



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II**

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ATLANTA, GEORGIA 30303-1257

February 1, 2018

Mr. Daniel G. Stoddard
Senior Vice President
and Chief Nuclear Officer
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060

SUBJECT: NORTH ANNA POWER STATION – NRC INTEGRATED INSPECTION
REPORT 05000338/2017004 AND 05000339/2017004

Dear Mr. Stoddard:

On December 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your North Anna Power Station, Units 1 and 2. On January 17, 2018, the NRC inspectors discussed the results of this inspection with Mr. L. Lane and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

The NRC inspectors did not identify any finding or violation of more than minor significance.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Steven D. Rose, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Docket Nos.: 05000338, 05000339
License Nos.: NPF-4, NPF-7

Enclosure:
IR 05000338/2017004 and 05000339/2017004
w/Attachment: Supplemental Information

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D. Stoddard

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REPORT 05000338/2017004 AND 05000339/2017004 February 1, 2018

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REGION II

Docket Nos.: 50-338, 50-339

License Nos.: NFP-4, NFP-7

Report No.: 05000338/2017004 and 05000339/2017004

Licensee: Virginia Electric and Power Company

Facility: North Anna Power Station, Units 1 and 2

Location: Mineral, VA

Dates: October 1, 2017 through December 31, 2017

Inspectors: G. Croon, Senior Resident Inspector
G. Eatmon, Resident Inspector
J. Dodson, Senior Project Engineer (Sections 1R20.2, 4OA2)
P. Capehart, Senior Operations Engineer (Section 1R11.3)

Approved by: Steven D. Rose, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Enclosure

SUMMARY

Integrated Inspection Report 05000338/2017004; and 05000339/2017004, October 1, 2017, through December 31, 2017; North Anna Power Station, Units 1 and 2.

The report covered a three-month period of inspection by resident inspectors and one regional inspector. No findings were identified during this inspection period. The NRC's program for overseeing the safe operations of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent rated thermal power (RTP) and remained so for the remainder of the quarter.

Unit 2 began the inspection period in a refuel outage. On October 7, 2017, the reactor was taken critical and placed back online. On October 18, 2017, the unit was returned to essentially full power operation and remained there until December 8, 2017, when the unit was taken offline for a forced outage. On December 10, 2017, the reactor was taken critical and placed back online and reached essentially full power operation on December 12, 2017. Unit 2 remained at 100 percent RTP for the remainder of the quarter.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R04 Equipment Alignment (71111.04 – 5 samples)

a. Inspection Scope

.1 Partial Walkdown

The inspectors verified that critical portions of the selected systems were correctly aligned by performing partial walkdowns. The inspectors selected systems for assessment because they were a redundant or backup system or train, were important for mitigating risk for the current plant conditions, had been recently realigned, or were a single-train system. The inspectors determined the correct system lineup by reviewing plant procedures and drawings. Documents reviewed are listed in the attachment.

The inspectors selected the following systems or trains to inspect:

- Unit 1, Auxiliary Feedwater Train “B”
- Unit 2, Residual Heat Removal Train “A” and “B” in Mode 5
- Unit 2, Primary Grade Water System Isolation Train “A” and “B” in Mode 6

.2 Complete Walkdown

The inspectors verified the alignment of the Unit 1 quench spray system outside containment, and the Unit 1 instrument air system inside the auxiliary building. The inspectors selected these systems for assessment because the quench spray is a risk-significant mitigating system and the instrument air system is important to various mitigating systems and served as a “vertical slice” review of a maintenance activity to assess whether different parts of the maintenance process work together effectively. The inspectors determined the correct system lineup by reviewing plant procedures, drawings, the updated final safety analysis report, and other documents. The inspectors reviewed records related to the system’s outstanding design issues, maintenance work requests, and deficiencies. The inspectors verified that the selected system was correctly aligned by performing a complete walkdown of accessible components. The inspectors observed whether there was indication of degradation,

To verify the licensee was identifying and resolving equipment alignment discrepancies, the inspectors reviewed corrective action documents, including condition reports (CRs) and outstanding work orders (WOs). The inspectors also reviewed periodic reports containing information on the status of risk-significant systems, including maintenance rule reports and system health reports. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05A/Q – 5 samples)

a. Inspection Scope

.1 Quarterly Inspection

The inspectors evaluated the adequacy of selected fire plans by comparing the fire plans to the defined hazards and defense-in-depth features specified in the fire protection program. In evaluating the fire plans, the inspectors assessed the following items:

- control of transient combustibles and ignition sources
- fire detection systems
- water-based fire suppression systems
- gaseous fire suppression systems
- manual firefighting equipment and capability
- passive fire protection features
- compensatory measures and fire watches
- issues related to fire protection contained in the licensee's corrective action program

The inspectors toured the following four fire areas to assess material condition and operational status of fire protection equipment. Documents reviewed are listed in the attachment.

