



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

January 28, 2010

Mr. David A. Heacock
President and Chief Nuclear Officer
Virginia Electric and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060

**SUBJECT: NORTH ANNA POWER STATION – NRC INTEGRATED INSPECTION
REPORT 05000338/2009005 AND 05000339/2009005**

Dear Mr. Heacock:

On December 31, 2009, the U. S. 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 25, 2010, with Mr. Daniel Stoddard and other members of your staff.

The inspection examined activities conducted under your licenses as they related 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.

This report documents one self-revealing finding of very low safety significance (Green) which was determined to be a violation of NRC requirements. However, because of the very low safety significance of this issue and because it was entered into your corrective action program, the NRC is treating this as a non-cited violation (NCV) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you wish to contest this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the North Anna Power Station.

Additionally, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at the North Anna Power Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

VEPCO

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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 the 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/

Gerald J. McCoy, Chief
Reactor Projects Branch 5
Division of Reactor Projects

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

Enclosure: Inspection Report 05000338/2009005 and 05000339/2009005
w/ Attachment: Supplemental Information

cc w/ encl. (See next page)

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Letter to David A. Heacock from Gerald J. McCoy dated January 28, 2010

SUBJECT: NORTH ANNA POWER STATION – NRC INTEGRATED INSPECTION
REPORT 05000338/2009005 AND 05000339/2009005

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-338, 50-339

License Nos.: NPF-4, NPF-7

Report No: 05000338/2009005 and 05000339/2009005

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: North Anna Power Station, Units 1 & 2

Location: 1022 Haley Drive
Mineral, Virginia 23117

Dates: October 1, 2009 through December 31, 2009

Inspectors: J. Reece, Senior Resident Inspector
R. Clagg, Resident Inspector

Approved by: Gerald J. McCoy, Chief
Reactor Projects Branch 5
Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000338/2009-005, 05000339/2009-005; 10/01/2009 – 12/31/2009; North Anna Power Station, Units 1 and 2; Routine Integrated Inspection Report and Event Follow-up.

The report covered a 3-month period of inspection by resident inspectors. One finding, which was a non-cited violation (NCV), was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspect, if applicable, is determined using IMC 0305, "Operating Reactor Assessment Program." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Initiating Events

Green. A Green, self-revealing, non-cited violation of TS 5.4.1a was identified for the failure to adequately establish procedural requirements for component cooling (CC) water flow through the Unit 1 excess letdown heat exchanger (Hx) which resulted in a cracked Hx tube and excessive reactor coolant system (RCS) leakage when placing the Hx in service. The licensee entered this problem into their corrective action program as condition report 354523.

This finding had a credible impact on safety due to continuous, excessive CC flow through the excess letdown Hx which caused a tube crack that allowed excessive intersystem leakage from the reactor coolant system (RCS) at approximately 60 gallons per minute for the 4 minutes in which the excess letdown heat exchanger was in service. The finding was more than minor because if left uncorrected it would have the potential to result in a more significant event involving multiple tube cracks with consequent leakage exceeding the capacity of a charging pump. In accordance with NRC inspection manual chapter (IMC) 0609, "Significant Determination Process," the inspectors performed a phase 1 analysis and determined the finding required a phase 2 analysis by a regional senior reactor analyst (SRA) due to the finding resulting in RCS leakage that exceeded TS limits. The finding resulted in an intersystem leak from the RCS system into the CC system when the excess letdown Hx was placed into service; however, an intersystem LOCA was not addressed in the pre-solved risk table, therefore a phase 3 analysis was performed by the SRA in accordance with the guidance of NRC IMC 0609, Appendix A. The SDP phase 3 risk evaluation resulted in a risk increase for the finding of less than 1E-6 for core damage frequency and less than 1E-7 for large early release frequency. The dominant sequence was an RCS leak into the CC system due to tube leakage in the excess letdown Hx when excess letdown was initiated, coupled with a failure of the charging function and a failure to isolate the leakage. Therefore, the finding was characterized as of very low safety significance (Green). The risk was low due to

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the magnitude of the leakage, which was less than the makeup capability of 1 charging pump, the availability of charging pumps to mitigate the leakage, and the high probability of accomplishing letdown isolation given the multiple operator cues and time availability. The finding had no cross-cutting aspects due to its legacy nature. (Section 4OA3)

B. Licensee-Identified Violations

A violation of very low safety significance, which was identified by the licensee, was 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 its associated corrective actions are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at full Rated Thermal Power (RTP) and operated at or near full power until a forced outage on October 23, 2009, due to an inoperable containment penetration. The unit returned to full power operation on October 30, 2009, and operated at or near full power for the remainder of the period.

Unit 2 began the inspection period at full RTP and operated at or near full power until an automatic reactor trip on December 9, 2009, due to a turbine trip following a low vacuum condition in the main condenser. The unit returned to full power operation on December 13, 2009, and operated at or near full power for the remainder of the period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

.1 Seasonal Susceptibilities

a. Inspection Scope

The inspectors reviewed the licensee's adverse weather preparations for cold weather operations specified in 0-GOP-4, "Cold Weather Operations," Revision 45, and the licensee's corrective action data base for cold weather related issues. The inspectors walked down the risk-significant areas listed below to verify compliance with procedural requirements and to verify that the specified actions provided the necessary protection for the applicable structures, systems, or components (SSCs). The inspectors reviewed the licensee's corrective action program (CAP) database to verify that weather related problems due to temperature were being identified at the appropriate level, entered into the CAP, and appropriately resolved.

