

# Memorandum

Michael Lindgren  
Chief Accelerator Officer

**Accelerator Division**  
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Kirk Road and Pine Street  
Batavia, Illinois 60510-5011

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**Date:** December 18, 2020

**To:** Todd Sullivan

**From:** Mary Convery for Michael Lindgren

Mary Convery, Digitally signed by Mary  
Convery, UID:convery  
Date: 2020.12.18  
18:47:37 -06'00'

**Re:** Approval for Running Beam to Meson Primary

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Safety documentation and procedures for restart of Meson Primary are now in place.  
Therefore, you are hereby authorized to run beam to Meson Primary.

cc: Gerald Annala  
Mary Convery  
Paul Czarapata  
Tom Kobilarcik  
Sue McGimpsey  
Eric McHugh  
Maddie Schoell



**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

<u>DEPARTMENT</u>	<u>DATE</u>	<u>SIGNATURE (Department Head/Designee)</u>
1. Controls	10-28-2020	<i>[Signature]</i> for J. Patrick
2. Cryogenics	N/A	
3. E/E Support	12/18/20	Chris Jensen <small>Digitally signed by Chris Jensen DN: cn=Chris Jensen, o=Fermilab, email=ccjensen@fnal.gov, c=US Date: 2020.12.18 18:53:48 -06'00'</small>
4. RPO Manager	12/18/20	Maddie Schoell, UID:maddiew <small>Digitally signed by Maddie Schoell, UID:maddiew Date: 2020.12.18 18:10:42 -06'00'</small>
5. LSO	N/A	
6. External Beamlines	12/18/20	Thomas R. Kobilarcik <small>Digitally signed by Thomas R. Kobilarcik Date: 2020.12.18 16:57:44 -06'00'</small>
7. Instrumentation	10/27/2020	<i>[Signature]</i>
8. Interlocks	12/17/20	Randy Zifko, UID:rmzifko <small>Digitally signed by Randy Zifko, UID:rmzifko Date: 2020.12.17 15:20:22 -06'00'</small>
9. Main Injector	N/A	
10. Mechanical Support	11/24/20	<i>[Signature]</i>
11. Muon	N/A	
12. Operations	11/04/20	<i>[Signature]</i>
13. Proton Source	N/A	
14. RF	N/A	
15. ENG Support	11/22/20	<i>[Signature]</i>
16. Target Systems	N/A	
17. Shutdown Coordinator	11/6/20	Consolato Gattuso <small>Digitally signed by Consolato Gattuso Date: 2020.11.06 14:46:24 -06'00'</small>

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

The Meson Primary radiation shielding meets the requirements documented in the 2003 "Shielding Assessment for the S4120 Project" and 2017 "P3 to S4 Absorber Incremental" shielding assessment.

<b>FINAL APPROVALS</b>			
System Department Head	Thomas R. Kobilarcik	<small>Digitally signed by Thomas R. Kobilarcik Date: 2020.12.18 18:36:47 -06'00'</small>	Date <u>12/18/20</u>
Assigned RSO	Maddie Schoell, UID:maddiew	<small>Digitally signed by Maddie Schoell, UID:maddiew Date: 2020.12.18 18:30:32 -06'00'</small>	Date <u>12/18/20</u>
AD Division Head	Mary Convery, UID:convery	<small>Digitally signed by Mary Convery, UID:convery Date: 2020.12.18 18:45:20 -06'00'</small>	Date <u>12/18/20</u>



**BEAM PERMIT**  
**12/18/2020**

**Meson Primary Accelerator Safety Envelope (ASE) Limit**

The maximum hourly beam power transmitted through Meson Primary to the M01 Target Train is limited as follows:

**Meson Primary:** 1.03 x 10<sup>16</sup> protons per hour at 120 GeV

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

**Meson Primary Beamline Operating Limits**

The maximum hourly operational charge transmitted through Meson Primary to the M01 Target Train limited as follows:

**Meson Primary:** 1.68 x 10<sup>14</sup> protons per hour at 120 GeV

Examples: Charge/hr = number of pulses/hr x number of protons/pulse

**Meson Primary:** 60 pulses per hour at 2.8 x 10<sup>12</sup> protons per pulse = 1.68 x 10<sup>14</sup> protons per hour

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Special conditions and comments:

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Reviewed by **Todd Sullivan** Digitally signed by Todd Sullivan  
Date: 2020.12.18 18:41:11 -06'00'  
Operations Department Head

Reviewed by **Thomas R. Kobilarcik** Digitally signed by Thomas R. Kobilarcik  
Date: 2020.12.18 18:37:28 -06'00'  
Systems Department Head

