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10CFR50.73
John L. Skolds
Vice President
Nuclear Operations

DEC 17 1990

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

Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
LER 90-010 (ONO 900117)

Attached is Licensee Event Report No. 90-010 for the Virgil C. Summer Nuclear Station. This report is submitted as a voluntary LER.

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

Very truly yours,

John L. Skolds

DCH:JLS:lcd
Attachment

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"NUCLEAR EXCELLENCE - A SUMMER TRADITION!"

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): Virgil C. Summer Nuclear Station DOCKET NUMBER (2): 05000395 PAGE (3): 1 OF 03

TITLE (4): Inverter Failure Results in Power Reduction to 90%

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		DOCKET NUMBER(S)
11	17	90	90	010	00	12	17	90			05000
											05000

OPERATING MODE (9): <u>1</u>	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11):				
POWER LEVEL (10): <u>100</u>	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(a)	<input type="checkbox"/> 60.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)	<input type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A) <u>Voluntary</u>
	<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 60.36(c)(1)	<input type="checkbox"/> 60.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)	
	<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 60.36(c)(2)	<input type="checkbox"/> 60.73(a)(2)(vi)	<input checked="" type="checkbox"/>	
	<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 60.73(a)(2)(ii)	<input type="checkbox"/> 60.73(a)(2)(vii)(A)		
	<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 60.73(a)(2)(iii)	<input type="checkbox"/> 60.73(a)(2)(vii)(B)		
<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 60.73(a)(2)(iii)	<input type="checkbox"/> 60.73(a)(2)(ix)			

LICENSEE CONTACT FOR THIS LER (12):
 NAME: W. R. Higgins, Supervisor, Regulatory Compliance
 TELEPHONE NUMBER: 803 345-4042

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS
X	E	F	I	N	V	T			Y

SUPPLEMENTAL REPORT EXPECTED (14):
 YES (If yes, complete EXPECTED SUBMISSION DATE): NO
 EXPECTED SUBMISSION DATE (15): MONTH DAY YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 0610 on November 17, 1990, in response to several spurious bistable actuations associated with Protection Set I, the Shift Supervisor (SS), an electrician, and an Instrument and Controls (I&C) technician made a local inspection of inverter XIT-5901. The inspection revealed that the output voltage was low and slowly degrading. The SS deenergized XIT-5901 and initiated actions to place its associated Bus (APN-5901) on an alternate power supply. APN-5901 and its associated loads were reenergized at approximately 0640. The loss of APN-5901 caused certain instrumentation and control anomalies which resulted in letdown isolation, increased charging and loss of auto make-up to the Volume Control Tank (VCT). This resulted in an auto transfer of the charging pump suction from the VCT to the Refueling Water Storage Tank (RWST) due to VCT low level. The addition of RWST water, at a boron concentration of approximately 2400 ppm, caused reactor power to slowly drift down to approximately 90% power. Prompt operator action maintained turbine power matched to reactor power during the transient.

The failure of the inverter did not present any safety consequences and did not preclude the ability for a safe and controlled shutdown. The plant was stabilized and returned to full power after reenergizing Bus APN-5901. Maintenance repaired a shorted ferroresonant transformer in inverter XIT-5901, returning it to operable status.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Virgil C. Summer Nuclear Station	DOCKET NUMBER (2) 0 5 0 0 0 3 9 5	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		9 0	0 1 0	0 0	0 2	OF	0 3

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

PLANT IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

EQUIPMENT IDENTIFICATION:

XIT-5901 - 120 V Inverter 1, NSSS (IEEE-INVT)

IDENTIFICATION OF EVENT:

A short in a ferroresonant transformer caused the failure of inverter XIT-5901 which resulted in an inadvertent boration and a power reduction to approximately 90% power.

EVENT DATE AND TIME:

November 17, 1990, at 0620

REPORT DATE:

December 17, 1990

CONDITIONS PRIOR TO EVENT:

Mode 1, 100% power

DESCRIPTION OF EVENT:

At 0610 on November 17, 1990, in response to several spurious bistable actuations associated with Protection Set I, the Shift Supervisor (SS), an electrician, and an Instrument and Controls technician made a local inspection of inverter XIT-5901 (the power supply to Bus APN-5901 which carries Protection Set I as a load). The inspection revealed that the output voltage was low and slowly degrading. The lower voltage caused increased current to the loads and caused the breaker supplying Protection Set I to trip at approximately 0620. When this occurred, the SS deenergized XIT-5901 and initiated actions to place APN-5901 on an alternate power supply. APN-5901 and its associated loads were reenergized at approximately 0640. The loss of Protection Set I and subsequent deenergization of APN-5901 caused certain instrumentation and control anomalies which resulted in letdown isolation, increased charging and loss of auto make-up to the Volume Control Tank (VCT). This resulted in a decreased level in the VCT to the emergency make-up setpoint which ensures pump protection by transferring the charging pump suction from the VCT to the Refueling Water Storage Tank (RWST). The addition of RWST water, at a boron concentration of approximately 2400 ppm, caused reactor power to slowly drift down to approximately 90%. At this time, approximately 0640,

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

Operations restored letdown, charging, and VCT make-up systems and stabilized the plant under normal operations. Prompt operator action maintained turbine power matched to reactor power during the transient.

CAUSE OF EVENT:

The failure of a ferroresonant transformer prevented inverter XIT-5901 from adequately maintaining output voltage and led to the loss of P₁ on Set I and the subsequent deenergization of Bus APN-5901. The failure of the ferroresonant transformer was due to an internal short.

ANALYSIS OF EVENT:

The effects of the Protection Set I supply breaker tripping and the subsequent deenergization of Bus APN-5901 was the partial actuation of one channel of Solid State Protection Circuitry and the loss of certain Chemical Volume Control System control functions. These effects would not prevent the safe and controlled shutdown of the plant if required and does not represent any safety consequences.

IMMEDIATE CORRECTIVE ACTIONS:

1. Inverter XIT-5901 was deenergized and declared inoperable.
2. Bus APN 5901 was placed on an alternate power supply.
3. The plant was stabilized and returned to full power.
4. A maintenance work order repaired the shorted transformer and returned inverter XIT-5901 to operable status.

ADDITIONAL CORRECTIVE ACTIONS:

The inverter failure was due to an internal short in the ferroresonant transformer. The plant has not experienced a trend in this type of ferroresonant transformer failure; therefore, no redundant failures of the other inverters is to be expected. No further corrective actions are deemed necessary.

PRIOR OCCURRENCES:

None.