- Unit 1 and 2 Auxiliary Feedwater Rooms
- Unit 1 and 2 Refueling Water Storage Tanks

b. Findings

No findings of significance were identified.

.2 External Flooding

a. Inspection Scope

The inspectors inspected the west side station flood protection dike, related culverts, and drainage ditches, to assess the external flood vulnerability of the North Anna site. The

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inspectors verified the condition of the station flood protection dike, related culverts, and drainage ditches. The inspectors also reviewed applicable station procedures and design documents to assess proper surveillance and maintenance for external flood protection features.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial Walkdowns

a. Inspection Scope

The inspectors conducted two equipment alignment partial walkdowns to evaluate the operability of selected redundant trains or backup systems, listed below, with the other train or system inoperable or out of service. The inspectors reviewed the functional system descriptions, Updated Final Safety Analysis Report (UFSAR), system operating procedures, and Technical Specifications (TS) to determine correct system lineups for the current plant conditions. The inspectors performed walkdowns of the systems to verify that critical components were properly aligned and to identify any discrepancies which could affect operability of the redundant train or backup system.

- 2H emergency diesel generator (EDG) and related support components during 2J EDG maintenance
- 1J EDG and related support components during emergent work on 1H EDG

b. Findings

No findings of significance were identified

.2 Complete Walkdown

a. Inspection Scope

The inspectors performed a detailed walkdown and inspection of the Units 1 and 2 vital and emergency electrical distribution system associated with the station batteries, related chargers, and 125VDC busses to assess proper alignment and to identify discrepancies that could impact its availability and functional capacity. The inspectors assessed the physical condition and position of related risk significant components based on guidance from internal NRC risk documentation, related TS, UFSAR, and design bases documents. The inspection also included a review of the alignment and the condition of support systems including fire protection, room ventilation, and emergency lighting. Equipment deficiency tags were reviewed as well as the work history and CAP documentation.

b. Findings

An unresolved item (URI) was identified by the inspectors and is discussed in Section 1R15 of this report.

1R05 Fire Protection

.1 Fire Protection – Tours

a. Inspection Scope

The inspectors conducted tours of the five areas listed below that are important to reactor safety to verify the licensee's implementation of fire protection requirements as described in licensee procedures CM-AA-FPA-100, "Fire Protection/Appendix R (Fire Safe Shutdown) Program," Revision 0, CM-AA-FPA-101, "Control of Combustible and Flammable Materials," Revision 0, and CM-AA-FPA-102, "Fire Protection and Fire Safe Shutdown Review and Preparation Process and Design Change Process," Revision 0. The inspectors evaluated, as appropriate, conditions related to: (1) licensee control of transient combustibles and ignition sources; (2) the material condition, operational status, and operational lineup of fire protection systems, equipment, and features; and (3) the fire barriers used to prevent fire damage or fire propagation.

- Cable Tray Spreading Room Unit 1 and Unit 2 (fire zones 4-1b / CSR-1 and 4-2b / CSR-2)
- Main Control Room (fire zone 2a / CR)
- Turbine Building (includes Chiller Rooms and Z-21B, Z-21C, Z-22, Z-34, Z-35, Z-36, and Z-46B) (fire zone 8a / TB)
- Charging Pump Cubicle 1-1A (fire zone 11Aa / CPC-1A), Charging Pump Cubicle 1-1B (fire zone 11Ba / CPC-1B), Charging Pump 1-1C (fire zone 11Ca / CPC-1C), Charging Pump Cubicle 2-1A (fire zone 11Da / CPC-2A), Charging Pump Cubicle 2-1B (fire zone 11Ea / CPC-2B), and Charging Pump Cubicle 2-1C (fire zone 11Fa / CPC-2C)
- Technical Support Center (fire zone 46b / TSC) and Technical Support Center Battery Room (fire zone 46B / TSCBR)

b. Findings

No findings of significance were identified.

.2 Fire Protection – Drill Observation

a. Inspection Scope

During a fire protection drill on December 16, 2009, the inspectors assessed the timeliness of the fire brigade in arriving at the scene, the fire fighting equipment brought to the scene, the donning of fire protection clothing, the effectiveness of communications, and the exercise of command and control by the scene leader. The

inspectors also assessed the acceptance criteria for the drill objectives and reviewed the licensee's CAP for recent fire protection issues.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

.1 Internal Flooding

a. Inspection Scope

The inspectors assessed the internal flooding vulnerability of the Units 1 and 2 Turbine Building interface with the Emergency Switchgear rooms and Air Conditioning Chiller rooms with respect to adjacent safety-related areas to verify that the flood protection barriers and equipment were being maintained consistent with the UFSAR. The licensee's CAP documents were reviewed to verify that corrective actions with respect to flood-related items identified in condition reports were adequately addressed. The inspectors conducted a field survey of the selected areas to evaluate the adequacy of flood barriers and floor drains to protect the equipment, as well as their overall material condition.

b. Findings

No findings of significance were identified.

