UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-338/84-30 and 50-339/84-30

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: August 6 - September 5, 1984

Inspectors: D. J. Burke 10/3/84
M. W. Branch, Senior Resident Inspector Date Signed

D. J. Burke 10/3/84
J. G. Luehman, Resident Inspector Date Signed

Approved by: D. J. Burke 10/3/84
for S. Elrod, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine inspection by the resident inspectors involved 244 inspector-hours on site in the areas of maintenance and surveillance activities, followup of previous inspection findings and licensee event reports, painting inside containment and refueling activities.

Results: Of the six areas inspected, no violations or deviations were identified in five areas. One apparent violation was identified in one area (failure to perform a 50.59 safety evaluation when nonqualified paint was applied to ventilation ducts inside containment, paragraph 10).

REPORT DETAILS

1. Licensee Employees Contacted

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

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

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on September 5, 1984, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspector's comments.

3. Licensee Action on Previous Inspection Findings

(Closed) Inspection 338/79-08-10: Failure to use properly approved documentation. Three of the four concerns expressed in this item were closed in report 338/80-22. The remaining concern was the failure to control station documents. North Anna Power Station Administrative Procedures (AP) now contain a complete section (Section III) on document control which delineates the procedures to be followed, the individual's responsibilities when using procedures, as well as other aspects of the program.

(Closed) Deficiency 338/79-08-23: Measures not established to control the issuance of documents. North Anna Power Station APs contain procedures covering the process and station records personnel use. Document Control Procedures also outline the requirements for document issue.

4. Unresolved Items*

Unresolved items were not identified during this inspection.

5. Plant Status

Unit 1

The unit remained shutdown with refueling completed. Startup will follow the satisfactory completion of the containment integrated leak rate test (ILRT).

Unit 2

The unit is shutdown with the licensee making preparations to refuel.

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.

338/80-82 Improper tap settings of offsite Ac power source transformers. The licensee's scheduled corrective action was to develop proper administrative controls for the tap settings. North Anna Power Station AP ADM 20.36 "Station Transformer Tap Position" dated March 31, 1983, is the control procedure presently in place to meet the commitment.

338/80-96 Out of phase transfer of emergency diesel generators (EDG). The concerns of this LER were addressed in inspection report 338/82-18.

338/80-108 Excessive leakage of reactor coolant pump seals. The seal runners in all the reactor coolant pumps have been replaced with runners that have a chrome carbide coating which is not susceptible to high PH degradation.

*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.

7. Followup of Previously Identified Items

(Closed) Inspector Followup Item (IFI) 338/79-03-03: Verification of respirator qualification. The licensee has in place a program that provides each individual with a respirator qualification card upon completion of all the training requirements. Additionally, respirator qualification dates are tracked by Health Physics using a computer tracking system.

(Closed) IFI 339/79-11-14: Establishment of a consumables control program. North Anna Power Station AP ADM 8.1 "Control of Consumable Material" dated February 29, 1984, establishes the system the licensee has in place to control consumable materials. This is an interim program and does not include expendable items such as O-rings, gaskets, pipe and electrical connectors. Expendable items are usually specified by an applicable standard or code.

(Closed) IFI 338/76-21-01 (8.F) and 339/79-11-23: Construction of a permanent records facility. The building has been completed and is in use.

(Closed) IFI 338/78-08-02: Ensuring radioactive waste is properly dewatered. The station Health Physics procedures contain a procedure to check for liquids in radioactive waste containers.

(Closed) IFI 338/76-21-02 (13.D): Training for use of administrative controls of maintenance and work activities. The station APs contain instructions for the use of both the Work Request (WR) and Maintenance Report (MR).

(Closed) IFI 338/76-25-01 (II.3.C and II.16.C): Equipment needed to monitor radioactive releases and station emergency procedures not yet in place. The equipment and procedures are in place.

(Closed) IFI 338/76-25-02 (II.7.C): Incomplete installation of the station communications systems and station alarms. Both systems are complete and operable.

(Closed) IFI 338/79-38-04 (6.d): Updates of 1-OP-21.6A. This procedure was updated November 23, 1983.

(Closed) IFI 338/77-18-01 (IV.6): Crane procedures for maintenance and inspection not in place. In the licensee's response to NUREG 0612 "Control of Heavy Loads" crane maintenance and inspection as well as operator training were covered.

