C-AD

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Radiation

Safety Minutes of RSC Subcommittee of June 1, 2016

Committee

Subject: Upgrade of Booster Access Control System

Present: D. Beavis, J. Reich, J. Sandberg, R. Karol, C. Schaefer, C. Theisen, G. Wagner, H. Hartmann, D. Hillis, and A. Etkin

The committee met to resolve unfinished decisions for the BoosterACS upgrade. The system will be finished during the summer 2016 shutdown. A list[1] of agreed changes and unresolved changes was provided to the committee.

EBIS Diagnostic Beam Mode

The committee recommends that redundant status of the Booster main magnet power supply (MMPS) off be used to allow the EBIS Beam stops to be open. If this is not possible then the committee recommends that a single status of the MMPS be used in conjunction with the status of the vacuum valve being closed. This mode (EBIS diagnostic mode) will be selected by a software button on the HMI. The vacuum group has been reluctant to allow use of the value but the committee wants to discontinue the use of locks and tags for this mode. If this mode is selected the vacuum group can install another value for this purpose. If it is necessary to use a vacuum valve it should be noted that the valve is closed and typically not opened until the EBIS diagnostic mode is no longer needed.

(CK-EBIS-July 1, 2016-J. Sandberg & K. Gardner-1045) Determine final EBIS diagnostic logic.

Linac Zones 3 and 4

Although the committee had recommended the change of this area a year ago there was no interest in needing this option. This was confirmed with operations and will not be implemented. The need to better understand the radiation from the Booster through the beam pipe into the spur can be removed from the list of check-off items.

High Intensity Beam: U-Line and NSRL

[1] J. Reich, "Items for ACS Upgrade", May 17, 2016

It was decided to make the protection of U-line and transport elements downstream such as Thompson Road and RHIC as simple as possible. It the AGS beam program changes it will take several years to implement a new facility and this would provide plenty of time to upgrade the access controls. The decision was to use U-down in beam enable mode to determine a risk was present for high intensity pulses. The access controls can use either the status of the power supplies for UD1/2 as on or the logical state that the downstream U line is in no access mode. If either of the B15 transformers see a pulse higher than the allowed limit the access control system will turn the Linac to Booster (LtB) off and the status will be latched. The Linac is the only source that can create beam intensity high enough to be a concern for short duration faults. The logic will allow one high intensity pulse to be extracted, which is allowed by the shielding policy[2].

(ATS-Sept. 1, 2015-P. Ingrassia & V. Schoefer-Uline) Change OPM 6.8 to reflect changes in the logic and operators responses for B15 transformers.

The Upstream U-line is required to be secure for AGS operations. This logic allows the AGS to operate with the downstream U-line unsecured and not be concerned with B15 transformer interlocks.

High Intensity Linac pulses can be delivered to NSRL from the Booster. This has been discussed[3] in previous RSC meetings.

The Linac is expected to undergo an intensity upgrade of a factor of two using higher repetition rate and a longer pulse width. The U-line and NSRL still are acceptable for accidental high intensity beam. However, the logic to prevent several pulses would be cleaner and simpler if a transformer was placed in LtB to interlock off transfer of beam to the Booster if high intensity pulses are detected.

(ATS-Sept. 1, 2015-W. Fischer & D. Raparia-Linac) The committee recommends that a current transformer in LtB be part of the intensity upgrade for the Linac.

Water Flow for D3 and B6

The water flow switches for both D3 and B6 should be moved to the machine protection system (MPS). If there is logic that requires them to be in a configuration management system such as the ACS then that reasoning needs to be presented.
(CK-EBIS-July 1, 2016-G. Mahler & K. Gardner-1046) Put D3 and B6 water flow switches in beam permit system.

Key Tree

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[2] Thompson Road is an Uncontrolled Area and the C-AD limit for a single fault is 20 mrem. One pulse of $2.5*10^{13}$ protons could produce 3.8 mrem at Thompson Road. The current limit on the transformers is $2.5*10^{12}$ protons.
[3] See RSC Meeting of Oct. 10, 2013; http://www.c-ad.bnl.gov/esfd/RSC/Minutes/10_10_13Minutes.pdf

The new keytree design was extensively reviewed with the operations group with C. Naylor activing as operations representative. The planned design is satisfactory both to operations and the ACG. The system is essentially as presented at the last Booster review of the ACS.

CC:

Present
RSC
RSC Minutes File
P. Ingrassia
D. Raparia
W. Fischer
T. Blydenburgh
D. Passarello
G. Mahler
K. Gardner