.2 Cables in Manholes/Underground Bunkers

a. Inspection Scope

The inspectors performed an annual review of cables located in underground bunkers/manholes. The inspectors evaluated, as appropriate, the three Units 1 and 2 service water cable areas listed below for the following: (1) direct observation verification that the cables were not submerged in water; (2) direct observation verification that cables and/or splices appeared intact; (3) verification that drainage or an appropriate dewatering device (sump pump) was in operation; and (4) verification that level alarm circuits were set appropriately to ensure that the cables would not be submerged.

- 01-BLD-MBAR-2MH03
- 01-BLD-MBAR-2MH04
- 01-BLD-MBAR-4MH04

b. Findings

Inadequate Inspection of Underground Cables

Introduction: A URI was identified by the inspectors relating to an issue involving the licensee's compliance with their procedure 0-MPM-1207-04, "Annual Pumping of Security and Electrical Cable Vaults," Revision 2.

Description: On November 19, 2009, the inspectors observed the completion of portions of procedure 0-MPM-1207-04 on three electrical cable vaults. The inspectors identified that the procedure contained steps covering the inspection of equipment and supports within each vault. It was noted, by the inspectors, that many of these inspection steps included attributes that could not effectively be assessed when viewing the equipment and supports from the electrical cable vault manhole which is located at grade level. The inspectors identified during the November 19, 2009, observation that the inspections for each of the electrical cable vaults were conducted while standing at grade level and viewing the equipment and supports via the vault's manhole. The licensee initiated condition report (CR) 362370 for an NRC-identified issue relating to proper inspection of risk significant cables contained in underground vaults.

The inspectors require additional information from the licensee to determine if there is a performance deficiency which is greater than minor. This issue is identified as URI 05000338, 339/2009005-01, Inspection of Underground Cables.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors selected the risk significant Unit 1 and Unit 2 A, B, and C charging pump lube oil and gear box oil coolers and reviewed inspection records, test results, maintenance work orders, and other documentation to ensure that deficiencies which could mask or degrade performance were identified and corrected. The test procedures and records were also reviewed to verify that they were consistent with Generic Letter 89-13 licensee commitments and Electric Power Research Institute (EPRI) Heat Exchanger Performance Monitoring Guidelines. In addition, the inspectors reviewed inspection documentation of the related service water piping to assess general material condition and to identify any degraded conditions. Documents reviewed included licensee procedures, Virginia Power Administrative Procedure (VPAP) -0811, "Service Water Inspection and Maintenance Program," Revision 6, and ER-AA-HTX-1003, "Heat Exchanger Monitoring and Assessment," Revision 3.

b. Findings

No findings of significance were identified

1R11 Licensed Operator Requalification Program

a. Inspection Scope

The inspectors observed an operator requalification simulator scenario which involved a failed open condenser steam dump valve, a failed channel for turbine auto stop oil pressure, a failed closed turbine governor valve, a failure of the reactor to trip, and the loss of reactor coolant outside of containment. The scenario required classifications 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 instructor 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 effectiveness of the corresponding licensee's 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) and licensee procedure ER-AA-MRL-10, "Maintenance Rule Program," Revision 2.

- CR355498, "MRule (a)(1) goals were not met for the 2J EDG (Ref AIG000214)"
- MRE011081, "MRule Evaluation: 2-CH-MOV-2286A stopped in mid-position"

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors evaluated, as appropriate, the three activities listed below for the following: (1) effectiveness of the risk assessments performed before maintenance

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activities were conducted; (2) management of risk; (3) upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) maintenance risk assessments and emergent work problems were adequately identified and resolved. The inspectors verified that the licensee was complying with the requirements of 10 CFR 50.65 (a)(4) and the data output from the licensee's safety monitor associated with the risk profiles of Units 1 and 2.

- Emergent work to repair exhaust leak on 1H EDG
- Closure of both pressurizer block valves on Unit 1 during unit startup
- Emergent entry into abnormal procedure, O-AP-8, "Response to Grid Instability," Revision 6, due to elevated switchyard voltage

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed six operability evaluations, listed below, affecting risk-significant mitigating systems, to assess, as appropriate: (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether other existing degraded conditions were considered as compensating measures; (4) whether the compensatory measures, if involved, were in place, would work as intended, and were appropriately controlled; and (5) where continued operability was considered unjustified, the impact on TS Limiting Conditions for Operation and the risk significance in accordance with the SDP. The inspectors' review included a verification that determinations of operability were made as specified by licensee procedure, OP-AA-102, "Operability Determination," Revision 5.

- OD000325, review of CR346629, "1-CH-P-1B Outboard motor bearing oil leak"
- OD000328, "NRC Resident identified possible support crack on 1J EDG lube oil piping"
- CR346333, "SWVH missile door not fully qualified for tornado design basis"
- CR357450, "U1 'C' FW line support 1-FW-PH-13 plate not in contact with support base"
- CR358461, "Station batteries do not have cable support assembly installed at terminals"
- Engineering Transmittal, ET-N-09-0088, "MOV: Operability Assessment for 1-RC-MOV-1536", per Work Order 59102018995

b. Findings

The enforcement aspects associated with CR346333 are discussed in Section 40A7 of this report.

.1 Units 1 and 2 Feedwater Pipe Support Issues

Introduction: A URI was identified by the inspectors relating to an issue involving feedwater pipe supports on Units 1 and 2.

