

## 1.0 INTRODUCTION

The intent of this document is to describe the physical and nuclear characteristics of a commercial nuclear reactor of the CANDU type. The physics analysis associated with the design and commissioning of these reactors is also discussed in some detail.

A description of a 600 MWe size reactor of the CANDU type is given in Section 2. The main focus is on the design of the core of the reactor. The functions of the devices used by the regulating and protective systems are also summarized.

The purpose of Section 3 is to present the methodology involved in the reactor physics analysis which is typically carried out during the course of the design process for one of these reactors. It is given in the sequence which is roughly analagous to the chronological chain of activity which takes place, rather than by subject area.

In Section 4, specific attention is given to the determination of the initial fuel load for the reactor. The CANDU reactor is fuelled semi-continuously on-power after about the first year of operation. The initial period of operation during which the unirradiated core is "burning down" to the so-called equilibrium burn-up condition is unique in the sense that it only occurs once in the life of the reactor.

The physics analysis associated with the low power commissioning of the reactor is given in Section 5. The physics tests which are typically done during this phase are also summarized.