

National Synchrotron Light Source II/Brookhaven National Laboratory			
Subject:	NSLS-II Beamline 7-BM Radiological Interlock Test Checklist		
Number:	NSLSII-7BM-CHK-001	Revision:	1
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NSLS-II Beamline 7-BM Radiological Interlock Test Checklist

Test Reason: <i>Initial Test</i>	Test Result: <input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed
Test Date: <i>6/19/2017</i>	Test Type: <input type="checkbox"/> Pre-Certification <input checked="" type="checkbox"/> Certification <input type="checkbox"/> Partial
Tester 1: <i>Thomas McDonald; Brian Heneveld</i>	Start Time: _____ Finish Time: _____
Tester 2: <i>Robert Chmiel; Gabrielle Stue</i>	Assistant 1: <i>Accelerator Division Operations</i>
Tester 1 Signature: <i>Thomas P McDonald</i>	Assistant 2: _____
*Reviewer 1:	Tester 2 Signature: <i>[Signature]</i>
Reviewer 2:	Reviewer 1 Signature: _____
** Safety Signature 7-BM (Beamline HMI) A Chain: <i>CB76 139A</i> B Chain: <i>EDD6 7C3F</i>	Reviewer 2 Signature: _____
** Safety Signature Pentant 3: Beamline (SR HMI) A Chain: <i>E39A 2A12</i> B Chain: <i>D9B1 829E</i>	Previous 7-BM SS# _____ Date: / / A Chain: _____ B Chain: _____
	Previous Pentant 3 SS# _____ Date: / / A Chain: _____ B Chain: _____

* 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 NSLS-II 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 Enable Switch ✓
- Linac modulator line cords (3) OR Booster Dipole F PS 480 V ✓
- 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

- 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, *Beamline Enclosure Search and Secure and Breaking Security Procedure* ✓

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Left Maglock A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Press ES</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Shutters A and B closed (red)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FOE Interlocked A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Shutter Permits A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Critical Device Permits A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Right Maglock A OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Left Maglock A OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Pull out ES</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ES Sum Latch OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Reset fault</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ES Sum Latch ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

A7 **Emergency Stops (ES) B Hutch**

For each ES search hutch, Beam Stop is closed.

Open FE Shutters and LIS1 Shutter from keypad

	ES1	ES2
All Shutters A and B open (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B Interlocked A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LIS1 Shutter Permit A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Critical Device Permits A and B ON	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Front Maglock A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Press ES</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LIS1 Shutter A and B closed (red)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B Interlocked A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LIS1 Shutter Permit A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Critical Device Permits A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Front Maglock A OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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<i>Pull out ES</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ES Sum Latch OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Reset fault</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ES Sum Latch ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

A8 Emergency Stops (ES) C Hutch

For each ES search hutch, Beam Stop is open.	<u>ES1</u>	<u>ES2</u>
<i>Open FE Shutters and LIS1 Shutter from keypad</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
All Shutters A and B open (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C Interlocked A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LIS1 Shutter Permit A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Critical Device Permits A and B ON	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Front Maglock A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Press ES</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LIS1 Shutter A and B closed (red)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C Interlocked A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LIS1 Shutter Permit A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Critical Device Permits A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Front Maglock A OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Pull out ES</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ES Sum Latch OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Reset fault</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ES Sum Latch ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

A9 B Hutch 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).

