UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

April 21, 2005

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 NOS. 05000338/2005002, 05000339/2005002 AND 07200016/2005001 AND ANNUAL ASSESSMENT MEETING SUMMARY

Dear Mr. Christian:

On March 31, 2005, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your North Anna Power Station, Units 1 and 2 and the North Anna Independent Spent Fuel Storage Installation. The enclosed integrated inspection report documents the inspection findings, which were discussed on March 22, 2005, with Mr. Larry Lane and other members of your staff. Additional items were discussed with either with Mr. Jerry Bischof or Mr. Larry Lane on March 28, April 8 and April 20, 2005.

The inspections 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 selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, no findings of significance were identified. However, two licensee-identified violations which were determined to be of very low safety significance are listed in Section 4OA7 of this report. If you contest these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the North Anna Power Station.

In accordance with 10 CFR 2.390 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 05000338/2005002, 05000339/2005002 and 07200016/2005-001 w/Attachment: Supplemental Information

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| NAME | Mking | GWilson | JLenahan | RChou | LGarner | | |
| DATE | 4/7/2005 | 4/20/2005 | 4/21/2005 | 4/21/2005 | 4/21/2005 | | |
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-338, 50-339, 72-016

License Nos.: NPF-4, NPF-7, SNM-2507

Report Nos.: 05000338/2005002, 05000339/2005002, 07200016/2005001

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: January 1, 2005 - March 31, 2005

Inspectors: M. King, Acting Senior Resident Inspector (January 1 - March 25)
G. Wilson, Resident Inspector
R. Chou, Reactor Inspector (Section 4OA5.2)
J. Lenahan, Senior Reactor Inspector (Section 4OA5.2)

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

Enclosure

## SUMMARY OF FINDINGS

IR 05000338/2005-002, IR 05000339/2005-002, IR 07200016/2005001; 01/01/2005 - 03/31/2005; North Anna Power Station Units 1 & 2, and North Anna Independent Spent Fuel Storage Installation. Routine integrated report.

The report covered a three-month period of inspection by the resident inspectors and a reactor and a senior reactor inspector from Region II. No findings were 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 Finding

No findings of significance were identified.

B. Licensee-Identified Violations

Two violations of very low safety significance, were identified by the licensee, and have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and corrective action tracking numbers are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 and Unit 2 began the inspection period at 100 percent power and remained at or near 100 percent power for the entire reporting period except for small power reductions to perform required periodic testing.

## 1. REACTOR SAFETY

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors performed two site specific weather related inspections due to the on-set of adverse weather conditions. On January 14, due to a tornado watch being issued during a heavy rain storm, the inspectors reviewed licensee response to these conditions and also performed a walkdown of outside areas (Unit 1 and 2 Refueling Water Storage Tanks level transmitter areas temporary tarp and heat lamp installation) for cold preparation prior to a rapid expected temperature drop of approximately 50 degrees F.

Additionally, the inspectors reviewed the licensee's response to cold weather with high winds affecting the 2H Emergency Diesel Generator (EDG) including a walkdown to assess the licensee's implementation of cold weather measures for the EDG rooms and licensee response to low lube oil temperature for the 2H EDG. The inspectors observed the condition of space heaters in all the EDG rooms being energized for protection of the governor controls as well as other room heaters, checked for cold weather herculite curtains being installed and properly closed. The inspectors also observed all EDG lube oil temperature indications to ensure the other EDGs were not negatively affected by the cold weather conditions and that 2H EDG lube oil temperature had been restored to normal. Inspection activities associated with plant issue documents related to 2H EDG low lube oil temperature issues due to weather conditions are documented in Section 4OA2.

Inspectors also reviewed Plant Issue N-2005-0201 (Operations unaware that the site was in a tornado watch on 1/14/05, from 0208 to 0504).

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

a. Inspection Scope

Partial System Walkdowns. The inspectors performed the following three 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 Quench Spray Train B during maintenance on "A" Quench Spray Pump;
- Unit 1 1H EDG during testing on 1J EDG; and,
- Unit 1 Component Cooling Water Train A during maintenance on B Component Cooling Water Heat Exchanger.

