Human Factors Engineering Critical Design Review Evaluation of the Human Research Facility Surface Water and Air Biocharacterization Experiment Hardware

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1.0 SCOPE

Human factors engineering (HFE) has been tasked to assist in the design of all Human Research Facility (HRF) hardware through multiple iterations of evaluations during various stages of product development. These evaluations have been based on recommendations from HFE principles and guidelines outlined within several HFE related documents such as the *Man Systems Integration Standards* (NASA-STD-3000), the *International Space Station Crew Integration Standard* (SSP 50005B), the *International Space Station Program Pressurized Payloads Interface Requirements Document* (SSP 57000), as well as several other International Space Station documents pertaining to HFE design (see Section 2.0, Applicable Documents).

An HRF human factors representative has been a member of the Experiment 99E049: *Comprehensive Characterization of Micro-organisms and Allergens in the Spacecraft Environment*, otherwise known as Surface, Water, and Air Biocharacterization (SWAB) experiment team since 2002. This has been instrumental in allowing human factors questions and issues to be addressed as efficiently and effectively as possible throughout the experiment and hardware design process.

The purpose of this report is to document the human factors review of SWAB hardware through Critical Design Review (CDR) and outline any issues or waivers that may need to be resolved.

1.1 Human Factors Engineering Process

One of the major milestones of HRF product development is the CDR, which displays approximately 90% of the product design. Prior to this stage, several preliminary HFE evaluations took place with the SWAB hardware, which resulted in the production of recommendations and comments. These evaluations included hardware overview and operations, verification matrices and methods, and analysis of engineering sketches and drawings.

Post-CDR, human factors engineers will verify that the hardware design includes any modifications agreed upon to satisfy human factors requirements. After training unit fabrication is complete, human factors engineers will ask crewmembers or crew representatives to evaluate how convenient and efficient the device is for the crew to use, noting comments about its operation. Any comments will be addressed in hardware design or procedures recommendations.

After the qualification and/or flight unit is complete, human factors engineers will evaluate its operation and verify the hardware design against the applicable ISS human factors requirements as documented in the System Requirements Document (SRD).

2.0 APPLICABLE DOCUMENTS

LS-20444-1	System Requirements Document for the Surface Water and Air Biocharacterization Experiment System
LS-71000	Program Requirements Document for the Human Research Facility
FED-STD-595B	Federal Standard 595B Colors Used in Government Procurement
NASA-STD-3000	Man-Systems Integration Standards
SSP 50005	International Space Flight Crew Integration Standard
SSP 50008	International Space Station Interior Color Scheme
SSP 50014	International Space Station Utility Coding Specification
SSP 50254	International Space Station Operations Nomenclature
SSP 57000	International Space Station Program Pressurized Payloads Interface Requirements Document

3.0 HUMAN FACTORS EVALUATIONS OF SWAB HARDWARE

The SWAB hardware has undergone several HFE evaluations. Appendix A includes a memo of the initial HFE evaluation for the SWAB Air Sampling Device (ASD) occurring in November 2002. In addition, the ISS Payload Label Approval Team (IPLAT) have been consulted on labeling schemes and were also instrumental in coordinating a meeting with Inventory Management System (IMS), ISS stowage, and Crew Office personnel to discuss label implementation. A summary of this meeting is presented in Appendix B.

The SWAB sampling tubes (SWAB Tubes), water bags and accessories, ASD and batteries, and stowage kit mockups continued to be made available to HFE personnel throughout 2003. Inspections and demonstrations were performed on the hardware and drawings were reviewed. The following paragraphs outline the results of human factors evaluations in the following areas: strength requirements, body envelope and reach accessibility, habitability, structural/mechanical interfaces, controls and displays, restraints and mobility aids, identification labeling, and crew safety. These topics are derived from those found in the “Human Factors Interface Requirements” section of the *International Space Station Program Pressurized Payloads Interface Requirements Document* (SSP 57000, Rev. E).