Beam Stop is closed.	<u>A</u>	<u>B</u>	<u>Latch</u>
<i>Search hutch</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Open FE Shutters and LIS1 Shutter from keypad</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
All Shutters A and B open (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B Interlocked A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LIS1 Shutter Permit A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Cable Lab 1 Switches/Latch A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FE Critical Device Permits A and B ON	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>Remove one switch actuator</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
L1S1 Shutter A and B closed (red)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
B Interlocked OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
L1S1 Shutter Permit OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Cable Lab 1 Switch/Latch Permit OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FE Critical Device Permits A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>Replace switch actuator and reset fault</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Remove labyrinth actuators and close labyrinth door				<input checked="" type="checkbox"/>

A10 **FOE 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>A</u>	<u>B</u>	<u>Reed</u>	
<i>Search hutch</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>Open FE Shutters from keypad</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FE Shutters A and B open (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FOE Interlocked A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FE Shutter Permits A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FOE Door Switch Sum A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FE Critical Device Permits A and B ON	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>Remove one switch actuator</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FE Shutters A and B closed (red)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FOE Interlocked OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FE Shutter Permit OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FOE Door Switch Sum OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FE Critical Device Permits A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>Replace switch actuator and reset fault</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Remove actuators and close door				<input checked="" type="checkbox"/>

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A11 FOE 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 A).

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

A12 B 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 A).

	<u>A</u>	<u>B</u>	<u>Reed</u>
Beam Stop closed.			
<i>Search hutch</i>	✓	✓	✓
<i>Open FE Shutters and L1S1 Shutter from keypad</i>	✓	✓	✓
All Shutters A and B open (green)	✓	✓	✓
B Interlocked A and B ON (green)	✓	✓	✓
L1S1 Shutter Permit A and B ON (green)	✓	✓	✓
B Door Switch Sum A and B ON (green)	✓	✓	✓
FE Critical Device Permits A and B ON	✓	✓	✓

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Remove one switch actuator

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

B Interlocked OFF

L1S1 Shutter Permit OFF

B Door Switch Sum OFF

FE Critical Device Permits A and B OFF

Replace switch actuator and reset fault

Remove actuators and close door

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

A13 Beam Stop Switches

Place actuators on the Beam Stop switches and latch.

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

	A	B	Latch
<i>Search hutch</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Open FE Shutters and L1S1 Shutter from keypad</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
All Shutters A and B open (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Beam Stop indicates closed (red)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
L1S1 Shutter Permit A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Critical Device Permits A and B ON	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Remove one switch actuator</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
L1S1 Shutter A and B closed (red)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Beam Stop does NOT indicate closed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
L1S1 Shutter Permit OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Critical Device Permits A and B OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Replace switch actuator and reset fault</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Remove actuators

A14 C 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 A).

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FE Shutter Permit A OFF	<u>✓</u>	<u>✓</u>	
<i>Turn On Maglock and reset fault</i>	<u>✓</u>	<u>✓</u>	
<i>Search hutch</i>	<u>✓</u>	<u>✓</u>	
<i>Using FE Shutter test fixture, Open FE Shutters</i>	<u>✓</u>	<u>✓</u>	
FE Critical Device Permits A and B ON	<u>✓</u>	<u>✓</u>	
<i>Using FOE test box, turn OFF Maglock</i>	<u>✓</u>	<u>✓</u>	
<i>Within 3 seconds:</i>			
FE Critical Device Permit A chain OFF	<u>✓</u>	<u>✓</u>	
<i>Close FE Shutters and reset fault</i>	<u>✓</u>	<u>✓</u>	
Disconnect FOE test box			<u>✓</u>

A16 Magnetic Lock Test (B Hutch)

Connect the FOE test box to the PPS cabinet. Use the box to turn ON the Maglocks (set switches to "Normal"). ✓

Beam Stop is closed.

	FR
<i>Search hutch</i>	<u>✓</u>
B Interlocked A and B ON (green)	<u>✓</u>
L1S1 Shutter Permit A and B ON (green)	<u>✓</u>
Door Maglock A and B ON (green)	<u>✓</u>
<i>Open FE Shutters and L1S1 Shutter</i>	<u>✓</u>
All Shutters open (green)	<u>✓</u>
<i>Using FOE test box, turn OFF Maglock</i>	<u>✓</u>
Door Maglock A OFF	<u>✓</u>
L1S1 Shutter closed (red)	<u>✓</u>
B Interlocked A OFF	<u>✓</u>
L1S1 Shutter Permit A OFF	<u>✓</u>
<i>Turn On Maglock and reset fault</i>	<u>✓</u>
<i>Search hutch</i>	<u>✓</u>
<i>Using FE Shutter test fixture, Open FE Shutters and L1S1 Shutter</i>	<u>✓</u>
FE Critical Device Permits A and B ON	<u>✓</u>
<i>Using FOE test box, turn OFF Maglock</i>	<u>✓</u>

