Minutes of the AGS Radiation Safety Committee

Subject: RHIC; Transfer Line Walk-through & Penetrations.

Meeting Date: November 6, 1992


Summary

The work that has started on labyrinth calculations for the various penetrations was presented. CASIM simulations of survey shafts and large He piping penetrations indicate no major problems.

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Walk Through

Before the meeting, the Committee walked through the Transfer Line region. The lack of a RHIC representative somewhat limited the value of this tour. The following comments and/or questions were raised:

There are many penetrations out of the upstream end of the W line. This and the U line will need evaluation.

The Committee feels that the labyrinth estimates should include an evaluation of "punch through". A particular case, the access labyrinth leading into the Transfer Line beam switching enclosure could represent a weak spot in the shielding.

The magnet cooling water piping and manifold over and behind the planned beam-dump limits the size of the dump, could possibly cause direct radiation from short lived isotopes produced in the water, and may cause unneeded dose to people operating and repairing these valves and pipes.

Meeting Minutes

Peter Gollon discussed, in general terms, labyrinths which exist for personnel access and ventilation in both the collider and Transfer Line regions of RHIC and the methodology employed for the estimation of the radiation field at the exits of labyrinths. He will cover "bendy" labyrinths only, eg. access labyrinths and vents. A. Stevens is to cover "direct" ones, eg.: survey shafts and He line experimental area bypass penetrations.

Gollon will use very conservative assumptions including:

The "source" is in front of the entrance to the first leg of the labyrinth,
One half the stored beam is lost at one location,
Two AGS cycles (96 Au bunches or 24 proton bunches) will be used,
The loss point is no longer than the labyrinth width.
For experimental halls, only consistency with the hall's shielding is required, as other safeguards will limit both direct and labyrinth radiation.

The Committee's comments/concerns were:
The lack of quantitative estimates on the labyrinths did not permit critical evaluation. The analysis at the moment must be considered work in progress.
"Punch through" at the corners of labyrinth legs should be considered, "All" labyrinths should be found and evaluated, for example under the RHIC ring there are possible storm drains as well as the tunnel for the Peconic river, which may be "opened" if the ground water drops.
Again the upstream end of the W line and the U line were not considered.
Weak locations, though adequate for planned use, should be identified if future changes in the source terms are needed.
For those points where the evaluation is very conservative, the nature of the evaluation needs to be documented so future evaluation of shielding or source term changes can be realistically done.

Alan Stevens presented an analysis, performed by Andy Van Ginneken of FNAL, of straight-through survey shafts which exist in both the collider and Transfer Line. For uncapped holes, the estimate is that a fault of 4.8x10^-12 28 GeV/c protons (24 bunches) would give 29 mRem on the berm top whereas a complete worst case fault in the collider (2.3x10^-13 250 GeV/c protons) would result in 910 mRem. Such shafts will be capped and at least partially plugged. The attenuation of this planned plug was not presented.

Stevens also presented an upper limit analysis for the large penetrations which exist for cryogenic bypass over experimental halls: 25 rem per worst case fault. These regions will be fenced off.

Action Items:
ACT_041 - A representative needs to be assigned from RHIC who will follow up on radiation safety items as they develop.

Attachments: #1 Transparencies of A Stevens talk.

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