



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

Report Nos.: 50-338/86-04 and 50-339/86-04

Licensee: Virginia Electric & Power Company  
Richmond, VA 23261

Docket Nos.: 50-338 and 50-339

Facility Name: North Anna 1 and 2

Inspection Conducted: February 3 - March 2, 1986

Inspectors: M. W. Branch for  
M. W. Branch, Senior Resident Inspector

3/17/86  
Date Signed

L. P. King for  
L. P. King

3/17/86  
Date Signed

Approved by: A. J. Ignatonis  
A. J. Ignatonis, Acting Section Chief  
Division of Reactor Projects

3/17/86  
Date Signed

SUMMARY

Scope: This routine inspection by the resident inspectors involved 203 inspector-hours on site in the areas of licensee event report (LER) review, engineering safety features (ESF) walkdown, operational safety verification, monthly maintenance, and monthly surveillance.

Results: One violation was identified - failure to comply with the requirements of a test procedure for emergency diesel generator operation, paragraph 8.

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## REPORT DETAILS

### 1. Licensee Employees Contacted

- \*E. W. Harrell, Station Manager
- \*D. B. Roth, Quality Control (QC) Manager
- G. E. Kane, Assistant Station Manager
- \*E. R. Smith, Assistant Station Manager
- R. O. Enfinger, Superintendent, Operations
- \*M. R. Kansler, Superintendent, Maintenance
- A. H. Stafford, Superintendent, Health Physics
- \*J. A. Stall, Superintendent, Technical Services
- J. L. Downs, Supervisor, Administrative Services
- J. R. Hayes, Operations Coordinator
- \*D. A. Heacock, Engineering Supervisor
- D. E. Thomas, Mechanical Maintenance Supervisor
- E. C. Tuttle, Electrical Supervisor
- R. A. Bergquist, Instrument Supervisor
- F. T. Terminella, QA Supervisor
- R. S. Thomas, Supervisor Engineering
- G. H. Flowers, Nuclear Specialist
- \*J. H. Leberstein, Licensing Coordinator

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

\*Attended exit interview.

### 2. Exit Interview

The inspection scope and findings were summarized on March 5, 1986, with those persons indicated in paragraph 1 above. A violation described in paragraph 8, failure to follow procedure requirements for emergency diesel generator operation, was discussed in detail. The licensee acknowledged the inspectors findings and took no exceptions. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection. The licensee also formally committed to those proposed corrective actions discussed in paragraph 12 of this report.

### 3. Licensee Action on Previous Inspection Findings

(Closed) Violation 338,339/85-16-02, including additional examples listed in paragraph 17 of inspection report 338,339/85-18: Failure to comply with station procedures. The inspectors reviewed the licensee's corrective action specified in their response dated September 19, 1985 (s/n 85-543) and later, in a revised response of December 19, 1985 (s/n 85-821). The corrective action was found to be acceptable.

#### 4. Plant Status

##### Unit 1

Unit 1 operated at or near 100% for most of the inspection period. However, on February 23, 1986, the unit tripped from 100% reactor power due to a low-low level in the "B" steam generator. The low-low steam generator level, caused by shrink, resulted when all four governor valves on the main turbine went shut due to a failure of the Electro Hydraulic Control (EHC) System. All safety systems responded normally; however, source range nuclear instrument channel N31 failed when energized. After subsequent detector replacement and testing, the channel was declared operable. The unit was returned to power on February 25, 1986, and is currently at 100% power.

##### Unit 2

On February 20, 1986, at 10:00 A.M., a Unit 2 shutdown from approximately 80% power was initiated due to an increase in unidentified reactor coolant (RC) leakage and leakage in steam generator "C". The calculated unidentified RC leakage was near the Technical Specification (TS) limit of 1.0 GPM. At 2:36 P.M. of the same date, while entering mode 3, the unit received a reactor trip on a high source range (SR) monitor N-31 signal which spiked high. Both SR monitors became inoperable and probable cause was suspected to be the high humidity in the containment prior to shutdown. The backup Appendix "R" monitor was operable and the licensee verified shutdown margin compliance per the TS. The unit entered into the 48-day refueling and maintenance outage, previously scheduled for March 1986.

