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

Report Nos.: 50-338/84-44 and 50-339/84-44

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: December 6, 1984 - January 5, 1985

Inspectors: Kenneth M Jenison for 6Feb85
M. W. Branch, Senior Resident Inspector Date Signed

Kenneth M Jenison for 6Feb85
J. C. Luehman, Resident Inspector Date Signed

Approved by: Virgil L Brownlee for 7 Feb 85
S. Elrod, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine inspection by the resident inspectors involved 159 inspector hours onsite in the areas of maintenance, surveillance, cold weather preparation, independent inspection, Engineered Safety Feature (ESF) system walkdown, operational safety verification and licensee event reports (LER).

Results: Of the seven areas inspected, two violations were identified and are discussed in paragraphs 9 and 10.

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REPORT DETAILS

1. Licensee Employees Contacted

E. W. Harrell, Station Manager
G. E. Kane, Assistant Station Manager
M. L. Bowling, Assistant Station Manger
L. Johnson, Superintendent, Technical Services
J. R. Harper, Superintendent, Maintenance
R. O. Enfinger, Superintendent, Operations
G. Paxton, Superintendent, Administrative Services
A. L. Hogg, Jr., 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, QA Supervisor
F. T. Terminella, QA 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 January 4, 1985, with those persons indicated in paragraph 1 above. Additionally, the inspectors discussed with the licensee, a recent problem that occurred at the Pilgrim Nuclear Power Station where through wall cracks were discovered in the 304 stainless steel piping used in the Post Accident Sampling System (PASS). The cracks were determined to be caused by chloride stress corrosion and it was theorized that the chloride concentrated in the pipe due, in part, to standing water from a hydrostatic test being boiled by electric heat tracing set at approximately 270°F.

The licensee acknowledged the inspectors findings and committed to evaluate the possibility of chloride stress corrosion in their PASS piping.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. New unresolved items identified during this inspection are discussed in paragraph 4.

5. Plant Status

Unit 1

The unit began the inspection period at 100% power. On December 31, 1984, the reactor tripped from 100% power. The trip was due to high negative flux rate which was caused by dropped control rods which resulted from a failed circuit card in a control rod power supply cabinet. While trouble-shooting of the rod control system during the subsequent startup, another reactor trip occurred. The unit was started up, reached 100% power on January 2, 1984, and ended the inspection period at or about that power level.

Unit 2

The unit was at 100% power at the beginning of the inspection period. On December 9, 1984, the unit was shutdown because both Emergency Diesel Generators (EDG) were inoperable. The EDG's were repaired (see paragraph 8 for more details), the unit started up and on December 14, 1984, stabilized at 100% power. For the remainder of the inspection period the unit operated at or about 100% power except for periods when load following occurred.

6. Licensee Event Report (LER) Followup

The following LER's 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 conditions had been identified.

338/84-07	Cycle 4 Fuel Examination Results
338/84-08	Recirculation Spray Cooler Lap Ring Cracking
338/84-19	Reactor Trip due to loss of Vital Bus I-III
338/84-22	Fire Main Pipe Rupture
338/84-21	Reactor Trip due to Closure of "B" Feedwater Regulating Valve.

(Closed) LER 338/84-07 Cycle 4 Fuel Examination Results. Members of the NRC Region II Test Programs Section reviewed much of the information used to compile this report and viewed the video tapes made during the fuel inspections. Their observations are contained in inspection reports 338, 339/84-26.

(Closed) LER 338/84-08 Recirculation Spray Cooler Lap Ring Cracking. This issue had been previously reviewed in inspection reports 338, 339/84-38 and 338, 339/84-34.

(Closed) LER 338/84-19 Reactor Trip due to Loss of Vital Bus 1-III. The inspectors have reviewed the licensee's followup of this event and at the time of LER one item remained open. That item was to determine why the auxiliary feedwater pump did not start as required. Further investigation revealed that the relay that should have started the pump was powered from the bus that was lost. Because the operator recognized that one pump had not started and manually started it before the bus was regained (which would have auto started the pump) the cause of the failure of the pump to start was not immediately identified.

7. ESF System Walkdown

The following selected Engineered Safety Feature (ESF) systems were verified operable by performing walkdowns of the accessible and essential portions of the systems on December 19, 1984.

Unit #1

Casing Cooling System (1-OP-7.10A)

Unit #2

Casing Cooling System (2-OP-7.10A)

The inspectors identified that for a large amount of time the two annunciators on each unit for the Casing Cooling System (High/Low Temperature and High/Low Tank Level) were illuminated.

The illuminated annunciators were not due to out of specification parameters. In the case of the temperature alarm on Unit 1, the annunciator was identified for repair because the alarm would not reset. For the tank level annunciators on both units the alarms were illuminated because the tanks were "overfilled" (which is not prohibited by plant specifications).

The danger in having these alarms illuminated continuously is two fold. First, readout of the monitored parameters is not immediately available to operators because of meter location and second, continuously alarming annunciators lead to situations such as the inadvertent draining of the Unit 2 Casing Cooling System described in inspection report 339/84-38.

