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National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-056	Author: T. McDonald	Effective Date: 29Apr2016 Review Frequency: 3 yrs	Version 1
Title: Beamline 17-BM Radiological Interlock Test			Technical

Attachment A

NSLS-II Beamline 17-BM Radiological Interlock Test Checklist

Test Reason: <i>Initial Test</i>	Test Result: <input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed
	Test Type: <input type="checkbox"/> Pre-Certification <input checked="" type="checkbox"/> Certification <input type="checkbox"/> Partial
Test Date: <i>5/1/16 - 5/25/16</i>	Start Time: _____ Finish Time: _____
Tester 1: <i>Thomas McDonald Brian Heneveld</i>	Assistant 1: <i>Accelerator Division Staff</i>
Tester 2: <i>Robert Chmiel Gabrielle Stow</i>	Assistant 2: _____
Tester 1 Signature: <i>Thomas McDonald</i>	Tester 2 Signature: <i>Robert Chmiel</i>
*Reviewer 1:	Reviewer 1 sig: _____
Reviewer 2:	Reviewer 2 sig: _____
** Safety Signature 17-BM (Beamline HMI) A Chain: <i>87B48404</i> B Chain: <i>F15C97CE</i>	Previous 17-BM SS# _____ Date: / / A Chain: _____ B Chain: _____
** Safety Signature Pentant 5 Beamline (SR HMI) A Chain: <i>447A6ED7</i> B Chain: <i>718CC902</i>	Previous Pentant 5 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 Mechanical Engineering for proper positioning	<input checked="" type="checkbox"/>
II. Inform Control Room Lead Operator that testing will be done	<input checked="" type="checkbox"/>
III. Obtain Beamline enable and PPS reset keys from Control Room	<input checked="" type="checkbox"/>
IV. Verify that beamline vacuum and water interlocks are satisfied	<input checked="" type="checkbox"/>
V. Place muffler on beam imminent sounder	<input checked="" type="checkbox"/>
VI. Request Lead Operator enable Master shutters	<input checked="" type="checkbox"/>

A1 Verify System Lockouts

Gun HVPS output cable connector

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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	A
<i>Close the Right door</i>	<u>✓</u>
"Entry Permitted" sign is ON	<u>✓</u>
<i>Using the keypad, lock the closed doors</i>	<u>✓</u>
<i>Press SB1</i>	<u>✓</u>
SB1 illuminates	<u>✓</u>
Search sounder sounds	<u>✓</u>
Search yellow beacon flashing	<u>✓</u>
<i>Press SB2</i>	<u>✓</u>
SB2 illuminates	<u>✓</u>
<i>Exit hutch and close main door</i>	<u>✓</u>
<i>Press SBE and begin timing</i>	<u>✓</u>
Beam imminent alarm sounds for 30 seconds	<u>✓</u>
After warning, (FOE Interlocked A and B ON (green), HMI	<u>✓</u>
"Interlocked" sign is ON	<u>✓</u>
Maglock A and B ON, HMI	<u>✓</u>
<i>Press the SBE/Access Button</i>	<u>✓</u>
Interlocked sign OFF, "Entry Permitted" sign is ON	<u>✓</u>
FOE Interlocked A and B OFF, HMI	<u>✓</u>
Maglock A OFF (may require opening Maglock on key pad)	<u>✓</u>
<i>Open door</i>	<u>✓</u>
Door opens, Maglock B OFF door	<u>✓</u>
A3 Out of Sequence Search in the FOE (A hutch)	
	A
<i>Press SB2</i>	<u>✓</u>
SB2 does not illuminate	<u>✓</u>
<i>Press SB1</i>	<u>✓</u>

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SB1 illuminates

Close hutch door and press SBE

Hutch does NOT secure

✓
✓
✓

A4 Search timeout

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

A
✓
✓
✓
✓
✓

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**)

“Beam On” sign is ON

Close FE shutters

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

✓
✓
✓
✓
✓
✓
✓
✓

A6 Emergency Stops (ES) FOE (A hutch)

For each ES 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**)

FE Critical Device Permits A and B ON

Right Maglock A ON (**green**)

Left Maglock A ON (**green**)

Press ES

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

FOE Interlocked A and B OFF

<u>ES1</u>	<u>ES2</u>	<u>ES3</u>
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓

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FE Shutter Permit 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 FOE 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).

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

ONLY ONE SET of A and B switches 1.M. 5/25/16

A8 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).

