

<b>Subject:</b>	<b>X17B1 Radiological Interlock Test</b>		
<b>Number:</b>	LS-PPS-0005	<b>Revision:</b>	D
<b>Effective:</b>	1/5/2004	<b>Page 1 of 6</b>	

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\*Approval signatures on file with master copy.

[Revision/Periodic Review Log](#)

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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 satisfied on X17B1.

#### 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 button, 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. Switch Direct Beam Stop (DBS) to "**White**" mode. Place B1 backstop in the Closed/"In-Beam" position. Switch shutter control to "B1".

Secure Transport Hutch. Search X17B1 hutch, one person remains inside

The Small Transport Enclosure Safety Shutter (STRESS)  
"enable" light does not come on until the end of the  
warning interval. \_\_\_\_\_

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- |     |   | <u>ES1</u> | <u>ES2</u> |
|-----|---|------------|------------|
| 6.  | The person inside presses an Emergency Stop Button.   |            |            |
|     | The shutter "enable" light goes out   | _____      | _____      |
|     | The ES indicator comes on   | _____      | _____      |
|     | The ES latch cannot be reset unless the SOR key is turned   | _____      | _____      |
| 7.  | Place latch device on door lock so key can be removed. Place switch holders on door switches. Search hutch, put door key in SRU and turn, and open STRESS and Beamline Safety Shutter (BLISS).  |            |            |
|     | The "Beam ON" signs turns on  |            | _____      |
|     | Remove holder from switch 2.  |            |            |
|     | RIB latch light comes on  |            | _____      |
| 8.  | Replace holder on switch 2.   |            |            |
|     | RIB cannot be reset unless SOR key is turned.   |            | _____      |
| 9.  | Remove holder on switch 1.  |            |            |
|     | STRESS shutter closes   |            | _____      |
|     | BLISS shutter closes  |            | _____      |
|     | RIA latch comes on  |            | _____      |
|     | Hutch interlock drops out   |            | _____      |
|     | RIA can't be reset w/o SOR  |            | _____      |
| 10. | Replace holder on switch 1. Search hutch, leave shutter closed.   |            |            |
|     | Hutch Kirk key (KKH) cannot be removed from SRU unless button is pushed   |            | _____      |
| 11. | Open STRESS shutter.  |            |            |
|     | KKH cannot be removed even if button is pushed  |            | _____      |
| 12. | Close shutters. 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 shutters, remove KKH, and replace. |            |            |
|     | RIA latch light comes on  |            | _____      |
|     | RIB latch light comes on  |            | _____      |
|     | The STRESS shutter closes   |            | _____      |
|     | The BLISS shutter closes  |            | _____      |
|     | Reset RIA and RIB.  |            |            |
| 13. | Beam line lockout key can be removed only if button on SRU is pushed  |            | _____      |
|     | Open STRESS   |            |            |
|     | Beam line lockout key can't be removed even if button is pushed   |            | _____      |

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14. Close STRESS, cheat SRU, and open STRESS. Leave BLISS closed. Remove lockout key, and replace.

RIA trips \_\_\_\_\_  
RIB trips \_\_\_\_\_  
STRESS closes \_\_\_\_\_  
SPA comes on when key in \_\_\_\_\_  
SPA can't be reset w/o SOR \_\_\_\_\_

15. Open STRESS & BLISS, and press an emergency stop button.

RIA latch light comes on \_\_\_\_\_  
RIB latch light comes on \_\_\_\_\_  
Hutch interlock drops out \_\_\_\_\_  
STRESS closes \_\_\_\_\_  
BLISS closes \_\_\_\_\_

Reset RIA, RIB and ES

16. Secure transport hutch. Open STRESS B by pressing and holding the button on the air solenoid. The BLISS remains closed.

Remove holder on switch 2 and replace.

RIB trips \_\_\_\_\_

Reset RIB, release switch 1

RIA trips \_\_\_\_\_

17. Close STRESS. Search hutch. Turn off air to STRESS, cycle shutter open & closed until it remains closed when open button is pressed.

Open BLISS and release switch 2.

RIB trips \_\_\_\_\_

Reset RIB, release switch 1

RIA trips \_\_\_\_\_

BLISS closes \_\_\_\_\_

Open air valve to solenoid bank.

18. Switch to **MONO** mode. Search hutch. Open STRESS and BLISS. Remove holder on switch 2 and replace.

RIB trips \_\_\_\_\_

Reset RIB, release switch 1

RIA trips \_\_\_\_\_

BLISS closes \_\_\_\_\_

STRESS closes \_\_\_\_\_

Hutch Interlock drops out \_\_\_\_\_

Reset RIA, search hutch.