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Within 3 seconds:

FE Critical Device Permit A chain OFF

✓

Close FE Shutters and reset fault

✓

Disconnect FOE test box

✓

A17 Magnetic Lock Test (C Hutch)

Connect the FOE test box to the PPS cabinet. Use the box to turn ON the Maglocks (set switches to "Normal").

✓

Beam Stop is open.

FR

Search hutch

✓

C Interlocked A and B ON (green)

✓

L1S1 Shutter Permit A and B ON (green)

✓

Door Maglock A and B ON (green)

✓

Open FE Shutters and L1S1 Shutter

✓

All Shutters open (green)

✓

Using FOE test box, turn OFF Maglock

✓

Door Maglock A OFF

✓

L1S1 Shutter closed (red)

✓

C Interlocked A OFF

✓

L1S1 Shutter Permit A OFF

✓

Turn On Maglock and reset fault

✓

Search hutch

✓

Using FE Shutter test fixture, Open FE Shutters and L1S1 Shutter

✓

FE Critical Device Permits A and B ON

✓

Using FOE test box, turn OFF Maglock

✓

Within 3 seconds:

✓

FE Critical Device Permit A chain OFF

✓

Close FE Shutters and reset fault

✓

Disconnect FOE test box

✓

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A18 Observe Beamline Photon Shutter Operation

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

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

✓
✓
✓
✓
✓
✓

A19 Observe FE Safety Shutter(s) Operation

With Maintenance Door open, connect FE Shutter test fixture.

Shutters are in the closed (down) position

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

Turn the "Air" switch ON

Open FE SSs A and B and Photon Shutter

Shutters open freely without hesitation

Shutters are in the open (up) position

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

Actuate Shutters closed

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

✓
✓
✓
✓
✓
✓
✓

A20 FE Safety: Shutters can only be Closed if FE Photon Shutter is Closed

Search hutch

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

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

Open FE SSA

SSA open

Open FE Photon Shutter

FE Critical Device Permits A and B OFF, HMI

Close Shutters

Reset fault

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

Open FE SSB

SSB open

Open FE Photon Shutter

FE Critical Device Permits A and B OFF, HMI

Close Shutters

Reset fault

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

✓
✓
✓
✓
✓
✓
✓
✓
✓
✓

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A21 Beamline Enable Key (Opening Shutter Without Key Trips SR RF and Dipole PS)

Remove beamline enable key	Beamline Online A and B OFF	✓
Search FOE	FOE Interlocked A and B ON (green), HMI	✓
	FE Critical Device Permits A and B ON (green), HMI	✓
Using FE Shutter test fixture, Open FE Shutters	FE Critical Device Permits A and B OFF	✓
Using FE Shutter test fixture, Close FE Shutters		✓
Replace beamline enable key and reset faults	Beamline Online A and B ON (green)	✓