3.1 Strength Requirements

A small-statured female participant operated the SWAB ASD, including the manipulation of the membrane keys and removing and replacing the air filter. The participant had sufficient grip strength to operate the hardware. The linear and torsional forces needed to operate the hardware were acceptable. Potential maintenance operations on the SWAB ASD may require the removal of the battery door. However, this does not require strength beyond expected norms, including that of a small-statured female. The SWAB Tube is easily held in one hand by a small-statured female. Strength necessary to open the tube was minimal. Water bags and adapters of the same design have been used previously on the International Space Station (ISS), and no human factors strength issues were noted. All equipment is designed to be used with either the right or left hand.

3.2 Body Envelope and Reach Accessibility

All parts of the SWAB ASD were arranged to provide visual access, such that areas which need to be accessed are not hidden. A small-statured female participant was able to physically access all areas of the ASD assembly, including the air filter and battery door. On-orbit Replaceable Units (ORUs), in this case the ASD battery, can be removed along a direct path. The SWAB Tubes and the water bags are able to be held in one hand. Reach accessibility is not an issue, since all items are portable and stowed in kits that can be removed from an ISS stowage locker. Furthermore, the SWAB kit designs are such that all of the SWAB hardware items are available in one ISS locker. Hardware items are grouped by function and also by experiment session (where applicable) to benefit crewmember accessibility.

Any and all areas of the SWAB experiment hardware could be reached, and not compromised, by the use of standard ISS foot restraints. The SWAB experiment hardware items are portable and do not possess any hindrances to foot restraint or handrail placement on the seat track of the ISS modules.

3.3 Habitability

A cover plate is provided on the SWAB ASD battery compartment to prevent moisture or debris from entering. Furthermore, the SWAB ASD will be encased in a Nomex cover. The unit will also be stowed when not in use, which provides sufficient protection for the air inlet. Air filters will also be stowed when not in use, and are housed in protective plastic covering prior to, and directly after, use. The SWAB Tubes and water bags do not need any connectors or covers, and are protected by the stowage kits.

The current housing for all of the SWAB hardware items is Commercial-Off-The-Shelf (COTS). However, a blue Nomex cloth cover has been added to the ASD, which meets ISS color requirements. Decals on the SWAB ASD conformed to Table 3.12.3.4-1 Surface Interior Colors and Paints. Background of the decals is Off-White Semigloss,

#27722 and the text is Black. These colors meet Paint Specifications per FED-STD-595 as referenced in SSP 50008, *International Space Station Interior Color Scheme*.

3.4 Structural/ Mechanical Interfaces

The SWAB ASD air filters may be placed on the air inlet in any orientation. Tabs are provided to aid in removing the air filter from the SWAB ASD. There are no connectors or fasteners to be operated by the crew other than Velcro, the correct amount of which was placed in accordance with ISS standards.

In an off-nominal condition, whereby it would be necessary to exchange the SWAB ASD battery, the battery door meets access requirements. Only one access cover needs to be removed to remove and replace the battery. The fasteners on the ASD battery door are held captive when disengaged.

The design of the handle on the SWAB ASD, as well as the Inventory Management System (IMS) label and other label text, serve as an indication of the correct orientation of the SWAB ASD. Similarly, the design of the SWAB Tubes and water bags indicate their correct orientation for use.

3.5 Controls and Displays

The SWAB ASD membrane keypad controls are protected adequately since they are in a recessed area. In addition, the operation of the start/stop button prevents accidental activation since it must be pressed twice to actually start the operation of the device. The same button will stop the device if necessary, and it will turn off automatically after the amount of time entered during the start of the experiment session. The size and shape of the keys are adequate for a small-statured and large-statured person to operate successfully. The SWAB Tubes and water bags do not have any displays or controls.

3.6 Restraints and Mobility Aids

The existing handle on the SWAB ASD meets the requirements for handle dimensions as listed in the *Pressurized Payloads Interface Requirements Document* (SSP 57000, Rev. E). The handle location is appropriate for proper usage of the device. A small-statured female is able to lift and carry the SWAB ASD. A small-statured female is also able to carry the SWAB Tubes and water bags in one hand. No additional restraints or mobility aids are necessary.

As mentioned previously in paragraph 3.2, the design of the SWAB experiment hardware does not preclude the use of ISS foot restraints or mobility aids.

