

ELECTRONIC DAMAGE TO SAFETY CHANNEL ONE

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I. History and Description of the Damage

On Saturday, 15 March 1980, the Physicist-in-Charge of the AFRRRI Reactor Facility discovered that most scram indicators on the reactor control console were illuminated. Such a condition is consistent with a power failure or outage of the console. A query of the AFRRRI Security Watch revealed that between approximately 1600 hours, 14 March, and 0400 hours, 15 March, a survey of the AFRRRI electrical systems was in progress. The nature of the survey was such that power could have been inadvertently removed and reapplied to the console. All scram indicators were reset and all systems appeared to be functioning normally.

On Monday, 17 March 1980, a Weekly Nuclear Instrumentation Checklist was performed expressly to verify console operability in light of the events of 14 and 15 March, and prior to any reactor operation. This inspection revealed that Safety Channel One would not initiate a scram in accordance with the Technical Specifications of Reactor Licence R-84. Safety Channel Two and all other instrumentation were fully operational.

The operational amplifier on a Safety Channel One circuit board had been damaged when electrical power had been reapplied to the console after the power outage. Normally that amplifier would have had an output of 10 volts with an input of 1 milliamp and a scram set point for the circuitry at 11 volts. The damaged amplifier had a maximum saturated output of approximately 8.4 volts. Thus, at the maximum authorized steady state power of 1000 KW, Safety channel One would have indicated about 840 KW. Safety Channel Two and all other nuclear instrumentation would have performed properly.

II. Corrective Action

The circuit board containing the damaged operational amplifier was replaced. At that time, Safety Channel One was calibrated, fully operational, and capable of performing its intended function. Additionally, a relay requiring manual reset was installed in series with the console so that, in the event of a power outage, the console circuitry is more fully protected.

The electrical survey performed on 14 March, was repeated on 22 March 1980. This survey revealed that the electricians involved had inadvertently thrown a circuit breaker that provided power to the console. That circuit breaker has been more clearly marked to prevent the recurrence of that particular event.

III. Safety Review

The damage done to Safety Channel One does not represent an unreviewed safety question and did not endanger the health and safety of AFRRRI personnel or of the general public. The AFRRRI Reactor and Radiation Facility Safety Committee will review this report at its next scheduled meeting.