Description: On November 10, 2009, the licensee initiated CR357450 for a NRC-identified issue with a Unit 1 'C' feedwater pipe support, 1-FW-PH-13, involving no contact between the floor-mounted section of the support and the section attached to the pipe. The inspectors expressed concerns regarding the impact on feedwater piping for both units because the licensee had completed a modification installing new ultrasonic flow instruments for the feedwater piping and had removed/installed the feedwater flow venturi for cleaning during the previous refueling outages. An extent of condition review was performed by the licensee and additional problems were identified with Unit 2 'A' feedwater pipe supports, 2-FW-PH-18 and 2-FW-PH-20.

The inspectors require additional information from the licensee to determine if there is a performance deficiency which is greater than minor. This issue is identified as URI 05000338, 339/2009005-02, Feedwater Pipe Support Issues.

.2 Units 1 and 2 Station Battery Cable Installation Issues

Introduction: A URI was identified by the inspectors relating to an issue involving the installation of cabling associated with the emergency DC bus station batteries for each of the 4 channels on Units 1 and 2.

Description: On November 17, 2009, the licensee initiated CR358461 for NRC-identified issues relating to installation of cabling associated with the emergency DC bus station batteries for each of the 4 channels on Units 1 and 2. Specifically, the cables did not appear to meet vendor installation requirements for the cables such that the battery posts do not bear the load. The licensee completed an operability determination, OD000347, which used the Seismic Qualification Utility Group process to determine the batteries were operable but not fully qualified; however, the inspectors' review of this document has not been completed. Additionally, licensee engineering evaluation of their installation relative to vendor requirements is also ongoing.

The inspectors require additional information from the licensee to determine if there is a performance deficiency which is greater than minor. This issue is identified as URI 05000338, 339/2009005-03, Units 1 and 2 Station Battery Cable Installation Issues.

1R18 Plant Modifications

.1 Temporary Modifications

a. Inspection Scope

The inspectors reviewed two temporary modifications, listed below, 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 temporary modifications were in

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accordance with VPAP-1403, "Temporary Modifications," Revision 13, and the related work packages, that adequate controls were in place, procedures and drawings were updated, and post-installation tests verified the operability of the affected systems.

- Temporary Modification "1-MOP-26.78 'B' RSS Transformer and 'E' Transfer Bus"
- Temporary Modification "1-PT-36.17A Channel Calibration for Station Blackout – Unit 1 Train A Bus 1D and Bus 1F"

b. Findings

No findings of significance were identified.

.2 Permanent Modifications

a. Inspection Scope

The inspectors reviewed the completed permanent plant modification design change package (DCP) NA-09-0105, "Installation of Pipe Seals in the Service Water Supply and Return Headers." The inspectors reviewed the 10 CFR 50.59 Safety Review/Regulatory Screening, technical drawings, test plans, and the modification package to assess the TS implications.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed six post maintenance test procedures and/or test activities associated with work orders (WO) for selected risk-significant mitigating systems listed below, to assess whether: (1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance criteria were clear and adequately demonstrated operational readiness consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy consistent with the application; (5) tests were performed as written with applicable prerequisites satisfied; (6) jumpers installed or leads lifted were properly controlled; (7) test equipment was removed following testing; and (8) equipment was returned to the status required to perform in accordance with licensee procedure VPAP-2003, "Post Maintenance Testing Program," Revision 13.

- WO 59101941734, "Replace 1-CH-P-1B motor with refurbished motor in stock"
- WO 59102015875, "Replace diaphragm with 40 hole on 01-CH-HCV-1200C-VALVOP"
- WO 59102015102, "Replace coil on 01-RC-SOV-1455C-3-VALVE"
- WO 59101989765, "Replace #4 extension pipe w/old style gaskets" on 1H EDG

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- WO 59102014957, "Repair of U-1 Excess Letdown Exchanger Tube Leak"
- WO 59101995036, "Replace #2 CS fuel injector high pressure line" on 1J EDG

b. Findings

.1 WO 59102014957

The enforcement aspects associated with WO 59102014957, "Repair of U-1 Excess Letdown Exchanger Tube Leak" are discussed in Section 4OA3.1 of this report.

.2 Development of Work Orders

Introduction: A URI was identified by the inspectors relating to an issue involving the development of WOs relating to specific job steps.

Description: On November 24, 2009, the licensee initiated CR359447 for NRC-identified issues relating to the development of WOs and respective job steps. Specifically, the inspectors noted that WO 59102015102 contained job steps to perform the work and referenced no maintenance procedure. The inspectors determined that WOs are developed per work management administrative procedure, WM-AA-100, "Work Management," Revision 4, which allows the use of job steps in lieu of a maintenance procedure. However, the inspectors also noted that WM-AA-100 does not require the same level of technical review as administrative procedure, VPAP-0502, "Procedure Process Control," Revision 49, requires for supplemental work instructions. The licensee does not expect to complete their evaluation until February, 2010.

The inspectors require additional information from the licensee to determine if there is a performance deficiency which is greater than minor. This issue is identified as URI 05000338, 339/2009005-04, Development of Work Orders.

