



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

Report Nos.: 50-338/86-13 and 50-339/86-13

Licensee: Virginia Electric and Power Company
Richmond, VA 23261

Docket Nos.: 50-338 and 50-339

Facility Name: North Anna 1 and 2

Inspection Conducted: May 5 - June 1, 1986

Inspectors: *A. J. Ignatonis* 7/1/86
for J. L. Caldwell, Senior Resident Inspector Date Signed

A. J. Ignatonis 7/1/86
for L. P. King Date Signed

Approved by: *A. J. Ignatonis* 7/1/86
A. J. Ignatonis, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

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

Results: One violation was identified - failure to follow design change procedures for the battery installation. See paragraph 13 for details.

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REPORT DETAILS

1. Licensee Employees Contacted

E. W. Harrell, Station Manager
R. C. Driscoll, 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.

2. Exit Interview (30703)

The inspection scope and findings were discussed with those persons in paragraph 1. One violation and two unresolved items* regarding station battery installation and charging pump repair were identified. The licensee acknowledged the inspectors findings and took no exception. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection.

(Open) Inspector Followup Item 338, 339/86-13-01: QA Items. QA items are not identified in the same manner at Surry and North Anna (paragraph 12).

(Open) Violation 338, 339/86-13-02: Design Change Procedure on Batteries. The corrected specific gravity for the station batteries was not determined and documented in the Design Change Package (paragraph 13).

(Open) Unresolved Item 338, 339/86-13-03: Battery Design Change. During this inspection period, the inspectors were not able to determine whether or not TS requirements were satisfied prior to the licensee declaring the batteries operable (paragraph 13).

*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.

(Open) Unresolved Item 338/86-13-04: Charging Pump Repair. The cause of the failure of the 1B charging pump appears to have been due to inadequate lubrication; however, this matter is being further investigated by the inspectors (paragraph 7).

3. Licensee Action on Previous Inspection Findings

(Closed) Violation 338,339/85-30-01: Falsification of QA Records. The licensee revised ADM 20.38 on January 23, 1986. The revision clarified the SEO review portion of the procedure and added an area of concern listing for coating applications.

(Closed) Violation 339/83-31-04: Evaluation of Technical Specification (TS) tank level indication errors. The licensee has performed detailed volumetric calculations using manufacturer's drawings, calibration equations were developed to include density effects, station curves were revised to reflect new setpoints and station procedures were revised.

(Closed) Violation 338/85-36-01: ASCO solenoid valves not properly installed. Quality control personnel were instructed in proper installation of valves and the improperly installed valves were repositioned.

4. Plant Status

a. Unit 1

At 10:00 a.m., on May 20, 1986, a reactor trip occurred from 100% power. The trip signal was generated from a Steam Flow/Feed Flow mismatch (1/2 channels Feed Flow 40% & Steam Flow) concurrent with a Low level (2/3 channels \$25% N.R. level) in the "A" steam generator. This occurred as a result of the closure of all three Main Feedwater Regulating Valves (MFRV). All three steam generators were affected but the "A" steam generator reached the trip setpoint first. All primary system parameters responded as expected during and following the transient. Only a slight increase in reactor coolant system (RCS) temperature (one degree Fahrenheit) and RCS pressure (15 psig) occurred prior to the trip. The lowest RCS temperature and pressure reached following the trip were 544 degrees Fahrenheit and 1865 psig, respectively. Secondary system parameters responded normally for this type of transient. Analysis of the post-trip data indicated that the MFRVs did re-open after closing. Although the licensee evaluated all possible actions that could cause the trip, they were not able to determine the actual cause of MFRV closure.

