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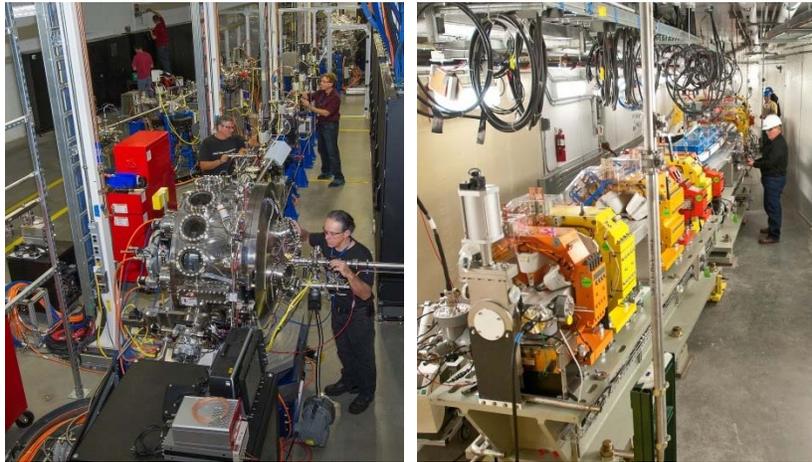
Doc No: NSLSII-ID-PRC-003

## **NSLS-II PROCEDURE: MEZZANINE-IMPLEMENTED LOTO FOR THE 3PW**

May 19, 2017

Rev. 2

H. Fernandes



 **Think** **Act**  
**Safety.** **Safely.**

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Doc No. NSLSII-ID-PRC-003	Author: H. Fernandes	Review Frequency: 3 yrs	Rev. 2
Title: Mezzanine-implemented LOTO for the 3PW			Effective Date: 19MAY2017

**ESH Review:**

5/22/2017

X 

Robert Lee  
ESH Manager  
Signed by: Lee, Robert J

By signing this Procedure I acknowledge that it complies with all ESH requirements and if performed correctly, will not present a significant hazard to personnel or equipment.

**Authorization Basis Review:**

5/22/2017

X 

Steve Moss  
Authorization Basis Manager  
Signed by: Moss, Steven H

By signing this Procedure I acknowledge that a USI Screening/Evaluation has been performed and this Procedure does not adversely impact the NSLS-II Authorization Basis Documents.

**Approved:**

5/22/2017

X Toshiya Tanabe

Toshiya Tanabe  
Insertion Devices Group Leader  
Signed by: Tanabe, Toshiya

By approving this Procedure I agree that the appropriate personnel have reviewed this document and I authorize this work to commence as written.

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### REVISION HISTORY

REVISION	SECTION(S)	PAGE #	DATE	List of Reviewers	DESCRIPTION
1	All	All	21JUN2016	See cover	First Issue
2	3	4	19MAY2017	G. Ganetis B. Lein C. Porretto J. Rank K. Rubino E. Zitvogel	Updated Table 3-1: <i>Rack Location of 3PWs on Mezzanine</i> . Reformatted procedure and changed document number from PS-C-ASD-PRC-209 in accordance with NSLSII-DPT-PDN-001, <i>NSLS-II Process Description: Management of NSLS-II Documents</i> . Validation waived by the author, H. Fernandes and the Conduct of Operations Manager, S. Moss on 5/19/17.

### ACRONYMS

3PW	Three Pole Wiggler	lb	Pound
BNL	Brookhaven National Laboratory	LOTO	Lockout/Tagout
CSS	Controls System Studio	NSLS-II	National Synchrotron Light Source II
ESH	Environment, Safety & Health	PPE	Personal Protective Equipment
FLOCO	Floor Coordinator	VAC	Volts Alternating Current
ID	Insertion Device		

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## 1 PURPOSE AND SCOPE

The purpose of this procedure is to provide instructions for LOTO of the NSLS-II 3PW from the mezzanine-resident rack, to protect against radiation when the 3PW is not in use.

The scope of this procedure includes 1) performing Centrally Controlled LOTO from the mezzanine racks on the 3PW for beam testing and/or ring commissioning, and 2) performing Centrally Controlled LOTO to safely take all 3PWs out of service before ring operations.