1R20 Refueling and Other Outage Activities

a. Inspection Scope

Unit 1 began an unscheduled outage on October 23, 2009, due to an inoperable containment penetration requiring a shutdown to Mode 5 per TS LCO 3.6.1. During the forced outage period, the inspectors used Inspection Procedure 71111.20, "Refueling and Outage Activities," to observe portions of the maintenance and startup activities to verify that the licensee maintained defense-in-depth commensurate with outage risk assessments and applicable TS. The inspectors reviewed licensee actions for the outage activities listed below.

- Decay heat removal processes to verify proper operation and that steam generators, when relied upon, were a viable means of backup cooling.
- Containment closure activities, including a detailed containment walkdown prior to startup, to verify that there was no evidence of leakage and that debris had not been left which could affect the performance of the containment sump.

- Heat up and startup activities to verify TS, license conditions, and other requirements, commitments, and administrative procedure prerequisites for mode changes were met prior to changing modes or plant conditions. RCS integrity was verified by reviewing RCS leakage calculations and containment integrity was verified by reviewing the status of containment penetrations and containment isolation valves.

The unit was synchronized to the grid on October 29, 2009, at 1558 hours, and 100% power was obtained on October 30, 2009, at 0340 hours.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the six surveillance tests listed below, the inspectors examined the test procedures, witnessed testing, 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 TS were met. The inspectors also determined whether the testing effectively demonstrated that the systems or components were operationally ready and capable of performing their intended safety functions.

In-Service Test:

- 2-PT-75.2A, "Service Water Pump (2-SW-P-1A) Quarterly Test," Revision 49
- 2-PT-71.2Q.1, "2-FW-P-3A Motor-Driven AFW IST Comprehensive Pump and Valve Test," Revision 6

Other Surveillance Tests:

- 0-PT-82.12, "Quarterly Test of 0-AAC-DG-OM, Alternate AC Diesel Generator (SBO Diesel), on E Transfer Bus," Revision 21
- 1-PT-82J, "1J Emergency Diesel Generator Slow Start Test," Revision 44-P1
- 1-PT-52.2A, "Reactor Coolant System Leakrate (Computer Calculation)," Revision 31
- 2-PT-71.1Q, "2-FW-P-2 Turbine Driven Auxiliary Feedwater Pump and Valve Test," Revision 50

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation.1 Simulator Drilla. Inspection Scope

On December 8, 2009, the inspectors reviewed and observed the performance of a simulator drill that involved a loss of RCS pressure control, fuel failure, RCS leak, and a large break loss of coolant accident (LOCA) which required the following emergency action levels: Notification of Unusual Event, Alert, and General Emergency. The inspectors assessed emergency procedure usage, emergency plan classification, notifications, and the licensee's identification and entrance of any problems into their corrective action program. This inspection also evaluated the adequacy of the licensee's conduct of the drill and critique performance. There were no drill issues identified.

b. Findings

No findings of significance were identified.

.2 Emergency Planning Drillsa. Inspection Scope

On October 15, 2009, the inspectors reviewed and observed the performance of an Emergency Planning Drill that involved a simulated general emergency due to fuel failure, and the loss of secondary integrity and safety injection. The inspectors assessed emergency procedure usage, emergency plan classification, notification, and the licensee's identification and entrance of any drill problems into their correction action program. This inspection also evaluated the adequacy of the licensee's conduct of the drill and critique performance. Drill issues were captured by the licensee in the CAP as CR352827, and were reviewed by the inspectors.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verificationa. Inspection Scope

The inspectors performed a periodic review of the Safety System Functional Failures for both Unit 1 and 2, to assess the accuracy and completeness of the submitted data and whether the performance indicators were calculated in accordance with the guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline,"

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Revision 6. The inspection was conducted in accordance with NRC Inspection Procedure 71151, "Performance Indicator Verification." Specifically, the inspectors reviewed the Unit 1 and Unit 2 data reported to the NRC for the period October 1, 2008, through September 30, 2009. Documents reviewed included applicable NRC inspection reports, licensee event reports, operator logs, and station performance indicators.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Review of Items Entered into the Corrective Action Program:

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 CAP. This review was accomplished by reviewing daily CR report summaries and periodically attending daily CR Review Team meetings.

.2 Annual Samples

Review of Operator Workarounds

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions for operator workarounds (OWAs). The inspectors reviewed the cumulative effects of the licensee's OWAs and licensee procedure OP-AA-1700, "Operations Aggregate Impact," Revision 0. The inspectors reviewed the data package associated with this procedure which included an evaluation of the cumulative effects of the OWAs on the operator's ability to safely operate the plant and effectively respond to abnormal and emergency plant conditions. The inspectors reviewed and monitored licensee planned and completed corrective actions to address underlying equipment issues causing the OWAs. The inspectors also evaluated OWAs against the requirements of the licensee's CAP as specified in PII-AA-200, "Corrective Action," Revision 11, 10 CFR 50, Appendix B, and OP-AA-100, "Conduct of Operations," Revision 7.

b. Findings and Observations

No findings of significance were identified. In general, the inspectors verified that the licensee has identified operator workarounds at an appropriate threshold, entered them in the corrective action program, and has proposed or implemented appropriate corrective actions.

.3 Semi-Annual Trend Review – Transient Combustible Permits

a. Inspection Scope

The inspectors performed a review of the licensee's correction action program documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment and corrective maintenance issues but also considered the results of daily inspector corrective action program item screening discussed in Section 4OA2.1. The review included issues documented outside the normal correction action program in system health reports, corrective maintenance work orders, component status reports, site monthly meeting reports, and maintenance rule assessments. The inspectors' review nominally considered the six month period of July through December 2009, although some examples expanded beyond those dates when the scope of the trend warranted.

