UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-338/85-12 and 50-339/85-12

Licensee: Virginia Electric and Power Company
Richmond, VA 23261

Docket Nos.: 50-338 and 50-339 License Nos.: NPF-4 and NPF-7

Facility Name: North Anna 1 and 2

Inspection Conducted: April 1 - May 5, 1985

Inspectors: Gregory A. Pick for 5/21/85
M. W. Branch, Senior Resident Inspector Date Signed

Gregory A. Pick for 5/21/85
J. G. Luehman, Resident Inspector Date Signed

Approved by: Virgil L. Brownlee for 5/22/85
S. Elrod, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine inspection by the resident inspectors involved 167 inspector-hours on site in the areas of licensee event reports, previously identified items, engineered safety features (ESF) walkdown, TMI action plan items, operational safety verification, monthly maintenance and monthly surveillance.

Results: One violation and one deviation were identified: Failure to properly perform surveillance, paragraph 10, and failure to properly set the turbine load limiter, paragraph 9, respectively.

REPORT DETAILS

1. Licensee Employees Contacted

E. W. Harrell, Station Manager
G. E. Kane, Assistant Station Manager
M. L. Bowling, Assistant Station Manager
J. A. Stall, Superintendent, Technical Services
J. R. Harper, Superintendent, Maintenance
R. O. Enfinger, Superintendent, Operations
G. Paxton, Superintendent, Administrative Services
A. L. Hogg, Jr., Quality Control (QC) Manager
S. B. Eisenhart, Licensing Coordinator
J. R. Hayes, Operations Coordinator
J. P. Smith, Engineering Supervisor
R. C. Sturgill, Engineering Supervisor
D. E. Thomas, Mechanical Maintenance Supervisor
A. H. Stafford, Health Physics Supervisor
E. C. Tuttle, Electrical Supervisor
R. A. Bergquist, Instrument Supervisor
F. P. Miller, Quality Assurance (QA) Supervisor
F. T. Terminella, QA Supervisor
G. Flowers, Licensing Coordinator
J. Leberstein, Licensing Coordinator

Other licensee employees contacted included technicians, operators, mechanics, security force members and office personnel.

2. Exit Interview

The inspection scope and findings were summarized on May 7, 1985, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspection findings. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Inspection Findings

Not inspected.

4. Unresolved Items

An Unresolved Item is a matter about which more information is required to determine whether it is acceptable or may involve a violation or deviation.

One unresolved item was identified during this inspection and is discussed in paragraph 8.

5. Plant Status

Unit 1 operated at or near 100% during the entire inspection period.

Unit 2 entered the inspection period operating at or near 100%. However, on April 18, at 0608, the unit was taken off line due to high unidentified reactor coolant system leakage. The leakage was determined to be packing leakage from Unit 2 valve 2-RC-6. Injection of Furmanite into the packing area reduced leakage to an acceptable value and the unit was returned to 100% power at 1952 on April 21.

On April 26, at 0915, the unit automatically tripped from 100% power when 125 VAC vital bus 2-1 was inadvertently deenergized. The loss of vital bus 2-1 caused the reactor protection system to sense a tripping of reactor coolant pump A breaker; thereby, tripping the plant in anticipation of a low flow condition. The unit was returned to 100% power at 1130 on April 30 after several days of operation at reduced power due to secondary plant chemistry holds.

6. Licensee Event Report (LER) Followup

The following LERs were reviewed and closed. The inspector verified that reporting requirements had been met; causes had been identified; corrective actions appeared appropriate; generic applicability had been considered; and the LER forms were complete. Additionally, for those reports identified by asterisk, a more detailed review was performed to verify that the licensee had reviewed the event; corrective action had been taken; no unreviewed safety questions were involved; and violations of regulations or Technical Specification (TS) conditions had been identified.

