



## 3.A-1.5.4B.2

### Procedure for Operation of the Liquids Reflectometer User IPPS Panel

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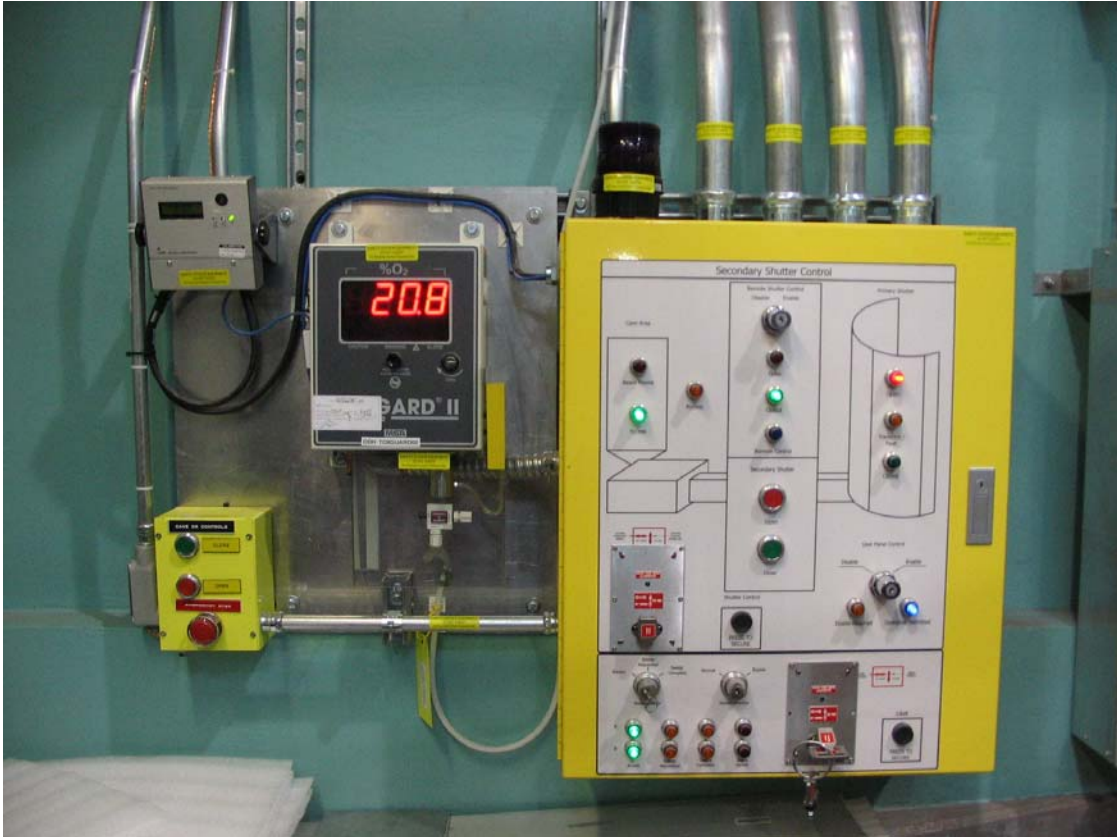
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## Procedure for Operation of the Liquids Reflectometer User IPPS Panel



### 1. Purpose

- 1.1 The purpose of this procedure is to provide instructions on the use of the Liquids Reflectometer User IPPS panel. 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. 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

### 2. Responsibilities

- 2.1 The **Liquids Reflectometer 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**