(Closed) IFI 338/77-22-01 (I.4.A): All radiation monitoring instrumentation not calibrated. All radiation monitoring equipment is on a regular calibration schedule.

(Closed) IFI 338/77-22-02 (II.4.B): All Health Physics and Chemistry procedures not in place. The required chemistry and health physics procedures are in place.

(Closed) IFI 338/79-21-03: Revision needs to be made to 1-OP-1A. This procedure was last updated October 11, 1980.

(Closed) IFI 338/79-38-03 and 339/79-44-03: Control systems failing other than "as is" during a high energy line break. This concern was addressed in a letter to the NRC Region II (serial no. 792A) dated October 24, 1979.

(Closed) IFI 338/79-31-01: Quadrant power tilt greater than 1.02. Extensive testing was done by both Westinghouse and the licensee to determine the cause of this problem. Initially, the possible causes were thought to be a flow imbalance, dropped rodlets or improper calculation of burnable poison worths. Inspection after cycle one eliminated the possibility of dropped rodlets as the power tilt cause. Calculations never defined any one cause for the problem and the power tilt eventually disappeared.

(Closed) IFI 338/77-13-01 (18.A-C): QC Surveillance program deficiencies. The licensee's procedures that address these concerns are found, for the most part, in Section 16 of the Nuclear Power Station Quality Assurance Manual.

(Closed) IFI 338/78-43-01 (I.4): Tagging of radioactive waste containers. Requirements in this area are now specified in the station Health Physics procedures.

(Closed) IFI 339/83-11-02: Update the load list to reflect the addition of back-up overcurrent protection breakers. The inspector reviewed 2-OP-26B and confirmed it had been updated to include back-up overcurrent protection breakers.

(Closed) IFI 338/80-35-03 and 339/80-33-03: Installation and testing of steam generator moisture carryover modifications. The inspector verified records that indicated that design changes 80-S67 and 80-S83 had been completed and testing had been satisfactorily completed.

(Closed) IFI 338/81-27-03: Use of the Furmanite process on the primary system. The flow elements that were sealed using the Furmanite process were subsequently cut out and replaced. The licensee indicated Furmanite now has a process that is fully qualified for use in the primary system. Future use of the process will be evaluated on a case by case basis.

(Closed) IFI 339/83-11-03: Implementation of the testing requirements for EDG fuel oil system level and pressure switches. The licensee has in place two performance tests (2-PT-82.5H and 2-PT-82.J) to verify the fuel oil system operability every 18 months. License condition 2.C(15)(h)4 also required the licensee to submit a Technical Specification (TS) change to incorporate the testing requirements. In VEPCO letter (Serial No. 292) dated May 14, 1983, the licensee stated that operation of this system fell under the definition of operability of the EDG and therefore a TS change was not required. In a letter dated June 15, 1983, NRR agreed that the TS change was not needed.

(Closed) IFI 338 & 339/83-08-02: Incorporation of Westinghouse technical information into the reactor trip breaker technical manuals. The inspectors checked a number of the copies of this manual and found one copy that had not been updated. The copy was subsequently updated and further problems of this type should be avoided by use of vendor interface procedures the licensee is putting into place in response to a Generic Letter 83-28 concern.

(Closed) IFI 338 & 339/84-27-01: Labeling of valves for RM-SW-107. The licensee's Operations Coordinator informed the inspectors that the labeling was incorrect when checked, but that the deficiencies had been corrected.

(Closed) IFI 338/79-39-01, 02, 03, 04, and 05: Reactor trip of September 25, 1979. This event was the subject of LER 338/79-128, and was evaluated by Westinghouse and Stone and Webster.

(Closed) IFI 338/79-15-01: Verification that differential pressure switches for 1CP-P-HV-2 are properly set. The values identified in this item are no longer the values used to set the switches. The present calibration values are contained in the North Anna Setpoint Document Volume 1. The inspector checked the calibration records of one switch and verified it was proper.

(Closed) IFI 338/77-17-01 (5.B.3 and 6) Preoperational environmental monitoring program. The latest inspections of the licensee's environmental monitoring program and its procedures indicate that they are in conformance with all requirements.

(Closed) IFI 338/80-16-01: Low Head Safety Injection (LHSI) lines not analyzed for less than 70°F. This item was the subject of LER 338/80-34 and was closed in inspection report 338/84-19.

(Closed) IFI 338/80-16-02: Guide tube support pins susceptible to cracking. This item was the subject of LER 338/80-35 and was closed in inspection report 338/84-19.