*338/80-70	Containment Air Particulate Monitor Inoperable.
*339/80-92	Train B of the Safety Injection System Failed to Reset Following a Functional Test.
*339/84-11 Rev. 2	2H Emergency Diesel Generator (EDG) Trips.
*339/85-04	Forced Shutdown Caused by Inoperable EDG (emergency diesel generator)
*339/85-05 Rev. 0 & 1	Unit 2 Reactor Trip.

(CLOSED) LER 338/80-70 Containment Air Particulate Monitor Inoperable. A design change to correct the described problem has been implemented by the licensee. LERs dealing with the same subject were addressed in Inspection Reports 338, 339/84-09.

(CLOSED) LER 339/80-92 Train B of the Safety Injection System Failed to Reset Following a Functional Test. LER 339/82-14, which was closed in Inspection Reports 338, 339/83-31, addressed the same relays discussed in this LER.

(CLOSED) LER 339/84-11 Rev 2, 2H Emergency Diesel Generator (EDG) Trips. The inspectors have reviewed and closed the two previous submittals of this report. This revision supplies some additional information on the actions the licensee plans to take or is taking.

(CLOSED) LER [illegible]/85-04 Forced Shutdown Caused by Inoperable EDG. As discussed in this report, inoperable EDGs have been the subject of a number of reports by the licensee. The Office of Nuclear Reactor Regulation (NRR) and NRC Region II are closely monitoring the licensee's implementation of the program discussed in this report.

(CLOSED) LER 339/85-05 Revisions 0 and 1, Unit 2 Reactor Trip. The inspectors have reviewed the licensee's actions, and they appeared to have been proper. The fact that the tripping of a grid transformer caused the loss of two Reserve Station Transformers (RSS) was discussed with NRR and the licensee. NRR stated that the licensee's off-site electrical distribution system is of acceptable design. As stated in the LER, the licensee is reviewing the design, because, eventhough the present design is acceptable, it may not be the optimum design with respect to continuity of power.

(OPEN) LER 338, 339/85-03 Flooding Potential Not Previously Evaluated. The licensee identified this deviation from a commitment, reported it, and has taken temporary corrective actions. Long term corrective actions are still being evaluated by the licensee and will be reviewed upon implementation.

7. Followup of Previously Identified Items

(CLOSED) Inspector Followup Item (IFI) 338, 339/84-27-04 Service Water Spray Riser Degradation. The licensee has committed to replacing the present spray arrays with ones made of stainless steel. They have also increased routine surveillance of the arrays by the operators to identify spray risers requiring repair. In response to Violation 339/84-04-01, the licensee increased the frequency of spray array inservice inspections to conform with the requirements of North Anna Unit 2 License Condition 2.c.(5) and Regulatory Guide 1.72.

(CLOSED) IFI 338/83-24-02 Log Entry to Meet Surveillance Requirement 4.4.1.3.2. This log entry needed a change to fully address the requirements of the surveillance. The inspectors have reviewed both 1-LOG-4 and 2-LOG-4, and both have been changed to more completely address the surveillance.

(CLOSED) IFI 338, 339/84-09-01 Failure of a Single Fire Damper Causing the Loss of Both Trains of Safeguards Area Ventilation System (SAVS). The inspectors and the licensee have reviewed this issue. The inspectors can find no other ventilation systems in the plant where a similar situation exists. The licensee recognizes the potential problem with the damper location in the SAVS but feels that the eighteen month damper inspection along with the monthly flow test ensure that any problems are quickly identified.

(CLOSED) IFI 338, 339/84-01-03 Brown Bovery Type 5HK Circuit Breakers. The breaker inspection recommended by IE Notice 83-84 was conducted on both units during the 1984 refueling outages. The periodic followup inspection of the breakers has been incorporated into electrical maintenance procedure EMP-P-PH-01 "Electrical Checkout of 4160 Volt Air Circuit Breakers." (2-20-85).