#### 5. Licensee Event Report (LER) Follow-Up (92700)

The following LERs were reviewed and closed. The inspector verified that reporting requirements had been met, that causes had been identified, that corrective actions appeared appropriate, that generic applicability had been considered, and that the LER forms were complete. Additionally, the inspectors confirmed that no unreviewed safety questions were involved and that violations of regulations or Technical Specification (TS) conditions had been identified.

(Closed) 338/85-013; Revision 1: Operability of the Reactor Vessel Level Indication System (RVLIS). In addition to the above review the inspectors also verified that performance test procedure (PT) 1(2)-PT-44.7 was modified to include the new acceptance criteria.

#### 6. Follow-up of Previously Identified Items

(Closed) IFI 338,339/85-05-04: Feedwater temperature accuracy. The inspectors reviewed and found acceptable the licensee's response to the concerns identified in the inspection report. Temporary jumpers were removed and the use of the manual method to perform calorimetric calibrations was eliminated from 1 (2)-PT-24. Additionally, the

installation and removal of any temporary equipment has been included in 1 (2)-PT-27.

7. Monthly Maintenance (62703)

Station maintenance activities affecting safety related systems and components were observed/reviewed, to ascertain that the activities were conducted in accordance with approved procedures, regulatory guides and industry codes or standards, and in conformance with Technical Specifications.

The inspectors observed the overhaul of the 2H Fairbanks Morse emergency diesel generator. The removal of the upper crankshaft, the 24 pistons and connecting rods and the number 1 thru 10 liners were observed. The individual fuel injectors were removed and shipped to the factory for modification. The number 1 thru 10 liners will be replaced with high temperature liners. The number 11 and 12 had been replaced on a previous outage. Recordings were taken to determine the clearances in the air supply blower.

8. Monthly Surveillance (61726)

The inspectors observed and reviewed TS required testing and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that limiting conditions for operation (LCO) were met and that any deficiencies identified were properly reviewed and resolved.

On February 4, 1986, the inspectors observed testing of solid state protection system and tripping of B reactor trip breaker - Unit 2 test 2-PT-36.1A

On February 11, 1986, the inspectors observed performance of 2H emergency diesel generator slow speed start per procedure 2-PT-82H.

On February 21, 1986, during the performance of 2-PT-70, "Main Steam Code Safety Valve Setpoint Verification" for Unit 2, 8 of the 15 main steam safety valves failed to relieve. Four of these valves were on the "C" steam generator main steam line. The design basis require a minimum of two safety valves per steam generator to be operable. 10 CFR 50.72(2) required that a four-hour report be made. This incident was reported at 12:30 p.m. on February 21, 1986. All 15 safety valves had been previously set offsite at ITT Hensley. The inspectors requested that the licensee furnish the test data from 2-PT-70 done offsite in September 1984. The valves have been sent offsite to Wyle Laboratories (Huntsville, Alabama) for further testing.

The inspectors also reviewed the completed procedure 2-PT-83.4, "Blackout of Emergency Bus for Shutdown Loads", performed on February 23, 1986, for the 2J emergency bus and on February 21, 1986, for the 2H emergency bus. The purpose of this test is to verify that the emergency diesel generator (EDG) operates satisfactorily for at least 24 hours with the generator loaded to

an indicated target value of 2950 kw (between 2900-3000 kw) during the first 2 hours of the test and between 2500-2600 kw for the remaining 22 hours.

During the performance of the 2J emergency bus portion of the test the system load increased and for a 7.5 minute period the 2J diesel remained loaded to approximately 3200 kw; and then again, for another 1.5 minute period the 2J diesel was loaded to approximately 3450 kw. During both of these periods, the operator failed to promptly intervene by bringing the load back into the required band. There are several factors that might have affected the operators response to the excessive EDG loading. First, the operator who was operating the diesel during the test was the normal shift backboard operator, and with his many other duties it was difficult for him to closely monitor the diesel during a 24-hour run. Also, neither the recorder nor the installed diesel instrumentation are equipped with an alarm circuit to aid the operator in restricting diesel loading. These factors combined with the adverse effects of electrically overloading the diesel beyond it's design capacity, appears to warrant immediate licensee attention. The failure to follow the requirements of test procedure 2-PT-83.4 is a violation of section 6.8.1 of the North Anna Technical Specifications, which requires that written procedures be established and implemented, (339/86-04-01).

9. ESF System Walkdown (71710)

The following selected ESF systems were verified operable by performing a walkdown of the accessible and essential portions of the systems.