Complete System Walkdown. The inspectors performed a detailed walkdown and inspection of the Unit 1 Auxiliary Feedwater System outside of containment to determine if it was properly aligned and to identify discrepancies that could impact its availability and functional capability. The inspectors assessed the physical condition of the pumps, valves, pipe supports, and instrumentation. The inspection also included review of the alignment and the condition of support systems including steam supply, condensate storage tank, fire protection, room ventilation and emergency lighting. Equipment deficiency tags were reviewed and the condition of the system was discussed with engineering personnel. The operating procedures, drawings and other documents utilized and reviewed as part of the inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

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 nine areas:

- Emergency Diesel Generator 2H Unit 2 (fire zones 9A-2a/ EDG-2H);
- Charging Pump Cubicles 2-1A, and 2-1B (fire zones 11Da/ CPC-2A and 11Ea/ CPC-2B);
- Emergency Switchgear Room, Unit 1 and Unit 2 (fire zones 6-1a /ESR-1 and 6-2a / ESR-2);

- Turbine-Driven Auxiliary Feedwater Pump Room Unit 1 and Motor-Driven Auxiliary Feedwater Pump Room Unit 1 (fire zones 14A-1a / TDAFW-1 and 14B-1a / MDAFW-1);
- Cable Tray Spreading Room Unit 1 and Unit 2 (fire zones 4-1b/ CSR-1 and 4-2b/ CSR-2);
- Quench Spray Pump House and Safeguards Area Unit 1, including Z-16-2 (fire Zone 15-1a / QSPH-1;
- Emergency Diesel Generator 2J Unit 2 (fire zone 9B-2a / EDG-2J);
- Technical Support Center and Technical Support Center Battery Room (fire zones 46b / TCS and 46B / TCSBR); and,
- Battery Rooms 1 - II Unit 1, 2 - II Unit 2, 1 - IV Unit 1 and 2 - IV Unit 2 (fire zones 7B-1 / BR 1-II, 7B-2 / BR2-II, 7D-1 / BR1-IV, 7D-2 / BR2-IV).

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope (External Flooding)

The inspectors assessed the external flooding vulnerability of the safeguards and quench spray buildings, associated pump cubicles and piping tunnels. The inspectors verified that removable ceiling-mounted equipment hatch plugs were properly sealed or covered to address possible water in-leakage and flooding of safety-related components. Building and cubicle sump pump maintenance histories were reviewed to verify that pumps were fully functional and available.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed inspection records, test results, maintenance work orders, and other documentation to ensure that heat exchanger (Hx) deficiencies that could mask or degrade performance were identified and corrected. The test procedures and records were also reviewed to verify that these were consistent with Generic Letter 89-13 licensee commitments, and EPRI Heat Exchanger Performance Monitoring Guidelines. The risk significant Hxs reviewed included all four Component Cooling (CC) Hxs as well as a visual inspection of two CC Hxs when opened for cleaning during this quarter.

The inspectors reviewed CC Hxs inspection and cleaning procedures, completed work orders, design specification sheets, and tube plugging margins. These documents were reviewed to verify that test results were consistent with design acceptance criteria,

inspection methods and performance of the Hxs under the current maintenance frequency were adequate, and to verify minimum flow requirements and that Hx design bases were being maintained.

The inspectors also reviewed the general condition of the SW system by reviewing design basis documents, system health reports, self-assessments, plant issues documents, SW system data trending such as supply temperature and reservoir level, and held discussions with the SW system engineer. These documents were reviewed to verify design bases were being maintained and to verify adequate SW system performance under current preventive maintenance, chemical treatments, and inspection frequencies.

Plant issues were reviewed for potential common cause problems and other issues which could affect system performance to confirm that the licensee was entering problems into the corrective action program and initiating appropriate corrective actions. The inspectors reviewed Hx test condition reports regarding foreign material found during recent and past CC Hx inspections. In addition, the inspectors conducted a walk down of all four CC HXs and the SW system to assess general material condition and to identify any degraded conditions. Specific documents reviewed as part of the inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed annual Licensed Operator Requalification Examination on February 16, 2005. The scenario, Simulator Examination Guide SXG-34, involved a failed pressurizer pressure transmitter failing low, a first stage turbine pressure channel failing low followed by a small steam leak, and then a main steam line break with resulting reactor trip and safety injection. The train “A” SI and phase “A” appropriate actuation did not occur and A train equipment was required to be manually operated.

The scenario required classification and notifications that were counted for NRC performance indicator input. The inspectors observed crew performance in terms of communications; ability to take timely and proper actions; prioritizing, interpreting, and verifying alarms; correct use and implementation of procedures, including the alarm response procedures; timely control board operation and manipulation, including high-risk operator actions; and oversight and direction provided by the shift supervisor, including the ability to identify and implement appropriate TS actions. The inspectors observed the post training critique to determine that weaknesses or improvement areas revealed by the training were captured by the instructors and reviewed with the operators.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the two 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."

