

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical

**Reviewed by:**

3/9/2016	3/10/2016	3/9/2016
<b>X</b> Robert Chmiel	<b>X</b> Scott Buda	<b>X</b> Ewart Orr
Robert Chmiel Safety Officer Signed by: Chmiel, Robert	Scott Buda Accelerator Safety Systems Group Leader Signed by: Buda, Scott	Ewart Orr Accelerator Safety Systems Engineer Signed by: Orr, Ewart
3/11/2016	3/10/2016	3/8/2016
<b>X</b> John Aloï	<b>X</b> 	<b>X</b> 
John Aloï Facility Support Representative Signed by: Aloï Jr, John	Mo Benmerrouche Physicist - Radiation Safety Signed by: Benmerrouche, Mohamed	Bruce Lein Training Group Leader Signed by: Lein, Bruce
3/8/2016	3/9/2016	3/11/2016
<b>X</b> 	<b>X</b> 	<b>X</b> Ferdiand Willeke
Christopher Porretto Quality Assurance Manager Signed by: Porretto, Christopher J	Steve Moss Acting Conduct of Operations Manager Signed by: Moss, Steven H	Ferdinand Willeke Accelerator Division Director Signed by: Willeke, Ferdinand
3/10/2016	3/11/2016	
<b>X</b> 	<b>X</b> Klaus Attenkofer	
Paul Zschack Photon Science Division Director Signed by: Zschack, Paul	Klaus Attenkofer 8-ID Lead Beamline Scientist Signed by: Attenkofer, Klaus	

<b>USI Screening/Resolution</b>	<b>Procedure Validation*</b>
3/9/2016	3/10/2016
<b>X</b> 	<b>X</b> Thomas McDonald
Steve Moss Authorization Basis Manager Signed by: Moss, Steven H	Thomas McDonald ESH Engineer Signed by: McDonald, Thomas
	*for Operations/Technical procedures only

**Approved by:**

3/10/2016

**X** 

---

Robert Lee  
ESH Manager  
Signed by: Lee, Robert J

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical

### VERSION HISTORY LOG

VERSION	DESCRIPTION	DATE
1	First Issue.	22Jan2016
2	Revised to correct discrepancies discovered during initial certification testing (Attachment A).	11Mar2016

### ACRONYMS

A	Amps	MCR	Main Control Room
ABM	Authorization Basis Manager	Neg	Negative
ASE	Accelerator Safety Envelope	NSLS-II	National Synchrotron Light Source II
BNL	Brookhaven National Laboratory	P	Pendant
ES	Emergency Stop	Pos	Positive
ESH	Environment, Safety and Health	PS	Power Supply
FE	Front End	PPS	Personnel Protection System
FOE	First Optical Enclosure	R	Right
FRM	First Optical Enclosure Radiation Monitor	RF	Radio Frequency
GeV	Giga electron Volts	SAF	Safety Approval Form
GPM	Gallons Per Minute	SB	Search Button
HMI	Human Machine Interface	SBE	Search Button External
HVPS	High Voltage Power Supply	SBMS	Standards Based Management System
ID	Insertion Device	SR	Storage Ring
I/O	Input/Output	SS	Safety Shutter
L	Left	STA	Safety Test Amplifier
LED	Light Emitting Diode	V	Volts
LOTO	Lockout/Tagout		

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical

## 1 PURPOSE AND SCOPE

The purpose of this procedure is to provide instructions for testing and certifying the radiological interlock system for the BNL NSLS-II Beamline 8-ID. The system will be re-tested every six months, in accordance with the SBMS Program Description: *Radiological Control Manual* and SBMS Subject Area, *Interlock Safety for High Risk Hazards*. Certification shall be completed sometime during, but no later than, the last day of the calendar month in which it is due. Any beamline PPS system going beyond the last day of the month in which it is due will be disabled by ESH Staff using Centrally Controlled LOTO until certification is complete. Testing will also be required after a change in wiring, components, or programming in accordance with PS-ESH-PRM-3.4.1, *Procedure for Safety System Work Permits* and the guidelines for certification specified in PS-C-ASD-SPC-SR-PPS-001, *Storage Ring Personnel Protection System (SPPS) Design Description* and PS-C-XFD-SPC-PPS-001, *Beamline Personnel Protection System (BLPPS) and Front End Personnel Protection System Design Description*. Changes to the system shall be performed in accordance with PS-C-ASD-PRC-057, *NSLS-II PPS Configuration Management*.

## 2 DEFINITIONS

None.

## 3 RESPONSIBILITIES

### 3.1 Testers

- 3.1.1 Coordinate and perform radiological interlock certification testing.
- 3.1.2 Delegate radiological interlock testing step actions to personnel acting as Assistants.
- 3.1.3 Complete attached test checklist as required.

### 3.2 Assistants

- 3.2.1 Assist the Tester in performing the interlock test step actions when directed by the Tester.
- 3.2.2 Report all radiological interlock test observations to the Tester.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical

### 3.3 Accelerator Safety Systems Engineers and Technicians

3.3.1 Provide technical support throughout testing.

### 3.4 Primary Authorized Employees

3.4.1 Apply LOTO in accordance with this procedure.

### 3.5 Configuration Management Specialist

3.5.1 Posts completed test checklists on the SharePoint Document Center.

## 4 PREREQUISITES

4.1 At least one Tester shall be ESH Staff.

4.2 Assistants shall be designated by the Testers.

4.3 A Mechanical Engineering Review has been completed for all hutch door switches to ensure proper positioning.

## 5 PRECAUTIONS AND LIMITATIONS

5.1 All steps in this procedure that require LOTO of systems/equipment for servicing and maintenance activities shall be performed in accordance with SBMS Subject Area, *Lockout/Tagout (LOTO) for Installation, Demolition, or Service and Maintenance*.

5.2 All steps in this procedure that require LOTO for any purpose other than servicing and maintenance shall be performed in accordance with PS-C-ASD-PRC-005, *Centrally Controlled Lockout/Tagout (LOTO) Procedure*.

5.3 Mufflers shall be used to reduce noise during testing by placing them on the sounders.

5.4 The radiological interlock systems for the facility are a credited control in accordance with the ASE. Any deviation or discrepancy from an expected test result may be a violation of the ASE and shall be reported to the ABM as soon as practical.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical

- 5.5 All steps in the test checklist that require a beamline search shall be performed in accordance with PS-C-XFD-PRC-010, *Beamline Enclosure Search and Secure and Breaking Security Procedure*.
- 5.6 All configuration control checklists, commissioning approval forms and SAFs for Beamline 8-ID shall be voided prior to the start of certification testing.

## 6 PROCEDURE

### 6.1 Test and Certify Radiological Interlocks

**Note:** Two Testers are required to test and certify Beamline 8-ID radiological interlocks.

- 6.1.1 Testers notify the Lead Operator and the Lead Beamline Scientist that a test of the Beamline 8-ID radiological interlocks will be performed.
- 6.1.2 Testers obtain the Beamline 8-ID enable key and Beamline PPS reset key from the Control Room.

**Note:** LOTO may be applied to other pieces of equipment such as: injection shutters, bending magnet power supplies, linac PPS enable switch, booster PPS enable switch or SR PPS enable switches that offer an equivalent amount of protection. Live testing will require the LOTO listed in 6.1.3 and 6.1.4.

