



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-338/78-30 and 50-339/78-28

Docket Nos.: 50-338 and 50-339

License Nos.: NPF-4 and CPPR-78

Licensee: Virginia Electric and Power Company
Post Office Box 2666
Richmond, Virginia 23261

Facility Name: North Anna Power Station, Units 1 and 2

Inspection at: North Anna Power Station, Mineral, Virginia

Inspection conducted: September 5-29, 1978

Inspector: M. S. Kidd
Resident Reactor Inspector

Accompanying Personnel: R. C. Lewis (September 26 and 27, 1978)

Reviewed by: R. C. Lewis
R. C. Lewis, Chief
Reactor Projects Section No. 2
Reactor Operations and Nuclear Support
Branch

10/31/78
Date

Inspection Summary

Inspection on September 5-29, 1978 (Report Nos. 50-338/78-30 and 50-339/78-28)

Unit 1 Areas Inspected: Routine inspection by the resident inspector of 10 CFR 21 and licensee event reports; plant tours; piping hangers, restraints, and snubbers; engineered safety feature motor breaker alarms; local Public Document Room in Louisa, Virginia; and follow-up on IE Circulars. The inspection involved 21 man-hours by the NRC resident inspector.

Unit 2 Areas Inspected: Routine inspection by the resident inspector of reports per 10 CFR 21 and 10 CFR 50.55(e), preoperational witnessing, new fuel storage conditions, plant tours, follow-up on IE Circulars, and meeting with an official of Louisa County. The inspection involved 38 man-hours by the NRC resident inspector.

Results: Within the areas inspected, no items of noncompliance or deviations were identified.

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DETAILS I

Prepared by:

Frank Gape for
M. S. Kidd, Resident Inspector
Reactor Projects Section No. 2
Reactor Operations and
Nuclear Support Branch

10/31/78
Date

Dates of Inspection: September 5-29, 1978

Reviewed by:

R. C. Lewis
R. C. Lewis, Chief
Reactor Projects Section No. 2
Reactor Operations and Nuclear
Support Branch

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1. Persons Contacted

a. Virginia Electric and Power Company (VEPCO)

K. A. Ackert, Assistant Engineer
K. E. Baker, Supervisor - Engineering Services
W. C. Barnes, Health Physics Technician Trainee
C. D. Bradley, Senior Health Physics Technician
W. R. Cartwright, Station Manager 3/4
J. M. Davis, Electrical Supervisor - Power Station Engineering
P. A. Furnham, Assistant Engineer
M. Harrison, Construction QC Engineer
J. D. Kellams, Operating Supervisor 1/2/3/4
E. Lifrage, Project Engineer, North Anna 1.
J. W. Martin, Jr., Supervisor Quality Assurance - Operations 2
E. E. Necessary, Superintendent - Station Operations 1/3/4
D. L. Smith, Resident QC Engineer - Operations 1/2/4
E. R. Smith, Jr., Supervisor - Engineering Services 1/2/3/4
D. C. Woods, Senior Engineering Technician 1/3
Three Control Room Operators

b. Stone and Webster Engineering Corporation (S&W)

R. F. Anderson, Assistant Test Engineer
J. R. Broadwater, Lead Primary Systems Engineer
P. Braddock, Field QC Inspector - Mechanical
R. J. Daly, Lead Advisory Engineer
W. L. Lembeck, Assistant Advisory Engineer

c. Hartford Steam Boiler Inspection and Insurance Company

G. W. Hiers, Authorized Nuclear Inspector
H. A. Webster, Authorized Nuclear Inspector

- ¹Denotes those present at Interview of September 14.
²Denotes those present at Interview of September 15.
³Denotes those present at Interview of September 21.
⁴Denotes those present at Interview of September 29.

2. Licensee Actions on Previous Inspection Findings

Not inspected.

3. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. One unresolved item disclosed during the inspection is discussed in paragraph 7.b of this report.