- Plant Issue N-2004-5064-E1, Instrument Air Compressor 1-1A-C-1 failed to start in hand due to timer failures / repeat maintenance preventable functional failure; and,
- Main steam dump to condenser valve issues, such as binding and not operating as expected, and a review of a Maintenance Rule performance criterion revision which deleted the unavailability performance criteria for the main steam dump valves. Specific plant issues reviewed as part of this inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

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 on planned and emergent work evaluations. The following six work items were inspected:

- Review of maintenance for week of January 10, 2005, including hinge/seal replacement as part of scheduled control room door work which was not assessed in the schedule or under the safety monitor. Plant Issue N-2005-0134 was written on this issue;
- Review of maintenance for week of January 17, 2005, including maintenance and surveillance testing on 1-QQS-MR-1A chiller checks, switchyard inspections 25B1 relay testing, Unit 2 CR Chiller to SB door mod 2-PT-35.11, and an

emergent surveillance test of the 1J EDG on January 21, 2005, due to a radiator leak;

- Review of maintenance for January 31, 2005, including maintenance and surveillance testing on 1-CC-E1B, 2-HV-P-22A, 1H EDG degraded voltage testing, Unit 2 Chiller Room door and 2-PT-14.3 on 1-CH-P-1C;
- Review of maintenance for the week of February 20, 2005, including 1-HV-E-4A, AMSAC testing, switchyard work and surveillance test 1-PT-82J;
- Review of maintenance for the week of February 14, 2005, including 1-CH-P-1B, 2-PT-82J, 1-PT-14.2, 1-HV-E-4A, and 2-FW-P-1C as well as scrub of door work for Unit 2 Emergency Switchgear which would have resulted in a yellow risk condition, Plant Issue N-2005-0625 was written on this issue; and,
- Review of maintenance for March 16, 2005, including 2-BLD-STR-554-11 door replacement resulting in a yellow risk condition.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-Routine Evolutions and Events

a. Inspection Scope

The inspectors evaluated operators' response for the non-routine event listed to ensure they were appropriate and in accordance with the required procedures. The inspectors also evaluated performance and equipment problems to ensure that they were entered the corrective action program.

The inspectors evaluated the response of the Unit 1 control room operators on March 22, 2005, for entry into abnormal procedure 0-AP5.2, " MGP Radiation Monitoring System" upon receipt of an alert and Hi alarms on the "B" Vent Stack Radiation monitor. The inspectors verified that the operators submitted a Plant Issue (N-2005-1121) and completed all actions required by the Offsite Dose Calculation Manual. The inspectors additionally discussed the event with control room operators and plant management.

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 six 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 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 Technical Specifications, the Technical Requirements Manual and the Updated Final Safety Analysis Report (UFSAR).

- N-2005-0037, grease was found to be mixed hard/pliable during disassembly/ inspection of 2-CH-P-1A pump to gear and motor to gear shaft couplings;
- N-2005-0101, 1H EDG developed a coolant leak on the non-control side where the jacket coolant inlet line goes into the engine, during performance of 1-PT-82A. The leak was spraying at full load and dripping at lower loads levels;
- N-2005-0966, yoke nuts on 2J EDG were overtorqued to 55 ft. pounds when procedure 0-MCM-0701-32 stated proper torque was 45 ft. pounds with a tolerance of plus 5 foot pounds;
- N-2005-1080, door change out 2-BLD-STR-S54-11;
- N-2005-0374, oil sample results on 2-EE-EG-2J for 2J EDG indicated high particle count and lower viscosity than expected; and,
- N-2005-1105, during inspection of Unit 1 and 2 containment penetration coolers, five leaks were identified.

b. Findings

No findings of significance were identified.

1R16 Operator Work-Arounds

a. Inspection Scope

The inspectors reviewed one licensee's operator workaround (OWA) regarding Recirculation Spray seal head tank high alarms. The inspectors reviewed the addition of OWA-107, " CVCS System Blender," and OWA-108, "Main Circulation Water Pump Elbow Priming Level Switches," to the licensee OWA list and discussed the added OWA with the licensee in the context of the licensee operator being able to perform the OWA during and following transients.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed the following six post-maintenance test (PMT) procedures, Work Orders (WOs), Plant Issues, 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 0-EPM-0302-04, “BBC/ITE 480-Volt K-Line Breaker 9 Year Inspection,” revision 414 per WO 52582901;
- Procedure 0-EPM-1401-05, “Outside Recirculation Spray Pump Inspection,” Rev. 4 per WO 52383301;
- Procedure PMT-LKT-EL-01, “Electrical Post Maintenance External Leakage Test,” per WO 0499640-01, following a generator oil change out on 2-EE-EG-2J for 2J EDG, reference Plant Issue N-2005-0387 no baseline PMT oil sample taken;
- Procedure 0-MCM-0400-9, “Packing Adjustment of Safety-Related Air Operator Valves,” Rev 10 per WO 52810201 and EMR 80-150;
- Procedure 1-PT-77.11A, “Control Room Chiller 1-HV-E-4A Pump and Valve Test (One Time Only Change 2),” following the removal of 1-HV-SOV-1200A per TM 2005-1753 and associated WO 528016-02; and,
- Procedure 1-FW-P-1B, “Testing for Maintenance on Seal Oil Cooler and Outboard Seal," per WOs 50127701, 50127801, 52776601 and 5213201.

b. Findings

One licensee-identified violation related to Plant Issue N-2005-0387 was reviewed and is documented in Section 4OA7.