6.1.3 Primary Authorized Employee applies LOTO to the following:

- Gun HVPS output cable connector in accordance with SBMS Subject Area, *Lockout/Tagout (LOTO) for Installation, Demolition, or Service and Maintenance* to ensure no signal output to the electron gun cage
- Three linac modulator power supply line cords OR Booster Dipole F Power Supply in accordance with SBMS Subject Area, *Lockout/Tagout (LOTO) for Installation, Demolition, or Service and Maintenance*
- Booster RF HVPS OR Booster low level RF drive termination in accordance with PS-C-ASD-PRC-047, *NSLS-II Booster Ring Radio Frequency System High Voltage Power Supply (BR-HVPS) Lockout/Tagout (LOTO)*
- SR System "C" low level RF drive termination OR SR System "C" RF output connection to cavity in accordance with SBMS Subject Area,

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

*Lockout/Tagout (LOTO) for Installation, Demolition, or Service and Maintenance*

- SR System “D” low level RF drive termination OR SR System “D” RF output connection to cavity in accordance with SBMS Subject Area, *Lockout/Tagout (LOTO) for Installation, Demolition, or Service and Maintenance*

6.1.4 Tester applies LOTO to each of the following in accordance with PS-C-ASD-PRC-005, *Centrally Controlled Lockout/Tagout (LOTO) Procedure*:

- Gun HVPS output cable connector
- Three linac modulator power supply line cords OR Booster Dipole F Power Supply
- Booster RF HVPS OR Booster low level RF drive termination
- SR System “C” low level RF drive termination OR SR System “C” RF output connection to cavity
- SR System “D” low level RF drive termination OR SR System “D” RF output connection to cavity

**Note:** With the exception of LOTO checklist items, checklist items (i.e., tests) specified in Attachment A, *NSLS-II Beamline 8-ID Radiological Interlock Test Checklist* may be performed without all of the specified checklist items (i.e., partial radiological interlock test).

6.1.5 Testers use Attachment A, *NSLS-II Beamline 8-ID Radiological Interlock Test Checklist* to test and certify the radiological interlocks.

- a. IF the correct corresponding observation has been made, THEN make a checkmark (✓) for each step.
- b. IF any step results in an undesired event or outcome, THEN contact the Accelerator Safety Systems Engineer and/or Technician.
- c. IF the undesired outcome or event requires a change to wiring, components, or programming, THEN make a checkmark (✓) in the Test Result “Failed” box at the top of the checklist.
- d. IF the checklist is fully completed with desirable outcomes, THEN make a checkmark (✓) in the Test Result “Passed” box at the top of the checklist.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

- 6.1.6 Testers notify the Lead Operator that the test of the NSLS-II Beamline 8-ID radiological interlocks is completed and the resulting outcome (i.e., Passed or Failed).
- 6.1.7 Testers remove LOTO from each of the following in accordance with PS-C-ASD-PRC-005, *Centrally Controlled Lockout/Tagout (LOTO) Procedure*:
- Gun HVPS output cable connector
  - Three linac modulator power supply line cords OR Booster Dipole F Power Supply
  - Booster RF HVPS OR Booster low level RF drive termination
  - SR System “C” low level RF drive termination OR SR System “C” RF output connection to cavity
  - SR System “D” low level RF drive termination OR SR System “D” RF output connection to cavity
- 6.1.8 Testers ensure all Beamline PPS cabinets are secure and locked.
- 6.1.9 Testers return the Beamline 8-ID enable key and the Beamline PPS reset key to the Control Room.
- 6.1.10 Testers notify Primary Authorized Employees for each of the following systems that interlock testing is complete AND removal of LOTO may be performed:
- Gun HVPS output cable connector
  - Three linac modulator power supply line cords OR Booster Dipole F Power Supply
  - Booster RF HVPS OR Booster low level RF drive termination
  - SR System “C” low level RF drive termination OR SR System “C” RF output connection to cavity
  - SR System “D” low level RF drive termination OR SR System “D” RF output connection to cavity
- 6.1.11 Testers provide the completed test checklist to the Configuration Management Specialist for posting on the SharePoint Document Center.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical

## REFERENCES

- 7.1 PS-C-ASD-PRC-005, *Centrally Controlled Lockout/Tagout (LOTO) Procedure*
- 7.2 PS-C-ASD-PRC-008, *NSLS-II Area Radiation Monitor PPS Test*
- 7.3 PS-C-ASD-PRC-047, *NSLS-II Booster Ring Radio Frequency System High Voltage Power Supply (BR-HVPS) Lockout/Tagout (LOTO)*
- 7.4 PS-C-ASD-PRC-057, *NSLS-II PPS Configuration Management*
- 7.5 PS-ESH-PRM-3.4.1, *Procedure for Safety System Work Permits*
- 7.6 PS-C-XFD-PRC-010, *Beamline Enclosure Search and Secure and Breaking Security Procedure*
- 7.7 SBMS Program Description: *Radiological Control Manual*
- 7.8 SBMS Subject Area, *Interlock Safety for High Risk Hazards*
- 7.9 SBMS Subject Area, *Lockout/Tagout (LOTO) for Installation, Demolition, or Service and Maintenance*
- 7.10 PS-C-CMD-PRC-002, *Records Management Procedure*
- 7.11 PS-C-ASD-SPC-SR-PPS-001, *Storage Ring Personnel Protection System (SPPS) Design Description*
- 7.12 PS-C-XFD-SPC-PPS-001, *Beamline Personnel Protection System (BLPPS) and Front End Personnel Protection System Design Description*

## 8 ATTACHMENTS

Attachment A, *NSLS-II Beamline 8-ID Radiological Interlock Test Checklist*

Attachment B, *NSLS-II 8-ID Beamline PPS Equipment Photos*

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical

## 9 DOCUMENTATION

The following document is generated as a result of this procedure, and shall be maintained in accordance with PS-C-CMD-PRC-002, *Records Management Procedure*:

- Completed NSLS-II Beamline 8-ID Radiological Interlock Test Checklists

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

*Intentionally blank for 2-sided printing*

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical

## Attachment A

### NSLS-II Beamline 8-ID Radiological Interlock Test Checklist

Test Reason:	Test Result: <input type="checkbox"/> Passed <input type="checkbox"/> Failed		
	Test Type:	<input type="checkbox"/> Pre-Certification	<input type="checkbox"/> Certification <input type="checkbox"/> Partial
Test Date:	Start Time:	Finish Time:	
Tester 1:	Assistant 1:		
Tester 2:	Assistant 2:		
Tester 1 Signature:	Tester 2 Signature:		
*Reviewer 1:	Reviewer 1 sig.:		
Reviewer 2:	Reviewer 2 sig.:		
** Safety Signature 8-ID (Beamline HMI) A Chain:                      B Chain:	Previous 8-ID SS#	Date: / /	
** Safety Signature Pentant 3 Beamline (SR HMI) A Chain:                      B Chain:	Previous Pentant 3 SS#	Date: / /	

\* A review by an Accelerator Safety Systems Engineer and a designated specialist (Reviewer 2) is only required upon a Test failure.

\*\*If Current Safety Signature number (found in top left corner on HMI) is different from previous number, contact the Accelerator Safety Systems Cognizant Engineer.

#### PREPARATION:

I. All hutch door switches have been evaluated by Mechanical Engineering for proper positioning	
II. Inform Control Room Lead Operator that testing will be done	
III. Obtain Beamline enable and PPS reset keys from Control Room	
IV. Verify that beamline vacuum and water interlocks are satisfied	
V. Place muffler on beam imminent sounder	
VI. Request Lead Operator enable Master shutters	

#### A1 **Verify System Lockouts**

Gun HVPS output cable connector \_\_\_\_\_

Linac modulator line cords (3) OR Booster Dipole F PS 480V \_\_\_\_\_

Booster RF HVPS 480 V OR Booster low level RF drive termination \_\_\_\_\_

SR System C low level RF drive termination OR SR System C RF output connection to cavity \_\_\_\_\_

SR System D low level RF drive termination OR SR System D RF output connection to cavity \_\_\_\_\_

