NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

# LICENSEE EVENT REPORT (LER)

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| North Anna Power Station Unit 1 | 0 5 0 0 0 3 3 8 | 1 OF 0 3 |

TITLE (4)

Turbine Trip/Reactor Trip - Loss of EHC DC Power Supply

| 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 |
| 1 0 | 1 2 | 8 4 | 8 4 | — 0 1 8 | — 0 0 | 1 1 | 0 8 | 8 4 | | 0 5 0 0 0 |

| OPERATING MODE (9) | 1 | 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 |
|---|---|
| | AREA CODE |
| E. Wayne Harrell | 7 0 3 8 9 4 - 5 1 5 1 |

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 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | J J | J X | W 1 2 0 | 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)


## ABSTRACT

On October 12, 1984, at 1546 hours with Unit 1 operating at 100% power a turbine trip - reactor trip occurred. The cause of the trip was a loss of Electro-Hydraulic-Control (EHC) system control power. The loss of EHC control power occurred as an Instrumentation and Control technician was troubleshooting turbine control problems that had occurred earlier in the day. All plant parameters and equipment responded normally for a post trip condition.




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

On October 12, 1984, at 1414 hours a turbine load step increase of approximately 40 mWe occurred. The turbine was operating in OPERATOR AUTO - IMP IN. The turbine was placed in MANUAL and attempts were made to reduce turbine load by placing Governor Valve #1 in test and running the valve in the closed direction. Concurrently, an Instrumentation and Control (I&C) technician was called to the Control Room to investigate the turbine control problem. The I&C technician suspected a failure of either the reheat pressure transducer, impulse pressure transducer, or the megawatt transducer inputs to the Electro-Hydraulic-Control (EHC) system. Based on these assumptions, the turbine was placed in OPERATOR AUTO - IMP OUT at 1438 hours and the plant was stabilized.

An Emergency Work Order was issued for the I&C technician to troubleshoot the EHC problem(s). An EHC power supply failure occurred while the technician was using an oscilloscope to check analog inputs to the EHC system. A "common" signal was inadvertently taken to station ground causing an instantaneous negative voltage spike to be sensed by the EHC power supply's protection circuit. The spike was of sufficient magnitude to cause the EHC's power supply protective circuit to sense a loss of power. The EHC's power supply actuated to its fail-safe condition of "OFF". This resulted in a turbine trip/reactor trip.

An oscilloscope was used instead of a digital voltmeter (DVM) so that the technician could detect possible voltage spikes from the outputs of the reheat, megawatt, and/or impulse pressure transducers (voltage spikes could occur too quickly for a DVM to detect them). The output of the transducers consists of a "high" side potential and a "common" signal. The common signal has a zero potential by design. However due to accumulated impurities (i.e. normal terminal aging) on the output pins of the EHC process cards, the common signal has a small potential. This potential ranges from a few millivolts to approximately 100 millivolts. The I&C technician was aware of this fact when he was troubleshooting. This condition did not concern him because he was working under the assumption that the oscilloscope he was using had a "floating ground". In that case the ground potential of the oscilloscope will "float" to match the "common" potential of the parameter being measured. However, the oscilloscope that he was using, used station ground instead of a floating ground. When the "common" signal from the megawatt transducer was connected to the "common" signal input to the oscilloscope, the megawatt transducer's "common" signal was taken to station ground. This caused an instantaneous negative voltage spike causing the EHC's power supply protective circuit to detect a loss of voltage. EHC control power is designed to shut itself down when an undervoltage condition is sensed. This is done to ensure reliable output from the logic portions of the EHC. Operation of the system in an undervoltage condition can lead to faulty logic outputs. It was this loss of EHC control power that initiated the turbine trip/reactor trip at 1546 hours.

The reactor trip was caused by the turbine trip coincident with reactor power greater than ten percent full power. All primary plant parameters responded normally and the plant was stabilized at no-load operating temperature and pressure without incident.

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The reactor was returned to criticality at 1730 hours on October 12, 1984. The reheat pressure transducer and the impulse pressure transducer were subsequently replaced. The unit was placed on line at 0629 hours on October 15, 1984. No further turbine control problems have been experienced.

The major contributor to the turbine trip/reactor trip was test equipment unfamiliarity. The I&C technician assumed he was using an oscilloscope equipped with a "floating ground". The technician was counseled on the importance of test equipment familiarity. The importance of understanding the relationship and possible adverse actions associated with test equipment and plant process and control instrumentation will be stressed during I&C technician training. This particular event will be discussed during future I&C technician training.

Vepco

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION
P. O. BOX 402
MINERAL, VIRGINIA 23117

November 8, 1984

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

Serial No. N-84-028
NO/DWR: 11
Docket No. 50-338

License No. NPF-4

Dear Sirs:

The Virginia Electric and Power Company hereby submits the following License Event Report applicable to North Anna Unit No. 1.

Report No. LER 84-018-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to Safety Evaluation and Control for their review.

Very Truly Yours,

E. Wayne Harrell
Station Manager

Enclosures (3 copies)

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
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