

ACCELERATOR DIVISION ES&H PROCEDURE- INTERIM PROCEDURE

ADSP-05-1220I

Delivery Ring & Extraction Enclosure  
13.8 kVAC and 480 VAC LOCKOUT/TAGOUT PROCEDURE

RESPONSIBLE DEPARTMENT Operations

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1.0 PURPOSE AND SCOPE..... 2

2.0 PERFORMANCE OF MAINTENANCE ACTIVITIES..... 2

3.0 THE NECESSITY OF WRITTEN LOTO PROCEDURE..... 2

4.0 RESPONSIBILITIES ..... 2

5.0 THE STEPS OF LOCKOUT/TAGOUT PRIOR TO MAINTENANCE ACTIVITY ..... 3

6.0 SPECIAL REQUIREMENTS FOR SHIFT/PERSONNEL CHANGE..... 5

7.0 THE STEPS FOR RETURN TO SERVICE ..... 5

8.0 PROCEDURE TRAINING REQUIREMENTS..... 6

9.0 DISTRIBUTION..... 7

APPENDIX A: ACCELERATOR DIVISION SAFETY PROCEDURE WRITTEN LOTO  
DEVELOPMENT AND REVIEW RESPONSIBILITIES..... 1

## 1.0 PURPOSE AND SCOPE

The purpose of this Accelerator Division Safety Procedure (ADSP) is to outline and detail the conduct of LOCKOUT/TAGOUT (LOTO) for Group Lockout of the Delivery Ring & Extraction enclosures.

## 2.0 PERFORMANCE OF MAINTENANCE ACTIVITIES

During maintenance/repair activities of the Delivery Ring & Extraction Enclosure devices in the enclosures, the 13.8 kV and 480 V circuit breakers need to be locked out. The positive control points for LOCKOUT/TAGOUT are at the AP10, AP30, AP50 & the MC-1 service buildings.

## 3.0 THE NECESSITY OF WRITTEN LOTO PROCEDURE

The reason for this written LOTO procedure is due to the necessity to lock out an energy source in an area in which access is restricted to authorized personnel only.

These panels then power each supply through individual breakers

The Delivery Ring & Extraction Enclosure devices are powered from panels:

- **DS-PHP-AP-10-4** at the AP10 service building
- **DS-PHP-AP-30-2, DS-PHP-AP-30-4 & DS-PHP-AP-30-PS** at the AP30 service building.
- **DS-PHP-AP-50-7 & DS-Y-AP50-1** (Outside transformer) at the AP50 service building.
- **DS-PHP-MC1B1-2** in the MC-1 power supply room.

## 4.0 RESPONSIBILITIES

### 4.1 OPERATIONS DEPARTMENT HEAD

The Operations Department Head shall develop and maintain a list of Lead Authorized Personnel and coordinate their training.

In addition, the Operations Department Head will ensure that the Lead Authorized Personnel implementing this procedure utilize appropriate lockout forms which are developed and maintained by the Operations Department and Electrical/Electronic Support Department and approved by the ESH&Q.

### 4.2 LEAD AUTHORIZED PERSONNEL

The role of the Lead Authorized Person is to properly Lockout/Tagout the disconnect switch which de-energizes the 480-volt circuit power. The completion of the Lockout/Tagout is to be documented using a lockout form developed and maintained by the Operations Department and Electrical/Electronic Support Department and approved by the ESH&Q.

The Lead Authorized Person shall carry the approved lockout form and each applicable step shall be checked off as they are performed. A copy of the completed form shall be placed in the Main Control Room (MCR) e-log. Completed original forms shall be maintained for one calendar year.

The Lead Authorized Personnel shall be from the Accelerator Operations Department who are authorized in writing by the Operations Department Head.

Authorized employees, who have the necessary knowledge and current training for General Lockout/Tagout, shall conduct lockout of the Group Lock Box.

#### 5.0 THE STEPS OF LOCKOUT/TAGOUT PRIOR TO MAINTENANCE ACTIVITY

Upon desiring to perform LOTO on the Extraction Enclosure devices, the MCR Crew Chief shall designate a Lead Authorized Person from a list of such named personnel maintained by the Operations Department Head.

5.1 **Prepare:** The Lead Authorized Person shall review this written procedure if necessary and obtain a copy of the approved lockout form. (Copies will be kept in a lockout binder on the Duty Assistant's desk.)

5.2 **Notify:** Notification shall be given to personnel deemed appropriate by the MCR Crew Chief.

5.3 **Shut Down:** The Lead Authorized Person shall check that the Delivery Ring & Extraction Enclosure devices are off.