(Closed) IFI 338/76-19-01 (III.2.e, III.3.b, III.3.c, III.3.d, and III.4): Licensee health physics procedures and equipment not fully implemented in place. These concerns have been addressed and the procedures and equipment needed are in place.

(Closed) IFI 338/77-01-01 (II.2): Various procedures required incorporation of inspector's comments. The start-up procedures referenced were one time procedures and have been successfully completed. 1-OP-8.3 was last revised November 20, 1980 and 1-OP-58.2 was last revised July 13, 1983.

8. Reactor Coolant System Pressure/Temperature Limits

Inspection reports 338, 339/84-27 discussed the licensee's failure to provide the required report on a Unit 1 reactor vessel material surveillance and the failure to perform the required analysis of the TS pressure/temperature curves. Subsequently, licensee determined that the problem

applied to Unit 2 as well, and in a letter (Serial No. 479) dated August 16, 1984, to the Office of Nuclear Reactor Regulation identified the fact that both units were affected and outlined the corrective actions taken and proposed.

The inspectors have reviewed the problem further and found the licensee did have a performance test (1-PT-54 "Vessel Irradiation Program," revised January 5, 1983) that should have identified the surveillance requirements of TS 4.4.9.12. The reason this performance test or the original did not ensure timely compliance or at least quicker identification of the problem and whether the performance test is adequate to meet the further surveillance requirements required by the TS is identified as inspector followup item 338, 339/84-30-01.

No violations or deviations were identified.

9. Receipt of New Fuel (60705)

On several occasions during the weeks of August 20 and 27, 1984, the inspectors witnessed the receipt, inspection, and storage of new fuel and burnable poison assemblies to be used in the upcoming Unit 2 refueling. It was verified these activities were conducted in accordance with the licensee's procedures. Additionally, the inspectors observed the work activities to verify that the requirements of the Radiation Work Permit (RWP) issued for these activities were followed.

No violations or deviations were identified.

10. Non-Qualified Paint Inside Units 1 and 2 Containment

During this inspection period, a concern with the quality of the paint on the ventilation ring ducting in Units 1 and 2 containments was investigated by the NRC. An internal investigation was also initiated by the licensee which confirmed the existence of non-qualified paint on the surface of the lower ring ventilation ducting inside the containment. The surface area affected was approximately 8,000 square feet per unit.

The ventilation ring in the lower level of containment was fabricated with galvanized surfaces and was designed to withstand a containment environment. However, boric acid solution had impinged on these galvanized surfaces and caused minor corrosion. To prevent further corrosion on the lower ring duct, the licensee had the ducts painted during January 1983 and May 1984. NRC Region II requested the licensee to review the paint application process and records. In response to the concern, the licensee checked the NA-1 Protective Coating Surface Preparation Records and determined that the coatings applied to the lower ring duct were:

a. An alkyd red primer
b. A catalyzed polyamide epoxy finish, Dupont Corlar Dual Build Epoxy Enamel, No. 823-Y-67632 with Activator No. VG-Y-8839.

Upon further investigation, the licensee determined the Alkyd Primer was not post-accident qualified and, although the Dupont epoxy (finish coat) was qualified, neither primer nor topcoat were approved for use on galvanized surfaces. As noted previously, the affected area was approximately 8,000 square feet of ductwork and supports. The above noted primer and finish coats had an average dry film thickness of 5 to 6 mils.

In addition, upon the identification of non-qualified paint at Unit 1, the licensee immediately investigated the Unit 2 protective coating surface preparation records. These records contained conflicting reports as to specific applications of primer and finish coats of paint applied to the Unit 2 lower ring ventilation ducts. The licensee therefore, decided to shut down Unit 2 in order to evaluate the conflicting paint records. Shutdown of NA-2 commenced at approximately 6:00 p.m., August 2, 1984. Unit 1 was in a refueling outage and scheduled for restart September 16, 1984.

Upon discovery of the non-qualified paint, VEPCO initiated test programs to evaluate the performance of the applied coating under design basis accident (DBA) conditions, and to verify the coating materials used. Representative samples of ductwork were selected and sent to the Oak Ridge National Laboratory (ORNL) for DBA testing. The licensee specified that the tests and procedures to be used at ORNL be in conformance with the Units 1 and 2 Updated Final Safety Analysis Report (UFSAR) as specified in Appendix 3D, "Testing of Protective Coatings Under Design Basis Accident Conditions." In addition, the licensee initiated chemical analyses (performed by KTA-Tator) to verify the generic type of coatings applied to the ductwork.