1R22 Surveillance Testing

a. Inspection Scope

For the six surveillance tests listed below, the inspectors examined the test procedure and witnessed testing, and 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-213.9, “Valve Inservice Inspection (1-S1-TV-1842),” stroke test of safety injection valves;
- 1-PT-14.1, “Charging Pump (1-CH-P-1A) Periodic Test;”
- 1-PT-82J, “1J Emergency Diesel Generator Slow Start Test”, note this surveillance run for 1J EDG schedule was pulled up due to radiator leak issue on Plant Issue N-2005-0306;
- 0-PT-82.11, “Quarterly Test of 0-AAC-DG-OM Alternate AC Diesel Generator (SBO Diesel), on D Transfer Bus;”
- 1-PT-36Q, “AMSAC Functional Test;” and,
- 1-PT-71.1Q, 1-FW-P-2, “Turbine Driven Auxiliary Feedwater Pump and Valve Test”

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the three listed temporary plant modifications to verify that the modification did not affect system operability or availability as described by the TS and UFSAR. In addition, the inspectors verified that the installations of the temporary modifications were in accordance with the work package, that adequate control was in place, procedures and drawings were updated, and post-installation tests verified the operability of the affected systems.

- Procedural Temporary Modification per 0-GOP-4.2A, Attachment 17, "General Operating Procedure - Extreme Cold Weather Preparations Daily Checks," for the installation of space heaters in 1H, 1J, 2H, and 2J, and the Station Black Out EDGs, as well as herculite curtains in 1J, 2H, and 2J EDG rooms to maintain governor temperatures greater than 65 degrees F;
- Temporary Modification (TM) 2005-1753 Unit 1 for the removal of 1-HV-SOV-1200A and the replacement with ½" union spool piece for seal injection to 1-HV-P-22A SW supply to main control room and emergency switchgear room chiller (HVAC); and,
- Temporary Modification (TM) 2005-1754 Unit 1 for the installation of a closing spring (internal) to 1-CH-240 to assist in seating the check valve.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**

1EP6 Drill Evaluation

a. Inspection Scope

On March 1, 2005, the inspectors reviewed and observed the performance of an Emergency Planning Drill that involved a simulated fuel failure event, main steam trip valve failure, automatic reactor trip, main steam safety valve failure, manual safety injection, and loss of 1J emergency bus and re-energization by 1J EDG. The inspectors assessed emergency procedure usage, emergency plan classification, notifications, protective action recommendations, and the licensee's identification and entrance of any drill problems into their corrective action program. This inspection evaluated the adequacy of the licensee's conduct of the drill and critique performance. Drill issues were captured by the licensee in Plant Issue N-2005-0823 and were reviewed by the inspectors.

b. Findings

No findings of significance were identified.

## 4. OTHER ACTIVITIES

### 4OA2 Identification and Resolution of Problems

#### .1 Daily Reviews

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 daily Plant Issues Summary Reports and periodically attending daily Plant Issue Review Team meetings.

#### .2 Annual Sample Review

Lube Oil Control Issues

a. Inspection Scope

While reviewing the extend of condition for Plant Issue N-2005-0374, January 27, 2005, high particle count in the generator bearing oil for the 2J EDG, the inspectors noted five other plant issues involving high particulates and twelve other plant issues associated with lube oil control. These issues all documented problems with verifying correct oil for replacement, oil sampling results, new oil cross-contamination, or other oil-related issues. These plant issues are listed in the Attachment. The inspectors evaluated whether the conditions adverse to quality were promptly identified, the cause and extent of condition (including common cause) determined, and if corrective actions taken to prevent recurrence were effective, timely and commensurate with the safety significance of the issue.

b. Findings and Observations

Oil control process issues were reviewed by the inspectors. Independently the licensee self-identified these same concerns and entered them into their corrective action program. One licensee-identified violation was reviewed and documented in Section 4OA7.

Following discovery of a high particulate count in the 2J EDG generator bearing oil sample on January 27, the inspectors reviewed the licensee's continuing efforts to address concerns related to their oil control process (including sampling, analysis, and control of the quality of new oil being disbursed for use in safety-related plant equipment). These oil related conditions had been entered into the licensees corrective action program since 2003. The inspectors noted the licensee had taken numerous corrective actions. However, these completed corrective actions have not adequately addressed the condition and been ineffective in preventing recurrence. This resulted in the licensee again having to enter the issue into their corrective action program in 2005 under Plant Issue N-2005-0573, "A negative trend noted in the station lubrication

program and oil control process regarding document control, disbursement, sampling and analysis." Similar issues had already been entered and addressed in the corrective action program under Plant Issues N-2004-0944 and N-2004-2988.