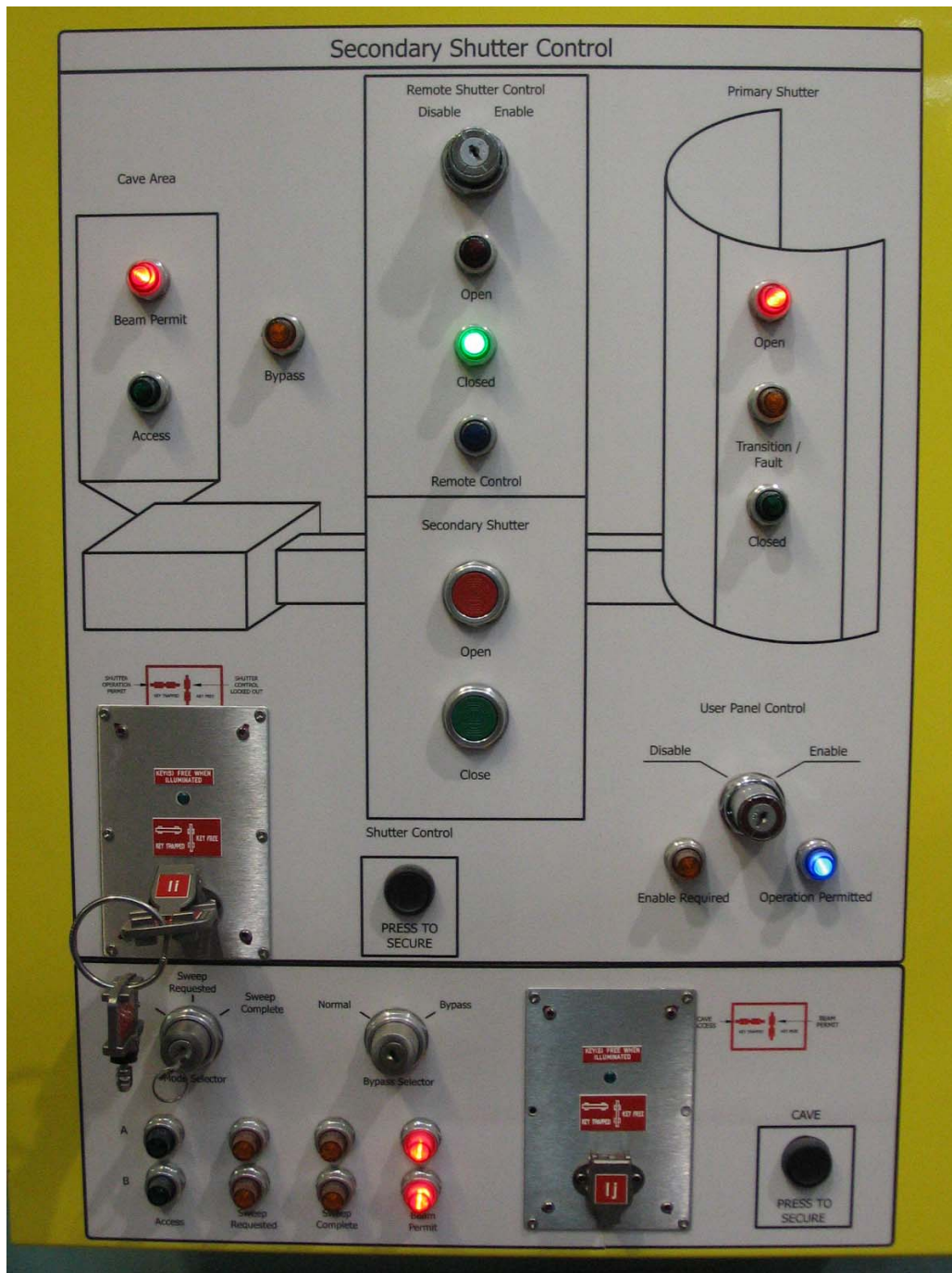
- 3.1 SNS staff and users must read [SNS-OPM 3.U-4B.1](#), Alarm Procedure.
- 3.2 SNS staff must review *IPPS Software Safety Requirements Specification Magnetism and Liquids Reflectometers (BLAB and 4b)*, SNS document 109090200-SR0004-R00.

### 4. **Precautions**

- 4.1 None

### 5. **Procedure**

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





**Figure 1: The User IPPS Panel**

The following table lists the keys and their function.

Key Name	Function/Purpose
Ii	This is a trapped key that normally resides in its location in the User IPPS Panel. When inserted and rotated to the trapped position in the User IPPS Panel it allows the IPPS to open the secondary shutter. This key can be rotated and released from its trapped condition in the User IPPS panel by closing the secondary shutter (see 5.2 below), then depressing 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.
Ij	This is a trapped key that normally resides in its location in the User IPPS Panel. When inserted and rotated to the trapped position in the User IPPS Panel it allows the IPPS to place the instrument into Beam Permit Mode. This key can be rotated and released from its trapped condition in the User IPPS panel by closing the secondary shutter and placing the system into Access mode by rotating the Mode selector key to Access (see 5.2 below), then depressing and holding 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.
Mode Selector	This key is used in the location labeled “Mode Selector”. It is normally stored in its position in the User IPPS Panel, and is used to place the system in Access, Sweep Requested or Sweep Complete mode.