4. Management Interviews

Management interviews were conducted September 14 with C. E. Necessary, September 15 with J. D. Kellams, and September 21 and 29, 1978, with W. R. Cartwright and other station staff members denoted in paragraph 1. All findings presented in these Details which relate directly to inspections of station activities were discussed.

5. IE Circulars

The following IE Circulars were reviewed to verify that they had been received by licensee management, reviews for applicability to Units 1 and 2 had been performed, and appropriate corrective action had been taken or planned:

a. Circular 78-04, Installation Errors That Could Prevent Closing of Fire Doors

A review for applicability to Units 1 and 2 was conducted by S&W and VEPCO station personnel. S&W findings were related to VEPCO via letter number NAS-10, 932 on August 10, 1978. Six fire doors of the same general design are or will be installed. Only one door, which will separate Units 2 and 3 turbine building rooms, is of the specific type referenced in the circular. This one is to be observed by S&W when installed. All others have been inspected with no problems noted.

Following review of the above letter and NAS Specification 276, "Tinclad Doors" (fire doors), discussions with licensee personnel, and observation of a similar door already installed, the inspector stated that there were no further questions on this circular.

b. Circular 78-08, Environmental Qualifications of Safety-Related Electrical Equipment

Discussions were held with a licensee representative to determine the status of VEPCO's actions on this Circular. These discussions revealed that VEPCO, through its Power Station Engineering Department, has assigned prime responsibility for reviewing the referenced materials to S&W. In order to facilitate present and future reviews, S&W has been requested by VEPCO to provide a listing of Category I systems/ components, qualification requirements for each, an index as to the location of documentation which demonstrates requirements have been met, and verification that qualification data have been reviewed and found acceptable. Additionally, documentation of review and acceptance of qualification data are to be retained with the data files. VEPCO intends to review the information generated by S&W to assure completeness and verify that any discrepancies have been cleared. The licensee representative contacted estimated that the review would be completed by the spring of 1979. The inspector stated that there were no further questions at that time, but that this would be assigned an open item number and would be reviewed further during a subsequent inspection (338/78-30-01 and 339/78-28-01).

6. Preoperational Test Witnessing

The conduct of 2-PO-40, "Hydrostatic Test of Reactor Coolant System and Associated High Pressure Auxiliary Systems", was witnessed by this and other NRC inspectors (see IE Report 50-339/78-27) on September 20, 1978. Prior to conduct of the test, several initial conditions as specified in 2-PO-40 were verified to be complete, including the following:

- a. Latest copies of 2-PO-40 operating procedures used, and hydro boundary drawings were available and in use.
- b. Inspection party personnel had been designated and indoctrinated.
- c. Thermal insulation had not been installed over welded joints.

- d. The Joint Test Group (JTG) had re-examined 2-PO-40 and reviewed the status of systems required to support the hydro to determine that no deficiencies existed which would affect performance of the test. JTG meetings on September 18 and 20 were attended by the inspector.
- e. Temperature instrumentation had been installed at critical positions to monitor system metal temperatures.
- f. Primary and backup hydro-laser pumps had been connected via the charging system with recently calibrated pressure gauges and relief valves set at 3,182 psig.
- g. High and low pressure safety injection check valves had been jumpered to permit hydro of upstream piping.
- h. Approximately two dozen valves within the hydro boundary were verified to be appropriately tagged and positioned.

The test was performed per procedure, with the test pressure of 3,107 psig being held for over ten minutes, the minimum required by USAS Code for Pressure Piping, B-31.7. After pressure was reduced to design of 2,485 psig, the inspectors accompanied the code inspectors from Hartford Steam Boiler during portion of their inspections. No through wall leaks were observed.

Throughout the test, at 500 psig increments, S&W Field QC personnel were involved in system walkdown to observe for leaks. Additionally, two VEPCO Operations QC representatives witnessed the conduct of the test. It was observed that line isometrics were being used by FQC to document inspections at design pressure.

Within the scope of testing observed, no items of noncompliance or discrepancies were found.

