NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Surry Power Station, Unit 1	0 5 0 0 0 2 8 0	1 OF 0 4

TITLE (4)
Reactor Trip on Low RCS Flow Due to Reactor Coolant Pump Trip

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)
										0 5 0 0 0
0 9	2 0	8 7	8 7	— 0 2 4 —	0 1	0 2	1 7	8 8		0 5 0 0 0

OPERATING MODE (9): N
POWER LEVEL (10): 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check one or more of the following)* (11)

[ ] 20.402(b)	[ ] 20.405(c)	[ ] 50.73(a)(2)(iv)	[ ] 73.71(b)
[ ] 20.405(a)(1)(i)	[ ] 50.36(c)(1)	[ ] 50.73(a)(2)(v)	[ ] 73.71(c)
[ ] 20.405(a)(1)(ii)	[ ] 50.36(c)(2)	[ ] 50.73(a)(2)(vii)	[ ] OTHER *(Specify in Abstract below and in Text, NRC Form 366A)*
[ ] 20.405(a)(1)(iii)	[X] 50.73(a)(2)(i)	[ ] 50.73(a)(2)(viii)(A)	
[ ] 20.405(a)(1)(iv)	[ ] 50.73(a)(2)(ii)	[ ] 50.73(a)(2)(viii)(B)	
[ ] 20.405(a)(1)(v)	[ ] 50.73(a)(2)(iii)	[ ] 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER	
	AREA CODE	
D. L. Benson, Station Manager	8 0 4	3 5 7 - 3 1 8 4

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS
X	A B	P	W 1 2 0	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

[ ] YES *(If yes, complete EXPECTED SUBMISSION DATE)* [X] NO

EXPECTED SUBMISSION DATE (15): MONTH | DAY | YEAR

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

On September 20, 1987 at 2028 hours, with Unit 1 at 100% power, a Low Reactor Coolant System (RCS) Flow reactor trip occurred when the 'B' Reactor Coolant Pump (RCP) {EIIS-AB P} tripped. Approximately 35 seconds after the reactor trip, a High Steam Flow with Low RCS Tavg Safety Injection occurred. Operators performed the appropriate emergency and function restoration procedures and quickly stabilized the unit.

The 'B' Reactor Coolant Pump breaker tripped on instantaneous ground fault. Inspection of the motor leads revealed a complete separation of the 'A' phase main load connection bus bar. An engineering evaluation has concluded that the failure was caused by vibration of the unsupported length of feeder cable leads which fatigued and cracked the copper at the knee of the 90 degree bend in the bus bar. The failed bus bar was replaced. The other bus bars on A, B and C RCPs were visually inspected and meggered to verify their integrity. A cable restraint will be installed in the motor termination box to secure the feeder cable leads to prevent vibration.

The High Steam Flow Safety Injection initiation was determined to be spurious.

IE22 1/1

8802230062 880217
PDR ADOCK 05000280
S PDR

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	PAGE (3)
Surry Power Station, Unit 1	0 5 0 0 0 2 8 0	8 7	— 0 2 4	— 0 1	0 2 OF 0 4

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

1.0 Description of the Event

On September 20, 1987 at 2028 hours, with Unit 1 at 100% power, a low Reactor Coolant System (RCS) Flow reactor trip occurred when the 'B' Reactor Coolant Pump (RCP) {EIIS-AB P} tripped. Approximately 35 seconds after the reactor trip, a High Steam Flow with Low RCS Tavg Safety Injection occurred. Following the reactor trip and safety injection, all control and protection systems functioned as expected with the exception of the following:

1. The load tap changer for "A" Reserve Station Service transformer {EIIS-XFMR} stuck in the raise position, causing an overvoltage of approximately 110% of nominal voltage on the J Emergency Bus.

2. The Main Steam Trip Valves, {EIIS-ISV} 1-MS-TV-101A, B and C did not close.

3. The Refueling Water Storage Tank (RWST) Cross Tie Valves, {EIIS-ISV} TV-SI-102A and B, did not open.

4. The Technical Support Center Ventilation System {EIIS-UF} did not realign to its emergency lineup.

Operators followed appropriate plant procedures and quickly stabilized the Unit following the reactor trip/safety injection.

2.0 Safety Consequences and Implications

The low flow reactor trip automatically trips the reactor to maintain sufficient margin above a DNBR of 1.3 with a loss of RCS flow. The loss of one pump from a nominal reactor coolant system heat output of 100% (2441 MWt) with three loops operating is an analyzed event in which DNB does not occur.

