room)	133-138	7	
47-48	AA115 (Prepared diets)	139-144	7	
49-50	AA118C (Diet ingredients)	145-150	7	
51-55	AA118B (Diet making) + AA118A (Diet ingredient prep)	151-165	7	
56	AA119 (Janitor room)	166-168	8	
57-58	AA117 (Storage)	169-174	8	
59-60	Stair AA1/AA2	175-180	8	
61-62	AA213 (MD lab)	181-186	7	
63-64	AA212 (MD lab)	187-192	7	
65-66	AA212 (Chamber #AA21201)	193-198	7	
67-68	AA209 (IPU Locker room)	199-204	8	
69-73	Corridor Q1 + Corridor Q (include autoclave cleanouts)	205-219	9	
74-75	AA207 (QC lab)	220-225	8	
76-77	AA207A (Molecular lab)	226-231	8	
78-79	AA106 (IQ Locker room)	232-237	8	
80-81	AA106A (Anteroom)	238-243	8	
82-83	AA129 (change room)	244-249	8	
84-88	AA130 (Cleanup area) + AA125 (General Work Area)	250-264	8	
89-90	AA128 (Cold room)	265-270	8	
91-92	AA127 (Research module)	271-276	8	
93-94	AA127 (Chamber #AA12701)	277-282	8	
95-96	AA126 (Research module)	283-288	8	
97-98	AA126 (Chamber #AA12601)	289-294	8	
99-100	AA123 (Electrophysiology lab)	295-300	8	
101-102	AA121 (Flushing room)	301-306	8	
103	AA120 (Log splitter room)	307-309	8	
104	AA122 (Washroom)	310-312	8	
105	AA124 (Janitor room)	313-315	8	
106-107	Stair AA3	316-321	8	
108-110	Corridor R2 + Corridor S1	322-330	8	
111-112	AA228 (Research module-MPB)	331-336	8	
113-114	AA228 (Chamber #AA22801)	337-342	8	
115-116	AA227 (Research module-ALB)	343-348	8	
117-118	AA227 (Chamber #AA22701)	349-354	8	
119-120	AA226 (IPU change room for IQ)	355-360	8	
121-122	AA211C (IPU anteroom)	361-366	8	
123-125	OUTSIDE	367-375	9	

IPS Form Number 0060/006

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