

Memorandum

Michael Lindgren
Division Head

Accelerator Division
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Batavia, Illinois 60510-5011

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Date: November ²³26, 2019
To: Todd Sullivan
From: Michael Lindgren 
Re: Approval for Running Meson Test

Message:

Safety documentation and procedures for approval to run beam through Meson Test are now completed and in place. Therefore, you are hereby authorized to run beam through Meson Test.

c.c. M. Convery
P. Czarapata
T. Kobilarcik
E. McHugh
M. Schoell
N. Chelidze

SYSTEM START-UP SIGN-OFF

The signatures below, unless noted in the comments section, indicate that the relevant systems are ready for the restart of beam operation. Indicate in the comments section any remaining work that would affect the restart of beam operations. Indicate N/A for departments that did not do any work on the system.

SYSTEM BEING SIGNED OFF: **Linac NIF MTA Booster [8-GeV Line-MI-10 Region]**
(Circle as Applicable) **[MI-20-MI-62/Recycler] BNB NuMI P1-P2 Muon P3-Switchyard**
Meson Primary (MT) MC NM FAST PIP-II _____

<u>DEPARTMENT</u>	<u>DATE</u>	<u>SIGNATURE (Department Head/Designee)</u>
1. Controls	11/21/19	Jamstaled
2. Cryogenics	N/A	
3. E/E Support	11/22/19	CDJ
4. RPO Manager	11/27/19	Madelyn Schell
5. LSO	N/A	
6. External Beamlines	11/23/2019	Philiparet
7. Instrumentation	11/21/2019	[Signature]
8. Interlocks	11/26/2019	Russ W. Zifko
9. Main Injector	N/A	
10. Mechanical Support	21 Nov 2019	MM Wong-Spis
11. Muon	N/A	
12. Operations	11/27/2019	Todd Sullivan
13. Proton Source	N/A	
14. RF	N/A	
15. ENG Support	11/21/19	Paul C Garapato
16. Target Systems	N/A	
17. Shutdown Coordinator	11/21/19	[Signature]

Comments and special conditions (please mark comment with department # to connect comment with appropriate department):

The MTest radiation shielding meets the requirements documented in the 2003 "Shielding Assessment for the Switchyard 120 Project." 2017 "P3 to Switchyard Absorber Incremental shielding assessment."

FINAL APPROVALS

System Department Head Thomas D. Robinson Date 11/27/2019
Assigned RSO N. Chelidze Date 11/27/2019
AD Division Head [Signature] Date 11/27/2019

BEAM PERMIT
11/27/2019

Meson Test Accelerator Safety Envelope (ASE) Limit

The maximum hourly beam power transmitted through Meson Primary to Meson Test is limited as follows:

Meson Test: 1.03×10^{16} protons per hour at 120 GeV

No accelerator or beam line will transmit beam without an operational beam interlock safety system.

Meson Beamline Operating Limits

The maximum hourly operational charge transmitted through Meson Primary to Meson Test is limited as follows:

Meson Test: 1.20×10^{13} protons per hour at 120 GeV

Examples: Protons/hr = number of pulses/hr \times number of protons/pulse

Meson Test: 60 pulses per hour at 2.00×10^{11} protons per pulse = 1.20×10^{13} protons per hour

Special conditions and comments:

Reviewed by *Todd Bullis* 11/27/19
Operations Department Head

Reviewed by *Thomas N. Kobilid*
Systems Department Head

Reviewed by *N. Chelidge* 11/27/2019
Assigned RSO

Reviewed by *Madelyn Schell* 11/27/2019
ESH&Q Radiation Physics Operations Department Head

Approved by *Mark Taylor* 11/27/2019
Accelerator Division Head

Operator Signatures

Crew Chiefs

Crew A

Crew B

Crew C

Crew D

Crew E

Other

Running Condition Meson Test

November 27, 2019

Area RSO

Nino Chelidze

Mode of Operation High Energy Pion Mode

Beam Limits	Beam Energy	ASE Limit	Operating Limit
	120 GeV	1.03 E16 protons/hr	1.20 E13 protons/hr

Critical Devices F:MW1W & MT3 Beam Stop

Enclosures Protected MT6 Section 1 and MT6 Section 2

Preferred Monitoring Devices* Intensity is monitored via F:MW1SEM

*Other methods of monitoring intensity may be used.

Requirements

Access Devices F:MW1W and MT3 Beam Stop must be disabled in order to access MT6 Section 1 or MT6 Section 2.

Cool Off Period

Special Interlocks The CDC Inputs including failure mode devices may all be found on the Safety System Status pages.

Special Concerns Any work performed on critical devices or obtaining a critical device key requires prior RSO approval.

Gates, Fencing and Passive Shielding Requirements There is no access to radiologically fenced areas without prior RSO approval.

Shielding, fencing and posting are in accordance with the following shielding assessment document: 2003 "Shielding Assessment for the Switchyard 120 Project"

Assigned RSO approval also signifies that all necessary Interlock Tests have been completed and Removable Shielding is installed.

Ops. Dept. Head Approval Zoltan Sulthi 11/27/2019

Assigned RSO Approval N. Chelidze

Sys. Dept. Head Approval Nino Chelidze

AD Head Approval Nino Chelidze

November 27, 2019

Area RSO

Nino Chelidze

Operational Comments

MCR must be appropriately staffed according to the Accelerator Safety Envelope.