## 2 PREREQUISITES

- 2.1 Primary Authorized Employees performing this procedure have completed training for NSLSII-ESH-PRC-006, *Centrally Controlled Lockout/Tagout (LOTO)*.
- 2.2 Refer to Figure 2-1 when necessary for a wiring diagram depicting the connections between the Control Rack and the 3PW.

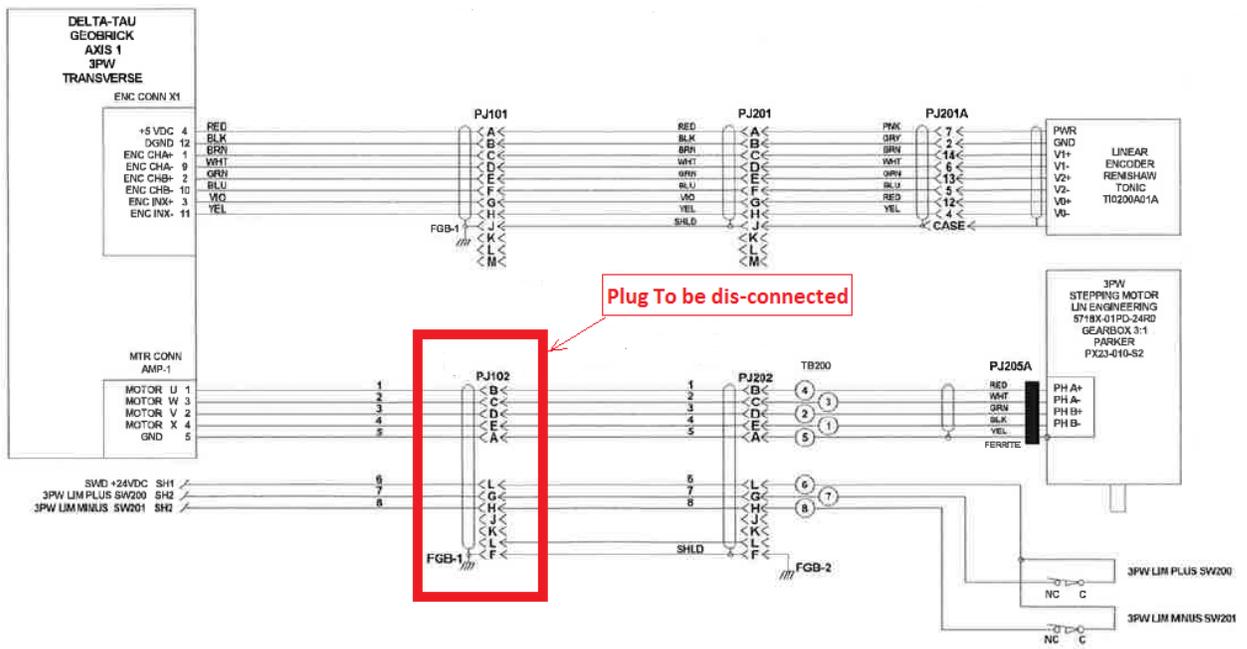


Figure 2-1: Control Rack to 3PW Cabling

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2.3 Each Primary Authorized Employee performing this procedure has facility specific PPE available.

2.4 For each 3PW to which LOTO will be applied, the following equipment/tools are required and available:

- One (1) red bodied padlock in accordance with NSLSII-ESH-PRC-006, *Centrally Controlled Lockout/Tagout (LOTO)*
- One (1) yellow Plug Lockout Boot (Prinzing Enterprises # PL023 or equivalent, see Figure 2-2)
- One (1) solid red lockout tag for Centrally Controlled LOTO in accordance with NSLSII-ESH-PRC-006, *Centrally Controlled Lockout/Tagout (LOTO)*
- Lockout Key Lock Box, (Emedco MGB11, size: 6"h x 9"w x 3-1/2"d or equivalent)



**Figure 2-2: Plug Lockout Boot**

2.5 Contact Operations Staff or ESH Staff to confirm availability to assist with the LOTO.

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- 2.6 Notify the Control Room, Mechanical Engineering Group Leader, Instrumentation Group Leader and the Lead Beamline Scientist of the impending LOTO.

