NSLS-II Beamline 12-ID Radiological Interlock Test Checklist

Test Reason:	Test Result: ☐ Passed		☐ Failed
	Test Type: ☐Pre-Certification	☐Certification	☐ 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 Signature:		
Reviewer 2:	Reviewer 2 Signature:		
** Safety Signature 12-ID (Beamline HMI) A Chain: B Chain:	Previous 12-ID SS# Date: / / A Chain: B Chain:		
** Safety Signature Pentant 4 Beamline (SR HMI) A Chain: B Chain:	Previous Pentant 4 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***

Repeat steps for each 12-ID Hutch

	A	**B**	**C**
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*	____	____	____
Close all hutch secondary doors	____	____	____
"Entry Permitted" signs ON (2 signs on A and C)	____	____	____
Using the keypad, lock the closed doors	____	____	____
Press SB1	____	____	____
SB1 illuminates	____	____	____
Search sounder sounds	____	____	____
Search yellow beacon flashing	____	____	____
Press SB2	____	____	____
SB2 illuminates	____	____	____
In the C hutch Press SB3			____
SB3 Illuminate			____
Exit hutch and close main door	____	____	____
*Press SBE and **begin timing***	____	____	____
Beam imminent alarm sounds for 30 seconds	____	____	____
After warning, (FOE, B, C,) Interlocked A and B ON (**green**), HMI	____	____	____
"Interlocked" signs ON (2 signs on A and C)	____	____	____
Maglock A and B ON (**green**), all doors, HMI	____	____	____
Press the SBE/Access Button	____	____	____
"Interlocked" signs OFF, "Entry Permitted" signs are ON	____	____	____
FOE, B, C Interlocked A and B OFF, HMI	____	____	____
Maglock A OFF (may require opening Maglock on key pad)	____	____	____
Open door	____	____	____
Door opens, Maglock B OFF	____	____	____

A3 ***Out of Sequence Search***

Repeat steps for each 12-ID hutch	**A**	**B**	**C**
Press SB2	____	____	____
SB2 does not illuminate	____	____	____
Press SB1	____	____	____
SB1 illuminates	____	____	____
In the C hutch Press SB3			____
SB3 does not illuminate			____
Close hutch door and press SBE	____	____	____
Hutch does NOT secure	____	____	____

A4 ***Search Timeout***

Repeat steps for each 12-ID hutch	**A**	**B**	**C**
Press first search button and ***begin timing***	____	____	____
Complete search ***without pressing Final Search button***	____	____	____
Search sounders off in 2 minutes	____	____	____
Press Final Search button	____	____	____
Search does not complete	____	____	____

A5 ***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 (**green**)	____
Search the FOE	FE Shutter Permits A and B ON ***after*** Beam Imminent Warning	____
Open FE Shutters	FE Shutters A and B indicate open (**green**)	____
	2 "Beam On" signs are ON	____
Close FE Shutters	FE Shutters A and B indicate closed (**red**)	____

A6 ***Emergency Stops (ES) FOE (A Hutch)***

For each ES search FOE hutch	**ES1**	**ES2**	**ES3**
Open FE Shutters from keypad	____	____	____
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**)	____	____	____
Press ES	____	____	____
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	____	____	____
Pull out ES	____	____	____
ES Sum Latch OFF	____	____	____
Reset fault	____	____	____
ES Sum Latch ON (**green**)	____	____	____

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

Mode 1: Beam into ESEE B only- Moveable Backstop and covers in place

For each ES search hutch	**ES1**	**ES2**	**ES3**
Open FE and L2S2 Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____
B Interlocked A and B ON (**green**)	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____

Front Maglock A and B ON (**green**)	____	____	____
Press ES	____	____	____
FE Shutters A and B closed (**red**)	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
B Interlocked A and B OFF	____	____	____
L2S2 Shutter Permit A and B OFF	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Front Maglock A OFF	____	____	____
Pull out ES	____	____	____
ES Sum Latch OFF	____	____	____
Reset fault	____	____	____
ES Sum Latch ON (**green**)	____	____	____