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	<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 (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	✓		✓		✓
<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					✓

*only 1 set of switches
T.M. 5/25/16*

A9 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 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 (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	✓		✓		✓
<i>Remove one switch actuator</i>	✓		✓		✓

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FE Shutters A and B closed (red)	<input checked="" type="checkbox"/>				
FOE Interlocked OFF	<input checked="" type="checkbox"/>				
FE Shutter Permit OFF	<input checked="" type="checkbox"/>				
FOE Door Switch Sum OFF	<input checked="" type="checkbox"/>				
FE Critical Device Permits A and B OFF	<input checked="" type="checkbox"/>				
<i>Replace switch actuator and reset fault</i>	<input checked="" type="checkbox"/>				
Remove actuators and close door	<input checked="" type="checkbox"/>				

A10 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: Right (R), Left (L)

	R	L
<i>Search hutch</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FOE Interlocked A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Shutter Permit A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Door Maglock A and B ON (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Open FE Shutters</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Shutters open (green)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Using FOE test box, turn OFF Maglock</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Door Maglock A OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Shutters closed (red)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FOE Interlocked A OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Shutter Permit A OFF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Turn On Maglock and reset fault</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Search hutch</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Using FE Shutter test fixture, Open FE Shutters</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FE Critical Device Permits A and B ON	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Using FOE test box, turn OFF Maglock</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Within 3 seconds: FE Critical Devices Permits A Chain OFF</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Disconnect the FOE test box and reset fault

A11 Observe FE Safety Shutter(s) Operation

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

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	Shutters are in the closed (down) position	<input checked="" type="checkbox"/>
	FE Shutter Closed A and B (red), HMI	<input checked="" type="checkbox"/>
<i>Turn the "Air" switch ON</i>		<input checked="" type="checkbox"/>
<i>Open FE Photon Shutter and SSs A and B</i>	Shutters open freely without hesitation	<input checked="" type="checkbox"/>
	Shutters are in the open (up) position	<input checked="" type="checkbox"/>
	FE Shutter Open A and B (green), HMI	<input checked="" type="checkbox"/>
<i>Actuate Shutters closed</i>	FE Shutter Closed A and B (red), HMI	<input checked="" type="checkbox"/>
A12	FE Safety Shutters can only be Closed if FE Photon Shutter is Closed	
<i>Search hutch</i>	FOE Interlocked A and B ON (green), HMI	<input checked="" type="checkbox"/>
	FE Critical Devices Permits A and B ON (green), HMI	<input checked="" type="checkbox"/>
<i>Open FE SSA</i>	SSA Open	<input checked="" type="checkbox"/>
<i>Open FE Photon Shutter</i>	FE Critical Devices Permits A and B OFF, HMI	<input checked="" type="checkbox"/>
<i>Close Shutters</i>		<input checked="" type="checkbox"/>
<i>Reset fault</i>	FE Critical Devices Permits A and B ON (green), HMI	<input checked="" type="checkbox"/>
<i>Open FE SSB</i>	SSB Open	<input checked="" type="checkbox"/>
<i>Open FE Photon Shutter</i>	FE Critical Devices Permits A and B OFF, HMI	<input checked="" type="checkbox"/>
<i>Close Shutters</i>		<input checked="" type="checkbox"/>
<i>Reset fault</i>	FE Critical Devices Permits A and B ON (green), HMI	<input checked="" type="checkbox"/>
A13	Beamline Enable Key (Opening shutter without key trips SR RF and Dipole PS)	
<i>Remove beamline enable key</i>	Beamline Online A and B OFF	<input checked="" type="checkbox"/>
<i>Search FOE</i>	FOE Interlocked A and B ON (green), HMI	<input checked="" type="checkbox"/>
	FE Critical Devices Permits A and B ON (green), HMI	<input checked="" type="checkbox"/>
<i>Using FE Shutter test fixture, Open FE Shutters</i>	FE Critical Devices Permits A and B OFF	<input checked="" type="checkbox"/>
<i>Replace beamline enable key and reset faults</i>	Beamline Online A and B ON (green)	<input checked="" type="checkbox"/>
	Live Testing	
A14	Reach Back FOE Door Switches	
<i>Secure P1 through P5</i>	SR Secure, A and B chain, SR HMI	<input checked="" type="checkbox"/>
<i>Place actuators on FOE hutch downstream left door switches and Maglock</i>		<input checked="" type="checkbox"/>
<i>Search hutch</i>	FOE Interlocked A and B ON (green), HMI	<input checked="" type="checkbox"/>

