**UNITED STATES**
**NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

July 23, 2013

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 05000338/2013003, 05000339/2013003 AND 05000338/2013501, 05000339/2013501

Dear Mr. Heacock:

On June 30, 2013, 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 July 29, 2013, with Mr. G. Bischof 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.

No NRC-identified or self-revealing findings were identified during this inspection. However, two licensee-identified violations, which were determined to be of very low safety significance, are listed in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you wish to contest the violations or significance of these NCVs, 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.

ML13204A292

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 Agencywide Document Access and Management 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

Enclosure: Inspection Report 05000338/2013003, 05000339/2013003 and 05000338/2013501, 05000339/2013501
w/ Attachment: Supplemental Information

cc w/ encl. (See page 3)

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Letter to David A. Heacock from Gerald McCoy dated July 23, 2013.

SUBJECT: NORTH ANNA POWER STATION – NRC INTEGRATED INSPECTION REPORT 05000338/2013003, 05000339/2013003 AND 05000338/2013501, 05000339/2013501

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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: | 05000338/2013003, 05000339/2013003 and 05000338/2013501, 05000338/2013501 |
| Licensee: | Virginia Electric and Power Company (VEPCO) |
| Facility: | North Anna Power Station, Units 1 & 2 |
| Location: | Mineral, Virginia 23117 |
| Dates: | April 1, 2013 through June 30, 2013 |
| Inspectors: | G. Kolcum, Senior Resident Inspector<br>R. Clagg, Resident Inspector<br>R. Hamilton, Senior Health Physicist, Section 2RS7<br>A. Nielsen, Senior Health Physicist, Sections 2RS1, 4OA1<br>C. Dykes, Health Physicist, Sections 2RS6, 4OA1<br>R. Kellner, Health Physicist, Section 2RS8<br>A. Sengupta, Reactor Inspector, Section 1R08<br>J. Nadel, Resident Inspector – Surry Power Station, Section 1R19<br>M. Speck, Senior Emergency Preparedness Inspector, Sections 1EP2, 1EP3, 1EP5, 4OA1, 4OA6 |
| Accompanied by: | M. Hiser, Nuclear Safety Professional Development Program (Training) |
| Approved by: | Gerald J. McCoy, Chief<br>Reactor Projects Branch 5<br>Division of Reactor Projects |

Enclosure

## SUMMARY OF FINDINGS

IR 05000338/2013003, 05000339/2013003; IR 05000338/2013501, 05000339/2013501; 04/01/2013 – 06/30/2013; North Anna Power Station, Units 1 and 2. Routine Integrated Inspection Report.

The report covered a three month period of inspection by resident inspectors, health physicists, reactor inspector, and emergency preparedness inspector from the region. No NRC-identified or self-revealing findings were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

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

## REPORT DETAILS

Summary of Plant Status

Unit 1 began the period at full Rated Thermal Power (RTP) and operated at full power during the report period.

Unit 2 began the inspection period at full RTP but shut down for a planned refueling and maintenance outage on April 7, 2013. Following the completion of the planned refueling outage, Unit 2 came back on line on May 9, 2013. Before reaching full RTP, greater-than-normal vibrations were detected in the #9 bearing for the main turbine exciter and the unit was tripped on May 10, 2013. Maintenance was performed on the exciter to replace the #9 bearing and the permanent magnet generator, and the unit was back online on May 22, 2013. A slow ramp up to 98 percent took place over the next several days to evaluate the bearing performance.

On May 28, 2013, operators manually tripped Unit 2 from 98 percent power after a discharge valve on one of the two running main feedwater pumps inadvertently closed, causing a main feedwater system transient. Following repairs to the motor breakers for the 'C' main feed pump, Unit 2 began startup from the forced outage on May 30, 2013, and reached 100 percent full RTP on June 2, 2013. The unit continued at full RTP through the remainder of the report period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

.1 Seasonal Susceptibilities

a. Inspection Scope

The inspectors reviewed the licensee's adverse weather preparations for hot weather operations, specified in 0-GOP-4.1, "Hot Weather Operations," Revision 29, 0-GOP-5.5, "EDG Hot Weather Operations," Revision 12, and the licensee's corrective action program (CAP) database for hot weather related issues. The inspectors walked down three risk-significant systems/areas listed below to verify compliance with the procedural requirements and to verify that the specified actions provided the necessary protection for the structures, systems, or components.

- Unit 1 & 2 emergency diesel generators (EDG)
- Unit 1 & 2 station blackout (SBO) diesel
- Unit 1 & 2 auxilliary feedwater (AFW) pump rooms

b. Findings

No findings were identified.

.2 External Flooding

a. Inspection Scope

The inspectors assessed the external flood vulnerability of the emergency switchgear room access in the turbine building from the SBO basin area. The inspectors verified the condition of the emergency flood protection measures in the turbine building outside the emergency switchgear room (ESGR) and the Unit 2 power transformer area. 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 were identified.

.3 Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors performed three site specific weather related inspections, listed below, due to anticipated adverse weather conditions. Specifically, the inspectors reviewed licensee adverse weather response procedure 0-AP-41, "Severe Weather Conditions," Revision 54, licensee response, and site preparations including work activities that could impact the overall maintenance risk assessments. Other documents reviewed are listed in the Attachment to this report.

- Tornado watch on April 12, 2013
- Tornado watch on June 10, 2013
- Severe thunderstorm watch on June 13, 2013

b. Findings

No findings were identified.

.4 Review of Offsite Power and Alternate AC Power Readiness

a. Inspection Scope

The inspectors verified that plant features, and procedures for operation and continued availability of offsite and alternate alternating current (AC) power systems were appropriate. The inspectors reviewed the licensee's procedures affecting those areas, and the communications protocols between the transmission system operator and the nuclear power plant to verify that the appropriate information was exchanged when issues arose that could impact the offsite power system. The inspectors evaluated the readiness of the offsite and alternate AC power systems by reviewing the licensee's procedures that address measures to monitor and maintain the availability and reliability of the offsite and alternative AC power systems.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial Walkdowns

a. Inspection Scope

The inspectors conducted four equipment alignment partial walkdowns, listed below, to evaluate the operability of selected redundant trains or backup systems with the other train or system inoperable or out of service. The inspectors reviewed the functional systems 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.

- Unit 2 motor driven AFW pump during automatic actuation on May 10, 2013
- Unit 2 turbine driven AFW pump during automatic actuation on May 10, 2013
- Unit 1 1H EDG coolant system due to leak
- Unit 2 turbine driven AFW pump during automatic actuation on May 28, 2013

b. Findings

No findings were identified.

