

<b>Brookhaven National Laboratory National Synchrotron Light Source</b>		<b>Number:</b> LS-PPS-0034	<b>Revision:</b> A
		<b>Effective:</b> 6/20/03	<b>Page 1 of 4</b>
<b>Subject: X28C Radiological Interlock Test</b>			
<b>Prepared/ Approved By:</b> M. Buckley	<b>Approved By:</b> S.Buda		

\*Approval signatures on file with master copy.

[Revision/Periodic Review Log](#)

Test Reason:	Test Result:	<input type="checkbox"/> Passed	<input type="checkbox"/> Failed
	Test Type:	<input type="checkbox"/> Full	<input type="checkbox"/> Partial
Test Date:	Start Time:	Finish Time:	
Tester 1:	Assistant 1:		
Tester 2:	Assistant 2:		

**PREPARATION:**

- Inform control room operator that test will be done. \_\_\_\_\_
- Turn off 'Red Tag' switch on x-ray ring interlock, and apply LOTO to X-Ray Security system. \_\_\_\_\_
- Verify that vacuum valves and water interlocks are OK on the beam lines that will be checked for Phase I beamlines or connect user interlock test jumper. \_\_\_\_\_
1. Search the hutch
    - The overhead lights go out \_\_\_\_\_
    - The red interior light comes on \_\_\_\_\_
    - The audible alarm sounds for 13 to 15 seconds minimum \_\_\_\_\_
    - The hutch interlock sign turns on \_\_\_\_\_
  2. Open hutch door
    - The hutch interlock sign goes out \_\_\_\_\_
  3. Press CS-1, close hutch door and wait.
    - Hutch interior lights come on in not more than 20 seconds \_\_\_\_\_
    - Press CS-E.
      - Interlock does not activate \_\_\_\_\_
  4. Press interior search buttons in order, close door, press CS-E, note that alarm comes on, open and close door, press CS-E again. (This must all be done in less than the timeout interval noted in step 3)
    - Interlock does not activate \_\_\_\_\_
  5. Search hutch, one person remains inside. Put hutch key in SRU and turn.
    - The Safety Shutter "enable" light does not come on until the end of the warning interval \_\_\_\_\_

6. The person inside presses Emergency Stop Button #1.

The shutter "enable" light goes out

The ES indicator comes on the main control & remote reset panel

The ES latch cannot be reset on the *main control panel* unless the SOR key is turned

**ES1**

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7. The person inside presses Emergency Stop Button #2.

The shutter "enable" light goes out

The ES indicator comes on the main control & remote reset panel

The ES latch cannot be reset on the *remote reset panel* unless the SOR key is turned

**ES2**

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8. Place latch device on door lock so key can be removed. Place switch holders on door switches. Search hutch, insert door key in SRU and rotate into position. Open safety shutter.

The "Beam On" sign turns ON

Remove holder from switch 2.

RIB latch light comes ON

Replace holder on switch 2.

RIB cannot be reset unless SOR key is turned.

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9. Remove holder on switch 1.

Safety shutter closes

RIA latch light comes on

Hutch interlock drops out

"Beam On" sign goes out

RIA can't be reset w/o SOR

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10. Replace holder on switch 1. Search hutch, leave shutter closed.

Hutch Kirk key (KKH) cannot be removed from SRU unless button is pushed

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11. Open safety shutter.

KKH cannot be removed even if button is pushed

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12. Close safety shutter. Turn KKH and note where solenoid unit stops rotation. Push the button and turn key just beyond this point, but not far enough to actuate "key removed" switch. Release the button and leave key in this position. Open safety shutter, remove KKH, and replace.

RIA latch light comes on the main control & remote reset panel.

RIB latch light comes on the main control & remote reset panel.

The safety shutter closes.

RIA fault cannot be reset on the *remote reset panel* unless the SOR key is turned.

RIB fault cannot be reset on the *remote reset panel* unless the SOR key is turned.