19. Cheat hutch SRU, open STRESS and BLISS.

Remove hutch Kirk key

RIA trips \_\_\_\_\_

RIB trips \_\_\_\_\_

STRESS closes \_\_\_\_\_

BLISS closes \_\_\_\_\_

Replace key

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20. Beam line lockout key can be removed only if button on SRU is pushed  
Open STRESS
- Beam line lockout key can't be removed even if button is pushed
21. Close STRESS, cheat SRU, and open STRESS. Leave BLISS closed. Remove lockout key, and replace.
- RIA trips  
RIB trips  
STRESS closes  
SPA comes on when key in  
SPA can't be reset w/o SOR
22. Open STRESS and BLISS. Press an Emergency Stop
- RIA trips  
RIB trips  
STRESS closes  
BLISS closes
- Reset RIA, RIB, and ES. Search hutch.
23.
  - Place switch holders on transport hutch door switches and latch device on door. Search transport hutch.
  - Break security in B1 hutch; remove switch holders, and leave B1 hutch door open.
  - Unplug DBS solenoid jumper cable from interface box. Attach DBS jumper power cable to the solenoid cable.
  - Open STRESS; BLISS remains closed. Plug the other side of the DBS jumper power cable into an AC outlet.

DBS Opens ("White" indicator comes ON)  
RIA trips  
RIB trips  
STRESS closes

24. Complete steps 24 - 26 for both beam modes. **Mono**      **White**

Place holders on B1 hutch door switches and latch device on door.

Place Backstop Kirk key (BSKK) in SRU and turn fully CW. Search B1 hutch.

Backstop Kirk key cannot be removed from SRU unless button is pushed.  
BLISS Enable light is ON.

Open STRESS and BLISS

Backstop Kirk key cannot be removed even if button is pushed.

Close STRESS and BLISS. Remove BSCK.

BLISS Enable light is OFF.

Attempt to Open Stress and BLISS.

Shutters will not Open.

25. Cheat SRU for backstop key. Open shutters.  
Remove backstop key from SRU.

RIA trips  
RIB trips

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26. Break security in X17B2 hutch.  
Reset RIA and RIB. Unlock backstop and lower enough to put latch device on backstop lock and return key to SRU. Place switch holders on both backstop upper limit switches. Open BLISS & STRESS. One-person reports to the X-Ray Security Panel (SR100) and clears all faults on panel.
- |   | Mono  | White |
|---|-------|-------|
| Release left switch holder                    |       |       |
| RIB latch comes ON                            | _____ | _____ |
| RIBX trips                                    | _____ | _____ |
| Replace left switch holder. Reset RIB & RIBX. |       |       |
| Release right switch holder.                  |       |       |
| RIA latch comes ON                            | _____ | _____ |
| RIAX trips                                    | _____ | _____ |
| Reset RIA and RIAX and close shutters         |       |       |
27. Remove switch holders from backstop switches. Remove latch device from backstop lock, using key from SRU. Move backstop to in-beam-position, then back out.  
Both limit switches operate freely and each makes a "click" when stop is moved from the in-beam position.
- |  |       |       |
|--|-------|-------|
|  | _____ | _____ |
|--|-------|-------|
28. Open the STRESS. Remove the Control Room Shutter Enable Key for X17B1, and then replace the key (Either mode).
- |   |  |       |
|---|--|-------|
|   |  |       |
| STRESS closes                                     |  | _____ |
| RIA trips   |  | _____ |
| The "Control Room Inhibit" light comes on         |  | _____ |
| The SPA latch comes on (after the key is back on) |  | _____ |
| STRESS cannot be opened                           |  | _____ |
| Reset RIA and SPA                                 |  |       |
29. One person goes to the x-ray equipment area and observes the indicators for RIAX and RIBX.  
Open STRESS and BLISS.
- |   | Mono  | White |
|---|-------|-------|
| Remove switch holder from door switch number 2. |       |       |
| RIB latch light comes on                        | _____ | _____ |
| RIBX trips                                      | _____ | _____ |
| Replace switch holder. Attempt to reset RIBX.   |       |       |
| RIBX will not reset                             | _____ | _____ |
| Reset RIB.                                      |       |       |
| RIBX resets                                     | _____ | _____ |
30. Remove holder from door switch 1.
- |                          |       |       |
|--------------------------|-------|-------|
|                          |       |       |
| RIA latch light comes on | _____ | _____ |
| RIAX trips               | _____ | _____ |
| Attempt to reset RIAX    |       |       |
| RIAX will not reset      | _____ | _____ |
| Reset RIA                |       |       |
| RIAX resets              | _____ | _____ |

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## 31. Open the Safety Shutter.

Turn "Auto Open" key to "ON".

At the Control Room Operator's Console, switch the shutter master enable to "Inhibit" and back to "Enable".

The safety shutter closes

And then re-opens

\_\_\_\_\_

\_\_\_\_\_

Turn "Auto Open" key to "OFF".

Switch the master enable to "Inhibit" and back to "Enable"

The safety shutter closes

And does not re-open

\_\_\_\_\_

\_\_\_\_\_

## 32. Open STRESS &amp; BLISS. Shut off water-cooling to the B1 Backstop (Close supply water valve).

STRESS Closes

BLISS Closes

X17B1 enable light goes out

**Mono****White**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Open Supply water valve and Reset X17B1 water interlock fault.

## 33. Go to the X-17B1 hutch. Remove the holders from the switches. Remove the latch device from the door lock. Stand inside the hutch and open and close the door.

Both door switches operate freely and each "clicks" when door is opened

\_\_\_\_\_

\_\_\_\_\_

## 34. Go to the X-17Transport hutch. 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 three door switches operate freely and each "clicks" when door is opened

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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