.2 Complete Walkdown

a. Inspection Scope

The inspectors performed a detailed walkdown and inspection of the Unit 2 Quench Spray System 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 each recirculation spray and casing cooling valve, whether manual, power operated or automatic, to ensure correct positioning of the valves. 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 and the condition of the system was discussed with the engineering personnel. The operating procedures, drawings, and other documents utilized and reviewed as part of the inspection are listed in the Attachment to this report.

b. Findings

No findings were identified.

1R05 Fire Protection

Quarterly Fire Protection Walkdowns

a. Inspection Scope

The inspectors conducted focused 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 fleet procedures CM-AA-FPA-100, "Fire Protection/Appendix R (Fire Safe Shutdown) Program," Revision 7, CM-AA-FPA-101, "Control of Combustible and Flammable Materials," Revision 4, and CM-AA-FPA-102, "Fire Protection and Fire Safe Shutdown Review and Preparation Process and Design Change Process," Revision 4. 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. Other documents reviewed are listed in the Attachment to this report.

- ESGR – Unit 1
- ESGR – Unit 2
- EDG 1H and EDG 2H
- Containment Unit 2
- Turbine Building Unit 1 and 2, and Turbine Building Lube Oil Room Unit 1 and 2

b. Findings

No findings were identified.

1R06 Flood Protection Measures

Internal Flooding

a. Inspection Scope

The inspectors assessed the internal flooding vulnerability of the Unit 1 and Unit 2 turbine building interface near the ESGR 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 corrective action 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 were identified.

1R07 Heat Sink Performance

System Heat Exchangers- Annual Review

a. Inspection Scope

The inspectors selected the risk significant Unit 2 'B' recirculation spray heat exchangers 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 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 are listed in the Attachment to this report.

Findings

b. No findings were identified.

1R08 Inservice Inspection (ISI) Activities (IP 71111.08P, Unit 2)

a. Inspection Scope

Non-Destructive Examination Activities and Welding Activities: From April 15, 2013, through April 18, 2013, the inspectors conducted an on-site review of the implementation of the licensee's ISI program for monitoring degradation of the reactor coolant system, emergency feed water systems, risk-significant piping and components, and containment systems in Unit 2. The inspectors' activities included a review of non-destructive examinations (NDEs) to evaluate compliance with the applicable edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI (Code of Record: 2004 Edition with Addenda 2006), and to verify that indications and defects (if present) were appropriately evaluated and dispositioned in accordance with the requirements of the ASME Code Section XI acceptance standards.

The inspector directly observed the following NDE mandated by the ASME Code to evaluate compliance with the ASME Code Section XI and Section V requirements, and, if any indications and defects were detected, to evaluate if they were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement:

- Visual Examination (VT-3) of snubber supports, accumulator to loop pipe, Work Order (WO) 59102532605

The inspectors also reviewed documentation for the following NDE activities:

- Ultrasonic Examination (UT) – Manual, Pressurizer Spray Line, elbow to pipe, WO59102532605

- UT – Phased Array, Curtiss Wright Report # VE-13-006, Summary # N2.R1.20.0414, RC Loop C-SG Inlet Nozzle, WO59102532605
- Liquid Penetrant Examination, 2-CH-308 Check Valve to Pipe, Reactor Coolant System, WO59102583598
- Radiography Examination, Charging/ SI, 02-CH-MOV-2289 Valve Replacement, WO59102219019
- Visual Examination (VT-2), Charging/ SI, 02-CH-MOV-2289 Valve Replacement, WO59102219019
- Visual Examination of Bottom Mounted Instrumentation (BMI) Nozzles following ASME Code Case N-722, WO59102099243

The inspectors observed the welding activities referenced below and reviewed associated documents in order to evaluate compliance with procedures and the ASME Code. The inspectors reviewed the work order, repair and replacement plan, weld data sheets, welding procedures, procedure qualification records, welder performance qualification records, and NDE reports.

- Direct observation of in-process welding WO59102583598, 2-CH-308 Check Valve to Pipe, Reactor Coolant System
- Review of welding package WO59102219019, Charging/ SI, 02-CH-MOV-2289 Valve Replacement

During non-destructive surface and volumetric examinations performed since the previous refueling outage, the licensee did not identify any relevant indications that were analytically evaluated and accepted for continued service. Therefore, no NRC review was completed for this inspection procedure attribute.

The inspectors reviewed the following NDE activities associated with the inspection of reactor vessel internal components (MRP-227A):

- Eddy Current Inspection of Incore Flux Thimble Tubes 2-IC-SEAR-1-TABLE, WO59102372103

The inspectors also reviewed the documentation of the UT examination for the nozzle-to-safe end dissimilar metal welds on the inlet and outlet of the “C” loop steam generator. The Phased Array UT examinations were performed from the outside diameter of the safe end and coverage was limited to 20.3 percent for the cold leg and 53 percent for the hot leg, which did not meet code requirements. A relief request from the coverage requirements identified in code case N-770-1 was submitted in accordance with 10 CFR 50.55a(g)(6)(ii)(F)(3). NRC approved the proposed alternative in NRC letter dated May 2, 2013, Adams Accession Number ML 13120A507. The approval identified that ultrasonic examination performed provides reasonable assurance of structural integrity and leak tightness until the next refueling outage in fall 2014.

PWR Vessel Upper Head Penetration Inspection Activities: For the Unit 2 vessel head, a bare metal visual examination and a volumetric examination were not required this outage in accordance with the requirements of ASME Code Case N-729-1 and 10 CFR

50.55a(g)(6)(ii)(D) as it was conducted last outage. In particular, the inspectors reviewed if the required examination coverages were achieved and limitations (if applicable) were recorded in accordance with the licensee's procedures. Additionally, the inspectors evaluated if the licensee's criteria for visual and UT examination quality and instructions for resolving interference and masking issues were consistent with 10 CFR 50.55a.

The inspectors reviewed the following NDE activities associated with the inspection of N-729-1 Examination:

- WO59102346793, Top Mounted Instrumentation, RFO 21, Summary # N2.B4.30.001
- WO59102376793, CRDM Nozzles, RFO 22

The licensee did not identify any relevant indications that were accepted for continued service during the bare metal visual exam. Additionally, the licensee did not perform any welding repairs to the vessel head penetrations since the beginning of the last Unit 2 refueling outage.