- Unit 1, Cable Vault and Tunnel and 280' Rod Drive, fire zone 3-1
- Unit 2, Cable Vault and Tunnel and 280' Rod Drive, fire zone 3-2
- Unit 1, Emergency Switchgear Instrument Rack and Air Conditioning Rooms with Battery Rooms 1-2 and 1-4, fire zones 6-1, 7B-1, 7D-1
- Unit 2, Emergency Switchgear Instrument Rack and Air Conditioning Rooms with Battery Rooms 2-2 and 2-4, fire zones 6-2, 7B-2, 7D-2

.2 Annual Inspection

The inspectors evaluated the licensee's fire brigade performance during a drill on December 29, 2017, and assessed the brigade's capability to meet fire protection licensing basis requirements. The inspectors observed the following aspects of fire brigade performance:

- capability of fire brigade members
- leadership ability of the brigade leader
- use of turnout gear and fire-fighting equipment
- team effectiveness

- compliance with site procedures

The inspectors also assessed the ability of control room operators to combat potential fires, including identifying the location of the fire, dispatching the fire brigade, and sounding alarms. The inspectors evaluated the licensee's ability to declare the appropriate emergency action level and make required notifications in accordance with NUREG 0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants (FEMA-REP-1)" and Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 3 samples)

a. Inspection Scope

.1 Internal Flooding

The inspectors reviewed related flood analysis documents and walked down the two areas listed below containing risk-significant structures, systems, and components susceptible to flooding. The inspectors verified that plant design features and plant procedures for flood mitigation were consistent with design requirements and internal flooding analysis assumptions. The inspectors also assessed the condition of flood protection barriers and drain systems. In addition, the inspectors verified the licensee was identifying and properly addressing issues using the corrective action program. Documents reviewed are listed in the attachment.

- Unit 1, Cable vault and tunnel
- Unit 2, Cable vault and tunnel

.2 Underground Cables

The inspectors reviewed related flood analysis documents and inspected the two areas listed below containing cables whose failure could disable risk-significant equipment. The inspectors directly observed the condition of cables and cable support structures and, as applicable, verified that dewatering devices and drainage systems were functioning properly. In addition, the inspectors verified the licensee was identifying and properly addressing issues using the corrective action program. Documents reviewed are listed in the attachment.

- Unit 1, Cable trench at manhole 01-EP-MH-25
- Unit 1, Cable trench at manholes 1-BLD-MBAR-5MH03 and 1-BLD-MBAR-5MH04

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance (71111.11 – 3 samples)

a. Inspection Scope

.1 Resident Inspector Quarterly Review of Licensed Operator Regualification

On December 21, 2017, the inspectors observed an evaluated simulator scenario administered to an operating crew as part of the annual regualification operating test required by 10 CFR 55.59, "Regualification." The scenario involved a main feedwater impeller degradation, followed by a main condenser vacuum degradation, a PZR Level control channel failing high, a feedwater check valve failing to return to AUTO, and ending with a seismic event with loss of offsite power and ruptured steam generator.

The inspectors assessed the following:

- licensed operator performance
- the ability of the licensee to administer the scenario and evaluate the operators
- the quality of the post-scenario critique
- simulator performance

Documents reviewed are listed in the attachment.

.2 Resident Inspector Quarterly Review of Licensed Operator Performance in the Actual Plant/Main Control Room

On October 7, 2017, the inspectors observed licensed operator performance in the main control room during the Unit 2 startup from the outage. On November 8, 2017, the inspectors observed licensed operator performance in the main control room during the Unit 2 troubleshooting of Unit 2, "B" Control Rod Bank Lo/Lo-Lo Limit alarm. On December 10, 2017, the inspectors observed licensed operator performance in the main control room during the Unit 2 shutdown due to excessive RCS leakage. On December 12, 2017, the inspectors observed licensed operator performance in the main control room during the Unit 2 startup.

The inspectors assessed the following:

- use of plant procedures
- control board manipulations
- communications between crew members
- use and interpretation of instruments, indications, and alarms
- use of human error prevention techniques
- documentation of activities
- management and supervision

Documents reviewed are listed in the attachment.

.3 Annual Review of Licensee Regualification Examination Results

On February 17, 2017, the licensee completed the comprehensive biennial regualification written examinations and the annual regualification operating examinations required to be administered to all licensed operators in accordance with Title 10 of the Code of Federal Regulations 55.59(a)(2), "Regualification Requirements,"

of the NRC's "Operator's Licenses." The inspectors performed an in-office review of the overall pass/fail results of the individual operating examinations and the crew simulator operating examinations in accordance with Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program." These results were compared to the thresholds established in Section 3.02, "Requalification Examination Results," of IP 71111.11.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12 – 2 samples)

a. Inspection Scope

The inspectors assessed the licensee's treatment of the issues listed below to verify the licensee appropriately addressed equipment problems within the scope of the maintenance rule (10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"). The inspectors reviewed procedures and records to evaluate the licensee's identification, assessment, and characterization of the problems as well as their corrective actions for returning the equipment to a satisfactory condition. In addition, the inspectors performed a review of quality control to ensure licensee was in compliance with their Quality Assurance Program requirements.

