Memorandum

Michael Lindgren
Chief Accelerator Officer

Accelerator Division
P.O. Box 500, MS 306
Kirk Road and Pine Street
Batavia, Illinois 60510-5011

Office: 630.840.8409
mlindgre@fnal.gov

Date: November 18, 2020

To: Todd Sullivan

From: Michael Lindgren

Michael Lindgren, UID:mlindgre
Digitally signed by Michael Lindgren, UID:mlindgre
Date: 2020.11.18 12:35:01 -06'00'

Re: Approval for Running Beam to 8 GeV (MI-8)

Safety documentation and procedures for running beam to the 8 GeV (MI-8) area are in place. Therefore, you are hereby authorized to run beam to 8 GeV (MI-8).

cc: D. Capista
M. Convery
P. Czarapata
S. McGimpsey
D. Morris
M. Schoell

Fermilab

ADAP-11-0001
REV. 9

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

DEPARTMENT	DATE	SIGNATURE (Department Head/Designee)
1. Controls	11/11/20	James Patrick — Digitally signed by James Patrick Date: 2020.11.11 07:03:55 -06'00'
2. Cryogenics	N/A	
3. E/E Support	11/13/20	Chris Jensen — Digitally signed by Chris Jensen DN: cn=Chris Jensen, o, ou=Fermilab, email=cjensen@fnal.gov, c=US Date: 2020.11.13 10:47:12 -06'00'
4. RPO Manager	11/18/20	Madelyn Schoell, UID:maddiew — Digitally signed by Madelyn Schoell, UID:maddiew Date: 2020.11.18 11:23:56 -06'00'
5. LSO	N/A	
6. External Beamlines	11/10/20	Thomas R. Kobilarcik — Digitally signed by Thomas R. Kobilarcik Date: 2020.11.10 05:23:31 -06'00'
7. Instrumentation	11/18/20	Craig Drennan — Digitally signed by Craig Drennan Date: 2020.11.18 09:35:26 -06'00'
8. Interlocks	11/10/20	Randy Zifko, UID:rmzifko — Digitally signed by Randy Zifko, UID:rmzifko Date: 2020.11.10 13:18:01 -06'00'
9. Main Injector	11/18/20	Ioanis Kourbanis, UID:ioanis — Digitally signed by Ioanis Kourbanis, UID:ioanis Date: 2020.11.18 09:53:42 -06'00'
10. Mechanical Support	11/13/20	
11. Muon	N/A	
12. Operations	11/04/20	
13. Proton Source		Cheng-Yang Tan, UID:cytan — Digitally signed by Cheng-Yang Tan, UID:cytan Date: 2020.11.10 10:50:57 -06'00'
14. RF	N/A	
15. ENG Support	10/29/20	
16. Target Systems	N/A	
17. Shutdown Coordinator	11/10/20	Consolato Gattuso — Digitally signed by Consolato Gattuso Date: 2020.11.10 10:28:08 -06'00'

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

The 8 GeV LINE radiation shielding meets the requirements documented in the 2002 "SHIELDING ASSESSMENT DOCUMENT FOR THE 8 GeV FIXED TARGET FACILITY AND THE 2010 POST ASSESSMENT MEMO "8 GeV BEAMLINE AND MINI BOONE BEAMLINE NOVA-ERA OPERATIONAL LIMITS" shielding assessment.

FINAL APPROVALS

System Department Head: Ioanis Kourbanis, UID:ioanis — Digitally signed by Ioanis Kourbanis, UID:ioanis Date: 2020.11.18 12:32:40 -06'00' — Date 11/18/20

Assigned RSO: Susan McGimpsey — Digitally signed by Susan McGimpsey Date: 2020.11.18 12:38:27 -06'00' — Date _____

AD Division Head: Michael Lindgren, UID:mlindgre — Digitally signed by Michael Lindgren, UID:mlindgre Date: 2020.11.18 12:42:07 -06'00' — Date 11/18/20

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ADAP-11-0001 Rev. 9

BEAM PERMIT
11/18/2020

8 GeV (MI-8) Beamline Accelerator Safety Envelope (ASE) Limit

The maximum beam intensity transmitted through the 8 Gev Beamline from Cell 803 to Cell 850 is limited to:

2.35×10^{19} protons/hr up to 8 GeV

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

8 Gev(MI-8) Beamline Operating Limits

The maximum beam intensity transmitted through the 8 GeV Beamline from Cell 803 to Cell 850 is limited to:

2.84×10^{17} protons/hr up to 8 GeV

Examples:

#1 18,000 pulses/hour x 1.58×10^{13} protons/pulse x = 2.84×10^{17} protons/hour

#2 9,000 pulses/hour x 3.16×10^{13} protons/pulse = 2.84×10^{17} protons/hour

Special conditions and comments:

Reviewed by Todd Sullivan — Digitally signed by Todd Sullivan Date: 2020.11.18 12:44:26 -06'00'
Operations Department Head

Reviewed by Ioanis Kourbanis, UID:ioanis — Digitally signed by Ioanis Kourbanis, UID:ioanis Date: 2020.11.18 12:35:14 -06'00'
Systems Department Head

Reviewed by Susan McGimpsey — Digitally signed by Susan McGimpsey Date: 2020.11.18 12:37:46 -06'00'
Assigned RSO

Reviewed by Madelyn Schoell, UID:maddiew — Digitally signed by Madelyn Schoell, UID:maddiew Date: 2020.11.18 11:24:32 -06'00'
ES&H Radiation Physics Operations Department Head

Approved by Michael Lindgren, UID:mlindgre — Digitally signed by Michael Lindgren, UID:mlindgre Date: 2020.11.18 12:49:01 -06'00'
Accelerator Division Head

Operator Signatures

Crew Chiefs

11/18/20

11/18/20

11/19/20

11/19/20

21 Nov 20

Crew A

11-21-20

11/21/20

11/21/2020

11-21-20

11-22-20

Crew B

Crew C

11/18/20

11/18/20

11/18/2020

11/20/20

Crew D

11/19/20

11-19-20

19 Nov 2020

11/19/20

Crew E

11/19/20

11/19/20

19 Nov 2020

11/19/20

Other

2020-11-18

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Running Condition
8 GeV (MI-8) Beamline

November 18, 2020

Area RSO Sue McGimpsey

Mode of Operation Beam transport from Cell 803 to Cell 850

Beam Limits

Beam Energy	ASE Limit	Operating Limit
8 GeV	2.35 E19 protons/hr	2.84 E17 protons/hr

Critical Devices B:MH1 & B:LAM

Enclosures Protected MI-8, MI-10 Enclosure, Muon Campus Transport Mid, MI-12A

Preferred Monitoring Devices* Intensity is monitored via B:BBM800

*Other methods of monitoring intensity may be used.

Requirements

Access Devices B:MH1 and B:LAM must be disabled during MI-10 Mode in order to access the MI-8 beamline, MI-10 enclosures, Muon Campus Transport Mid, MI-12A.
MI-10 Enclosure, Muon Campus Transport Mid & MI-12A maybe accessed if Booster is in Dump Mode.

Cool Off Period none

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 is in accordance with 2002 "Shielding Assessment Document for the 8 GeV fixed target facility.

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

ps. Dept. Head Approval Todd Sullivan Digitally signed by Todd Sullivan Date: 2020.11.18 12:42:58 -06'00'

Assigned RSO Approval Susan McGimpsey Digitally signed by Susan McGimpsey Date: 2020.11.18 12:39:07 -06'00'

Sys. Dept. Head Approval Ioanis Kourbanis, UID:ioanis Digitally signed by Ioanis Kourbanis, UID:ioanis Date: 2020.11.18 12:34:18 -06'00'

AD Head Approval Michael Lindgren, UID:mlindgre Digitally signed by Michael Lindgren, UID:mlindgre Date: 2020.11.18 12:48:28 -06'00'

Operational Comments

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

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Running Condition
8 GeV (MI-8) Beamline

November 18, 2020

Area RSO Sue McGimpsey

Instrument Information

Interlocked detectors in "Rate" mode that trip require RSO approval before reset. All detector trips shall be documented in the MCR E-log.

MUX	Type	Location	QF	R/I Mode	Trip Level	CDC	Device(s) Tripped
2-126	Chipmunk	Transport Mid/DS Gate	5	Rate	2.5 mrem/hr	B:CRDEV	B:MH1 & B:LAM
2-127	Chipmunk	Transport Mid/US Gate	5	Rate	2.5 mrem/hr	B:CRDEV	B:MH1 & B:LAM
1-128	Chipmunk	MI-8 Service Building Labyrinth Gate	5	Rate	5 mrem/hr	B:CRDEV	B:MH1 & B:LAM

Note: QF only included for chipmmunks

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Running Condition
8 GeV (MI-8) Beamline

November 18, 2020

Area RSO Sue McGimpsey

Operator Signatures

Crew Chiefs

11/18/20

11/18/20

11/19/20

11/19/20

29 Nov 20

Crew A

11-21-20

11/21/20

11/21/2020

11-21-20

11-22-20

Crew B

Crew C

11/18/20

11/18/2020

11/20/20

Crew D

11/19/20

11-19-20

19 Nov 2020

11/19/20

Crew E

11/19/20

11/19/20

19 Nov 2020

11/19/20

Other

2020-11-18