

Chapter 1



Introduction

1.1 Background

The nuclear energy program in Thailand was initiated almost 25 years ago with plan the first nuclear power plant in Thailand. Electricity Generating Authority of Thailand (EGAT) had prepared plant location, staffs, technology, etc. However, the plan was terminate because of strong movement anti-nuclear and the return rate of investment is doubtful. Nevertheless, the nuclear energy has not yet been suspended.

At present, the Office of Atomic Energy for Peace (OAEP) is the authority who regulates and controls radioactive materiel and nuclear activity in Thailand. It houses the only nuclear reactor in Thailand name as Thai Research Reactor 1/M1 (TRR 1/M1). It is mainly used for isotope productions and experimental purposes.

The progress in computer technology which is more powerful and faster. Microcomputer have taken over the jobs done by mini or mainframe machines. Microcomputer have played important roles in modern technology especially in the area of computer simulation.

Simulations were widely used to verify new design, improve the control system, staff refreshment cross check with the actual operating condition, presentation, etc. in nuclear power plant in Canada .

This thesis adopted the idea of simulation from Atomic Energy of Canada Limited and attempted to adapt to the Thai Research Reactor 1/M1. It is hoped to provide operator with the capability to do mimic results on unexpected operating conditions, training personnel and do presentation.

This thesis focuses on constructing and interfaces between calculation modules in neutronic and thermal-hydraulic and front-end displays. Complex neutronic and thermal-hydraulic equations describing TRR 1/M1 were significantly simplified and some of the fundamental reactor physics may be lost. One dimensional space is applied in this model. The neutronic model is assumed to vary in axial and keep constant in radial axis. Cylindrical coordinate is used in thermal-hydraulic model which fuel pins are in cylindrical shape.

Diffusion equation is applied in the neutronic modeling. Heat conduction equation is used in the thermal-hydraulic model with the heat convection as boundary condition.

Thermal-hydraulic system of the nuclear reactor was also simplified and many assumptions were made for convenience.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย