



**Minutes of Meeting:** Radiation Safety Committee, sub-committee.

**Date:** Wednesday 17 September 1997

**Present:** D. Beavis, E. Lessard, S. Musolino, K. Reece, A. Stevens, R. Thern.

**Subject:** CASIM vs. LCS (Lahet Code System) for Neutron Dose Estimates.

The primary purpose of this meeting was for the RSC (or RSC sub-committee) to meet and review a proposal (A. Stevens) to include Lahet as a resource for estimating neutron doses for beam loss scenarios.

In Alan's presentation, strengths and weaknesses of both computer codes were noted and discussed. While CASIM and Lahet are both accurate, one or the other may be more appropriate in a given situation. Also, a combination of the two may also be employed.

When calculating dose estimates using first CASIM, and then Lahet for the identical loss and geometry conditions in a multi-leg penetration, discrepancies between the results from these two codes were examined (A. Stevens) and found to be a consequence of the initial conditions assumed for CASIM; and that Lahet more accurately estimated the dose. In another comparison of the two codes for "cracks" in the STAR shield wall, Lahet found them to be much less of a concern (reduced by a factor of 10 to 30) than originally estimated using CASIM. Lahet was suggested as the code to quote in this case since it better accounts for the neutron energy and transport.

In summary, conclusions from this RSC sub-committee were as follows;

1. The RSC **accepts** the use of Lahet as an additional code to be used in the calculation of dose estimates.
2. The code "experts" must understand the dose estimate to be done, *in context with the assumed geometries and operating conditions*. Thus, the application of either code will be driven by the strengths and weaknesses already documented, (as well as others that may be noted later).
3. Since CASIM and Lahet have both strengths and weaknesses, the decision to use one or the other computer code (or a mixed result from both) must be left to the discretion of the experts (A. Stevens or designate). This is appropriate since each shielding case, along with the assumptions and methods used, is reviewed by members of the RSC. Any questions concerning appropriate use of either code will be addressed at that time.

3.1. Two examples of this have already been noted; they are a multi-leg labyrinth and the STAR shield wall "cracks". In both instances, causes for the differing results were documented, traced and understood.

4. The RSC **rescinds** an earlier recommendation made in the review of the STAR shield wall relating to the addition of polyethylene "filler" material between shield blocks. Another RSC recommendation concerning the construction of this wall remains valid; that is to require the liaison physicist and liaison engineer to insure the STAR shield wall cracks do not exceed the recommended maximum width.

5. Fence and/or posting of RHIC penetrations will be reviewed by an RSC sub-committee on a case by case basis.

6. An RSC sub-committee, including the responsible liaison physicist(s) for RHIC, will consider the possibility of conducting beam fault studies at specific locations to compare empirical results with calculation(s).

7. A. Stevens stated that, in his opinion, RHIC management would not object to an administrative limit of  $\frac{1}{2}$  Design Intensity during the initial year of running. This limit would then allow a factor of 16 reduction in dose estimates, (since they are routinely scaled to 4 times Design Intensity for RSC reviews). Concerns to be presented to the RSC can then, in many situations, be scaled from actual measurement for review.

cc: RSC file (w/attachment)