Documents reviewed are listed in the attachment.

- Maintenance Rule (a)(1) Evaluations for the effluent radiation monitoring system (RM007) and the fire protection system (FP002)
- QC Sample - WO 59103118225, Replacement of 3/4-inch VOGT Check Valve

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 samples)

a. Inspection Scope

The inspectors reviewed the maintenance activities listed below to verify that the licensee assessed and managed plant risk as required by 10 CFR 50.65(a)(4) and licensee procedures. The inspectors assessed the adequacy of the licensee's risk assessments and implementation of risk management actions. The inspectors also verified that the licensee was identifying and resolving problems with assessing and managing maintenance-related risk using the corrective action program. Additionally, for maintenance resulting from unforeseen situations, the inspectors assessed the effectiveness of the licensee's planning and control of emergent work activities. Documents reviewed are listed in the attachment.

- Unit 2, October 18, 2017, repair breaker for 2-FW-P-1A for pump status indication in Control Room and on breaker
- Unit 1, October 10, 2017, Main Generator AVR (1-ED-SW-1) oscillations in AUTO
- Unit 1, October 23, 2017, Perform relay testing (1-EP-BKR-15610)

- Unit 1, October 30, 2017, PLC B failure troubleshooting and repair (WO 59103134708/CR 1081632)
- Unit 2, November 1, 2017, Channel calibration for station black out (2-PT-36.17B)

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 6 samples)

a. Inspection Scope

The inspectors selected the operability determinations or functionality evaluations listed below for review based on the risk-significance of the associated components and systems. The inspectors reviewed the technical adequacy of the determinations to ensure that technical specification operability was properly justified and the components or systems remained capable of performing their design functions. To verify whether components or systems were operable, the inspectors compared the operability and design criteria in the appropriate sections of the technical specification and updated final safety analysis report to the licensee's evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the attachment. In addition, a review of the control room operator workaround log was performed.

- Unit 2, 2-FW-94, "B" Main Feed check valve failed PT, CR 1077517
- Unit 2, Suspect 2-SW-MOV-205C is Leaking By, CR 1080579
- Unit 2, Personnel hatch malfunction, CR 1080718
- Unit 2, High oil level on 1C charging pump (2-CH-P-1C), CR 1081731
- SBO diesel expansion tank level is low, CR 1066776
- Unit 1, 1-SI-P-1B leaking oil, CR 1086669

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 3 samples)

a. Inspection Scope

The inspectors verified that the plant modifications listed below did not affect the safety functions of important safety systems. The inspectors confirmed the modifications did not degrade the design bases, licensing bases, and performance capability of risk significant structures, systems and components. The inspectors also verified modifications performed during plant configurations involving increased risk did not place the plant in an unsafe condition. Additionally, the inspectors evaluated whether system operability and availability, configuration control, post-installation test activities, and changes to documents, such as drawings, procedures, and operator training materials, complied with licensee standards and NRC requirements. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was

identifying and correcting any deficiencies associated with modifications. Documents reviewed are listed in the attachment.

- DC1519C, U2 turbine controls upgrade
- DC64767, U2 thimble tube and seal fittings replacement
- 0-GP-4.2, Extreme weather operations, Install space heaters in SBO diesel room

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 3 samples)

a. Inspection Scope

The inspectors either observed post-maintenance testing or reviewed the test results for the maintenance activities listed below to verify the work performed was completed correctly and the test activities were adequate to verify system operability and functional capability.

- WO 59102428409, Valve In-service Inspection Associated with 2-EG-TK-2H for 2-EG-260, October 31, 2017
- WO 59103109220, Instrument air dryer inlet drain valve repair, October 16, 2017
- WO 59102448803, "1C" main feedwater pump replacement, October 18, 2017

The inspectors evaluated these activities for the following:

- Acceptance criteria were clear and demonstrated operational readiness
- Effects of testing on the plant were adequately addressed
- Test instrumentation was appropriate
- Tests were performed in accordance with approved procedures
- Equipment was returned to its operational status following testing
- Test documentation was properly evaluated

Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with post-maintenance testing. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 2 samples)

a. Inspection Scope

.1 Refuel Outage

For the Unit 2 refueling outage from September 9, 2017, through October 7, 2017, the inspectors evaluated the following outage activities:

- outage planning
- shutdown, cooldown, refueling, heatup, and startup
- initial containment entry
- reactor coolant system instrumentation and electrical power configuration
- reactivity and inventory control
- decay heat removal and spent fuel pool cooling system operation
- containment closure

The inspectors verified that the licensee:

- considered risk in developing the outage schedule
- controlled plant configuration in accordance with administrative risk reduction methodologies
- developed work schedules to manage fatigue
- developed mitigation strategies for loss of key safety functions
- adhered to operating license and technical specification requirements

Inspectors verified that safety-related and risk-significant structures, systems, and components not accessible during power operations were maintained in an operable condition. The inspectors also reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with outage activities. Documents reviewed are listed in the attachment.

