UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

January 26, 2004

Virginia Electric and Power Company
ATTN.: Mr. David A. Christian
Sr. Vice President and
Chief Nuclear Officer
Innsbrook Technical Center - 2SW
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: NORTH ANNA POWER STATION - NRC INTEGRATED INSPECTION REPORT NO. 05000338/2003005, 05000339/2003005 AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION REPORT NO. 07200016/2003002

Dear Mr. Christian:

On December 27, 2003, the US Nuclear Regulatory Commission (NRC) completed an inspection at your North Anna Power Station, Units 1 and 2. The enclosed integrated inspection report documents the inspection findings which were discussed on January 13, 2004, with Mr. Donald Jernigan and other members of your staff.

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selective procedures and records, observed activities, and interviewed personnel.

On the basis of the results of this inspection, no findings of significance were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at *http://www.nrc.gov/reading-rm/adams.html* (the Public Electronic Reading Room).

Sincerely,

/RA/
Kerry D. Landis, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Docket Nos.: 50-338, 50-339, 72-016
License Nos.: NPF-4, NPF-7, SNM-2507

Enclosures: Inspection Reports 05000338/2003005, 05000339/2003005 and 07200016/2003002 w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-338, 50-339 and 72-016
License Nos.: NPF-4, NPF-7

Report Nos.: 05000338/2003005, 05000339/2003005 AND 0720016/2003002

Licensee: Virginia Electric and Power Company (VEPCO)

Facilities: North Anna Power Station, Units 1 & 2
North Anna Independent Spent Fuel Storage Installation

Location: 1022 Haley Drive
Mineral, Virginia 23117

Dates: September 28, 2003 - December 27, 2003

Inspectors: M. Morgan, Senior Resident Inspector
J. Canady, Resident Inspector
M. Widmann, Senior Resident Inspector (V. C Summer)
L. Garner, Senior Project Engineer
B. Desai, Senior Project Engineer
M. Cox, Resident Inspector (Indian Point)
R. Chou, Senior Reactor Inspector

Approved by: K. Landis, Chief, Reactor Projects Branch 5
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000338/2003-005, IR 05000339/2003-005 and 0720016/2003-002; 09/28/2003 - 12/27/2003; North Anna Power Station Units 1 & 2; Resident Inspector Integrated Report.

The report covered a three month period of inspection by resident inspectors and announced inspections by two regional senior project engineers and a regional senior reactor inspector. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violations

None

Enclosure

Report Details

Summary of Plant Status

Unit 1 began the inspection period at 100% power and remained at this power level throughout the reporting period except for small power reductions to perform periodic testing.

Unit 2 began the inspection period at 100% power and remained at this power level throughout the reporting period except for small power reductions to perform periodic testing.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

During the inspection period, the inspectors performed three cold weather preparation inspections. The inspectors reviewed procedures, held discussions with licensee personnel and conducted walkdowns of the following systems, structures and components (SSC) that have the potential for being impacted by cold weather:

- Motor Driven Fire Pump House (October 20, 2003),
- Intake Structure (October 21, 2003),
- Unit 1 and Unit 2 refueling water storage tank (RWST) level transmitter areas (October 29, 2003),
- Unit 1 and Unit 2 emergency diesel generator (EDG) rooms (November 17, 2003), and
- Station blackout diesel (SBO) room (November 17, 2003).

The walkdowns of the SSCs were to assess the licensee's preparation for freezing conditions at the plant. The inspectors verified that feeder breakers for the heating units in the EDG and the SBO diesel rooms were in the "on" position and that the breakers for the RWST level transmitters heat tracing were energized in accordance with procedural requirements. The material condition of louvers, portable heaters, herculite curtains, drain grating, and piping associated with the walk-downed areas were examined by the inspectors.

Documentation reviewed included the following:

- 0-AP-41, "Severe Weather Conditions;"
- 0-GOP-4, "Cold Weather Preparations;"
- 0-GOP-4.2, "Extreme Cold Weather Operations;" and,
- 0-GOP-2.10, "Freeze Protection Heat Tracing Circuits."

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

a. Inspection Scope

Partial System Walkdown. The inspectors performed the following six partial system walkdowns during this inspection period. The walkdowns were to evaluate the operability of the selected train or system when the redundant train or system was inoperable or out of service. The inspectors checked for correct valve and power alignments by comparing the positions of valves, switches, and electrical power breakers to that of procedures and drawings.