Boric Acid Corrosion Control (BACC) Inspection Activities: The inspectors reviewed the licensee's BACC program activities to ensure implementation with commitments made in response to NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary," and applicable industry guidance documents. Specifically, the inspectors performed an on-site record review of procedures and the results of the licensee's containment walkdown inspections performed during the current spring refueling outage. The inspectors also interviewed the BACC program owner, conducted an independent walkdown of containment to evaluate compliance with licensee's BACC program requirements, and verified that degraded or non-conforming conditions, such as boric acid leaks, were properly identified and corrected in accordance with the licensee's BACC and corrective action programs.

The inspectors reviewed the following condition reports (CRs) and associated corrective actions related to evidence of boric acid leakage to evaluate if the corrective actions completed were consistent with the requirements of the ASME Code Section XI and 10 CFR Part 50, Appendix B, Criterion XVI:

- CR 373299
- CR 459908
- CR 467649
- CR 477377
- CR 499295
- CR 505574
- CR 506293
- CR 510240
- CR 511202
- CR 511849
- CR 511286

The inspectors reviewed the engineering evaluations, listed below, completed for evidence of boric acid identified in systems containing borated water to determine if degraded components were documented in the corrective action program. The inspectors also evaluated corrective actions for any degraded components to determine if they met the ASME Section XI Code and/or NRC approved alternative.

- CR 453396
- CR 454954

The inspectors reviewed the following apparent cause evaluation (ACE) completed for evidence of boric acid identified in systems containing borated water to determine if degraded components were documented in the corrective action program:

- ACE 019008 (CR459908)

Steam Generator (SG) Tube Inspection Activities: The NRC inspectors reviewed the following documentation and evaluated them against the licensee's technical specifications, commitments made to the NRC, ASME Section XI, and Nuclear Energy Institute (NEI) 97-06 (Steam Generator Program Guidelines):

- Condition Monitoring and Operational Assessment (CMOA), CM-AA-ETE-101, dated October 6, 2011
- TSTF 510, Revision 2
- Unit 2 Long Range Plan, dated March 13, 2013

Identification and Resolution of Problems: The inspectors performed a review and sample of ISI-related problems that were identified by the licensee and entered into the corrective action program as condition reports (CRs). The inspectors reviewed the CRs to confirm the licensee had appropriately described the scope of the problem and had initiated corrective actions. The review also included the licensee's consideration and assessment of operating experience events applicable to the plant. The inspectors performed this review to ensure compliance with 10CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements. The corrective action documents reviewed by the inspectors are listed in the Attachment to this report.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance

.1 Resident Inspector Quarterly Review

a. Inspection Scope

The inspectors reviewed licensed operator performance on May 28, 2013, during Simulator Examination Guide SEG CPE 13-3J which involved a loss of main feedwater,

an anticipated transient without scram, a loss of heat sink, and a steam generator tube rupture. The scenario required classifications and notifications that were counted for NRC performance indicator input.

The inspectors observed the following elements of crew performance in terms of communications: (1) ability to take timely and proper actions; (2) prioritizing, interpreting, and verifying alarms; (3) correct use and implementation of procedures, including the alarm response procedures; (4) timely control board operation and manipulation, including high-risk operator actions; and (5) 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 were identified.

.2 Quarterly Control Room Operator Performance Observations

a. Inspection Scope

During the inspection period, the inspectors conducted observations of licensed reactor operators actions and activities to ensure that the activities were consistent with the licensee procedures and regulatory requirements. These observations took place during both normal and off-normal plant working hours. As part of this assessment, the inspectors observed the following elements of operator performance: (1) operator compliance and use of plant procedures including technical specifications; (2) control board/in-plant component manipulations; (3) use and interpretation of plant instruments, indicators and alarms; (4) documentation of activities; (5) management and supervision of activities; and, (6) communication between crew members.

The inspectors observed and assessed licensed operator performance during the following events;

- During Unit 2 reactor startup activities on May 8, 2013
- During Unit 2 Mode 3 operation with steam generator power operated relief valve temperature control on May 14, 2013
- During Unit 2 reactor startup activities on May 21, 2013

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the three equipment issues listed below, the inspectors evaluated the effectiveness of the respective 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 licensee staff. 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 4. Other documents reviewed are listed in the Attachment to this report.

- MRE016019, Weld leak on 2H EDG lube oil line
- CR507231, Unit 2 'A' charging pump
- Self Assessment Report SAR002038, review of 10 CFR 50.65(a)(3) periodic evaluation

b. Findings

No findings were identified. The enforcement aspects of the issue reviewed in MRE016019 are as discussed in Section 4OA7 of this report.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors evaluated, as appropriate, the six activities listed below for the following: (1) effectiveness of the risk assessments performed before maintenance 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 in compliance with the requirements of 10 CFR 50.65 (a)(4) and the data output from the licensee's safety monitor associated with the risk profile of Units 1 and 2. The inspectors reviewed the corrective action program to verify that deficiencies in risk assessments were being identified and properly resolved.

- Updated maintenance risk assessment due to the failure of the 2H EDG standby lube oil circulation pump on April 10, 2013
- Updated maintenance and shutdown risk assessment due to 0-AP-41 entry for tornado watch on April 12, 2013
- Updated maintenance and shutdown risk assessment due to 0-AP-41 entry for tornado watch on April 20, 2013
- Updated maintenance and shutdown risk assessment due to 2H EDG maintenance during rod latching and drag testing, refueling cavity pumpdown, and reactor vessel reassembly on April 28, 2013

- Updated maintenance risk assessment due to 0-AP-41 entry for tornado watch on June 10, 2013
- Updated maintenance risk assessment due to 0-AP-41 entry for severe thunderstorm watch on June 13, 2013

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments

a. Inspection Scope

The inspectors reviewed six operability determinations and functionality assessments, 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 Significant Determination Process (SDP). The inspectors' review included a verification that operability determinations (OD) were made as specified by procedure OP-AA-102, "Operability Determination," Revision 10. Other documents reviewed are listed in the Attachment to this report.

- Review of OD000526, "OD for N2C23 to address the fuel rod bow phenomenon"
- Review of OD000534, "Evaluate potential impact on operation of 2-SW-P-1B Service Water pump due to concrete debris entry
- Review of CR501347, "Weld leak on 2H EDG lube oil line between 2-EG-P-2H and 4.5 inch lube oil header, common cause for 2J EDG"
- Review of OD000535, "Evaluate U2 'A' Charging Pump gear box oil pressure"
- Review of IOD000187, "Missing Documentation for Fabrication/Inspection of Flange Alignment Piece"
- Review of OD000542, "AFW Tunnel Manways"

b. Findings

No findings were identified.