Operations personnel were able to reduce the voltage on the J bus to normal operating voltage in a timely manner. The bus and the equipment powered from the bus are designed for 110% nominal voltage. J bus voltage did not exceed 110% nominal voltage; therefore, no damage was expected and none has been observed.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	PAGE (3)
Surry Power Station, Unit 1	0 5 0 0 0 2 8 0	8 7	— 0 2 4	— 0 1	0 3 OF 0 4

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

The High Steam Flow Safety Injection initiation was determined to be spurious. In addition, all other safety related systems remained operable during the event and plant parameters remained within the bounds of the accident analysis. Therefore, this event did not constitute an unreviewed safety question and the health and safety of the public were not affected.

3.0 Cause

The reactor trip was due to the 'B' Reactor Coolant Pump breaker tripping on instantaneous ground fault. Inspection of the motor leads revealed a complete separation of the 'A' phase main load connection bus bar. An engineering evaluation has concluded that the bus bar failure was caused by vibration of the unsupported length of feeder cable leads, which fatigued and cracked the copper at the knee of the 90 degree bend in the bus bar. This structural damage of the bus bar changed the resistance pattern, causing the bus bar to overheat until it failed.

A positioning cam in the 'A' Reserve Station Service transformer load tap changer was found to be out of adjustment. This affected the limit switch operation of the tap changer and caused it to stick in the raise position.

The High Steam Flow Safety Injection signal (which generates a Main Steam isolation signal) was present for approximately 2 seconds. The short duration of this signal did not allow enough time for air to vent from the actuators of the Main Steam Trip Valves and the RWST Cross Tie Valves. Therefore, the valves did not reposition. A review of the control logics of these valves has verified that the valves functioned in accordance with their design.

The Technical Support Center ventilation did not align to its emergency lineup due to a blown fuse in the start circuit of the emergency supply fan.

★U.S.GPO:1986-0-624-538/455

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Surry Power Station, Unit 1	0 5 0 0 0 2 8 0	8 7	— 0 2 4	— 0 1	0 4 OF 0 4

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

4.0 Immediate Corrective Action

The operators performed the appropriate emergency procedures and function restoration procedures to ensure the plant was returned to a stable condition. Also, the Shift Technical Advisor performed the critical safety function status tree review to ensure specific plant parameters were noted and that those parameters remained within safe bounds.

5.0 Additional Corrective Actions

The failed main load connection bus bar of 'B' RCP was replaced. The other bus bars on A, B and C RCPs were visually inspected and meggered to verify their integrity.

The positioning cam in the 'A' RSS transformer tap changer has been properly adjusted, and the tap changer has been tested to verify proper operation.

The Main Steam Trip Valves and the RWST Cross Tie Valves have been tested and verified as fully operable in accordance with their design.

The TSC Ventilation System failure was caused by a blown fuse in the neutral leg on the secondary side of a control transformer. The use of fuses in the neutral legs of control circuitry is not an accepted practice and is not necessary. The control circuit has been modified, the fuse deleted, and the system was tested and verified operable.

6.0 Actions Taken to Prevent Recurrence

A cable restraint will be installed in the motor termination box to secure the feeder cable leads to prevent vibration.

7.0 Similar Events

Reference: LER 84-020, Unit 1

8.0 Manufacturer/Model Number

Westinghouse/5710-79A.

★U.S.GPO:1986-0-624-538/455

VIRGINIA ELECTRIC AND POWER COMPANY
Surry Power Station
P. O. Box 315
Surry, Virginia 23883

February 17, 1988

U.S. Nuclear Regulatory Commission
Document Control Desk
016 Phillips Building
Washington, D.C. 20555

Serial No.: 87-028A
Docket No.: 50-280
Licensee No.: DPR-32

Gentlemen:

Pursuant to Surry Power Station Technical Specifications, Virginia Electric and Power Company hereby submits the following updated Licensee Event Report for Surry Unit 1.

REPORT NUMBER

87-024-01

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be reviewed by Safety Evaluation and Control.

Very truly yours,

for

David L. Benson
Station Manager

Enclosure

cc: Dr. J. Nelson Grace
Regional Administrator
Suite 2900
101 Marietta Street, NW
Atlanta, Georgia 30323

IE22
1/1