A8 ***Emergency Stops (ES) C Hutch***

Mode 2: Beam into ESEE C only- Moveable Beam Pipe and covers in place

For each ES search hutch.	**ES1**	**ES2**	**ES3**	**ES4**	**ES5**
Open FE and L2S2 Shutters from keypad	____	____	____	____	____
FE Shutters A and B open (**green**)	____	____	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____	____	____
C Interlocked A and B ON (**green**)	____	____	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____	____	____
FE Critical Device Permits A and B ON	____	____	____	____	____
Right Maglock A and B ON (**green**)	____	____	____	____	____
Left Maglock A and B ON (**green**)	____	____	____	____	____
Press ES	____	____	____	____	____
FE Shutters A and B closed (**red**)	____	____	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____	____	____
C Interlocked A and B OFF	____	____	____	____	____
L2S2 Shutter Permit A and B OFF	____	____	____	____	____
FE Critical Device Permits A and B OFF	____	____	____	____	____
Right Maglock A OFF	____	____	____	____	____
Left Maglock A OFF	____	____	____	____	____

Pull out ES	____	____	____	____	____
ES Sum Latch OFF	____	____	____	____	____
Reset fault	____	____	____	____	____
ES Sum Latch ON (**green**)	____	____	____	____	____

A9 ***Hutch B Labyrinth 1 Switches and Latch***

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.

Mode 1: Beam into ESEE B only- Moveable Backstop and covers in place

	A	**B**	**Latch**
Search hutch	____	____	____
Open FE and L2S2 Shutters from keypad	____	____	____
Shutters A and B open (**green**)	____	____	____
B Interlocked A and B ON (**green**)	____	____	____
L2S2 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	____	____	____
Remove one switch actuator	____	____	____
Cable Lab 1 Switch/Latch Permit OFF	____	____	____
B Interlocked OFF	____	____	____
L2S2 Shutter Permit OFF	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Replace switch actuator and reset fault	____	____	____
Remove labyrinth actuators and close labyrinth door			____

A10 ***Hutch B Labyrinth 2 Switches and Latch***

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.

Mode 1: Beam into ESEE B only- Moveable Backstop and covers in place

	A	B	Latch
Search hutch	____	____	____
Open FE and L2S2 Shutters from keypad	____	____	____
Shutters A and B open (**green**)	____	____	____
B Interlocked A and B ON (**green**)	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____
Cable Lab 2 Switches/Latch A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____
Remove one switch actuator	____	____	____
Cable Lab 2 Switch/Latch Permit OFF	____	____	____
B Interlocked OFF	____	____	
L2S2 Shutter Permit OFF	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Replace switch actuator and reset fault	____	____	____
Remove labyrinth actuators and close labyrinth door			____

A11 ***Hutch C Labyrinth 1 Switches and Latch*** ____

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.

Mode 2: Beam into ESEE C only- Moveable Beam Pipe and covers in place

	A	B	Latch
Search hutch	____	____	____
Open FE and L2S2 Shutters from keypad	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____
C Interlocked A and B ON (**green**)	____	____	____
L2S2 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	____	____	____
Remove one switch actuator	____	____	____
Cable Lab 1 Switch/Latch Permit OFF	____	____	____

C Interlocked OFF	____	____	____
L2S2 Shutter Permit OFF	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Replace switch actuator and reset fault	____	____	____
Remove labyrinth actuators and close labyrinth door			____

A12 ***Hutch C Labyrinth 2 Switches and Latch***

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.

Mode 2: Beam into ESEE C only- Moveable Beam Pipe and covers in place

	A	**B**	**Latch**
Search hutch	____	____	____
Open FE and L2S2 Shutters from keypad	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____
C Interlocked A and B ON (**green**)	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____
Cable Lab 2 Switches/Latch A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____
Remove one switch actuator	____	____	____
Cable Lab 2 Switch/Latch Permit OFF	____	____	____
C Interlocked OFF	____	____	____
L2S2 Shutter Permit OFF	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Replace switch actuator and reset fault	____	____	____
Remove labyrinth actuators and close labyrinth door			____

A13 ***Hutch C Labyrinth 3 Switches and Latch***

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.

Mode 2: Beam into ESEE C only- Moveable Beam Pipe and covers in place

	A	B	Latch
Search hutch	____	____	____
Open FE and L2S2 Shutters from keypad	____	____	____
Shutters A and B open (**green**)	____	____	____
C Interlocked A and B ON (**green**)	____	____	____
L2S2 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	____	____	____
Remove one switch actuator	____	____	____
Cable Lab 1 Switch/Latch Permit OFF	____	____	____
C Interlocked OFF	____	____	____
L2S2 Shutter Permit OFF	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Replace switch actuator and reset fault	____	____	____
Remove labyrinth actuators and close labyrinth door			____

A14 ***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).