At 9:31 p.m., on May 31, 1986, Unit 1 tripped from 100% power as a result of a loss of power to Vital Bus 1-I (VB 1-I). The alternate power supply (sola transformer) was supplying power to VB 1-I, and was lost when the sola transformer insulation melted. The power supply to VB 1-I was transferred to the sola transformer on May 29, 1986, due to ampere fluctuations on the battery charger. VB 1-I powers the relay which senses the breaker position of reactor coolant pump "A". When

this relay was de-energized following the loss of sola transformer, a reactor trip signal was generated as a result of the reactor protection system sensing the RCP "A" breaker opening coincident with the reactor power greater than 30% (P-8). Power was returned to VB-1-I within approximately one minute by transferring to the normal power supply (inverter).

Loss of VB 1-I caused the following:

- (1) Four water box vacuum breakers failed open which tripped the circulating water pumps resulting in the condenser being unavailable to remove steam via the condenser steam dumps. Steam was relieved via the steam generator power operated relief valves.
- (2) Component cooling trip valves to the RCPs closed and were then opened.
- (3) The "A" train solid state protection cabinets lost power preventing the start of "A" auxiliary feedwater pump. The "B" feedwater pump and the auxiliary steam driven pump started on lo-lo steam generator level.
- (4) Steam generator "B" level increased because the "B" main feedwater regulating valve leaked by. Level increased above 75% which generated a main feedwater isolation signal which caused the running "A" main feedwater pump to trip.
- (5) A hi-hi level was reached in the "5A" feedwater heater due to tube leakage. This caused "A" condensate pump to trip.
- (6) N1-36 intermediate range channel II was undercompensated which required the source range detectors to be manually energized.

Five tubes were plugged in the "5A" feedwater heater on the morning of June 1, 1986. The unit was returned to critical at 7:43 a.m., on June 1, 1986. A decision was made at 4:05 a.m., on June 2, 1986, to increase power above 5% despite a chemistry hold on steam generator cation conductivity being out of tolerance. The administrative procedure allowed this based on consultation with the vice president of Nuclear Operations.

Unit 1 is presently operating at 100% power.

b. Unit 2

On May 29, 1986, at 10:55 a.m., with Unit 2 at 100% power, a reactor trip occurred from a negative flux rate trip. The negative flux rate trip signal was caused by the opening of the stationary coil power supply disconnect to the rod control power distribution cabinet 1AC, which caused 12 rods to drop into the core. All plant responses were normal. Intermediate range nuclear instruments N-35 and N-36 exhibited

responses of being over compensated and the compensation voltage was adjusted subsequent to the trip. The cause of the disconnect switch was attributed to personnel painting above the rod control cabinets while standing on them.

Unit 2 operated at 100% power for the rest of the reporting period.

5. Licensee Event Report (LER) Follow-Up

The following LERs were reviewed and closed. The inspector verified that reporting requirements had been met, that the 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 TS conditions had been identified.

(Closed) LER 338/85-21, Clarifier demineralizer out of service. For corrective action, the licensee has changed to Duratek resin which has greater than 45 days runtime.

(Closed) LER 338/85-19, Manual reactor trip due to loss of reactor coolant pump motor cooling water flow. The licensee corrected the problem which was caused by a fault of the D.C. Battery room supply fan motor tripping the breaker.

(Closed) LER 338/85-27#1, Reactor shutdown required by TS, RPS instrumentation channels inoperable. The licensee repaired the problem caused by a change in the resistance characteristics of the loop B coldleg RTD.

(Closed) LER 338/86-04, Radiation monitor power supply failure. The licensee replaced the low voltage power supply and verified no operational abnormalities.

(Closed) LER 338/85-29, Plant shutdown required by the TS due to high unidentified RCS leakage caused by debris on the seal rings. The licensee corrected the problem with MMP-C-RC-15B which installs a seal rope in the interface area. MMP-C-RC-11B removes the seal. Both procedures were approved on March 11, 1986.

(Closed) LER 338/85-17 #0,1, Manual reactor trip caused by dropped control rods caused by failed alarm circuit cards. The three faulty alarm circuit cards were replaced. The cards will be tested during the refueling outages. The following procedures were generated and approved: IMP-P-1-RCS-3 (Unit 1), and IMP-P-2-RCS-3 (Unit 2).

