

# SNS OPERATIONS PROCEDURES MANUAL



## 3.A-1.5.2.2

### Procedure for Operation of the Backscattering Spectrometer User IPPS Panel

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## SNS-OPM 3.A-1.5.2.2

### Procedure for Operation of the Backscattering Spectrometer User IPPS Panel

#### 1. Purpose

- 1.1 The purpose of this procedure is to provide instructions on the use of the Backscattering Spectrometer User IPPS panel (See Figure 1). This panel is used to open and close the Secondary Shutter on the instrument and control access to the entry door to the Restricted Sample Area (RSA). This procedure will also discuss the message display located directly above the panel and the radiation detector directly adjacent to the left of the panel. This panel is routinely used by both SNS staff and external users of the instrument.

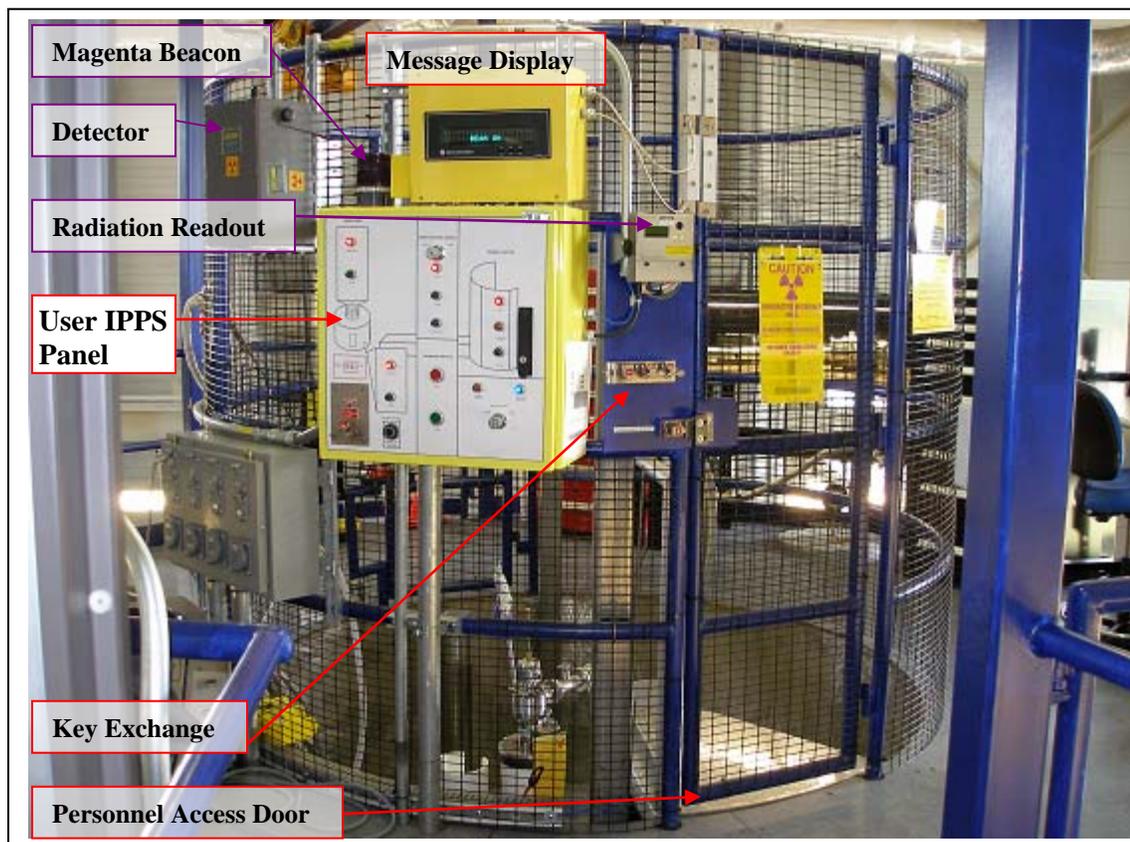


Figure 1. The User IPPS Panel controlling the fenced Restricted Sample Area (RSA)

#### 2. Responsibilities

- 2.1 The **Backscattering Spectrometer Lead Instrument Scientist** or designee is responsible for ensuring that SNS staff who are required to operate the IPPS User panel have read, understood, and follow this procedure.