At the AP10 Service Building lock out the disconnect switch for the power supplies by performing the following:

- A. Open disconnect switch **DS-PHP-AP-10-4**
  - a. Operation of the disconnect switch in this step is an NFPA 70E Class 0 activity.
- B. Lock the disconnect switch in the open position with a **ACC/DEB LOTO Lock**.
- C. **Verify:** The Lead Authorized Person shall verify that all three switches are open, through the windows. The Lead Authorized Person shall indicate on the approved lockout form the accomplishment of this step.

At the AP30 Service Building lock out the disconnect switch for the power supplies by performing the following:

- A. Open disconnect switches
  - a. **DS-PHP-AP-30-2**

**b. DS-PHP-AP-30-4**

**c. DS-PHP-AP-30-PS**

- i. Operation of the disconnect switches in this step is an NFPA 70E Class 0 activity.
- B. Lock the disconnect switches in the open position with a **ACC/DEB LOTO Lock**.
- C. **Verify:** The Lead Authorized Person shall verify that all three switches are open, though the windows. The Lead Authorized Person shall indicate on the approved lockout form the accomplishment of this step.

At the AP50 Service Building lock out the disconnect switch for the power supplies by performing the following:

- A. Open disconnect switch **DS-PHP-AP-50-7**
  - a. Operation of the disconnect switch in this step is an NFPA 70E Class 0 activity.
- B. Lock the disconnect switch in the open position with a **ACC/DEB LOTO Lock**.
- C. **Verify:** The Lead Authorized Person shall verify that all three switches are open, though the windows. The Lead Authorized Person shall indicate on the approved lockout form the accomplishment of this step.

Outside at the AP50 Service Building lock out the disconnect switch for D:IB by performing the following:

- D. Open disconnect switch **DS-Y-AP50-1**
  - a. **Operation of the disconnect switch in this step is an NFPA 70E Class 2 activity.**
- E. Lock the disconnect switch in the open position with a **ACC/DEB LOTO Lock**.
- F. **Verify:** The Lead Authorized Person shall verify that all three switches are open, though the window. The Lead Authorized Person shall indicate on the approved lockout form the accomplishment of this step

At the MC-1 Service Building lock out the disconnect switch for the power supplies by performing the following:

- G. Open disconnect switch **DS-PHP-MC1B1-2.**
  - a. Operation of the disconnect switch in this step is an NFPA 70E Class 0 activity.
- H. Re Lock the disconnect switch in the open position with a **ACC/DEB LOTO Lock**.
- I. **Verify:** The Lead Authorized Person shall verify that all three switches are open, though the windows. The Lead Authorized Person shall indicate on the approved lockout form the accomplishment of this step.

- 5.4 **Lock and Tag Out:** The Lead Authorized Person shall return to the Main Control Room. **Muon Campus (Pbar) ACC/DEB Rings** key shall be placed in the Delivery Ring/Extraction Enclosure LOTO lockout box.

The Lead Authorized Person shall attach a **BT-5** padlock (MCR Crew Chief lock) to the lockout box. A copy of the completed lockout form shall be entered into the MCR e-log.

## 6.0 SPECIAL REQUIREMENTS FOR SHIFT/PERSONNEL CHANGE

If the maintenance continues beyond a shift, the next MCR Crew Chief assumes the responsibility and authority of the off-going MCR Crew Chief for this group lockout.

## 7.0 THE STEPS FOR RETURN TO SERVICE

The MCR Crew Chief or Lead Authorized Person must coordinate the following steps prior to returning the equipment to service after service or maintenance activity

- 7.1 **Check Equipment:** Check the MCR lockbox and ensure that all personnel have removed their locks and tags.
- 7.2 **Check Work Area:** Check that The Extraction Enclosure enclosures are secure and all keys have been returned.
- 7.3 **Notify:** The MCR Crew Chief or Lead Authorized Person shall notify appropriate personnel that they are ready to reenergize.
- 7.4 **Remove Padlocks and Tags and Reenergize:** The MCR Crew Chief or Lead Authorized Person shall remove the Crew Chief locks and tags from the group lockboxes. The Lead Authorized Person shall obtain the **Muon Campus (Pbar) ACC/DEB Rings** key (PRPLS).

At the AP10 Service Building enable the disconnect switch for the power supplies by performing the following:

- A. Unlock and remove the **ACC/DEB LOTO Lock**
- B. Close disconnect switch **DS-PHP-AP-10-4**
  - a. Operation of the disconnect switch in this step is an NFPA 70E Class 0 activity.
- C. **Verify:** The Lead Authorized Person shall verify that all three switches are closed, though the windows.