#### A2 **Verify Search and Time Beam Imminent Alarm**

Repeat steps for each 8-ID Hutch

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

	<u>A</u>	<u>B1</u>	<u>B2</u>
Verify that search path is free from obstacles and line of sight is clear in search mirrors in accordance with PS-C-XFD-PRC-010, <i>Beamline Enclosure Search and Secure and Breaking Security Procedure</i>	_____	_____	_____
<i>Close all hutch secondary doors</i>	_____	_____	_____
“Entry Permitted” signs ON (2 signs on B2)	_____	_____	_____
<i>Using the keypad, lock the closed doors</i>	_____	_____	_____
<i>Press SB1</i>	_____	_____	_____
SB1 illuminates	_____	_____	_____
Search sounder sounds	_____	_____	_____
Search yellow beacon flashing	_____	_____	_____
<i>Press SB2</i>	_____	_____	_____
SB2 illuminates	_____	_____	_____
<i>Exit hutch and close main door</i>	_____	_____	_____
<i>Press SBE and <b>begin timing</b></i>	_____	_____	_____
Beam imminent alarm sounds for 30 seconds	_____	_____	_____
After warning, (FOE, B1, B2) Interlocked A and B ON ( <b>green</b> ), HMI	_____	_____	_____
“Interlocked” signs ON (2 signs on B2)	_____	_____	_____
Maglock A and B ON ( <b>green</b> ), all doors, HMI	_____	_____	_____
<i>Press the SBE/Access Button</i>	_____	_____	_____
Interlocked signs OFF, “Entry Permitted” signs are ON (2 signs on B2)	_____	_____	_____
FOE, B1, B2 Interlocked A and B OFF, HMI	_____	_____	_____
Maglock A OFF (may require opening Maglock on key pad)	_____	_____	_____
<i>Open door</i>	_____	_____	_____
Door opens, Maglock B OFF door	_____	_____	_____

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

**A3 Out of Sequence Search in the FOE (A hutch) and B hutches**

Repeat steps for each 8-ID hutch	<u><b>A</b></u>	<u><b>B1</b></u>	<u><b>B2</b></u>
Press SB2	_____	_____	_____
SB2 does not illuminate	_____	_____	_____
Press SB1	_____	_____	_____
SB1 illuminates	_____	_____	_____
Close hutch door and press SBE	_____	_____	_____
Hutch does NOT secure	_____	_____	_____

**A4 Search timeout**

Repeat steps for each 8-ID hutch	<u><b>A</b></u>	<u><b>B1</b></u>	<u><b>B2</b></u>
Press first search button and <b>begin timing</b>	_____	_____	_____
Complete search <b>without pressing Final Search button</b>	_____	_____	_____
Search sounders off in 2 minutes	_____	_____	_____
Press Final Search button	_____	_____	_____
Search does not complete	_____	_____	_____

**A5 Disconnected Partition Wall Connectors will not allow search in the B hutches**

In the B1 hutch disconnect the 2 connectors near the beam stop	_____		
Attempt a search of the hutch	_____	_____	
Search does not complete on either Chain	_____	_____	
Reconnect the 2 connectors	_____		

**A6 Shutter enable**

Place actuators on FOE door switches and attach Maglock devices			_____
	Beamline Online A and B OFF		_____
Enable beamline with key and perform a reset	Beamline Online A and B ON ( <b>green</b> )		_____
Search the FOE	FE Shutter Permits A and B ON <b>after</b> Beam Imminent Warning		_____
Open FE shutters	FE Shutters A and B indicate open ( <b>green</b> )		_____
	“Beam On” sign is ON		_____
Close FE shutters	FE Shutters A and B indicate closed ( <b>red</b> )		_____

**A7 Emergency Stops (ES) FOE (A hutch)**

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

	<u>ES1</u>	<u>ES2</u>	<u>ES3</u>	<u>ES4</u>
For each ES search hutch				
<i>Open FE shutters from keypad</i>	_____	_____	_____	_____
FE Shutters A and B open (green)	_____	_____	_____	_____
FOE Interlocked A and B ON (green)	_____	_____	_____	_____
FE Shutter Permit A and B ON (green)	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____
Upstream Right Maglock A ON (green)	_____	_____	_____	_____
Upstream Left Maglock A ON (green)	_____	_____	_____	_____
Downstream Right Maglock A ON (green)	_____	_____	_____	_____
Downstream Left Maglock A ON (green)	_____	_____	_____	_____
<i>Press ES</i>	_____	_____	_____	_____
FE Shutters A and B closed (red)	_____	_____	_____	_____
FOE Interlocked A and B OFF	_____	_____	_____	_____
FE Shutter Permit A and B OFF	_____	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____	_____
Upstream Right Maglock A OFF	_____	_____	_____	_____
Upstream Left Maglock A OFF	_____	_____	_____	_____
Downstream Right Maglock A OFF	_____	_____	_____	_____
Downstream Left Maglock A OFF	_____	_____	_____	_____
<i>Pull out ES</i>	_____	_____	_____	_____
ES Sum Latch OFF	_____	_____	_____	_____
<i>Reset fault</i>	_____	_____	_____	_____
ES Sum Latch ON (green)	_____	_____	_____	_____

**A8 Emergency Stops (ES) B1 hutch**

	<u>ES1</u>	<u>ES2</u>	<u>ES3</u>
For each ES search hutch			
<i>Open FE and LIS1 shutters from keypad</i>	_____	_____	_____
FE Shutters A and B open (green)	_____	_____	_____
LIS1 Shutter A and B open (green)	_____	_____	_____
B1 Interlocked A and B ON (green)	_____	_____	_____
FE Shutter Permit A and B ON (green)	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____
Front Right Maglock ON A and B (green)	_____	_____	_____

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

Front Left Maglock ON A and B (**green**)

\_\_\_\_\_

*Press ES*

\_\_\_\_\_

FE Shutters A and B closed (**red**)

\_\_\_\_\_

L1S1 Shutter A and B closed (**red**)

\_\_\_\_\_

B1 Interlocked A and B OFF

\_\_\_\_\_

L1S1 Shutter Permit A and B OFF

\_\_\_\_\_

FE Critical Device Permits A and B OFF

\_\_\_\_\_

Front Right Maglock A OFF

\_\_\_\_\_

Front Left Maglock A OFF

\_\_\_\_\_

*Pull out ES*

\_\_\_\_\_

ES Sum Latch OFF

\_\_\_\_\_

*Reset fault*

\_\_\_\_\_

ES Sum Latch ON (**green**)

\_\_\_\_\_

**A9 Emergency Stops (ES) B2 hutch**

For each ES search hutch. Open beam stop in B1.

**ES1**

**ES2**

**ES3**

*Open FE and LIS1 shutters from keypad*

\_\_\_\_\_

FE Shutters A and B open (**green**)

\_\_\_\_\_

L1S1 Shutter A and B open (**green**)

\_\_\_\_\_

B2 Interlocked A and B ON (**green**)

\_\_\_\_\_

L1S1 Shutter Permit A and B ON (**green**)

\_\_\_\_\_

FE Critical Device Permits A and B ON

\_\_\_\_\_

Front Maglock ON A and B (**green**)

\_\_\_\_\_

Rear Right Maglock ON A and B (**green**)

\_\_\_\_\_

Rear Left Maglock ON A and B (**green**)

\_\_\_\_\_

*Press ES*

\_\_\_\_\_

FE Shutters A and B closed (**red**)

\_\_\_\_\_

L1S1 Shutter A and B closed (**red**)

\_\_\_\_\_

B2 Interlocked A and B OFF

\_\_\_\_\_

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

L1S1 Shutter Permit A and B OFF	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____
Front Maglock OFF A and B	_____	_____	_____
Rear Right/Left Maglock A OFF	_____	_____	_____
<i>Pull out ES</i>	_____	_____	_____
ES Sum Latch OFF	_____	_____	_____
<i>Reset fault</i>	_____	_____	_____
ES Sum Latch ON (green)	_____	_____	_____

**A10 Hutch B1 Labyrinth 1 Switches and Latches**

Place actuators on the labyrinth switches/latches and downstream left door switches and Maglock. \_\_\_\_\_

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1). Latch trips on both A and B Permits. **Note:** B chain reed and push button switches must be cycled together for reset.

