

Minutes of the AGS Radiation Safety Committee

Friday, December 28, 1990

Present: D. Beavis, R. Chrien, A. Etkin, W. Glenn, A.J. McGeary, S. Musolino,
A. Stevens, P. Yamin

Subject: 2 GeV/c beamline

Discussion was based on the written description on the beam line and the associated beam rates (attachment 1 - previously distributed).

Comments on the assumed running parameters which affect the estimates of the secondary beam intensity were:

- 1) A maximum primary beam intensity of 10^{13} was used in the analysis. For the next year the maximum primary beam intensity will be less than 2×10^{13} protons/spill. It will be decided at another meeting whether for FY91 running the committee will allow for administrative control to limit the beam to 10^{13} protons/spill to the D line. In future year the booster will increase the maximum primary beam intensity up to 6×10^{13} protons/spill.

Limiting the primary beam intensity into target caves will continue to become an issue; the committee recommends that the instrumentation group examine how the intensity into primary cave can be limited using instrumentation in the primary caves or transport (ACT-007 D. Beavis and E.T. Lessard).

- 2) That the limiting momentum of 2 GeV/c is set by the first dipole, D6D1, maximum integrated field.
- 3) The reference for the secondary particle yields are from the report of Sanford and Wang. It is noted that this is often considered an overestimate of the particle yields at these low momentum.

Comments on the transport optics were:

- 1) It was noted that the transport tune shown in Fig. 1 was not the final tune for the beam line, thus it has a larger horizontal size at the target than the final tunes done with turtle.
- 2) It was noted that the apertures inside D6D3 and D6Q9, a series of fixed collimators and the second mass slit, limit the ability to retune the beam to obtain a substantially smaller beam.

Comments on the normal running conditions were:

- 1) The size of the maximum intensity excursions was the main discussion. If primary beam intensities above 10^{13} are folded in then these factors can approach 600 (positive Secondary beam at 2×10^{13} protons on Target) above the desired operating level.

Comments for the upstream separator cave were:

- 1) It was noted that this is an activation area. Levels at the upstream end of the cave near D6Q1 are expected to be several rem/hr.
- 2) The area will be interlocked as a class I area when the D Line is operational. The entrance gate be a primary gate. The gate reset and access functions (including controlled access) be as similar as possible to other primary gates in the facility. However, it is important that entrance into this gate does not require a resweep of the D cave. (CK-D-1)
- 3) A secure means must exist to prevent entry from the separator cave to the reentrant cavity of the primary beam. Residual levels in the reentrant cavity may exceed 5 rem/hr. This must be verified before operations. (CK-D-2)
- 4) The option of placing an interior gate near the steel shield across the separator should be considered. This gate could reduce dose in sweeping since the activated portion of the beamline is upstream. It might enable classifying the rear portion of the cave as a radiation area with D primary beam off provided appropriate protection from x-rays from the separators is provided.
- 5) That status indicators for the separators exist at the entry gate and inside the cave. (CK-D6-1)
- 6) That the need for a reset station and crash button on the dump side of the beam line be examined when the separators are in place. Also, whether this is a one man or two man sweep will need to be determined when the separator and magnets are in the cave. (CK-D-3)
- 7) That the appropriate sweep procedure be prepared for this cave. (CK-D-4)
- 8) The committee recommends that additional consideration be given on how to handle the separators and be approved by the sub-committee listed below and be reported back to the committee. (CK-D-5)
- 10) A sub-committee of D. Beavis, W. Glenn, A. McGeary, and A. Etkin examine and approve the final interlock logic for both separator caves. (CK-D-6)

Comments for the downstream separator cave were:

- 1) It was noted that this is an activation area. Residual levels at the first mass slit are expected to be approximately 1mr/hr and this should be the maximum residual activity.
- 2) The entrance gate be a primary gate. The gate reset and access functions (including controlled access) be as similar as possible to other primary gates in the facility. However, it is important that entrance into this gate do not require a resweep of the D cave. (CK-D-7)
- 3) That status indicators for the separators exist at the entry gate and inside the cave. (CK-D6-3)
- 4) That the appropriate sweep procedure be prepared for this cave. (CK-D-8)
- 5) The only reason that this separator cave need be classified as a high radiation area with beam off in the D line is because the separators can be a source of x-rays. With experimenters needing to access this cave for equipment at the first mass slit it may be difficult to require they have high radiation area training. Therefore, the committee recommends that additional consideration be given on how to handle access with the separators on and the D line off. It was also noted that experimenters without high radiation worker training may not know the proper response to the lights dimming and also other hazards associated with magnets in the transport cave. The sub-committee for the separator caves will examine these issues further. (CK-D6-4)
- 6) The area must meet class I standards for barriers and interlocks. (CK-D-9)

Comments and recommendations on the experimental area were:

- 1) Two NMC units will prevent intensity excursions, with locations as described in written description. (CK-D6-5) If one is located immediately downstream of the first mass slit then it must be shown to be sensitive to the beam and not dominated by noise from the mass slit. It may have a trip level factor of 10 higher than the one sited in the experimental area. (CK-D6-6)
- 2) The large intensity excursions warrant that extra precautions be taken both in the experimental area barriers and interlocks.
- 3) The area fence should meet Class II standards and be 8 feet high. The committee waives the need for the barrier to be totally enclosed the area. The planned fence may have removable panels. These panels must be properly secured from inside the experimental area. The fence must be inspected prior to operation. (CK-D6-7)

- 4) Area reset indicators should be at the entrance gate and several placed to be visible from inside the experimental area. (CK-D6-8)
- 5) Reset stations and the associated sweep procedure must be in place before operations. (CK-D6-8)
- 6) The gates have 2 sensors indicating that they are closed. That two devices D6D1 and D6D2 be used to disable the beam. The logic should be such that the gate entry system is hardwired, dual, and failsafe. Failure of either critical device will be monitored by a reachback circuit. (CK-D6-9)
- 7) It was discussed whether the area should be classified as a class II area. The only additional requirements would be crash buttons (which might be covered by the crashable gates) and whether sufficiently dramatic local indicators warning of beam turn on can be provided. This was left unresolved.
- 8) User control of the area in a low intensity mode was discussed. The committee recognizes the experimenters desire to have quick and easy access to the area for low intensity running. The only mode that the committee thought would be acceptable was a hardware device (collimator, mass slit, etc.) to limit the beam intensity coupled with a lower setting on the NMC units. This will be resolved at a future meeting.

At a future meeting the following will be reviewed:

- 1) Shielding of the 2 GeV/c beam line and experimental area.
- 2) Interlocks on the beam line parameters and the spectrometer magnet.
- 3) Unresolved issues discussed above.
- 4) D line shielding and interlock changes.
- 5) SBE operation to this cave must be reviewed.

Checkoff lists for both the D line and D6 secondary beam line will be prepared by D. Beavis.

DB/mvh:dc

minutes. mtg

Attachment

Distribution:

#1 - file only - "Radiation Safety Analysis...."
 Radiation Safety Committee
 RSC Info. List
 Department Administration
 Others Present at Meeting
 AGS Main Control Room