

Memorandum

Michael Lindgren
Chief Accelerator Officer

Accelerator Division
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Date: December 16, 2020

To: Todd Sullivan

From: Mike Lindgren
Michael Lindgren, UID:mlindgre
Date: 2020.12.16 14:03:34 -06'00'

Re: Approval for running of beam through P3 to Switchyard Absorber

Safety documentation and procedures for approval to run beam through P3 to Switchyard Absorber are now complete and in place. Therefore, you are hereby authorized to run beam through P3 to Switchyard Absorber.

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] [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	10-28-2020	<i>[Signature]</i>
2. Cryogenics	N/A	
3. E/E Support	12/11/20	Chris Jensen <small>Digitally signed by Chris Jensen DN: cn=Chris Jensen, o=Fermilab, email=ccjensen@fnal.gov, c=US Date: 2020.12.11 12:51:28 -0600'</small>
4. RPO Manager	12/16/20	Madelyn Schoell, UID:maddiew <small>Digitally signed by Madelyn Schoell, UID:maddiew Date: 2020.12.16 13:40:30 -06'00'</small>
5. LSO	N/A	
6. External Beamlines	12/16/20	Thomas R. Kobilarcik <small>Digitally signed by Thomas R. Kobilarcik Date: 2020.12.16 13:43:44 -06'00'</small>
7. Instrumentation	10/27/2020	<i>[Signature]</i>
8. Interlocks	12/11/20	Randy Zifko, UID:rmzifko <small>Digitally signed by Randy Zifko, UID:rmzifko Date: 2020.12.11 07:44:38 -06'00'</small>
9. Main Injector	N/A	
10. Mechanical Support	11/24/20	<i>W. Wong Squires</i>
11. Muon	N/A	
12. Operations	11/04/2020	<i>[Signature]</i>
13. Proton Source	N/A	
14. RF	N/A	
15. ENG Support	10/29/20	<i>[Signature]</i>
16. Target Systems	N/A	
17. Shutdown Coordinator	11/5/20	Consolato Gattuso

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

RPO: A1 boroscope work is complete on the SY berm, but the end of work on the East side still has open excavation that's right on the line for having beam remain off. HP3US will remain locked until backfilled, should coincide with cooling pond work.

The P3 to SY Absorber radiation shielding meets the requirements documented in the 2017 "P3 to SY Absorber Incremental Shielding Assessment." 2019 "P3 to SY Absorber Incremental SA for ZERC" shielding assessment.

FINAL APPROVALS

System Department Head Thomas R. Kobilarcik Digitally signed by Thomas R. Kobilarcik
Date: 2020.12.16 14:01:54 -06'00' Date 12/16/20

Assigned RSO Madelyn Schoell, UID:maddiew Digitally signed by Madelyn Schoell, UID:maddiew
Date: 2020.12.16 13:50:14 -06'00' Date 12/16/20

AD Division Head Michael Lindgren, UID:mlindgre Digitally signed by Michael Lindgren, UID:mlindgre
Date: 2020.12.16 14:07:37 -06'00' Date 12/16/20

BEAM PERMIT
12/16/2020

P3-SY 120 Accelerator Safety Envelope (ASE) Limit

The maximum hourly beam power transmitted to Switchyard Absorber is limited to:
 1.03×10^{16} protons at 120 GeV.

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

P3-SY 120 Beamline Operating Limits

The maximum operational limit for beam transmitted to Switchyard Absorber is limited to:
 6.00×10^{14} protons per hour at 120 GeV.

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

#1 60 pulses per hour at 1.0×10^{13} protons per pulse = 6.00×10^{14} protons per hour.

Special conditions and comments:

Reviewed by	Todd Sullivan	Digitally signed by Todd Sullivan Date: 2020.12.16 14:08:07 -06'00'
	Operations Department Head	
Reviewed by	Thomas R. Kobilarcik	Digitally signed by Thomas R. Kobilarcik Date: 2020.12.16 14:02:43 -06'00'
	Systems Department Head	
Reviewed by	Madelyn Schoell, UID:maddiew	Digitally signed by Madelyn Schoell, UID:maddiew Date: 2020.12.16 13:51:37 -06'00'
	Assigned RSO	
Reviewed by	Madelyn Schoell, UID:maddiew	Digitally signed by Madelyn Schoell, UID:maddiew Date: 2020.12.16 13:51:47 -06'00'
	ES&H Radiation Physics Operations Department Head	
Approved by	Michael Lindgren, UID:mlindgre	Digitally signed by Michael Lindgren, UID:mlindgre Date: 2020.12.16 14:10:07 -06'00'
	Accelerator Division Head	

Operator Signatures

Crew Chiefs

Crew A

Crew B

Crew C

Crew D

Crew E

Other

Running Condition

P3 - Switchyard 120

December 16, 2020

Area RSO

Maddie Schoell

Mode of Operation Beam to Switchyard Absorber

Beam Limits	Beam Energy 120 GeV	ASE Limit 1.03 E16 protons/hr	Operating Limit 6.00 E14 protons/hr
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Critical Devices S:HP3US & S:HP3DS

Enclosures Protected Transfer Hall & Enclosures B, C, D, E, J, G1 Stub

Preferred Monitoring Devices* Intensity is monitored via I:BEAM sampled on the \$39 or S:SYDINT
 Intensity to the SY Absorber is monitored via S:SYDINT (see Operational Comments)

*Other methods of monitoring intensity may be used.

Requirements

Access Devices S:HP3US and S:HP3DS must be disabled 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.
 Shielding, fencing and posting are in accordance with the following shielding assessment documents:
 2017 "P3 to Switchyard Absorber Incremental Shielding Assessment"
 2019 "Addendum to P3 to Switchyard Absorber Incremental Shielding Assessment for IERC"

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

<p>Sys. Dept. Head Approval</p> <p>Todd Sullivan <small>Digitally signed by Todd Sullivan Date: 2020.12.16 14:07:27 -06'00'</small></p>	<p>Assigned RSO Approval</p> <p>Madelyn Schoell <small>Digitally signed by Madelyn Schoell, UID:maddiew Date: 2020.12.16 13:50:56 -06'00'</small></p>	<p>Sys. Dept. Head Approval</p> <p>Thomas R. Kobilarcik <small>Digitally signed by Thomas R. Kobilarcik Date: 2020.12.16 14:03:25 -08'00'</small></p>	<p>AD Head Approval</p> <p>Michael Lindgren <small>Digitally signed by Michael Lindgren, UID:mlindgre Date: 2020.12.16 14:10:53 -06'00'</small></p>
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Operational Comments

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

The sustained beam intensity to the Absorber should not exceed $6.00 \text{ E}14$ protons/hour due to thermal considerations of the Absorber. Protons per pulse may change depending on the rep rate.

It is also acceptable to transport beam to the Switchyard Absorber using single turn extraction.

Operator Signatures

Crew Chiefs

Crew A

Crew B

Crew C

Crew D

Crew E

Other