	<u>A1</u>	<u>A2</u>	<u>B1</u>	<u>B2</u>	<u>Latch</u>
<i>Search hutch</i>	_____	_____	_____	_____	_____
<i>Open FE and L1S1 Shutters from keypad</i>	_____	_____	_____	_____	_____
L1S1 Shutter A and B open (green)	_____	_____	_____	_____	_____
B1 Interlocked A and B ON (green)	_____	_____	_____	_____	_____
L1S1 Shutter Permit A and B ON (green)	_____	_____	_____	_____	_____
Cable Lab 1 Switches/Latch A and B ON (green)	_____	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____	_____
<i>Remove one switch actuator</i>	_____	_____	_____	_____	_____
Cable Lab 1 Switch/Latch Permit OFF	_____	_____	_____	_____	_____
B1 Interlocked OFF	_____	_____	_____	_____	_____
L1S1 Shutter Permit OFF	_____	_____	_____	_____	_____
L1S1 Shutter A and B closed (red)	_____	_____	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____	_____	_____
<i>Replace switch actuator and reset fault</i>	_____	_____	_____	_____	_____
Remove labyrinth actuators and close labyrinth door	_____	_____	_____	_____	_____

**A11 Hutch B2 Labyrinth 1 Switches and Latches**

Place actuators on the labyrinth switches/latches and downstream left door switches and Maglock. \_\_\_\_\_

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1). Latch trips on both A and B Permits. **Note:** B chain reed and push button switches must be cycled together for reset.

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

	<u>A1</u>	<u>A2</u>	<u>B1</u>	<u>B2</u>	<u>Latch</u>
Open beam stop in B1.	_____	_____	_____	_____	_____
<i>Search hutch</i>	_____	_____	_____	_____	_____
<i>Open FE and LIS1 Shutters from keypad</i>	_____	_____	_____	_____	_____
L1S1 Shutter A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
B2 Interlocked A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
L1S1 Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
Cable Lab 1 Switches/Latch A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____	_____
<i>Remove one switch actuator</i>	_____	_____	_____	_____	_____
Cable Lab 1 Switch/Latch Permit OFF	_____	_____	_____	_____	_____
B2 Interlocked OFF	_____	_____	_____	_____	_____
L1S1 Shutter Permit OFF	_____	_____	_____	_____	_____
L1S1 Shutter A and B closed ( <b>red</b> )	_____	_____	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____	_____	_____
<i>Replace switch actuator and reset fault</i>	_____	_____	_____	_____	_____
Remove labyrinth actuators and close labyrinth door	_____	_____	_____	_____	_____

**A12 FOE Upstream Right Door Switches**

Place actuators on the door switches and Maglock.

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).

	<u>A1</u>	<u>A2</u>	<u>B1</u>	<u>B2</u>	<u>Reed</u>
<i>Search hutch</i>	_____	_____	_____	_____	_____
<i>Open FE Shutters from keypad</i>	_____	_____	_____	_____	_____
FE Shutters A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
FOE Interlocked A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FOE Door Switch Sum A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____	_____
<i>Remove one switch actuator</i>	_____	_____	_____	_____	_____

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

FE Shutters A and B closed ( <b>red</b> )	_____	_____	_____	_____	_____
FOE Interlocked OFF	_____	_____	_____	_____	_____
FE Shutter Permit OFF	_____	_____	_____	_____	_____
FOE Door Switch Sum OFF	_____	_____	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____	_____	_____

*Replace switch actuator and reset fault*

Remove actuators and close door	_____	_____	_____	_____	_____
---------------------------------	-------	-------	-------	-------	-------

**A13 FOE Upstream Left Door Switches**

Place actuators on the door switches and Maglock.

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).

	<u>A1</u>	<u>A2</u>	<u>B1</u>	<u>B2</u>	<u>Reed</u>
<i>Search hutch</i>	_____	_____	_____	_____	_____
<i>Open FE Shutters from keypad</i>	_____	_____	_____	_____	_____
FE Shutters A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
FOE Interlocked A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FOE Door Switch Sum A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____	_____

*Remove one switch actuator*

FE Shutters A and B closed ( <b>red</b> )	_____	_____	_____	_____	_____
FOE Interlocked OFF	_____	_____	_____	_____	_____
FE Shutter Permit OFF	_____	_____	_____	_____	_____
FOE Door Switch Sum OFF	_____	_____	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____	_____	_____

*Replace switch actuator and reset fault*

Remove actuators and close door	_____	_____	_____	_____	_____
---------------------------------	-------	-------	-------	-------	-------

**A14 FOE Downstream Right Door Switches**

Place actuators on the door switches and Maglock.

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

	<u>A1</u>	<u>A2</u>	<u>B1</u>	<u>B2</u>	<u>Reed</u>
<i>Search hutch</i>	_____	_____	_____	_____	_____
<i>Open FE Shutters from keypad</i>	_____	_____	_____	_____	_____
FE Shutters A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
FOE Interlocked A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FOE Door Switch Sum A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____	_____
<i>Remove one switch actuator</i>	_____	_____	_____	_____	_____
FE Shutters A and B closed ( <b>red</b> )	_____	_____	_____	_____	_____
FOE Interlocked OFF	_____	_____	_____	_____	_____
FE Shutter Permit OFF	_____	_____	_____	_____	_____
FOE Door Switch Sum OFF	_____	_____	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____	_____	_____
<i>Replace switch actuator and reset fault</i>	_____	_____	_____	_____	_____
Remove actuators and close door					_____

**A15 FOE Downstream Left Door Switches**

Place actuators on the door switches and Maglock.

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).

	<u>A1</u>	<u>A2</u>	<u>B1</u>	<u>B2</u>	<u>Reed</u>
<i>Search hutch</i>	_____	_____	_____	_____	_____
<i>Open FE Shutters from keypad</i>	_____	_____	_____	_____	_____
FE Shutters A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
FOE Interlocked A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FOE Door Switch Sum A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____	_____
<i>Remove one switch actuator</i>	_____	_____	_____	_____	_____
FE Shutters A and B closed ( <b>red</b> )	_____	_____	_____	_____	_____
FOE Interlocked OFF	_____	_____	_____	_____	_____

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

FE Shutter Permit OFF \_\_\_\_\_

FOE Door Switch Sum OFF \_\_\_\_\_

FE Critical Device Permits A and B OFF \_\_\_\_\_

*Replace switch actuator and reset fault* \_\_\_\_\_

Remove actuators and close door \_\_\_\_\_

**A16 B1 Hutch Right Door Switches**

Place actuators on the door switches and Maglock. \_\_\_\_\_

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).

**A1**      **A2**      **B1**      **B2**      **Reed**

*Search hutch* \_\_\_\_\_

*Open FE and LIS1 Shutters from keypad* \_\_\_\_\_

FE Shutters A and B open (**green**) \_\_\_\_\_

LIS1 Shutter A and B open (**green**) \_\_\_\_\_

B1 Interlocked A and B ON (**green**) \_\_\_\_\_

LIS1 Shutter Permit A and B ON (**green**) \_\_\_\_\_

B Door Switch Sum A and B ON (**green**) \_\_\_\_\_

FE Critical Device Permits A and B ON \_\_\_\_\_

*Remove one switch actuator* \_\_\_\_\_

LIS1 Shutter A and B closed (**red**) \_\_\_\_\_

B1 Interlocked OFF \_\_\_\_\_

LIS1 Shutter Permit OFF \_\_\_\_\_

B Door Switch Sum Permit OFF \_\_\_\_\_

FE Critical Device Permits A and B OFF \_\_\_\_\_

*Replace switch actuator and reset fault* \_\_\_\_\_

Remove actuators and close door \_\_\_\_\_

**A17 B1 Hutch Left Door Switches**

Place actuators on the door switches and Maglock. \_\_\_\_\_

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

	<u>A1</u>	<u>A2</u>	<u>B1</u>	<u>B2</u>	<u>Reed</u>
<i>Search hutch</i>	_____	_____	_____	_____	_____
<i>Open FE and LIS1 Shutters from keypad</i>	_____	_____	_____	_____	_____
FE Shutters A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
LIS1 Shutter A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
B1 Interlocked A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
LIS1 Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
B Door Switch Sum A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____	_____
<i>Remove one switch actuator</i>	_____	_____	_____	_____	_____
LIS1 Shutter A and B closed ( <b>red</b> )	_____	_____	_____	_____	_____
B1 Interlocked OFF	_____	_____	_____	_____	_____
LIS1 Shutter Permit OFF	_____	_____	_____	_____	_____
B Door Switch Sum Permit OFF	_____	_____	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____	_____	_____
<i>Replace switch actuator and reset fault</i>	_____	_____	_____	_____	_____
Remove actuators and close door	_____	_____	_____	_____	_____

**A18 B2 Hutch Front Door Switches**

Place actuators on the door switches and Maglock.

