

DB

Minutes of the AGS Radiation Safety Committee

Friday, May 3, 1991

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Subject: E854 in the B2 Beam Line

The B2 beam line is an existing beam line to the MPS. The beam line allows for velocity selection of particle species using electrostatic separators and a mass slit located upstream of B2D5. The beam line has not been modified since its last use.

A. Etkin provided an estimation of the beam intensity levels of the beam line for the experiment (Attachment 1). Maximum fault and secondary beam intensities were discussed for a maximum of 10^{13} protons/spill on a thick target.

The maximum dose rate in the beam is estimated to be 250 rem/hour where the beam can be focused. The two normal focal points are the mass slit and the experimental area. The B2 separator area has direct access to the beam.

The committee recommends that appropriate barriers be installed to prevent personnel access to the beam in the B2 secondary cave (CK-B2-1). The gate to this area has interlocks. The barriers prevent access to the beam, act as one level of protection and the access gate with its interlocks as a second.

The committee recommends that the barriers be appropriately labeled and a memo be written by the liaison physicist describing appropriate action if a barrier needs to be removed for work (CK-B2-2). This labeling and memo should also include the barriers between the mass slit and the MPS experimental area.

The MPS experimental area is presently rated as a Class III area. Based on the maximum beam intensity, this is appropriate. A single NMC unit located immediately downstream of B2D5 should be sufficient to prevent any potential intensity excursions. A limit of 4×10^7 particles/spill will be the top of the Class III rating for the transport pipe and the MPS experimental area.

The level should be set as low as possible below the maximum allowed level but high enough to prevent nuisance trips on intensity. The expected normal operating intensities for the experiment are:

1-2 x 10¹² particles/spill on B target,
3 x 10⁶ particles/spill transported to MPS,
3 x 10⁷ particles/spill on the mass slit.

The committee recommends that one NMC unit with a maximum of 4 x 10⁷ particles/spill be placed immediately downstream of B2D5 (CK-B2-3).

To prevent mismatches in polarities which could create the potential for abnormally high levels on the experimental floor, the committee recommends that the dipoles B2D3, B2D4, D2D5, B2D6, and the MPS spectrometer be locked and red tagged in the proper polarity prior to operation (CK-B2-4).

The B2 beam line transports the beam across the experimental floor where there is direct access to the beam line elements and beam pipe. The dipoles B2D5 and B2D6 have current comparators which are referenced to B2D4. The levels on the floor (a radiation area) might exceed the 5 rem/hour, which a single active failsafe device is allowed to protect. In addition, it is expected that a chipmunk should be placed downstream of B2Q7 to prevent scraping in the beam pipe due to poorly tuned beam.

The committee recommends that an alarming/interlocking chipmunk be placed in the vicinity of B2Q7 to prevent scraping from poorly tuned beam and to act as a redundant device should the current comparators fail on B2D5 or B2D6 (CK-B2-5).

The committee recommends that the following fault studies be conducted (CK-B2-6):

1. Routine operations with substantial beam on the mass slit to examine levels caused by the mass slit and specifically in the E871 counting house.
2. The beam stop for leakage of neutrons and especially muons. The test for muons should be done at higher negative beams such as 7 to 9 GeV/c (near the top running momentum of 9 GeV/c).
3. Faults caused by B2D6 running at incorrect currents including outside the allowed window of the current comparator.

4. Scraping in the quadrupoles B2Q7 and downstream. Scraping downstream of B2Q7 may require an additional chipmunk or barriers depending on the results of the fault studies.

The experiment may request some running without a target in place at the B target station to check out beam line instrumentation. The source for the beam line would be the B target flag. Thus, the B2 beam intensity would be substantially lower but the final beam line fault studies may not be complete. If this becomes necessary, a subgroup will examine the required conditions for this run.

Attachment

#1 - "B2 Beam to the MPS", 5/2/91

mvh

minutes.mtg

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