

## Reportable Occurrence for R-67 TRIGA Reactor

Description and Observations:

During the last run of the day on the R-67 reactor at about 4:45 p.m. on August 30, 1978, the senior reactor operator at the console discovered that, as he had reached the desired full power (1500 KW), the regulating control rod continued to withdraw, even though he was not depressing the "UP" control button. The operator, observing that the power level was creeping above 1500 KW, quickly actuated the DOWN buttons for this control rod and one additional rod. The power level stopped rising and dropped quickly to or below the 1500 KW level. For a few seconds, the observed power level exceeded 1500 KW but did not reach the automatic scram level of 1650 KW. Observing that the Reg control rod would again withdraw as soon as he released the DOWN button, he allowed this rod to run to its full out position, compensating for the additional reactivity by partially inserting the Shim II control rod. The run of 17 minutes was completed without other incident, and the reactor was scrammed manually.

After a scram, all control rods drop fully into the reactor core, then the control rod motor drives are driven automatically to the full DOWN position. This occurred after the above scram; however, it was observed that the Reg control rod drive moved down at a rate very much slower than normal. Furthermore, after reaching the full DOWN position and the scram being manually reset, the Reg control rod drive again withdrew unless the operator intervened. After 4 or 5 minutes of manipulating the switches and observing the control rod action, the problem disappeared and could not be induced to reappear, either that afternoon or early the next morning.

Diagnosis:

The manager of the GAC research reactor instrumentation group and the resident expert on control rod drives, logic and operation reviewed the problem early on August 31. It was determined that all features of the above observations could be duplicated if the UP control button was physically actuated continuously. Even if this button is actuated, depression of the DOWN button will cause insertion of the control rod (an engineered safety feature).

7810270107 A

After a scram, the actuated DOWN button will cause the scrambled motor drive to move very slowly, exactly as observed during the August 30 occurrence.

It was postulated that the UP switch failed intermittently, remaining actuated continuously during the event of August 30. Subsequently, the condition vanished and regular operation returned.

Correction:

Before the reactor was operated again after the last run on August 30, 1978, the faulty UP control switch was replaced with a new one of the same type. It was installed by the research reactor instrumentation group and was tested thoroughly. After the switch replacement and related testing, the reactor was returned to routine operation.

WRM:hr