7. Review of Licensee Event Reports

The following events concerning the Units 1 and 2 service water reservoir, reported to the NRC under 10 CFR 21, 10 CFR 50.55(e) and/o. the Unit 1 Technical Specifications, were reviewed and discussed with licensee personnel. The review included verification that the licensee had reviewed each event, that corrective actions had been taken, no unreviewed safety questions were involved, and violations of regulations or Technical Specifications had been identified.

a. LER 78-49, Service Water Spray Flow and Pressure Discrepancy

This LER (Unit 1) was also reported as a potential significant deficiency per 10 CFR 21, June 23, 1978 (serial number 355), and as a construction deficiency for Unit 2 (10 CFR 50.55(e)), July 13, 1978 (serial no. 396). Due to design errors, too many spray nozzles were specified on three of the four spray arrays for Units 1 and 2. An Engineering and Design Coordination Report (E&DCR), P-2318-1, was initiated June 13, 1978, to determine the number of nozzles to be plugged in order to return flows and pressure drops to design values. Capping of the nozzles was accomplished as a design change, no. DC-78-46, "Service Water Spray Nozzle Capping", and was completed July 17, 1978. Acceptability of the spray system as modified will be determined as part of the service water thermal efficiency test conducted in July of 1978. Results of this test are to be reported to the NRC in the near future. These results will be reviewed when received to verify final design adequacy (open item 338/78-30-02 and 339/78-01-05). This represents continued follow-up for a previously identified open item on Unit 2.

b. LER 78-62, Failure of Service Water Spray Nozzles

Over a period of several weeks, two nozzles were observed missing on Unit 1 and four on Unit 2 arrays. This was reported as an LER for Unit 1 and as a potential defect per 10 CFR 21 on July 21, 1978 (letter no. 412 - Unit 1) and July 26 (letter no. 428 - Unit 2). As noted in the LER, failure of the nozzles at the joint of the nozzle and riser was attributed to random construction errors during fabrication (total of 960 nozzles originally installed). The missing nozzles were replaced under the control of maintenance reports N1-004221 and N1-78-06211730.

The letter of July 26 states that daily inspections of operating spray arrays was being implemented. The inspector confirmed this by verifying that page 7 of Outside Log 1-LOG-GE had been revised July 27, 1978, to require the operator to inform the shift supervisor of any clogged, missing or otherwise inoperable spray nozzles on the operating headers.

Following review of the above documents and discussions with licensee personnel, the inspector had no further questions on this event and that the item was considered closed (Unit 2 item 78-24-04).

During the performance of the review, licensee personnel were questioned as to whether the fiberglass piping had been scheduled for inservice inspection as recommended by Regulatory Guides 1.72 and 1.51. Apparently, no inspections have been scheduled and station management stated that this matter would have to be evaluated further to determine if any would be. The inspector stated that this matter would be unresolved and would be reviewed further (338/78-30-03; 339/78-28-02).

c. LER 78-74, Failure of Service Water Spray Riser Support Wires

This event was also reported under the provisions of 10 CFR 21 and 10 CRF 50.55(e). (Unit 2) on August 7, (letter no. 453) and September 8, 1978 (letter no. 455A). It involved the failure, due to corrosion, of several guy wires which support the spray risers in the spray pond. Analysis revealed that the galvanized steel wire rope was not suitable for the environment and had oxidized, resulting in failure.

Immediate corrective action involved replacement of the broken guy wires with stainless steel material. This was accomplished as a design change, NA1-FC-78-36, and the associated S&W design change (E&DCR) no. P-2380-2, with revisions P-2380A, P-2380B, and P-2380C. Review of the above documents and discussions with licensee personnel revealed that all broken cables had been replaced as of August 29, 1978. It appeared that this evolution had been handled in accordance with station administrative procedure 104.0, "Implementation of Architect-Engineer Construction Design Changes After Receipt of Operating License". The inspector had no further questions on immediate corrective actions.