1R18 Plant Modifications

Permanent Modifications

a. Inspection Scope

The inspectors reviewed the completed permanent plant modification design change packages DC-NA-09-00131, DC-NA-11-00001, DC-NA-11-00002,

and DC-NA-11-00006, for the Spent Fuel Pool Cooling Pump Alternate Power. The inspectors conducted a walkdown of the installations, discussed the desired improvements with system engineers, and reviewed the 10 CFR 50.59 Safety Review/Regulatory Screening, technical drawings, test plans and the modification packages to assess the TS implications.

b. Findings

No findings were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed six post maintenance test procedures and/or test activities, listed below, for selected risk-significant mitigating systems 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 VPAP-2003, “Post Maintenance Testing Program,” Revision 14. Documents reviewed are listed in the Attachment to this report.

- Unit 2 ‘A’ Charging Pump PMT using 2-PT-14.1, “Charging Pump 2-CH-P-1A,” Revision 49
- Unit 2 2-SW-MOV-205C and 205D PMT using 2-PT-210,1, “Valve Inservice Inspection (Service Water MOVs to RSHXs),” Revision 13, and 2-PT-214.11, “Valve Inservice Inspection (Recirculation Spray Heat Exchangers Service Water Valve Position Indicator,” Revision 12, for WO59102118962 and WO59102585769
- WO59102095825, Replace contactor on 1 ‘B’ spent fuel cooling pump
- Unit 1 ‘A’ Charging Pump using 1-PT-14.1, “Charging Pump 1-CH-P-1A,” Revision 51
- 2J EDG 24 hour run using 2-PT-83.12J, “2J Diesel Generator Test(start by ESF actuation) Followed by 24-Hour Run and Hot Restart Test,” Revision 24
- 2H EDG 24 hour run using 2-PT-83.7H, “2H EDG 24-Hour Run,” Revision 14

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities

Refueling Outage

a. Inspection Scope

The inspectors reviewed the Outage Safety Review (OSR) and contingency plans for the Unit 2 refueling outage, which began April 7, 2013, to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. The inspectors used NRC inspection procedure 71111.20, "Refueling and Outage Activities," to observe portions of the shutdown, cooldown, refueling, maintenance activities, and startup activities to verify that the licensee maintained defense-in-depth commensurate with the outage risk plan and applicable TS. The inspectors monitored licensee controls over the outage activities listed below. Documents reviewed are listed in the Attachment to this report.

- Licensee configuration management, including daily outage reports, to evaluate maintenance of defense-in-depth commensurate with the OSR for key safety functions and compliance with the applicable TS when taking equipment out of service.
- Implementation of clearance activities and confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing.
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and an accounting for instrument error.
- Controls over the status and configuration of electrical systems to ensure that TS and outage safety plan requirements were met, and controls over switchyard activities.
- Monitoring of decay heat removal.
- Controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system.
- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss.
- Controls over activities that could affect reactivity.
- Refueling activities, including fuel handling and sipping to detect fuel assembly leakage.
- Startup and ascension to full power operation, tracking of startup prerequisities, walkdown of the drywell (primary containment) to verify that debris had not been left which could block emergency core cooling system strainers, and reactor physics testing.
- Licensee identification and resolution of problems related to refueling outage activities.

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the eight 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. Documents reviewed are listed in the Attachment to this report.

In-Service Test:

- 1-PT-71.2Q, "1-FW-P-3A, A Motor-Driven AFW Pump and Valve Test," Revision 39
- 2-PT-70.1, "Main Steam Safety Valve Setpoint Verification Using Trevitest," Revision 8
- 2-PT-210.1, "Valve Inservice Inspection (Service Water MCVs to RSHXs)," Revision 13
- 2-PT-139, "Valve Inservice Inspection (High/Low Pressure Interface Leak Test)," Revision 13

RCS Leakage:

- 2-PT-52.2A.1, "Reactor Coolant System Leak Rate (Computer Calculation)," Revision 38

Containment Isolation Valve:

- 2-PT-61.3, "Containment Type C Testing," Revision 41, Penetration 31, valves 2-HC-TV-205A and 205B

Other Surveillance Tests:

- 1-PT-82H, "1H Emergency Diesel Generator Slow Start Test," Revision 48
- 2-PT-82.8, "Simultaneous Diesel Generator Start Test," Revision 2

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert and Notification System Evaluation

a. Inspection Scope

The inspectors evaluated the adequacy of the licensee's methods for testing and maintaining the alert and notification system in accordance with NRC Inspection Procedure 71114, Attachment 02, Alert and Notification System Evaluation. The applicable planning standard, 10 CFR Part 50.47(b)(5) and its related 10 CFR Part 50, Appendix E, Section IV.D requirements were used as reference criteria. The criteria contained in NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Revision 1, were also used as a reference.

The inspectors reviewed various documents which are listed in the Attachment to this report and interviewed personnel responsible for system performance. This inspection activity satisfied one inspection sample for the alert and notification system on a biennial basis.

b. Findings

No findings were identified.

1EP3 Emergency Response Organization Staffing and Augmentation System

a. Inspection Scope

The inspectors reviewed the licensee's Emergency Response Organization (ERO) augmentation staffing requirements and process for notifying the ERO to ensure the readiness of key staff for responding to an event and timely facility activation. The qualification records of key position ERO personnel were reviewed to ensure all ERO qualifications were current. A sample of problems identified from augmentation drills or system tests performed since the last inspection was reviewed to assess the effectiveness of corrective actions.

The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 03, Emergency Response Organization Staffing and Augmentation System. The applicable planning standard, 10 CFR 50.47(b)(2), and its related 10 CFR 50, Appendix E requirements were used as reference criteria.

The inspectors reviewed various documents which are listed in the Attachment to this report. This inspection activity satisfied one inspection sample for the ERO staffing and augmentation system on a biennial basis.

b. Findings

No findings were identified.

1EP5 Maintenance of Emergency Preparedness

a. Inspection Scope

The inspectors reviewed the corrective actions identified through the Emergency Preparedness program to determine the significance of the issues, the completeness and effectiveness of corrective actions, and to determine if issues were recurring. The licensee's post-event after action reports, self-assessments, and audits were reviewed to assess the licensee's ability to be self-critical, thus avoiding complacency and degradation of their emergency preparedness program. Inspectors reviewed the licensee's 10 CFR 50.54(q) change process, personnel training, and selected evaluations of Emergency Preparedness document revisions to assess adequacy. The inspectors toured facilities and reviewed equipment and facility maintenance records to assess licensee's adequacy in maintaining them. The inspectors evaluated the capabilities of selected radiation monitoring instrumentation to adequately support Emergency Action Level (EAL) declarations.