(OPEN) IFI 338, 339/84-04-04 Correction of Discrepancies Found in the Auxiliary Feedwater System Walkdowns. With the exception of the update of drawing 11715-FM-74A, the identified problems have been corrected.

(OPEN) IFI 338, 339/84-27-05 Correction of Problems in Offsite Review Committee Procedures. This item is no longer an Unresolved Item. The licensee has committed to revising the present offsite review Technical Specification to more accurately reflect the present organization structure. Additionally, the licensee committed to revising their offsite review committee administrative procedures to incorporate quorum requirements for the required monthly meeting. The implementation of these changes is an Inspector Followup Item.

8. Hydrogen Recombiner

a. While reviewing the North Anna TS, the inspectors discovered surveillance requirements that appear to conflict with the North Anna Safety Evaluation Report (SER) for TMI action item II.E.4.1 (Dedicated Hydrogen Penetrations). Specifically, TS 4.6.4.2.a, which may be conducted during power operations, requires a six month hydrogen recombiner functional test involving operation of the equipment and communicating containment atmosphere with the external recombiner. Meanwhile, TS 3.6.1.1 for containment integrity while in modes 1, 2, 3, and 4, requires valves not receiving an automatic closure signal be maintained closed. Revision 3 of the licensee response to TMI item II.E.4.1 dated May 31, 1982, described the recombiner system and proposed several modifications to the originally-installed system which did not require automatic closure of the containment isolation valves. NRR accepted the licensee modification in a letter dated January 12, 1984 and specified the containment penetration valves should be opened only under specific administrative control as specified in post-accident procedures. Additionally, the hydrogen recombiner is designed and tested to 10 psig while containment pressure for the first hour after the design basis accident may increase to approximately 45 psig. The recombiner should not be needed during the first hour of the accident and is normally not needed until approximately 24 hours after the accident when containment pressure has been reduced below the 10 psig design pressure. However, every six months during testing, there exists an approximately four hour time period where the system could be overpressurized if an accident occurred.

An additional concern is that the system as described in the licensee's TMI response, Revision 3, dated May 31, 1982, is not like the actually-installed system as described on system drawings 11715-FM-106A-8, 11715-FM-92A-11 and 12050-FM-92A-10. Specifically, the inlet

to the hydrogen recombiner does not tap off the containment vacuum pump suction downstream of the Phase "A" isolation as stated, and under accident conditions, it will not be necessary to open the vacuum pump isolation valves to establish flow to the recombiner and/or hydrogen analyzer as stated. Additionally, the drawing submitted in the licensee NUREG 0737 response is outdated and not correct.

The licensee has been requested to provide to the inspectors, the latest correspondence between themselves and NRR on item II.E.4.1. This item will be considered unresolved pending outcome of the licensee efforts. This item is identified as Unresolved Item 338, 339/85-12-01.

b. The inspectors observed portions of the testing accomplished on one of the post accident thermal hydrogen recombiners following replacement of the motors on that unit. Subsequently, the inspectors reviewed the following procedures:

1-OP-63.1	"Post Accident Thermal Hydrogen Recombiner" (4/18/85)
1-PT-68.1.1	"Containment Hydrogen Recombiner Functional Test - 1-HC-HC-1 (10-05-83)
1-PT-68.1.2	"Containment Hydrogen Recombiner Functional Test - 2-HC-HC-1 (10-05-83)
1-PT-68.2.1	"Containment Hydrogen Recombiner System - Operability Test of 1-HC-HC-1 (10-27-82)
1-PT-68.2.2	"Containment Hydrogen Recombiner System - Operability Test of 2-HC-HC-1 (10-05-83)

The inspectors had the following comments on their observations and reviews.

(1) The functional test procedures for recombiners 1-HC-HC-1 and 2-HC-HC-1 are substantially different in format. The procedure for 1-HC-HC-1 (1-PT-68.1.1) references 1-OP-63.1 for the performance of many of the action steps. Engineering Work Request (EWR) 83-335 recommended that "stand alone" functional test procedures, rather than those that reference other procedures, be implemented for the hydrogen recombiners. This has been done for 2-HC-HC-1 (1-PT-68.1.2).