3.7 Identification Labeling

A meeting to discuss the unique labeling for the SWAB hardware was held in October 2003. Present at the meeting were representatives from the SWAB experiment team,

IPLAT, IMS group, ISS stowage, and Crew Office. A summary of this meeting and a description of the label plan can be found in Appendix B.

The SWAB hardware labels will meet the requirements as set forth in Appendix C of the *Pressurized Payloads Interface Requirements Document* (SSP 57000, Rev. E), as well as the Payload Interface Revision Notice (PIRN) titled "Payload Label Updates and Reductions" (# 57000-NA-0301). Specific information on label design and text can be found in Appendix C.

3.8 Crew Safety

No extra precautions for overload protection are necessary on the SWAB ASD. The unit meets all human factors requirements for crew electrical safety. There are no holes, latches, or securing pins on the unit. The design of the device meets all human factors crew safety requirements. Similarly, there are no electrical hazards associated with the SWAB Tubes or water bags. There are no holes, latches or pins which may cause harm to a crewmember or their clothing.

4.0 CONCLUSIONS

The SWAB ASD, SWAB Tubes, and water bags are compliant with all human factors requirements as listed in the *Pressurized Payloads Interface Requirements Document* (SSP 57000, Rev. E). The LCD, labels, and membrane keypad on the ASD were found to be readable and easy to use. The SWAB Tubes and water bags are intuitive in design. Additionally, the design of the hardware does not present any human factors issues or concerns. No ISS human factors requirements waivers are anticipated.

Human factors personnel will continue to work with the HRF SWAB experiment team to ensure that the hardware is easy to use and designed to enhance experiment success.

APPENDIX A: Memo from ASD Initial Evaluation

Memorandum

To: Micah Johnson

CC:

From: Cynthia Hudy

Date: 11/25/2002

Re: SWAB Air Sampling Device

OBJECTIVES

The purpose of this memo is to address the topics of human factors and labeling with the Human Research Facility (HRF) Air Sampling Device for Experiment 99E049: Comprehensive Characterization of Micro-organisms and Allergens in the Spacecraft Environment (SWAB). Human factors engineering personnel were asked to perform an informal assessment of an MD8 Sartorious Air Sampler and to provide appropriate recommendations for any additions or modifications to the hardware design or labeling. The assessment was based on human engineering requirements listed in the *Pressurized Payloads Interface Requirements Document* (SSP 57000, Rev. E) and general human factors principals and guidelines.

HARDWARE DESIGN

Strength requirements. Human factors personnel do not anticipate any issues with grip strength, linear forces, or torque. Potential maintenance requires the removal of the battery door. However, this does not require strength beyond expected norms, including that of a small-statured female.

Reach accessibility. The hardware is designed to provide both visual and physical access for all crew interfaces. On-orbit Replaceable Units (ORUs), in this case potential battery removal, can be accomplished along a straight path.

Habitability. A cover plate is provided for the battery compartment to prevent moisture or debris from entering. The unit will also be stored when not in use, which provides sufficient protection for the air inlet. However, if a cloth cover will be provided for the unit, it is recommended that part of this cover be a flap over the air inlet, which could then be secured out of the way (through the use of Velcro or other means) during air sampling. Air filters should also be stored when not in use, and may want to be housed in some kind of protective covering, such as cloth or Ziploc bags.

The current housing for the air sampling unit is Commercial-Off-The-Shelf (COTS) and may require a waiver for the *Pressurized Payloads Interface Requirements Document* (SSP 57000) requirement for Lighting Design (para. #3.12.3.4-A). However, if a cloth cover will be provided, this requirement will not be applicable. It is suggested, however, that a cloth cover be dark colored, such as the blue used for many HRF soft goods.

Structural/Mechanical Interfaces. If the air filters are to be placed on the air inlet in a certain orientation, ensure that labeling or markings are visible to aid in the orientation of the air filter.

The requirement for Access (para. #3.12.4.2.8) states that access to inspect or replace a hardware item shall not require removal of more than one access cover. If access to remove and replace the battery is required on-orbit, it is suggested that the battery compartment door and interior (holding) plate be combined into one piece, if possible. In addition, any cover plate or access door should be tethered or somehow held captive to the Air Sampling device.

