

Radiation

Safety

Minutes of Radiation Safety Committee of December 13, 2000

Committee

The Neutron Spallation Test facility (E956) in the C7 Line

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Motivation: The C1 beam line has been removed and a new target station built for neutron spallation tests (E956) and shielding studies. A description was distributed to the committee (see attachment 1). The beam dump design and target station was reviewed by the committee on July 27, 2000. The focus of this meeting was on the beam transport and transverse shielding.

The upstream portion of the beam line is/was the existing C5/C1 beam transport. This beam line has only transported low intensity beam, i.e. secondary beams, heavy ions, and Polarized protons. The beam line shares a common cave with the C3 transport, which is used to transport full energy protons of intensities of 5-10 TP to the C-prime target station. A downstream portion of the C7 roof is not common to the C3 beam line. This portion of the C7 roof has equivalent thickness as the C3 roof and has been carefully butted into the B roof. The roof thickness is between 8 to 9 feet of heavy concrete equivalent. The dose equivalent rate on the roof over the mercury target is estimated to be 60 mrem/hr for 5×10^{15} p/hr.

The east shield wall is closer to the C3 beam line than the C7 beam line. The C7 beam line is considered less of a potential radiation source to this wall than the C3 beam line. The chipmunks along the C3 transport must be in place.

The upstream portion of the west wall has the B cave on the opposite side. Occupation of this cave is not allowed with protons in the C line. There is a trench between the C and B cave, which has not been plugged with shielding. The downstream portion of the west wall has the B5 dump and outside area. No work on the B shielding can be conducted without approval to avoid confusion while the C7 line operates. The trench downstream of C5D8 has been plugged with a 4-foot long buss block. Concrete will be placed in front of the B5 vacuum box window (CK-C7-FY2001-207).

The C5 beam line still exists. The C5 area interlocks are not expected to be active during the January 2001 run of E956. 20 feet of shielding blocks the C5 secondary beam. This is sufficient to protect the C5 area. The C5 interlocks can have jumpers installed allowing C7 to operate provided the shielding blocking the port remains in place.

There are many weak spots along the primary transport, which are protected with chipmunks. The interlock levels are typically 20 mrem/hr or higher. It may not be possible to tune the high intensity beam if the interlock levels are lowered so that the building can remain a Controlled Area. It was decided that building 912 will be posted as a Radiation Area. (CK-protons-switchyard-FY2001-222)

The other primary caves must be RS LOTOed off or their check-off lists completed both for full energy and low energy beams. E956 will use a 3 GeV beam and full energy beam. (CK-Switchyard-FY2001-protons)

To prevent unusual fault conditions in the C3 cave the all dipoles will be RS LOTOed in the A polarity. (CK-C7-FY2001-208)

The C4 beam line is to be RS LOTOed off. (CK-C7-FY2001-209)

The C8 beam line is to be RS LOTOed off. (CK-C7-FY2001-210)

The chipmunk must be in place in the C4 area since the detector is pulled back. (CK-C7-FY2001-211)

The C target and CP3 must be removed. (CK-C7-FY2001-212)

All collimators in the C5/C7 beam line must be RS LOTOed in the full open position. (CK-C7-FY2001-213)

A RWP must exist for the transport of any experimental materials exposed to the beam (such as foils) from building 912. (CK-C7-FY2001-214)

Several chipmunks will be installed in the area near the new target station. The liaison physicist will determine the locations. These will not be interlocking but will have remote readout. (CK-C7_FY2001-215)

The CME must review that the transport and beam dumps can handle single bunch beam of intensity 10^{13} protons. (CK-C7-FY2001-216)

The U line should be RS LOTOed off during the low energy running or the energy check is tested and operational for the V1 beam line. (CK-AGS-FY2001-protons-217)

The integrated beam intensity during this run is expected to be about 10^{16} protons. Any potential soil activation was not considered to be a problem since the building concrete floor and roof meet the criteria for a soil cap to prevent any possible leaching. Also, sufficient shielding was placed below the Hg target to attenuate the particle flux incident on the soil by a factor of 50. It was reported that there are not pipes under the C5/C7 beam line, which if leaking could leach potential radioactivity from the soil.

Asher Etkin will review the access controls to the building man trench before beam is delivered to the C line. (CK-C-FY2001-218)

Fault studies to verify the shielding will be conducted prior to routine operation at both low energy (3 GeV) and full energy (24GeV). (CK-C7-FY2001-219)

The water system for the downstream portion of the C7 line is on the open portion of cooling tower 2. The pipes and tower must be check for potential radiation levels. This should be done during the fault studies and routing running. (CK-C7-FY2001-220)

Attachments: (RSC files only)

1) A. Carroll Nov. 29, 2000