	A	B	Reed
Search hutch	____	____	____
Open FE Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
FOE Interlocked A and B ON (**green**)	____	____	____
FE Shutter Permit A and B ON (**green**)	____	____	____
FOE Door Switch Sum A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____
Remove one switch actuator	____	____	____
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 ____ ____ ____

Replace switch actuator and reset fault ____ ____ ____

Remove actuators and close door ____

A15 ***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).

	A	**B**	**Reed**
Search hutch	____	____	____
Open FE Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
FOE Interlocked A and B ON (**green**)	____	____	____
FE Shutter Permit A and B ON (**green**)	____	____	____
FOE Door Switch Sum A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____
Remove one switch actuator	____	____	____
FE Shutters A and B closed (**red**)	____	____	____
FOE Interlocked Permit 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			____

A16 ***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).

	A	**B**	**Reed**
Search hutch	____	____	____
Open FE Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
FOE Interlocked A and B ON (**green**)	____	____	____

FE Shutter Permit A and B ON (**green**)	____	____	____
FOE Door Switch Sum A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____
Remove one switch actuator	____	____	____
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	____	____	____
Replace switch actuator and reset fault	____	____	____
Remove actuators and close door			____

A17 ***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).

	A	**B**	**Reed**
Search hutch	____	____	____
Open FE Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
FOE Interlocked A and B ON (**green**)	____	____	____
FE Shutter Permit A and B ON (**green**)	____	____	____
FOE Door Switch Sum A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____
Remove one switch actuator	____	____	____
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	____	____	____
Replace switch actuator and reset fault	____	____	____
Remove actuators and close door			____

A18 ***B 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).

Mode 1: Beam into ESSE B, Backstop in place

	A	**B**	**Reed**
Search hutch	____	____	____
Open FE and L2S2 Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____
B Interlocked A and B ON (**green**)	____	____	____
L2S2 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	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
B Interlocked OFF	____	____	____
L2S2 Shutter Permit OFF	____	____	____
Door Switch Sum Permit OFF	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Replace switch actuator and reset fault	____	____	____
Remove actuators and close door			____

A19 ***B 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).

Mode 1: Beam into ESSE B, Backstop in place

	A	**B**	**Reed**
Search hutch	____	____	____
Open FE and L2S2 Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____
B Interlocked A and B ON (**green**)	____	____	____

L2S2 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 ____ ____ ____

L2S2 Shutter A and B closed (**red**) ____ ____ ____

B Interlocked OFF ____ ____ ____

L2S2 Shutter Permit OFF ____ ____ ____

Door Switch Sum Permit OFF ____ ____ ____

FE Critical Device Permits A and B OFF ____ ____ ____

Replace switch actuator and reset fault ____ ____ ____

Search hutch leaving actuator in place ____

A20 ***B1 Enclosure Switches and Kirk Key***

Place actuators on the B1 inner enclosure door switches and place latch device on Kirk Key (KK) assembly. ____

Remove KK from door and cycle into SRU ____

Attempt to remove KK without pressing button ____

Key cannot be removed ____

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

Mode 1: Beam into ESSE B, Backstop in place

Use FOE test box to "cheat" KK SRU (SRU light is ON with LS2S open) ____

	Left Door		**Right Door**		
Open FE and L2S2 Shutters from keypad	**A**	**B**	**A**	**B**	**KK**
FE Shutters A and B open (**green**)	____	____	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____	____	____
B Interlocked A and B ON (**green**)	____	____	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____	____	____
FE Critical Device Permits A and B ON	____	____	____	____	____
Remove one switch actuator/cycle KK out	____	____	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____	____	____
B Interlocked OFF					____
L2S2 Shutter Permit OFF	____	____	____	____	____
FE Critical Device Permits A and B OFF	____	____	____	____	____
Replace switch actuator/KK and reset fault	____	____	____	____	____

Remove actauators and close B1 Doors ____

A21 ***Mode 1 Beam into B Backstop SW5***

Place actuators on usptream (SW1) and downstream (SW2) covers. ____

Place actuators on Backstop switches (SW5) and latch ____

Search B1 enclosure and B hutch ____

	A	**B**	**Latch**
Open FE and L2S2 Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____
Remove one switch actuator	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
L2S2 Shutter Permit OFF	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Replace switch actuator and reset fault	____	____	____