- Unit 1 Train B Auxiliary Feedwater (AFW) subsystem while the A subsystem was out of service for pre-planned maintenance (OP-7.31.2A, "Valve Checkoff–Auxiliary Feedwater," and Plant Drawing 11715-FM-074A, sheets 1 & 3);
- Unit 2 Train A Outside Recirculation Spray subsystem while the B subsystem was out of service due to suspected problems with level in the pump's associated head tank (1-OP-7.5A, "Valve Checkoff-Outside Recirculation Spray System," and Plant Drawings 12050-FM-091A, sheet 4);
- Unit 1 Train B Service Water System while the A train was removed from service and drained (Unit 1 and 2 Service Water tagging record (N)0-03-SW-0012, "Remove #1 and #4 headers from service for maintenance," and Plant Drawing NCRODP-13-NA, Figure 12-2-NA, Sheets 1 and 2);
- Trains I and II Control Room Bottled Air System, while trains III and IV were below the operable pressure limit as a result of prior surveillance testing (0-PT-76.4A, "Control Room Bottled Air Pressurization," Plant Drawing 11715-FB-034F, sheet 1, and Plant Issue N-2003-4056, Bottled Air trains returned to service prior to TS allowed outage time for being in mode 3);
- A train of the Service Water System with the B train removed from service; and
- Spent Fuel Pool (SFP) Cooling system accompanied by the system inspector. WR 000882227 for 1A SFP Cooling pump seal leak, WR 00094412 for SFP Cooling pump 1B seal leak, Drawing 11715-FM-88A, Training document NCRODP-49-NA were reviewed by the inspector. During the walkdown, loading activities associated with the Independent Spent Fuel Storage Installation were ongoing with the cask positioned in the SFP.

For the A train Service Water System inspection, service water availability to major components such as inside recirculation spray system heat exchangers, charging pump coolers, control room chillers and component water heat exchanges was determined by observations of valve positions, control room indications, and electric power availability. Material condition of major piping, valves, standby pumps, piping supports and instrumentation was examined for those components in the Auxiliary Building, Safeguards Building and Service Water Pump House. The system engineer accompanied the inspectors on portions of the walkdown. Outstanding work orders (WOs) were also reviewed.

Complete System Walkdown. The inspectors performed a complete equipment alignment review of the Unit 1A and 1B control room and emergency switchgear ventilation system. The inspectors assessed the system for material condition, proper damper alignment, electrical power availability, essential support equipment operational function, component labeling correctness and the functionality of hangers and supports. In addition, the inspectors reviewed outstanding maintenance work requests, design issues, temporary modifications, and operators workarounds that could impact the system functional capability. System related plant issues were reviewed to verify that the licensee had properly identified and resolved equipment problems that could affect the availability, reliability and operability of the ventilation units. The inspectors also reviewed the following documents as part of the inspection:

- TS 3.7.10, "Main Control/Emergency Switchgear Room (MCR/ESGR) Emergency Ventilation System;"
- 2-OP-21.6, "Main Control and Relay Room Air Conditioning;"
- 0-OP-21.7, "Main Control and Relay Room Emergency Ventilation Operation;"
- Updated Final Safety Analysis Report (UFSAR), Section 9.4.1, "Main Control and Relay Room Ventilation;"
- NCRODP-36, "Secondary Plant Ventilation Systems;"
- 0-AP-51, "Common Unit Radiation Monitoring System;"
- 0-LOG-6A, "Operator Logs," containing MCR Differential Pressure Reading;
- 0-GOP-10.6A, General Note 31, operator response to low MCR reading;
- 1-PT-57.4, "Safety Injection Operation Test," (actuation of MCR/ESGR ventilation);
- Plant Drawings 11715-FB-44B/C/E/F, "Flow Diagrams - Ventilation Systems;" and,
- PIant Issues N-2002-0890 and 3470, N-2003-1292, 1376, 2403, 2724, and 3125.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Fire Drill

a. Inspection Scope

During a fire protection drill on November 12, 2003, at the station blackout diesel, the inspectors assessed the response time of the fire brigade, fire fighting equipment brought to the scene, the donning of fire protective clothing, and the effectiveness of communications. The inspectors reviewed the scenario for the fire; assessed the acceptance criteria for the objectives; and attended the post critique.

The inspectors witnessed another drill on November 18, 2003. The inspectors monitored the arrival of the fire brigade at a simulated fire in the Unit 2 Switchgear Room on the 307 foot elevation of the Service Building. The inspectors assessed the

strategy used by the scene leader for the simulated fire in the area with a failure of the carbon dioxide (CO_2) to dump. The post drill critique was attended by the inspectors.

b. Findings

No findings of significance were identified.

.2 Fire Area Tours

a. Inspection Scope

The inspectors assessed the implementation of the fire protection program using Virginia Power Administrative Procedure (VPAP)-2401, "Fire Protection Program." The inspectors checked the control of transient combustibles and the material condition of the fire detection and fire suppression systems in the following four areas:

- Unit 1 and Unit 2 Fuel Handling Trolley area;
- Unit 1 and Unit 2 Emergency Diesel Rooms;
- Unit 2 Emergency Switchgear and Instrument Rack areas; and,
- Unit 2 Air Conditioning and Chiller areas.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

Internal Flooding. The inspectors assessed the internal flooding vulnerability of the emergency switchgear room (ESGR) due to the flooding in the turbine building. The inspectors determined from a review of the Updated Final Safety Analysis Report (UFSAR) that a complete rupture of a main condenser circulating water expansion joint would result in a flooding of the turbine building (TB) basement in a matter of minutes before the circulating pumps would trip on TB flooding (254 elevation). A walkdown was performed of the turbine building basement, the ESGR, and the air conditioning chiller rooms to assess the material condition of flood barriers, sumps, and turbine building level detectors.