(Closed) LER 338/85-14, Improperly encoded key card resulted in potential for unauthorized access to vital areas. The licensee revised ADM-SPIP-31, Inspections and Tests, to include testing of key cards upon their arrival from the vendor. The procedure is approved.

(Closed) LER 338/85-05 #1, Surveillance not performed on seismic monitoring equipment. It was concurred with NRC that the testing would not improve the reliability of the seismic recorder and testing should not be performed under these circumstances. The action statement was entered and the special report submitted.

(Closed) LER 339/85-07, "B" RSST transformer operation with the LTC in neutral (auto load tap changer). The "B" RSST was replaced and tested.

(Closed) LER 339/86-02, Reactor trip - source range detector failure. A final investigation of potential failure mechanisms on the source range detectors gave no conclusive evidence for any one particular type of failure. The detectors were checked for electrical and physical damage.

6. Follow-up of Previously Identified Items (92701)

(Closed) IFI 338,339/85-16-01: Licensee to write and incorporate procedure for SD margin with dropped rod into the abnormal procedures. Unit 1 dropped rod B-10 on July 4, 1985. The licensee has incorporated a shutdown margin calculation for a dropped rod in AP(1-AP-1.4; 2-AP-1.4).

(Closed) IFI 338,339/85-18-01: Review of licensee emergency plan actions tied to plant shutdown. The emergency plan does not require revision with respect to 10 CFR 50.72 notifications. The notification is automatic once the emergency plan is entered due to a violation of emergency action levels in the plan.

(Closed) UNR 338,339/85-18-05: Training records storage and retrievability. Station Administrative Procedure 2.22 has been written and was approved by SNSOC on March 20, 1986.

(Closed) IFI 339/79-57-01: Concrete tester calibration program deficient.

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 the TS.

Maintenance activities observed included:

- a. Overhaul of 1-CU-P-3B, Unit 1, vacuum pump;
- b. Repair of Unit 1 outside casing cooling tank chiller;
- c. Repair of Unit 1, B charging pump which has been out of service since April 24, 1986. The charging pump shaft and motor end bell housing have been damaged. A Westinghouse representative investigated the damage and the shaft and housing are being shipped to Westinghouse for repair. The inspector is investigating the cause of the failure. A

review of the work done on the pump prior to failure is being researched. The failure appears to have been caused by inadequate lubrication. The shaft and end bell housing are still on site awaiting shipment to Westinghouse. This item is identified as an Unresolved Item (URI 338/86-13-04) pending further inspector review on this matter.

Within the areas inspected, no violations or deviations were identified.

8. Monthly Surveillance (61726)

The inspectors observed/reviewed technical specification 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 April 3, 1986, licensee personnel performed Performance Test (PT) 1-PT-71.2, Auxiliary Feedwater Pump (1-FW-P-3A) test. This PT is required to be performed at least once per 31 days. The results of the PT indicated the feedwater pump was in the alert range on delta P. PT 1-FW-P-3A, Step 4.16.a requires the testing frequency to be doubled anytime the pump parameter places it in the alert range. This increased frequency is to continue until the cause of the problem is determined and corrected and either the existing reference values are verified or a new set established. On May 24, 1986, the inspector discovered that feedwater pump 1-FW-P-3A had not been tested on April 17, 1986, as was required by PT 1-PT-71.2, since the pump had been determined to be in the alert range on April 3, 1986. Further inspection and discussion with the licensee revealed that the licensee had documented this procedure violation on a Deviation Report 86-630 and had doubled the testing frequency of the feedwater pump as required by PT 1-PT-71.2. Since this violation of TS 6.8.1 was identified by the licensee and meets the five criteria of 10 CFR 2, Appendix C for licensee self-identification and correction, a Notice of Violation will not be issued. The inspectors will continue to review pump and valve PTs to ensure the licensee's corrective action is adequate to prevent further occurrence.

