

Magnetism Reflectometer IPPS Operating Procedure for Users

Revised 10/16/2007



A U.S. Department of Energy Multilaboratory Project

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Magnetism Reflectometer IPPS
Operating Procedure
For Users

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Revised 10/16/2007

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for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-00OR227

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Magnetism Reflectometer IPPS Operating Procedure for Users

Objective

The objective of this procedure is to ensure that SNS Magnetism Reflectometer Users be familiar with the operation of the beam line 4A Instrument Personnel Protective System (BL4A IPPS), understand alarm response procedures and demonstrate proper operation.

Description

This procedure describes how to operate the Instrument Personnel Protection System, which includes the following activities:

- Performing a sweep of the BL4A instrument cave.
- Opening the secondary shutter.
- Closing the secondary shutter.
- Entering the instrument cave.

And the following information:

- Keys used in operating the IPPS.

References

OPM document 03-A-01-05-4A-02 *Operation of the BL4A IPPS User Panel*

OPM document 05-U-4A-01 *BL4A Alarm Response Procedure*

SNS document *Alarm Response for Users*

Performing a sweep of the BL4A instrument cave

An instrument cave sweep is performed to ensure that no one is in the instrument cave when the door is closed in preparation for opening the secondary shutter.

It is intended that only trained individuals may perform a sweep of the instrument cave, and that these individuals ACTUALLY LOOK through the entire cave to ensure that there is no one else in the cave, either hiding, incapacitated, asleep or working behind equipment and obstructed from view.

Take a moment to become familiar with the beam line 4A IPPS User Panel, which is located at the entrance to the instrument cave. Review the list of keys used in operating the IPPS User Panel. A larger version of this picture, as well as other components of the IPPS User Panel, is located at the end of this procedure.



Beam Line 4A IPPS User Panel

The IPPS User Panel is separated into two sections: the **Secondary Shutter Control** section and the **Cave Access Control** section. 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.



Mode selector key and status lights in Access Mode

To begin a sweep of the instrument cave, turn the **Mode Selector** key to the **Sweep Requested** position. The amber **Sweep Requested** status lights will illuminate.



Mode Selector key and status lights in Sweep Requested Mode

Note

A sweep request may be canceled at any time by turning the **Mode Selector** key back to the **Access** position, even if the key has been removed from the user panel. Simply reinsert the **Mode Selector** key and rotate it to the **Access** position. The **Access** status lights will illuminate and the request will be canceled.

Once a sweep has been requested, the amber light on the exterior stack light station will illuminate.



Exterior Stack Light Station amber light illuminated

Remove the **Mode Selector** key from the user panel and take it into the instrument cave to the search station, located at the far wall of the cave.

Note

Notice as you pass the Interior Stack Light/E-Stop Station that the green (Access) light is still illuminated. This is normal. When the IPPS is operating correctly one, and only one, stack light will be illuminated at all times. If no stack lights are illuminated, or more than one stack light is illuminated, an IPPS fault condition has occurred. In the event of an IPPS fault condition, exit the instrument cave and notify the instrument hall coordinator (241-4432). Do not attempt to reenter the instrument cave until the fault is corrected.



Interior Stack Light/E-Stop Station Access light illuminated

Insert the key into the search station and turn the key **clockwise**. Wait a second and then turn the key back **counterclockwise**.



4A Search Station, with Mode Selector key inserted and turned

The Interior Stack Light amber light is now illuminated.



Interior Stack Light amber illuminated

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.



Cave Door Control Station

Once the cave door is closed completely, rotate the **Mode Selector** key to **Sweep Complete**. The amber **Sweep Complete** status lights will illuminate. There will be an audible metallic sounding click as the magnetic lock on the cave door engages.



Mode Selector Key and Status Lights in Sweep Complete Mode

The Instrument Cave Sweep Procedure is now completed.

Note

If the Mode Selector key is rotated to Sweep Complete prior to the cave door being closed completely the cave mode will revert to access mode, the green Access mode lights on the user panel and both stack lights will illuminate, and the sweep process will have to be repeated. If this occurs, rotate the Mode Selector key back to access and begin the sweep procedure again.

Opening the Secondary Shutter

To open the secondary shutter, press and hold the button labeled **Cave Press to Secure**, located to the right of the trapped key labeled **Ig** on the **Cave Access Control** section of the user panel.



