

## Memo

*Date:* April 17, 2015

*To:* K. Kusche, P. Cirnigliaro & RSC

*From:* D. Beavis 

*Subject:* ATF experiment "Space Radiation Effect Experiments for Jovian Mission"  
(AE67)

The potential dose rates outside the ATF shielding have been examined for this experiment. The experiment will use targets of Al and Ta with various thicknesses. The experiment has stated that they have targets of 1cm Al, 2cm Al, and .375 in Ta in thickness. Downstream of the target is an Al slit assembly that has a zero degree port and a production angle port at a fixed angle. There are three Al slit assemblies for measuring production at 45°, 30°, and 15°. Downstream of the slit will be a permanent magnet that will bend the transmitted electrons down and the created positrons up.

The beam energy is 62 MeV and the beam power is 0.054 Watts, which is well below the maximum allowed power of 1.3 Watts. The estimated leakage out either side wall was calculated to be 0.02 mrem/hr. The estimated dose out the building roof above the experiment is expected to be less than 1.3 mrem/hr. The building roof is posted as a Controlled Area with no access allowed during beam operations into the experimental hall. The back wall has been evaluated in fault studies and this experiment will not challenge the established posting configuration outside the shielding.

The placement of targets and materials into the vacuum vessel that houses the experiment will be under the control of ATF staff. It is expected that there will be blank target runs to establish background. This has not been defined by the experimenter. For blank target runs the beam will go to the beam stop at the end of the beam line. For thin targets the beam will be degraded and hit the side wall of Pb between the beam line dipole magnet and the beam stop. For thin targets RCT radiation surveys should be conducted on the east side of the experimental hall including the door area.

RCT should conduct perimeter surveys for the initial thick target. This experiment falls within the safety analysis conducted for radiation for the ATF facility. The activation of the targets have not been calculated. Either the ATF staff should use their experience with striking materials with the ATF beam or have an RCT conduct a survey before personnel access the targets. All materials that the experiment places in and around the beam are subject to appropriate activation checks and release regulations.

The details of the apparatus were not sufficient to determine if high energy remnants of the electron beam could transvers any substantial fringe field of the permanent magnet. The ATF staff should examine this issue on setup and if necessary request that the deflection by the magnet be considered in the shielding analysis.

The experiment will run for intermittently for a period or two weeks.

CC:

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