REACTOR CONSOLE SIMULATOR (RCS)

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NUKLEAR MALAYSIA

Under Project PQRD: NM-R&D-12-14
"DEVELOPMENT OF REACTOR CONSOLE SIMULATOR (RCS)"

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Figure 1
Original RTP control console

BACKGROUND

- Reactor Console Simulator (RCS) project was initiated on 21th November 2011 after suggested by Dr. Ashhar on 18th November 2011 during his meeting with research officers from Section of Reactor Electronic, Instrumentation and Control, Nuclear Power Division.
- This project was started with installation of LabVIEW 2009 software. Then, the main user interface in the right hand drawer, left hand drawer as well as central console was simulated or mimic. Components such as knobs or dials, buttons, meters, chart recorders and others were simulated. The original PUSPATI TRIGA Reactor (RTP) control console is as shown in Figure 1.

FEATURES OF INVENTION/INNOVATION

NOVELTY

- "Reactor Simulator" is commonly used by Nuclear Facilities centre all around the world. However, "Reactor Console Simulator" maybe available only in Nuclear Malaysia.
- RCS used to mimic and match the size of the actual reactor console, by using three monitors as right hand, left hand, centre and control panels. The setup of innovation is as shown in Figure 2.

Figure 2
Innovation of RCS using 3 monitors

GENERAL OBJECTIVES

To simulate the behaviours and characteristics of the actual reactor console for RTP. During the usage of this RCS, user will feel that they are handling or controlling the actual situation.

MAIN PURPOSE

To train the reactor operators as a complement of using the actual reactor console. The operators will understand the behaviours and characteristics of reactor console as well as the reactor itself.

Figure 3
Expectation for future full scope RTP Simulator

APPLICATIONS

RCS absolutely can be used by TRIGA type reactor operator's especially with the original console. The system is suitable to train the reactor operators as a complement of using the actual reactor console.

For education purpose RCS may be used in field of reactor instrumentation and control as well as TRIGA Reactor system.

For Reactor Simulator developer, this system can be used as a base system because of its user interface and mathematical programming capabilities.

ADVANTAGES

Reactor's usage time, reactor operator's working time and total cost of reactor operation can be saved when a part of operator's training using actual reactor console replaced by using RCS.

The main capabilities of RCS are to simulate physical user interface as well as to predict the reactor parameters especially in steady state operation mode. From control rod position, reactivity, power, fuel temperature and other parameters can be predicted or simulated.

The parameters estimated by this RCS basically accurate in steady state operation.

RCS can be used anywhere without any problems. The duplication of this RCS system will only require a computer and three monitors.

LOOKING FORWARD

- This RCS system can be upgraded or modified to meet our specific requirement with some extra features added to the system.
- The capabilities in user interface, reactor physics and thermal-hydraulics can be expanded to RTP simulation and even Nuclear Power Plant simulation can be explored and developed. Figure 3 shows the expectation for full scope RTP simulator.

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