.2 Forced Outage

On December 10, 2017, at 2334, Unit 2 entered TS 3.3.3 for two trains of the reactor vessel level indication system (RVLIS) inoperable. The unit was shut down and repairs were made. Inspectors reviewed the repair plan for the RVLIS bellows and followed the implementation of the repair plan. On December 12, 2017, inspectors observed the startup of Unit 2, which followed repairs of the RVLIS bellows. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 samples)

a. Inspection Scope

The inspectors reviewed the surveillance tests listed below and either observed the test or reviewed test results to verify testing activities adequately demonstrated that the affected SSCs remained capable of performing the intended safety functions (under conditions as close as practical to design bases conditions or as required by technical specifications) and maintained their operational readiness.

The inspectors evaluated the test activities to assess for preconditioning of equipment, procedure adherence, and equipment alignment following completion of the surveillance. Additionally, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with surveillance testing. Documents reviewed are listed in the attachment.

Routine Surveillance Tests

- 1-PT-34.3, "Turbine Valve Freedom Test"
- 2-PT-14.1, "1A Charging Pump Test"
- 1-PT-71.1Q, "Terry Turbine (1-FW-P-2) Pump Test"

Reactor Coolant System Leak Detection

- 2 GOP-52,2A, "Increased RCS Leak"

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 – 1 samples)

a. Inspection Scope

The inspectors observed the emergency preparedness drill conducted on October 12, 2017. The inspectors observed licensee activities in the simulator to evaluate implementation of the emergency plan, including event classification, notification, and protective action recommendations. The inspectors evaluated the licensee's performance against criteria established in the licensee's procedures. Additionally, the inspectors attended the post-exercise critique to assess the licensee's effectiveness in identifying emergency preparedness weaknesses and verified the identified weaknesses were entered in the corrective action program. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151 – 6 samples)

a. Inspection Scope

The inspectors reviewed a sample of the performance indicator (PI) data, submitted by the licensee, for the Unit 1 and Unit 2 PIs listed below. The inspectors reviewed plant records compiled between January 1, 2017 and December 31, 2017, to verify the accuracy and completeness of the data reported for the station. The inspectors verified that the PI data complied with guidance contained in Nuclear Energy Institute 99-02, "Regulatory Assessment Performance Indicator Guideline," and licensee procedures. The inspectors verified the accuracy of reported data that were used to calculate the value of each PI. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with PI data. Documents reviewed are listed in the attachment.

Cornerstone: Mitigating Systems

- residual heat removal system
- emergency AC power system
- heat removal system

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 6 samples)

.1 Routine Review

The inspectors screened items entered into the licensee's corrective action program to identify repetitive equipment failures or specific human performance issues for follow-up. The inspectors reviewed condition reports, attended screening meetings, or accessed the licensee's computerized corrective action database.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors reviewed issues entered in the licensee's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors focused their review on all reports of seal leakage on plant valves and pumps on both the primary and secondary side of plant for both units. The purpose was to identify any common issues or trends for seals and seal leakage at North Anna. The sampling was performed during the current cycle as a representation of repetitive equipment issues, but also considered the results of inspector daily condition report screenings, licensee trending efforts, and licensee human performance results. The review nominally considered the 6-month period of July 2017 through December 2017, although some examples extended beyond those dates since the scope of the trend warranted such. The inspectors compared their results with the licensee's analysis of trends. Additionally, the inspectors reviewed the adequacy of corrective actions associated with a sample of the issues identified in the licensee's trend reports. The inspectors also reviewed corrective action documents that were processed by the licensee to identify potential adverse trends in the condition of structures, systems, and/or components as evidenced by acceptance of long-standing non-conforming or degraded conditions. Documents reviewed are listed in the attachment.

b. Findings and Observations

No findings were identified. The inspectors discussed the results of their sampling with the licensee. The licensee had previously identified seal leakage trends several years prior to this sampling and have seen a reduction of seal leak occurrence over the past five years. The licensee continues to monitor and submitted a trend CR 1088383, Boric Acid on Various Components.

.3 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors conducted a detailed review of the following five nuclear condition reports:

- CR 1076763, MCC Bucket 2H1-3-B2 Requires Control Power Fuse Replacement
- CR 1084460, 1-HV-AC-2 MCR chiller fan discharge damper not opening when fan started
- CR 1074806, Reduced Margin due to Temperature Derating of SWPH MCC Bucket Transformers/Fuses
- CR 1084540, U2 Reactor Vessel Flange Leak off High Temp Alarming
- CR 1085649, U-2 C Steam Generator Loose Parts Alarm

The inspectors chose these samples because they were considered as high priority and were listed as conditions adverse to quality.

The inspectors evaluated the following attributes of the licensee's actions:

- complete and accurate identification of the problem in a timely manner
- evaluation and disposition of operability and reportability issues
- consideration of extent of condition, generic implications, common cause, and previous occurrences
- classification and prioritization of the problem
- identification of root and contributing causes of the problem
- identification of any additional condition reports
- completion of corrective actions in a timely manner

Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On January 17, 2018, the resident inspectors presented the inspection results to Mr. Larry Lane and other members of the licensee's staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

M. Becker, Manager, Nuclear Outage and Planning
J. Collins – Corporate Director, Emergency Preparedness (EP)
R. Evans, Manager, Nuclear Training
R. Galbraith, ISI/NDE Supervisor
E. Hendrixson, Director, Nuclear Site Engineering
D. Hicks, Manager, Nuclear Protection Services
L. Hilbert, Plant Manager
J. Jenkins, Manager, Nuclear Site Services
L. Lane, Site Vice President
D. McGinnis, Technical Specialist II
B. Nevius, Supervisor, Nuclear Station Procedures
R. Page, Licensing Engineer
B. Raven, Manager, Nuclear Maintenance
J. Schleser, Manager, Nuclear Organizational Effectiveness
R. Simmons, Manager, Radiation Protection and Chemistry
R. Simpson, Supervisor, Reactor Engineering
J. Slattery, Manager, Nuclear Operations
W. Standley, Director, Nuclear Station Safety & Licensing
D. Taylor, Manager, Station Licensing
N. Turner, EP Manager
M. Whalen, Technical Advisor, Licensing

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

None

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

1-OP-31.2A, Operating Procedure, Valve Checkoff – Auxiliary Feedwater, Revision 25
2-OP-14.1, Operating Procedure, Residual Heat Removal, Revision 55
2-GOP-13.1, General Operating Procedure, Alternate Core Cooling Method Assessment Guidelines, Revision 19
OP-AA-600, Request to Work on or Near Protected Equipment, Attachment 1 for performing walkdown of U2 RHR equipment dated 10/4/2017
OCC Outage Manager Shift Brief dated 10/4/2017
NAPS U2 Fall Outage POD Summary dated 10/4/2017
2-PT-12.1B, Operations Periodic Test, Boration Flow Path Verification – Shutdown, Revision 7
2-OP-4A, Operating Procedure, Mode Change Checklist Mode 5 to Mode 6 or Defueled to Mode 6, Revision 32
2-LOG-2A, Log, RCS Makeup Log for Mode 3,4,5 and 6, Revision 4-P2
FM-082-82A, Sh 1, Flow/Valve Operating Numbers Diagram Compressed Air System, Sh 1, Rev 27
11715-FM-082-82A, Sh 2, Flow/Valve Operating Numbers Diagram Compressed Air System, Sh 2, Rev 27
11715-FM-082-82A, Sh 3, Flow/Valve Operating Numbers Diagram Compressed Air System, Sh 3, Rev 32
11715-FM-082-82B, Sh 1, Flow/Valve Operating Numbers Diagram Compressed Air System, Sh 1, Rev 24
11715-FM-082-82B, Sh 2, Flow/Valve Operating Numbers Diagram Compressed Air System, Sh 2, Rev 25
11715-FM-082-82B, Sh 3, Flow/Valve Operating Numbers Diagram Compressed Air System, Sh 3, Rev 34
11715-FM-091, Sh 1, Flow/Valve Operating Numbers Diagram Containment Quench and Recirc Spray Subsystem, NASP, Rev 47
11715-FM-091, Sh 2, Flow/Valve Operating Numbers Diagram Containment Quench and Recirc Spray Subsystem, NASP, Rev 36
11715-FM-091, Sh 3, Flow/Valve Operating Numbers Diagram Containment Quench and Recirc Spray Subsystem, NASP, Rev 27
11715-FM-091, Sh 4, Flow/Valve Operating Numbers Diagram Containment Quench and Recirc Spray Subsystem, NASP, Rev 35
NAPS UFSAR, Section 6.2, Rev 52.01
NAPS, Technical Specifications, Section 3.6.6
CR 1078279, Tubing Crimped 02-IA-876 VALVE
CR 1058706, Found IA Regulator Pressure for 1-MS-FCV-120 Out of Specification
CR 1049734, 1-IA-FL-7 Leaking at Housing
ER-AA-1021, NAPS System Health & Maintenance Rule Report, Dec 2017.