Cave Press to Secure Button

The green light labeled **Key(s) Free When Illuminated**, located above the trapped key will illuminate.



Trapped Key **Ig**

Continue to press the Cave **Press to Secure** button, and rotate the trapped key **Ig** and remove it from the panel. The **Beam Permit** status lights on the user panel and the Red light on the stack light station will illuminate, and the warning horn inside the cave will sound for twenty seconds. This horn is to warn anyone who may have inadvertently been locked inside the instrument cave that the secondary shutter is opening.

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:
Next to the cave door



And on the interior stack light/E-STOP station



The red **Beam Permit** lights on both the lower and upper sections of the **IPPS User Panel** will now be illuminated.



Beam Permit status lights illuminated

Insert the key labeled **If** into the **If** trapped key position located in the **Secondary Shutter Control** section of the user panel. Rotate the key **clockwise** ninety degrees to its trapped, **shutter operation permitted**, position.



The **If** key, inserted and rotated to the shutter operation position

Momentarily press the **Secondary Shutter Open** button, located on the **Secondary Shutter Control** panel.



Secondary Shutter Open/Close buttons

The message board will display the **Beam On** message.



Red stack light illuminated with Beam On message

The secondary shutter will take approximately ten seconds to open, the red **Open** light, located underneath the **Remote Shutter Control** key, will illuminate. All red **Beam Permit** lights, and

Closing the Secondary Shutter

To close the secondary shutter, momentarily push the green **Secondary Shutter Close** button.



Secondary Shutter Open/Close buttons

The message board will display the **Beam Off Prim-Open Secd-Clsd** message.



Message board displaying Beam Off message

Press and hold the button labeled Shutter Control **Press to Secure**, located to the right of the trapped key labeled **If** on the **Secondary Shutter Control** section of the user panel. The green

light labeled **Key(s) Free When Illuminated**, located above the trapped key will illuminate. Continue to press the Shutter Control **Press to Secure** button, and rotate the trapped key **If** **counterclockwise** to the **Key Free** position and remove it from the panel.



The **If** key, inserted and rotated to the shutter operation position

Entering the Instrument Cave

Insert the key labeled **Ig** into the **Ig** trapped key position located in the **Cave Access Control** section of the user panel. Rotate the **Ig** key **clockwise** ninety degrees to its trapped, **Cave Access/Sweep Required**, position.



Trapped Key Ig

The amber **Sweep Complete** status lights will illuminate.



Mode Selector Key and Status Lights in Sweep Complete Mode

Rotate the **Mode Selector** key to the **Access** position.



Mode selector key and status lights in Access Mode

The cave door is now unlocked, and may be opened with the **Open** button on the door control station.



Cave Door Control Station

Note

Conditions inside the instrument cave may prevent the cave access mode from returning to Access mode, even though the mode selector key has been rotated to the Access position.



The most common condition under which this occurs is when the detector table is not at the zero angle "home" position. If this is the case the message board will display the following message:



To correct this condition, restore all key positions to their beam permit positions (mode selector key to sweep complete, Ig key to Beam permit...don't forget to push the Press to Secure button before trying to turn the Ig key) and drive the detector table angle to zero degrees. Then repeat the process of returning the cave mode to Access as listed above: Rotate the Ig key clockwise ninety degrees to its trapped, Cave Access/Sweep Required, position. The amber Sweep Complete status lights will illuminate. Rotate the Mode Selector key to the Access position. If the conditions inside the cave allow, the cave mode will revert to Access, and the green Access status lights will illuminate, and the door will be unlocked, and may be opened with the door control Open button. If the status continues to remain in Beam Permit, contact a member of the BL4A staff or an Instrument Hall Coordinator (241-4432) for assistance.

Keys used in operating the User IPPS Panel

The following table lists the keys and their functions.