As noted in the VEPCO letter of September 8, 1978, long-term corrective and preventive action would involve replacement of all guy wires with stainless steel material. It further states that replacement would be accomplished prior to operation of each applicable Unit (2, 3 and 4). E&CDR's P-2406-1 and P-2407-2 have been issued by S&W and approved by VEPCO (September 11, 1978) to prescribe the materials and repair methods. Discussions with station management revealed that material procurement might delay replacement of Unit 1 wires until late 1978 or early 1979. Licensee personnel were informed that this would remain an open item (338/78-30-04 and 339/78-24-01).

8. Unit 2 Fuel Storage

Approximately two-thirds of the fuel needed for initial fuel loading of Unit 2 is presently stored in the new fuel racks in the Unit 1 and 2 fuel building (see FSAR Figures 1.2-17 and 1.2-18). On September 12, 1978, the inspector visited the fuel building to verify that provisions for physical security and environmental protection of the fuel were in agreement with those of the application for the Unit 2 Special Nuclear Materials (SNM) License dated October 3, 1977 (serial no. 148).

Security measures were found to be equal to or greater than the commitments of the SNM application and the Station Security Plan. Protection of the fuel from dust, debris and physical damage was also found to be adequate. Observation of fire extinguishers in the area revealed them to have recent inspection dates. Additionally, housekeeping in the area was found to be in order. No items of noncompliance or deviations were identified.

9. Plant Tours

Tours of most accessible plant areas were conducted during the inspection period, with emphasis on Unit 2 on September 15, 19, 20 and 28; the fuel storage building on September 12, and Unit 1 Containment on September 25, 1978. During those tours, the following items, as available, were observed:

a. Hot Work

Adequacy of fire prevention/protection measures used.

b. Fire Equipment

Operability and evidence of periodic inspection of fire suppression equipment.

c. Housekeeping

Minimal accumulations of debris and maintenance of required cleanliness levels in systems under or following testing.

d. Equipment Preservation

Maintenance of special preservative measures for installed equipment as applicable.

e. Component Tagging

Implementation and observance of equipment tagging for safety or equipment protection.

f. Instrumentation

Adequate protection for installed instrumentation.

g. Cable Pulling

Adequate measures taken to protect cable from damage while being pulled.

h. Communication

Effectiveness of public address system in all areas toured.

i. Equipment Controls

Effectiveness of jurisdictional controls in precluding unauthorized work on systems turned over for testing.

j. Foreign Material Exclusion

Maintenance of controls to assure systems which have been cleaned and flushed are not re-opened to admit foreign material.

k. Security

Implementation of security provisions. Particular attention to maintenance of the Unit 1/Unit 2 interface and that for the fuel building.

l. Logbooks

The chronological log for preoperational test 2-PO-40 was observed.

m. Testing

The conduct of 2-PO-40 was observed as reported in paragraph 6 of these details.

No discrepancies were noted for those activities observed when compared to the applicable NAS standard or other guidance, such as the Station Security and Emergency Plans.

During the tour of Unit 1 Containment on September 25, the inspector observed Standing and Special Radiation Work Permits issued for activities in the building. Personnel protective clothing and radiation control procedures observed were in accordance with the RWP's. Access controls for containment and high radiation areas in containment, such as pump cubicles were observed. No discrepancies were noted for these activities.

10. Unit 1 Piping, Hangers and Restraints

Certain inspection efforts related to expansion and restraint measurements and observations for Unit 1 piping were documented in IE Report 50-338/77-8, Details IV, paragraph 5. On September 25, 1978, with Unit 1 in cold shutdown, the inspector again observed many of the same lines to determine their status after transient testing had been completed as part of the start-up test program. Piping was observed to verify that no obvious interferences or unusual deflections had been experienced. Hydraulic snubbers on the lines listed below, and others randomly selected were observed to verify that oil levels were appropriate, no excessive oil leakage existed, and that the snubber piston arms had not bound up or reached maximum extension. Spring hangers were observed to verify that none had reached maximum extension. Specific lines observed included:

- . Feedwater lines - 16 inch WFPD-24-601-Q2, WFPD-23-601-Q2 and WFPD-22-601-Q2.
- . Hot and cold leg safety injection lines in reactor coolant pump cubicles - 6 inch RC-16-1502-Q1, RC-18-1502-Q1, RC-21-1502-Q1, RC-17-1502-Q1, RC-131-1502-Q1, RC-19-1502-Q1, RC-132-1502-Q1, RC-20-1502-Q1 and RC-133-1502-Q1.
- . Pressurizer surge line - 14 inch RC-10-250R-Q1, spray line, 4 inch RC-14-1502-Q1 and relief valve discharge line, 12 inch RC-36-602-Q3.
- . The 32 inch mainsteam lines in containment up to the containment penetrations.

Within the areas observed, no items of noncompliance or deviations were identified.

11. Low Head Safety Injection Flushing - Unit 2

On September 28, 1978, the inspector observed flushing activities in progress per S&W Advisory Operations procedure AD-OPS 2-P-1, "Flushing Procedure, Chemical and Volume Control System, Demineralizers, High Head Safety Injection System, Low Head Safety Injection System, Primary Grade Water System, Reactor Coolant Pumps Standpipes". The suction line for LHSI pump A from the containment sump was being flushed on this date, and the flush had been in progress for several days. Certain operations were observed for conformance to AD-OPS 2-P-1, Revision 2, and to NAS Specification 407, "Cleaning of Systems and Components During Construction". This line was being flushed in accordance with Grade A requirements for an open-ended line even though it would be subjected to any debris in the containment sump following a loss of coolant accident.

Two sample flushes to determine acceptability were observed. These specific items were noted:

- a. Flush water was passed through a cloth filter of less than one square test surface area for approximately six minutes on each occasion.
- b. The line was surged approximately halfway through each sample period by closing the sample flush line isolation valve and reopening it.
- c. Acceptance criteria for accepting or rejecting the samples as discussed by the Advisory Engineer and the FQC Inspector were as stated in NAS 409. In the two samples observed, rejection was based on total number of particles.
- d. Suction and discharge pressure gauges used to compute pump head developed and thus flow rate both had current calibration stickers.
- e. Chemical analysis of the Unit 2 refueling water tank, 2-QS-TK-1, for September 28 and several previous days showed the flush water to be in accordance with requirements of NAS 407.

Within the scope of activities observed, no discrepancies were noted. Inspection in this area was continuing at the end of the report period.

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- . Pressurizer surge line - 14 inch RC-10-250R-Q1, spray line, 4 inch RC-14-1502-Q1 and relief valve discharge line, 12 inch RC-36-602-Q3.
- . The 32 inch mainsteam lines in containment up to the containment penetrations.

Within the areas observed, no items of noncompliance or deviations were identified.

12. Engineered Safety Feature Motor Breaker Alarms

Due to the discovery of the lack of annunciator alarms upon loss of function of engineered safety feature pumps because of breaker trip due to lockout or overload conditions at another nuclear power station, the inspector was requested to determine whether a similar situation existed at North Anna 1 and 2. Investigation of this matter revealed that Unit 1 and 2 do utilize annunciators to indicate when breakers are open due to such conditions as phase or ground overcurrent trip, the breakers being racked out to test position, or overload relay actuation. This was verified by observation of annunciators in the control room and review of a typical annunciator response procedure. The inspector had no questions on this matter.

13. Local Public Document Room

On September 8, 1978, the inspector visited the local Public Document Room for the North Anna Power Station located on the second floor of the Louisa County Court House in Louisa, Virginia. A brief review of the documents filed there revealed them to be filed in an orderly fashion. It appeared that the files are updated periodically, with documents dated as recently as July of 1978 being noted.

14. Meeting with a Local Official

On September 27, 1978, the inspector and R. C. Lewis, Chief, Reactor Projects Section No. 2, Region II, met with Mr. E. H. Kube, Louisa County Administrator. The meeting purpose was to discuss the NRC's inspection program at North Anna (located in Louisa County) and, in particular, the resident inspection program. Mr. Kube's questions were answered and telephone numbers at which the inspector could be contacted were provided.