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

April 23, 1990

U. S. Nuclear Regulatory Commission
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Serial No.: 90-236
Docket No.: 50-280
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Gentlemen:

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

REPORT NUMBER

90-003-00

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

Very truly yours,

M. R. Kansler
Station Manager

Enclosure

cc: Regional Administrator
Suite 2900
101 Marietta Street, NW
Atlanta, Georgia 30323

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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 7

TITLE (4)
Unit 1 LP Heater Drain System Pipe Leak Due to Excessive Pipe Wall Thinning

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 3	2 3	9 0	9 0	0 0 3	0 0	0 4	2 3	9 0		0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	9 0	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
M. R. Kansler, Station Manager	AREA CODE 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	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
X	S M	P S F	X X X X	N							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 6	3 0	9 0

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

On March 23, 1990 at approximately 2300 hours with Unit 1 at 90% power and Unit 2 at 100% power, a leak developed downstream of a low pressure heater drain pump releasing steam and water into the Unit 1 turbine building. Following this event, the halon system for the Unit 1 and Unit 2 Emergency Switchgear Room (ESGR) spuriously actuated, releasing halon. Personnel in the Unit 2 ESGR, which included an instrument technician performing a surveillance test and a fire watch assigned to an open fire door between the Unit 2 ESGR and #3 Mechanical Equipment room, evacuated the area. The fire watch, required by Technical Specifications, was instructed by the shift supervisor to leave the area with the door open for personnel safety reasons. Approximately one hour following the event, numerous security alarms actuated which required dispatching security personnel to control access to areas affected by the alarms. The leak was a result of a pipe failure due to excessive thinning of the pipe wall. The spurious halon discharge in the ESGRs was a result of water and steam in the Unit 1 turbine building. The failed section of pipe was removed and replaced with a new section. Also a similar section on the "A" train of the LP heater drain system was replaced. The affected systems were returned to service. Actions to prevent recurrence will be provided by a task team formed to investigate the event.

1.0 Description of the Event

On March 23, 1990 at approximately 2300 hours, with Unit 1 at 90% power and Unit 2 at 100% power, plant personnel reported that steam and water were being released in the Unit 1 turbine building. After an immediate investigation by operations personnel, it was determined that a leak had developed downstream of the "B" Low Pressure (LP) Heater Drain Pump (EIIS-SM,P) (1-SD-P-2B) and the pump was stopped at 2309 hours. At approximately 2318 hours, the halon fire protection system (EIIS-KP) for the Unit 1 Emergency Switchgear Room (ESGR) and Relay Room (RR) spuriously actuated, discharging halon into these areas. Approximately five minutes later, the Unit 2 ESGR/RR halon system spuriously actuated. At the time of the discharge, instrument technicians were in the Unit 2 RR performing a surveillance test on a protection channel and immediately left the area upon noticing the halon discharge. In addition, a fire watch posted at an open fire door (EIIS-DR) between the Unit 2 ESGR and #3 Mechanical Equipment Room also left the area after contacting the shift supervisor who instructed the fire watch to leave the door open.

After the instrument technicians exited the ESGR, they informed the shift supervisor that the protection channel being tested was still in the test position. The shift supervisor directed the instrument technician to remove the channel from test and return it to service. He based this decision on the understanding that the channel was fully operable. However, the instrument technicians had discovered while performing the test that a multiplier/divider module required minor adjustment in accordance with the test procedure, but this was not communicated to the shift supervisor. Consequently, the channel was returned to operation prior to making this adjustment.

An automatic fire door (EIIS-DR), separating the Unit 1 and Unit 2 ESGRs, did not close when halon discharged. It was not clear however, if the door had actually received a signal to close upon the spurious actuation of the halon system. The door failed to

close several times during subsequent testing on March 26, 1990, and it was declared inoperable at that time.

Operations personnel identified the exact location of the leak, which was subsequently determined to be a pipe failure, and isolated the leak at 2324 hours by closing a valve upstream of the "B" LP heater drain pump.

Approximately one hour following the event, numerous security alarms (EIIS-IA) actuated overloading the central process units that control access to security controlled areas in the plant. This resulted in the disabling of the card readers at the security controlled areas rendering the areas inaccessible. Security personnel were dispatched and stationed at these areas to control access.

2.0 Safety Consequences and Implications

The LP heater drain system is part of the plant's secondary system and is designed to improve plant efficiency. It does not perform a nuclear safety function. Failure of this system could result in reduced secondary plant efficiency, lowered feedwater temperature, and consequently an increase in reactor power. However, safety related reactor control and protection systems are provided to automatically reduce turbine power limiting reactor power in the event this occurs. In this case, the leak was small, the unit was at a reduced power level, and these control and protection systems were not challenged.

