ACCELERATOR DIVISION ES&H PROCEDURE

ADSP-05-1210

MAIN INJECTOR F-SECTOR & TRANSFER HALL EXPOSED BUS LOCKOUT/TAGOUT PROCEDURE

RESPONSIBLE DEPARTMENT Operations

PREPARED BY _____ DATE 6/12/18
Duane Newhart
AD Operations Department

APPROVED BY _____ DATE 6/12/2018
Mike Lindgren
Accelerator Division Head

REVISION NO. 6 REVISION ISSUE DATE 6/12/18

REVIEW AND CONCURRENCE RECORD

REVIEWED BY _____ DATE 6/12/18
Dan Johnson
Operations Department Head

REVIEWED BY _____ DATE 6/12/18
Chris Jensen
EE Support Department Head

REVIEWED BY _____ DATE 6/12/18
John Anderson, Jr.
ESH&Q Associate Head

REVIEWED BY _____ DATE 6/12/18
Eric McHugh
ESH&Q AD DSO

REVIEWED BY _____ DATE 6/12/18
Joseph Pathiyil
FESS High Voltage Engineering

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 major exposed bus power supplies in the Main Injector, F-Sector and Transfer Hall enclosures.

2.0 PERFORMANCE OF MAINTENANCE ACTIVITIES

During maintenance/repair activities within the Main Injector, F-Sector and Transfer Hall enclosures the 13.8 KV pulsed power feeder system and exposed bus components need to be locked out. In the case of the F-Sector and Transfer Hall enclosures, this does not LOTO all of the exposed bus but does give a central point for personnel to lock off the largest distributed power supplies. The following table shall be used to determine which components need to have LOCKOUT/TAGOUT performed on them for the different enclosures. The completion of the Lockout/Tagouts are to be documented using lockout forms developed and maintained by the Operations Department and Electrical/Electronic Support Department and approved by the ESH&Q.

3.0 THE NECESSITY OF WRITTEN LOTO PROCEDURE

The reason for this written LOTO procedure is due to the necessity to lock out multiple energy sources in an area in which access is restricted to authorized personnel only. An additional purpose of the procedure is to allow the authorized employee to follow **General** LOTO procedures for these exposed bus power supplies via the Group Lock Box in the MCR after the Lead Authorized Employee completes this LOTO written procedure.

Disconnects		**MOS 86 & 87**	**MOS 89**	**DSPHP-MI10-1A-7**	**DSPHP-MI30-1A-7**	**HP3DS**	**QP3**	**DS-F17B3**
Location		KRSS	KRSS	MI10	MI30	F4	F4	F2
Enclosures	MI10	**Yes**	**Yes**	**Yes**	No	No	No	No
	MI20-62	**Yes**	**Yes**	No	**Yes**	No	No	No
	F-Sector	No	**Yes**	No	No	No	No	**Yes**
	Transfer Hall	No	No	No	No	**Yes**	**Yes**	No

4.0 RESPONSIBILITIES

4.1 OPERATIONS DEPARTMENT HEAD

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

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 various components listed on the approved lockout sheets for the enclosures entered. The completion of the Lockout/Tagout is to be documented using the approved lockout sheets and posted at the group lock box.

The Lead Authorized Person shall carry the form and each step shall be checked off as they are performed. The completed form shall be posted at the MCR lockout box and a copy placed in the Main Control Room (MCR) log.

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

5.0 THE STEPS OF LOCKOUT/TAGOUT PRIOR TO MAINTENANCE ACTIVITY

Upon desiring to access the accelerator enclosure and perform LOTO, 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 appropriate approved lockout form for the enclosure being entered. (Copies will be kept in a blank 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 various power supplies are turned off for the enclosure to be entered.

5.4 **Verify and Lock/Tag out:** The Lead Authorized Person shall take the steps below for the enclosure to be entered and verify completed lockouts by noting on the appropriate approved lockout form that each required item is completed.

5.5 MI10 EXPOSED BUS LOCKOUT

These steps must be followed for proper lockout of the exposed bus supplies prior to entering the Main Injector MI10 Enclosure.

Lock out MOS 86, 87, & 89 using ADSP-05-1214

Place

NOTE: *Bring a flashlight* as verification consists of visually confirming that all three knife switchblades are open.

At MI-10 service building, switch off the safety switch for the transfer supplies by performing the following: Operation of the disconnect in this step is an NFPA 70E Class 0 activity requiring safety glasses, non-melting or untreated natural fiber long sleeve shirt and long pants.

a. Open DSPHP-MI10-1A-7 and verify that all three knife switchblades are open.

b. Turn and remove the MI-10 DSPHP Kirk Key from actuator locking DSPHP-MI10-1A-7 in the open position.

Lockout the Main Injector MI10 HiPotter by opening the disconnect switch located in the MCR and locking it in the open position. Verify that the HiPotter has no power and will not turn on. Operation of the disconnect in this step is an NFPA 70E Class 0 activity requiring safety glasses, non-melting or untreated natural fiber long sleeve shirt and long pants.

