**Virginia Electric and Power Company**
Surry Power Station
P. O. Box 315
Surry, Virginia 23883

July 27, 1990

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

Serial No.: 90-468
Docket No.: 50-280
License No.: DPR-32

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

90-006-00

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

137

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 6 |

TITLE (4) Unit 1 Manual Reactor Trip Following Loss of Instrument Air Due to Air Dryer Failure

| 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 7 | 0 1 | 9 0 | 9 0 | — 0 0 6 | — 0 0 | 0 7 | 2 7 | 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) | 1 0 0 | 20.402(b) | 20.405(c) | X 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) | 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 |
|---|---|---|---|---|---|---|---|---|---|
| B | L D | D R Y | X X X X | N | | | | | |
| | | | | | | | | | |

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

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

On July 1, 1990 at 1802 hours, with Unit 1 at 100% power, the "A" Reserve Station Service Transformer tripped due to actuation of its sudden pressure relay. The transformer trip deenergized the 1J 4160V emergency bus and the #3 Emergency Diesel Generator started and loaded onto the 1J bus as designed in approximately nine seconds. An Individual Rod Position Indication (IRPI) control rod stop and turbine runback signal was received, and the unit load was automatically reduced to approximately 95% power. After the turbine runback, with plant conditions stable at 95% power, operators observed Instrument Air (IA) pressure decreasing rapidly. Before instrument air could be restored, the Reactor Operator (RO) received indication of the "C" Main Steam Trip Valve (MSTV) beginning to close and manually tripped the reactor at 1807 hours. Instrument air was restored approximately two minutes following the manual trip by bypassing and isolating a failed IA dryer. The unit was brought to stable hot shutdown conditions using the "A" and "C" steam generator atmospheric Power Operated Relief Valves (PORVs). A four hour non-emergency report was made to the Nuclear Regulatory Commission in accordance with 10CFR50.72.

## 1.0 DESCRIPTION OF THE EVENT

On July 1, 1990 at 1802 hours, with Unit 1 at 100% power, the "A" Reserve Station Service Transformer tripped due to actuation of its sudden pressure relay (EIIS-XFMR,RLY). The transformer trip deenergized the 1J 4160V (EIIS-EK) emergency bus and the #3 Emergency Diesel Generator (EIIS-GEN,EK) started and loaded onto the 1J bus as designed in approximately nine seconds. An Individual Rod Position Indication (IRPI) (EIIS-2I,AA) control rod stop and turbine runback signal was received. Unit load was automatically reduced to approximately 95% power at which time runback was terminated due to restoration of power. After the turbine runback, with plant conditions stable at 95% power, operators observed Instrument Air (IA) (EIIS-LD) pressure decreasing rapidly. Operators were dispatched to isolate and bypass an air dryer that was suspected to be the cause. Before the dryer could be bypassed, however, the Reactor Operator (RO) received indication of the "C" Main Steam Trip Valve (MSTV) (EIIS-SB,SHV) beginning to close. At that point, (1807 hours), the RO manually tripped the reactor. The other two MSTVs closed shortly after the manual trip due to loss of instrument air pressure. Operators performed the appropriate abnormal and emergency procedures, and the Station Technical Advisor (STA) monitored the critical safety function status trees to ensure that plant parameters remained within safe bounds. Instrument Air was restored approximately two minutes following the manual trip by bypassing and isolating a failed IA dryer (EIIS-LD,DRY). The unit was brought to stable hot shutdown condition using the "A" and "C" steam generator atmospheric Power Operated Relief Valves (PORVs) (EIIS-SB,RV). A four hour non-emergency report was made to the Nuclear Regulatory Commission in accordance with 10CFR50.72.

Equipment malfunctions encountered following the trip consisted of: one of eight steam dump valves which stuck partially open, two other steam dump valves indicated intermediate when closed, and the failure of the "B" steam generator PORV to open on demand from the control room.

The steam dump valves were not used in the initial cooldown because the MSTVs had closed, thereby isolating the steam generator from steam dump valves. Approximately forty-five minutes following the manual trip, the MSTVs were bypassed and decay heat removal continued using the "B" train of steam dump valves and the main condenser. (The "A" train steam dumps were isolated due to the partially stuck open dump valve.)