Section 1R05: Fire Protection

Renewed License No. NPF-4, Amendment No. 276 for North Anna Unit 1
North Anna Appendix R Report, Revision 39
CM-AA-FPA-100, Fire Protection/Appendix R (Fire Shutdown) Program, Revision 13
CM-AA-FPA-101, Control of Combustible and Flammable Materials, Revision 8
CM-AA-ETE-101, Engineering Technical Evaluation of Permanently Stored Combustible Material dated April 27, 2016
Justrite 55 Gallon Gray Cease Fire Receptacle product description from Justrite Safety Online
1-FS-S-2, Loss Prevention Fire Strategy, Fire Fighting Preplan for Cable Vault and Tunnel and 280' Rod Drive Unit 1 Safe Shutdown Equipment, Revision 12
2-FS-S-2, Loss Prevention Fire Strategy, Fire Fighting Preplan for Cable Vault and Tunnel and 280' Rod Drive Unit 2 Safe Shutdown Equipment, Revision 11

CR 1035983, "There is groundwater intrusion dripping into U2 Cable Tunnel"
 1-FS-S-3, Unit 1 Emergency Switchgear Instrument Rack and Air Conditioning Rooms Service Building Elev. 254 ft. Safe Shutdown Equipment, Revision 13
 1-FS-ESG-BR-1, Battery Rooms 1-2 and 1-4, Revision 3
 2-FS-C-1, "Loss Prevention Fire Strategy, Containment – Unit 2," Revision 4
 2-FS-S-3, Unit 2 Emergency Switchgear Instrument Rack and Air Conditioning Rooms Service Building Elev. 254 ft. Safe Shutdown Equipment, Revision 11
 2-FS-ESG-BR-1, Emergency Switchgear Battery Room 2-2 and 2-4 Unit 2, Revision 1
 Docket 50-338 and 50-339, Technical Exemption Requests form Appendix R, 10 CFR Part 50/ North Anna Power Station, Units No. 1 and No. 2 dated November 6, 1986
 Docket 50-338 and 50-339, North Anna Power Station Unit Nos. 1 and 2, 10 CFR Appendix R Req-analysis – Phase II dated October 31, 1984
 2-OP-21.4, Operating Procedure, Building Heating and Ventilation System, Revision 16
 CR 1079212, "2-HV-F-24 does NOT indicate running"

Section 1R06: Flood Protection Measures

ET No. CEP 00-0006, Evaluation of the Potential for Flooding in the Emergency Switchgear Rooms North Anna Power Station Units 1 & 2, Revision 0
 1-FS-S-2, Fire Fighting Preplan for Cable Vault and Tunnel and 280' Rod Drive, Unit 1 Safe Shutdown Equipment, Revision 12
 2-FS-S-2, Fire Fighting Preplan for Cable Vault and Tunnel and 280' Rod Drive, Unit 2 Safe Shutdown Equipment, Revision 11
 DNES-AA-GN-BAR-1001, Passive Design Features and Barriers, Revision 7
 ET-N-10-0014, Development of Flooding TRM, Revision 1
 ETE-NA-2012-0053, Flooding Walkdown List (FWDL), Revision 0
 Fire Protection Design Change 78-68B, Revision 30
 Field Change DC-78-68B, Cable Vault & Tunnel, and Component Cooling Pump Area – Sprinkler Fire Protection Systems, Revision 14
 Response to CTS 02-92-4036-023, Perform the First Periodic Inspection after the initial IPE Walkdown that was conducted in 1992, dated November 12, 1993
 Virginia Electric and Power Company, North Anna Power Station Units 1 and 2, Response to Generic Letter 88-20 and Supplement 1, Individual Plant Examination (IPE) for Severe Accident Vulnerabilities, dated December 14, 1992
 0-MPM-1208-01, Inspection of Station Flood Barriers and Dikes, Revision 4
 AD-AA-100-Attachment 17, Feedback Incorporation Process for 0-MPM-1208-01 regarding Technical Reference "Internal Plant Flood Protection Program," dated 10/17/2017
 WO 59102427767, Inspect Drain Check Valve, 01-DB-424-CHVALV
 WO 59101803639, Inspect Drain Check Valve, 01-DB-424-CKVALV
 WO 59102427776, Inspect Drain Check Valve, 01-DB-423-CKVALV
 WO 59102168494, Inspect Drain Check Valve, 01-DB-423-CKVALV
 WO 59102742549, Flood Dike and Barriers Inspection U1
 WO 59102545817, Flood Dike and Barriers Inspection U1
 WO 59102741103, Flood Dike and Barriers Inspection U2
 WO 59102541617, Flood Dike and Barriers Inspection U2
 CR 1077412, 2-BLD-FLW-2 missing 3 washers
 CR 1077413, 1-BLD-FLW-3 sealant appears to be hard, unlike some barriers that have silicon
 CR 1085930, Calculation Required Justifying Height of Steel Curb Flood Barriers in CV&T
 Unit 1, Cable trench at manhole 01-EP-MH-25
 Unit 1, Cable trench at manholes 1-BLD-MBAR-5MH03 and 1-BLD-MBAR-5MH04

