



Contribution ID: 105

Type: Poster

## Development of the “Approach to Critical” Experiment Simulation Model for the Consort Reactor Using LABVIEW

*Thursday, 27 August 2015 14:00 (1h 30m)*

Following the shutdown of the CONSORT reactor, the “Approach to Critical” experiment which allowed students to observe and understand the procedure for taking the reactor to critical, balancing the system at low power and increasing the power over a range of powers levels and eventual reactor shutdown, would no longer be possible. It was therefore important to develop a simulation model of the experiment that would enable future students to have comparable training.

An “Approach to Critical” Experiment Simulation model for the CONSORT Reactor was developed using Lab-VIEW software to simulate the “Students” experiment version. Lab-VIEW software was chosen due to its good user graphical user interface, offers ready to start functions and also the possibility of improving on the system with new algorithms. The modulation process was used to develop mathematical codes from equations using Lab-VIEW 2012 based on the CONSORT historical experimental data and known literature.

The Simulation models the kinetics of a sub-critical reactor with a start-up neutron source, such that control rods are used to increase the power, then achieve power balance and finally shutting down the reactor. Reactivity changes due to temperature effects were neglected.

The model was validated by testing the code through performing the three parts of the experiment; Approach to Critical, Doubling time method and Rod drop method, and results compared to the historical experimental data.

The results were in agreement with historical data. However the negligible variations were obtained in the Rod drop method due to the reactivity values used to generate the code.

### Country or International Organization

UGANDA

**Primary author:** ABBO, Damalie Noel Ofumbi (Ministry of Energy and Mineral Development, Uganda)

**Presenter:** ABBO, Damalie Noel Ofumbi (Ministry of Energy and Mineral Development, Uganda)

**Session Classification:** Session 11A: Posters: Career Development