(2) 1-PT-68.1.1 does not contain all the Initial Conditions and Precautions of 1-PT-68.1.2 and step 4.6 of 1-PT-68.1.1 references the wrong section of 1-OP-63.1.

(3) 1-PT-68.2.1 does not contain the formula for computation of corrected purge blower flow (Q) provided by the vendor (EWR 83-335).

(4) The inspectors noted that the operator performing the testing on the hydrogen recombiner became confused when calculating the measured purge blower flow rate (Qo). This confusion was caused by the fact that purge blower inlet pressure (PBo) which was read

on PI-HC-205-1 read out in inches of Hg while the formula requires the reading to be entered in psia. Either a conversion factor needs to be provided or the formula needs to be changed to reflect the units being read.

Followup of these comments is identified as IFI 338, 339/85-12-02.

9. Turbine Load Limiter

The inspectors conducted a review of recent operational transients in which the main electric turbine generator, operating at 100% load (i.e., approximately 940 megawatts electrical (MWE) assumed an additional 40 MWE when a large electrical station was removed from the grid resulting in voltage and/or frequency droop. To better explain the significant of the turbine load increase, a brief description of the North Anna design follows:

Each North Anna unit utilizes a 1000 MWE turbine generator that is oversized when compared to the licensed electrical output equivalent of 2775 megawatts thermal reactor power, or 954 MWE. This difference in rating results in the four turbine governor valves being at an average position of 80% open when the reactor is at 100% power. The turbine control system utilizes a governor valve position limiter; however, in the past, this limiter was set at 100% and did not restrict turbine load increases above the electrical load equivalent of 100% reactor power. Section 15.2.11 of the Updated Final Safety Analysis Report (UFSAR) states "excessive loading by the operator or by system demand would be limited by the turbine load limiter".

The inspectors reviewed the UFSAR, system drawings and technical manuals but were unable to locate a turbine load limiter as described in Safety Analysis 15.2.11 of the UFSAR. The licensee was requested to review their design and provide their findings. As an interim measure, licensee management provided instructions to the operating crews to set the turbine governor valve position limiter to a value of 2% above the 100% reactor power governor valve position, i.e., approximately 82%. Subsequent correspondence with the turbine vendor indicated that the governor valve position limiter was the load limiter discussed in the UFSAR. As discussed earlier, licensee procedures previously set the governor valve position limiter at 100% - effectively rendering it inoperable as the load limiter described in the UFSAR.

Even though the turbine load limiter has not been used as described, excessive load increase accident protection is provided by overpower delta T, overtemperature delta T and power range high neutron flux trips. The licensee has committed to modifying operating procedures to set the governor valve position limiter where it will perform the load limiter function.

The failure to properly use the governor valve limiter as the load limiter described in the UFSAR is identified as Deviation 338, 339/85-12-03.

10. Station Batteries

During a routine plant inspection of the station battery rooms, numerous cell electrolyte levels were above the maximum level mark for seven of the eight batteries on both Units 1 and 2. TS require the battery cell electrolyte level to be maintained between the minimum and maximum level indication marks.

The vendor, when contacted by the licensee, informed the licensee that even though cell electrolyte levels being slightly high posed no immediate operational problems, the levels should be reduced into the normal operating range.

The licensee determined that approximately two weeks before the inspectors identified this concern, the cell electrolyte levels had been adjusted to the top of the operating band, and during subsequent charging, levels must have slowly increased to above the indicated maximum.

