

**Comments from NuMI Hot Horn Handling Review
February 27, 2002**

**Responses by Bruce Baller
May 7, 2004**

1. (Reviewer: D. Ayres) As discussed at the review, more thought needs to be given to the containment of target cooling water in the event of a leak.

OK

2. (Reviewer: D. Ayres) The remote couplings of cooling water lines between the support modules and the horn/target systems need to be worked out in detail. The intention is to use some type of "quick-disconnect" fittings that can make remote, leak-free connections as a horn or target assembly is mated to its module feed-through lines. A number of the NuMI hot handling systems are based on experience with similar devices at AP0 -- I hope that this is one of them. Otherwise, this system should be designed and prototyped soon.

Done.

3. (Reviewer: D. Ayres) The layouts of the lead-brick and lead-glass penetrations of the work-cell walls need to be worked out in detail before the work cell design is finalized. As was stressed at the review, these designs should be based on detailed procedures for performing specific operations. The layout of the "diamond" penetration in the downstream work-cell wall, nominally to be filled with a reconfigurable arrangement of lead bricks and lead glass blocks, is perhaps the most serious issue. It needs to be carefully thought out before the diamond hole is actually cut in the steel wall.

Done.

4. (Reviewer: D. Ayres) Although it was not discussed at the review, the location of the work cell cannot be finalized until the target hall bridge crane coverage and hook height are known. It is important that the NuMI outfitting group take into account cost implications for hot handling systems when a specific crane is chosen. A modest cost savings on a bridge crane with less than full coverage could be spent many times over in modifications to the work cell and morgue systems.

Done.

5. (Reviewer: D. Ayres) The project should attempt to find funds to purchase, assemble and test the hot cell motion platform as soon as the purchase orders are

ready. This will save time and effort and lead to better performance than will be the case if we must wait for the availability of FY03 funds.

Done.

6. (Reviewer: D. Boehnlein) One of my questions from the previous review was whether or not the MARS-based estimates of residual radioactivity considered thermal neutron capture on elements in concrete. This question never was answered but we were told that it was not a concern, since the half-life of Na-24 is 15 hours and there would always be a cooldown period of several days before entering the enclosure. However, the Excel spreadsheet describing the dose rates and dose estimates for the procedure considers a one-day cooldown period. While this spreadsheet appears generally well-organized and promises to be a useful tool for radiological protection in the horn-handling process, it should be consistent with the realistic procedures. I recommend revising the spreadsheet to be consistent with the cooldown times that are actually anticipated.

OK

7. (Reviewer: D. Boehnlein) As mentioned in the last review, the target hall is likely to be a very hostile environment as regards corrosion of machinery kept there. The mechanisms for the scissors tables and hot cell door should be made as corrosion-resistant as possible.

OK

8. (Reviewer: D. Cossairt) A reasonable level of effort needs to be made to contain water spills. It is noted that the horn/target assembly is a large, complex piece of equipment, which renders very difficult complete containment of every drop of water that might be released. However, the levels of radioactivity, especially tritium, in the cooling water are sufficiently high that spill containment should be included at all points where one can do so in a straightforward manner. I do believe these efforts should go beyond just putting containment in where it is "easy". I know I am being a bit vague here but I don't want to hamstring the project.

OK

9. (Reviewer: D. Cossairt) In the discussion of the railings on the catwalk above the target station, it was certainly made clear that their primary purpose is fall protection. At points in the discussion, one could get the impression that radiation technician coverage, perhaps continuous, is going to be the sole means of keeping people from lowering themselves down to the top of the target station to "take a peek" into the void left when the horn and target are removed. Given the radiation levels and the configuration, while personnel access to the catwalk may be permissible with the target station "open", the dose rates will almost certainly

preclude being able to look into the pit. In fact, they are likely to be sufficiently high that one may not completely trust "radiation technician supervision" as being adequate to prevent such excursions by "gung-ho" personnel. After all, one could expect engineers and physicists to want to "take a look" if any one of a variety of operational problems arise. Such a brief look is likely to result in a sizeable dose. While this may not be a design issue, it is one that should remain in our minds as we proceed forward. In other words, this area may need to be locked off in some manner when the shielding "open".

OK

10. (Reviewer: B. Reilly) Claim and obtain your lead glass blocks ASAP, and check their sizes per drawings.

OK

11. (Reviewer: B. Reilly) Have a quantity of thin steel shims and filler plates cut up ready to fit in the cracks as you build the shielding walls.

OK

12. (Reviewer: B. Reilly) You will undoubtedly need to fill in around the lead glass and lead bricks with steel shims.

OK