

Linac Power Outage Response

Reviewed by _____

If the Pre-Acc area, Linac Galleries, or associated power supplies are affected by a power outage, use the guidance below to aid in the investigation and recovery. Steps don't need to be done in the order they're written. Some can be done simultaneously and some can be skipped depending on the situation. As always, the major objective during any power outage is to ensure the safety of personnel and equipment, and to restore power.

Contact Personnel as Necessary:

- Duty Electrician
- Proton Source Department Head
- Linac Machine Coordinator
- Linac Operations Group Leader
- Pre-Acc Group Leader
- Mechanical Support Department Head
- Operations Specialist for Proton Source
- Operations Department Head

Linac LCW Systems:

Since many Linac LCW systems are located in the Linac galleries, they may also be affected by a Linac power outage. Monitor the status of these systems:

- Pre-Acc LCW skid (“I- Skid”)
- Laser Notcher skid
- Cavity and RF skids for LRF stations
- Distribution Skid
- KRF LCW systems in the Lower Linac Gallery
- Klystron Cooling Skids 1, 2, and 3
- 400MeV/Waveguide skid
- Debuncher Cavity and RF skids

Scout:

If personnel are available, a field team can try to ascertain the extent of the outage.

- Bring a flashlight and walk the Pre-Acc area and Linac Galleries and make note of the areas that are without power.
- Check the Linac enclosure lights to see if power is still on.
- Make note of any other issues found such as strange odors and water on the floor.

Monitor:

If the Controls System is running, it can be used to monitor the following:

- Supply and Return pressures and temperatures for the above LCW systems.
- Status of Pre-Acc and Linac power supplies and RF.
- Status of Linac interlocks.

Actions:

If you discover signs of trouble with any Linac system, take reasonable action to protect associated equipment. For LCW problems, consult with the Linac Machine Coordinator to turn off the affected equipment:

- **RFQ Injector Linac (RIL):** Make sure that the power supplies for LEBT solenoids, MEBT quads, and RFQ RF station are off.
- **LE QUADS:** Breaker off the drift tube quads.
- **Low Energy RF stations:** Turn off the control power on the A5 racks for the LE RF stations.
- **Klystron Stations:** Turn off charging switches, solenoid coil power supplies, and filament breakers.

Follow all guidance given by the experts who are contacted. They may have additional instructions.

When Power Returns:

- Inform everyone who has already been contacted.
- Validate alarms to ensure everything that should be monitored is being monitored.
- Continue to monitor Linac LCW system pressures, temperatures, and levels.
- Walk the Pre-Acc area and Linac Galleries as time and personnel availability permit. Look for any signs of lingering complications.
- Work with experts to begin recovering affected systems (vacuum, RF, magnet power supplies, etc.)
- Verify that all Linac Nodes are responding to the node poll.
- Make sure that Linac sees TCLK. Reminder: if TCLK is lost, nodes *should* automatically switch to LCLK.
- Do a 400MeV Power Cycle.
- When beam returns, verify that the 400MeV Autotune is up and running.

Make sure to document all steps taken in the MCR e-log.

***A word file for this document is kept on the BD/Operations Staff Sharepoint.**

NOTES: Please use this area to note any problems encountered during recovery.