

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)										DOCKET NUMBER (2)										PAGE (3)																									
Virgil C. Summer Nuclear Station										0 5 0 0 0 3 9 5										1 OF 0 4																									
TITLE (4)																																													
Reactor Trip During Surveillance Testing With N-42 Inoperable																																													
EVENT DATE (5)						LER NUMBER (6)						REPORT DATE (7)						OTHER FACILITIES INVOLVED (8)																											
MONTH		DAY		YEAR		YEAR		SEQUENTIAL NUMBER		REVISION NUMBER		MONTH		DAY		YEAR		FACILITY NAMES																											
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OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following): (11)																																											
		20.402(b)										20.406(c)										X		50.73(a)(2)(iv)										73.71(b)											
POWER LEVEL (10)		1 0 0										20.406(a)(1)(i)										50.38(a)(1)												50.73(a)(2)(v)										73.71(c)	
		20.406(a)(1)(ii)										50.38(a)(2)												50.73(a)(2)(vi)																					
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OTHER (Specify in Abstract below and in Text NRC Form 366A)																																													
LICENSEE CONTACT FOR THIS LER (12)																																													
NAME										TELEPHONE NUMBER																																			
W. R. Higgins, Supervisor, Regulatory Compliance										AREA CODE 8 0 3 3 4 5 - 4 0 4 2																																			
COMPLETE ONE LINE FOR EACH CONSEQUENT FAILURE DESCRIBED IN THIS REPORT (13)																																													
CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NPDOS		CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NPDOS																											
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SUPPLEMENTAL REPORT EXPECTED (14)																																													
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO																																			
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ABSTRACT (Limit to 1400 spaces - i.e., approximately fifteen single-space typewritten lines) (16)

On February 16, 1988 at 2331 hours, the reactor tripped from 100% power on a neutron flux negative rate signal. At the time of the trip, Nuclear Instrumentation System (NIS) power range channel N-42 was inoperable with bistables tripped, having failed a surveillance test at 1300 hours earlier that day. A Quadrant Power Tilt Ratio (QPTR) determination was required by Technical Specifications by 0100 hours, February 17, 1988 to maintain 100% power.

While inserting the digital volt meter leads into the test point for current readings on N-44, the Shift Engineer moved a loose terminal post adjacent to the test point, momentarily interrupting the current signal and resulting in a negative rate trip signal for N-44. With the bistables for N-42 tripped, the two out of four coincidence was satisfied and the reactor tripped on a power range neutron flux negative rate signal.

The primary cause is that the design of the meter test board terminal posts is such that the posts are susceptible to mechanical loosening and did not incorporate the features necessary to lock the connection. The Licensee is currently evaluating various design changes and has incorporated procedure changes to preclude recurrence.

Approximately 10 minutes after the trip, a fire occurred in the main generator ALTERREX cabinet when the exciter field breaker failed to remotely trip from the main control board. Attempts to trip the breaker locally were unsuccessful. The breaker tripped following the extinguishing of the fire.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-010

EXPIRES: 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Virgil C. Summer Nuclear Station	0500039588	88	002	00	02	OF	04

TEXT (If more space is required, use additional NRC Form 366A's) (17)

PLANT IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

EQUIPMENT IDENTIFICATION:Nuclear Instrumentation System (NIS) Power Range Channel N-44 (EIIS:JC)
ALTERREX Exciter Field Breaker (EIIS:EL)IDENTIFICATION OF EVENT:

Reactor trip due to interrupting current in one NIS power range channel with another channel already in test.

PREVIOUS SIMILAR EVENT:

None.

EVENT DATE: 02/16/88 at 2331 hoursREPORT DATE: 03/17/88

This report was initiated by Off-Normal Occurrence number 88-008.

CONDITIONS PRIOR TO EVENT:Mode 1 - Reactor power 100%.
NIS power range channel N-42 bistables tripped with troubleshooting in progress by Instrumentation and Control personnel.
Surveillance Test Procedure (STP) 108.001, "Quadrant Power Tilt Ratio," was in progress.DESCRIPTION OF EVENT:

On February 16, 1988 at 2331 hours, the reactor tripped from 100% power on a neutron flux negative rate signal. At the time of the trip, NIS power range channel N-42 was inoperable with bistables tripped, and a Quadrant Power Tilt Ratio (QPTR) determination was being performed in accordance with STP-108.001.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Virgil C. Summer Nuclear Station	0500039588	—	002	—	000	3	OF 04

TEXT (If more space is required, use additional NRC Form 366A's) (17)

On February 16, 1988 at 1300 hours, NIS power range channel N-42 was declared inoperable upon failure of STP-302.037, "NIS Power Range (N-42) Operational Test." Instrumentation and Control personnel tripped the channel in accordance with Technical Specifications Section 3.3.1, "Reactor Trip System Instrumentation," and initiated a maintenance work request for troubleshooting. A QPTR determination was required by Technical Specifications Section 3.3.1 by 0100 hours, February 17, 1988 if N-42 could not be repaired.