## **5.2 Opening of the Secondary Shutter.**

Step Number	Procedure/Actions to be performed
5.2.1	The secondary shutter will not operate unless the IPPS controlled area (the instrument cave) is in beam permit. An instrument cave sweep is performed to insure that no one is in the instrument cave when the door is closed in preparation for opening the secondary shutter. Performing a sweep only requires the use of one key in the Cave Access Control Section: the Mode Selector key. When the secondary shutter is closed and the cave door is open the Mode Selector key will be in the Access position, and the indicator lights, located below the selector key, will be green.

	 <p>The image shows a control panel with a 'SECURE' label at the top right. On the left, there is a 'Mode Selector' key with positions for 'Access', 'Sweep Requested', and 'Sweep Complete'. The key is currently in the 'Sweep Requested' position. To the right is a 'Bypass Selector' key with positions for 'Normal' and 'Bypass'. Below these keys are two rows of indicator lights labeled 'A' and 'B'. In row 'A', the 'Access' light is green and illuminated, while the 'Sweep Requested', 'Sweep Complete', and 'Beam Permit' lights are unlit. In row 'B', the 'Access' light is green and illuminated, while the other three lights are unlit.</p>
<p><b>5.2.2</b></p>	<p>To begin a sweep of the instrument cave, turn the <b>Mode Selector</b> key to the <b>Sweep Requested</b> position. The amber <b>Sweep Requested</b> status lights will illuminate. By visual inspection, ensure that the instrument cave is clear of all personnel.</p>  <p>The image shows the same control panel as above. The 'Mode Selector' key is still in the 'Sweep Requested' position. In row 'A', the 'Access' light is now unlit, and the 'Sweep Requested' light is amber and illuminated. In row 'B', the 'Access' light is unlit, and the 'Sweep Requested' light is amber and illuminated. The 'Sweep Complete' and 'Beam Permit' lights remain unlit.</p>
<p><b>5.2.3</b></p>	<p>Remove the <b>Mode Selector</b> key from the user panel and take it into the instrument cave to the search station, located at the far wall of the cave.</p>





Insert the key into the search station and turn the key clockwise. Wait a moment and then turn the key back counterclockwise. By visual inspection, ensure that the instrument cave is clear of all personnel. Remove the key from the search station and return to the user panel and reinsert the key into the Mode Selector position. Close the cave door using the close button on the cave door control station.



Visually confirm that the instrument cave door is closed.

**5.2.4**

Rotate the key to “SWEEP COMPLETE”. Successful completion of the sweep is indicated by the “SWEEP COMPLETE” lights on the Staff IPPS Panel being illuminated. The stack lights will remain illuminated yellow until the instrument cave is placed into Beam Permit.



**5.2.5** Press and hold the Press to Secure button located in the Cave Access Control section of the Staff IPPS Panel.



**5.2.6** When the green light labeled Key Free When Illuminated is illuminated turn Ij key to Beam Permit (Free) position. All Beam Permit (Red) lights should now be illuminated.



