

K. Reece



**Minutes of Meeting (addendum):** Radiation Safety Committee sub-committee.  
[ref: Summary of meetings held 9/10/96 and 10/20/97]

**Present:** [9/10/96] A. Etkin, A. Javidfar, J. Mills, S. Musolino, K. Reece, A. Stevens.  
[10/20/97] D. Beavis, C. Pearson, K. Reece, A. Stevens.

**Subject:** PHENIX shield wall design.

Alan Stevens noted two items not included in the review summary for the PHENIX shield wall. The first is that dose estimates for only the cracks in the permanent section(s) of the shield wall have been estimated, (A. Stevens). There are, in fact, horizontal cracks in the moveable shield wall that have not yet been addressed.

1. Dose estimates for expected width(s)/location(s) of horizontal cracks must be completed and reviewed prior to RHIC commissioning, **(CK-PHENIX-09)**.

The second concern is for an RSC sub-committee (Beavis, Musolino, Reece, Stevens, Thern) to review the shield wall on the opposite side of the PHENIX assembly area.

2. A. Stevens will schedule a meeting of this RSC sub-committee.

cc: RSC  
RSC file

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Designs for the PHENIX shield wall have varied from a "one layer" wall <=> "two layer" wall over time. The final proposal submitted for consideration by the RSC was a "one layer" wall. This summary was taken from meeting notes of A. Stevens (RSC file) for both 9/10/96 and 10/20/97.

The PHENIX shield wall consists of a large moveable section of 5' thick light concrete. This section can be retracted into the experimental assembly area on two steel tracks. The side permanent sections of the wall are 5.5' of light concrete. From the perspective of the experimental assembly area, a personnel labyrinth is located to the left of the shield wall and a small "person plug door" will be an integral part of the moveable wall (midway between the center and right edge of the moveable wall).

Note: [*Life Safety Code requires this second means of egress for access to the experiment IR area at all times*].

Short term access will be allowed through the "person plug door" (not the labyrinth). The labyrinth is intended for secondary egress and emergency access only.

Dose estimates through this shield wall and some penetrations were done (A. Stevens) using both CASIM and Lahet. Also, the standard intensity extrapolations for dose/pulse of 4 x Design Intensity and doubling the Quality Factor were made. A summary of these results and recommendations from this sub-committee follows, (items #1 and #2 represent the "base" dose to which "excess dose" from penetrations must be added);

- 1. Permanent shield wall (5.5' light concrete) = 250 mrem, (accepted).
- 2. Moveable shield wall (5' light concrete) = 339 mrem, (accepted).

3. 3/8" Vertical and 1/4" Horizontal cracks = 180 mrem, **(accepted)\***.

3.1 \*An RSC sub-committee has **already accepted** 'de-rating' the dose due to cracks by a factor of three (lens of the eye criteria). The "de-rated" crack dose is then 60 mrem.

3.2 The "expected" cracks of this size will be located at an elevation that is not easily accessible; the RSC has not recommended access restriction for these elevations.

4. At the time of the second meeting, the personnel labyrinth design was under revision, making previous Lahet calculations invalid. A. Stevens proposed the use of 1.5" of polyethylene on the personnel labyrinth door **(CK-PHENIX-01)** as an additional moderator **(accepted)**. This should lead to a factor of four reduction in the dose seen outside this door. A. Stevens did not expect this dose to be a concern but will re-estimate this dose, **(CK-PHENIX-02)**.

5. This final design indicated a different crack width/geometry at the boundary between the permanent and moveable section of the main shield wall. A. Stevens did not expect this dose to be a concern but will re-estimate this dose, **(CK-PHENIX-03)**.

6. The "person plug door" must be integrated into the PASS system **(CK-PHENIX-04)** to control access to this area.

7. Dose estimates for penetrations under the shield wall for cabling, piping, etc. must be done **(CK-PHENIX-05)**.

8. Dose estimates for the moveable wall tracks must be done **(CK-PHENIX-06)**.

9. The sub-committee noted that it may well be possible/preferable to place local shielding at some of the penetrations listed in items #7 and #8, **(CK-PHENIX-07)**.

10. The liaison engineer and liaison physicist must insure (during construction) that all cracks between shield blocks do not exceed specified limits, **(CK-PHENIX-08)**.

The Radiation Safety Committee (sub-committee) reviews of the design of the PHENIX shield wall were sufficient. Action Items listed in these minutes must be addressed as part of the RSC Check-Off List for Commissioning of the RHIC RING.

**The RSC approved the PHENIX shield wall design.**

cc: RSC file (w/attachment)