The inspectors were concerned that corrective actions have been limited in scope and that corrective actions sometimes have relied upon ineffective previous actions implemented per already closed plant issues. The inspectors confirmed the licensee had issued a detailed assignment under Plant Issue N-2004-0944-E1 on March 25, 2004, with a completion due date expected of April 24, 2004 to "Address programmatic issues between NSS, Materials, Maintenance, and Engineering regarding proper identification of lubricants and installing the proper lubricant into the proper component." Additionally, in August 2004 a new Plant Issue N-2004-2998, "New oil from storage containers was not free of debris," identified that changes to the process controls for storing and transporting of oil used in plant components were needed to reduce potential for cross-contamination of oil (high particulate issues). The licensee's responses to these issues, however, have been ineffective at preventing recurrence of these oil related issues. Additionally, the inspectors concluded the overall licensee corrective actions for oil related problems have not been timely and commensurate with the potential safety-significance involved (common mode failure of safety-related /risk significant pumps and safety-related EDGs due to incorrect lubrication and/or cross-contamination).

This issue is more than minor because if left uncorrected it would become a more significant safety concern. The inspectors concluded that given the components involved and their safety significance (i.e., safety-related charging pumps, recirculation spray pumps and emergency diesel generators) the licensee corrective actions for oil related problems were not commensurate with the risk significance for the components involved and had been ineffective to preclude repetition. Effective programmatic controls of oil used in safety-related components are needed to ensure the availability, reliability and long term capability of these components. The issue was determined to be of very low safety significance because while oil samples had been missed, and cross-contamination of new oil had occurred (i.e., high particulate counts in safety-related EDG oil) and oil labeling issues had occurred repetitively they had not resulted in inoperability or excessive additional unavailability of a safety-related components. Because the licensee also self-identified these issues and has documented this issue into their corrective action program under Plant Issue N-2005-0573, "A negative trend noted in the station lubrication program and oil control process regarding document control, disbursement, sampling and analysis," this finding is being dispositioned as a licensee-identified violation in Section 4OA7.

2H EDG Low Lube Oil Temperatures

a. Inspection Scope

The inspectors reviewed the Plant Issues N-2005-0845 and N-2005-0861 associated with March 2005 cold weather induced low lube oil temperatures on the 2H EDG. The extent of condition, the root and contributing causes, and effectiveness and timeliness of

corrective actions were evaluated. In addition, the adequacy of previous corrective actions associated with a similar event in January 2005 (Plant Issue N-2005-0310) were also reviewed. Specific documents reviewed as part of this inspection are listed in the Attachment.

b. Findings and Observations

No findings of significance were identified. The 2H EDG remained operable during the events. However, the inspectors noted that corrective actions had not been totally effective in precluding cold weather conditions from causing low lube oil temperature alarms on the 2H EDG.

On January 23, 2005, during cold weather conditions, the control room operators were notified that lube oil temperatures for the 2H EDG had decreased due to lowering diesel room temperatures. Further investigation revealed that the room heater 1-HV-UH-56B was not functioning properly and contributed to the lowering lube oil temperatures and potential for inoperability of the 2H EDG. The licensee entered this condition into their corrective action program under Plant Issue N-2005-0310 and actions were taken to evaluate this condition. Twice on March 2, 2005, cold weather conditions similar to those encountered during January again affected the 2H EDG lube oil temperature. The 2H EDG room heater 1-HV-UH-56B was again not functioning properly to help maintain the diesel room warm and lube oil temperatures had decreased slightly below the alarm setpoint. The licensee is evaluating actions to: improve the reliability and availability of room heater 1-HV-UH-56B; provide additional wind protection; and, provide additional temporary room heating, if necessary.

4OA5 Other Activities

.1 INPO/WANO Report Review

On January 27, 2005, the Acting Senior Resident Inspector and Chief, Reactor Projects Branch 5 reviewed the final version of the Institute of Nuclear Power Operations/ World Association of Nuclear Operators (INPO / WANO) Peer Review Final Report of North Anna Nuclear Power Station report, received under cover letter dated March 24, 2004.