Any connectors to be operated by the crew on-orbit must be designed and placed so they can be mated/demated with either hand. In addition, it must be possible to remove one connector without having to remove another. Connectors must be placed at least 1 inch from each other or adjacent obstructions. Protection, such as dust caps, must be provided for demated connectors. Different size, shape, or keying of connectors is required where connectors differ in content.

Any fasteners planned to be operated by the crew on-orbit, such as fasteners on the battery compartment door, must be captive when disengaged. Hex-type external or internal grip fasteners must be used where on-orbit crew actuation is planned. Only right-handed threads shall be used. If a smooth surface is required, such as the exterior of the Air Sampling device, flush or oval head internal hex grip fasteners must be used. In addition, fasteners planned to be removed or installed on-orbit must be placed so that they can be mated/demated using either the right or left hand. It is recommended that the battery compartment door screws be changed to captive thumb screws, if possible.

Controls and Displays. The membrane keypad controls are protected adequately since they are in a recessed area and that the start/stop button must be pressed twice to actually start the operation of the device. The size and shape of the keys are adequate for a small-statured and large-statured person to operate successfully.

Restraints and Mobility Aids. All unrestrained parts, such as access plates, that may be temporarily removed on-orbit must be tethered or otherwise held captive. Once it is decided how the unit will be mounted, ensure that proper restraints are provided. Restraints could be in the form of Velcro, bungees, etc.

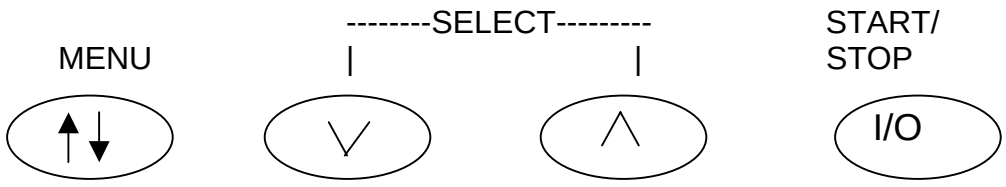
The existing handle on the Air Sampling device appears to meet the requirements for handle dimensions as listed in the *Pressurized Payloads Interface Requirements Document* (SSP 57000). However, human factors personnel will re-measure the length of the handle to ascertain whether a height of 1.88 inches from the top of the unit to the underside of the handle is maintained for approximately 4.38 inches over the length of the handle. This would meet the requirement for a "one-handed bar". If not, it is believed that the weight of the unit would allow the handle to be considered a "two-finger" grasp, where the handle dimension requirements are smaller. The handle location is appropriate for proper usage of the device.

Crew Safety. No extra precautions for overload protection are necessary. The unit meets all human factors requirements for crew electrical safety. There are no holes, latches, or securing pins on the unit. The design of the device meets all human factors crew safety requirements.

IDENTIFICATION LABELING

Control and Display Labels. According to discussions with the International Space Station Payload Labeling Approval Team (IPLAT) lead, Commercial-Off-The-Shelf (COTS) hardware is typically not assessed or modified by IPLAT. The control and display buttons can remain as is, as long as the procedures documentation uses the same terminology and/or symbols. However, if changes to the interface are desired, human factors recommendations are listed below.

1. The left-most options menu membrane key (with up and down arrows) could be labeled as "MENU", since this button is understood to present options to the crew for device operation parameters.
2. The middle two membrane keys (with open up and down arrow heads) could be labeled "SELECT", since these buttons are understood to cycle through the menu selections. The label should appear as shown below.
3. The right-most start and stop membrane key (with 'I/O' symbol) could be labeled "START/STOP", since this button is understood to turn the device on and begin sampling, and also to stop sampling if necessary. It is understood that the device will shut off automatically at a time selected with the menu key.



The membrane key labels must be in all capital letters. The font must be at least 12-point Helvetica. If desired, the labels can be produced by the Decal Design and Production Facility at NASA/JSC. The labels should be located above the membrane keys, if adequate space is available.