The inspectors compared and contrasted their results with the results contained in the licensee's latest integrated quarterly assessment report. Corrective actions associated with a sample of the issues identified in the licensee's trend report were reviewed for adequacy.

b. Assessment and Observations

No findings of significance were identified. In general, the licensee has identified trends and addressed them in their corrective action program. The inspectors noted that the licensee had identified an adverse trend in the application of requirements prescribed in the licensee's program to control transient combustibles. The inspectors reviewed licensee procedure CM-AA-FPA-100, "Fire Protection/Appendix R (Fire Safe Shutdown) Program," Revision 0 and CM-AA-FPA-101, "Control of Combustible and Flammable Materials," Revision 0, both of which became effective on August 14, 2009. The inspectors also reviewed VPAP-2401, "Fire Protection Program," Revision 29, which was in effect prior to August 14, 2009, and contained information regarding processes covered by the two previously listed procedures. The inspectors noted that both VPAP-2401 and CM-AA-FPA-101 defined transient combustibles as those materials that are not permanent plant equipment or stored in approved storage areas. The inspectors also noted that both procedures required that material be considered a transient fire load if it was to be stored in an unapproved storage area past one shift. Both procedures were also noted to require a transient fire loading report if material was to be stored in certain areas greater than one shift and written approval by supervisor nuclear site safety was required prior to locating transient fire loads in safety related areas.

The inspectors identified multiple issues regarding transient fire loads as noted in the following CRs:

- CR089889, Herculite was in place in 2J EDG room without transient fire loading sheet
- CR318830, Materials stored above the Security UPS battery room
- CR334967, Material stored in 2J EDG room without transient fire load sheet
- CR342754, Failed to submit request for transient fire loading in U-2 safeguards

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The inspectors also noted that VPAP-2401 and CM-AA-FPA-101 contained requirements that transient fire loading reports incorporate certain information, including the date the transient material will be removed from the work area and the date the permit will expire. The inspectors identified occasions where the licensee failed to meet this requirement. These failures were documented in the following CRs:

- CR340617, Transient fire load permit in SWPH was expired
- CR344507, Improper procedure adherence

The inspectors also noted that the licensee had identified multiple occurrences where they had failed to meet the requirements of VPAP-2401 or CM-AA-FPA-101. These failures were documented in the following CRs:

- CR093318, Improper storage of combustibles
- CR095098, Transient combustibles being stored in service bldg HVAC room
- CR097603, Transient fire load permit not issued as per VPAP-2401 at the time of staging
- CR110731, Hydrogen bottle stored without transient fire load permit

As a result of the identified trend, the licensee initiated CR343146, "Transient fire loading permit system," which will investigate potential improvements to the licensee's program. Additionally, the inspectors continue to review issues associated with the licensee's control of transient combustibles under URI 05000338, 339/2009004-01, Control of Transient Combustibles.

4OA3 Event Follow-up

.1 Unit 1 Inoperable Containment Penetration

a. Inspection Scope

The inspectors reviewed the licensee's response to a leak on the Unit 1 normal letdown line and a unit shutdown to Mode 5 per TS LCO 3.6.1 due to an inoperable containment penetration which occurred on October 23, 2009. During preparations for the TS required shutdown the licensee also identified a leak in the excess letdown heat exchanger after placing the component in service. The inspectors discussed the events with operations, engineering, and licensee management personnel to gain an understanding of the event and assess follow up actions. The inspectors reviewed operator actions taken in accordance with licensee procedures and reviewed unit and system indications to verify that actions and system responses were as expected. The inspectors reviewed the licensee's root cause evaluation and assessed the team's actions to gather, review, and assess information leading up to and following the shutdown. The inspectors also reviewed the initial licensee notifications to verify that the requirements specified in NUREG-1022, "Event Reporting Guidelines" were met.

b. Findings

Inadequate Procedure Results in Excess Letdown Heat Exchanger Leakage

Introduction: A Green, self-revealing, non-cited violation of TS 5.4.1a was identified for the failure to adequately establish procedural requirements for component cooling (CC) water flow through the Unit 1 excess letdown heat exchanger (Hx) which resulted in a cracked Hx tube and excessive reactor coolant system (RCS) leakage when placing the Hx in service.

Description: On October 23, 2009, while investigating boric acid indications on 1-CH-TV-1204B (outside containment isolation valve for normal letdown line), the licensee confirmed a small, unquantifiable, through-wall leak on the normal letdown line just upstream of the valve and entered TS 3.6.1 condition A for an inoperable containment. The normal letdown leak was entered into the licensee's CAP as CR354489. The cause of the leak was a crack at the valve due to a weld discontinuity from original fabrication by the vendor. The inspectors determined that the crack involved an old design issue which was not representative of current licensee performance; therefore, there are no enforcement aspects for this issue associated with the normal letdown leak. However, during the same day, the licensee attempted to place the excess letdown Hx in service in order to isolate the normal letdown line for the aforementioned crack repair.