**3. Prerequisites**

- 3.1 SNS staff must read [SNS-OPM 3.A-1.5.2.1](#), Procedure for Operation of the Backscattering Spectrometer Staff IPPS Panel.
- 3.2 SNS staff must read [SNS-OPM 7.T-17](#), Target Facility Key Control Procedure.
- 3.3 SNS staff must read [SNS-OPM 3.A-4.5.2.1](#), Sweep Procedure for Beam Line 2 – Backscattering Spectrometer Evacuated Final Flight-path.
- 3.4 SNS staff must review *IPPS Software Safety Requirements Specification Backscattering Spectrometer*, SNS document 109090200-SR0002-R00.

**4. Precautions**

- 4.1 None

**5. Procedure**

**Section 5.1 below describes the keys associated with the User Panel and their function.**

**Section 5.2 below describes Operation of the Secondary Shutter.**

**Section 5.3 below describes the information given on the Message Display and personnel responses to those messages.**

**Section 5.4 below describes the radiation detector, its alarms, and personnel responses.**

**5.1 Keys used in operating the User IPPS Panel.**

The following table lists the keys and their function; Figure 2 shows panel key locations.

<b>Key Name</b>	<b>Function/Purpose</b>
<b>Ia</b> 	<b>Secondary Shutter Control</b> This is a trapped key that normally resides either in its location in the User IPPS Panel or in the adjacent key exchange station (See Figure 2). In order to access beam-restricted areas when the secondary shutter is closed, the Ia key must be trapped (inserted and rotated) in the key exchange station, releasing the two Ib access keys. In order to open the secondary shutter, the Ia key must be trapped in the User IPPS Panel. The Ia key can be released from its trapped condition in the key exchange station by trapping the two Ib keys. It can be released from the User IPPS Panel by closing the secondary shutter (see 5.2 below), then pressing the black “Press to Secure” button and rotating the key to the “free” position. The secondary shutter must always be in the “Closed” condition prior to attempting this operation.
<b>Ib</b>	<b>Access to restricted areas</b> These two keys are not used to operate the User panel, but are released from

	<p>the adjacent key exchange station when the Ia key is removed from the User panel and trapped in the key exchange station. When either Ib key is removed from the key exchange station, the Ia key is trapped until the Ib key is reinserted and rotated. One Ib key is used to open the Personnel Access door of the RSA. The second Ib key is used in the key exchange station located near the Staff IPPS Panel (<a href="#">SNS-OPM 3.A-1.5.2.1</a>, “Procedure for Operation of the Backscattering Spectrometer Staff IPPS Panel”).</p>
<p><b>BL-2 User Enable</b></p> 	<p><b>User Panel Enable</b> This key is inserted into the panel location “User Panel Control” and rotated to the enable position when operation of the panel is desired. The blue “Operation Permitted” light will come on when this is accomplished, allowing the secondary shutter to operate. (Note: The key must be rotated to update the status.) If it is desired to disable operation of the panel, the key may be inserted and rotated to the “Disable” position. The blue light will go off and the red “Enable Required” light will be lit. This key normally remains locked in the Instrument Team’s Keybox A located near the Staff IPPS Panel.</p>
<p><b>BL-2 Remote Shutter</b></p> 	<p><b>Remote Shutter Operation</b> This key is used in the key location labeled “Remote Shutter Control” to enable remote (computer) control of the secondary shutter when operation is permitted by the IPPS. This function is currently not implemented in the Backscattering Spectrometer Data Acquisition System and default position should be “DISABLE”. This key normally remains locked in the Instrument Team’s Keybox A located near the Staff IPPS Panel.</p>

