CHAPTER III

DESCRIPTION OF EXPERIMENT

3.1 Irradiation.

Bare foils and cadmium-covered foils were used. Each was separately irradiated in the pneumatic system. The technique of irradiation is to put the foil on one end of the pneumatic rabbit. The rabbit was shot into the reactor for a period of time and then returned. The irradiation time for bare foils was short but for cadmium-covered foils was long enough so as it was enable in counting.

3.2 Foils.

Foils used for determination of cadmium ratio were gold foils, indium foils and manganese foils.

For gold, foil thickness varies from about 10 mg/cm^2 to 100 mg/cm^2.

For indium, small amount of indium was coated on the aluminum foil. By neutron activation, the thickness (mg/cm^2) can be approximately determined. The same foil was used both for bare and cadmium-covered irradiation (allowing 24-hour decay). The flux variation was corrected by using an indium monitor foil (same foil on both days).

For manganese, the foils are made of manganese-nickel alloy and a single thickness was used throughout .

3.3 Counting Procedure.

Foils were counted with a single channel analyzer and also a G.M. counter which was set up to count gamma radiation. For G.M. counter, the count rate was kept low as in the region of 10,000 cpm. The foil position was far enough so that the count rate would not be too high. Results were obtained as the bare count rate per unit weight divided by cadmium-covered count rate per unit weight.

From the count rate obtained, the well known relation was used to determine the saturated activity.

$$I_{o,sat} = \frac{I}{e^{-\lambda t_2}\ (1-e^{-\lambda t_1})}$$

where $I_{o,sat}$ is the saturated activity.

I is the measured activity.

t_1 is the irradiation time.

t_2 is the wait time.

λ is the disintegration constant.