The pipe failure was a result of single phase flow erosion/corrosion caused by the higher localized flow velocities immediately downstream of a flow control valve located at the discharge of the LP heater drain pump.

One of the two redundant control room bottled air systems discharges solely into the #3 MER. In order to consider this system operable, the fire door between the #3 MER and the Unit 2 ESGR must be

maintained open with a constant fire watch present in accordance with Technical Specification 3.21.B.7. The shift supervisor made his decision to leave the door open and unattended after the halon discharge by considering that the halon in the Unit 2 ESGR minimized the potential for fire. Consequently, there was a minimal impact on fire protection safety, the redundant bottled air systems remained operable, and the safety of the fire watch was assured.

Following the discharge of halon into the ESGR/RRs and subsequent ventilation of the rooms, fire watches were established to patrol the area on an hourly basis while the system was inoperable.

Following the failure of the security system, security personnel were stationed at the appropriate areas to control access until the system was restored.

The protection channel affected by the out of tolerance multiplier/divider was the Unit 2 steam flow input to the reactor trip on low steam generator level in coincidence with a steam flow/feed flow mismatch (EIIS-JC). Although the surveillance test required adjusting the out of tolerance multiplier/divider prior to completion of the test, this condition did not render the channel incapable of performing its intended function.

Therefore, for the reasons stated above, these events did not constitute an unreviewed safety question and the health and safety of the public were not affected.

3.0 Cause

The pipe failure occurred immediately downstream of a flow control valve (EIIS-FCV). Turbulence in this area, created by flow through the valve, increased the rate of pipe wear decreasing the wall thickness to the point where pipe failure occurred.

The halon discharge in Unit 2 is suspected to be caused by water entering the halon system control panel shorting out control modules and causing spurious actuation of the system. The halon discharge

in Unit 1 may have been due to the water entering the control panels or the increase in pressure in the halon bottles as a result of a temperature increase due to the hot water and steam released by the pipe failure. The bottles are equipped with pressure relieving devices which were noted to have actuated on five of the eight Unit 1 bottles. If the rate of pressure increase is too great, the bottles may actuate, pressurizing the discharge header. The system is designed to automatically release all bottles common to a discharge header when the header is pressurized. Consequently, the discharge of some of the bottles on each of the three Unit 1 discharge headers due to rapid pressure increase, may have initiated the release of all the Unit 1 bottles.

The failure of the fire door between Unit 1 and Unit 2 ESGR to close was due to crimped wires in the release mechanism.

Water from the pipe failure entered the security control panels that provide an input to the processing unit, shorting out circuits in the panels and generating numerous spurious security alarms. These alarms resulted in an overload of the security processing unit, locking out access to the controlled areas.

Imprecise communications between the instrument technicians and shift supervisor resulted in the shift supervisor not fully understanding the status of the protection channel and consequently his erroneous decision to remove the channel from the test position.

4.0 Immediate Corrective Action(s)

Operations personnel, upon being notified of the leak, warned all plant personnel to remain clear of the Unit 1 turbine building and immediately took actions to isolate the leak.

After the security system malfunction, security personnel were dispatched to control access to the areas affected.

The Unit 1 and Unit 2 ESGRs were ventilated and the fire watch reestablished at the door between the Unit 2 ESGR and the #3 MER.

5.0 Additional Corrective Action(s)

The failed piping section was removed and replaced with a new section and satisfactorily tested. Areas of piping with similar configurations were identified and evaluated. Pipe wall thickness measurements were taken by ultrasonic examination at several locations where the piping had not been previously inspected. The results of these inspections indicated that, with the exception of the "A" LP heater drain pump discharge, no areas of piping below the minimum required thickness were found. The section of pipe at the "A" LP heater drain pump discharge was replaced and tested satisfactorily.

The halon system for the Unit 1 and Unit 2 ESGR was recharged, satisfactorily tested, and returned to service. The automatic fire door release was repaired, and the door tested satisfactorily.

The water damaged security system was repaired and returned to service.

The surveillance test on the Unit 2 steam flow channel was completed satisfactorily.

6.0 Action(s) Taken to Prevent Recurrence

A task team was formed to investigate the event and generate a report. Actions to prevent recurrence will be provided following the completion of the report.

7.0 Similar Events

Unit 2 LER 86-020: The ESGR halon system released due to water entering the control panel following the Unit 2 feedwater system pipe failure in December 1986. Corrective actions taken to prevent recurrence following this event and additional actions required will be discussed in the task team's final report.

8.0 Manufacturer/Model Number(s)

LP heater drain piping, 4 inch diameter, schedule 40, A106 Grade B carbon steel.