General Labeling. In addition, the device must have an Inventory Management System (IMS) label and identification (name) label. Depending on the ultimate use of the device, some recommendations are “HRF AIR SAMPLING DEVICE” or “HRF SWAB AIR SAMPLING DEVICE”. Note that the identification label must also be in all capital letters. The font must be larger than that used for the membrane keys (i.e., larger than 12-point font). The font must be Helvetica. The IMS label must appear above or to the left of the identification (name) label.

Another option is to use a combined IMS and name label. In this case, the device name would appear in mixed case, such as “HRF Air Sampling Device”. If desired, the label can be produced by the Decal Design and Production Facility at NASA/JSC. IMS labels must be approved separately through the IMS label group – Ed Bowers/LM is in charge of this for HRF hardware.

Finally, any loose items, such as the air filters, or possibly, the battery door, must also have an IMS and identification label. In the case of the air filters, the protective bag or kit in which they are stored can be labeled.

CONCLUSIONS

The MD8 Sartorious Air Sampler device meets most all human factors requirements as listed in the *Pressurized Payloads Interface Requirements Document* (SSP 57000). Additionally, the design of the unit is usable and does not present any human factors issues or concerns. Human factors engineering personnel should be consulted again once more is known about the life-cycle of the batteries, and whether or not they will be replaced on-orbit. Furthermore, additional consultation can be provided on labeling, once the experiment use of the device and the question of a cloth cover are better known.

APPENDIX B: Summary of IPLAT Meeting

Memorandum

To: Rich Ellenberger/ NASA SF; Antonius Widjokongko/ LM SF; Andrew Tucker/ LM SM

CC: Micah Johnson/ LM EB

From: Cynthia Hudy/ LM SF

Date: October 2003

Re: SWAB Experiment Label Design

OBJECTIVE

The purpose of this memo is to summarize the results of the ISS Payload Label Approval Team (IPLAT) meeting for the Human Research Facility (HRF) Experiment 99E049: *Comprehensive Characterization of Micro-organisms and Allergens in the Spacecraft Environment*, otherwise known as Surface, Water, and Air Biocharacterization (SWAB).

BACKGROUND

The SWAB experiment was approved as an International Space Station (ISS) experiment whose duration spans several increments. The SWAB hardware consists of: an air sampling device (ASD), air filters, tubes with cotton swabs for collecting surface samples (SWAB Tubes), water bags for the collection of different sources of potable water, condensate syringes, and kits to identify and store this hardware. Per ISS requirements, the hardware must be labeled with an identification label, but the date and place of collection were also of paramount importance to the experiment team. The hardware items are commercial-off-the-shelf (COTS) and are sealed by the manufacturer to remain sterile until use. Typically, the sterile container will be discarded once the item is opened, and a second container is needed after the sampling is complete. This unique situation presented difficult questions for labeling.

The SWAB experiment team and HRF human factors personnel had met previously with IPLAT personnel to informally discuss a label scheme for the various SWAB experiment hardware. The conclusion from these meetings was that further discussions with ISS stowage, Inventory Management System (IMS) personnel, and Crew Office were necessary.

In October 2003, a meeting was held for this purpose. Attendees were Andrew Tucker and Cynthia Hudy, representing the SWAB team; Rich Ellenberger and

Antonius Widjokongko, representing IPLAT; Nicole Stott, Michelle Rowland, and Pat Williams, representing the Crew Office; and Mary Winton, Amy Schellhase, and Scott Stinson, representing the IMS group.

MEETING SUMMARY

There are multiple quantities of air filters, SWAB Tubes, and water bags. In addition, a certain set of water bags are designated for collecting the water, but are considered temporary, since the water is then squeezed into final water bags that include preservative. Therefore, it was not necessary or appropriate to place IMS barcode labels on all the items. The main point discussed during the meeting was what level of information does the SWAB experiment team need to (or want to) track. It was agreed that it would only be prudent to label the hardware kits with IMS barcode labels. For example, the kit containing the air filters would be labeled "SWAB Air Filter Kit", would have an IMS barcode, and would display the contents and quantity, for example "SWAB Air Filter [10]". Subsequently, each individual air filter, water bag, and SWAB Tube would have an identification label, but would not have IMS labels. The individual hardware labels would also allow for crew comments, such that individual dates or locations of the sampling would be recorded. Such a label scenario for the multiple items would allow the items to be distinguished after use for science purposes, and would not cause any IMS issues or confusion.

