Collider-Accelerator Department

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Memo

date: *February 12, 2010*

to: *RSC, D. Raparia, J. Alessi, C. Gardner, J. Reich, K. Brown, H. Huang*

from: *D. Beavis*

subject: *Linac Access Control System*

The Linac access control system is expected to be updated in the future. It is presently a relay based system. The logic and the wiring are documented in a series of schematics D40-E001 to D40-E026. These documents can be examined using the C-AD Drawing archives. To access the archives go to the link: http://dwg-server.c-ad.bnl.gov/ENG-ARCH/index.htm . When at the index select AGS, then AGS mechanical and electrical, then AGS electrical released drawings, and finally security.

The drawings were examined both for details and with an eye towards simplification for a future upgrade of the system. The wiring prints were not field checked since the Linac is operating. The drawings were found to be reasonable with minor nomenclature issues. I would like to address several generic issues for the Linac and other areas such as the AGS and Booster for a future meeting.

It is suggested that the committee consider how device protection is handled in the future. There are several examples in the Linac Access Control system where device protection is in the interlocks. An example is that the water-cooled beam stops have flow switches that interlock the beam if the flow stops. However, the beam stop will provide protection should the cooling fail, although the device may be damaged. The Linac already has device protection through the Fat Beam Interrupt (FBI) system.

There are substantial complications to the interlock logic to allow for RF pulsing with access to tanks 1 to 9. This mode is entangled into the interlocks for beam operations. The x-ray hazard from RF pulsing is well below 50 rem in an hour while the beam hazard exceeds 1,000,000 rem per hour with full beam on a target. **It is suggested that either the RF access for testing be handled by an administrative process with controlled keys and procedures or that it be implemented with a simple one layer interlock system not entangled with the beam operation interlocks.** The Linac staff should clarify the uses and need for a special RF testing system.

Remove as many internal gates as possible. Since TtB will become obsolete with the completion of EBIS the internal HEBT gate could be removed. Removal of this gate before EBIS completion could be handled with administrative procedures. The hazard for a full beam fault in TtB is less than 50 rem in an hour. If the RF testing option is handled administrative then either

the Tank 9 gate can be removed or removed from the beam interlocks. The need and use of the BLIP gate should be included.

It is suggested that dead ends and no-man zones be allowed to be swept and secured at any time and that the sweep complete for these type of zones stay valid until a door is opened.

Consider if and when an HP disable switch should be included in the systems for various gates.
It is suggested that the access method be considered such as controlled keys, card readers etc. Using the same method everywhere throughout the C-AD may add unnecessary complexity for some areas.

The committee should consider the options for phasing in the upgrades so that the entire interlock system for an area does not have to be changed in one year. For example the crash system and warning systems could be upgraded and then interfaced to the old relay system until the upgraded controls are installed.

The scope for future upgrades needs to be determined. What devices and barriers will remain unchanged and which ones will be changed. End of life issues should be examined for existing components especially for critical devices.

CC: RSC Linac file
RSC Interlock file