### 3 HAZARDS, CONTROLS AND LIMITS

- 3.1 The 3PW is constructed with permanent magnets that do not have an on/off switch. Internal magnetic loads of hundreds of pounds may be present. Since the magnetic gap is not guarded, magnetic materials should be kept clear of the "beam centerline" area. A selection of non-magnetic tools is available from the ID Group.
- 3.2 All steps in this procedure require Centrally Controlled LOTO, and shall be performed in accordance with NSLSII-ESH-PRC-006, *Centrally Controlled Lockout/Tagout (LOTO)*. LOTO for any other purpose shall not be performed as part of this procedure.
- 3.3 Only a person that is identified as a Primary Authorized Employee may perform Centrally Controlled LOTO on the 3PW and Control Rack.
- 3.4 The following equipment remains powered during the performance of this procedure:
- The 3PW Control Rack, powered by a floor-mounted 208 VAC junction box and a 110 VAC power strip with outlets on both sides
  - The position limit switches (for readback of open/close position to the 3PW)
  - The encoder
- 3.5 The 3PW Control Rack at Cell 22 resides on the ring inner side on the mezzanine above Cells 22 (labeled MC22-RG-G1). Refer to Table 3-1 for the relative position of the 3PW with reference to rack for installed 3PWs in the ring.

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**Table 3-1:** Rack Location of 3PWs on Mezzanine

<b>Beamline</b>	<b>3PW Location in Ring</b>	<b>Rack Position on Mezzanine</b>	<b>Channel on Delta Tau</b>	<b>Cable Tag Nomenclature</b>
FIS/MET	Cell 22	MC22RG-G1	8	SR-C22BM-FE-FIS3PW:AX1 MTR 1
XFP	Cell 17	MC18RG-E4	8	SR-C17BM-FE-XFP3PW:AX1 MTR 1
CMS	Cell 11	MC12RG-E4	8	SR-C11BM-FE-CMS3PW:AX1 MTR 1
TES	Cell 8	MC9RG-E4	8	SR-C8BM-FE-TES3PW:AX1 MTR 1
QAS	Cell 7	MC8RG-E4	8	SR-C7BM-FE-QAS3PW:AX1 MTR 1
BMM	Cell 6	MC6RG-E4	8	SR-C6BM-FE-BMM3PW:AX1MTR 1
XFM	Cell 4	MC5RG-E4	8	SR-C4BM-FE-XFM3PW:AX1 MTR 1

3.6 Deviations from expected configuration(s) require a halt to this procedure for evaluation by the ID Group Cognizant Engineer.