8. Emergency Diesel Generators (EDG)

On December 9, 1984, North Anna Unit 2 was forced to shutdown per the action of Technical Specification 3.8.1.1 when the 2H and 2J emergency diesel generators were declared inoperable. A description of the diesel problems as well as a chronology of the events leading up to the diesel generators being declared inoperable, is porvided below.

- At 0719 on December 7, 1984, the 2H EDG was removed from service for preventive maintenance due to a high crankcase pressure and an air start system problem.

- At 1321 on December 7, 1984, the 2J EDG failed during the TS required testing when a high crank case pressure condition tripped the engine. At this time both EDGs were inoperable and restoration of 2H EDG was expedited.

- At 1655 on December 7, 1984, the 2H EDG was restored to operation after repairs which included: cleaning of the oil strainer, verification of proper pressure setting on the crank case pressure switch and verification of starting air system operability. Prior to declaring the EDG operable, a satisfactory surveillance test was completed.

- At 1719 on December 7, 1984, another unsuccessful attempt to start the 2J EDG occurred when it took approximately two minutes to start. Subsequently, the EDG was started while being observed by the EDG vendor technical representative and again tripped on high crankcase pressure. It was determined that the number 2, 3 and 11 upper pistons were leaking-requiring replacement, additionally, the number 11 cylinder liner was determined to need replacing.

- At 0652 on December 9, 1984, during the sixth TS operability run, the 2H EDG failed on high crank case pressure. This resulted in both EDGs being inoperable and, at 0830, a unit 2 ramp-down was started. The number 10 lower piston was found to have a shattered ring and a new piston and rings were installed.

- On December 11, 1984, both EDG were declared operable after the above repairs and extensive testing. The primary system was heated up and unit 2 was placed on line December 16, 1984.

The failures of the EDG required the plant conduct more frequent (weekly) testing of each EDG. The cause of the piston cracking problem is still being evaluated by the licensee with preliminary indication being that rapid loading, i.e., within 60 seconds, of the EDG every surveillance test may be the cause.

In response to Generic Letter 84-15 (Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability) the licensee stated, in their August 16, 1984 letter (S/N 439), that comments on present testing vs. proposed testing will be provided by January 31, 1985. The licensee has indicated that information gained during the resent EDG outage will be a factor in their response with recommendations to reduce the effect of rapid loading on the EDG reliability.

9. Service Water Reservoir Spray Piping

The piping used for the service water arrays at North Anna is fiberglass-reinforced plastic piping. (North Anna Power Station UFSAR section 9.2.1.2.1) Pursuant to North Anna Power Station, Unit 2 Facility Operating License NPF-7 dated August 21, 1980, condition 2.c.(5) the licensee committed to a surveillance program that is consistent with the regulatory position in Revision 2 of Regulatory Guide 1.72. This position states that the inspection frequency for the piping should be increased to once annually if an exterior weather-resistant coating is not provided.

Review of the piping manufacturer's literature reveals that the piping used is only provided with improved protection from ultraviolet radiation and, as far as the licensee can determine, has no weather-resistant coating. This is a violation and is identified as item 339/84-44-01.

Further investigation into the requirements of the regulatory position of Regulatory Guide 1.72 revealed two other issues. The position states that the design temperature for the spray pond piping should be 212°F (100°c). Review of the manufacturer's specifications for the piping in use at North Anna shows the maximum recommended temperature is 210°F. This small difference by itself is not significant considering the maximum temperature of the service water system will not exceed 110°F (UFSAR 9.2.1.2.2) but, the 210°F recommended temperature is based on using only water in the piping. Service water at North Anna is treated with a number of different chemicals and their effects on the piping need to be considered in that some chemicals are not recommended for use with this piping and the use of others lowers the maximum recommended temperature. The safety analyses performed by the licensee for use of chemicals in this system does not consider the effects on the fiberglass piping. Manufacturer's test data shows that, at higher concentrations (5%), at least one of the chemicals used by the licensee (sodium hyporchlorite) is not recommended for use with this piping.

The second issue involves the purchase classification of the pipe. North Anna Power Station Administrative Procedure (ADM 2.1), Classification of Systems, Components, and Structures states that the service water spray system is a quality assurance Category I system. Review of purchase records for replacement fiberglass piping reveals it is being bought under a lower classification. The effects of chemicals and purchasing of replacement piping are identified as unresolved item 338, 339/84-44-02 pending evaluation by the licensee and further review by the inspector.

10. Unavailability of Unit 1 B Charging Pump

During the period 4-5, December 1984, maintenance was performed on the Unit 1 C charging pump and it was tagged out electrically for most of that period. The Unit 1 A charging pump was running, providing nominal makeup and seal water flow while the Unit 1 B charging pump was designated as the operable standby pump.