## 2.0 SAFETY CONSEQUENCES AND IMPLICATIONS

The event consisted of a manual trip initiated because of a decrease in IA pressure sufficient to allow MSTV's to close and a subsequent cooldown using two of three steam generator PORVs. Plant parameters responded as expected following the trip. The plant is analyzed for a trip from full power with no steam generator PORVs operable. The safety analysis relies on the steam generator code safety valves for maintaining the primary heat sink. The steam generator safety valve setpoints were not challenged during the event. This event was within the bounds of the accident analysis. The health and safety of the public were not affected.

## 3.0 CAUSE

The cause of the "A" RSST trip was a grounded terminal in its sudden pressure relay connector causing the relay to actuate, thereby locking out the "A" RSST. The connector ground was a

result of corrosion coupled with entry of rainwater into the connector through a split in the outer insulation of the control cable just beyond the connector's water seal. Subsequent testing verified a valid sudden pressure condition had not existed in the transformer.

The IRPI runback was caused by the power transient on the 1J emergency bus which was selected to power the semi-vital bus which powers the IRPIs.

The cause of the Instrument Air dryer failure is still under investigation. The dryer failure could not be repeated. Normally the dryer allows air to pass through one of two desiccant chambers until the desiccant is saturated. It then isolates air to the saturated chamber, allows air to pass through the dry chamber, and regenerates the saturated chamber by allowing dry air to blow backwards through it to atmosphere. The dryer is designed to fail in a safe mode upon loss of power by allowing air to pass through the dryer with no regeneration available until power is restored. When the dryer failed, it allowed air to flow back through to atmosphere (as if in regeneration mode), but it did not allow air to pass through to the IA system. This resulted in rapidly decreasing IA system pressure.

The cause of the failure of the "B" steam generator PORV to open from the control room was a drift in the positioner zero setting resulting from a loose locknut.

The cause of the partially stuck open steam dump valve and one of the steam dump valve inaccurate position indications was tight packing. The cause of the other inaccurate steam dump valve position indication was the adjustment of the limit switch contacts.

## 4.0 IMMEDIATE CORRECTIVE ACTION(S)

Operators tripped the unit and implemented appropriate emergency and abnormal procedures. The STA monitored the critical safety function status trees to ensure that plant parameters remained within safe bounds. The failed IA dryer was bypassed and isolated, thereby restoring IA system pressure. The unit was brought to stable hot shutdown condition using the "A" and "C" steam generator atmospheric PORVs.

## 5.0 ADDITIONAL CORRECTIVE ACTION(S)

The faulty coupling on the "A" RSST and the sudden pressure relay was field repaired. Additionally, although it did not contribute to this event, the sudden pressure relay tested outside allowable limits and was replaced. The transformer was returned to service at 0700 hours on July 2, 1990. As an interim corrective action, check valves have been installed in the air dryer lines to prevent blowdown of the IA system in the event of a similar IA dryer failure. The "B" steam generator PORV positioner was adjusted and the valve verified to stroke properly on demand. The steam dump valves with tight packing were cleaned, had their packing adjusted, and were stroked satisfactorily. The limit switch contacts on the steam dump valve that displayed inaccurate position indication were adjusted.

## 6.0 ACTIONS TO PREVENT RECURRENCE

The connectors, cables, and the sudden pressure relay packages will be replaced during the next scheduled outages for the RSST's. The sudden pressure relay package used as a replacement will be an improved version which should

improve reliability by preventing grounded conductor conditions from causing false actuations. Additionally, other station transformers are being reviewed for similar modification.

Evaluations of enhancements to the IRPI system and its power supply are being conducted as a result of a previous IRPI power supply problem.

A modification will be implemented to install an enhanced power supply system and automatic air dryer bypass valves. These valves will bypass the IA dryer when a low pressure is sensed downstream.

Instrument and Control personnel will be cautioned to ensure that the S/G PORV positioner setting locknuts are properly tightened per procedure.

Steam dump packing design and limit switch adjustments are being reviewed as part of an in progress component failure evaluation.

## 7.0 SIMILAR EVENTS

A unit trip resulting from loss of IA pressure was reported in LER 1-86-001. This trip was also due to a dryer malfunction; however, that dryer was a refrigerant type which failed due to ice blockage. That dryer was replaced with the desiccant type dryer which was the cause of this event.

## 8.0 MANUFACTURER/MODEL NUMBER

IA Dryer: Pall Pneumatic Products Company/T650DHA-F01