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).

Open beam stop in B1.	<u>A1</u>	<u>A2</u>	<u>B1</u>	<u>B2</u>	<u>Reed</u>
<i>Search hutch</i>	_____	_____	_____	_____	_____
<i>Open FE and LIS1 Shutters from keypad</i>	_____	_____	_____	_____	_____
FE Shutters A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
LIS1 Shutter A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
B2 Interlocked A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
LIS1 Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
B2 Door Switch Sum A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____	_____
<i>Remove one switch actuator</i>	_____	_____	_____	_____	_____

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

L1S1 Shutter A and B closed ( <b>red</b> )	_____	_____	_____	_____	_____
B2 Interlocked OFF	_____	_____	_____	_____	_____
L1S1 Shutter Permit OFF	_____	_____	_____	_____	_____
B2 Door Switch Sum Permit OFF	_____	_____	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____	_____	_____
<i>Replace switch actuator and reset fault</i>	_____	_____	_____	_____	_____
Remove actuators and close door					_____

**A19 B2 Hutch Right Rear Door Switches**

Place actuators on the door switches and Maglock.

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).

Open beam stop in B1.	<u><b>A1</b></u>	<u><b>A2</b></u>	<u><b>B1</b></u>	<u><b>B2</b></u>	<u><b>Reed</b></u>
<i>Search hutch</i>	_____	_____	_____	_____	_____
<i>Open FE and L1S1 Shutters from keypad</i>	_____	_____	_____	_____	_____
FE Shutters A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
L1S1 Shutter A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
B2 Interlocked A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
L1S1 Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
B2 Door Switch Sum A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____	_____
<i>Remove one switch actuator</i>	_____	_____	_____	_____	_____
L1S1 Shutter A and B closed ( <b>red</b> )	_____	_____	_____	_____	_____
B2 Interlocked OFF	_____	_____	_____	_____	_____
L1S1 Shutter Permit OFF	_____	_____	_____	_____	_____
B2 Door Switch Sum Permit OFF	_____	_____	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____	_____	_____
<i>Replace switch actuator and reset fault</i>	_____	_____	_____	_____	_____
Remove actuators and close door					_____

**A20 B2 Hutch Left Rear Door Switches**

Place actuators on the door switches and Maglock.

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

	<u>A1</u>	<u>A2</u>	<u>B1</u>	<u>B2</u>	<u>Reed</u>
Open beam stop in B1.					
<i>Search hutch</i>	_____	_____	_____	_____	_____
<i>Open FE and LIS1 Shutters from keypad</i>	_____	_____	_____	_____	_____
FE Shutters A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
LIS1 Shutter A and B open ( <b>green</b> )	_____	_____	_____	_____	_____
B2 Interlocked A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
LIS1 Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
B2 Door Switch Sum A and B ON ( <b>green</b> )	_____	_____	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____	_____	_____
<i>Remove one switch actuator</i>	_____	_____	_____	_____	_____
LIS1 Shutter A and B closed ( <b>red</b> )	_____	_____	_____	_____	_____
B2 Interlocked OFF	_____	_____	_____	_____	_____
LIS1 Shutter Permit OFF	_____	_____	_____	_____	_____
B2 Door Switch Sum Permit OFF	_____	_____	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____	_____	_____
<i>Replace switch actuator and reset fault</i>	_____	_____	_____	_____	_____
Remove actuators and close door					_____

**A21 Beam Stop**

Place actuators on the beam stop switches and latch.

Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).

	<u>A1</u>	<u>B1</u>	<u>Latch</u>
<i>Search FOE and B1 hutches</i>	_____	_____	_____
<i>Open FE and LIS1 Shutters from keypad</i>	_____	_____	_____
FE Shutters A and B open ( <b>green</b> )	_____	_____	_____
FE Critical Device Permits A and B ON	_____	_____	_____
LIS1 Shutter A and B open ( <b>green</b> )	_____	_____	_____
Beam Stop indicates open ( <b>green</b> )	_____	_____	_____
B2 Interlocked A and B ON ( <b>green</b> )	_____	_____	_____
LIS1 Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____
<i>Remove one actuator</i>	_____	_____	_____

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

Beam Stop Does Not indicate open	_____	_____	_____
L1S1 Shutter A and B closed ( <b>red</b> )	_____	_____	_____
L1S1 Shutter Permit OFF	_____	_____	_____
FE Critical Device Permits A and B OFF	_____	_____	_____

Remove actuators and close beam stop \_\_\_\_\_

**A22 Magnetic Lock Test (FOE)**

Connect the FOE test box (Attachment B Figure B4) to the PPS cabinet (Attachment B Figure B7). Use the box to turn ON the Maglocks (set switches to "Normal").

Repeat steps for each door: Upstream Right (USR), Upstream Left (USL), Downstream Right (DSR) and Downstream Left (DSL).

	<u>USR</u>	<u>USL</u>	<u>DSR</u>	<u>DSL</u>
<i>Search hutch</i>	_____	_____	_____	_____
FOE Interlocked A and B Permit ON ( <b>green</b> )	_____	_____	_____	_____
FE Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____	_____
Door Maglock A and B ON ( <b>green</b> )	_____	_____	_____	_____
<i>Open FE Shutters</i>	_____	_____	_____	_____
FE Shutters open ( <b>green</b> )	_____	_____	_____	_____
<i>Using FOE test box, turn OFF Maglock</i>	_____	_____	_____	_____
Door Maglock A OFF	_____	_____	_____	_____
FOE Shutters closed ( <b>red</b> )	_____	_____	_____	_____
FOE Interlocked A OFF	_____	_____	_____	_____
FE Shutter Permit A OFF	_____	_____	_____	_____
<i>Turn On Maglock and reset fault</i>	_____	_____	_____	_____
<i>Search hutch</i>	_____	_____	_____	_____
<i>Using FE Shutter test fixture, Open FE Shutters</i>	_____	_____	_____	_____
<i>Using FOE test box, turn OFF Maglock</i>	_____	_____	_____	_____
<i>Within 3 seconds:</i> FE Critical Devices Permits A Chain OFF	_____	_____	_____	_____

**A23 Magnetic Lock Test (B1 Hutch)**

Connect the FOE test box (Attachment B Figure B4) to the PPS cabinet (Attachment B Figure B7). Use the box to turn ON the Maglocks (set switches to "Normal").

Repeat steps for each door: Front Right (FR) and Front Left (FL)

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

	<b><u>FR</u></b>	<b><u>FL</u></b>
<i>Search hutch</i>	_____	_____
B1 Interlocked A and B ON ( <b>green</b> )	_____	_____
L1S1 Shutter Permit A and B ON ( <b>green</b> )	_____	_____
Door Maglock A and B ON ( <b>green</b> )	_____	_____
<i>Open FE and LIS1 Shutters</i>	_____	_____
Shutters open ( <b>green</b> )	_____	_____
<i>Using FOE test box, turn OFF Maglock</i>	_____	_____
Door Maglock A OFF	_____	_____
Shutters closed ( <b>red</b> )	_____	_____
B1 Interlocked A OFF	_____	_____
L1S1 Shutter Permit A OFF	_____	_____
<i>Turn On Maglock and reset fault</i>	_____	_____
<i>Search hutch</i>	_____	_____
<i>Using FE Shutter test fixture, Open FE Shutters</i>	_____	_____
<i>Using FOE test box, turn OFF Maglock</i>	_____	_____
<i>Within 3 seconds: FE Critical Devices Permits A Chain OFF</i>	_____	_____

**A24 Magnetic Lock Test (B2 hutch)**

Connect the FOE test box (Attachment B Figure B4) to the PPS cabinet (Attachment B Figure B7). Use the box to turn ON the Maglocks (set switches to "Normal").