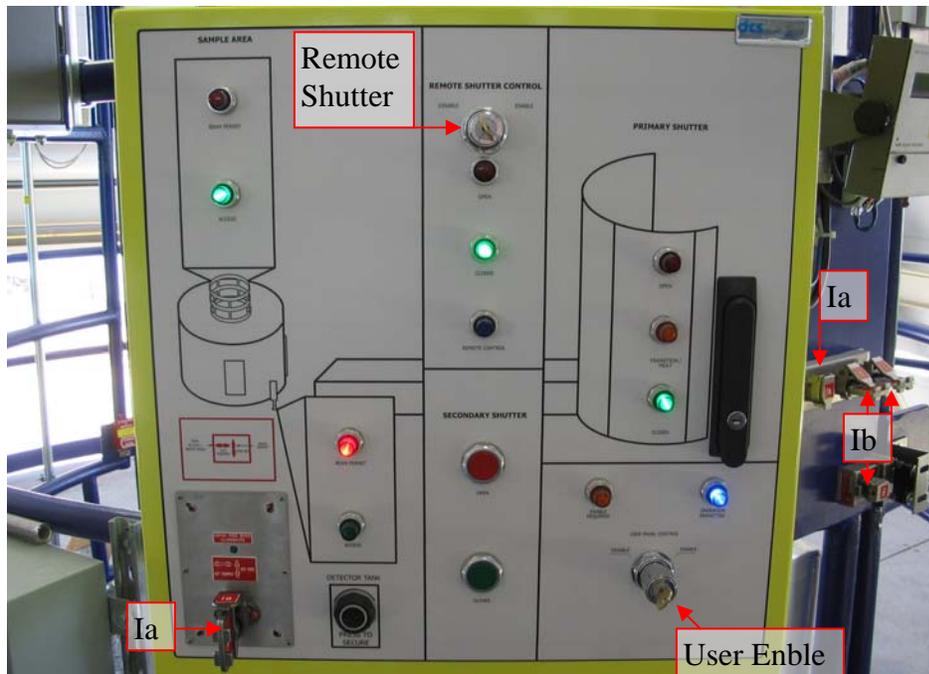


Figure 2. Key locations on and near the User IPPS panel.

## 5.2 Operation of the Secondary Shutter.

The secondary shutter will not operate unless both of the IPPS controlled areas - the Evacuated Final Flight Path (EFF) and the RSA - are in beam permit.

Step Number	Procedure/Actions to be performed
5.2.1	<p><b>Secure EFF from Access</b></p> <p>Beam permit for the EFF can be achieved by a Staff member following the procedures described in <a href="#">SNS-OPM 3.A-1.5.2.1</a>, “Procedure for Operation of the Backscattering Spectrometer Staff IPPS Panel” and <a href="#">SNS-OPM 3.A-4.5.2.1</a>, “Sweep Procedure for Beam Line 2 – Backscattering Spectrometer Evacuated Final Flight-path”. (Following these procedures will result in inserting and rotating the Ib key from the lower key exchange panel in its location in the key exchange panel immediately adjacent the User IPPS Panel).</p>
5.2.2	<p><b>Secure RSA from Access – Equipment Access Door</b></p> <p>Visually confirm that the Equipment Access Door (See Figure 3) is closed and latch is secured. If unsecured,</p> <ul style="list-style-type: none"> <li>• Slide the door latch to the right (See Figure 4).</li> <li>• Align the door latch with the red IPPS receptacle.</li> <li>• Slide the door latch to the left into the red IPPS receptacle until it is secured.</li> </ul> <div style="display: flex; justify-content: space-around;">   </div> <p>Figure 3. Equipment Access Door      Figure 4. Door latch with open instruction</p>
5.2.3	<p><b>Secure RSA from Access – Personnel Access Door</b></p> <ul style="list-style-type: none"> <li>• By visual inspection, ensure that the RSA, defined as the interior of the black fenced area on which the User Panel is mounted, is clear of all personnel.</li> <li>• Close the Personnel Access Door</li> <li>• Rotate and remove the Ib key in the door lock (See Figure 5)</li> </ul>

- Insert and rotate clockwise the Ib key in the adjacent key exchange station.



Figure 5. Rotating Ib key counter-clockwise for removal from door lock

**5.2.4**

**Insert Ia Key**

Rotate and remove the Ia key from the adjacent key exchange station. Insert and rotate the key in its location on the lower left corner of the User panel (See Figure 7). The key is now in a trapped location and cannot be rotated and removed without pressing the black “Press to Secure” button next to the key location.



Figure 7. Ia key trapped in the User panel

**5.2.5**

**Confirm Access Control**

On the upper left of the User panel, both red “Beam Permit” lights (the upper one for the RSA, the lower one for the EFF) should be lit (See Figure 8).

	 <p>Figure 8. Indicator lights showing restricted areas are secured and beam is permitted.</p>
<p><b>5.2.6</b></p>	<p><b>Open Secondary Shutter</b></p> <p>The secondary shutter may be operated by pressing the red “Open” button located in the “Secondary Shutter” area of the User panel. Momentary contact is all that is required. The secondary shutter should open within 10 seconds.</p>
<p><b>5.2.7</b></p>	<p><b>Close Secondary Shutter</b></p> <p>The secondary shutter may be closed at any time by pressing the green “Closed” button in the area of the User panel labeled “Secondary Shutter”.</p>

**5.3 Message Display information and Responses.**

The message display board (See Figures 1, 9) on top of the User panel displays 8 unique messages. The following table describes the condition and the expected response to these messages.