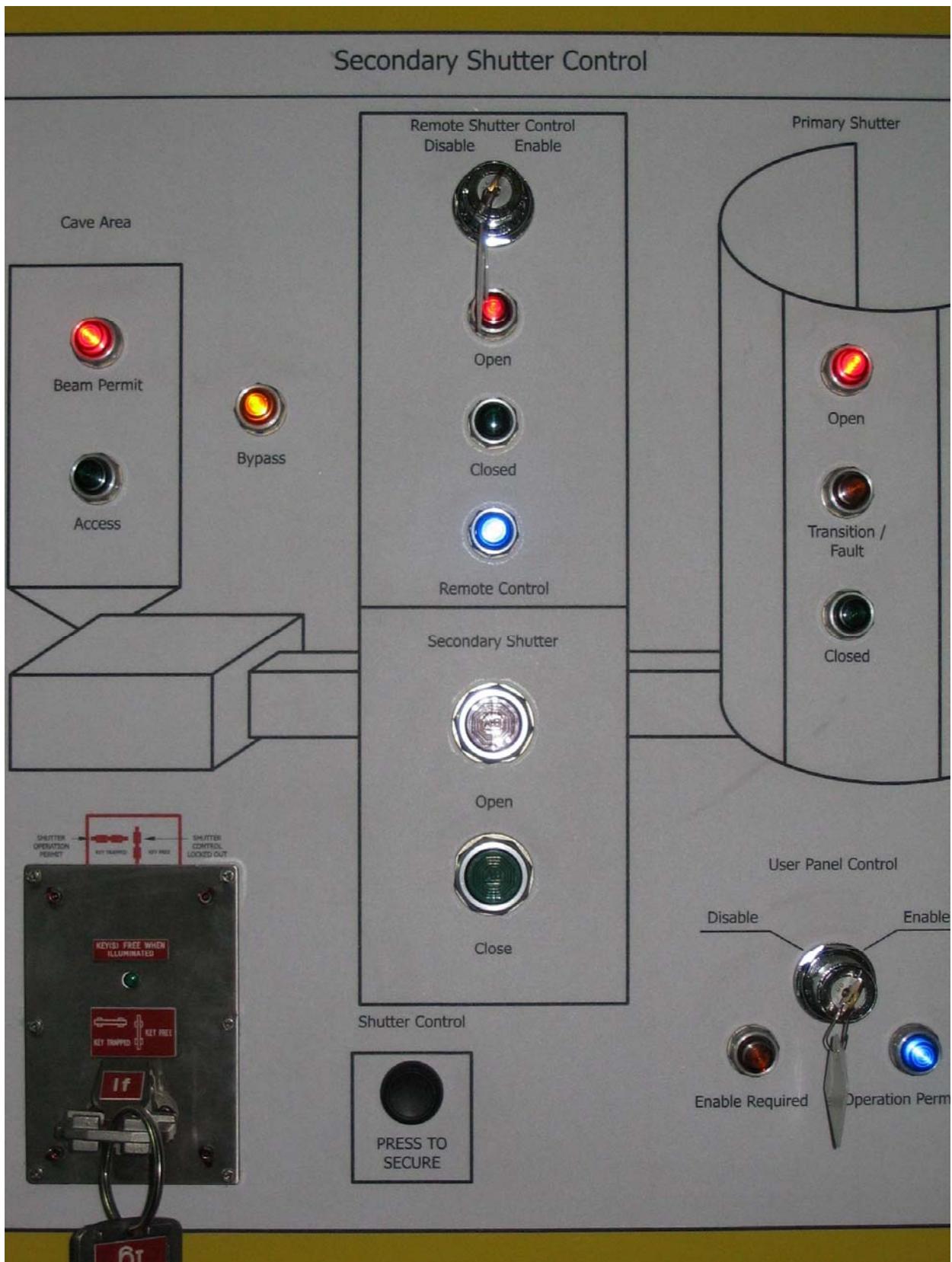
Key Name	Function/Purpose
User Panel Control	This key controls operation of the User IPPS Panel. It is normally in the custody of BL4 staff, which has the authority to Enable or Disable the panel. This key is normally locked the lockbox that is attached to the beam stop. Users will not have access to the User Panel Control key.
If	This is a trapped key physically joined to trapped key Ig (see below). It will be in its trapped (horizontal) position when the Cave is in Access and during a Sweep. It may be removed upon Sweep Complete to enter Beam Permit and to free trapped key Ig to open the secondary shutter (see Section 5.2 below). To free the key, press the Press to Secure button, wait for the green light above the keyhole to light, then rotate the key to free (vertical). When not in its keyhole in the User IPPS Panel, it will be found dangling from the Ig keyhole in the User IPPS Panel.
Bypass Selector	This key is used to place the beam line in either Normal mode, in which certain motorized equipment operation (detector table drive and hexapod) is disabled when the instrument cave door is open, or in Bypass mode, in which this equipment is allowed to operate when the instrument cave door is open. This key normally resides in the lockbox attached to the BL4A beam stop. The lockbox is under the control of BL4A personnel. The bypass mode is a staff procedure. Users will not have access to the bypass key.
Mode Selector	This key is used to set Cave access status and has three positions. The left-most position sets cave Access, center position sets Sweep Requested, and the right-most position sets Sweep Complete. It is normally stored in its keyhole in the User IPPS Panel, is removed during a Sweep, and replaced upon Sweep Complete (see Section 5.2 below).
Remote Shutter Control	This key Enables and Disables remote operation of the shutter via the Data Acquisition System. It is normally in the custody of the Instrument Team and remains locked in the lockbox that is attached to the beam stop.
Ig	This is a trapped key physically joined to trapped key If (see above). It will be in its trapped (horizontal) position for Shutter Operation Permit. When removed or in the free (vertical) position, Shutter Control is Locked Out. To free the key, press the Press to Secure button, wait for the green light above the keyhole to light, then rotate the key to free (vertical). When not in its keyhole, it will be found dangling from the If location in the User IPPS Panel.