Repeat steps for each door: Front Right (FR), Rear Right (RR), Rear Left (RL)

	<b><u>FR</u></b>	<b><u>RR</u></b>	<b><u>RL</u></b>
<i>Search hutch</i>	_____	_____	_____
B2 Interlocked A and B ON ( <b>green</b> )	_____	_____	_____
L1S1 Shutter Permit A and B ON ( <b>green</b> )	_____	_____	_____
Door Maglock A and B ON ( <b>green</b> )	_____	_____	_____
<i>Open FE and LIS1 Shutters</i>	_____	_____	_____
Shutters open ( <b>green</b> )	_____	_____	_____
<i>Using FOE test box, turn OFF Maglock</i>	_____	_____	_____
Door Maglock A OFF	_____	_____	_____
Shutters Closed ( <b>red</b> )	_____	_____	_____

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

B2 Interlocked A OFF

L1S1 Shutter Permit A OFF

*Turn On Maglock and reset fault*

*Search hutch*

*Using FE Shutter test fixture, Open FE Shutters*

*Using FOE test box, turn OFF Maglock*

*Within 3 seconds:*

FE Critical Devices Permits A Chain OFF

Disconnect FOE test box from PPS cabinet

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**A25 Water Interlock**

Water flow meters are located on top of the hutch (Figure 1).

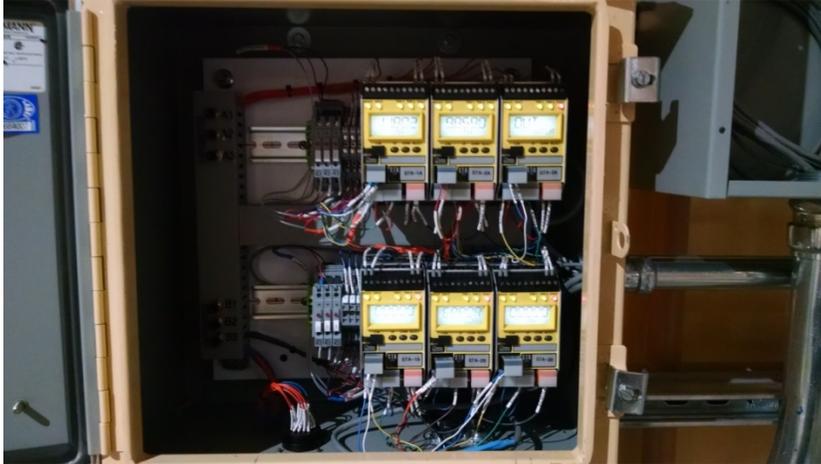


**Figure 1:** Water Meters

The PPS Water Safety Test Amplifiers (STA) are located in the cabinet to the upper right of the meters on top of the hutch (Figure 2).

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical



**Figure 2:** PPS Water STAs

Record the pretest water flows for the 3 PPS meters in GPM.

Meter Reading	Meter Reading	Current STA A	Current STA B
A1= _____	B1= _____	A STA1= _____	B STA1= _____
A2= _____	B2= _____	A STA2= _____	B STA2= _____
A3= _____	B3= _____	A STA3= _____	B STA3= _____

The current programmed trip settings for the amplifiers are in column 1. The STA readouts for each tested A and B chain STAs will be recorded in columns 3 and 4. These recordings should be within 15% of the programmed trip point (Column 2).

Trip Points	Trip Points (- 15 %)	Recorded A Trip	Recorded B Trip
PPS 1: 1.5 GPM	1.3 GPM	A STA1= _____	B STA1= _____
PPS 2: 1.5 GPM	1.3 GPM	A STA2= _____	B STA2= _____
PPS 3: 1.5 GPM	1.3 GPM	A STA3= _____	B STA3= _____

Repeat each step for all water flow meters

*Open FE Shutters*

FE Shutters A and B open (**green**)

Water Permits A and B ON (**green**), HMI

FE Shutter Permits A and B ON (**green**), HMI

*Using the valve, lower water flow to trip point*

FE Shutters A and B closed (**red**)

In 5 seconds: FE Shutter Permits A and B OFF, HMI

<u>PPS1</u>	<u>PPS2</u>	<u>PPS3</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

Water Permits A and B OFF, HMI \_\_\_\_\_

Recorded STA A and B levels above; within 15% \_\_\_\_\_

*Return water flow to pretest values* \_\_\_\_\_

Water Permits A and B remain OFF, HMI \_\_\_\_\_

*Reset fault at PPS cabinet* \_\_\_\_\_

Water Permits ON (**green**), HMI \_\_\_\_\_

FE Shutter Permits A and B ON (**green**), HMI \_\_\_\_\_

**A26 Water Safety Test Amplifier Faults**

Repeat each step for all water flow meters

**PPS1   PPS2   PPS3**

*Open FE Shutters with keypad* \_\_\_\_\_

FE Shutters A and B open (**green**) \_\_\_\_\_

Water Permits A and B ON (**green**), HMI \_\_\_\_\_

FE Shutter Permits A and B ON (**green**), HMI \_\_\_\_\_

*Press A chain fault/reset button* \_\_\_\_\_

FE Shutters A and B closed (**red**) \_\_\_\_\_

Water Permit A OFF, HMI \_\_\_\_\_

In 5 seconds: FE Shutter Permit A OFF, HMI \_\_\_\_\_

*Reset Fault* \_\_\_\_\_

*Open FE Shutters with keypad* \_\_\_\_\_

FE Shutters A and B open (**green**) \_\_\_\_\_

Water Permits A and B ON (**green**), HMI \_\_\_\_\_

FE Shutter Permits A and B ON (**green**), HMI \_\_\_\_\_

*Press B chain fault/reset button* \_\_\_\_\_

FE Shutters A and B closed (**red**) \_\_\_\_\_

Water Permit B OFF, HMI \_\_\_\_\_

In 5 seconds: FE Shutter Permit B OFF, HMI \_\_\_\_\_

*Reset fault* \_\_\_\_\_

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

**A27 Observe Beamline Photon Shutter Operation**

**L1S1**

*Close Beamline Photon Shutter*

Shutter indicates closed A and B (**red**), HMI

*Open Beamline Photon Shutter*

Shutter opens smoothly without hesitation

Shutter indicates open A and B (**green**), HMI

*Close Beamline Photon Shutter*

**A28 Observe FE Safety Shutter(s) Operation**

With Maintenance Door open, connect FE Shutter test fixture (Attachment B Figure B5).