.2 (Closed) Inspection Followup Item (IFI) 05000338, 339/1999008-01, Availability of Safety Related Pipe Support Design Calculations

This IFI was identified during a followup inspection for Violation 50-338, 339/1998005-01, Failure to Construct Pipe Supports in Accordance with Design Requirements. During review of the licensee's actions to correct the violation, the inspectors requested copies of additional pipe support calculations to review the weld design margin available for existing pipe supports. When licensee engineers attempted to retrieve these calculations from their design records they discovered the calculations were not available. Further discussions with licensee engineers disclosed that they did not have copies within their quality records system of any of these original pipe support calculations. The inspectors noted that Inspection and Enforcement Bulletin 79-14,

"Seismic Analyses for As-Built Safety Related Piping Systems," issued by the NRC on July 2, 1979, recommended that licensees maintain documents, including design calculations, which reflect as-built conditions for piping systems. The licensee documented this concern in their corrective action program under Plant Issue N-2000-0303. For disposition of the plant issue, the licensee determined that no short term actions were required since the plant had been designed under a 10CFR50, Appendix B quality assurance program. Initially, licensee engineers had been unable to locate the original design calculations.

During the current inspection, the inspectors discussed the availability of calculations used to document design safety-related piping during plant construction. These discussions disclosed that the licensee has been able to retrieve a large number of construction era piping calculations, including piping stress analyses, pipe support calculations, and calculations evaluating design changes, field change requests and construction deficiencies. The licensee also has calculations for design of modifications implemented since start of plant operation to numerous piping systems. The licensee printed lists of calculations which included the calculation number and subject/title for the inspectors to review. The inspectors randomly selected various piping stress calculations and pipe support calculations for review. The inspectors also reviewed the licensee's design control procedures for performing piping stress analysis and design of pipe supports. In addition, the inspectors reviewed selected plant issues associated with pipe support deficiencies identified since the year 2000. The inspectors concluded that the licensee had adequate documentation to support design of the piping and supports. IFI 05000338, 339/1999008-01 is closed.

.3 Review of the Operation of an Independent Spent Fuel Storage Installation (60855)

a. Inspection Scope

Inspectors reviewed the normal operations of the Independent Spent Fuel Storage Installation (ISFSI). Inspectors walked down the ISFSI pad to assess the material condition of the casks, the installation of security equipment, and the performance of the monitoring systems. In preparation for an upcoming cask loading the inspectors reviewed licensee cask loading and handling procedures and reviewed previous cask loading and ISFSI related plant issues and corrective actions status. The inspectors also reviewed bridge crane lubrication / inspection work orders completion data and calibration data sheets for equipment that would be used during cask loading. Specific documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

4OA6 Meetings, including Exit

On March 22, 2005, the acting senior resident inspector presented the inspection results to Mr. Larry Lane and other members of the staff. The resident inspector discussed

additional items with either Mr. Jerry Bischof or Mr. Larry Lane on March 28, April 8 and April 20, 2005. The licensee acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

.2 Annual Assessment Meeting

On March 29, 2005, the NRC Chief of Reactor Projects Branch 5 met with Virginia Electric and Power Company to discuss the NRC's Reactor Oversight Process (ROP) and the North Anna Power Station annual assessment of safety performance for the period of January 1, 2004 - December 31, 2004. Attendees included corporate and site management, site staff and members of the local news media.

This meeting was open to the public. The presentation material used for the discussion is available from the NRC's document system (ADAMS) as accession number ML051030203. ADAMS is accessible from the NRC Web site as http://www.nrc.gov/reading-rm/adams.html (the Public Reading Room).

4OA7 Licensee-Identified Violations

The following findings of very low significance were identified by the licensee and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCVs.

.1 TS 5.4.1 states, in part, that written procedures shall be implemented to cover activities specified in Regulatory Guide (RG) 1.33, Revision 2, Appendix A, February 1978. RG 1.33, Appendix A, Item 9e , requires that maintenance affecting the performance of safety-related equipment be properly performed in accordance with written procedures appropriate to the circumstances. Work Order (WO) 499640-01 required a post maintenance test of the 2J EDG following generator bearing oil change out on October 28, 2004. This work order required per Electrical Post Maintenance External Leakage Test, PMT-LKT-EL-01, a specified PMT for oil change out including a base line oil sample and analysis following a post maintenance EDG run. Contrary to the above requirements an oil sample was not taken and analyzed. Additionally, the licensee subsequently identified that for WO 481133 (1H EDG) and WO 498914 (2H EDG) the PMT generator bearing oil samples had also not been taken and analyzed following oil change outs. These deficiencies are of very low safety significance because operability of the emergency diesel generators was still maintained. This deficiency is entered into the licensee's corrective action program under Plant Issue N-2005-0387.

.2 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," in part, requires that measures shall be established to assure that conditions adverse to quality, such as deficiencies, deviations and non-conformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. Contrary to the above, the licensee failed to preclude repetition of significant conditions adverse to quality, in that, during 2003 and 2004 numerous deficiencies with the oil

control process for safety-related components were identified and repetitive deficiencies were again identified in 2005. These repetitive oil control process deficiencies are of very low safety significance because they have not resulted in safety-related equipment inoperability or excessive unavailability. This deficiency is entered in the licensee's corrective action program under Plant Issue N-2005-0573.

## SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

Licensee personnel

G. Bischof, Director, Nuclear Safety and Licensing
W. Corbin, Director, Nuclear Engineering
J. Crossman, Assistant Manager, Nuclear Operations
J. Davis, Site Vice President
R. Evans, Manager, Radiological Protection
R. Foster, Supply Chain Manager
S. Hughes, Manager, Nuclear Operations
P. Kemp, Supervisor, Nuclear Safety & Licensing
J. Kirkpatrick, Manager, Maintenance
L. Lane, Director, Operations and Maintenance
J. Leberstien, Licensing Technical Advisor
T. Maddy, Manager, Nuclear Protection Services
F. Mladen, Manager, Nuclear Site Services
B. Morrison, Assistant Engineering Manager
H. Royal, Manager, Nuclear Training
M. Sartain, Manager, Nuclear Engineering

## LIST OF ITEMS OPENED AND CLOSED

Opened
None

Closed

| | | |
|---|---|---|
| 05000338, 339/1999008-01 | IFI | Availability of Safety Related Pipe Support Design Calculations (Section 4OA5.3) |

## LIST OF DOCUMENTS REVIEWED

### Section 1R04: Equipment Alignment

Documents

- 1175-FM-079A, Component Cooling Water System, revision 30
- Procedure 1-OP-51.1A, Component Cooling Water Valve Checkoff, revision 18
- UFSAR, Section 9.2, Component Cooling Water System, revision 34
- Design Basis Documents, Component Water Cooling Water, revision 5
- NUREG/CR-5837 - AFW System Risk-Based Inspection Guide for North Anna
- Auxiliary Feedwater System Drawing 11715-FM-074A
- Plant Issue N-2004-0133, 1-FW-P-2 PT, 1-FW-P-2 had to be secured due to leak on 1-FW-FI-103
- Plant Issue N-2005-0269, Turbine driven AFW pump discharge check valve was found leaking from hinge pin bolt

- Plant Issue N-2003-2932, Steam driven aux feed pump discharge check valve was leaking while pump was running
- Root Cause Evaluation S-2004-1932
- UFSAR Section 10.4.3
- Information Notice 2004-01: AFW Pump Recirculation Line Orifice Fouling

**Section 1R07: Heat Sink Performance**

Procedures

- VPAP-0811, Service Water System Inspection and Maintenance Program, Rev 4
- Assessment ITC-SA-04-29, Dominion GL 89-13 Program Service Water System Problems Affecting Safety-Related Equipment, dated 04/05 - 08/04
- 0-PT-115, Survey of Settlement Monitoring Points, Rev 5, completed 10/04/04
- 0-PT-75.12, Visual Inspection of the Service Water Reservoir Dike Crest and Toe, Rev 3, completed 11/12/04
- 0-PT-75.8, Service Water Reservoir Loss Monitoring Procedure, completed 12/17/04
- 0-PT-75.7, Service Water Reservoir Ground Water Level, completed 12/8/04
- 0-PT-75.6.2, Service Water Pump House Drain System: Flow Rate and Clarity, completed 09/01/04
- 0-PT-75.15, Generic Letter 89-13 Service Water System Testing Requirements Coordination, dated 09/02/04
- 2-PT-74B, Component Cooling Heat Exchanger
- 2-CC-E-1B, Performance Test, performed 06/29/04
- 0-MCM-0801-01, Heat Exchanger Inspection Report, Rev 16, dated 01/31/05
- 0-MCM-0801-01, Heat Exchanger Inspection Report, Rev 15, dated 01/24/05

Documents

- Pitting Corrosion of Stainless Steel Service Water Components, dated 08/31/1999
- Category 1 Root Cause Evaluation RCE Report –99-0587
- Calculation ME-530, Component Cooling Heat Exchanger Tube Plugging Study, dated 02/10/97
- North Anna Site Engineering Services Implementing Procedure GL 89-13 Programs, dated 10/03/03
- Technical Report ME-0025, NRC GL 89-13 Activities, Rev 2, dated 12/05/94
- Technical Report ME-0026, Service Water Single Failure Review, Rev 2, dated 06/17/03
- ET SE 98-010. Discontinuing the Periodic Flush of SW System Pipelines that Supply the AFW Pumps Suction Pipelines NAPS Units 1 & 2, Rev 0, dated 03/09/98

**Section 1R12: Maintenance Effectiveness**

Plant Issues

- N-2001-3604, Unit 2 Steam Dump Failures

- N-2003-0401, During Low Power Operation on Unit 2, “B” MS Dump Valve Started Oscillating Severely
- N-2003-1126, Valve Stem Sheared and Separated from Actuator During Performance of as-found Diagnostic Testing
- N-2003-2329, During Unit 1 Reactor Trip, Main Steam Dump Valves did not Operate as Expected
- N-2004-1532, Foreign Material Discovered Inside the Unit 2 B Steam Dump Valve
- N-2004-4366, Level and Steam Flow Increased on all 3 Steam S/G