IPPS User Panel Components

Here is a set of larger images of the IPPS User Panel and its components.



IPPS User Panel



IPPS User Panel Secondary Shutter Control Section



IPPS User Panel Cave Access Control Section



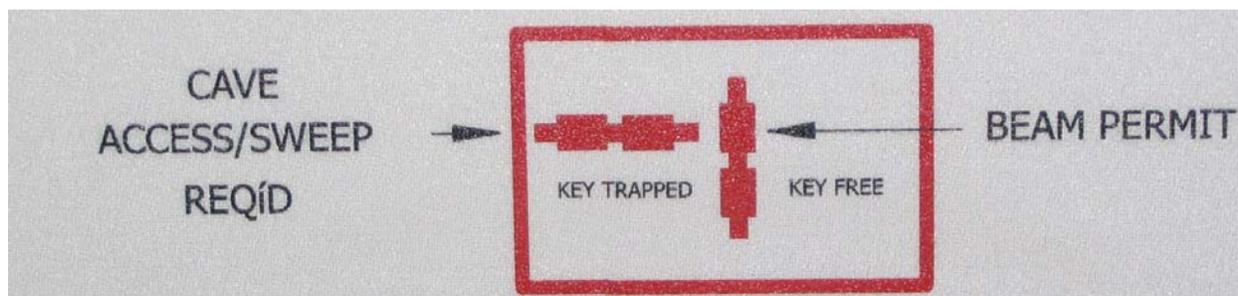
Mode Selector Key