The inspection was conducted in accordance with NRC Inspection Procedure 71114.05, Maintenance of Emergency Preparedness. The applicable planning standards, related 10 CFR 50, Appendix E requirements, and 10 CFR 50.54(q) and (t) were used as reference criteria.

The inspectors reviewed various documents which are listed in the Attachment to this report. This inspection activity satisfied one inspection sample for the maintenance of emergency preparedness on a biennial basis.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety and Public Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls

a. Inspection Scope

Hazard Assessment and Instructions to Workers: During facility tours, the inspectors directly observed labeling of radioactive material and postings for radiation areas, high radiation areas (HRA)s, and Very High Radiation Areas (VHRA)s established within the radiologically controlled area (RCA) of the auxiliary building, Unit 2 reactor containment building, and radioactive waste (radwaste) processing and storage locations. The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys for selected RCA areas. The inspectors reviewed survey records for several plant areas including surveys for alpha emitters, discrete radioactive particles, airborne radioactivity, gamma surveys with a range of dose rate gradients, and pre-job surveys for upcoming tasks. The inspectors also discussed changes to plant

operations that could contribute to changing radiological conditions since the last inspection. For selected outage jobs, the inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details to assess communication of radiological control requirements and current radiological conditions to workers.

Hazard Control and Work Practices: The inspectors evaluated access barrier effectiveness for selected Locked High Radiation Area (LHRA) locations and discussed changes to procedural guidance for LHRA and VHRA controls with health physics (HP) supervisors. The inspectors reviewed implementation of controls for the storage of irradiated material within the spent fuel pool. Established radiological controls (including airborne controls) were evaluated for selected Unit 2 Refueling Outage 22 (2R22) tasks including loop stop valve maintenance, heat exchanger eddy current testing, and reactor coolant system piping laser mapping. In addition, the inspectors reviewed licensee controls for areas where dose rates could change significantly as a result of plant shutdown and refueling operations.

Through direct observations and interviews with licensee staff, inspectors evaluated occupational workers' adherence to selected RWPs and HP technician proficiency in providing job coverage. Electronic dosimeter (ED) alarm set points and worker stay times were evaluated against area radiation survey results for selected 2R22 job tasks. The inspectors also reviewed the use of personnel dosimetry (ED alarm response, extremity dosimetry, multibadging in high dose rate gradients, etc.).

Control of Radioactive Material: The inspectors observed surveys of material and personnel being released from the RCA using small article monitor, personnel contamination monitor, and portal monitor instruments. The inspectors reviewed calibration records for selected release point survey instruments and discussed equipment sensitivity, alarm setpoints, and release program guidance with licensee staff. The inspectors compared recent 10 Code of Federal Regulations (CFR) Part 61 results for the Dry Active Waste (DAW) radioactive waste stream with radionuclides used in calibration sources to evaluate the appropriateness and accuracy of release survey instrumentation. The inspectors also reviewed records of leak tests on selected sealed sources and discussed nationally tracked source transactions with licensee staff.

Problem Identification and Resolution: The inspectors reviewed and assessed CRs associated with radiological hazard assessment and control. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also reviewed recent self-assessment results.

Radiation protection activities were evaluated against the requirements of UFSAR Section 12; TS Sections 5.4 (Procedures) and 5.7 (High Radiation Areas); 10 CFR Parts 19 and 20; and approved licensee procedures. Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, "Control of Radioactively Contaminated Material." Documents reviewed are listed in the Attachment to this report.

b. Findings

No findings were identified.

2RS6 Radioactive Gaseous and Liquid Effluent Treatment

a. Inspection Scope

Event and Effluent Program Reviews: The inspectors reviewed the 2011 and 2012 Annual Radiological Effluent Release Report documents for consistency with requirements in the Offsite Dose Calculation Manual (ODCM) and TS. There were no new changes for the inspectors to review in the ODCM. Routine and abnormal effluent release results and reports, as applicable, were reviewed and discussed with responsible licensee representatives. Status of the radioactive gaseous and liquid effluent processing and monitoring equipment as described in the UFSAR and current ODCM were discussed with responsible staff.

Radioactive Waste Treatment Systems: The inspectors walked-down the gaseous and liquid radioactive waste (radwaste) processing and discharge systems for material condition and configuration. To the extent practical, the inspectors observed and evaluated the material condition of in-place waste processing equipment for indications of degradation or leakage that could constitute a possible release pathway to the environment. Inspected components included waste monitor tanks (clarifier), waste gas decay tanks, ventilation filtration systems, boron recovery tanks, vendor-supplied liquid waste processing equipment, and associated piping and valves. The inspectors interviewed licensee staff regarding radwaste equipment configuration and effluent monitor operation. The inspectors also reviewed surveillance testing records for auxiliary building ventilation filtration systems.

Effluent Processing: The inspectors observed the collection of airborne and liquid effluent samples from the Ventilation Vent Monitors, Boron Recovery Tank, Steam Generator High Capacity Blow Down Tank, and the Clarifier Effluent Proportional Tank. Inspectors observed technician proficiency in collecting and analyzing some of the samples. The inspectors discussed liquid and gaseous effluent discharge pathways and operability of the effluent radiation monitors with plant personnel. The inspectors reviewed gaseous and liquid release permits, effluent monitor setpoints, and public dose calculations. The reviews included review and discussion of selected dose calculation summaries. Release quantities and dose impacts were reviewed and discussed. Inspectors reviewed 10 CFR 61 analysis data. The inspectors reviewed the calculated public dose results for any indications of higher than anticipated or abnormal releases. The inspectors also reviewed compensatory sampling data for time periods when selected radiation monitors were out of service. The inspectors reviewed the results of the radiochemistry cross-check program for 2011 and 2012 to evaluate the quality of the radioactive effluent sample analyses. Recent land use census results and meteorological data used to calculate doses to the public were evaluated as part of inspection procedure 71124.07.

Ground Water Protection: The inspectors reviewed the current groundwater sample results. The inspectors discussed possible changes in the groundwater program and site hydrology and recently identified tritium in several on-site monitoring wells. The groundwater program was discussed with Radiation Protection representatives. The inspectors reviewed and discussed the licensee's program for monitoring of structures, systems, and components with the potential to release radioactive material to the environment, including selected portions of the liquid radwaste system. Potential effluent release points due to onsite surface water bodies were also evaluated.

Problem Identification and Resolution: The inspectors reviewed selected CAP CR documents in the areas of gaseous and liquid effluent processing and release activities. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with procedure PI-AA-200, "Corrective Action," Revision 21. The inspectors also discussed the scope of the licensee's internal audit program and reviewed recent assessment results.