Section 1R11: Licensed Operator Regualification Program and Licensed Operator Performance

Licensed Operator Regualification Program, Cycle 17-6, Segment 1B, Revision 5
 OP-AA-103, Operator Qualifications, Revision 6
 TR-AA – 100, Analysis, Revision 13
 TR-AA – 101, Conduct of Training, Revision 5
 TR-AA – 200, Design, Revision 5
 ADM-TR-AA – 300, Development, Revision 12
 ADM-TR-AA – 310, Just – In – Training, Revision 3
 TR-AA – 400, Implementation, Revision 17
 TR-AA-710, NRC Exam Security Requirements, Revision 4
 TR-AA-730, Licensed Operator Biennial and Annual Operating Regualification Exam Process, Revision 8
 TR-AA-740, Administrative Requirements for Application and Maintenance of Operator Licenses, Revision 1
 TR-AA-750, Conduct of Simulator Training and Evaluation, Revision 6
 TR-AA-SIM-100, Simulator Modification Process, Revision 5
 TR-AA-SIM-101, Simulator Configuration Control Committee, Revision 2
 TR-AA-SIM-200, Simulator Hardware Management, Revision 4
 TR-AA-SIM-300, Simulator Software Management, Revision 3
 TR-AA-SIM-400, Simulator Performance Testing, Revision 6
 Licensed Operator Regualification Program, December 19, 2017

Section 1R12: Maintenance Effectiveness

Maintenance Rule Expert Panel – North Anna Meeting Agenda for November 14, 2017
 PIR 1068346, Monitor the Effectiveness of maintenance by performing a periodic evaluation in accordance with 10CFR50.65(a)(3), Evaluation Period 9/1/2015 to 3/1/2017
 ER-AA-MRL-100, Guidance for Completing (a)(1) Evaluation for RM007 (effluent radiation monitoring system)
 ER-AA-MRL-100, Guidance for Completing (a)(1) Evaluation for FP002 (fire protection system)
 Unit 1 A-1 Status Log
 CR 1078851, 2-CH-358 Internal Parts Failed QC Inspection Criteria
 CR 1078463, 2-MS-420 QC Blue Check is UNSAT due to Excessive Wear in Body Seat

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

NUMARC 93-01, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 4A
 Medium Risk Plan Actions for 2-FW-P-1A, October 19, 2017
 North Anna Unit 1 logs for October 16-20, 2017
 CR 1081353, 2-FW-P-1A has no red light indication on 2-EP-BKR-25A6 switch
 CA 3068403, Perform MRule Functional Failure Evaluation for 2-FW-P-1A no red light indication on 2-EP-BKR-25A6 switch
 2-MOP-31.6, Tagging 2-FW-P-1A, Main Feedwater Pump, Revision 15
 2-OP-31.1, Operating Procedure Main Feedwater System, Revision 53
 WM-AA-301, Operational Risk Assessment, Revision 17
 OP-NA-601, Protected Equipment, Revision 16
 2-E-0, Reactor Trip or Safety Injection, Revision 54
 CR 1081632 AMSAC PLC-8 Failed
 CA 3068703, Perform MRule Functional Failure Evaluation for PLC-8
 1-Log-14, Non-Routine Surveillance Log, Initiate the following Maintenance Rule(a)(4) Fire RMA Defense-in-Depth Measures for TR 7.5
 WM-AA-301, "Operational Risk Assessment," Revision 14
 WO 59103098001
 WO 59102932957

WO 59103101877
 WO 59102933066
 WO 59103134708

Section 1R15: Operability Determinations and Functionality Assessments

Facility Safety Review Meeting for October 10, 2017
 NAPS Control Room Operator Workaround Log, Dec 2017
 CR 1077517, 2-FW-94, B Main Feed check valve failed PT
 CA 3065504, 2-FW-94, B Main Feed Check Valve (Prior Operability – Failed Performance of 2-PT-211.1)
 2-PT-211.1, Valve In-service Inspection (Main Feedwater Check Valves), Revision 29
 CME 96-020, Leakage Acceptance Criteria for Main FW Check Valves to SGs 1-FW-47, -79, -111; 2-FW-62, -94, -126, Revision 0
 ETE-NA-2017-0060, Assessment of Operability of 2-SW-MOV0205C if the MOV is left in Manual mode, dated October 17, 2017
 CR 108579, Suspect 2-SW-MOV-205C is leaking by
 CR 1066776, U3 TDFW Pump Suction Flows are Diverging
 CR 1086669, 1-SI-P-1B Leaking Oil
 CR 1081731, Speed Increaser Sight Glass are not full
 CR 1080718, U2 Personnel Hatch Malfunctioning During Entry
 CR 1080579, Suspect 2-SW-MOV-205C is Leaking By
 CR 1072002, U1 Generator Voltage Swinging
 WO 59103098137
 WO 05910312409
 WO 29102943523

Section 1R18: Plant Modifications

CM-AA-DDC-201, Design Changes, Rev. 16
 DC1519C, "U2 Turbine Controls Upgrade"
 DC64767, "U2 Thimble Tube and Seal Fittings Replacement."
 0-GP-4.2, "Extreme Weather Operations, Install Space Heaters in SBO Diesel Room."