On August 3, 1984, the licensee met with NRR representatives. Based on a review of the Summary Report of that meeting, dated August 13, 1984, it was determined that the licensee stated that protective coatings, within containment, should remain intact on applied surfaces following postulated Loss of Coolant Accident (LOCA) environmental conditions. The licensee further stated that the NRC approved Units 1 and 2 FSAR specifies that coatings applied after initial construction must meet the technical performance requirements for simulated DBA testing set forth in the American National Standards Institute (ANSI) standard N101.2-72. VEPCO went on to say that, since the coating system utilized at Unit 1 on the lower ring ventilation ducts had not been nuclear qualified, corrective action was required.

The licensee had evaluated various options for implementing corrective actions. These options were:

a. Install new ductwork-which would impact the Unit 1 restart schedule of August 12, 1984, by three months and represent significant cost expenditures and shutdown time.

b. Remove the non-qualified paint from the ductwork and supports by chipping and abrasive tools-which would cause an unsuitable environment for NRC required electrical work underway to meet NUREG-0737, "Post TMI Requirements."

c. Install a stainless steel wire mesh screen over the affected surfaces of the ductwork and supports in Unit 1 containment to retain any coating material which could potentially cause blockage of the containment sump screens if separated in sheets from the ductwork.

Based on the above noted impacts and associated problems associated with items a and b above, VEPCO decided to take the corrective action specified in item c.

The licensee indicated that a stainless steel wire mesh screen would be installed over all affected surfaces of the coated ductwork and supports. The installed screen would be a 8 x 8 per linear inch mesh, fabricated from Type 304 stainless steel. The width of the screen opening would be 0.097 inch, which is smaller than the opening of the fine mesh sump screen (0.120 inches). Sheet metal ribs would be installed approximately every four linear feet of ductwork and the mesh screen riveted to the metal ribs. In addition, the seismic analysis weight would be within the envelope of design criteria.

The licensee provided its bases for ensuring that the proposed corrective actions for non-qualified paint would not result in any impact on the operation of safety equipment required to mitigate the consequences of a DBA. Assuming that the non-qualified paint coating separated from the galvanized surface following a DBA, the wire mesh surrounding the ductwork would entrap a significant portion of the paint. In addition, entrapment of the paint particles on the mesh screen would cause a build up of paint particles on the screen as a function of time. As a result of the buildup on the screen, only smaller sized paint particles would subsequently pass through the screen. Also, a large portion of the lower ring ductwork is not located in the area of the containment sump and water on the floor in these areas flows to the sump at a low velocity following a postulated LOCA. A large portion of the paint particles which might escape the wire mesh screen should settle out or become entrapped elsewhere before reaching the fine mesh screen on the containment recirculation pumps. Finally, any paint particles reaching the containment sump should be of a smaller size than the pump screen mesh and could be circulated through the recirculation system.

The licensee provided the NRR staff with an update on the status of paint conditions at Unit 2. The decision to shutdown Unit 2 the previous day was based upon the uncertainty of paint record validity. Unit 2 ducting had been painted in April and May 1983, to mitigate the same corrosive effects identified in Unit 1. The Unit 2 protective coating surface preparation records indicated that the following coatings were applied over the galvanized surface.

a. Primer: Keeler and Long White Epoxy Primer 6548.

b. Finish: Keeler and Long White Epoxy Finish 6548.

The above primer and finish coats present a coating system which is dba qualified over carbon steel surfaces. However, disparities in paint records could not provide complete assurance that the identified coatings were in place on the affected ring duct surface area. Therefore, test coupons had been prepared and expedited to ORNL for DBA testing as in the case for Unit 1.

Finally, the licensee stated that paint procedures and records will be reviewed and revised to provide stricter quality control for verifying that qualified paint is properly applied inside containment.

