



6/12 recommendations

Absorber Review
A. Wehmann
Nov. 20, 2001
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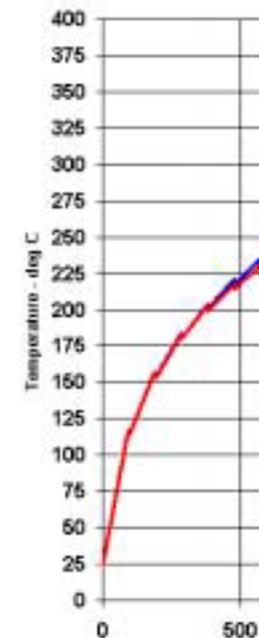
- This talk will cover the recommendations and comments of the 6/12 Absorber review and will discuss the response to many of them.
- Recommendations/comments were grouped under the headers: *Radiation Analysis, Thermal Analyses, Core Design & Repair/Replacement, Installation Plan, Cost Estimate, Instrumentation and Beam Interlocks, Additional comments, Concluding Remarks*



Radiation Analysis

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- *Mars model with current geometry*: see NuMI 729 for star densities (groundwater activation okay); residual activation, air activation, labyrinth source term need more work (underway); RAW activation studied by K. Vaziri
- *accident condition*: loss of water cooling just as important as errant beam, combination unlikely, many ways of detecting both; if both, see 50 °C temperature jump in module #4 in one minute—easily detectable with RTDs





Radiation Analysis (con't)

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- *Cracks*: E.V. has staggered steel, concrete to minimize cracks; Igor Tropin has studied cracks for Target Hall; Target hall mockup with Duratek blocks was performed in Meson Detector Building
- *Secondary Containment*: sheet metal containment under core, drain pipe to 55 gallon drums; drums will have piping to allow pump-out from a distance; drums and piping not yet on a drawing; no secondary containment for RAW system pipes



Thermal Analyses

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- *discrepancy between R. Wand's study of flow of 50 gpm per one module and RAW system capacity of 70-80 gpm total for 8 modules: ΔT is 10 °C, for 10 gpm --> 50 gpm (R. Wands study). Conclusion is that flow restrictors would be nice, but are not necessary.*
- *loss of all cooling to a module: studied and conclusion is that module can survive, if necessary (with power levels consistent with target in place); for beam missing target RTDs will sense abnormal ΔT fast enough.*
- *remote valves: valves eliminated from system, turning off faulty circuit will be done by modifications at the manifold (is now next to RAW skid in bypass tunnel)*



Core Design & Repair/Replacement

- *Module replacement*: dropped plan for module replacement; have redundant water circuits; module without cooling can reject heat adequately to adjacent modules
- *Decommissioning*: Core sits on carrier plate mounted on rollers, no hazardous materials, disassembly involves no grinding or burning, why not leave in place?
- *Weld Joint*: joint design inherently strong, mockup test done (E.V. will describe); water manifold removed to location next to RAW skid in bypass tunnel; turning off circuits will be done by modifying manifold



Installation Plan

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- *Equipment:* Plan on use of purchased Lazer forklift (battery operated)
- *Crack staggering:* now in E.V. 3 D model
- *fail-safe equipment:* refer to Lazer manufacturer
- *trolley drive:* hydraulic chain drive should handle bridge tilt adequately
- *swinging of loads:* Mini-Jack crane operates slowly, won't generate much swing



Cost Estimates, Instrumentation and Beam Interlocks

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- *integrated cost, schedule:*
 - was presented at the 9/11-13 DOE Review & is available, did include oversight costs
 - will be discussed in a separate talk
- *redundant thermocouples:* use redundant RTDs, wired but not instrumented
- *flow rate monitors:* not reliable, not needed
- *system level:* is there, refer to D. Pushka material on RAW system



Additional Comments

- *Future Upgrades to Intensity:* Needed even to get to assumed intensity of $4E13$ per spill every 1.9 seconds (Minos would like to have this as a problem)
- *Personnel Egress:*
 - Not a WBS 1.1.4 design issue--except to keep clear passage and keep residual radiation levels reasonable. Labyrinth design is cognizant of this requirement.
 - There is impetus from the Minos collaboration to extend the decay pipe into the target chase (24" diameter extension) and use a thin window upstream—to improve neutrino flux at the far detector. Utilizing helium instead of vacuum is a possibility in this scenario; will need to study ODH issues that would result.