A22 ***Mode 1 Beam into B Upstream Cover SW1***

	A	**B**	**Latch**
Open FE and L2S2 Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____
Remove one switch actuator	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
L2S2 Shutter Permit OFF	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Replace switch actuator and reset fault	____	____	____

A23 ***Mode 1 Beam into B Downstream Cover SW2***

	A	**B**	**Latch**
Open FE and L2S2 Shutters from keypad			
FE Shutters A and B open (**green**)	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____
Remove one switch actuator	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
L2S2 Shutter Permit OFF	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Replace switch actuator	____	____	____
Remove actuators from Backstop			____

A24 ***Mode 2 Beam into C Upstream Beam Pipe SW3***

Search C hutch. ____

Place actuators on Beam Pipe switches/latch (SW3 and SW4). ____

	A	**B**	**Latch**
Open FE and L2S2 Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____
FE Critical Device Permits A and B ON	____	____	____
Remove one switch actuator	____	____	____
L2S2 Shutter A and B closed (**red**)	____	____	____
L2S2 Shutter Permit OFF	____	____	____
FE Critical Device Permits A and B OFF	____	____	____
Replace switch actuator and reset fault	____	____	____

A25 ***Mode 2 Beam into C Upstream Cover SW1***

	A	**B**	**Latch**
Open FE and L2S2 Shutters from keypad	____	____	____
FE Shutters A and B open (**green**)	____	____	____
L2S2 Shutter A and B open (**green**)	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____

	FE Critical Device Permits A and B ON	____	____	____
	Remove one switch actuator	____	____	____
	L2S2 Shutter A and B closed (**red**)	____	____	____
	L2S2 Shutter Permit OFF	____	____	____
	FE Critical Device Permits A and B OFF	____	____	____
	Replace switch actuator and reset fault	____	____	____
A26	***Mode 2 Beam into C Downstream Beam Pipe SW4***	**A**	**B**	**Latch**
	Open FE and L2S2 Shutters from keypad	____	____	____
	FE Shutters A and B open (**green**)	____	____	____
	L2S2 Shutter A and B open (**green**)	____	____	____
	L2S2 Shutter Permit A and B ON (**green**)	____	____	____
	FE Critical Device Permits A and B ON	____	____	____
	Remove one switch actuator	____	____	____
	L2S2 Shutter A and B closed (**red**)	____	____	____
	L2S2 Shutter Permit OFF	____	____	____
	FE Critical Device Permits A and B OFF	____	____	____
	Replace switch actuator and reset fault	____	____	____
A27	***Mode 2 Beam into C Downstream Cover SW2***	**A**	**B**	**Latch**
	Open FE and L2S2 Shutters from keypad	____	____	____
	FE Shutters A and B open (**green**)	____	____	____
	L2S2 Shutter A and B open (**green**)	____	____	____
	L2S2 Shutter Permit A and B ON (**green**)	____	____	____
	FE Critical Device Permits A and B ON	____	____	____
	Remove one switch actuator	____	____	____
	L2S2 Shutter A and B closed (**red**)	____	____	____
	L2S2 Shutter Permit OFF	____	____	____
	FE Critical Device Permits A and B OFF	____	____	____
	Replace switch actuator and reset fault	____	____	____
	Remain in Mode 2 Configuration for hutch C tests	____	____	____
A28	***C Hutch Rear Right Door Switches***			
	Place actuators on the door switches and Maglocks.			____
	Check the corresponding Permits for each switch tested (e.g., A Permit for switch A1).			

		A	**B**	**Reed**
	Search hutch	____	____	____
	Open FE and L2S2 Shutters from keypad	____	____	____
	FE Shutters A and B open (**green**)	____	____	____
	L2S2 Shutter A and B open (**green**)	____	____	____
	C Interlocked A and B ON (**green**)	____	____	____
	L2S2 Shutter Permit A and B ON (**green**)	____	____	____
	C Door Switch Sum A and B ON (**green**)	____	____	____
	FE Critical Device Permits A and B ON	____	____	____
	Remove one switch actuator	____	____	____
	L2S2 Shutter A and B closed (**red**)	____	____	____
	C Interlocked OFF	____	____	____
	L2S2 Shutter Permit OFF	____	____	____
	C Door Switch Sum Permit OFF	____	____	____
	FE Critical Device Permits A and B OFF	____	____	____
	Replace switch actuator and reset fault	____	____	____
	Remove actuators and close door			____

