Date: April 3, 2015

To: J. Skaritka, M. Fedurin, I. Ben-Zvi, and C. Folz

From: D. Beavis

Subject: Beam Stops at the End of the ATFII Beam Lines

The project has requested guidance/design for beam stops at the end of the experimental beam lines and the linac straight. To facilitate efficient design efforts for the beam stops please provide the information requested below for each beam stop. I would suggest that for beam lines which may be upgraded to 500 or 1000 MeV you consider requesting the final beam stop. Changing energy does not cause a large difference in the beam stop material but could broach stress issues for the material as the energy density and gradient is increased.

The intention is to design a beam stop that will be an integrated package. Many members of the RSC are not keen on making shielding and bean stops out of small pieces of material that can be easily moved by hand and only having administrative procedures to protect against their inadvertent movement. I know many small facilities use small pack block but this increases the risk of configuration control. In addition, specifically the beam stops are stopping/reducing a very large forward radiation source. The potential radiation of this machine is much higher than most of the electrons machine at BNL that personnel have experience working at.

Should the ATFII Project feel this may be too burdensome then they can request for the RSC to meet and discuss the topic. However, I am strongly against using small hand movable shielding for ATFII except where it makes very good sense. The intent is that the beam stops will require a lifting device to move or the building crane.

The present design for the facility appears to have five beam stops at the end of the beam lines. Several may have clearance issues on the sides where an adjacent beam line may exist. At the moment we will design each stop to have a maximum external temperature below 120° F.

Beam stop Information requested:

1. Diameter of beam pipe before the beam stop
2. Diameter of the flange in front of the beam stop
3. Is the beam stop part of the machine vacuum or will it be isolated via a vacuum window.
4. A re-entrant cavity should be either part of the beam stop design. If the beam stop is not part of the vacuum then we will need to establish a distance upstream of the beam pipe window flange that can be used to form the re-entrant cavity.
5. Maximum beam energy onto the beam stop
6. Minimum beam energy onto the beam stop
7. Beam current at each of the above energies
8. Min. and maximum beam spot size at the energy extremes
9. Min. clearance required between the shield wall and the beam stop (you may desire the side and back to be different).
10. Any transverse restrictions on the size of the beam stop.

Least important for the moment is what budget have you assigned for the construction of these beam stops.

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