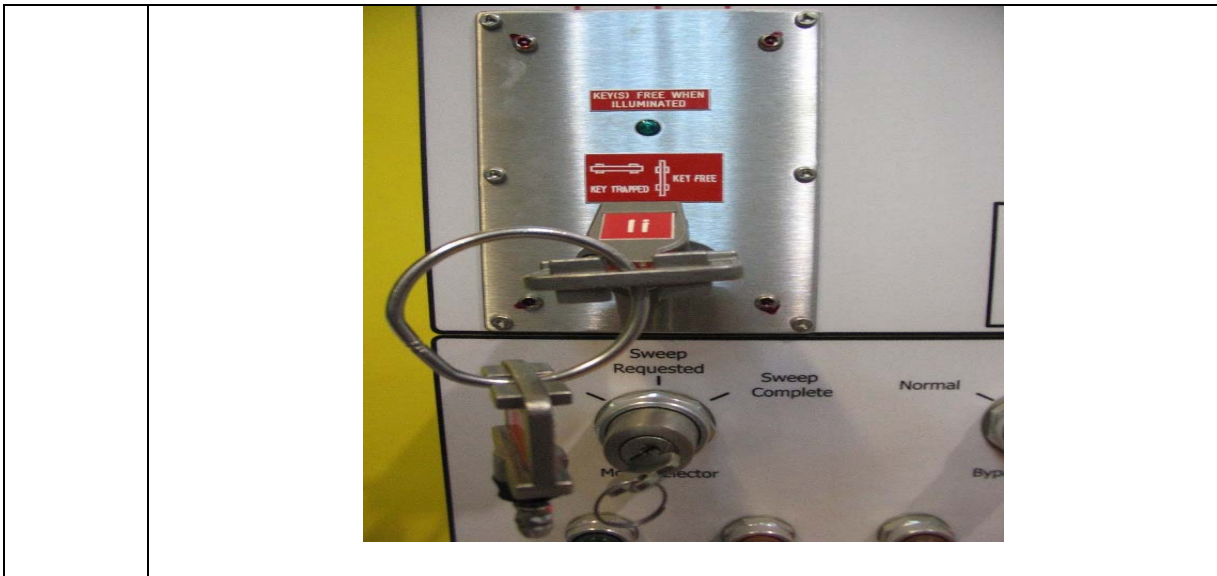




**5.2.7** Remove key Ij from its position and insert key Ii into its position.



**5.2.8** Turn key Ii to its trapped (shutter operation permit) position.



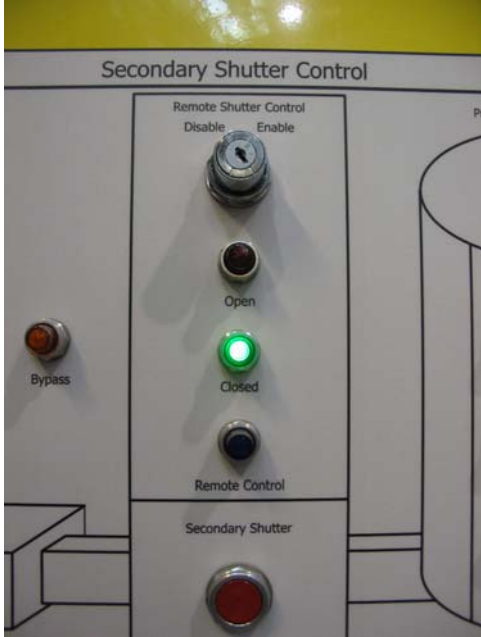

**5.2.9** The secondary shutter may be operated by pressing the red “Open” button located in the “Secondary Shutter” area of the User Panel. Momentary contact is all that is required. The secondary shutter should open within 10 seconds.



**5.2.10** 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”. Momentary contact is all that is required.

**5.3 Closing Secondary Shutter for Entry into the Cave**

<b>Step Number</b>	<b>Procedure/Actions to be performed</b>
<b>5.3.1</b>	Close the secondary shutter (see 5.2 above) or confirm that it is already closed via the green “Closed” light in the Secondary Shutter area of the User Panel.

	 <p>The image shows a control panel titled "Secondary Shutter Control". It features a rotary switch at the top labeled "Remote Shutter Control" with positions for "Disable" and "Enable". Below this is a red "Bypass" button, a green "Open" button, a green "Closed" button, and a black "Remote Control" button. At the bottom is a red "Secondary Shutter" button.</p>
<p><b>5.3.2</b></p>	<p>Press the black “Press To Secure” button in the Secondary Shutter Control section of the panel and simultaneously rotate the Ii key from the horizontal, trapped position to the vertical free position.</p>  <p>The image is a close-up of the key switch area. It shows a key switch with a red "KEY FREE" indicator. To the right, there is a green "Open" button and a black "Close" button. Below these is a black "PRESS TO SECURE" button. At the bottom, there is a rotary switch with positions for "Sweep Complete", "Normal", and "Bypass".</p>
<p><b>5.3.3</b></p>	<p>Remove the Ii key from the key switch.</p>
<p><b>5.3.4</b></p>	<p>Insert and rotate Ij key into its location in the Cave Access Control section and turn to the trapped position. Insure that the system drops from “Beam Permit” (red light) mode to (amber light) “Sweep Complete” mode as indicated by the row of lights in the Cave Access Control section.</p>



**5.3.5** Rotate the Mode key to “Access”. The green “Access” lights in the Cave Access Control section of the panel should be illuminated and the cave door should unlock.



**5.3.6** Press and hold the “Open” button on the door control panel (located to the left of the IPPS User Panel) until the cave door is fully open.