A29 ***C Hutch Rear Left Door Switches***

		A	**B**	**Reed**
	Search hutch	____	____	____
	Open FE and L2S2 Shutters from keypad	____	____	____
	FE Shutters A and B open (**green**)	____	____	____
	L2S2 Shutter A and B open (**green**)	____	____	____
	C Interlocked A and B ON (**green**)	____	____	____
	L2S2 Shutter Permit A and B ON (**green**)	____	____	____
	C Door Switch Sum A and B ON (**green**)	____	____	____
	FE Critical Device Permits A and B ON	____	____	____
	Remove one switch actuator	____	____	____
	L2S2 Shutter A and B closed (**red**)	____	____	____
	C Interlocked OFF	____	____	____
	L2S2 Shutter Permit OFF	____	____	____

	C Door Switch Sum Permit OFF	____	____	____
	FE Critical Device Permits A and B OFF	____	____	____
	Replace switch actuator and reset fault	____	____	____
	Remove actuators and close door			____

A30 ***C Hutch Front Right Door Switches***

		A	**B**	**Reed**
	Search hutch	____	____	____
	Open FE and L2S2 Shutters from keypad	____	____	____
	FE Shutters A and B open (**green**)	____	____	____
	L2S2 Shutter A and B open (**green**)	____	____	____
	C Interlocked A and B ON (**green**)	____	____	____
	L2S2 Shutter Permit A and B ON (**green**)	____	____	____
	C Door Switch Sum A and B ON (**green**)	____	____	____
	FE Critical Device Permits A and B ON	____	____	____
	Remove one switch actuator	____	____	____
	L2S2 Shutter A and B closed (**red**)	____	____	____
	C Interlocked OFF	____	____	____
	L2S2 Shutter Permit OFF	____	____	____
	C Door Switch Sum Permit OFF	____	____	____
	FE Critical Device Permits A and B OFF	____	____	____
	Replace switch actuator and reset fault	____	____	____
	Remove actuators and close door			____

A31 ***C Hutch Front Left Door Switches***

		A	**B**	**Reed**
	Search hutch	____	____	____
	Open FE and L2S2 Shutters from keypad	____	____	____
	FE Shutters A and B open (**green**)	____	____	____
	L2S2 Shutter A and B open (**green**)	____	____	____
	C Interlocked A and B ON (**green**)	____	____	____
	L2S2 Shutter Permit A and B ON (**green**)	____	____	____
	C Door Switch Sum A and B ON (**green**)	____	____	____

FE Critical Device Permits A and B ON	____	____	____	
Remove one switch actuator	____	____	____	
L2S2 Shutter A and B closed (**red**)	____	____	____	
C Interlocked OFF	____	____	____	
L2S2 Shutter Permit OFF	____	____	____	
C Door Switch Sum Permit OFF	____	____	____	
FE Critical Device Permits A and B OFF	____	____	____	
Replace switch actuator and reset fault	____	____	____	
Remove actuators and close door				____

A32 ***Magnetic Lock Test (FOE)***

Connect the FOE test box to the PPS cabinet. 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).

	USR	**USL**	**DSR**	**DSL**
Search hutch	____	____	____	____
FOE Interlocked A and B ON (**green**)	____	____	____	____
FE Shutter Permit A and B ON (**green**)	____	____	____	____
Door Maglock A and B ON (**green**)	____	____	____	____
Open FE Shutters	____	____	____	____
FE Shutters open (**green**)	____	____	____	____
Using FOE test box, turn OFF Maglock	____	____	____	____
Door Maglock A OFF	____	____	____	____
FOE Shutters closed (**red**)	____	____	____	____
FOE Interlocked A OFF	____	____	____	____
FE Shutter Permit A OFF	____	____	____	____
Turn On Maglock and reset fault	____	____	____	____
Search hutch	____	____	____	____
Using FE Shutter test fixture, Open FE Shutters	____	____	____	____
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				____