Effluent process and monitoring activities were evaluated against details and requirements documented in UFSAR Sections 11 and 12; ODCM; TS 5.6.3 (Annual Radioactive Release Report),10 CFR Part 20; Appendix I to 10 CFR Part 50; and approved licensee procedures. In addition, ODCM and UFSAR changes since the last onsite inspection were reviewed against the guidance in NUREG-1301 and Regulatory Guide (RG) 1.109, RG 1.21, and RG 4.1. Records reviewed are listed in the Attachment to this report.

b. Findings

No findings were identified.

2RS7 Radiological Environmental Monitoring Program (REMP)

a. Inspection Scope

REMP Implementation: The inspectors observed routine sample collection and surveillance activities as required by the licensee's environmental monitoring program. The inspectors noted the material condition and operability of airborne particulate filter and iodine cartridge sample stations and observed collection of weekly air samples and rainwater at selected monitoring locations. Environmental thermoluminescent dosimeters at selected sites were checked for material condition. The inspectors determined the current location of selected sample points using global positioning system instrumentation. Land use census results, changes to the ODCM, and sample collection/processing activities were discussed with environmental technicians and licensee staff. The current status and completeness of the licensee's 10 CFR 50.75(g) decommissioning files were reviewed and discussed, as well as the licensee's assessment of structures, systems, and components that could potentially leak material into the groundwater. Additional assessment of the ground water protection program to include sampling of wells and curtain drain systems was performed in section 2RS6.

The inspectors reviewed the last two calibration records for selected environmental air samplers. The inspectors also reviewed the 2010, 2011 and 2012 Annual Radiological Environmental Operating Reports, interlaboratory cross-check program results, and procedural guidance for environmental sample collection and processing. Selected environmental measurements were reviewed for consistency with licensee effluent data, evaluated for radionuclide concentration trends, and compared with detection level sensitivity requirements.

Meteorological Monitoring Program: The inspectors performed a walk down with licensee staff of the meteorological tower. The inspectors observed the physical condition of the tower and its instrumentation and discussed equipment operability and maintenance history with licensee staff. The inspectors evaluated transmission of locally generated meteorological data to other licensee groups such as emergency operations personnel and main control room operators. For the meteorological measurements of wind speed, wind direction, and temperature, the inspectors reviewed the last two calibration records for applicable tower instrumentation.

Identification and Resolution of Problems: The inspectors reviewed selected CRs in the areas of radiological environmental monitoring and meteorological tower maintenance. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with PI-AA-200, "Corrective Action," Revision 21.

Licensee procedures and activities related to meteorological monitoring were evaluated against: ODCM; UFSAR Chapter 11; TS 5.6.1 (Annual Radiological Environmental Operating Report) and proposed revision 1 to RG 1.23, Meteorological Programs in Support of Nuclear Power Plants (1980). Documents reviewed are listed in the Attachment to this report.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

a. Inspection Scope

Waste Processing and Characterization: During inspector walk-downs, accessible sections of the liquid and solid radwaste processing systems were assessed for material condition and conformance with system design diagrams. Inspected equipment included radwaste storage tanks; resin transfer piping, resin and filter packaging components; and abandoned evaporator equipment. The inspectors discussed component function, processing system changes, and radwaste program implementation with licensee staff.

The 2010, 2011, and 2012 Annual Radiological Effluent Release Reports and radionuclide characterizations for selected waste streams were reviewed and discussed with Radioactive Material Control (RMC) staff. For the Unit 1, Unit 2, and Common DAW waste streams the inspectors evaluated analyses for hard-to-detect nuclides, reviewed

the use of scaling factors, and examined quality assurance comparison results between licensee waste stream characterizations and outside laboratory data. Waste stream mixing and concentration averaging methodology for resins and filters was evaluated and discussed with RMC staff. The inspectors also reviewed the licensee's procedural guidance for monitoring changes in waste stream isotopic mixtures and discussed radionuclide characterization data for radioactive filter media, and resins.

Radioactive Material Storage: During walk-downs of indoor and outdoor radioactive material storage areas located inside and outside the protected area, the inspectors observed the physical condition and labeling of storage containers and the posting of Radioactive Material Areas. The inspectors also reviewed licensee procedural guidance for storage and monitoring of radioactive material. Radioactive material and waste storage activities were reviewed against the requirements of 10 CFR Part 20.

Transportation: There were no significant shipments during the week of inspection, however the inspectors did review shipping procedure requirements and discussed preparation of shipping documents, package marking and labeling, and interviewed shipping technicians regarding Department of Transportation (DOT) regulations.

Selected shipping records were reviewed for consistency with licensee procedures and compliance with NRC and DOT regulations. The inspectors reviewed emergency response information, DOT shipping package classification, waste classification, radiation survey results, and evaluated whether receiving licensees were authorized to accept the packages. Licensee procedures for handling shipping containers were compared to Certificate of Compliance requirements and manufacturer recommendations. In addition, training records for selected individuals currently qualified to ship radioactive material were reviewed.

Problem Identification and Resolution: The inspectors reviewed CRs in the area of radioactive material control, radwaste processing, and transportation. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with procedure PI-AA-200, "Corrective Action," Revision 21. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results.

Radwaste processing activities and equipment configuration were reviewed for compliance with the licensee's Process Control Program and UFSAR, Chapter 11. Waste stream characterization analyses were reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 61, and guidance provided in the Branch Technical Position on Waste Classification (1983). Transportation program implementation was reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 71, 49 CFR Parts 172-178, as well as the guidance provided in NUREG-1608. Training activities were assessed against 49 CFR Part 172 Subpart H. Documents reviewed are listed in the Attachment to this report.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

.1 Barrier Integrity

a. Inspection Scope

The inspectors performed a periodic review of the following two barrier integrity Unit 1 and 2 PIs 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," 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 April 1, 2012 through March 31, 2013. Documents reviewed included applicable NRC inspection reports, licensee event reports, operator logs, station performance indicators, and related CRs.

- RCS Specific Activity (BI01)
- Reactor Coolant System Leakage (BI02)

b. Findings

No findings were identified.

.2 Emergency Preparedness

a. Inspection Scope

The inspectors sampled licensee submittals relative to the PIs listed below for the period April 1, 2012, through March 31, 2013. To verify the accuracy of the PI data reported during that period, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, were used to confirm the reporting basis for each data element.