Unit 1

Auxiliary Feedwater (1-OP-31.2A dated December 23, 1985)

Unit 2

Auxiliary Feedwater (2-OP-31.2A dated April 25, 1985)

No violations or deviations were identified.

10. 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 inspectors verified compliance with selected Technical Specification (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 permits (RWP) were reviewed and the specific work activity was monitored to assure the activities were being conducted per the RWPs. Selected radiation protection instruments were periodically checked and equipment operability and calibration frequency was verified.

The inspectors were kept informed, on a daily basis, of overall status of both units and of any significant safety matter 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 inspectors 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 recorder readings, annunciator alarms, and housekeeping.

11. Inspection and Enforcement Bulletin (IEB) Followup (92703)

(Closed) IE Bulletin 85-01; Steam binding of Auxiliary Feedwater Pumps. The inspectors reviewed the licensee's response dated February 18, 1986 (Serial No. 85-797) and found it acceptable. Additionally, the inspectors reviewed the revisions to 1-LOG-6F and 2-LOG-6F as well as 1(2) PT-71.1, 1(2)-PT-71.2 and 1(2)-PT-71.3. New abnormal procedure AP-22.9, "Auxiliary Feedwater Check Valve Backleakage", was also reviewed and found acceptable.

12. Westinghouse Reactor Protection Over-Power Delta Temperature (OP  $\Delta$ T) Card

During the inspection period, the inspectors verified that the licensee received the Inspection and Enforcement Information Notice (IEIN) No. 85-98. This IEIN described a condition of missing low-limiting JA type jumpers from the lead/lag circuit card in the Westinghouse 7300 process cabinet. Without this jumper, a decreasing TAVE will raise the OP  $\Delta$ T setpoint when certain accident analysis assume a maximum limit for this setpoint.

Although the licensee had not fully evaluated the subject IEIN and they have 90 days to complete the review per their administrative procedure, due to the nature of the concern the inspectors requested that the licensee expedite their evaluation and verify the existence of JA jumpers. On February 12, 1986, the jumpers for Unit 1, Channel 1 and 3, were discovered to be missing. All three Unit 2 jumpers and the Unit 1, Channel 2, jumper were verified to be correctly installed. The missing jumpers were installed and a card calibration was performed.

The licensee and the inspectors could not determine if the jumpers have always been missing, or whether a replacement of the cards over the years

resulted in the jumpers not being installed. To address a concern expressed in this IEIN, the licensee has committed to modify the card repair test procedure to require testing of both the positive and negative derivative response. Additionally, the licensee has committed to issuing an Instrument Department memo to require a specific jumper verification of all replacement cards in addition to the component and loop calibration already being performed.

The Westinghouse provided precautions, limitation and setpoint document for North Anna does not establish a low-limit on the OP  $\Delta T$  setpoint. Additionally, the Technical Specification basis for the OP  $\Delta T$  trip states that "No credit was taken for operation of this trip in accident analysis; however, its function capability at the specified trip setting is required by this specification to enhance the overall reliability of the Reactor Protection System".

The inspectors evaluated the violation against the criteria established by 10 CFR, Part 2, Appendix C. Considering the minimal safety significance, combined with the licensee's prompt corrective actions and commitments to correct root cause, no notice of violation will be issued.

### 13. Diesel Generator Problems

In inspection report 338, 339/85-27 the inspectors described previous diesel generator failures and probable cause. At the time of that inspection the licensee felt that stress-related damage to the wrist pin-to-connecting rod and wrist pin-to-piston bushing, was caused by cumulative mechanical overload from past testing. TS testing requirements for Unit 2 were modified to reduce the number of cold fast starts and rapid loading of the diesel generators. However, during the current complete engine overhaul the wrist pin-to-connecting rod bushing was observed as having elongated; not as severe as that seen during the October 1985 failures, but enough to cause a concern. Since October 1985 when all piston assemblies including the bushing were replaced, the 2H engine has seen very little run time; approximately 80 hours, with only 20 starts, three of which were fast starts.

The licensee plans to replace out-of-specification bushings and change the lubrication oil in all four diesel engines. The new oil, Chevron Dello 6000, has been approved by Colt and will replace the present Gulf XHD 40 oil. The inspectors will continue to follow the diesel engine problems under IFI (338, 339/85-27-02).