Retrieve the MI10 captured keys from MOS 86, 87 & 89 Transfer blocks. Place the captured keys and keys from the steps above in the Main Injector MI10 Lockbox and lock the Lockbox with a Main Control Room Crew Chief BT-5 Padlock. Verify that the following keys are contained in the Lockbox:

MI10 Exposed Bus MOS 86 Captured Key
MI10 Exposed Bus MOS 87 Captured Key
MI10 Beamline Feeder MOS 89 Captured Key
MI10 HiPotter Key
MI-10 DSPHP Kirk Key

Make a copy of the completed approved lockout form and attach to the Main Injector Lockbox and put an electronic copy in the MCR e-log.

5.6 MI20-62 EXPOSED BUS LOCKOUT

These steps must be followed for proper lockout of the exposed bus supplies prior to entering the Main Injector MI20-62 Enclosure.

Lock out MOS 86, 87, & 89 using ADSP-05-1214

NOTE: *Bring a flashlight* as verification consists of visually confirming that all three knife switchblades are open.

At MI-30 service building, switch off the safety switch for the transfer supplies by performing the following: Operation of the disconnect in this step is an NFPA 70E Class 0 activity requiring safety glasses, non-melting or untreated natural fiber long sleeve shirt and long pants.

a. Open DSPHP-MI30-1A-7 and verify that all three knife switchblades are open.

b. Turn and remove the MI-30 DSPHP Kirk Key from actuator locking DSPHP-MI30-1A-7 in the open position.

Lockout the Main Injector MI20-62 HiPotter by opening the disconnect switch located in the MCR and locking it in the open position. Verify that the HiPotter has no power and will not turn on. Operation of the disconnect in this step is an NFPA 70E Class 0 activity requiring safety glasses, non-melting or untreated natural fiber long sleeve shirt and long pants.

Retrieve the MI20-62 captured keys from MOS 86, 87 & 89 Transfer blocks. Place the captured keys and keys from the steps above in the Main Injector MI20-62 Lockbox and lock the Lockbox with a Main Control Room Crew Chief BT-5 Padlock. Verify that the following keys are contained in the Lockbox:

MI20-62 Exposed Bus MOS 86 Captured Key
MI20-62 Exposed Bus MOS 87 Captured Key
MI20-62 Beamline Feeder MOS 89 Captured Key
MI20-62 HiPotter Key
MI-30 DSPHP Kirk Key

Make a copy of the completed approved lockout form and attach to the Main Injector Lockbox and put an electronic copy in the MCR e-log.

5.7 F-SECTOR ENCLOSURE EXPOSED BUS LOCKOUT

These steps must be followed for proper lockout of the major exposed bus supplies prior to entering the F-Sector in the Tevatron Enclosure.

Lock out MOS 89 using ADSP-05-1214

At F2 service building, switch off the F17B3 disconnect by performing the following: Operation of the disconnect in this step is an NFPA 70E Class 0 activity requiring safety glasses, non-melting or untreated natural fiber long sleeve shirt and long pants.

a. Open DS-F17B3 disconnect and verify that all three knife switchblades are open.

b. Turn and remove the F-Sector F17B3 Lockout Kirk Key from actuator locking DS-F17B3 in the open position.

Retrieve the F-Sector Beamline Feeder MOS 89 Captured Key from the MOS 89 Kirk Key Transfer block and place in F-Sector lockbock. Lock the Lockbox with a Main Control Room Crew Chief BT-5 Padlock. Verify that the following keys are contained in the Lockbox:

F-Sector Beamline Feeder MOS 89 Captured Key
F-Sector F17B3 Lockout Kirk Key

Make a copy of the completed approved lockout form and attach to the F-Sector Lockbox and put an electronic copy in the MCR e-log.

5.8 TRANSFER HALL ENCLOSURE EXPOSED BUS LOCKOUT

These steps must be followed for proper lockout of the major exposed bus supplies prior to entering the Transfer Hall Enclosure.

Lock out HP3DS and QP3 using ADSP-05-1215

Place keys from the steps above in the Main Injector Lock the Lockbox with a Main Control Room Crew Chief BT-5 Padlock. Verify that the following keys are contained in the Lockbox:

HP3DS Kirk Key
QP3 Kirk Key

Make a copy of the completed approved lockout form and attach to the Transfer Hall Lockbox and put an electronic copy in 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 lock box and ensure that all personnel have removed their locks and tags.

7.2 **Check Work Area:** Check that the appropriate enclosure is secure.

7.3 **Notify:** As required by the individual procedures, notification shall be given to personnel deemed appropriate by the MCR Crew Chief.

7.4 **Remove Padlocks and Tags and Reenergize:** The MCR Crew Chief or Lead Authorized Person shall remove the Crew Chief lock and tag. Lead Authorized Person returns the controlled keys to their associated locks. Operation of the disconnects in this step are an NFPA 70E Class 0 activity requiring safety glasses, non-melting or untreated natural fiber long sleeve shirt and long pants. Equipment may then be re-energized once the locks permit operation.

This completes the requirements for returning the equipment to service.

8.0 PROCEDURE TRAINING REQUIREMENTS

Initial training shall consist of reading and understanding this procedure and participating with a qualified operator. The time interval for re-qualification shall 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.

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[1], in this case as a written LOTO procedure, to control access to AD facilities as needed to protect the health and safety of personnel[2].

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[3] and reviewed[4] 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 6/12/2018

Mike Lindgren
Accelerator Division Head

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[1] ADAP-01-0001 3.1.2c
[2] ADAP-01-0001 3.1.2d
[3] FESHM 2100 5.7
[4] FESHM 2100 4.4