- Drill/Exercise Performance (DEP)
- Emergency Response Organization Drill Participation (ERO)
- Alert and Notification System Reliability (ANS)

For the specified review period, the inspector examined data reported to the NRC, procedural guidance for reporting PI information, and records used by the licensee to identify potential PI occurrences. The inspectors verified the accuracy of the PI for ERO drill and exercise performance through review of a sample of drill and event records. The inspectors reviewed selected training records to verify the accuracy of the PI for ERO drill participation for personnel assigned to key positions in the ERO. The inspectors verified the accuracy of the PI for alert and notification system reliability through review of a sample of the licensee's records of periodic system tests. The inspectors also interviewed the licensee personnel who were responsible for collecting

and evaluating the PI data. Licensee procedures, records, and other documents reviewed within this inspection area are listed in the Attachment to this report. This inspection satisfied three inspection samples for PI verification on an annual basis.

b. Findings

No findings were identified.

.3 Occupational/Public Radiation Safety

a. Inspection Scope

Occupational Radiation Safety Cornerstone: The inspectors reviewed the Occupational Exposure Control Effectiveness PI results for the Occupational Radiation Safety Cornerstone from April 2012 through December 2012. The inspectors also reviewed ED alarm logs and CRs related to controls for exposure significant areas. Documents reviewed are listed in the Attachment to this report.

Public Radiation Safety Cornerstone: The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results for the Public Radiation Safety Cornerstone from April 2012 through December 2012. For the assessment period, the inspectors reviewed cumulative and projected doses to the public contained in liquid and gaseous release permits and CRs related to Radiological Effluent TS/Offsite Dose Calculation Manual issues. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in the Attachment to this report.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution

.1 Review of Items Entered into the Corrective Action Program

As required by NRC 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 Sample: Review of CR508838, 2-CH-P-1A Shaft Sleeve Set Screw Torque Appears to be Insufficient

a. Inspection Scope

The inspectors performed a review regarding the licensee’s assessments and corrective actions for CR508838, 2-CH-P-1A Shaft Sleeve Set Screw Torque Appears to be

Insufficient," to ensure that the full extent of the issue was identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspectors also reviewed ACE019428 sent to maintenance to investigate the cause of the seal issue on charging pump 2-CH-P-1A. The inspectors evaluated the CR against the requirements of the licensee's CAP as specified in procedure, PI-AA-200, "Corrective Action Program," Revision 21, and 10 CFR 50, Appendix B.

b. Findings and Observations

In general, the inspectors verified that the licensee had identified problems at an appropriate threshold and entered them into the CAP database, and had proposed or implemented appropriate corrective actions. The enforcement aspects of this issue are as discussed in Section 4OA7.

.3 Annual Sample: Review of CR507231, 2-CH-P-1A outboard pump seal has a 120 M/L min leak

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions for CR507231, "2-CH-P-1A outboard pump seal has a 120 M/L min leak," to ensure that the full extent of the issue was identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspectors also reviewed ACE019411 investigate the cause of the outboard pump seal leak. WO59102572932 was issued for repairs. The inspectors evaluated the CR against the requirements of the licensee's CAP as specified in procedure, PI-AA-200, "Corrective Action Program," Revision 21, and 10 CFR 50, Appendix B.

b. Findings and Observations

No findings were identified. In general, the inspectors verified that the licensee had identified problems at an appropriate threshold and entered them into the CAP database, and had proposed or implemented appropriate corrective actions.

.4 Annual Sample: CR501347, Weld leak on 2H EDG lube oil line between 2-EG-P-2H and 4.5 inch lube oil header

a. Inspection Scope

The inspectors performed a review regarding the licensee's assessments and corrective actions for CR501347, "Weld leak on 2H EDG lube oil line between 2-EG-P-2H and 4.5 inch Lube oil header," to ensure that the full extent of the issue was identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspectors also reviewed ACE019363 documentation of the cause of the weld leak and the operability assessment. The inspectors evaluated the CR against the requirements of the licensee's CAP as specified in procedure, PI-AA-200, "Corrective Action Program," Revision 21, and 10 CFR 50, Appendix B.

b. Findings and Observations

In general, the inspectors verified that the licensee had identified problems at an appropriate threshold and entered them into the CAP database, and had proposed or implemented appropriate corrective actions. The enforcement aspects of this issue are as discussed in Section 4OA7.

.5 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's corrective 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 corrective 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 January through June 2013, 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. Documents reviewed are listed in the Attachment to this report.

b. Findings and Observations

No findings of significance were identified. In general, the licensee has identified trends and has addressed the trends with their corrective action program.

4OA5 Other Activities

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 were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On July 29, 2013, the senior resident inspector presented the inspection results to Mr. G. Bischof and other members of the staff, who acknowledged the findings. The inspectors verified no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy for being dispositioned as Non-Cited Violations.

- Technical Specification 5.4.1.a states, in part, that written procedures shall be implemented covering the applicable procedures recommended in RG 1.33, Revision 2, Appendix A, February 1978, of which Section 9 specifies procedures for performing maintenance. Contrary to this, on March 21, 2013, the licensee identified that during the week of March 18, 2013, maintenance personnel tightened the locking collar set screws on the Unit 2 'A' charging pump to an incorrect torque value of 10.5 ft-lbs, as specified in station procedure 0-MCM-0103-01, "Repair of the Charging and High Head Safety Injection Pump," Step 6.32.6, instead of the manufacturer recommended value of 35 ft-lbs. Specifically, the Unit 2 'A' charging pump was degraded because the mechanical shaft sleeve overheated during pump operation due to insufficient tightening of the locking collar set screws.

  The inspectors determined that this finding was of very low safety significance (Green) because the finding did not represent an actual loss of function of at least a single train for greater than its technical specification allowed outage time or two separate safety systems out-of-service for greater than its technical specification allowed outage time. The inspectors determined that the licensee correctly evaluated the finding and developed appropriate corrective action as documented in the licensee's CAP as CR508838.

- 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states, in part, that activities affecting quality shall be prescribed by documented instructions or procedures appropriate to the circumstances. Contrary to this, following the January 2, 2013 leak on the 2H EDG, the licensee identified that in May 2010 licensee personnel failed to prescribe the installation of rubber expansion joints on the 2H EDG with procedures or instructions appropriate to the circumstances. Specifically DC-NA-09-00170, "EDG Lube Oil S-Line Flexible Connection" did not contain post design change testing instructions that verified that the design change

did not create an unintended deficiency as required by CM-AA-DDC-301, “Post Design Change Testing”, Revision 1.

The inspectors determined that this finding was of very low safety significance (Green) because the finding did not represent an actual loss of function of at least a single train for greater than its technical specification allowed outage time or two separate safety systems out-of-service for greater than its technical specification allowed outage time. The inspectors determined that the licensee correctly evaluated the finding and developed appropriate corrective action as documented in the licensee’s CAP as CR501347.

