Comparison between MCEEP and Hand Calculation
(Mar. 1, 2001)

Ran MCEEP v3.2 which has included EPIPROD v4.2 . The kinematics were centered $\theta_{cm} = 135$ at $Q^2 = 1.0$ and W=1232 MeV. The test was to check agreement between a hand calculation of the yield and MCEEP's yield when using a thin hydrogen target and limited acceptance in θ_{tg} and ϕ_{tg} for both arms. The luminousity was set to 100 μA$\cdot\frac{g}{cm^2}$ and the target length was 0.1 cm. The full θ_{tg} acceptance was 0.012 rad and the ϕ_{tg} acceptance was 0.006 radians. Running MCEEP with these conditions and no radiation losses and no energy loss gives a yield of 10.5 $\pm$ 0.02 in the W bin of 1230 to 1235. With this cut on W the average Q^2 is 1.0, average W is 1232, the average θ_{cm} is 135.2 and the average cross section is 262 nb/sr^2/GeV . When MCEEP is run with energy loss then yield is 10 counts. When MCEEP is run with radiation and energy loss the yiled is 8 counts.

With these conditions the stand-alone EPIPROD calculates the cross section of 265 nb/sr^2/GeV . The yield is

$$Yield = 3.76x10^5 \frac{1}{nb \cdot sec} \cdot 3600 sec \cdot 265 \cdot 1.14 \cdot 5.2x10^{-9} \cdot 0.005 = 10.6 counts \tag{1}$$

The factor 1.14 is dk_f/dW jacobian.