Memorandum

Michael Lindgren
Division Head

Accelerator Division
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Date: December 20, 2019

To: Todd Sullivan

From: Mike Lindgren Mary Convery for Mike Lindgren

Re: Approval for Running NIF

Safety documentation and procedures for restart of beam operations in the low energy Linac are now complete and in place. Therefore, you are hereby authorized to deliver beam to NIF.

cc: M. Convery
P. Czarapata
T. Kobilarcik
S. McGimpsey
E. McHugh
M. Schoell

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ADAP-11-0001
REV. 8

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 PIP-II _____

DEPARTMENT	DATE	SIGNATURE (Department Head/Designee)
1. Controls		NA
2. Cryogenics		NA
3. E/E Support		NA
4. RPO Manager	12/20/19	N. Chelidze
5. LSO		NA
6. External Beamlines		NA
7. Instrumentation		NA
8. Interlocks	9/13/2019	Greg M. Zeller
9. Main Injector		NA
10. Mechanical Support		NA
11. Muon		NA
12. Operations	09/27/19	Todd Sullivan
13. Proton Source		NA
14. RF		NA
15. ENG Support		NA
16. Target Systems		NA
17. Shutdown Coordinator	9/13/19	[signature]

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

The LINAC - NIF radiation shielding meets the requirements documented in the LINAC SHIELDING ASSESSMENT (SEE LINAC SIGN OFF SHEET) AND 1992 "NEUTRON THERAPY FACILITY 1992 SHIELDING ASSESSMENT" shielding assessment.

FINAL APPROVALS

System Department Head [signature] 11874 Date 12/20/19

Assigned RSO [signature] Date 12/20/19

AD Division Head [signature] 14804 Date 12/10/19

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BEAM PERMIT
12/20/2019

NIF Accelerator Safety Envelope (ASE) Limit

The maximum beam intensity transmitted through the NIF Beamline is limited to:
6.70 x 10^{18} protons/hr at 66 MeV

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

NIF Beamline Operating Limits

The maximum beam intensity transmitted through the NIF Beamline is limited to:
6.70 x 10^{17} protons/hr at 66 MeV

Example: Particles/hr = current (mA) x pulse length (μsec) x number of pulses/hr x 6.25 x 10^9

46.44 mA of beam with pulse length 57 μsec at 15 pulses/sec for 45 minutes in one hour:
(46.44 mA x 57 μsec x [15 pulses/sec x 2700 sec/hr] x 6.25 x 10^9 = 6.70 x 10^{17} particles/hour)

Special conditions and comments:

Reviewed by _____ 12/20/19
Operations Department Head

Reviewed by _____ 20 DEC 19
Systems Department Head

Reviewed by _____ 12/20/19
Assigned RSO

Reviewed by N. Chelidze 12/20/19
ESH&Q Radiation Physics Operations Department Head

Approved by _____ 12/20/19
Accelerator Division Head

Operator Signatures

Crew Chiefs

Crew A

Crew B

Crew C

Crew D

Crew E

Other

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Running Condition
NIF

December 20, 2019

Area RSO Sue McGimpsey

Mode of Operation Full Operation

Beam Limits	**Beam Energy**	**ASE Limit**	**Operating Limit**
	66 MeV	6.70 E18 protons/hr	6.70 E17 protons/hr

Critical Devices L:C58DEG and L:C32DEG bend magnets

Enclosures Protected NIF (NTF) Treatment Room, LL Gallery North Cage

Preferred Monitoring Devices* Intensity is monitored via L:ClNT

*Other methods of monitoring intensity may be used.

Requirements

Access Devices The L:C58DEG and L:C32DEG bend magnets must be disabled to enter the NIF Treatment Room or the fenced area located in the Lower Linac Gallery, north side of NIF.

Cool Off Period none

Special Interlocks The CDC Inputs including failure mode devices may all be found on the Safety System Status pages.
The NIF Critical Devices are hardware permitted to the NIF treatment Room Poly door, Timer, and the Lower Linac Gallery fenced area Stone/Gate, Crash Button, Linac, Ground Fault.

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 gates, fencing and passive shielding requirements for Linac Operation must be met, and in accordance with the "Neutron Therapy Facility 1992 shielding assessment", in addition to the requirements listed below while beam is enabled in the NIF Treatment Room (TR). The fence on the roof above the TR must be posted as a Radiation Area and locked with a Radiation Area fence lock. The fence around the passive shielding immediately above the TR be locked with a PAD 111 cored padlock (Neutron Therapy Facility Reset & Enable key). The areas located in the Linac Upper Level Gallery adjacent to the TR on the north and south side must be posted as Radiation Areas by the Proton Source Department, in accordance with the NIF Shielding Assessment, and the fence located in the Linac Lower Level Gallery adjacent to the north and south sides of the TR must be posted as a Radiation Area and locked with a PAD 111 cored padlock by the Proton Source Dept.

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

Ops. Dept. Head Approval 12/20/19 **Assigned RSO Approval**

Sys. Dept. Head Approval 11871e **AD Head Approval**

Operational Comments

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

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Running Condition
NIF

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Area RSO Sue McGimpsey

Instrument Information

There are no interlocked detectors that specifically trip the NIF critical devices. Beam to NIF would trip Linac interlocked detectors.

MUX	Type	Location	QF	R/I Mode	Trip Level	CDC	Device(s) Tripped
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Note: QF only included for chipmmunks

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Running Condition
NIF

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Area RSO Sue McGimpsey

Operator Signatures

Crew Chiefs

Crew A

Crew B

Crew C

Crew D

Crew E

Other