At the AP30 Service Building enable the disconnect switch for the power supplies by performing the following:

- A. Unlock and remove the **ACC/DEB LOTO Locks** from
  - a. **DS-PHP-AP-30-2**
  - b. **DS-PHP-AP-30-4**
  - c. **DS-PHP-AP-30-PS**
- B. Close disconnect switches for
  - a. **DS-PHP-AP-30-2**
  - b. **DS-PHP-AP-30-4**
  - c. **DS-PHP-AP-30-PS**
    - i. Operation of the disconnect switches in this step is an NFPA 70E Class 0 activity.
- C. **Verify:** The Lead Authorized Person shall verify that all three switches are closed for all contactors, though the windows.

At the AP50 Service Building enable the disconnect switch for the power supplies by performing the following:

- A. Unlock and remove the **ACC/DEB LOTO Lock**
- B. Close disconnect switch **DS-PHP-AP-50-7**
  - a. Operation of the disconnect switch in this step is an NFPA 70E Class 0 activity.
- C. **Verify:** The Lead Authorized Person shall verify that all three switches are closed, though the windows.

Outside at the AP50 Service Building enable the disconnect switch for D:IB by performing the following:

- A. Unlock and remove the **ACC/DEB LOTO Lock**
- B. Close disconnect switch **DS-Y-AP50-1**
  - a. **Operation of the disconnect switch in this step is an NFPA 70E Class 2 activity.**
- C. **Verify:** The Lead Authorized Person shall verify that all three switches are closed, though the window.

At the MC-1 Service Building enable the disconnect switch for the power supplies by performing the following:

- A. Unlock and remove the **ACC/DEB LOTO Lock**
- B. Close disconnect switch **DS-PHP-MC1B1-2 .**
  - a. Operation of the disconnect switch in this step is an NFPA 70E Class 0 activity.
- C. **Verify:** The Lead Authorized Person shall verify that all three switches are closed, though the windows.

This completes the requirements for returning the equipment to service.

## 8.0 PROCEDURE TRAINING REQUIREMENTS

Initial training shall be coordinated by the Operations Department Head. The time interval for re-qualification will be every year in accordance with Laboratory procedures.

9.0

#### DISTRIBUTION

An electronic controlled copy of this procedure is maintained on the AD ESH website at: [http://ad-esh.fnal.gov/ad\\_adsp.html](http://ad-esh.fnal.gov/ad_adsp.html).



## APPENDIX A: ACCELERATOR DIVISION SAFETY PROCEDURE WRITTEN LOTO DEVELOPMENT AND REVIEW RESPONSIBILITIES

This appendix describes the responsibilities for drafting and reviewing written procedures used for exposed bus Lock Out/Tag Out (LOTO) with the purpose of accessing accelerator and beamline enclosures.

These procedures are formalized as Accelerator Division Safety Procedures (ADSP) to establish ESH&Q policies for implementation by AD departments<sup>1</sup>, in this case as a written LOTO procedure, to control access to AD facilities as needed to protect the health and safety of personnel<sup>2</sup>.

The scale of the systems included in the procedures involve multiple organizational units having only partial knowledge of or responsibility for the overall system. The written LOTO procedure shall be drafted<sup>3</sup> and reviewed<sup>4</sup> by knowledgeable employees from each D/S/P that owns, uses, maintains, or services equipment directly affected by or used to execute the written LOTO procedure, including Energy Isolating Devices, and approved by a line manager at the department head level or higher (or designee).

The AD OPS department provides the authorized and lead authorized employees, performs the inspector component of the training and maintains the training of the lead authorized personnel.

The AD EES department acts as the knowledgeable employee for magnet power supplies from the AC service LOTO Energy Isolation Device, through the power supply and to the power supply terminals. In some instances, FESS maintains the LOTO Energy Isolating Device and is the knowledgeable employee for that device.

The department(s) responsible for the enclosure act as the knowledgeable employee for the loads in the beamline enclosure.

The approval of the line manager is recorded in the REVIEW AND CONCURRENCE RECORD of the ADSP indicating that they have reviewed the procedure, provided input for their area of knowledge and recognize their responsibilities as users, owner, maintainers or servicers of a portion of the systems used in the written LOTO procedure.

APPROVAL:  DATE 10/11/2018  
Mike Lindgren  
Accelerator Division Head

<sup>1</sup> ADAP-01-0001 3.1.2c

<sup>2</sup> ADAP-01-0001 3.1.2d

<sup>3</sup> FESHM 2100 5.7

<sup>4</sup> FESHM 2100 4.4