NRR conclusions based on the meeting were as follows:

a. The NRR staff found VEPCO's corrective action (as discussed above) to be acceptable for Unit 1. Should final analysis confirm similar problems for Unit 2 ring duct ventilation paint, the proposed corrective measures are also acceptable for Unit 2.

b. VEPCO's corrective measures are acceptable on a short term and long term basis providing the results of the Comanche Peak Task Force (non-qualified paint) identify no new generic concerns.

c. The results of particle-dynamic calculations of particle interactions and granular flow have shown that grading of small size fines can in certain cases result in paint collection on surfaces with openings of greater size than the particle fines in question. The NRR staff suggested the licensee might assure themselves that such interaction would not take place.

d. The NRR staff also recommended that the licensee upgrade quality control for qualified paint records inside containment and the procedures for application to surfaces inside containment.

e. The physical corrective measures VEPCO described in the meeting with NRR must be completed prior to restart of either unit.

Subsequent to the meeting with NRR, the licensee received preliminary test results from Oak Ridge National Laboratory (ORNL) that confirmed degradation of both paint samples under simulated DBA conditions. In the case of Unit 1, a significant percentage (75-80%) of the sample surface was observed to be blistered. For Unit 2, 10-20% flaking was observed in an adhesion test.

To determine the root cause of how non-qualified painting was performed on containment ventilation ducts, the inspectors reviewed records, performed visual inspections and had discussions with the licensee and contract personnel. The following observations are provided:

a. Painting on Unit 1 was accomplished under Maintenance Report (MR) N1-82-12230610 and was authorized by the shift supervisor on January 13, 1983, and signed as completed by the foreman February 9, 1983.

b. Painting on Unit 2 was accomplished under MR 82-06030033 and was authorized by the shift supervisor on May 8, 1983, and signed as completed by the foreman on May 18, 1983.

c. Both of the above MRs were categorized as non-safety related with the "procedure-to-be-used" block marked N/A or none.

d. Multiple station reviews of the MRs above did not identify the fact that they had been improperly categorized.

e. Painting of the containment ventilation duct should have been controlled by the design change procedure specified in Section 3 of the VEPCO Nuclear Power Station Quality Assurance Manual. Actual control of painting the containment ventilation was performed under the MR system and adequate controls were not specified.

f. FSAR Section 3.8.2.7.6.6 specifies that coatings applied after initial construction must meet the technical performance requirements for simulated DBA testing set forth in the ANSI standard N101.2-72.

g. Site Painting Specification 13075.89, NAS 1016, Part II (Application of Protective Coating Materials Within the Containment) specifies requirements to ensure quality of material and workmanship. This was not referenced or followed during the painting of the ventilation duct. Additionally, painting of galvanized steel is not authorized by the NAS 1016 specification.

h. Painting applied to the Unit 1 and Unit 2 containment ring duct ventilation during the 1983 outages was not DBA qualified for the specific application (i.e., painting of galvanized metal).

Failure to perform a safety evaluation on a permanent change to the facility is a violation of 10 CFR 50.59. Procedures for work control and facility change control, contributed to this violation. The above violation is identified as 338,399/84-30-02.

Since the identification of the painting issue by the NRC, the licensee has conducted a detailed investigation and implemented the following corrective actions:

a. All painting was suspended until procedures and training could be evaluated and modified as necessary.

b. The licensee reviewed current procedures and in an August 16, 1984 memo indicated that painting specification, NAS 1016; Coating Inspection Procedure, QCI 11.1; and Qualification of Protective Coatings

Applicators and Blasters, ADM 2.18 were reviewed and found adequate. Additionally, the memo attributed the problems experienced in the coating of the containment ventilation ducts to personnel error. NRC has not made findings in this area.

c. Two new procedures, Site Operating Procedure 8.8.ON and Quality Assurance Department Instruction 10.13 were developed to specify additional instruction to amplify the controls of all painting at North Anna.

d. Engineering Work Request 84-441 was initiated to wrap the duct with stainless steel wire mesh as described earlier in this section.

The inspectors have reviewed the licensee's corrective actions and have inspected the Unit 1 screen wrap to ensure that the installed system is technically the same as the system described to NRR on August 3, 1984, by the licensee.

11. Generic Letter 83-28

"Required Actions Based on Generic Implications of the Salem ATWS"

In a revised response to NRC Region II, Serial No. 1016A, dated February 12, 1981, the licensee stated that a program for control of "all safety-related Technical manuals will be implemented by January 1, 1982." Likewise, the licensee's response to Generic Letter 93-28 dated November 4, 1983, contains a schedule for implementation of such a control program.

The inspectors questioned the necessity of the second program if the first one was in place at the specified date. The licensee indicated that the new program was an improvement over the original program because in retrospect, the first program did not address all aspects of the problem.