Section 1R19: Post-Maintenance Testing

2-PT-81.1A, Emergency Diesel Generator Fuel Oil Transfer Pumps 2-EG-P-2HA and 2-EG-P-2HB Quarterly Test, Revision 21
 2-PT-142.9A.1, Valve In-service Inspection Associated with 2-EG-TK-2H for 2-EG-260, Rev 3
 North Anna Unit 2 Log for October 31, 2017
 ETE-NA-2016-0049, Emergency Diesel Generator Mission Time and Evaluated Leakage Rates, Revision 1
 Medium Risk Plan Actions for Maintenance on 2-EG-260, 2-EG-P-2HA discharge check valve, October 18, 2017
 CR 1056597, 2-EG-P-2HA Fuel Oil like Leak
 CR 1082700, 2-EG-LG-206B Failed Low

Section 1R20: Refueling and Other Outage Activities

2-OP-1B, Containment Checklist, dated October 7, 2017
 2-LOG-18, Containment Boundary Break Log, dated October 8, 2017
 ER-AP-BAC-10, Boric Acid Corrosion Control Program, Revision 12
 ER-AP-BAC-101, Boric Acid Corrosion Control Program (BACCP) Inspections, Revision 12
 ER-AP-BAC-102, Boric Acid Corrosion Control Program (BACCP) Evaluations, Revision 13

Section 1R22: Surveillance Testing

1-PT-34.3, Turbine Valve Freedom Test, Revision 42
 2-PT-14.1, 1A Charging Pump Test, Revision 42
 1-PT-71.1Q, Terry Turbine (1-FW-P-2) Pump Test, Revision 55
 2 GOP-52,2A, Increased RCS Leak, Revision 3
 CR 1084084, PCS remote display TT107 screen not updating

Section 1EP6: Drill Evaluation

Dominion Generation, North Anna Power Station, October 12, 2017 Training Drill – Initial Conditions and Scenario Material

Section 4OA1: Performance Indicator Verification

Technical Report No SE-0007, NRC Mitigating System Performance Index (MSPI) Basis Document, North Anna Power Station Units 1 and 2, Revision 3

Section 4OA2: Problem Identification and Resolution**Condition Reports**

1085649	1084460	1081238
1075867	1074806	1080331
1063361	1084540	1044016
1050483	1080398	1038568
1044016	454266	516384
1038568	114442	492627
1033587	021274	397998
1076763	1085649	397303

CR 1086836 1-CC-P-1B INBD Seal Leak Rate Increasing
 CR 1086583 600 CC / hr outboard seal leak on 2-CH-P-1C
 CR 1082461 2-FW-P-1C Inboard seal leak has increased to 45 DPM
 CR 1081439 1-FW-P-3A Aux feedwater pump has excessive inboard pump seal leakage.
 CR 1080648 02-RS-P-3A-PUMP Seal leak
 CR 1080337 2-RC-P-1B Seal leak
 CR 1079326 18 DPM inboard seal leak on 1-CC-P-1B
 CR 1075168 1-SI-P-1A had slight seal leakage during 1-PT-57.1A
 CR 1088383, Boric Acid on Various Components.WO59103104236 Safety Injection
 2-RC-R-1 – Unit 2 Reactor Vessel, CR 1080448/ODM CA3067586, Revision 1
 2-AR-B-E1, Revision 3, Rx Ves Flge Leakoff Hi Temp
 2-GOP-52.2B, Revision 0, Reactor Vessel Flange Leakage
 2-LOG-4, U2 Control Bd (Modes 1-4), 12/11/17-12/13/17
 Summary of North Anna Unit 2 'C' Steam Generator Loose Parts Alarms, Research, Recommendations and Plans, 12 December 2017
 WO59103131322 Flush No 3 Seal Leak Off Line
 WO59103131482 Check Valve Replacement
 WO59080579301 Repair Seal Leak / Unquantifiable
 WO59102814182 Inboard Seal Replacement
 WO59103006382 2-CH-P-1C Outboard Seal is Leaking 25ml/min
 WO59103124041 18DPM inboard seal leak on 1-CC-P-1B
 CO-REPORT-000-0282-0119-02, Reactor Coolant Pump Seal Leakage Independent Review, Rev 0