

An Open Letter to Cornell Faculty regarding Ward Center for Nuclear Sciences Review

February 16, 2001

Paul I. Craven
Senior Reactor Operator and Reactor Supervisor

After reading the Committee's Report I feel there is material the Committee should have considered in the decision-making process but did not request. Although I am not qualified to discuss the academic or research capabilities at Ward Lab, I do believe that over 30 years of experience in maintaining the reactor control systems does qualify me to talk about them. This report conveys the information that I believe should have been part of the decision-making process. The control instrumentation systems at the Cornell TRIGA Reactor are less than 10 years old and in good condition. I have given the specifics below.

TRIGA Instrumentation

From 3/10/93 to about 3/23/93, the Ward staff replaced the old TRIGA instrumentation with new instrumentation from General Atomic.

- 1) The linear range power-monitoring unit was replaced with General Atomic NMP 1000; this is an automatic/manual current to voltage device, which displays power from 1×10^{-3} watts to 5×10^5 watts. The unit also contains a high voltage power supply and readout for the linear channel detector. Both the reactor power monitor and high voltage power supply incorporate their own scram capability.
- 2) The temperature measuring channels were replaced with General Atomic units NFT 1000. The TRIGA incorporates two NFT 1000 channels with temperature scram capabilities.
- 3) The old log channel was replaced with General Atomic's NLW 1000. This unit provides a logarithmic display as a function of power from less than icps to full power. At 1×10^6 CPS the detector draws enough current from the power supply that the logarithmic count rate signal is summed with the logarithmic current signal to generate an output proportional to power. This unit also incorporates its own high voltage supply and scram circuit.
- 4) The old % power channel was replaced with the HPP 1000 unit from General Atomic. This unit has a linear current to voltage signal, which displays steady state power from 10×10^3 watts to full power, it also provides the circuitry to

record and display the peak and integrated functions of power during pulse mode operations. This unit also contains its own high voltage power supply and scram functions.

- 5) The relays which drop out and actually disrupt current to the control rod magnets are housed in the 300 unit along with the various switches needed to turn on the power, raise and lower control rods and initiate a manual scram. The transformers, power supplies and other functions originally assigned to this unit are no longer used or have been taken over by the units from General Atomic. In looking back through the logbook I have found only three times in the last 15 years that a problem with one of these relays was the cause of the reactor shutting down. These are the old 110v Potter & Drumfield relays that were, I believe, built to be installed in tanks and last forever.

TRIGA Rod Drives

The Reactor control rods are rack and pinion gear drives. The pinion engages a rack attached to a magnet drawtube, an electromagnet mounted on the lower end of the drawtube engages an armature that screws into a connecting rod. The control rod is then attached to the lower end of the connecting rod.

There have been a couple of times that the wire to the magnet winding would separate where it was attached to the magnet then we would either have the control rod drop back into the core if operating or not be able to withdraw it at all if starting up. In 1994 General Atomic had funding to refurbish control rod drives for TRIGA reactors. The Ward staff modified the rod drive we had gotten from Columbia University to physically fit the Cornell drive system. We then sent one control rod drive at a time back to General Atomic to be refurbished. We now have control rod drives that are ~ 7 years old. The decision to get the old drives refurbished was due to the fact that we could get new control rods for practically nothing, not due to any problems we were having with them at the time.

Respectfully submitted,

Paul I. Craven
Senior Reactor Operator and
Reactor Supervisor