The inspectors also assessed the internal flooding vulnerability of the Unit 1 and Unit 2 high head safety injection (charging pumps) due to a flooding of the auxiliary building. A walkdown of the auxiliary building basement and the charging pump cubicles was performed by the inspectors to assess the potential flooding vulnerability to safety equipment.

Reviews included the following documentation:

- North Anna Power Station Updated Final Safety Analysis Report, Section 10.4.2.3, Performance Analysis;"
- 0-AP-39.2, "Auxiliary Building Flooding;"
- 0-MOP-49.11, "Service Water Flooding in the Auxiliary Building;"
- 0-AP-39.1, "Turbine Building Flooding;" and,
- 1-EPM-0801-01, "Testing the Flood Control System."

External Flooding. The inspectors performed visual examination of the storm drain system inside and outside the protected area to verify that drains were not blocked and the ground was properly graded to channel water into the system. During these walkdowns the inspectors assessed, as appropriate, the material condition of culverts, dikes, flood barriers, sumps, sump pumps and level switches. The inspectors also reviewed a sample of potential external flood related plant issues to verify corrective actions taken or planned to address identified deficient conditions. These included Plant Issues N-2002-0934 and N-2002-2979, in addition to Request for Engineering Assistance (REA)-1997-0977. Operating experience (OE) was also reviewed to verify the licensee incorporated applicable items into their program, specifically, OE item N-2002-0812.

The inspectors reviewed the following documents for the licensee's external flood mitigation plans to determine consistency with design requirements and commitments:

- UFSAR Sections 2.4.1 through 2.4.10; 2.4.13; 3.1.2; and 3.4;
- Yard storm sewer and manhole drawings 11715-FB-1A, 1B, 1C, 1D , 1G and 1J; and,
- 0-MPM-1207-01, "Pumping of Security and Electrical Cable Vaults."

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the WO, the Updated Final Safety Analysis Report (UFSAR), data packages and Technical Specifications associated with the replacement of the condenser (2-HV-E-4B-2) for the main control room/emergency switchgear room air conditioning system chiller. Post maintenance testing for the chiller following the condenser "like for like" replacement was reviewed.

Documents reviewed included the following:

- 0-MCM-0803-01, "Repair of the Control Room Air Conditioning Chillers (1 / 2-HV-E-4A, B, and C) and Front Office Air Conditioning Chillers (1-HV-3A, B, and C);"
- 0-PT-171.3, "ASME System Pressure Tests;"

- 2-PT-77.13A, “Control Room Chiller Equipment Performance Test (2-HV-E-4A);”
- WO 415687-01, Replace chiller condenser; and
- VPAP-2003, “Post Maintenance Testing Program;”

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed licensed operator requalification training involving crew D operations group supervisors and board operators. The inspectors observed simulator training dealing with a non-routine start-up of the Unit 1 reactor plant from Mode 3 to Mode1 operation. Control board operations and crew communications were evaluated. The inspectors assessed operator responses to a simulated dropped rod event, a simulated loss of nuclear instrumentation (start-up range instrument item), and a simulated failure of the C main feed water regulating valve event. The inspectors also attended a scheduled Licensed Operator Requalification classroom presentation on boron calculations.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the equipment issues listed below, the inspectors evaluated the licensee’s effectiveness of the corresponding preventive and corrective maintenance. The inspectors performed walkdowns of the accessible portions of the systems, performed in-office reviews of procedures and evaluations, and held discussions with system engineers. The inspectors compared the licensee’s actions with the requirements of the Maintenance Rule (10 CFR 50.65) using VPAP 0815, “Maintenance Rule Program”, and Engineering Transmittal CEP-97-0018, “North Anna Maintenance Rule Scoping and Performance Criteria Matrix.” Additionally, the inspectors attended some of the licensee’s scheduled Maintenance Rule Working Group meetings.