## WARNING

In the event that you are inside the instrument cave and the warning horn sounds **IMMEDIATELY** press the nearest red E-STOP button to close the secondary shutter and unlock the instrument cave door. Push the instrument cave door open to exit the cave. The E-STOP buttons are located in the following two locations:

The interior stack light/E-STOP station





And next to the cave door

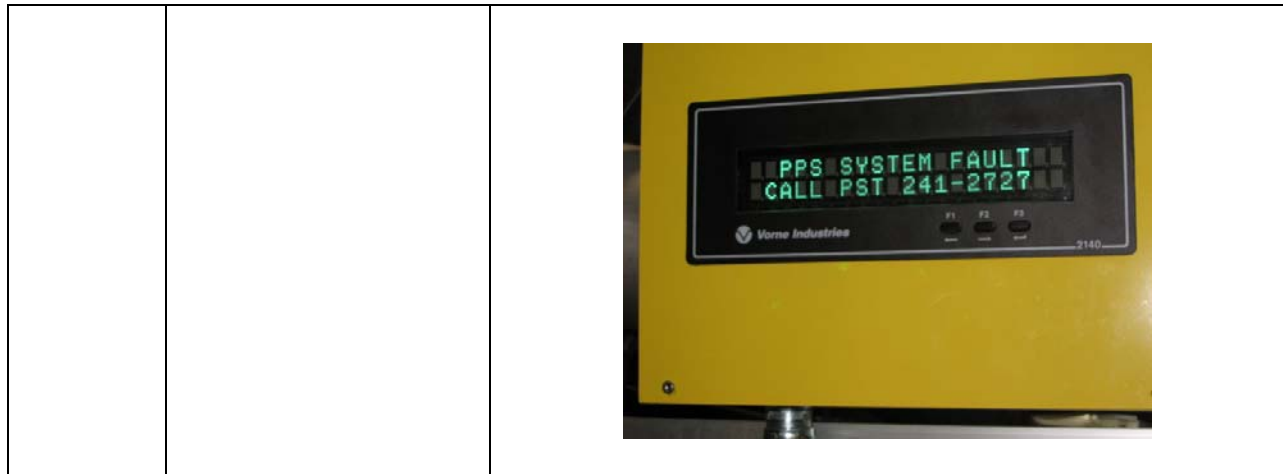


### 5.3 Message Display information and Responses.

The message display board displays 3 messages and the following table describes the condition and the expected response to these messages.

Message No.	Message	Condition/Response
1	Beam On	Both primary and secondary shutters are OPEN and neutron beam could be incident at the sample position. This is a normal state of the instrument, no response required.  
2	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 of the instrument, no response required.  
3	System Fault Call PST 241-2727	The IPPS has detected a system fault. Call the Protection Systems Team at 241-2727.





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

The User Panel has a radiation detector located adjacent to it and mounted to the fencing of the Restricted Sample Area. This detector monitors the radiation levels in the area and has two alarm points.

5.4.1 The magenta beacon is activated when radiation levels at the monitor exceed 5 mrad/hr but remains less than 20 mrad/hr. This is not a normal mode of operation for the instrument but may be permitted if the area is properly posted and controlled and authorization has been granted by the SNS Radiation Safety Officer. If this alarm point is reached without the prior approval of the SNS RSO, immediately close the secondary shutter and determine the cause for the elevated radiation level. Continued operation is permitted only after correcting the cause of the elevated radiation level and notification of the Lead Instrument Scientist (or designee) or floor coordinator.



5.4.2 If the radiation level exceeds 20 mrad/hr, the IPPS will command the flow of neutrons to terminate, and a “Beam Off, High Rad Call CCR 576-1502” message will be displayed. Call the CCR and request that the Floor Coordinator come to the instrument.

**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-1.5.4B.1, Procedure for Operation of the Liquids Reflectometer Staff IPPS Panel.  
<https://neutrons.ornl.gov/x/operations/SNS-OPM/03-A-01-05-4B-01.pdf>
- *IPPS Software Safety Requirements Specification Liquids and Liquids Reflectometers (BL4B & 4B)*, SNS document 109090200-SR0004-R00.  
(in ProjectWise at <https://shawnee.ornl.gov/WEL/index.html>)
- SNS-OPM 5.U-4B.1 Alarms and Response at the Liquids Reflectometer Procedure.

**8. Attachments**

- NONE