

CHAPTER I

INTRODUCTION

The present study deals mainly with neutron measurement technique. The measurement is limited to slow neutrons in the thermal and epithermal regions. An Americium-Beryllium neutron source of approximately 500 millicuries in strength was used in the experiment. The source was immersed in water in a tank and neutrons in water around the source were measured at various distances. Indium foils were used in most of the measurements as neutron detectors. The induced radioactivity in indium was measured using a G.M. counter and a scaler. It is well-known that indium perturbs the neutron distribution and corrections are necessary in order to achieve a good result. Primarily, the study aims to investigate the resonance self-shielding factor which is a very important correction factor.

The spatial neutron distribution in the tank was also studied. The absolute value of thermal neutron flux was estimated experimentally by using gold foil activation. The counting system was calibrated using gold foil of known activity. The latter was irradiated in the reactor and standardized by a calibrated gamma ray spectrometer available at the reactor centre. Subsequent to this measurement, it is possible to calibrate the counting system for indium foil so that indium foil can be used to measure the flux.