C-AD

Radiation

Safety Committee

Issued: June 29, 2006

Minutes of Radiation Safety Committee of May 10, 2006

Subject: RD1/2 as Critical Devices for NSRL

Present: D. Beavis, B. Van Kuik, L. Ahrens, K. Yip, A. Rusek, I.-H. Chiang, J. Reich, J.W. Glenn, R. Karol, W. MacKay, P. Pile, and A. Etkin.

The committee reviewed the material related to the potential for scattered particles from the RD1/2 vacuum box being transported into the experimental area if RD1/2 are used as critical devices.

The committee recommended that the proposed fault study (see attachment 1) be done to obtain a measurement of the dose to the experimental area.

The expected dose is 1-10 mrem per 10**12 protons (see attachment 2 and attachment 1). It is anticipated that the actual source that can be created will produce less particle flux than in the simulations. The committee will review the results and make a decision if the mode of operation with RD1/2 as critical devices can be used and under what conditions. Beam can get to RD1/2 if the beam permit fails. It is important that a measurement of the time for the interlocks to stop the beam be made to establish how much beam could strike RD1/2 if the beam permit fails.

The beam optics are well understood for the NSRL beam line. The instrumentation package upstream of RD1/2 should help ensure that the beam is steered properly into RD1/2 during the fault study. P. Pile provided (attachment 2) an extensive treatment of the beam optics, particle production, and dose to the experimental area. This worse case scenario requires retuning the beam optics both before and after RD1/2 to optimize particle production and acceptance into the beam line for transport to the experimental area. The increased particle production predicted by MCNPX (see attachment 3) at low energy was taken into account in the dose estimate above . This includes the potential for a narrow elastic peak near the beam energy. The fault study can be conducted with a 1 GeV proton beam and scaled to the highest NSRL energy with MCNPX.

The beam plug could be added as a second device to supplement RD1/2 if the results from the fault study indicate that the potential dose in a fault is too high. During proton operations the use of D6 septum as a critical device is not as disruptive as during heavy

ion operations. It might be possible to limit the RD1/2 critical device operation to Booster operations with only beams from the Tandem.

Attachments (file copy only)

1) D. Beavis, " Using RD1/2 as Critical Devices", memo of May 8, 2006
2) P. Pile, " NSRL Fault Study Turtle Simulation", PowerPoint File of April 4, 2006
3) K. Yip, MCNPX particle production at 20 degrees for 1 GeV and 3 GeV protons on steel.

CC:

Present
RSC
RSC Minutes file
RSC NSRL File