Cave Access Status Lights



Ig Trapped Key



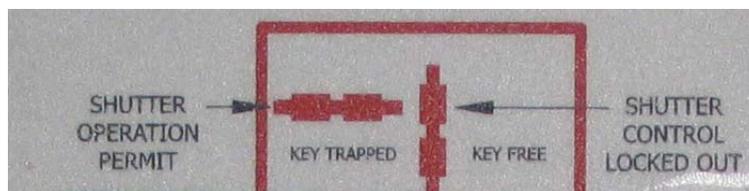
Ig Trapped Key Position Indicator



Cave Press to Secure Button



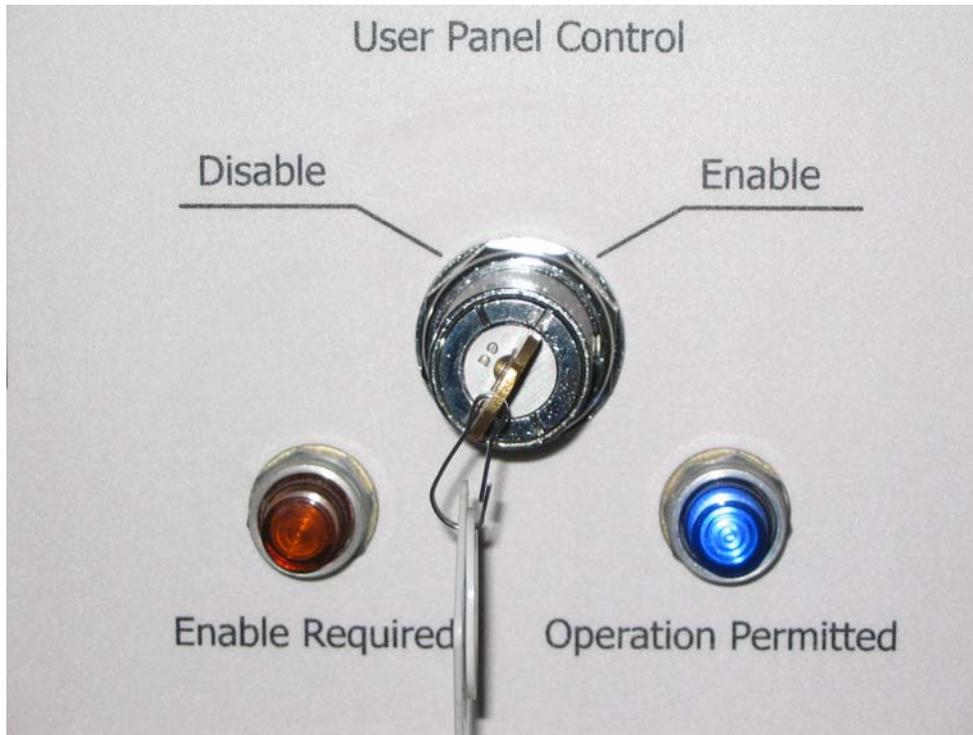
If Trapped Key



If Trapped Key Position Indicator



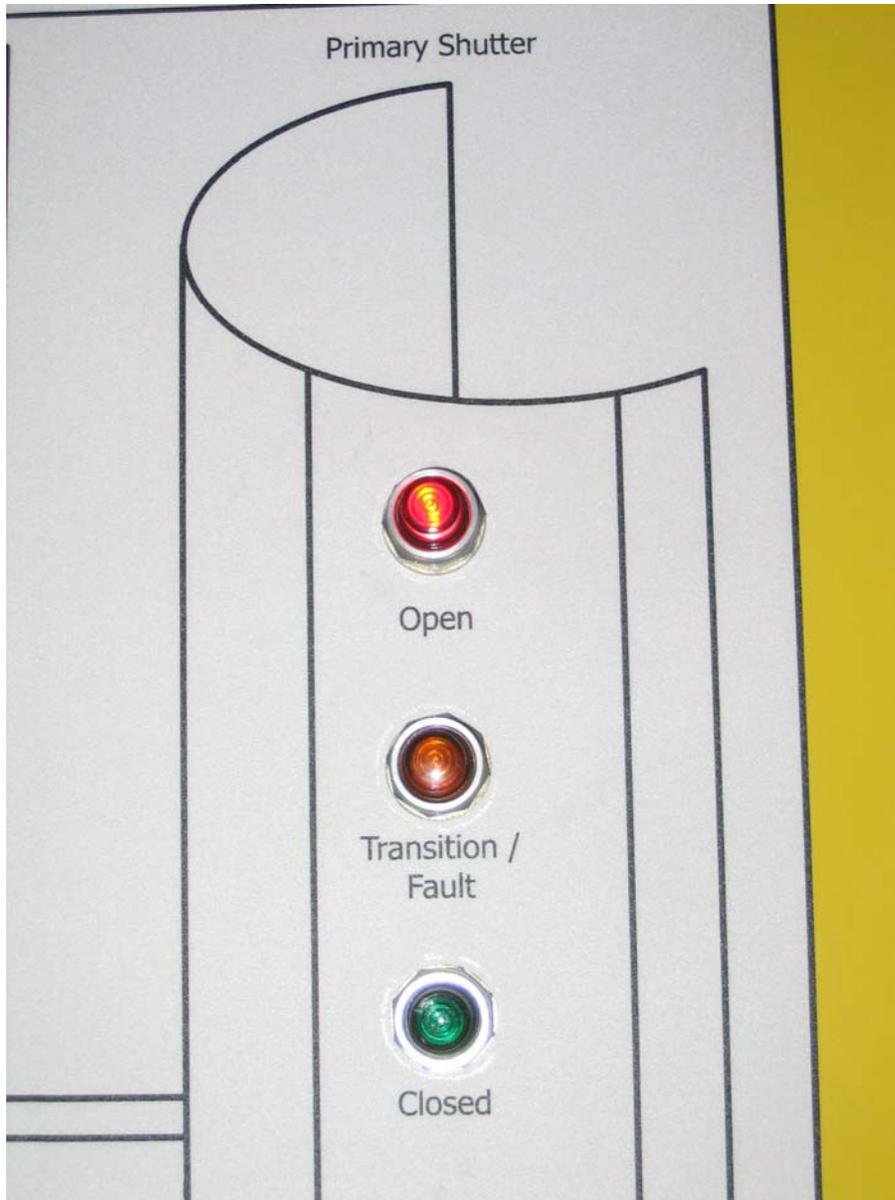
