

Comments for Review of NuMI Hadron Absorber

Nov 20, 2001

From Mark Reichanadter  
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1. Overall Remarks

In general, a positive review. Good progress on a number of fronts. Some overall concern on the tight tolerances between the mini-jack crane and the cavern walls.

2. Itemized suggestions, questions and concerns

(1) On the RAW system, there are a few comments. I was not involved in the RAW review so please forgive any repetition that may have been addressed at that review.

(1.1) The present design calls for full flow return through the makeup tank, which may cause excessive turbulence and add entrained air into the system. Currently the system has 86gpm returning through a 30 gallon expansion tank. Assuming the tank is ~75% filled with fluid, this will result in a turnover of the full around every 16 seconds, much too high. Consider taking off only a small portion of the return flow through a tee to the expansion tank to allow the entrained air to settle out. Suggest bringing the return line into the expansion tank tangentially to minimize turbulence. The Pbar target (or lithium lens?) system is designed with this feature and it works well.

(1.2) Consider adding a connection line from the secondary cooling to the primary cooling to be used for makeup water for the primary loop. This should be a simple way to add the water. Since the makeup water is not DI, some time will be needed to polish the water. However, the DI is not necessary for any high potential requirements, so it should be fine to allow periodic degradations in the DI quality when adding makeup.

(1.3) Consider individual valves for the supply and return to each module. Although this is slightly more expensive, and does add the potential for valve leakage, valves allow remote isolation and troubleshooting of any minor leaks on the modules. Additionally, current valve technology can turn out a high quality product that is designed to last longer than the 10-year lifetime of the experiment, and cutting and welding pipes can be quite messy in a RAW system, particularly if you have a small leak on an undetermined module.

(2) It was mentioned during the review that the gantry crane could not be used to place the top shielding block and that it would need to be 'rigged by hand'. Develop a plan to 'rig by hand' the upper concrete shielding block on the for the absorber shielding.

- (3) The Lazer forklift will be a key during the installation phase. Consider spare parts and a priority maintenance contract to ensure the schedule.
- (4) General question on heat transfer. Should a module develop a leak current plan calls for isolated module to reject heat to adjacent modules. How? Convection or conduction through the base contact? The  $T_{max}$  is probably too low for any significant radiation heat transfer.
- (5) Consider setting up a mockup (that can be pressure tested) to ensure the module weld joint can be welded adequately with a 3-inch gap.