- Plant Issue N-2003-0407 - dealing with work performed on Unit 2 Loop A RCS Drain Valve (2-RC-11-VALVE) per WO 00484817-01;
- Plant Issues N-2003-3921 and N-2003-3962 - dealing with the cycling of the Unit 1 A Circulating Water Pump during trouble shooting of the pump’s associated traveling screen; and,
- Maintenance Rule Meeting (Mrule) - inspectors noted an MRule “one-time” unavailability approval of work associated with the service water system

(SW002) expansion joint replacement design change package (DCP)-02-006), and a revision of MRule function SI002 for unavailability (and extension of unavailability hours) for Unit 1 B and C high head safety injection pumps.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed data output from the licensee's safety monitor associated with the risk profile of Units 1 and 2, attended pre-job briefs, and held discussions with licensee personnel. The following risk assessment areas were inspected:

- A 107-day risk (green window) existed on Unit 1 due to troubleshooting activities associated with the reactor trip breaker P-4 interlock problem in conjunction with the performance of switchyard work. The inspectors noted that the licensee did not commence the troubleshooting activity for the P-4 interlock problem (emergent work) until after a risk analysis had been performed;
- A 47-day risk (green window) existed on Unit 2 due to maintenance activities being performed on the Unit 2 C main feedwater pump (2-FW-P-1C), and the Unit 2 A/B steam dump valves while performing switchyard work;
- A 36-day and a 209-day risk (green window) existed on Unit 1 and Unit 2, respectively, due to the Unit 1 A motor driven auxiliary feedwater pump (1-FW-P-3A) and the Unit 2 instrument air compressors being out of service for maintenance in conjunction with switchyard maintenance activities;
- A change from a 21-day to an 11-day risk (green window) existed on Unit 1 and Unit 2 due to the removal from service of the station blackout diesel for emergent work requirements while the Unit 1 A service water header and the Unit 2 C circulating water pump was out of service;
- A 104 hour (yellow window) existed on Unit 1 due to the B and C charging pumps being out of service for an uncoupled maintenance run on the B pump. Both pumps were inoperable during the uncoupled run due to being powered from the same bus.
- Licensee's risk assessment following a seismic event near the plant was reviewed. The assessment considered the combined effects of ongoing maintenance on the 1B circulating pump, the B service water header, the 1B charging pump, and the switchyard.

b. Findings

No findings of significance were identified.

1R14 Operator Performance During Non-routine Evolutions and Events

a. Inspection Scope

For the non-routine events described below, the inspectors reviewed operator logs, plant computer data, and held discussions with plant operators to determine what occurred and how the operators responded, and to determine if the response was in accordance with plant procedures:

- The inspectors reviewed Unit 1 and Unit 2 operators response to an electrical disturbance of 20 - 40 megawatts on the distribution grid. This disturbance occurred on November 13, 2003, as a result of another power plant on the system tripping off. The inspectors reviewed the data package associated with procedure 1-MISC-32, “Electrical Disturbance Report;”
- The inspectors monitored control room operator activities during the occurrence of peak solar geomagnetic disturbances on October 29, 2003. The inspectors observed that control room personnel were vigilant of power indicators in the control room and were kept informed of the grid conditions external to the plant by the system operator. The inspectors reminded the licensee about the existence of “NRC Information Notice 90-42, Failure of Electrical Power Equipment due to Solar Magnetic Disturbances;”,
- On December 9, a minor earthquake was felt at the site; however, the nearby earthquake was not strong enough to be recorded on control room seismic instrumentation. The 4.5 magnitude earthquake was centered about 30 miles SW of the North Anna plant. The inspectors immediately responded to observe operator actions in the control room and subsequent actions by the operating crew, management and engineering personnel. The inspectors accompanied an engineer during his walkdown of the upper three levels of the Auxiliary Building. During this walkdown, the inspectors assessed the adequacy of the licensee's walkdown to detect adverse impact the earthquake may have had on plant equipment and structures. The inspectors also independently evaluated the condition of equipment and structures during this walkdown. The inspectors subsequently reviewed the results of the licensee's complete plant walkdown.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors conducted reviews and held discussions with the appropriate licensee engineers, managers and operations personnel for the four operability determinations addressed in the plant issues listed below: The inspectors assessed the accuracy of the evaluations, the use and control of compensatory measures, and compliance with Technical Specifications (TS). The inspectors review included a verification that the

operability determinations were made as specified by Procedure VPAP-1408, "System Operability." The technical adequacy of the determinations was reviewed and compared to the TS, the Technical Requirements Manual and the UFSAR.

- N-2003-3739 Unit 1 B reactor trip breaker (P-4 interlock) catch finger was discovered to be bent during troubleshooting activity;
- N-2003-4019 Unit 2 recombiner failed to start during testing due to closed, normally open instrument line valves;
- N-2003-4337 Unit 1 gear box cooler rear channel head for the B charging pump was installed 90 degrees out; and
- N-2003-4053 Unit 1 boron injection tank was not lagged nor heat traced as per heat trace drawing.

b. Findings

No findings of significance were identified.

