



Stephen A. Byrne
Senior Vice President, Nuclear Operations
803.345 4622

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Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Ladies and Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
LICENSEE EVENT REPORT (LER 2002-003-01)
AUTOMATIC REACTOR TRIP DUE TO SPURIOUS NOISE ON NUCLEAR
INSTRUMENTATION CHANNEL – SUPPLEMENT 1

Attached is Licensee Event Report (LER) No. 2002-003-00, for the Virgil C. Summer Nuclear Station (VCSNS). The report describes the automatic reactor trip that occurred on June 1, 2002 initially determined to be the result of a failed circuit board in a nuclear instrumentation channel. This report is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(iv). The Supplement is providing the results of the root cause investigation performed to determine the cause of the event.

Should you have any questions, please call Mr. Mel Browne at (803) 345-4141.

Very truly yours,

Stephen A. Byrne

PAR/SAB
Attachment

c: N. O. Lorick
N. S. Cams
T. G. Eppink (w/o attachment)
R. J. White
L. A. Reyes
K. R. Cotton
NRC Resident Inspector
F. Rehrig
Paulette Ledbetter
D. L. Abstance

EPIX Coordinator
K. M. Sutton
INPO Records Center
J&H Marsh & McLennan
NSRC
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IE22

Estimated burden per response to comply with this mandatory information collection request 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOF-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503

NRC FORM 366 (7-2001)

LICENSEE EVENT REPORT (LER)

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V.C Summer Nuclear Station	05000395	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

PLANT IDENTIFICATION

Westinghouse - Pressurized Water Reactor

EQUIPMENT IDENTIFICATION

(EIS - RI) Nuclear Instrumentation, Intermediate Range channel, NI-36

IDENTIFICATION OF EVENT

During the performance of startup testing, approximately 2 % power and steady, after refueling outage 13, the reactor tripped automatically on spurious high intermediate range (IR) neutron flux on one of two channels as indicated by IR nuclear instrument NI-36. This indicated power was determined to be a momentary surge or spike caused by noise on the instrument channel. The redundant IR channel, NI-35, did not indicate any power excursions. This event is documented on corrective action report CER 02-1899.

EVENT DATE

June 1, 2002

REPORT DATE

July 30, 2002, LER 2002-003-00
January 28, 2003, LER 2002-003-01

CONDITIONS PRIOR TO EVENT

Mode 2, 2% power

DESCRIPTION OF EVENT

On June 1st 2002, at 18:40 the reactor automatically tripped during startup testing in Mode 2 after completion of refueling outage 13. At the time of the trip power was steady at approximately 2 percent. The first out annunciator showed that the trip was due to IR channel NI-36 exceeding the high setpoint of 15 to 17 percent reactor power (lower setpoint used during physics testing). The reactor protection system supplied the trip signal once the required logic (1/2) was satisfied. Review of the recorded data showed that there was significant spiking output (noise) on that channel. This spiking exceeded the high setpoint. The channel data was compared with IR channel NI-35 to determine if a power excursion was occurring. No other power measurement indicated that reactor power was changing.

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After the plant was stabilized, NI-36 continued to demonstrate intermittent spiking. Emergency Feedwater was supplying feedwater to the steam generators at the time of the event; therefore, no Engineered Safeguard Feature actuation was required or occurred. All systems functioned as expected.

CAUSE OF EVENT

The cause of the event was preliminarily determined to be excessive noise in the instrument channel pre-amplifier, which resulted in intermittent spiking of the instrument loop output. The noise was traced to the instrumentation for this channel. The exact cause of the noise is not known but was eliminated after replacement of several circuit boards. One of the replaced cards contained components that appeared to be heat stressed. A root cause investigation determined the failure mechanism to be intermittent noise on the high voltage power supply, which resulted in noise at the output of card A8.

ANALYSIS OF EVENT

The Reactor Protection System utilizes redundant safety grade instrument loops to assure that the plant and public remain safe during an event, which could create a potential for a release of radiation. The IR neutron flux high is one of these functions. This function is comprised of two instrument loops, NI-35 and NI-36, with one out of two logic. Should either of these loops indicate a reactor power level in excess of the setpoint before the channel output is manually blocked once the reactor reaches 10 percent (P-10), an automatic trip occurs on IR high neutron flux.

The reactor was being held at approximately 2 percent power so no block was performed yet. The system comparator recognized the spike as exceeding the setpoint and the logic was satisfied. The system reacted as designed to protect the plant and the public.

During the troubleshooting activities, maintenance replaced cards A1, 2, 3 & 8 for channel NI-36. Card A8 in the wide range amplifier had visual degradation of components but verifiable circuitry affects are unknown at this time. During discussions with vendor Gamma-Metrics (G-M) failure mechanisms for the power supplies were discussed. The present version of power supply can fail high and cause additional equipment damage. A newer version is available that in the event of a failure, fails low and minimizes the impact on additional components. The power supplies do not appear to be on a preventative maintenance (PM) program for replacement and are nearing end of life. There is no indication that the power supplies played any role in this trip but have the potential to cause problems in the future if not addressed. In prior discussions with G-M concerning an intermittent failure on N35 there is no recommendation from G-M to replace cards on a set frequency. The plant PM program has not included these cards in any type of replacement program. The circuit cards in this system have not been replaced since installation in 1987.

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CORRECTIVE ACTIONS

The plant automatically shut down and the control room operations personnel entered Emergency Operations Procedure EOP-1.0 to assure the plant was shut down and remained stable.

Instrumentation and Control personnel preliminarily determined the noise was located in the instrumentation for the channel and replaced circuit boards in the pre-amplifier. Nonconformance report NCN 02-1900 was generated to address card replacement as well as cause and corrective action. Testing showed that the spiking was no longer present on the channel.

OTHER CORRECTIVE ACTIONS

A replacement schedule is being developed for the power supplies with initial replacement to be completed by the end of the next refueling outage.

A root cause evaluation has been initiated to determine the actual cause of the event and assign actions to preclude reoccurrence. A supplemental LER should be submitted by January 31, 2003 providing the results of the evaluation.

The high voltage power supply for channel N-36 was replaced on September 20, 2002. A schedule for replacement of the high voltage power supply on the redundant channel as well as the low voltage power supplies for both channels is being developed. These components are being placed into the preventative maintenance program for routine replacement. This is being tracked via an action in CER 02-1899.

PRIOR OCCURRENCES

None