On at least two occasions during this period the 1 C charging pump electrical isolation tags were cleared and the pump was run for short periods in conjunction with the maintenance being performed. In both cases the isola-

tion tags were rehung after completion of the pump runs. The first of these runs occurred on the 4 p.m. to midnight shift of December 4, 1984, while the second occurred on the 8 a.m. to 4 p.m. shift on December 5, 1984.

The electrical logic for the charging pumps is such that anytime the C charging pump alternate power supply breaker is racked in, lockout of the B charging pump occurs (North Anna UFSAR Section 8.3.1.1.1). The licensee has verified through interviews with the operators involved that the alternate power supply breaker for the 1C charging pump was not only racked in during the December 4th pump run but was also the power source used to run the pump. During the second pump run it was clear that the alternate power supply breaker was not used to run the pump, however, whether the breaker was racked in and subsequently racked out is not clear. Each time the 1C charging pump power supply breaker was racked out, the annunciator response for the 1B charging pump lockout needed to be followed in order to reset the lockout. After the final rack out of the alternate power supply breaker, the annunicator response was not followed leaving 1B charging pump locked out.

In summary, the racking in of the 1C charging pump alternate power supply breaker caused the lockout of the 1B charging pump. The short periods when this lockout occurred during testing of the 1C charging pump are not considered significant because they were under direct control of the operator. However, failure to follow the annunciator response after the final rackout of the 1C alternate power supply breaker left 1B charging pump locked out from the 8:00 a.m. to 4 p.m. shift on December 5, 1984, until early on the midnight to 8 a.m. shift on December 6, 1984. During this time the 1B charging pump was not available for automatic start and the 1C charging pump was in a similar condition because of the electrical isolation. These circumstances left the 1A charging pump as the only available charging pump placing the plant in the Action a. of Technical Specification 3.5.2 without the operating staff's knowledge. Failure to recognize the lit annunciator and to follow the annunciator response procedure and failure to perform proper shift turnovers regarding annunciator status as required by administrativce procedure 19.3 paragraph 1.1.a are identified as violation 338/84-44-01.

11. Cold Weather Preparations (71714)

Using the licensee's Mechanical Department Administrative Procedure (M.D. ADM 20.0) "Plant Winterization Program" as a guide, the inspectors reviewed the plant's cold weather preparations and had the following observations. First, the auxiliary feedwater pump buildings should be added to M.D. ADM 20.0. Pressure transmitter 2 -PI-QS-203 off of the Refueling Water Storage Tank (RWST) has frozen and subsequently leaked two winters in a row. Though the instrument does not serve a safety function, the leakage of borated and potentially contaminated water onto the ground is undesirable. The insulation wrapped around the piping leading to the Unit 2 RWST level transmitters should be adequate protection, however a permanent enclosure would be even better.

The inspectors will reinspect freeze protection as necessary during an extremely cold weather or extended winter plant shutdown.

12. Previously Inspected Inspector Followup Items

The following Inspector Followup Item (IFI) and Licensee Event Report (LER) items were reviewed in inspection report 338, 339/83-11 to determine the completeness and appropriateness of licensee corrective action taken. Within the areas inspected, no violations were identified. Due to an administrative oversite, these items were omitted from inspection report 338, 339/83-11 however, these items were closed for Units 1 and 2 based on inspector review of licensee actions and status as of the issuance of the subject report.

Unit 1 (Docket No. 338)

78-11-07	79-33-02	79-37-01	79-41-06
79-45-01	80-20-03	80-21-10	80-32-01
80-32-02	80-32-03	80-32-06	80-32-07
81-05-07	81-11-01	81-11-04	82-10-01
80-07-04	LER83-25	LER82-22	LER82-49
LER82-04	LER82-13	P2182-01	79-21-01

Unit 2 (Docket No. 339)

82-29-04	LER81-10	LER83-21

Included in the same administrative oversite, items P2-82-01 and LER83-21 were erroneously listed as closed for Unit 1.

The following Inspector Followup Item (IFI) and Licensee Event items were reviewed in inspection report 338, 339/83-13 to determine the completeness and appropriateness of licensee corrective action taken. Within the areas inspected, no violations were identified. Due to an administrative oversite these items were omitted from inspection report 338, 339/83-13 however, these items were closed for Unit 1 based on inspector review of licensee actions and status as of the issuance of the subject report.

80-19-05	80-38-11	79-49-04	81-05-10
80-21-11	80-38-12	79-49-05	80-CI-21
80-26-03	80-41-01	81-09-01	82-29-01
80-29-01	80-41-03	81-11-03	82-29-06
80-29-02	80-38-01	81-11-05	82-20-01
80-29-03	79-48-01	81-15-01	82-33-01
80-30-01	79-48-02	81-15-03	82-25-01
80-30-02	79-48-03	81-22-04	82-20-01
80-35-01	79-49-01	81-25-04	82-33-01
80-35-05	79-49-02	80-38-03	LER80-44
80-35-06	79-49-03	82-10-02	LER80-58
LER81-10	LER81-64	LER83-04	LER81-69
	LER81-62	LER81-19	LER82-82

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 T. S. and LCO.

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 (RWPs) 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.