When it became clear to the operating shift that N-42 would not be returned to service prior to the deadline of the QPTR, the Shift Engineer and a reactor engineer implemented STP-108.001, "Quadrant Power Tilt Ratio." A QPTR using a digital volt meter (DVM) was necessary after a less accurate QPTR was performed using the power range drawer meters. Using the DVM required pulling out each power range drawer and measuring the current reading at two test points on the meter test board.

While inserting the DVM leads into the test points for current readings on N-44, the Shift Engineer moved a loose terminal post adjacent to one of the test points, momentarily interrupting the current signal and resulting in a negative rate trip signal for N-44. With the bistables for N-42 tripped, the two out of four coincidence was satisfied and the reactor tripped on a power range neutron flux negative rate signal.

Approximately 10 minutes after the trip, a fire occurred in the main generator ALTERREX cabinet when the exciter field breaker failed to completely trip from the main control board. Attempts to trip the breaker locally were unsuccessful. The breaker tripped following the extinguishing of the fire. Since the fire lasted less than 15 minutes, a Notification of Unusual Event was not necessary.

ANALYSIS OF EVENT:

This report is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv). Notification to the NRC Operations Center via the Emergency Notification System was also made pursuant to the requirements of 10CFR50.72(b)(2)(ii).

Activation of the turbine driven emergency feedwater pump resulted in a total radioactive release of 12 micro-curies of tritium due to minor primary to secondary leakage in the steam generators.

There were no safety consequences associated with this event since the reactor protection system functioned as designed and maintained the plant in a safe condition throughout the transient.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

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Virgil C. Summer Nuclear Station	0500039588	--	002	--	000	4	OF 04

TEXT (If more space is required, use additional NRC Form 366A's) (17)

CAUSE OF EVENT:

The cause of the reactor trip is considered to be two-fold. The primary reason is that the design of the terminal posts for the meter test boards is such that the posts are susceptible to loosening. The terminal post for the meter test board consists of a screw secured to the circuit board by a nut which makes electrical connection with the foil on the circuit board. This design does not incorporate the features necessary to lock the connection. When the Shift Engineer moved the loose terminal post, the "play" in the connection resulted in a momentary electrical discontinuity with the subsequent negative rate trip signal. The Licensee does not believe that the design of this terminal post is the optimum for this application, given its susceptibility to loosening.

The second cause is an inadequate procedure. The Licensee's procedure did not require the positive verification of the mechanical tightness of this connection during the NIS power range calibration every refueling outage.

The fire was caused by the failure of the exciter field main contacts to remotely open from the main control board which caused the exciter field shorting resistor to overheat. Failure of the exciter field breaker was most likely due to accumulation of dirt and dust from a recent floor repair.

IMMEDIATE CORRECTIVE ACTION:

The operating shift placed the plant in a stable condition in accordance with Emergency Operating Procedure (EOP) 1.0, "Reactor Trip/Safety Injection Actuation," and EOP-1.1, "Reactor Trip Recovery."

All power range drawer meter test boards terminal posts were verified to be mechanically tight prior to startup. In addition, the Licensee revised STP-310.005 through 310.008, "NIS Power Range (N-41 through N-44) Calibration," to require the positive verification of the mechanical tightness of the terminal post at a minimum frequency of every 18 months.

The exciter field breaker was cleaned and lubricated. The shorting resistor was replaced and damaged wires were repaired.

ADDITIONAL CORRECTIVE ACTION:

A Management Review Board meeting, chaired by the Vice President, Nuclear Operations, convened to investigate the details of the event and identify corrective actions necessary to prevent recurrence. As a result of this meeting, The vendor has been requested to review the terminal post and test point design and to recommend potential upgrades to the system necessary to prevent recurrence. In addition, the Licensee has reviewed the exciter field breaker maintenance program and considers it adequate.



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10CFR50.73
Dan A. Nauman
Vice President
Nuclear Operations

March 11, 1988

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

Subject: Virgil C. Summer Nuclear Station
Docket No. 50/395
Operating License No. NPF-12
LER 88-002

Gentlemen:

Attached is Licensee Event Report No. 88-002 for the Virgil C. Summer Nuclear Station. This report is submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

Should there be any questions, please call us at your convenience.

Very truly yours,

D. A. Nauman

MDB/DAN:lcd
Attachment

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