Both slow resonant and single turn extraction are acceptable at this time.

When changing modes, the beam should be disabled. When the parameters are satisfied, the critical devices are enabled.

The inputs required to enable the High Energy Pion Mode are as follows:

F:MT2WD1 must be running less than 600 amps

F:MT2WD2 must be running less than 240 amps

F:MT2WU must be running less than 425 amps

F:MT3PUV and F:MT3PDV Pinhole Collimator OUT

F:MW1TGT IN

November 27, 2019

Area RSO

Nino Chelidze

Operator Signatures

Crew Chiefs

Crew A

Crew B

Crew C

Crew D

Crew E

Other

Running Condition Meson Test

November 27, 2019

Nino Chelidze

Area RSO

Mode of Operation Low Energy Pion Mode

Beam Limits	Beam Energy	ASE Limit	Operating Limit
	120 GeV	1.03 E16 protons/hr	1.20 E13 protons/hr

Critical Devices F:MW1W & MT3 Beam Stop**Enclosures Protected** MT6 Section 1 and MT6 Section 2**Preferred Monitoring Devices*** Intensity is monitored via F:MW1SEM

*Other methods of monitoring intensity may be used.

Requirements

Access Devices F:MW1W and MT3 Beam Stop must be disabled in order to access MT6 Section 1 or MT6 Section 2.**Cool Off Period****Special Interlocks** The CDC Inputs including failure mode devices may all be found on the Safety System Status pages.**Special Concerns** Any work performed on critical devices or obtaining a critical device key requires prior RSO approval.**Gates, Fencing and Passive Shielding Requirements** There is no access to radiologically fenced areas without prior RSO approval.Shielding, fencing and posting are in accordance with the following shielding assessment document:
2003 "Shielding Assessment for the Switchyard 120 Project"

Assigned RSO approval also signifies that all necessary Interlock Tests have been completed and Removable Shielding is installed.

Ops. Dept. Head Approval *Tom Lelli* 11/27/2019**Assigned RSO Approval** *N. Chelidze***Sys. Dept. Head Approval** *Nino Chelidze***AD Head Approval** *Nino Chelidze* 11/27/2019

November 27, 2019

Area RSO

Nino Chelidze

Operational Comments

MCR must be appropriately staffed according to the Accelerator Safety Envelope.

Both slow resonant and single turn extraction are acceptable at this time.

When changing modes, the beam should be disabled. When the parameters are satisfied, the critical devices are enabled.

The inputs required to enable the Low Energy Pion Mode are as follows:

F:MT2WD1 must be operating between 900-1,100 amps

F:MT2WD2 must be operating between 350-450 amps

F:MT2WU must be operating between 640-780 amps

F:MT3PUV and F:MT3PDV Pinhole Collimator Out

F:MT4W must be running less than 320 amps

F:MT5E must be running less than 340 amps

F:MT4TGT is IN

November 27, 2019

Area RSO

Nino Chelidze

Operator Signatures

Crew Chiefs

Crew A

Crew B

Crew C

Crew D

Crew E

Other

Running Condition Meson Test

November 27, 2019

Area RSO

Nino Chelidze

Mode of Operation Diffracted Proton Mode

Beam Limits	Beam Energy	ASE Limit	Operating Limit
	120 GeV	1.03 E16 protons/hr	1.20 E13 protons/hr

Critical Devices F:MW1W & MT3 Beam Stop

Enclosures Protected MT6 Section 1 and MT6 Section 2

Preferred Monitoring Devices* Intensity is monitored via F:MW1SEM

*Other methods of monitoring intensity may be used.

Requirements

Access Devices F:MW1W and MT3 Beam Stop must be disabled in order to access MT6 Section 1 or MT6 Section 2.

Cool Off Period

Special Interlocks The CDC Inputs including failure mode devices may all be found on the Safety System Status pages.

Special Concerns Any work performed on critical devices or obtaining a critical device key requires prior RSO approval.

Gates, Fencing and Passive Shielding Requirements There is no access to radiologically fenced areas without prior RSO approval.

Shielding, fencing and posting are in accordance with the following shielding assessment document:
2003 "Shielding Assessment for the Switchyard 120 Project"

Assigned RSO approval also signifies that all necessary Interlock Tests have been completed and Removable Shielding is installed.

Ops. Dept. Head Approval Tommy L. Hill 11/27/2019 Assigned RSO Approval N. Chelidze
Sys. Dept. Head Approval Thomas N. Hill AD Head Approval Mark Z. Long

November 27, 2019

Area RSO

Nino Chelidze

Operational Comments

MCR must be appropriately staffed according to the Accelerator Safety Envelope.

Both slow resonant and single turn extraction are acceptable at this time.

When changing modes, the beam should be disabled. When the parameters are satisfied, the critical devices are enabled.

The inputs required to enable the Diffracted Proton Mode are as follows:

F:MT2WD1 must be operating between 900-1,100 amps

F:MT2WD2 must be operating between 350-450 amps

F:MT2Q1, F:MT2Q2, F:MT3Q1 and F:MT3Q2 must be off

F:MT2WU must be operating between 640-780 amps

F:MT3PUV and F:MT3PDV Pinhole Collimator IN the 1 mm hole

F:MW1TGT IN

Running Condition Meson Test

November 27, 2019

Area RSO

Nino Chelidze

Operator Signatures

Crew Chiefs

Crew A

Crew B

Crew C

Crew D

Crew E

Other