AGS/RHIC
*R*adiation
*S*afety
*C*ommittee

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U-Line Operations for E938, E945 and E945A

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At the beginning of March, E938, E945 and E945A will again use protons of various energies from the U-line fast extracted beam. As before the E938 mercury target tests will be within the block house. They will use single bunches for pressure waves and TOF tests at 24 and 12 GeV, and as well studies at 1.9 GeV. E945 and E945A will use protons <1.9 GeV in the tunnel upstream of the blockhouse. The tunnel is shielded by 10 feet of sand shielding.

The new features of E938 are:

1. A lead reflector around the mercury target. Since the lead is not struck by the primary beam, the activation should be modest and on the inside of the 1 meter cube.

2. A water moderator: the committee asked that the water be in a sealed container. [Subsequent to the meeting, the JAERI group has indicated that the 5 x 5 x 10 cm^3 container is sealed]. **CK_U_MAR99_01**

3. A shielded TOF tube with a shielded detector enclosure at the end. The gate to the enclosure will have a padlock under HP supervision with a key coupled to the UEG-2 gate key. **CK_U_MAR99_02**

4. A procedure or Job Specific RWP will be required for changing foils or other operations around the mercury target. **CK_U_MAR99_03**

All shielding drawings must be signed off. **CK_U_MAR99_04**

E945 is a new test assembly of 10 cm diameter, encapsulated tungsten discs inside an aluminum sleeve which is surrounded by cylinders of polyethylene(3.6 cm thick) and lead(16.5 cm thick). There will be exposures at energies of 1.6, 1.2 and 0.8 GeV (if possible). Each exposure of 10 minutes at about 100 microAmp(6 x 10^11 protons/sec) will deliver a total of 4 x 10^{14} protons to the assembly. The intensity and duration of the exposures will be under administrative control of the L.P. or designate. **CK_U_MAR99_05**

At the top of the berm a steady 100 microAmp will lead to a level of 200 mRem/hr(calculated by E. Snow of LANL - see attachment). For the 10 minutes the total will be 35 mRem at each energy. The trip setting for the chipmunk(No 83) nearest the E945 apparatus will have to be raised to 50 mRem/hr to during these exposures. **CK_U_MAR99_06**

Following 10 minute exposures and 30 minute cool down, experimenters for E945 and E945A will enter to insert E945A into the beam line. An estimate of the radiation level emerging from the E945 apparatus should be calculated, and if it is above 20 mRem/hr at the E945A position, then s shield should be devised to cover the end of E945**.** **CK_U_MAR99_07**

Since E945 may be greater than 100 mRem/hr immediately after exposure, Procedures or Job specific RWP's need to be prepared, **CK_U_MAR99_08** and the areas around E945 and E945A be roped off and posted as "High Radiation Areas". **CK_U_MAR99_08**

The E945 tube will be smeared after each withdrawal. **CK_U_MAR99_09**

E945A only exposes fine wires to the beam, so as long as the proton is reasonably steered, the activation should be very slight. Even if the beam strikes the 3 cm thick wire holder, the activation should be only a few per cent of the mercury target or E945 assembly. Neither the wires nor their holder will be removed from the cryostat during this run.

Unless there are good reasons, all accesses will be through UEG-2 after the U-Line is put on Controlled Access. **CK_U_MAR99_10**

Radiation Security Conditions:

1. The U and V lines will be under PASS control as for E821(g-2).
   CK_U_MAR99_11

2. W, X & Y lines will be chained shut with double padlockes inside and out.
   CK_U_MAR99_12

2. The berm over the U and V lines will be securely locked to Thompson Rd.
   CK_U_MAR99_13

4. WD1-8 will be RSC LOTO'd by both the U-line LP and the ATR LP. **CK_U_MAR99_14**

Limiting Exposures:

1. The maximum intensity for the E938 mercury target will be $<10^{13}$ in a single bunch with a repetition rate of 2.4 sec. The beam size will have a beam diameter >5 cm at 24 GeV. A maximum of 20 pulses into the target will be allowed under these conditions.

2. The remain running will be done at $<5 \times 10^{12}$ protons/spill with the expectation that most of the intensities will be $<2 \times 10^{12}$ spill at a repetition rate of 2.4 sec.

3. The total flux for E938 will be $<3 \times 10^{15}$ protons at 12 and 24 GeV. The total flux for E938 will be $<5 \times 10^{14}$ protons at 1.9 GeV. The total flux for E945 will be $<3 \times 10^{15}$ protons at each energy. The total flux for E945A will be $<5 \times 10^{15}$ protons at each energy.

4. A written set of these guidelines will be given to the MCR, and the intensities will be monitored by the LP or his designate. **CK_U_MAR99_15**