Live Testing

A22 Reach Back FOE Door Switches

Secure P1 through P5	SR Secure, A and B chain, SR HMI	✓
Place actuators on FOE hutch door switches and Maglock		✓
Search hutch	FOE Interlocked A and B ON (green), HMI	✓
	FE Critical Device Permits A and B ON (green), HMI	✓
Check Control Room SR HMI (Beamline Page)	FE Critical Device Permit A and B ON (green), SR HMI	✓
Check I/O Box 7BM Beamline Enable Panel	FE Critical Device Permits A and B LEDs ON	✓
Check I/O Box 28 Beamline Enable Panel	FE Critical Device Permit Sum A and B LEDs ON	✓
Check Dipole PS (positive) Beamline Interface	A and B Permits ON, Dipole PS Pos. Interface	✓
Check Dipole PS (negative) Beamline Interface	A and B Permits ON, Dipole PS Neg. Interface	✓
Check SR RF System C HVPS Beamline Interface	A and B Permits ON, SR RF System C HVPS Interface	✓
Check SR RF System D HVPS Beamline Interface	A and B Permits ON, SR RF System D HVPS Interface	✓
Operator enables SR Dipole PS	SR Dipole PS is ON	✓
Operator enables SR RF System C HVPS	SR RF System C HVPS is ON	✓
Operator enables SR RF System D HVPS	SR RF System D HVPS is ON	✓
Using FE Shutter test fixture, open the FE Shutters (SSA, SSB and Photon)		✓
	FE Shutters open	✓
Remove an "A chain" door switch actuator from beamline hutch door		✓
	FOE Interlocked A OFF, HMI	✓
	FE Critical Device Permit A OFF, HMI	✓
Check I/O Box 7BM Beamline Enable Panel	FE Critical Device Permit A LED OFF	✓
Check I/O Box 28 Beamline Enable Panel	FE Critical Device Permit Sum A LED OFF	✓
Check Control Room SR HMI (Beamline Page)	FE Critical Device Permit A OFF (red), SR HMI	✓

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<i>Check SR RF System C HVPS Beamline Interface</i>	A Permit OFF, SR RF System C HVPS Interface	✓
<i>Check SR RF System D HVPS Beamline Interface</i>	A Permit OFF, SR RF System D HVPS Interface	✓
<i>Check Dipole PS (positive) Beamline Interface</i>	A Permit OFF, Dipole PS Pos. Interface	✓
<i>Check Dipole PS (negative) Beamline Interface</i>	A Permit 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 FE Shutters with FE Shutter test fixture</i>	FE Shutters closed	✓
<i>Replace "A chain" door switch actuator and reset fault(s)</i>		✓
<i>Search hutch</i>		✓
	FOE Interlocked A and B ON (green), HMI	✓
	FE Critical Device Permits A and B ON (green), HMI	✓
<i>Check Control Room SR HMI (Beamline Page)</i>	FE Critical Device Permit A and B ON (green), SR HMI	✓
<i>Check I/O Box 7BM Beamline Enable Panel</i>	FE Critical Device 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 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>		✓
	FE Shutters open	✓
<i>Remove "B chain" switch actuator</i>	FOE Interlocked B OFF, HMI	✓
	FE Critical Device Permit B OFF, HMI	✓
<i>Check I/O Box 7BM Beamline Enable Panel</i>	FE Critical Device Permit B LED OFF	✓
<i>Check Control Room SR HMI (Beamline Page)</i>	FE Critical Device Permit B OFF (red), 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 Permit OFF, SR RF System C HVPS Interface	✓
<i>Check SR RF System D HVPS Beamline Interface</i>	B Permit OFF, SR RF System D HVPS Interface	✓
<i>Check Dipole PS (positive) Beamline Interface</i>	B Permit OFF, Dipole PS Pos. Interface	✓

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- Check Dipole PS (negative) Beamline Interface B Permit OFF, Dipole PS Neg. Interface ✓
- SR Dipole PS is OFF ✓
- SR RF System C HVPS is OFF ✓
- SR RF System D HVPS is OFF ✓
- Close FE Shutters with FE Shutter test fixture FE Shutters closed ✓
- Remove beamline hutch switch actuators and Maglock actuator ✓

A23 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 FE Shutters and remove FE shutter test fixture ✓

A24 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 7-BM Test Checklist Completed

NA
No AAM HAS BEEN INSTALLED AT

A25 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 ✓

THIS TIME TAM
6/19/17

- END -

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Revision History

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