After placing the excess letdown Hx in service the licensee received alarms for CC surge tank high level, CC system high-high radiation, RCS pressurizer low pressure, and CC Hx high temperature. The licensee removed excess letdown from service and subsequently determined that a RCS leak rate of approximately 60 gallons per minute (gpm) existed for approximately 4 minutes based on the increase in CC surge tank level. Consequently, the licensee commenced a TS required unit shutdown due to the problems with normal and excess letdown. The excess letdown Hx leakage problem was entered into the licensee's CAP as CR354523. The inspectors reviewed the associated root cause evaluation (RCE) 000991 and noted that the CC flow through the Hx was found at approximately 500 gpm which is above the design flow of 165 gpm as specified by the vendor manual, NA-VTM-000-59-W893-00072, "Westinghouse Instruction Manual for Auxiliary Heat Exchangers," Revision 2. The inspectors also noted that the excessive CC flow caused vibration of a Hx tube against a baffle plate which led to the tube crack and excessive RCS leakage once the excess letdown Hx was placed in service. The inspectors determined that the excessive CC flow, which existed for approximately 22 years, was due to improper establishment of a procedure which positioned a throttle valve, 1-CC-256, "1-CH-E-4 Return," as open and locked. The inspectors noted that the respective procedure, 1-OP-51.1B, "Valve Checkoff – Component Cooling, Containment," Revision 13 was subsequently revised to have 1-CC-256 positioned as throttled and sealed to ensure CC flow is within the design limits. The inspectors also reviewed the licensee's corrective actions regarding the extent of condition impact on Unit 2. The licensee administratively removed the Unit 2 excess letdown Hx from service until further corrective actions can ensure the operability of this component.

Analysis: A self-revealing performance deficiency was identified for the failure to adequately establish procedure requirements for excess letdown Hx CC flow as required by TS 5.4.1a. This finding had a credible impact on safety due to continuous, excessive CC flow of approximately 500 gpm through the excess letdown Hx which caused a tube crack that allowed excessive intersystem leakage from the RCS at approximately 60 gpm for the 4 minutes in which the excess letdown heat exchanger was in service. The finding was more than minor because if left uncorrected it would have the potential to result in a more significant event involving multiple tube cracks with consequent leakage exceeding the capacity of a charging pump. In accordance with NRC inspection manual chapter (IMC) 0609, "Significant Determination Process," the inspectors performed a Phase 1 analysis and determined the finding required a phase 2 analysis by a regional senior reactor analyst (SRA) due to the finding resulting in RCS leakage that exceeded TS limits. The finding resulted in an intersystem leak from the RCS system into the CC system when the excess letdown Hx was placed into service; however, an intersystem LOCA was not addressed in the pre-solved risk table, therefore a phase 3 analysis was performed by the SRA in accordance with the guidance of NRC IMC 0609, Appendix A. The SDP phase 3 risk evaluation resulted in a risk increase for the finding of less than $1E-6$ for core damage frequency and less than $1E-7$ for large early release frequency. The dominant sequence was an RCS leak into the CC system due to tube leakage in the excess letdown Hx when excess letdown was initiated coupled with a failure of the charging function and a failure to isolate the leakage. Therefore, the finding was characterized as of very low safety significance (Green). The risk was low due to the magnitude of the leakage, which was less than the makeup capability of 1 charging pump, the availability of charging pumps to mitigate the leakage, and the high probability of accomplishing letdown isolation given the multiple operator cues and time availability. The finding had no cross-cutting aspects due to its legacy nature.

Enforcement: TS 5.4.1.a, requires in part, that written procedures shall be established per Regulatory Guide 1.33, Appendix A, of which part 3 requires procedures for startup, operation, and shutdown of safety related systems. Contrary to this, on October 23, 2009, the licensee failed to adequately establish procedure, 1-OP-51.1B, such that CC flow through the excess letdown Hx was within the design limit. Consequently, elevated flow resulted in a tube crack and excessive RCS leakage. Because this finding is of very low safety significance and it was entered in the licensee's corrective program as CR354523, this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000338/2009005-05, Inadequate Procedure Results in Excess Letdown Heat Exchanger Leakage.

.2 Unit 2 Automatic Reactor Trip Due to Turbine Trip

a. Inspection Scope

The inspectors responded to an automatic reactor trip of Unit 2 on December 9, 2009 due to a turbine trip following a low vacuum condition on the main condenser. The inspectors discussed the trip with operations, engineering, and licensee management personnel to gain an understanding of the event and assess follow up actions. The inspectors reviewed operator actions taken in accordance with licensee procedures and reviewed unit and system indications to verify that actions and system responses were

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as expected. The licensee's root cause evaluation was still in progress at the close of the inspection period and will be reviewed by the inspectors upon completion to evaluate the team's actions to gather, review, and assess information leading up to and following the shutdown. The inspectors also reviewed the initial licensee notifications to verify that the requirements specified in NUREG-1022, "Event Reporting Guidelines" were met.

b. Findings

No findings of significance were identified regarding licensee response to the event.