A stowage kit scenario was also discussed. The SWAB experiment team's original plan was to send up a large Nomex kit which includes smaller kits designated for each sampling session for that increment. The crew would then pull out one of these smaller Nomex kits for each sampling session which would include the correct number of air filters, SWAB Tubes, and water bags. There would also be a return kit, for samples to be sent back to Earth for science processing. The discussion group commented that there would be too many kits, and that some of the kits would have no purpose once the samples were taken. The thought was that this would create too much trash, or if not discarded, then too much stowage prior to return to Earth. The recommendation was to use more plastic bags, which can stow easily, and not as many Nomex bags. The stowage plan is still being discussed with HRF stowage and kit design personnel.

SWAB LABEL PLAN

With these recommendations in mind, a draft labeling scheme was created. Details for each piece of hardware are discussed below.

SWAB Air Sampling Device. The ASD will be labeled with a new "combination" identification and IMS label that meets the requirements outlined in the Payload Interface Revision Notice (PIRN) titled "Payload Label Updates and Reductions" (# 57000-NA-0301). The label includes the name of the equipment, "SWAB Air Sampling Device" and the IMS barcode label. Added to the SWAB ASD were labels for the membrane control keys. "MENU" is used to indicate the keypad used to cycle through menu options. "CYCLE SETTINGS" is used to indicate the two keypads (up

and down arrows) used to cycle through menu option settings. “ON/START/STOP” is used to indicate which keypad is used to operate the device.

SWAB Air Filters. The air filters are received from the manufacturer in a sterile plastic bag, which is opened and discarded when the air filter is to be used. Therefore, labeling this bag was not appropriate. Instead, the air filter and plastic bag will be placed in an additional bag, which will then be labeled with an identification (name) label and lines on which the date and location from which the sample was taken can be recorded. The SWAB Air Filters will be kept in a kit, which will be labeled with a combination label, providing the name, quantity, and IMS barcode label.

SWAB Tubes. The SWAB Tubes will be labeled with a name label and lines on which the date and location from which the sample was taken can be recorded. In addition, the SWAB Tubes contain a preservative which is toxicity level 1. A toxicity level 1 label will be placed on available space on the name label. The SWAB Tubes will be kept in a kit, which will be labeled with a combination label, providing the name, quantity, and IMS barcode label.

Temporary Water Bags. The temporary water bags used for collection from the potable water sources will be labeled with a name label and lines on which the date and location from which the sample was taken can be recorded. The water is collected from three sources: SRV-K Hot, SRV-K Warm, and SVO-ZK, which are displayed on the name label. The temporary water bags will be kept in a kit, which will be labeled with a combination label, providing the name, quantity, and IMS barcode label.

Final Water Bags. The water collected in the temporary water bags is squeezed into the final water bags which include a preservative. The final water bags are labeled with an identifying name to show the source from which it was taken. Since the preservative is toxicity level 2, it needs to be further contained. Therefore, each water bag is placed within another plastic bag. These outer plastic bags are labeled the “SWAB Final Water Kit”. This is also where the crewmember would write the date the sample was taken, and would stow the used water line adapter. Both internal and external bags will have toxicity level 2 labels on each bag. The final water kits will be kept in a Nomex kit, which will be labeled with a combination label, providing the name, quantity, and IMS barcode label.

Condensate Syringe. The condensate syringe will be labeled with a name label and lines on which the date and location from which the sample was taken can be recorded. The syringes will be kept in a kit, which will be labeled with a combination label, providing the name, quantity, and IMS barcode label.

Stowage Kits. The stowage kits, including the main kit within the ISS locker and the return kit, will be labeled with a name label and IMS barcode label. The name label will include a list of contents and quantities.

CONCLUSION

The label plan for the SWAB experiment is still under development, however, appropriate steps are being taken to include comments from human factors, IPLAT, ISS stowage, IMS group, and the Crew Office. The goal is to create an ideal plan that will allow easy identification for the crew, while also satisfying ISS requirements.