A33 ***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"). ___

Complete steps for Right (R) door and Left (L) door

Mode 1: Beam into ESSE B, Backstop in place

	R	**L**
Search hutch	____	____
B Interlocked A and B ON (**green**)	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____
Door Maglock A and B ON (**green**)	____	____
Open FE and L2S2 Shutters	____	____
Shutters open (**green**)	____	____
Using FOE test box, turn OFF Maglock	____	____
Door Maglock A OFF	____	____
Shutters closed (**red**)	____	____
B Interlocked A OFF	____	____
L2S2 Shutter Permit A OFF	____	____
Turn On Maglock and reset fault	____	____
Search hutch	____	____
Using FE Shutter test fixture, Open FE Shutters	____	____
Using FOE test box, Open L2S2 shutter	____	____
FE Critical Device Permits A and B ON	____	____
Using FOE test box open, turn OFF Maglock	____	____
Within 3 seconds: FE Critical Device Permit A Chain OFF	____	____
Close ALL shutters and reset fault	____	____

Disconnect FOE test box ____

A34 ***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"). ____

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

Mode 2: Beam into ESSE C, Beam Pipe in place

	FR	FL	RR	RL
Search hutch	____	____	____	____
C Interlocked A and B ON (**green**)	____	____	____	____
L2S2 Shutter Permit A and B ON (**green**)	____	____	____	____
Door Maglock A and B ON (**green**)	____	____	____	____
Open FE and L2S2 Shutters	____	____	____	____
Shutters open (**green**)	____	____	____	____
Using FOE test box, turn OFF Maglock	____	____	____	____
Door Maglock A OFF	____	____	____	____
Shutters Closed (**red**)	____	____	____	____
C Interlocked A OFF	____	____	____	____
L2S2 Shutter Permit A OFF	____	____	____	____
Turn On Maglock and reset fault	____	____	____	____
Search hutch	____	____	____	____
Using FE Shutter test fixture, Open FE Shutters	____	____	____	____
Using FOE test box, Open L2S2 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 ALL shutters and reset fault	____	____	____	____
Disconnect FOE test box from PPS cabinet				____

A35 ***Water Interlock***

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

Figure 1: Water Flow 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).

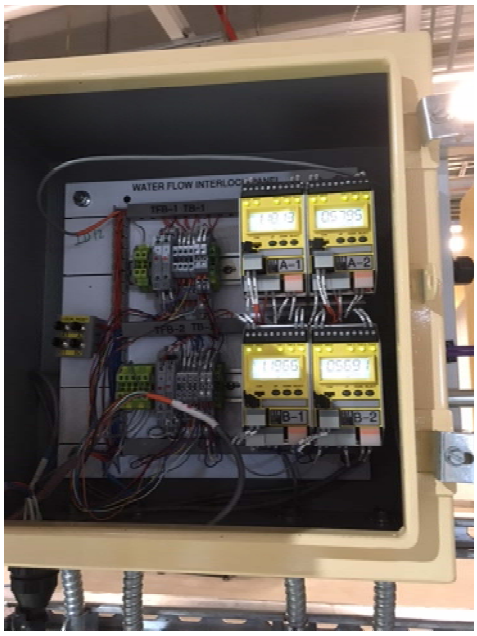

Figure 2: PPS Water STAs

Record the pretest water flows for the 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=_____

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: 1.06 GPM	0.9 GPM	A STA1=_____	B STA1=_____
PPS 2: 0.35 GPM	0.3 GPM	A STA2=_____	B STA2=_____

Repeat each step for all water flow meters	**PPS1**	**PPS2**
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	____	____
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 A and B ON (**green**), HMI	____	____
FE Shutter Permits A and B ON (**green**), HMI	____	____

A36 ***Water Safety Test Amplifier Faults***

Repeat each step for all water flow meters	**PPS1**	**PPS2**
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 ____ ____

A37 ***PPS Aperture***

The PPS Aperture Transmitter meters are located inside the FOE. The STAs are located in the PPS cabinet outside of the FOE.

Record the Transmitter meter readings (absolute pressure):

Meter Reading	Meter Reading	Current STA A	Current STA B
A1= _____	B1=_____	A STA1=_____	B STA1=_____

Qualified Beamline Staff will adjust the valve to lower the absolute pressure (trip point at 18 psia).