The inspector reviewed Unit 2 PT 57.5 A&B "Leak Rate Test of 2-51-P-1 A&B" and PT 52.2 "Reactor Coolant System Leak Rate" dated May 19, 1986.

Plant staff was interviewed concerning the administrative system used for tracking surveillances during the normal surveillance program and when equipment surveillances are increased as a result of being in an alert condition. The present computer tracking system is inadequate to monitor surveillances on a daily basis and is updated weekly. This requires the completed surveillances to be annotated on the last printout available.

Within the areas inspected, no violations were identified.

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 on May 30, 1986.

Unit 1

1-OP-7.5A. Valve Checkoff for Outside Recirc Spray System

Unit 2

2-OP-7.5A. Valve Checkoff for Outside Recirc Spray System

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 TS requirements and Limiting Conditions for Operations.

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 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.

The inspector reviewed the jumper log for Unit 1.

Simulator training for requalification program was observed. The simulator incidents included:

- a. Simulation of a 600 gpm tube leak on B steam generator;
- b. Recovery from a single rod drop.

The training included the use of the new emergency procedures.

Within the areas inspected, no violations or deviations were identified.

11. Safeguards Inspection (71707)

In the course of the monthly activities, the resident inspectors included a review of the licensee's physical security program. The performance of various shifts of the security force was observed in the conduct of daily activities to include; protected and vital areas access controls, searching of personnel, packages and vehicles, badge issuance and retrieval, escorting of visitors, patrols and compensatory posts. In addition, the resident inspectors observed protected area lighting, protected and vital areas barrier integrity and verified an interface between the security organization and operations or maintenance. Specifically, the resident inspector interviewed individuals with security concerns.

Within the areas inspected, no violations or deviations were identified.

12. Quality Assurance

During this inspection period, the inspector visited the Surry site for the refueling outage. It was noted that there was a significantly smaller number of outstanding QA items at Surry than at North Anna. The inspector on inquiring about the difference, found that the QA manager at Surry was replacing the QA manager at North Anna and it was determined that not all of the items are identified in the same manner at the two sites. The inspector will followup on this difference IFI 338,339/86-13-01.

13. Batteries

In addition to the items discussed in paragraph 12 in inspection report 338,339/86-10, the following problems were identified as a result of a more in-depth review of design change procedures 85-29 (Unit 1) and 85-30 (Unit 2).

- a. The Attachment 6.1 of Administrative Procedure 3.1, titled "Design Change Notification for Final Design Testing" was missing from design change procedure 85-30.
- b. There is no requirement for quality control to review and sign for the completed acceptance test.
- c. The plant procedures, identified in the design change procedures as requiring modifications to bring them into compliance with the design change, were not modified.
- d. The specific gravities for the batteries were not corrected for level or temperature as required by the test data sheets, TS 4.8.2.3.2.a.2 and IEEE-450, 1980.

Administrative Procedure 3.1, Step 5.2.2.5 states that upon receipt of the design change acceptance form, attachment 6.2, the Cognizant Supervisor - QC shall review the Master Colored Controlled Copy for completeness and identify any additional deficiencies on Attachment 6.3. The inspector is concerned that despite the above deficiencies discovered by the inspector, Attachment 6.2 was signed off by the Site Engineering Supervisor, the Cognizant QC Supervisor and approved by the Station Nuclear Safety and Operating Committee (SNSOC) as accepted and complete.

TS 6.8.1 requires written procedures be established, implemented, and maintained covering surveillance and test activities. The failure of the licensee to determine the corrected specific gravity as required by the data sheets in acceptance test associated with design change procedures 85-30 and 85-29 is identified as a violation 338,339/85-13-02.

The inspectors were unable, during this inspection period, to determine whether or not TS requirements were satisfied prior to the licensee declaring the station batteries, modified by design change procedures 85-29 and 85-30, operable. This item is identified as an Unresolved Item 338, 339/85-13-03 pending further review and discussion with the licensee by the inspectors.