Reviewed by **Maddie Schoell, UID:maddiew** Digitally signed by Maddie Schoell, UID:maddiew  
Date: 2020.12.18 18:32:57 -06'00'  
Assigned RSO

Reviewed by **Maddie Schoell, UID:maddiew** Digitally signed by Maddie Schoell, UID:maddiew  
Date: 2020.12.18 18:33:10 -06'00'  
ES&H Radiation Physics Operations Department Head

Approved by **Mary Convery, UID:convery** Digitally signed by Mary Convery, UID:convery  
Date: 2020.12.18 18:44:26 -06'00'  
Accelerator Division Head

Operator Signatures

Crew Chiefs

Kelley 12/18/20 ✓  
Michael Doherty 12/19/20 ✓  
Dan Brown 12/19/20 ✓

Crew A

Judith M. Johnson 12/19/20 ✓  
Jay I. Munn 12-19-20 ✓  
Chris Ober 12/19/20 ✓  
Andy Patten 12-19-20 ✓

Crew B

George Williams 12/18/20 ✓  
Steve Brown 19 Dec 20 ✓  
Jamal Johnson 12/19/2020 ✓  
Quare 12/21/2020 ✓

Crew C

Shelley Peay 12/21/20  
John T. Hogan 12/21/20  
Myron Bullman 12/21/20  
Judith M. Johnson 12/21/20  
Matthew Patten

Crew D

Kwairi 12/18/20 ✓  
John Schaeffer 12/18/20 ✓  
Tony 12-18-20 ✓  
Ken P. McQuay 12/18/20 ✓

Crew E

Other

# Running Condition Meson Primary

December 18, 2020

Area RSO

Maddie Schoell

**Mode of Operation** Beam to the M01 Target Train

<b>Beam Limits</b>	<b>Beam Energy</b> 120 GeV	<b>ASE Limit</b> 1.03 E16 protons/hr	<b>Operating Limit</b> 1.68 E14 protons/hr
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**Critical Devices** S:MLAM1 & S:V204

**Enclosures Protected** F1,F2, F3, M01, M02, M03, M04 & M05

**Preferred Monitoring Devices\*** Intensity is monitored via S:F1SEM and/or F:MC1SEM

\*Other methods of monitoring intensity may be used.

## Requirements

**Access Devices** S:MLAM1 and S:V204 must be disabled in order to access the enclosures protected

**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. All fencing from M01 through and including M05 must be intact. The following gates must be secured with a Rad Fence lock to safely transport beam: M01PAE, M01PAW, M02PAE, M02VAE, M02PAW, M02VAW1, M02VAW2, M03PAW, M03VAE, M03PAE1, M03PAE2, M04PAE, M04VAE, M04VAW.

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.

**Sys. Dept. Head Approval** Todd Sullivan  
Digitally signed by Todd Sullivan  
Date: 2020.12.18 18:42:08  
+08'00'

**Sys. Dept. Head Approval** Thomas R. Kobilarcik  
Digitally signed by Thomas R.  
Kobilarcik  
Date: 2020.12.18 18:39:36 -0800'

**Assigned RSO Approval** Maddie Schoell,  
Digitally signed by Maddie Schoell, UID:maddiew  
Date: 2020.12.18 18:52:13 -0800'

**AD Head Approval** Mary Convery,  
Digitally signed by Mary Convery,  
UID:convery  
Date: 2020.12.18 18:46:13 -0800'

Area RSO

December 18, 2020

Maddie Schoell

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**Operational Comments**

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

It is acceptable to transport beam to the Meson Target Train using both slow spill and single turn extraction.



December 18, 2020

Area RSO

Maddie Schoell

Operator Signatures

Crew Chiefs

~~Rock~~ 12/18/20  
Phil G. Oak 12/19/20  
Duff Allen 12/19/20

Crew A

Jerry [unclear] 12/19/20  
Jim [unclear] 12-19-20  
Chris Ober 12/19/20  
Andy [unclear] 12-19-20

Crew B

George Williams 12/18/20  
Drew [unclear] 19 Dec 20  
Jamal Johnson 12/19/2020  
Darius 12/21/2020

Crew C

Sheldon [unclear] 12/21/2020  
John T. Horgan 12/21/20  
Kyrin [unclear] 12/21/20  
Jeddie [unclear] 12/21/20  
Nathan [unclear] 12/21/20

Crew D

[unclear] 12/18/20  
Jared Schaeffer 12/18/20  
[unclear] 12-18-20  
Kurt McDougall 12-18-20

Crew E

Other