Thursday 23 February 1995

K. Reece

RICR.

Minutes of meeting: Radiation Safety Committee, Wednesday 8 February 1995

Present: L.Ahrens, D.Beavis, H.Brown, I.H.Chiang, R.Connolly, A.Etkin, D.Lazarus, A.McGeary, E.Njoku, K.Reece, D.Trbojevic; G.Bunce, A.Carroll, D.Dayton, W.Morse, S.Tanaka.

Subject(s): Single Bunch Extraction (SBE) in the B2 Test Beam.

A presentation by Alan Carroll (attached) reviewed the operating requirements for the SBE test in the B2 test beam. The experiment was approved with the following comments;

1. Experiment beam intensity is 2×10^{12} protons per bunch (per 3 second repetition period).
2. Use a standard chipmunk to monitor the pulsed radiation levels adjacent to the beamline. FNAL data indicates the response of the chipmunk (and HPI-1010 meter) to a 40nsec bunch to be approximately 65% of the response to a DC beam. This must be considered for the Alarm and Interlock levels set for this device as well as HP survey data. [Suggest Alarm = 10mrem/hr and Interlock = 20mrem/hr.] This chipmunk will be located at the fence where the HP surveys indicate the maximum "normal operation" levels, (67 degrees from the Calorimeter).
3. The experimenters should stay upstream of the B2 access gate.
4. The security group (A.McGeary) must provide the interlock logic for this area, (chipmunk interlock or gate "crash" will turn the B2 beamline Safely-off. [CK-B2-SBE-01]
5. B2 test beam will be posted and controlled as a ClassIII area for this run. [CK-B2-SBE-02]
6. MCR/EAG will control the "B2 test beam key" for the duration of this test. MCR/EAG is responsible for the sweep and securing of the area. [CK-B2-SBE-03]
7. The target "B" target should be reviewed by the liaison engineer to prevent any contamination from falling to the floor if the target fails. [CK-B2-SBE-04]
8. The "B" target cave should be checked by HP for contamination during and after the run if access is required.
9. Both B2 dipoles should be LOTO in (+) polarity. [CK-B2-SBE-05]
10. Current limits on the two B2 dipoles should be set to limit the beam momentum to 3GeV/c. [CK-B2-SBE-06]
11. An ion chamber will be used to measure the beam intensity. A calibration with DC beam should be done first to compare with the bunched beam response. W. Morse has the data from an earlier run with SBE and this old data should also be compared with the new calibration. [CK-B2-SBE-07]

12. The beam should be "fully enclosed" (beam pipe and/or He bag). [CK-B2-SBE-08]
13. Data from other chipmunks should be reviewed from this run.
14. Adjacent primary beam caves (C and C3) must be secured for this run. [CK-B2-SBE-09]
15. Adjacent locations must be surveyed by HP throughout the run, (with the 65% meter efficiency).

cc: RSC
RSC file
P. Ingrassia
R. Hubbard

31 Jan 1995
Rev 7 February 1995
A. S. Carroll

RADIATION SAFETY FOR SBE MARCH 1995 RUN IN B2 TEST BEAM

RATES:

Wide open acceptance of B2 is 7.8x10**-05 ster-GeV. The production of 3 GeV/c pi+ is 1.41 and protons is 0.53 particles/GeV/c/inter proton at 24 GeV.

So for 3 x 10**13 in AGS there are 4 x 10**12/rf bucket. This implies 1.3 x 10**12 interacting if we use a 1 interaction length target.

(1.3 x 10**12)(3.8 x 10**-5)(1.94)=9.6 x 10**7 particle/pulse

The spot size is about 8 cm**2, and the repetition rate is 3 sec.

The rate is then 4 x 10**6/cm**2/sec.

Suggest that B2C2 momentum collimator be closed(+/-12mm) to prevent rise over 2 x 10**6/cm**2/sec - with Class III limitations.

SECURING AREA:

Secured area, reset by HP or ~~Radiation Workers.~~ RSW. by securing B2 test leg.

BEAM LIMITATION: => request 2×10^{12}/bunch (not 4).

Use Ion Chamber to measure intensity. Limit maximum momentum to about 3 GeV/c.

Interlock CHIPMUNK to trip beam at 20 mRem/hour at highest level along fence. From Fermilab Report* the efficiency of the Chipmunk for the short spills will be about 65% so that the trip at 20 mRem/hr will actually correspond to 30 mRem/hr.

SCATTERING SOURCES;

Need to insure that there is no significant scattering material upstream of calorimeters. Install a helium bag. Calorimeter should remain in the magnet.

Estimating from a CASIM calculation at 28 GeV/c the radiation level at the fence should not be more than about 5 mRem/hour at the worse spot. The magnet back leg will reduce this further. It would be advisable for the experimenters to sit upstream of their calorimeter to reduce the levels still further.

Need to be sure that target can withstand the thermal/mechanical shock of the fast beam bunch. Use a 0.5 x 0.5 in**2 by 3 inch long copper target. From CASIM run, the heat produced by 2 x 10**12 particles/sec is 0.2 GeV/particle which corresonds to (0.2 x 10**9 ev)(1.6 x 10**-19Joules/ev) (2 x 10**12 particles) = 64 watts. Steady state cooling should not be a problem.

Shielding needed to intercept all possible bend angles from g-2 magnet(B2D3). This was tried last running period.