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	FE Critical Devices Permits A and B ON (green), HMI	<input checked="" type="checkbox"/>
<i>Check Control Room SR HMI (MCR beamline 1)</i>	FE Critical Device Permit A and B ON (green), SR HMI	<input checked="" type="checkbox"/>
<i>Check I/O Box 17 Beamline Enable Panel</i>	FE Critical Devices Permits A and B LEDs ON	<input checked="" type="checkbox"/>
<i>Check I/O Box 28 Beamline Enable Panel</i>	FE Critical Device Permit Sum A and B LEDs ON	<input checked="" type="checkbox"/>
	FE Shutters Closed A and B LEDs ON	<input checked="" type="checkbox"/>
<i>Check Dipole PS (positive) Beamline Interface</i>	A and B Permits ON, Dipole PS Pos. Interface	<input checked="" type="checkbox"/>
<i>Check Dipole PS (negative) Beamline Interface</i>	A and B Permits ON, Dipole PS Neg. Interface	<input checked="" type="checkbox"/>
<i>Check SR RF System C HVPS Beamline Interface</i>	A and B Permits ON, SR RF System C HVPS Interface	<input checked="" type="checkbox"/>
<i>Check SR RF System D HVPS Beamline Interface</i>	A and B Permits ON, SR RF System D HVPS Interface	<input checked="" type="checkbox"/>
<i>Operator enables SR Dipole PS</i>	SR Dipole PS is ON	<input checked="" type="checkbox"/>
<i>Operator enables SR RF System C HVPS</i>	SR RF System C HVPS is ON	<input checked="" type="checkbox"/>
<i>Operator enables SR RF System D HVPS</i>	SR RF System D HVPS is ON	<input checked="" type="checkbox"/>
<i>Using FE Shutter test fixture, open the FE Shutters (SSA, SSB and Photon)</i>		<input checked="" type="checkbox"/>
	FE Shutters Open	<input checked="" type="checkbox"/>
<i>Remove an "A chain" door switch actuator from beamline hutch door</i>		<input checked="" type="checkbox"/>
	FOE Interlocked OFF A, HMI	<input checked="" type="checkbox"/>
	FE Critical Devices Permits A chain OFF, HMI	<input checked="" type="checkbox"/>
<i>Check I/O Box 17 Beamline Enable Panel</i>	FE Critical Devices Permit A LED OFF	<input checked="" type="checkbox"/>
<i>Check I/O Box 28 Beamline Enable Panel</i>	FE Critical Device Permit Sum A LED OFF	<input checked="" type="checkbox"/>
<i>Check Control Room SR HMI (MCR beamline 1)</i>	FE Critical Device Permit A (red), SR HMI	<input checked="" type="checkbox"/>
<i>Check SR RF System C HVPS Beamline Interface</i>	A Permits OFF, SR RF System C HVPS Interface	<input checked="" type="checkbox"/>
<i>Check SR RF System D HVPS Beamline Interface</i>	A Permits OFF, SR RF System D HVPS Interface	<input checked="" type="checkbox"/>
<i>Check Dipole PS (positive) Beamline Interface</i>	A Permits OFF, Dipole PS Pos. Interface	<input checked="" type="checkbox"/>
<i>Check Dipole PS (negative) Beamline Interface</i>	A Permits OFF, Dipole PS Neg. Interface	<input checked="" type="checkbox"/>
	SR RF System C HVPS is OFF	<input checked="" type="checkbox"/>
	SR RF System D HVPS is OFF	<input checked="" type="checkbox"/>
	SR Dipole PS is OFF	<input checked="" type="checkbox"/>
<i>Close Shutters</i>	Shutters closed	<input checked="" type="checkbox"/>

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Replace A chain door switch holder and reset fault(s) ✓

Search hutch ✓

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

FE Critical Devices 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 17 Beamline Enable Panel

FE Critical Device Permit Sum A and B LEDs ON ✓

Check I/O Box 28 Beamline Enable Panel

FE Shutters Closed 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 Devices Permits B OFF, HMI ✓

Check I/O Box 17 Beamline Enable Panel

FE Critical Devices Permit B LED OFF ✓

Check Control Room SR HMI (MCR beamline 1)

FE Critical Device Permits 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 is OFF ✓

SR RF System C HVPS is OFF ✓

SR RF System D HVPS is OFF ✓

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	<i>Close FE Shutters with test fixture</i>		✓
	<i>Remove hutch switch holders and Maglock actuator</i>		✓
A15	Observe All Shutters Closed Sum		
	<i>Check I/O Box 28 Beamline Enable Panel</i>	FE Shutters closed A chain light ON	✓
		FE Shutters closed B chain light ON	✓
	<i>Using FE Shutter test fixture open both FE SSs and then Photon Shutter</i>		✓
		FE Shutters open (green), HMI	✓
	<i>Check I/O Box 28 Beamline Enable Panel</i>	FE Shutters closed A chain light OFF	✓
		FE Shutters closed B chain light OFF	✓
	<i>Close Shutters and remove test device</i>		✓
A16	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 -