1R16 Operator WorkArounds (OWA)

a. Inspection Scope

The inspectors reviewed the cumulative effects of the licensee's OWAs and procedure 0-GOP-5.3, "Review of Operator Work Around." The inspectors reviewed the data package associated with this procedure which included an evaluation of the cumulative effect of the OWAs on the operators ability to safely operate the plant and effectively respond to abnormal and emergency plant conditions. Additionally, the inspectors discussed the OWAs with operations personnel to determine whether outstanding OWAs were reviewed in the aggregate on a periodic basis as required by VPAP-1401, "Conduct of Operations."

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

The inspectors reviewed the completed permanent modification DCP 03-127, Replace 1H Emergency Diesel Temperature Switches - Unit 1, that was implemented to improve the reliability of the EDG. The inspectors conducted a walkdown of the installations, discussed the desired reliability improvements with the system engineer, reviewed drawing T-EG-607H-2, reviewed the test plan and the modification package to assess Technical Specification implications, and evaluated the Safety Review/Regulatory Screening.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed the following post-maintenance test (PMT) procedures, WOs, and activities associated with the repair or replacement of the following components to determine that the procedures and test activities were adequate to verify operability and functional capability of the equipment:

- Procedure 2-PT-14.1, "Charging Pump 2CH-P-1A," and WO 492573-01 and WO 498145-01. The maintenance activity was associated with the replacement of the sheared shaft on the Unit 2 High Head Safety Injection System (Charging Pump) A pump;
- Procedure 1-PT-36.1B, "Train B Reactor Protection and ESF Logic Actuation Test," and DNAP 2000, attachment 5. The post maintenance procedure was associated with problems with the Unit 1 reactor trip breaker P-4 interlock;
- Procedure 1-PT-71.2Q, "1-FW-P-3A, A Motor-Driven AFW Pump and Valve Test," and WO-491305, "Annual Maintenance." This review followed post maintenance testing of the Unit 1 A Auxiliary Feedwater Pump after changing of the oil and lubrication of the shaft coupling;
- Procedure 1-PT-213.3, "Valve Inservice Inspection (Containment Atmosphere Cleanup System)," Plant Issue N-2003-4094 dealing with the H_2 analyzer valve 1-HC-TV-101A which failed to stroke, and WO-501430, "Replace/Repair Control Switch";
- Procedure 2-PT-63.1A, "Quench Spray System - A Subsystem," Procedure 2-PT-213.5H, "Valve Inservice Inspection (2-QS-MOV-201A)," and WO-486872-01, MOV inspection, cleaning and lubrication; and
- Procedure 1-PT-82.12, "Quarterly Test of 0-AAC-DG-OM, Alternate AC Diesel Generator (SBO Diesel), on E Transfer Bus," Plant Issue N-2003-4228, Breaker 0-AAC-BKR-04M1-2 failed to close during quarterly testing, 0-EPM-0304-04, "Testing Square D 480-volt Breaker Assemblies." and WO-486123, AAC 480V Breaker and Switchgear Checkout.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the four surveillance tests listed below, the inspectors examined the test procedure and either witnessed the testing and/or reviewed test records and data packages to determine whether the scope of testing adequately demonstrated that the affected equipment was functional and operable, and that the surveillance requirements of the technical specifications were met:

- 1-PT-64.1.1, “Unit 1A Outside Recirculation Spray Pump 1-RS-P-2A;”
- 1-PT-64.1.2, “Unit 1B Outside Recirculation Spray Pump 1-RS-P-2B;”
- 1-PT-64.4B, “Casing Cooling Pump (1-RS-P-3B);” and
- 2-PT-14.1, “Charging Pump 2-CH-P-1A.”

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the details of temporary modification (TM) NI-1727. This involved a temporary mounting bracket for the installation of a replacement start relay for the 1H emergency diesel generator. The temporary bracket was necessary due to the differences in mounting design of the replacement relay. Engineering will develop a design change package to install a permanent bracket.

The inspectors also reviewed the details of 0-GOP-4.2, “Extreme Cold Weather Operations,” a procedurally controlled temporary modification for the installation of herculite curtains in the 1J, 2H, and 2J emergency diesel generator (EDG) rooms. Space heaters were installed in Unit 1 and Unit 2 EDG rooms. The curtains and space heaters were installed due to low ambient outside temperature with the potential for affecting the EDG batteries and governors.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors reviewed the licensee’s Emergency Plan Implementing Procedures (EPIP) that provided guidelines for the classification, notification, and protective action recommendations (PAR) for the licensee’s emergency preparedness drill on November 12, 2003. The drill scenario was reviewed and the post drill critique was attended by the inspectors. The inspectors observed portions of the drill in the simulator control room, the technical support center, and the operations support center.

Additionally, the inspectors observed licensed operator simulator emergency preparedness training on November 21, 2003. The simulated emergency event involved the loss of all control room annunciators and the subsequent notifications to the state and local governments of the appropriate emergency action level (EAL). The inspectors

assessed the licensee's performance for the event classification by the Station Emergency Manager and the notifications provided to the state and local governments by the State and Local Communicator. The inspectors verified that the EAL classifications and the notifications were in accordance with the requirements of the EPIPs.