.3 (Closed) Licensee Event Report (LER) 05000338/2009-001-00: Missile Shield Door Design Function Not Met Due to Improper Configuration

On October 13, 2009, with Units 1 and 2 operating in Mode 1 at 100% power, a licensee engineering evaluation determined that the east missile shield door for the Service Water Valve House (SWVH) would not have performed its design function during a design basis tornado event. Station procedure 0-AP-41, "Severe Weather Conditions," Revision 44, did not ensure the SWVH missile shield doors were properly secured by using the door locking pins, which were not normally engaged due to binding concerns, and the security hasp and lock were determined to not be capable of meeting the design loading. This presented the possibility of the east missile shield door swinging outward in a tornado missile event and a tornado missile could have entered the SWVH and disabled the electric power supply to the Service Water (SW) motor operated valves. This could have prevented the SW system from being able to mitigate the consequences of an accident. The licensee initiated CR346333 to address this issue and subsequently repaired the SWVH missile shield door locking pins and revised their procedure. The enforcement aspects of this issue are discussed in Section 4OA7 of this report. This LER is closed.

.4 (Closed) Licensee Event Report (LER) 05000338/2009-002-00: Completion of Unit Shutdown Due to RCS Leakage

On October 23, 2009, with Unit 1 operating in Mode 1 at 100% power, the licensee commenced a unit shutdown per Technical Specification 3.6.1, Containment, due to a small unquantifiable leak on the normal letdown line immediately upstream of the outside containment isolation valve. The licensee was unable to repair the leak on line due to the unavailability of the excess letdown Hx. The unit entered Mode 5 on October 24, 2009 and the licensee subsequently identified the leak location as being between the valve body and the special end connection on the normal letdown line outside containment isolation valve. Unit 1 returned to full power operation on October 30, 2009. The enforcement aspects of this event are discussed in Section 4OA3.1 of this report. This LER is closed.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with the licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

On January 25, 2010, the resident inspector presented the inspection results to Mr. Daniel Stoddard and other members of the staff, who acknowledged the findings. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which met the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600 for disposition as a NCV:

- TS 5.4.1.a, requires in part, that written procedures shall be established per Regulatory Guide 1.33, Appendix A, of which part 6 requires procedures for combating emergencies and other significant events such as acts of nature. Contrary to this, on October 13, 2009, the licensee failed to adequately establish procedure, 0-AP-41, "Severe Weather Conditions," Revision 44, such that the SWVH missile shield doors were properly secured. This issue was identified in the licensee's CAP as CR346333. A regional Senior Reactor Analyst performed a Phase 3 evaluation under the Significance Determination Process and concluded that the finding was of very low safety significance (Green). The dominant accident sequence involved a postulated tornado causing a non-recoverable Loss of Offsite Power and four of the six Service Water Pumps on site failing due to the performance deficiency. Then operators failed to switch to the Lake to Lake cooling mode. This resulted in a loss of all service water which caused a loss of all cooling to the RCP seals. A seal LOCA ensued without RCS makeup capability since service water provided the ultimate cooling capability for the High Head Safety Injection/Charging pumps. Consequently, core damage happened.

For the equipment that failed as a consequence of the performance deficiency no recovery was assumed. Also, an exposure period of eight months was used for the evaluation.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

W. Anthes, Manager, Nuclear Maintenance
J. Breeden, Supervisor, Radioactive Analysis and Material Control
R. Evans, Manager, Radiological Protection and Chemistry
E. Hendrixson, Director, Nuclear Safety and Licensing
T. Huber, Director, Nuclear Engineering
S. Hughes, Manager, Nuclear Operations
P. Kemp, Supervisor, Station Licensing
L. Lane, Plant Manager
G. Lear, Manager, Organizational Effectiveness
T. Maddy, Manager, Nuclear Protection Services
G. Marshall, Manager, Nuclear Outage and Planning
C. McClain, Manager, Nuclear Training
F. Mladen, Manager, Nuclear Site Services
B. Morrison, Supervisor Nuclear Engineering
J. Scott, Supervisor, Nuclear Training (operations)
D. Stoddard, Site Vice President

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000338, 339/2009005-01	URI	Inspection of Underground Cables (Section 1R06)
05000338, 339/2009005-02	URI	Feedwater Pipe Support Issues (Section 1R15)
05000338, 339/2009005-03	URI	Units 1 and 2 Station Battery Cable Installation Issues (Section 1R15)
05000338, 339/2009005-04	URI	Development of Work Orders (Section 1R19)

Opened and Closed

05000338/2009005-05	NCV	Inadequate Procedure Results in Excess Letdown Heat Exchanger Leakage (Section 4OA3)
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Closed

05000338/2009-001-00	LER	Missile Shield Door Design Function Not Met Due to Improper Configuration (Section 4OA3)
05000338/2009-002-00	LER	Completion of Unit Shutdown Due to RCS Leakage (Section 4OA3)

Discussed

05000338, 339/2009004-01 URI Control of Transient Combustibles (Section 4OA2)

LIST OF ACRONYMS

ADAMS	Agencywide Document Access and Management System
CA	Corrective Action
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
EDG	Emergency Diesel Generator
IMC	Inspection Manual Chapter
JPM	Job Performance Measures
LHSI	Low Head Safety Injection
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
OD	Operability Determination
PARS	Publicly Available Records
PI	Performance Indicator
QS	Quench Spray
RCE	Root Cause Evaluation
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RTP	Rated Thermal Power
SDP	Significance Determination Process
SR	Surveillance Requirements
TDAFWP	Turbine Driven Auxiliary Feedwater Pump
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VEPCO	Virginia Electric and Power Company
VPAP	Virginia Power Administrative Procedure
WO	Work Order