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**X28C Radiological Interlock Test**

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- 13. With hutch interlocked, leave shutter(s) closed.
    - Beam line Lockout key can be removed only if button on SRU is pushed \_\_\_\_\_
    - Open safety shutter.
      - Beam line Lockout key can't be removed even if button is pushed \_\_\_\_\_
  
  - 14. Close safety shutter.
    - "Cheat" SRU as described in step 13. Open safety shutter, remove the key and replace.
      - The safety shutter closes \_\_\_\_\_
      - RIA latch light comes on the main control & remote reset panel. \_\_\_\_\_
      - RIB latch light comes on the main control & remote reset panel. \_\_\_\_\_
      - RIA fault cannot be reset on the *main control panel* unless the SOR key is turned. \_\_\_\_\_
      - RIB fault cannot be reset on the *main control panel* unless the SOR key is turned. \_\_\_\_\_
      - SPA comes on the main control & remote reset panel. \_\_\_\_\_
      - SPA can't be reset on the *main control panel* unless the SOR key is turned. \_\_\_\_\_
  
  - 15. Remove the lockout key from the SRU and Replace.
    - SPA comes on the main control & remote reset panel. \_\_\_\_\_
    - SPA can't be reset on the *remote reset panel* unless the SOR key is turned. \_\_\_\_\_
  
  - 16. Open safety shutter. Press an emergency stop button.
    - RIA latch light comes on \_\_\_\_\_
    - RIB latch light comes on \_\_\_\_\_
    - Hutch interlock drops out \_\_\_\_\_
    - ES indicator comes on \_\_\_\_\_
    - Safety Shutter Closes \_\_\_\_\_
  
  - 17. Open the safety shutter. Remove the Control Room Shutter Enable Key for this beam line, then replace the key.
    - The safety shutter closes \_\_\_\_\_
    - RIA latch light comes on \_\_\_\_\_
    - The "Control Room Shutter Enable" light goes out \_\_\_\_\_
    - The SPA latch comes on (after the key is back on) \_\_\_\_\_
    - The safety shutter cannot be opened \_\_\_\_\_
- Reset RIA and SPA

**X28C Radiological Interlock Test**

- 18. Open the Safety Shutter.  
Turn "Auto Open" key to "ON".  
At the Control Room Operator's Console, press the master shutter enable button to "Inhibit" and back to "Enable"  
The safety shutter closes \_\_\_\_\_  
And then re-opens \_\_\_\_\_  
Turn "Auto Open" key to "OFF".  
Press the master enable button to "Inhibit" and back to "Enable"  
The safety shutter closes \_\_\_\_\_  
And does NOT re-open \_\_\_\_\_
  
- 19. One person goes to the x-ray equipment area and resets the indicators for RIAX and RIBX at SR100.  
Open the safety shutter.  
Remove switch holder from door switch number 2.  
RIB latch light comes on \_\_\_\_\_  
RIBX "Loop Enabled" indicator goes out \_\_\_\_\_  
RIBX "Loop Disabled" indicator comes on \_\_\_\_\_  
Replace switch holder.  
RIBX cannot be reset \_\_\_\_\_  
Reset RIB  
RIBX CAN be reset \_\_\_\_\_  
("Loop Enabled" indicator comes on) \_\_\_\_\_
  
- 20. Remove holder from door switch 1.  
RIA latch light comes on \_\_\_\_\_  
RIAX "Loop Enabled" indicator goes out \_\_\_\_\_  
RIAX "Loop Disabled" indicator comes on \_\_\_\_\_  
The safety shutter closes \_\_\_\_\_  
The photon shutter closes (if equipped) \_\_\_\_\_  
RIAX cannot be reset \_\_\_\_\_  
Reset RIA  
RIAX CAN be reset \_\_\_\_\_  
("Loop Enabled" indicator comes on) \_\_\_\_\_
  
- 21. Remove the holders from the switches. Remove the latch device from the door lock. Stand inside the hutch and open and close the door.  
All door switches operate freely and each makes a "click" when door is opened \_\_\_\_\_
  
- 22. Search the hutch. Locate the safety shutter associated with the beam line by tracing the beam pipe through the shield wall. Do not rely on labels on the shutter mechanism. Open the shutter.  
The correct shutter opens \_\_\_\_\_  
No other shutter at that saw tooth opens or attempts to open \_\_\_\_\_  
Close the safety shutter.  
The mechanism moves freely and without hesitation \_\_\_\_\_
  
- 23. Remove user interlock test jumper (if applicable). \_\_\_\_\_

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