The documents reviewed included the following:

- EPIP-1.01, "Emergency Manager Controlling Procedure;"
- EPIP-1.06, "Protective Action Recommendations;"
- EPIP-2.01, "Notification of State and Local Governments;"
- EPIP-2.02, "Notification of NRC;
- Simulator Exercise Guide-5A, Spurious Reactor Trip with Loss of Annunciators
- 1 / 2 AP-6, "Loss of Main Control Room Annunciators,"
- Plant Issue N-2003-4076, TSC ambient airborne radiation monitor fails during EP drill; and
- Plant Issue N-2003-4251, Main Control Room State and Local Government communicator erroneously counted on EP performance indicator report.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

.1 Emergency Preparedness

a. Inspection Scope

The inspectors assessed the accuracy of the PI for the emergency response organization (ERO) drill and exercise performance (DEP) over the past eight quarters through review of a sample drill and exercise records focusing on the records for the second quarter of 2003. The inspectors reviewed sign-in rosters for selected drills against the ERO roster participation dates to determine the accuracy of the ERO drill participation PI. The inspectors assessed the accuracy of the PI for the alert and notification system reliability through reviews of a sample of the licensee's records of the bi-weekly silent tests and quarterly full-cycle tests. These PIs were for Unit 1 and Unit 2.

b. Findings

No findings of significance were identified.

.2 Mitigating Systems

a. Inspection Scope

The inspectors performed a periodic review of the following Unit 1 and 2 PIs in the mitigating systems cornerstone:

- Emergency AC power (SSU); and
- Residual heat removal system (SSU).

The inspectors reviewed data for the fourth quarter 2002 through the third quarter 2003 from the licensee's corrective action program, maintenance rule records, operating logs, and maintenance WOs. Discussions with the applicable system engineers, the PI data compiler and the maintenance rule coordinator were held by the inspectors regarding the reviewed data. The data was compared with that displayed on the NRC's public web site. The PI method of assessment was compared with the guidelines contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline."

During plant tours the inspectors also periodically assessed the Occupational Exposure Control Effectiveness and the RETS/ODCM Radiological Effluent Occurrence PIs by determining if high radiation areas (>1 R/hr) were properly secured and looking for unmonitored radiation release pathways.

b. Findings

No findings of significance were identified.

4OA2 Problem Identification and Resolution

.1 Condition Report Reviews and Attendance at Daily Screen Meetings

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's corrective action program. This review was accomplished by reviewing hard copies of each condition report, attending daily screening meetings, and accessing the licensee's computerized database.

.2 Focused Reviews

a. Inspection Scope

The inspectors performed focused reviews of the licensee's corrective action program (CAP) to access trends that might indicate the existence of more significant safety issues. This review included a review of the licensee's system health report, self assessment reports, and plant issues. As a result of the focused reviews, the inspectors assessed the following three issues in the licensee's CAP.

Fire main breaks

Plant issues and applicable root cause evaluations reviewed for fire main breaks included the following:

- N-2001-0327 Fire pumps started and would not shutdown. Underground leak on fire loop found on construction site side of hydrant;
- N-2001-0338 Roadway near steam generator storage building appears damaged as the result of fire main leak near roadside hydrant;
- N-2001-1956 During performance of fire pump testing a large break occurred in the fire main outside the auxiliary boiler room; and
- N-2003-4091 Rupture of 12 inch fire main north of Unit 3 construction area outside of protected area fence. It was discovered that the fire piping was not buried to a sufficient depth.

Wiring degradation

Plant issues and applicable root cause evaluations reviewed by the inspectors associated with wiring degradation issues included the following:

- N-2003-4070 While troubleshooting problems with the warehouse fire pump, control wiring was found degraded due to excessive heating. The heating also caused major degradation of the entire control system wiring circuitry;
- N-2003-2216 During condenser fan motor replacement, wiring for the control power was noted to be cracked in several places along the wiring insulation;
- N-2003-2660 During work on a Unit 2 control room ventilation system chiller high temperature thermostat, the condition of the thermostat's wiring was found degraded. Conductors were visible on both of the thermostat's leads and the insulation was worn;
- N-2003-3121 While working on a Unit 1 sample system compressor, craft noted that the wiring from the control panel was cracked and crimped connectors were loose; and
- N-2003-3377 The main dam spillway emergency diesel generator's engine instrumentation wiring bundles have degraded wiring jackets.