**Section 4OA2: Identification and Resolution of Problems**

Lube Oil Control Issues

Plant Issues

- N-2005-0932, oil sample results have a high particle count and also has iron and copper particles present in oil
- N-2005-0432, oil sample for generator bearing reached first alarm setpoint for particle count
- N-2005-0374, oil sample analysis results for generator bearing indicated high particle count at 18048 particles per ml
- N-2005-0251, oil sample results for generator bearing is in the alarm range
- N-2004-2887, gearbox fan oil sample has visible ferrous particles present

2H EDG Low Lube Oil Temperatures

Plant Issues

- N-2003-3097, Oil cubicle for the recirculation spray pump 2B has incorrect stock number for the oil listed. Issue of correct oil and grease is a serious issue;
- N-2003-3724, during Nuclear Oversight Vice President Brief it was identified lubricant bins and cans were labeled differently (one digit missing from stock number compared to bin number). This could set up craft personnel for failure;
- N-2004-0944, Lube oil (LO) manual calls for a certain type of oil but gives different stock number, LO manual creates an error-likely situation for personnel;
- N-2004-1173, Correct lube oil information not available, oil cannot be added to pumps without this information available to operators, repeat occurrence;
- N-2004-2988, New oil storage containers are not free of debris (oil in question was to be used for a safety-related charging pump motor);
- N-2004-3002, Oil from new barrel found to have dirt and grit when filtered. Investigation revealed sample equipment suspected of cross-contamination;
- N-2005-0387, No baseline oil sample taken for the PMT requirement after oil change out of the 2J EDG generator bearing oil (either sample not taken or lost);
- N-2005-0489, Received two samples labeled gearbox fan reservoir and none for the generator bearing reservoir (mislabeling issue with the 2H EDG oil samples);
- N-2005-0559, After new oil being added to the 1H EDG was strained through a paper funnel with a screen, the paper funnel was full of particles and debris;

- N-2005-0573, A negative trend noted in the station lubrication program and oil control process regarding document control, disbursement, sampling and analysis;
- N-2005-0606, Lube oil manual stock # and noun description don't match up, very confusing to craft personnel and an error precursor;
- N-2005-0754, Lube oil manual discrepancies for feedwater manual valves could lead craft personnel to install the incorrect lubricant into these valve yokes; and,
- N-2005-0981,Oil sample from 1-EE-EG-1H (1H EDG generator bearing oil) obviously darker than oil replacement.

Additional Plant Issues Associated With High Particulates

- N-2003-4046, Lube oil temperature at strainer outlet on 1H and 2H was at 111 and 112 degrees F
- N-2004-1073, due to high winds and below normal outside temperature, 0-GOP-4.2 needed to be reinitiated for EDG rooms
- N-2004-5052, 2H EDG room temperature decreased approximately 15 degrees due to changes in ambient temperature
- N-2005-0861, 2H EDG lube oil strainer outlet temperature decreased at 109 degrees F due to low outside ambient temperature and high wind condition
- N-2004-2263, louvers did not close after diesel run

**Section 4OA5: Other Activities - Operation of an ISFSI (60855)**

Documents

- Procedure 0-OP-4.35, TN-32 Cask Loading and Handling
- 0-ECM-2004-01, TN-32 Cask Pressure Switch Alarm Installation and Removal
- 0-ICP-MIS-G-001, Calibration Data Sheets for 0-HVD-PI-108, 0-HVD-PT/PI-108, 0-HVD-PI-109, and 0-HVD-PT/PI-109

Plant Issues

- N-1999-1647, chemistry did not independently determine SFP and cask pit boron concentration within four hours of loading fuel
- N-1999-1701, while moving cask from impact limiter in fuel building to spent fuel cask pit, the cask nearly contacted the upper structure of the fuel building
- N-1999-3101, two mechanical maintenance employees exceeded 24 hours in a 48 hours period without prior approval
- N-2001-2158, alarm received at ISFSI cask alarm panel at decon bay
- N-2002-0221-E1, 0-HVD-PI-109 was not calibrated within 90 days of the caskload as required
- N-2002-2038-E1, dry cask storage TN-32-30 was indicating a low pressure in the OP system as indicated by the alarm monitor
- N-2004-0356-E1, operator removed the fill hose before removing the quick connect fitting causing helium to escape from dry storage cask TN-32-42
- N-2004-0794-E1, a 3 inch edge of sacrificial brass bearing surface of lift beam was rolled indicating trunnion surface was not fully seated in lift beam saddle

Work Orders

- WO 00515307
- WO 00518708
- WO 00522724
- WO 00522883
- WO 00526437
- WO 00527764