Shutters are in the closed (down) position

FE Shutter Closed A and B (**red**), HMI

*Turn the "Air" switch ON*

*Open FE Photon Shutter and SSs A and B*

Shutters open freely without hesitation

Shutters are in the open (up) position

FE Shutter Open A and B (**green**), HMI

*Actuate Shutters closed*

FE Shutter Closed A and B (**red**), HMI

**A29 FE Safety Shutters can only be Closed if FE Photon Shutter is Closed**

*Search hutch*

FOE Interlocked A and B chain (**green**), HMI

FE Critical Devices Permits A and B ON (**green**), HMI

*Open FE SSA*

SSA Open

*Open FE Photon Shutter*

FE Critical Devices Permits A and B OFF, HMI

*Close Shutters*

FE Critical Devices Permits A and B ON (**green**), HMI

*Reset Fault*

*Open FE SSB*

SSB Open

*Open FE Photon Shutter*

FE Critical Devices Permits A and B OFF, HMI

*Close shutters*

FE Critical Devices Permits A and B ON (**green**), HMI

*Reset fault*

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

**A30 *Beamline Enable Key (Opening shutter without key trips SR RF and Dipole PS)***

<i>Remove beamline enable key</i>	FOE Enabled OFF, HMI	_____
<i>Search FOE</i>	FOE Interlocked A and B chain ( <b>green</b> ), HMI	_____
	FE Critical Devices Permits A and B ON ( <b>green</b> ), HMI	_____
<i>Using FE Shutter test fixture, Open FE Shutters</i>	FE Critical Devices Permits A and B OFF	_____
<i>Replace beamline enable key and reset faults</i>		_____

**Live Testing**

**A31 *Reach Back FOE Door Switches***

<i>Secure P1 through P5</i>	SR Secure, A and B chain, SR HMI	_____
<i>Place actuators on FOE hutch downstream left door switches and Maglock</i>		_____
<i>Search hutch</i>	FOE Interlocked A and B chain ( <b>green</b> ), HMI	_____
	FE Critical Devices Permits A and B ON ( <b>green</b> ), HMI	_____
	FE Critical Device Permit A and B ON ( <b>green</b> ), SR HMI	_____
<i>Check Control Room SR HMI (MCR beamline 1)</i>		_____
<i>Check I/O Box 8 Beamline Enable Panel</i>	FE Critical Devices Permits A and B LEDs ON	_____
<i>Check I/O Box 28 Beamline Enable Panel</i>	FE Critical Device Permit Sum A and B LEDs ON	_____
	FE Shutters Closed A and B LEDs ON	_____
<i>Check Dipole PS (positive) Beamline Interface</i>	A and B Permits ON, Dipole PS Pos. Interface	_____
<i>Check Dipole PS (negative) Beamline Interface</i>	A and B Permits ON, Dipole PS Neg. Interface	_____
<i>Check SR RF System C HVPS Beamline Interface</i>	A and B Permits ON, SR RF System C HVPS Interface	_____
<i>Check SR RF System D HVPS Beamline Interface</i>	A and B Permits ON, SR RF System D HVPS Interface	_____
<i>Operator enables SR Dipole PS</i>	SR Dipole PS is ON	_____
<i>Operator enables SR RF System C HVPS</i>	SR RF System C HVPS is ON	_____
<i>Operator enables SR RF System D HVPS</i>	SR RF System D HVPS is ON	_____
<i>Using FE Shutter test fixture, open the FE Shutters (SSA, SSB and Photon)</i>		_____
	FOE Shutters Open	_____
<i>Remove an "A chain" door switch actuator from beamline hutch door</i>		_____
	FOE Interlocked OFF A chain, HMI	_____

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

	FE Critical Devices Permits A chain OFF, HMI	_____
<i>Check I/O Box 8 Beamline Enable Panel</i>	FE Critical Devices Permit A LED OFF	_____
<i>Check I/O Box 28 Beamline Enable Panel</i>	FE Critical Device Permit Sum A LED OFF	_____
<i>Check Control Room SR HMI (MCR beamline 1)</i>	FE Critical Device Permit A ( <b>red</b> ), SR HMI	_____
<i>Check RF System C HVPS Beamline Interface</i>	A Permits OFF, SR RF System C HVPS Interface	_____
<i>Check RF System D HVPS Beamline Interface</i>	A Permits OFF, SR RF System D HVPS Interface	_____
<i>Check Dipole PS (positive) Beamline Interface</i>	A Permits OFF, Dipole PS Pos. Interface	_____
<i>Check Dipole PS (negative) Beamline Interface</i>	A Permits OFF, Dipole PS Neg. Interface	_____
	SR RF System C HVPS is OFF	_____
	SR RF System D HVPS is OFF	_____
	SR Dipole PS is OFF	_____
<i>Close Shutters</i>	Shutters closed	_____
Replace A chain door switch holder and reset fault(s)		_____
<i>Search hutch</i>		_____
	FOE Interlocked A and B chains ON ( <b>green</b> ), HMI	_____
	FE Critical Devices Permits A and B ON ( <b>green</b> ), HMI	_____
<i>Check Control Room SR HMI (MCR beamline 1)</i>	FE Critical Device Permit A and B ON ( <b>green</b> ), SR HMI	_____
<i>Check I/O Box 8 Beamline Enable Panel</i>	FE Critical Device Permit Sum A and B LEDs ON	_____
<i>Check I/O Box 28 Beamline Enable Panel</i>	FE Shutters Closed A and B LEDs ON	_____
<i>Check Dipole PS (positive) Beamline Interface</i>	A and B Permits ON, Dipole PS Pos. Interface	_____
<i>Check Dipole PS (negative) Beamline Interface</i>	A and B Permits ON, Dipole PS Neg. Interface	_____
<i>Check SR RF System C HVPS Beamline Interface</i>	A and B Permits ON, SR RF System C HVPS Interface	_____
<i>Check SR RF System D HVPS Beamline Interface</i>	A and B Permits ON, SR RF System D HVPS Interface	_____
<i>Operator enables SR Dipole PS</i>	SR Dipole PS is ON	_____
<i>Operator enables SR RF System C HVPS</i>	SR RF System C HVPS is ON	_____
<i>Operator enables SR RF System D HVPS</i>	SR RF System D HVPS is ON	_____
<i>Using FE Shutter test fixture, open the FE Shutters (SSA, SSB and Photon)</i>		_____
	FOE Shutters Open	_____

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

Remove “ <b>B chain</b> ” switch actuator	FOE Interlocked B chain OFF, HMI	_____
	FE Critical Devices Permits B OFF, HMI	_____
<i>Check I/O Box 8 Beamline Enable Panel</i>	FE Critical Devices Permit B LED OFF	_____
<i>Check Control Room SR HMI (MCR beamline 1)</i>	FE Critical Device Permits B OFF ( <b>red</b> ), SR HMI	_____
<i>Check I/O Box 28 Beamline Enable Panel</i>	FE Critical Device Permit Sum B LED OFF	_____
<i>Check SR RF System C HVPS Beamline Interface</i>	B Permits OFF, SR RF System C HVPS Interface	_____
<i>Check SR RF System D HVPS Beamline Interface</i>	B Permits OFF, SR RF System D HVPS Interface	_____
<i>Check Dipole PS (positive) Beamline Interface</i>	B Permits OFF, Dipole PS Pos. Interface	_____
<i>Check Dipole PS (negative) Beamline Interface</i>	B Permits OFF, Dipole PS Neg. Interface	_____
	SR Dipole is OFF	_____
	SR RF System C HVPS is OFF	_____
	SR RF System D HVPS is OFF	_____
<i>Close FE Shutters with test fixture</i>		_____
<i>Remove beamline hutch switch holders and Maglock actuator</i>		_____
<b>A32 Water Interlock (Live)</b>		
<i>Search FOE</i>	FOE Interlocked A and B chains ON ( <b>green</b> ), HMI	_____
	FE Shutter Permits ON A and B permits ( <b>green</b> ), HMI	_____
	FE Critical Devices Permits A and B ON ( <b>green</b> ), HMI	_____
<i>Check I/O Box 8 Beamline Enable Panel</i>	FE Critical Devices Permits A and B LEDs ON	_____
<i>Check I/O Box 28 Beamline Enable Panel</i>	FE Critical Device Permit Sum A and B LEDs ON	_____
<i>Check Control Room SR HMI (MCR beamline 1)</i>	FE Critical Device Permit A and B ON ( <b>green</b> ), SR HMI	_____
<i>Check Dipole PS (positive) Beamline Interface</i>	A and B Permits ON, Dipole PS Pos. Interface	_____
<i>Check Dipole PS (negative) Beamline Interface</i>	A and B Permits ON, Dipole PS Neg. Interface	_____
<i>Check RF System C HVPS Beamline Interface</i>	A and B Permits ON, RF System C HVPS Interface	_____
<i>Check RF System D HVPS Beamline Interface</i>	A and B Permits ON, RF System D HVPS Interface	_____
<i>Operator enables SR Dipole PS</i>	SR Dipole PS is ON	_____
<i>Operator enables SR RF System C HVPS</i>	SR RF System C HVPS is ON	_____
<i>Operator enables SR RF System D HVPS</i>	SR RF System D HVPS is ON	_____

