

BROOKHAVEN NATIONAL LABORATORY

MEMORANDUM

DATE: Monday, March 18, 1996
TO: ESRC and RSC Sub-Committees
FROM: E. Lessard ETZ
SUBJECT: ESRC/RSC Sub Committees on Proposed Use of U Foil at E910

On Friday, March 15, 1996, two sub-committees met to review a proposal by E910 to use a 1 mm thick U foil inside the EOS TPC. E. Lessard, R. Thern, E. Hartouni, K. Foley, K. Reece, J. Scaduto, R. Hackenberg, J. Levesque, C. Schaefer and R. Miltenberger were present.

Facts Presented

1. A uranium-238 foil 1 mm thick and about 2.5 inches by 2.5 inches will be mounted inside a re-entrant volume being assembled inside the EOS TPC.
2. The re-entrant volume will contain: the U-238 foil, pre-amps, phototube bases, wiring, scintillating fibers and scintillator plastic. Thus, the volume will contain an ignition source plus combustible items.
3. The re-entrant volume will have mylar windows separating the P10 counting gas from the re-entrant volume.
4. P10 counting gas inside the EOS TPC is argon and 10% methane.
5. Uranium is pyrophoric; that is, fine pieces will spontaneously ignite. Uranium is highly toxic if inhaled and 250 mg is lethal. U-238 is naturally radioactive at about 0.4 μ Ci per gram. Additionally, about 1 mCi of spallation products may be produced during irradiation from 1×10^6 p/s for two weeks.
6. The smallest beam size estimated to be possible is 3 to 4 mm.

Concerns

1. The uranium is accountable nuclear material. Prior to bringing it to BNL, the Users shall contact K. Dahms (x4051).
2. A 'material custodian' shall be assigned. This person shall be the responsible authority in order to ensure contamination checks are performed and to ensure the target is moved on and off site according to the rules. (Users)
3. There is concern regarding the potential for contamination, both in a fire or if the target should become broken and dispersible. A containment should be placed around the target; a 0.004 inch or more thick can with Al walls may be acceptable.

The 'material custodian' chosen by the Users shall ensure the target is not removed from its containment while it is at BNL. Contact E. Lessard (x4250) when the containment design is ready for review. (Users)

4. Dry nitrogen should be flowed through the re-entrant volume while the target is in place. (J. Scaduto, Users)
5. Heat transfer calculations for beam on U-238 metal should be performed for the worst case beam size, worst case spill length, and worst case proton intensity possible for this beam line.
6. AGS HP (x4660) shall be notified with regard to all on-site movement of this target. (Users)
7. Smears of the containment shall be taken before and after irradiation, and the re-entrant cavity shall be checked for contamination. (Users, HP)
8. The fusing for the wiring leading to detector components that are inside the re-entrant cavity shall be reviewed by the ESRC. Contact E. Lessard (x4250) when the wiring diagrams or sketches are ready. (Users)
9. Windows for the interface between P10 gas and the re-entrant cavity shall be reviewed by the ESRC. Contact E. Lessard when ready. (Users)

Experimental Safety Review
Sub-Committee

Foley, K.
Levesque, J.
Thern, R.

Radiation Safety Sub-Committee

Miltenberger, R.
Reece, K.
Schaefer, C.

Copy to:

Bunce, G.
Hackenberg, R.
Hartouni, E. (E910)
Lowenstein, D.
Penzick, A.
Pile, P.
Scaduto, J.
Thomas, J. (E910)