Figure 9. Message Display Board

<b>Message No.</b>	<b>Message</b>	<b>Condition/Response</b>
1	System Fault Call PST 241-2727	The IPPS has detected a system fault. Contact a member of the instrument team (Instrument Scientist, designee or Instrument Hall Coordinator) or the Protection Systems Team according to the phone numbers on the display or next to the instrument phones.
2	Beam On	Both primary and secondary shutters are OPEN and neutron beam could be incident at the sample position. This is a normal state; no response is required.

3	Beam Off Prim-Open Secd-Clsd	The neutron beam is off because the secondary shutter is closed. The primary shutter is open. This is a normal state; no response is required.
4	Beam Off Prim-Clsd Secd-Open	The neutron beam is off because the primary shutter is closed. The secondary shutter is open. This is an unusual but safe state for the instrument and no response is required. No neutron beam can reach the sample so it is likely that either the primary shutter should also be open or the secondary shutter should be closed.
5	Beam Off Prim-Clsd Secd-Clsd	The neutron beam is off because both the primary and secondary shutters are closed. This is a normal state; no response is required.
6	Enable Required Call CCR 576-1502	This message is displayed when an IPPS enable is required in order to operate the IPPS User Panel. If operation is desired, call a member of the instrument team to enable the IPPS. If the CCR is called, explain the need for an enable.
7	Beam Off, High Rad Call CCR 576-1502	The IPPS has closed the secondary shutter because a high radiation level has been detected at the radiation monitor adjacent to the User Panel. Call the CCR and request that a member of the instrument team and an RCT come to the instrument. If the beacon does not turn off within 20 seconds, EXIT the area. Do not attempt to open the secondary shutter until the condition causing a high radiation field is corrected. The IPPS will require an "Enable" by a member of the instrument team prior to continued neutron beam operation.
8	Beam Off, Rad Fail Call PST 241-2727	The IPPS has closed the secondary shutter because the radiation detector has failed. Contact the instrument team or Protection Systems Team. If the beacon does not turn off within 20 seconds, EXIT the area. Do not attempt to operate the secondary shutter. The IPPS will require an "Enable" by a member of the instrument team prior to continued neutron beam operation.

## **5.4 The Radiation Detector Alarms and Responses.**

### **5.4.1 Alarms**

The User panel has a radiation detector located adjacent to it and mounted to the RSA fence (See Figure 1). This detector monitors the radiation levels at the RSA boundary with two alarm points:

1. Over 5 mrad/hr: the magenta beacon will flash



2. Over 20 mrad/hr: the magenta beacon will flash and the secondary shutter will close. An uncertified audible alarm was installed and may sound to draw attention.

#### **5.4.2 Response**

It is not a normal mode of operation for the magenta beacon to flash. If this alarm point is reached without the prior approval of the SNS RSO, immediately close the secondary shutter if it is open. Contact the RCT office and a member of the instrument team to determine the cause for the elevated radiation level. If the beacon does not stop flashing within 20 seconds of closing the shutter, EXIT until it stops or there is guidance by an RCT. Continued operation is permitted only after correcting the cause of the elevated radiation level and notifying the instrument team.

**NOTE:** If an experiment requires operation at this level, it will be pre-approved. The area will be properly posted and controlled with a display of limitations and authorization granted by the SNS Radiation Safety Officer (RSO). Staff and users alike will be trained for the appropriate response during this limited operation.

#### **6. Documentation**

- NONE

#### **7. References**

- SNS-OPM 7.T-17, Target Facility Key Control Procedure.  
<https://neutrons.ornl.gov/x/operations/SNS-OPM/07-T-17.pdf>
- SNS-OPM 3.A-1.5.2.1, Procedure for Operation of the Backscattering Spectrometer Staff IPPS Panel.  
<https://neutrons.ornl.gov/x/operations/SNS-OPM/03-A-01-05-02-01.pdf>
- SNS-OPM 3.A-4.5.2.1 Sweep Procedure for Beam Line 2 – Backscattering Spectrometer Evacuated Final Flight-path.  
<https://neutrons.ornl.gov/x/operations/SNS-OPM/03-A-04-05-02-01.pdf>
- SNS-OPM 5.U-2.1, Procedure for Alarm Response at the Backscattering Spectrometer.  
<https://neutrons.ornl.gov/x/operations/SNS-OPM/05-U-02-01.pdf>
- *IPPS Software Safety Requirements Specification Backscattering Spectrometer*, SNS document 109090200-SR0002-R00.  
(in ProjectWise at <https://shawnee.ornl.gov/WEL/index.html>)

#### **8. Attachments**

- NONE