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: <b>Beamline 8-ID Radiological Interlock Test</b>			<b>Technical</b>

*Using FE Shutter test fixture, turn on air and open Photon then SSs*

FE Shutters indicate open (**green**), HMI \_\_\_\_\_

*Using water trip points in Step A25, lower flow to one meter*

Water Permits A and B OFF, HMI \_\_\_\_\_

FE Shutter Permits OFF A and B Permits, HMI \_\_\_\_\_

Within 3 seconds

FE Critical Devices Permits A and B OFF, HMI \_\_\_\_\_

*Check I/O Box 8 Beamline Enable Panel*

FE Critical Devices Permit A and B OFF \_\_\_\_\_

*Check I/O Box 28 Beamline Enable Panel*

FE Critical Device Permit Sum A and B LED OFF \_\_\_\_\_

*Check Control Room SR HMI (MCR beamline 1)*

FE Critical Device Permit A and B OFF, SR HMI \_\_\_\_\_

*Check RF System C HVPS Beamline Interface*

A and B Permits OFF, RF System C HVPS Interface \_\_\_\_\_

*Check RF System D HVPS Beamline Interface*

A and B Permits OFF, RF System D HVPS Interface \_\_\_\_\_

*Check Dipole PS (positive) Beamline Interface*

A and B Permits OFF, Dipole PS Pos. Interface \_\_\_\_\_

*Check Dipole PS (negative) Beamline Interface*

A and B Permits OFF, Dipole PS Neg. Interface \_\_\_\_\_

SR RF System C HVPS is OFF \_\_\_\_\_

SR RF System D HVPS is OFF \_\_\_\_\_

SR Dipole PS is OFF \_\_\_\_\_

*Close Shutters*

Shutters closed \_\_\_\_\_

*Return water flow to recorded level*

*Reset fault(s)*

**A33 Observe All Shutters Closed Sum**

*Check I/O Box 28 Beamline Enable Panel*

FE Shutters closed A chain light ON \_\_\_\_\_

FE Shutters closed B chain light ON \_\_\_\_\_

*Using FE Shutter test fixture open both FE SSs and then Photon Shutter*

FE Shutters open (**green**), HMI \_\_\_\_\_

*Check I/O Box 28 Beamline Enable Panel*

FE Shutters closed A chain light OFF \_\_\_\_\_

FE Shutters closed B chain light OFF \_\_\_\_\_

*Close Shutters and remove test device*

\_\_\_\_\_

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical

A34 **FOE Area Radiation Monitor**

**Refer to PS-C-ASD-PRC-008, NSLS-II Area Radiation Monitor PPS Test and complete Attachment D, NSLS-II Beamline (FOE) Area Radiation Monitor Checklist.**

FRM 8-ID Test Checklist Completed \_\_\_\_\_

A35 **Test Completion**

Inspect all hutch doors and labyrinths to ensure all PPS switch and Maglock actuators have been removed \_\_\_\_\_

Return Beamline enable key and Beamline PPS reset key to the Control Room \_\_\_\_\_

Remove muffler from beam imminent sounder \_\_\_\_\_

Ensure PPS cabinets are secure and locked; challenge locks \_\_\_\_\_

Remove all LOTO \_\_\_\_\_

Inform Lead Operator that testing is complete \_\_\_\_\_

**- END ATTACHMENT A -**

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical

## Attachment B - NSLS-II 8-ID Beamline PPS Equipment Photos



**Figure B1:** NSLS-II Beamline Enable Panel (Mounted on Mezzanine I/O Box)



**Figure B2:** FE Safety Shutters B and A

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical



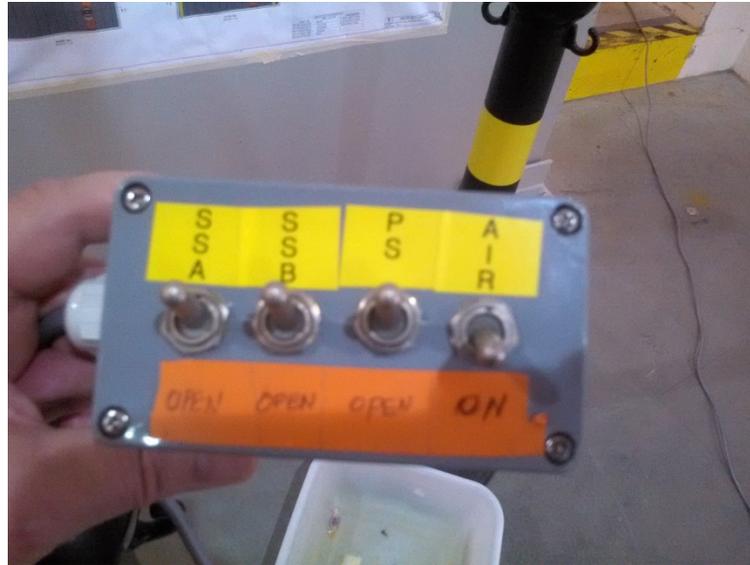
**Figure B3: FE Photon Shutter**



**Figure B4: FOE Test Box**

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical



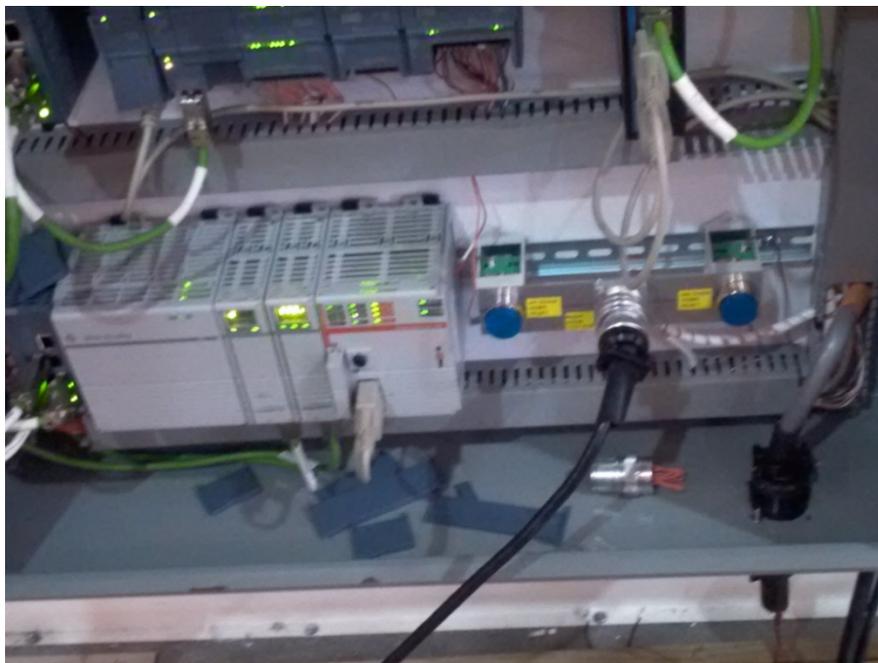
**Figure B5:** FE Shutter Test Fixture



**Figure B6:** FE Shutter Junction Boxes (inside SR)

The only official copy of this document is the one online in the SharePoint Document Center. Before using a printed copy, verify that it is current by checking the printed document's version history log (p. ii) with that of the online version.

National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-043	Author: T. McDonald	Effective Date: 11Mar2016 Review Frequency: 3 yrs	Version 2
Title: Beamline 8-ID Radiological Interlock Test			Technical



**Figure B7:** FOE Test Box Connection inside PPS Cabinet

**-END-**