Appendix C: Summary of Current Labeling Plan

SWAB Labels
Nov. 26, 2003

Note: This list may not include all "kit" labels that are necessary. Team will have to review when kit designs are more mature.

AIR SAMPLING DEVICE

1. "Combo" Label – Name & Barcode
    a. Will order from the JSC Decal Lab
    b. Will find out if we can get it with HRF "smart" label for barcode
    c. Label Design:

SWAB ASD
(Air Sampling Device) P/N: xxx |||||||||| S/N: xxx

AIR SAMPLING DEVICE BATTERY

1. "Combo" Label – Name & Barcode
    a. Will order from the JSC Decal Lab
    b. Will find out if we can get it with HRF "smart" label for barcode
    c. Label Design:

SWAB ASD Battery
P/N: xxx |||||||||| S/N: xxx

AIR FILTERS

1. Label on each outer Ziploc bag
    a. No IMS label
    b. Label design:

SWAB ASD Filter
Date: _____
Location: _____

SWAB TUBE

1. Label on each tube
    a. No IMS label
    b. Label design:

        SWAB Tube
        Date: _____
        Location: _____
        Comments: _____

1. Tox Label = 1
    a. Tox label on each tube near the end of the tube with the preservative

WATER BAGS -- Temporary

1. Label on each water bag
    a. No IMS label
    b. Label design:

        SWAB TMPRY Water Bag SRV-K Hot or
        SWAB TMPRY Water Bag SRV-K Warm or
        SWAB TMPRY Water Bag SVO-ZV

ADAPTERS

1. Label provided by CHeCS?
    a. Potable Water Samplers

WATER BAGS – Inside Bag

1. Label on each water bag
    a. No IMS label
    b. Label design:

        SWAB Final Water Bag SRV-K Hot or
        SWAB Final Water Bag SRV-K Warm or
        SWAB Final Water Bag SVO-ZV

1. Tox Label = 2

WATER BAGS – Outside Bag (contains water bag & adapter)

2. Label on each bag
    a. No IMS label
    b. Label design:

        SWAB Final Water Kit
        Date: _____

1. Tox Label = 2

CONDENSATE SYRINGE

2. Label on outer Ziploc bag
    a. No IMS label
    b. Place a blank label over the manufacturer's label – if necessary
    c. Label design:

        SWAB Syringe
        Date: _____
        Location: _____
        Comments: _____

1. Tox Label = 2

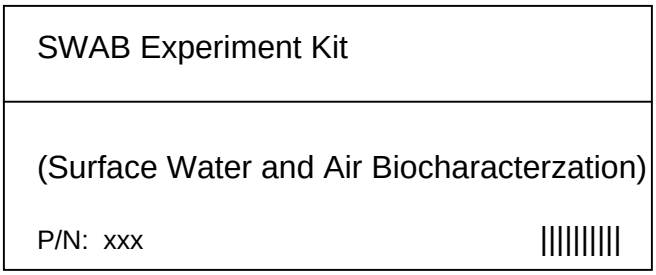
AIR FILTER KIT
SWAB TUBE KIT
WATER BAG KIT
SYRINGE KIT

ALL of the above kits will need:

2. Name label
3. IMS label (HRF "smart" label)
4. Contents label

MIDDECK LOCKER BAG

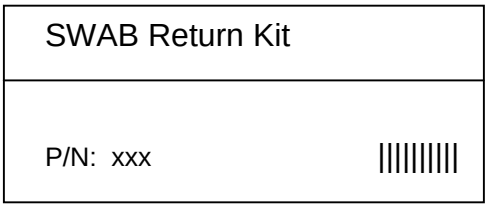
5. Name label:
    a. Will order from the JSC Decal Lab
    b. Will find out if we can get it with HRF “smart” label for barcode
    c. Label Design:



1. Contents Label

TRANSFER BAG

2. Name label:
    a. Will order from the JSC Decal Lab
    b. Will find out if we can get it with HRF “smart” label for barcode
    c. Label Design:



1. Contents Label