Reactor trip breakers failure to close

For Plant Issues N-2003-3727 (N-2003-3739 closed to N-2003-3727) and N-2003-2443 (N-2003-2447 closed to N-2003-2443) associated with reactor trip breakers' failure to close, the inspectors reviewed the plant issues to ensure:

- Complete and accurate identification of the problem in a timely manner commensurate with its significance;

- Evaluation and disposition of performance issues associated with maintenance effectiveness, including maintenance practices, work controls and risk assessment;
- Consideration of extent of condition, common cause and previous occurrences;
- Identification of root and contributing causes of the problem;
- Identification of corrective actions which are appropriately focused to correct the problem;
- Completion of corrective actions in a timely manner commensurate with the safety significance of the issue.

The inspectors also reviewed Station Level Assessment, SLA-02-11, "Root Cause Program Effectiveness," and discussed the quality of the subject plant issues with cognizant licensing, engineering and quality assurance personnel.

b. Findings and Observations

No findings of significance were identified. The inspectors identified that there was an increase in the number of fire main break problems due mainly to pipe and yard loop aging and original design and yard loop construction problems. The inspectors noted that the immediate concerns with the piping were addressed; however, a long-term fix to the problem remains an ongoing issue.

During the review of corrective actions for reactor trip breakers failing to close, the inspectors identified problems with corrective action documentation. One breaker's failure was attributed to a less durable manufactured latch. Although the licensee was planning to inspect the other reactor trip breakers for a similar condition, corrective actions documents generated, i.e., WOs and procedures, failed to incorporate this action. In addition, corrective actions documents did not completely document actions being taken to address the multiple failures to close. Specifically, the plan to evaluate other vendors to overhaul the reactor trip breakers was not incorporated in their corrective actions documentation. Normally for category 3 plant issues, a Station Nuclear Safety Operating Committee (SNSOC) review is not required; however, because of the increasing trend of closure failures, the subject plant issues were to be submitted to SNSOC. Discussions with nuclear safety oversight personnel revealed that they had identified an issue with quality of evaluations associated with category 1 and 2 plant issues submitted to SNSOC as documented in SLA-02-011. In the North Anna Power Station Performance Annunciator System the Root Cause Program was yellow in the fourth quarter 2002 and the first quarter of 2003 and white in the subsequent quarters. The inspectors concluded that the licensee continues to experience problems with the quality of evaluations.

4OA3 Event Followup

.1 (Closed) Licensee Event Report (LER) 05000338/2003004-00, Automatic Reactor Trip Due to Main Transformer Fault

The inspectors reviewed the licensee's corrective actions associated with a June 11th automatic reactor trip that occurred as a result of a C main transformer fault. The initiating signal was a main transformer lockout relay turbine trip resulting in a turbine trip/reactor trip. The cause of the transformer fault was an unused electrical lead (tap-changer lead) that became disengaged from the tap-changer and contacted the transformer casing. The cause of the event was attributed to improper cable assembly (mechanical termination) of the tap-changer cable during manufacture of the main transformer. As part of the licensee's response to this event, all other C transformer terminations were checked tight and all related terminations in the A and B main transformers were also checked tight. No new findings were identified in the inspectors's review. This item was placed in the licensee's corrective action program as plant issue N-2003-2322 and an associated licensee root cause evaluation was performed (N-2003-2322-E1).

.2 (Closed) LER 05000338/2003003-00, Manual Reactor Trip Due to Loss of Electro-hydraulic Control (EHC) System Pressure

The inspectors reviewed the licensee's corrective actions associated with an April 19th manual reactor trip that was initiated due to the loss of main turbine EHC system pressure. The cause of the EHC low pressure was attributed to part slippage in the diaphragm cover flange on the turbine auto stop oil EHC interface valve. A RTV sealant which was not applied in accordance with product instructions, became, in effect, a lubricant, rather than a sealant, on the flanges of the diaphragm cover. Applicable maintenance procedures were revised to inform licensee personnel that RTV was not longer to be used in diaphragm replacements. No new findings were identified in the inspectors's review. This is a minor violation not subject to formal enforcement. This item was placed in the licensee's corrective action program as PI N-2003-1761 and an associated licensee root cause evaluation was performed (N-2003-1761-E1).

.3 (Closed) LER 05000339/2003001-00, Automatic Reactor Trip Due to Steam Flow-Feed Flow Mismatch

The inspectors reviewed the licensee's corrective actions associated with a March 31st automatic reactor trip that was initiated due to a C steam generator low level coincident with a steam flow greater that feed flow mismatch that was caused by closure of the C main feed regulating valve. The cause of the C main feed regulating valve closure was a blown fuse on the valve's Westinghouse Series 7300 driver card. The card (with an originally manufactured fuse) was scheduled for replacement in the upcoming 2004 Unit 2 outage; however, due to fuse aging, the fuse failed. Recommended service life for all fuses is 15 years; however this fuse, being an originally installed fuse, may have been in service for over 22 years. As part of the licensee's response to this event, this specific card (with the failed fuse) was replaced, the cards on the related valves, A and B main

feed regulating valves, were also replaced, and the earlier established scheduled preventative maintenance program was checked to ensure replacement of aged cards. No new findings were identified in the inspectors's review. This is a minor violation not subject to formal enforcement. This item was placed in the licensee's corrective action program as PI N-2003-1449 and an associated licensee root cause evaluation was performed (N-2003-1449-E1).

