

APPENDIX A

CBETA INTERLOCK CHECKOUT PROCEDURE

Rev. 03.04.2019

- _____ 1. Announce that CBETA Interlock Checkout is about to begin.
- _____ 2. Disable the following three Radiation Producing Systems for the duration of the interlock checkout:
 - a. Gun High Voltage
 - b. Laser primary power or shutters
 - c. R. F. Klystrons primary power or H.V.
 - d. SSA primary power
 - e. HPA primary power
- _____ 3. Reset the Light Beam interlocks (LBI) and check chains on the LED panel in Rm.147.R734.
- _____ 4. Using a LBI Key, reset the Area Reset Boxes and check for a completed reset chain on the LED panel in Rm.147.R734.
- _____ 5. Return all LBI Keys to their storage box and check for completed redundant chains on the LED panel in Rm.147.R734.
- _____ 6. See that Gun High Voltage, Laser Shutters and R.F. Klystrons are enabled.
- _____ 7. Remove a LBI key and check that each of the following three Radiation Producing Systems becomes disabled:
 - a. Gun High Voltage
 - b. Laser shutters
 - c. R. F. Klystrons
- _____ 8. Using a spare key to enter the accelerator perimeter and open the laser gun table lid.
 - a. Verify that the laser shutter chain cannot be completed and that the laser shutters cannot be opened due to the flight path interlock.
- _____ 9. Replace the laser gun table lid and check for completed redundant chains in both the LED panel in Rm.17.R.734 and the EPICS display.
- _____ 10. Use the spare key to enter the accelerator perimeter and activate each Emergency Stop.
 - a. First floor (5 total)
 - i. ___ North side of MLC
 - ii. ___ NW building wall, near gun and laser room
 - iii. ___ North building wall, in electronics racks
 - iv. ___ East wall, near beam dump
 - v. ___ Center of ring, near pump skid
 - b. Second floor (3 total)
 - i. ___ Northwest corner, near door

- ii. ___ North wall, near reset box
- iii. ___ Southeast mezzanine, near reset box

- _____ 11. Check:
- a. That each of the following three Radiation producing systems are disabled with each Emergency stop activation:
 - i. Gun High Voltage
 - ii. Laser shutters
 - iii. R. F. Klystrons
 - b. Verify that the activation of any of the emergency stop buttons removes the emergency stop element of the three enable chains.
 - c. Reset all emergency stop buttons.
 - d. Check the RED warning beacon and confirm the 5sec. evacuation horn sounds.
- _____ 12. Again check for completed redundant chains on the LED panel in Rm.147.R734.
- _____ 13. See that Gun High Voltage, Laser Shutters and R.F. Klystrons are enabled.
- _____ 14. Interrupt the L0.E **West IR Light beam** and see:
- a. That each of the following Radiation Producing Systems becomes disabled:
 - i. Gun High Voltage
 - ii. Laser shutters
 - iii. R. F. Klystrons
 - b. That all reset boxes in the following areas lose their reset status.
 - i. L0E 1st floor
- _____ 15. Reset the Light Beam interlocks and check for completed redundant chains on the LED panel in Rm.147.R734.
- _____ 16. Reset the Area Reset Boxes and check for a completed reset chain on the LED panel in Rm.147.R734.
- _____ 17. See that Gun High Voltage, Laser Shutters and R.F. Klystrons are enabled.
- _____ 18. Interrupt the L0.E **South Stairs IR Light beam** and see:
- a. That each of the following Radiation Producing Systems becomes disabled:
 - i. Gun High Voltage
 - ii. Laser shutters
 - iii. R. F. Klystrons
 - b. That all reset boxes in the following areas lose their reset status.
 - i. L0E 1st floor
- _____ 19. Reset the Light Beam interlocks and check for a completed redundant chains on the LED panel in Rm.147.R734.
- _____ 20. Reset the Area Reset Boxes and check for a completed reset chain on the LED panel in Rm.147.R734.

- _____ 21. See that the Gun High Voltage, Laser Shutters and R.F klystrons are enabled.
- _____ 22. Open the L0.E **DRE Hall Gate (will also turn off CESR GUN)** and see:
- a. That each of the following Radiation Producing Systems becomes disabled:
 - i. Gun High Voltage
 - ii. Laser shutters
 - iii. R. F. Klystrons
 - b. That all reset boxes in the following areas lose their reset status.
 - i. L0E 2nd Floor
- _____ 23. Close the Hall Gate then reset interlocks and check for a completed redundant chains on the LED panel in Rm.147.R734.
- _____ 24. Reset the Area Reset Boxes and check for a completed reset chain on the LED panel in Rm.147.R734.
- _____ 25. See that the Gun High Voltage, Laser Shutters and R.F. klystrons are enabled.
- _____ 26. Interrupt the L0.E **East Stairs IR Light Beam** and see:
- a. That each of the following Radiation Producing Systems becomes disabled:
 - i. Gun High Voltage
 - ii. Laser shutters
 - iii. R. F. Klystrons
 - b. That all reset boxes in the following areas lose their reset status.
 - i. L0E 1st floor
 - ii. L0E 2nd Floor
- _____ 27. Reset the Area Reset Box and check for a completed reset chain on the LED panel in Rm.147.R734.
- _____ 28. See that the Gun High Voltage, Laser Shutters and R.F. klystrons are enabled.
- _____ 29. Interrupt the L0.E **North IR Light Beam** and see:
- a. That each of the following Radiation Producing Systems becomes disabled:
 - i. Gun High Voltage
 - ii. Laser shutters
 - iii. R. F. Klystrons
 - b. That all reset boxes in the following areas lose their reset status.
 - i. L0E 1st floor
 - ii. L0E 2nd Floor
- _____ 30. Reset the Area Reset Box and check for a completed reset chain on the LED panel in Rm.147.R734.
- _____ 31. See that the Gun High Voltage, Laser Shutters and R.F. klystrons are enabled.
- _____ 32. Test each radiation monitor trip level:

- a. Check that each of the following three Radiation Producing Systems is disabled:
 - i. Gun High Voltage
 - ii. Laser shutters
 - iii. R. F. Klystrons
- b. Monitors:
 - i. _____ Gamma – Overhead Door East
 - ii. _____ Gamma – Overhead Door West
 - iii. _____ Gamma – F-line
 - iv. _____ Gamma – CHESS Mezzanine
 - v. _____ Neutron – Overhead Door East
 - vi. _____ Neutron – Overhead Door West
 - vii. _____ Neutron – F-line
 - viii. _____ Neutron – CHESS Mezzanine
 - ix. _____ ~~Gamma~~ SPARE (not connected)

_____ 33. See that the Gun High Voltage, Laser Shutters and R.F. klystrons are enabled.

_____ 34. Announce that CBETA Interlock Checkout is Complete

_____ 35. Remove any interlock checkout disabling devices.

_____ 36. Sign this Interlock Check sheet and file in the CBETA Log Book.

Completed by _____ Date _____

PPS Rack L0.E.R723 Safety Seal Number _____