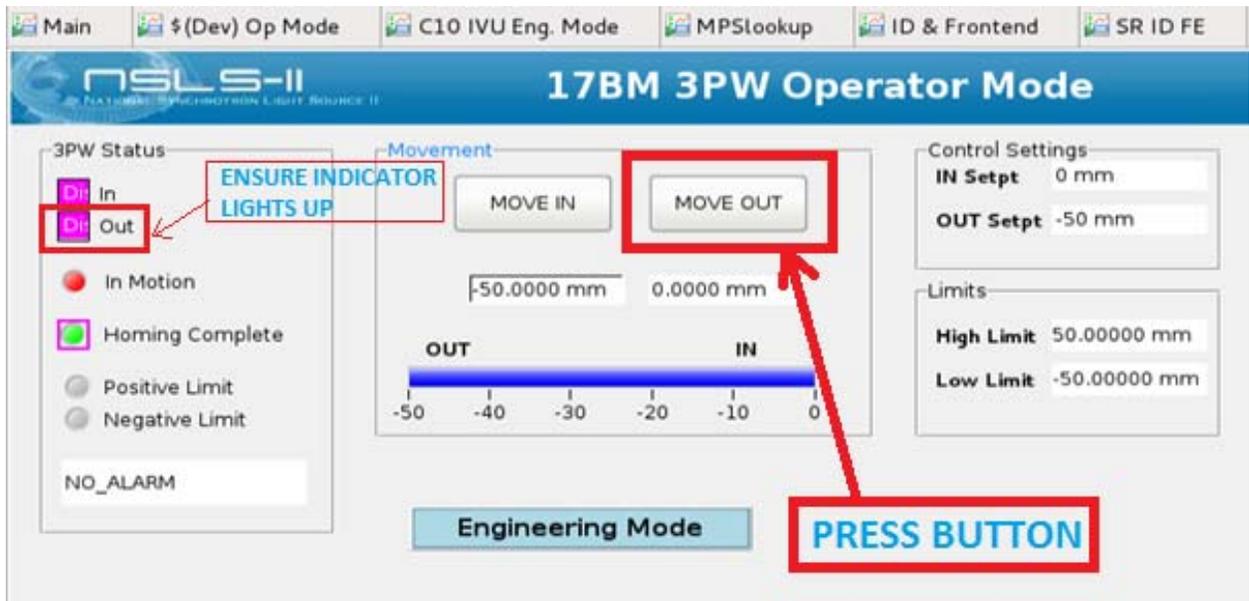
## 4 PROCEDURE

### 4.1 Apply Centrally Controlled LOTO

**Caution:** During and after completion of this LOTO procedure, the 3PW and its Control Rack remain energized and present a shock hazard; only the cable connector for the motor is disconnected.

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- 4.1.1 Obtain the appropriate red bodied padlocks, Plug Lockout Boot (Figure 2-2) and solid red lockout tags.



**Figure 4-1:** CSS 3PW Control Page

- 4.1.2 On the CSS ID Control Page for 3PW, command the Driven Axis System to go to the fully retracted position:
- Press the “MOVE OUT” button as indicated in Figure 4-1 in CSS.
  - Confirm that the 3PW status “OUT” indicator in Figure 4-1 is ON in CSS.
- 4.1.3 IF ring access is available, THEN visually verify that the 3PW is in the retracted position.
- 4.1.4 Confirm that the 3PW and its Controller Channel 4 are safe to shut down.
- 4.1.5 Complete all information required on the face of the solid red lockout tags.
- 4.1.6 Notify the Instrumentation Group Leader that the required 3PW motor will be disconnected and refer to Table 3-1 for the channel number.

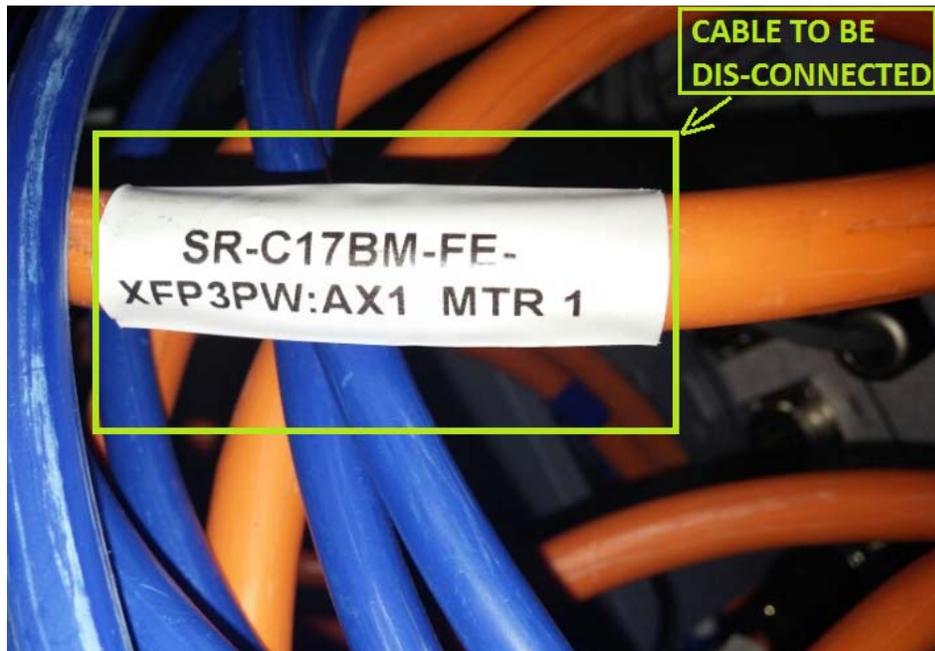
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**Note:** As agreed upon by the Instrumentation Group, the motor cable may be “unplugged hot,” as the controller is shared by other beamline and front end components.

4.1.7 Disconnect the motor cable connector located behind the Control Rack, as indicated in Figure 4-2 and Table 3-1.

**Note:** The figure below is an example of the Cell 17 motor cable. All 3PWs will have their cables marked accordingly.



**Figure 4-2:** Typical 3PW Motor Cable

4.1.8 Insert the motor cable connector indicated in step 4.1.7 into the Plug Lockout Boot (Figure 4-3).

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**Figure 4-3:** Plug Lockout Boot Applied to Cable Connector

4.1.9 Apply a red bodied padlock AND a solid red lockout tag to the Plug Lockout Boot, in accordance with NSLSII-ESH-PRC-006, *Centrally Controlled Lockout/Tagout (LOTO)*, as indicated in Figure 4-3.