Shutter Control Press To Secure Button



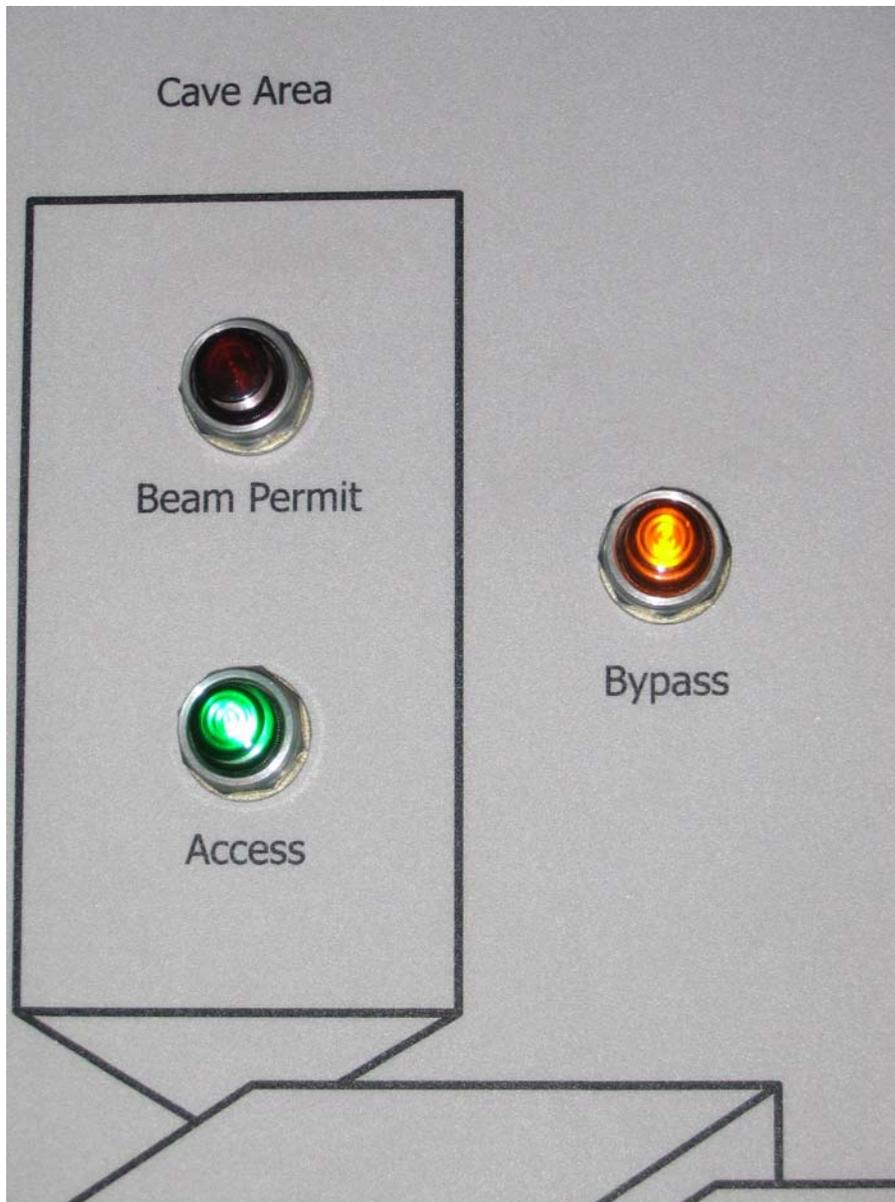
User Panel Control Key



User Panel Bypass Key



Primary Shutter Indicator



Cave Access Indicator



Remote Shutter Control Key/Indicator and
Secondary Shutter Indicator



Secondary Shutter Control