The inspectors reviewed the latest completed 1-PT-85 and 2-PT-85, "D.C. Distribution System", which were performed on April 30, 1985. These performance tests are performed every seven days to meet the requirements of TS surveillance 4.8.2.3.2 which, in part, requires the verification of proper electrolyte level for the battery pilot cells. On May 1, 1985, the electrolyte level of at least one pilot cell (Battery 2-II) was clearly above the maximum level indication mark, and as mentioned earlier, numerous other cells exhibited the same condition.

The failure to properly conduct the surveillance requirements of TS 4.8.2.3.2 is identified as Violation 339/85-12-04.

11. ESF System Walkdown

The following selected ESF systems were verified operable by performing a walkdown of the accessible and essential portions of the systems on May 3, 1985:

Unit 1

1H Diesel Engine Cooling Water (1-OP-6.1A)
1J Diesel Engine Cooling Water (1-OP-6.2A)
1H Diesel Engine Lube Oil System (1-OP-6.3A)
1J Diesel Engine Lube Oil System (1-OP-6.4A)
Diesel Air (1-OP-46.4A)

Unit 2

2H Diesel Engine Cooling Water (2-OP-6.1A)
2J Diesel Engine Cooling Water (2-OP-6.2A)
2H Diesel Engine Lube Oil System (2-OP-6.3A)
2J Diesel Engine Lube Oil System (2-OP-6.4A)
Diesel Air (2-OP-46.4A)

Upon the completion of the walkdowns, the inspectors had the following comments.

a. Valves 2-EB-16, 17, 62, and 63 are required to be locked open by Attachment 2 of North Anna Power Station Administrative Procedure ADM 19.29. These valves are in fact locked open; however, 2-OP-46.4A requires them only to be open.

b. Small air leaks were noted on valves 1-EB-39 and 2-EB-83.

Correction of these discrepancies is identified as Inspector Followup Item 338, 339/85-12-05.

12. TMI Action Plan Items

The inspectors reviewed the status of outstanding TMI Action Plan Items and performed the action specified in the applicable IE Manual Chapter 2515 Temporary Instruction. The status of those items reviewed are as follows:

a. Closed: (Units 1 and 2) II.B.1.2 (Install Reactor Coolant Vents): As stated in the March 4, 1985, VEPCO response, serial number 85-091, to Enforcement Action EA 84-57 described in inspection report 50-338, 339/84-06, the installation was completed by opening the manual isolation valve.

b. Closed: (Units 1 and 2) II.F.2.3.B (Implement Reactor Vessel Level Instruments): As stated in a March 7, 1984, letter to NRR, Serial Number 047A, VEPCO ensured the level instruments were operable after the 1984 refueling outages.

c. Closed: (Units 1 and 2) II.K.3.5.B (Auto Trip of Reactor Coolant Pumps): The licensee proposal to include manual tripping instructions in their emergency procedures was verified complete.

13. Routine Inspection

By observations during the inspection period, the inspectors verified that the control room manning requirements were being met. In addition, the inspectors observed shift turnover to verify that continuity of system status was maintained. The inspectors periodically questioned shift personnel relative to their awareness of plant conditions.

Through log review and plant tours, the inspector verified compliance with selected TS and Limiting Conditions for Operations.

During the course of the inspection, observations relative to Protected and Vital Area security were made, including access controls, boundary integrity, search, escort and badging.

On a regular basis, radiation work procedures (RWP) were reviewed and the specific work activity was monitored to assure the activities were being conducted per the RWPs. Radiation protection instruments were verified operable and calibration/check frequencies were reviewed for completeness.

The inspector kept informed, on a daily basis, of the overall status of both units and of any significant safety matters related to plant operations. Discussions were held with plant management and various members of the operations staff on a regular basis. Selected portions of operating logs and data sheets were reviewed daily.

The inspector conducted various plant tours and made frequent visits to the Control Room. Observations included: witnessing work activities in progress; verifying the status of operating and standby safety systems and equipment; confirming valve positions, instrument and recording readings, annunciator alarms, housekeeping and vital area controls.

No violations or deviations were identified in these areas.