4.1.10 Challenge the red bodied padlock to ensure that it is installed securely.

## 4.2 Test Centrally Controlled LOTO

4.2.1 On the CSS ID Control Page for 3PW, command the Driven Axis System to go to the fully retracted position.

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- a. Press the "MOVE IN" button as indicated in Figure 4-1 in CSS.
- b. Confirm that the CSS readout on the limit switch indicator does not show a change in value.

4.2.2 Place the key to the red bodied padlock in the Lockout Key Lock Box.

4.2.3 Apply a red bodied padlock AND solid red lockout tag to the Lockout Key Lock Box.

4.2.4 Operations Staff OR ESH Staff apply a red bodied padlock and solid red lockout tag to the Lockout Key Lock Box.

**Note:** After the Operations Staff or ESH Staff apply their red bodied padlock to the lockout Key Lock Box, it will be kept in the Control Room for the duration of the LOTO.

4.2.5 Notify the Control Room that LOTO has been successfully applied.

4.2.6 Document Centrally Controlled LOTO in accordance with NSLSII-ESH-PRC-006, *Centrally Controlled Lockout/Tagout (LOTO)*.

### **4.3 Restoring Equipment to Service - Clear LOTO**

4.3.1 Verify that the reason for the LOTO is complete.

4.3.2 Confirm that the 3PW and Controller Channel 4 are safe to enable.

4.3.3 Contact Operations Staff OR ESH Staff for removal of their red bodied padlock from the Lockout Key Lock Box.

4.3.4 Notify the Control Room, Instrumentation Group Leader, Mechanical Engineering Group Leader and the Lead Beamline Scientist of the intent to return to service.

4.3.5 Recover the red bodied padlock key from the Lockout Key Lock Box in accordance with NSLSII-ESH-PRC-006, *Centrally Controlled Lockout/Tagout (LOTO)*.

4.3.6 Remove the red bodied padlock, Plug Lockout Boot and solid red lockout tag.

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- 4.3.7 Connect the plug for the 3PW motor cable indicated in Figure 4-2.
- 4.3.8 On the CSS ID Control Page for 3PW, command the Driven Axis System to go to the fully retracted position.
  - a. Press the "MOVE IN" button as indicated in Figure 4-1.
  - b. Confirm that the 3PW status indicated in Figure 4-1 "in" indicator is ON in CSS.
- 4.3.9 IF ring access is available, THEN visually verify that the 3PW is in the retracted position.
- 4.3.10 Notify the Control Room, Mechanical Engineering Group Leader, Instrumentation Group Leader and Lead Beamline Scientist that LOTO has been successfully removed.
- 4.3.11 Return the solid red lockout tag, Plug Lockout Boot and red bodied padlock to the LOTO station.
- 4.3.12 Document the clearing of Centrally Controlled LOTO in accordance with NSLSII-ESH-PRC-006, *Centrally Controlled Lockout/Tagout (LOTO)*.

## 5 REFERENCES

- 5.1 NSLSII-ESH-PRC-006, *Centrally Controlled Lockout/Tagout (LOTO)*

## 6 ATTACHMENTS

None.

## 7 DOCUMENTATION

None.

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## 8 DEFINITIONS

- 8.1 Centrally Controlled LOTO: LOTO of systems or equipment to prevent personnel injury and/or exposure to hazardous energy, for operational reasons.
- 8.2 Equipment Protection System (EPS): The engineered interlocks that protect ring-resident equipment during NSLS-II operations.
- 8.3 Affected Employees: Employees who are required to use machines or equipment on which LOTO is being performed. For the NSLS-II, this is typically the Operations Staff.
- 8.4 Primary Authorized Employee: An Authorized Employee who is designated by their department/division to coordinate complex-group LOTO procedures. The Primary Authorized Employee coordinates workforces and ensures continuity of LOTO protection for all involved (both Authorized and Affected Employees). They are the first to apply their lock and the last to remove their lock from a group LOTO. At the NSLS-II, Primary Authorized Employees apply Centrally Controlled LOTO for the protection of other workers as well.

[If you have any questions or feedback regarding this document, please click this link.](#)

**-END-**