4OA5 Other Activities

Observation of Dry Cask Loading (60855)

a. Inspection Scope

The inspectors observed: loading spent fuel assemblies into the spent fuel dry storage cask TN-32-41; verification of assemblies being loaded into the cask; setting the lid on the top of canister; verification of positive engagement of lifting devices being positioned; lifting of the loaded cask above the water surface; draining a small portion of water from the cask for the lid bolting; removing water from bolt holes; hand tightening lid bolts; draining the water from the cask; moving the loaded cask to the cask setting area by following the heavy load lifting path; drying the cask; and backfill with helium. Observations were compared to the licensee's procedures to ensure compliance. The inspectors also observed radiation protection controls and monitoring.

The inspectors reviewed required records and data contained in the working copy of the procedure. The inspectors reviewed TN-32-41 Independent Spent Fuel Storage Installation (ISFSI) Fuel Assembly and Insert Component Certification and Cask Loading Map to verify that the loaded assemblies met the Technical Specification TN-32 Cask Operating Limits. This documents contained the description and limits of the spent fuel assemblies to be placed in the canister, such as initial fuel enrichment, fuel burnup, decay heat, time discharged, fuel assembly design, time since discharged for burnable poison rods (BPRAs), and uranium content. The inspectors reviewed training certificates and qualification records for crane operators and cask loading operators. The inspectors reviewed spent fuel cask crane periodic inspection, function test, and maintenance records.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On January 13, 2004, the resident inspectors presented the inspection results to Mr. D. Jernigan and other members of his staff who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

D. Christian, Senior Vice President and Chief Nuclear Officer
K. Barnette, Supervisor, Site Industrial Safety/Fire Protection
J. Crossman, Supervisor, Nuclear Engineering
L. Lane, Director, Nuclear Safety and Licensing
E. Dryier, Supervisor Dosimetry
M. Dunston, Manager, Site Services
J. Davis, Site Vice President
D. Jernigan, Director, Nuclear Operations & Maintenance
P. Kemp, Manager, Operations
M. Lane, ALARA Supervisor
J. Leberstien, Supervisor Licensing
T. Maddy, Manager, Nuclear Protection Services
B. McBride, Supervisor, Emergency Preparedness
F. Mladen, Manager, Maintenance
N. Nichols, Staff Health Physicist
Q. Parker, Maintenance Rule Coordinator
W. Renz, Director, Nuclear Security and Emergency Preparedness
H. Royal, Manager, Nuclear Training
M. Sartain, Manager, Station Engineering
B. Speckine, Fuel Handling Supervisor
A. Stafford, Manager, Radiological Protection
M. Whalen, Supervisor Licensing

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

NONE

Closed

05000338/2003004-00	LER	Automatic Reactor Trip due to Main Transformer Fault (Section 4OA3.1)
05000338/2003003-00	LER	Manual Reactor Trip due to Loss of Electro-Hydraulic Control (EHC) System Pressure (Section 4OA3.2)
05000339/2003001-00	LER	Automatic Reactor Trip Due To Steam Flow-Feed Flow Mismatch (Section 4OA3.3)

Discussed

NONE

LIST OF DOCUMENTS REVIEWED

Section 4OA5: Other Activities

Observation of Dry Cask Loading (60855)

Procedures
0-OP-4.35,TN-32 Cask Loading and Handling, Revision 024
0-OP-4.38,Inspection and Maintenance of Dry Storage Cask Lifting Yoke and Lid Lifting Tools, Revision 001
0-PT-4.5, Inservice Inspection of Dry Cask Handling Tools, Revision 1
Dominion Augmented Inspection Manual Attachment 11, Special Lifting Devices, Revision 32

Miscellaneous Documents
TN-32 Certificate of Compliance 1021
Crane Operator and Quality Control Inspector Training Certificates and Qualification Records
North Anna ISFSI Fuel Assembly/Insert Component Certification TN-32-41, Revision 0
North Anna ISFSI Cask Loading Map TN-32-41, Revision 0
Work Order 00470448 for spent fuel crane inspection and test
Work Orders 00480953 and 00490008 for 125 ton main hook and 10 ton auxiliary hook inspection/lube semi-annual
Work Order 00468153 for 125 ton main hook and 10 ton auxiliary hook inspection/lube 5 year inspection
Work Order 00495518 for 125 ton main hook and 10 ton auxiliary hook wire rope inspection
Engineering Transmittal CCE-98-0008, Revision 0, Evaluation of the Fuel Building Trolley, 01-MH-CRN-15, for NUREG-0612, North Anna Units 1 & 2