Open FE Shutters ____

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

Aperture Low Press. A and B ON (**green**), HMI ____

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

Using the valve, lower pressure to below trip point at 18 psia ____

Both A and B chains trip within 5% of 18 psia (>17.1) **A** ____ **B** ____

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

FE Critical Device Permits A and B OFF, HMI ____

Aperture Low Press. A and B OFF, HMI ____

Qualified Beamline Staff return pressure to pretest values ____

Aperture Low Press. A and B ON (**green**), HMI ____

Reset fault at I/O Box ____

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

A38 ***PPS Aperture (Module Fault)***

Repeat for A and B chain STAs	**A1**	**B1**
Open FE Shutters	____	____
FE Shutters A and B open (**green**)	____	____
Aperture Module Fault A and B ON (**green**), HMI	____	____
FE Critical Device Permits A and B ON (**green**), HMI	____	____
Generate a trip amplifier fault	____	____
FE Shutters A and B closed (**red**)	____	____
FE Critical Device Permits A and B OFF, HMI	____	____
Aperture Module Fault OFF (**red**), HMI	____	____
Return trip amplifier to operating condition	____	____
Aperture Module Fault A and B ON (**green**), HMI	____	____
Reset fault at I/O box	____	____
FE Critical Device Permits A and B ON (**green**), HMI	____	____

A39 ***Observe Beamline Photon Shutter Operation***

	L2S2
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	____

A40 ***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 Photon Shutter and SSs A and B	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	____
A41	***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	____
A42	***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		
A43	***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 chain (**green**), HMI	____
		FE Critical Device Permits A and B ON (**green**), HMI	____
	Check Control Room SR HMI (MCR beamline 1)	FE Critical Device Permit A and B ON (**green**) SR HMI	____
	Check I/O Box 12 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 OFF A, HMI	____
	FE Critical Device Permits A chain OFF, HMI	____
Check I/O Box 12 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 (MCR beamline 1)	FE Critical Device Permit A OFF (**red**), SR HMI	____
Check SR RF System C HVPS Beamline Interface	A Permit OFF, SR RF System C HVPS Interface	____
Check SR RF System D HVPS Beamline Interface	A Permit OFF, SR RF System D HVPS Interface	____
Check Dipole PS (positive) Beamline Interface	A Permit OFF, Dipole PS Pos. Interface	____
Check Dipole PS (negative) Beamline Interface	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	____
Close FE Shutters with FE Shutter test fixture	FE Shutters closed	____
Replace "***A chain***" door switch actuator and reset fault(s)		____
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 (MCR beamline 1)	FE Critical Device Permits A and B ON (**green**), SR HMI	____
Check I/O Box 12 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 "***B chain***" switch actuator	FOE Interlocked B OFF, HMI	____
	FE Critical Device Permit B OFF, HMI	____
Check I/O Box 12 Beamline Enable Panel	FE Critical Device Permit B LED OFF	____
Check Control Room SR HMI (MCR beamline 1)	FE Critical Device Permit B OFF (**red**), SR HMI	____
Check I/O Box 28 Beamline Enable Panel	FE Critical Device Permit Sum B LED OFF	____
Check SR RF System C HVPS Beamline Interface	B Permits OFF, SR RF System C HVPS Interface	____
Check SR RF System D HVPS Beamline Interface	B Permits OFF, SR RF System D HVPS Interface	____
Check Dipole PS (positive) Beamline Interface	B Permits OFF, Dipole PS Pos. Interface	____
Check Dipole PS (negative) Beamline Interface	B Permits 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		____

A44 ***Water Interlock (Live)***

Search FOE	FOE Interlocked A and B ON (**green**), HMI	____
	FE Shutter Permits A and B ON (**green**), HMI	____
	FE Critical Device Permits A and B ON (**green**), HMI	____
Check I/O Box 12 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 Control Room SR HMI (MCR beamline 1)	FE Critical Device Permit A and B ON (**green**), SR HMI	____
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, turn on air and open Photon then SSs		
	FE Shutters indicate open (**green**), HMI	____
Using water trip points in Step A35, lower flow to one meter		____
	Water Permits A and B OFF, HMI	____
	FE Shutter Permits A and B OFF, HMI	____
Within 5 seconds	FE Critical Device Permits A and B OFF, HMI	____
Check I/O Box 12 Beamline Enable Panel	FE Critical Device Permits 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 SR RF System C HVPS Beamline Interface	A and B Permits OFF, SR RF System C HVPS Interface	____
Check SR RF System D HVPS Beamline Interface	A and B Permits OFF, SR 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 FE Shutters with FE Shutter test fixture	FE Shutters closed	____
Return water flow to recorded level		____
Reset fault(s)		____

A45 ***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		____

A46 ***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 12-ID Test Checklist Completed ____

A47 ***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-

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Revision	Description	Date
1	First Issue.	17OCT2016