ATTACHMENT: SUPPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

Licensee personnel:
M. Becker, Manager, Nuclear Outage and Planning
G. Bischof, Site Vice President
D. Blakeney, Director, Nuclear Station Safety & Licensing
P. Bradley, Supervisor, Health Physics Operations
R. Britt, Boric Acid Corrosion Program
A. Cass, Telecommunications Lead Technician
C. Cherry, ISI Program Engineer
J. E. Collins, Manager, Emergency Preparedness
J. Daugherty, Manager, Nuclear Maintenance
B. Derreberry, Supervisor, ISI/NDE
R. Evans, Manager, Radiological Protection
B. Gaspar, Manager, Nuclear Site Services
J. Graf, EP Specialist
C. Gum, Fleet Manager, Emergency Preparedness
K. Hacker, NDE
R. Hanson, Manager, Nuclear Protection Services
E. Hendrixson, Director, Nuclear Site Engineering
S. Hughes, Manager, Nuclear Operations
P. Kemp, Supervisor, Station Licensing
J. Leberstien, Technical Advisor, Station Licensing
C. McClain, Manager, Nuclear Training
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J. Plossl, Supervisor, Nuclear Station Procedures
J. Schleser, Manager, Nuclear Organizational Effectiveness
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T. Shalaski, EP Specialist
G. Simmons, Supervisor, Health Physics Tech Services
J. Swenson, Welding Engineer
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M. Whalen, Technical Advisor, Station Licensing

Attachment

## LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Opened and Closed

None

Discussed

None

## LIST OF DOCUMENTS REVIEWED

### Section 1R01: Adverse Weather Protection

NAPS UFSAR, Table 3.2-1, "Structures, Systems, and Components that are Designed to Seismic and Tornado Criteria," Revision 48
NAPS UFSAR, Chapter 3.3, "Wind and Tornado Design Criteria," Revision 48

### Section 1R04: Equipment Alignment

SDBD-NAPS-QS, "System Design Basis Document for Quench Spray System," Revision 16
CR503260, "Heat Trace Low Alarm on CKT 487"
CR503311, "487N heat trace adjusted"
CR513520, "Fail QC Hold inspection"
CR513521, "2-QS-11 will not freely move to the closed seat."
WO59102553470 02-HT-HTT-ET-487N-HEATER "Heat Trace Low Alarm on CKT 487"
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GMP-M-152, "Installation of Safety-Related and Non-Safety-Related Piping Systems," Revision 18
CR514818, "2-QS-P-1B Suction flange bolts torque in excess of procedure"
CR514477, "2-QS-P-1B Suction Flange leak"
CR513051, "BDB RCS Make-up Connection Fit-up Offset Requires Remediation"
CR511735, "WO needed to shim pipe support 2-QS-R-402.145"
CR513147, "Request measures to compensate for misalignment of flanges
DC NA-12-00066"

### Section 1R05: Fire Protection

0-FS-TB-1, "Turbine Building Fire Fighting Strategy," Revision 0
2-FS-C-1, "Loss Prevention Fire Strategy Containment Unit 2," Revision 4

**Section 1R07: Heat Sink**

Virginia Power Administrative Procedure (VPAP) Service Water Inspection and Maintenance Program," Revision 6
Procedure ER-AA-HTX-1003, "Heat Exchanger Monitoring and Assessment," Revision 5
Procedure 2-MOP-49.35, "Dry Lay-Up of Recirc Spray Heat Exchangers (Service Water Side)," Revision 3
Procedure 0-PT-75.14, "Service Water Wall Thickness Monitoring," Revision 15
WO59102171619, "Perform Eddy Current Testing"

**Section 1R08: Inservice Activities (IP 71111.08P, Unit 2)**

Corrective Action Documents
373299
459908
467649
477377
499295
505574
506293
510240
511202
511849
511286
LCO001122

Engineering Evaluations
CR453396/WO 59102403941
CR454954

Apparent Cause Evaluations
CR454954
019008 (CR459908) Through wall leak at socket for 2-CH-170 Pressure Indicator Branch Line

Drawings
DWG 12050-WMKS-01138, Inservice Inspection Isometric RC, RH & SI Systems, Revision 2
DWG 12050-PSSK-113B.09, Reactor Containment Loop 2 Low Head SI and RHR System-Unit 2

Procedures
2-PT-48, Visual inspection of Reactor Coolant Pressure Boundary Components, Revision 23
2-PT-48.1B, Visual Inspection of Class 2 and 3 Bolted Components Inside Reactor Containment-B Group
2-PT-48.4, Bare Metal Inspection of Vessel BMI Nozzles, Revision 6
2-PT-48.5, Leakage Inspection above Reactor Vessel Head
EP-AP-BAC-10, Revision 9, Boric Acid Corrosion Control Program
ER-AP-BAC-101, Revision 8, Boric Acid Corrosion Control Program Inspections
ER-AP-BAC-102, Revision 9, Boric Acid Corrosion Control Program Evaluation

ER-AA-NDE-PT-300-NPQR, ASME Section XI Liquid Penetrant Examination Procedure, Revision 2
ER-AA-NDE-PT-301, "Balance of Plant (BOP) Liquid Penetrant Examination Procedure," Revision 5
ER-AA-NDE-RT-400, Radiographic Examination Procedure, Revision 0
ER-AA-NDE-UT-800, Appendix VIII Qualified Equipment Tables for PDI Generic Procedures, Revision 3
ER-AA-NDE-UT-802, Ultrasonic Examination of Austenitic Piping Welds in Accordance with ASME Section XI, Appendix VIII, Revision 2
ER-AA-NDE-UT-815, Procedure for Encoded Phased Array Ultrasonic Examination of Dissimilar Metal Piping Welds, Revision 3
ER-AA-NDE-VT-602, Visual Examination Procedure, Revision 3
ER-AA-NDE-VT-603, VT-3 Visual Examination Procedure, Revision 4
O-MCM-1800-01, Mechanical Corrective Maintenance, Revision 0
O-MCM-1801-01, Welding Safety-Related and Seismic-Related Equipment, Revision 22
P-101, General Piping and Pressure Vessel Welding Procedure, Revision 17
PI-AA-300-3002, Apparent Cause Evaluation, Revision 5

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Personnel NDE Examiner Qualification Records for: J. Currao, J. Cole, T. Blechinger, J. Devers, N. Huls, D. Block, G. Fuechtmann, D. Popp, C. Van Ruler, R. Blanchard, T. Kupfer, M. Eustice, L. Espana
Welder Qualification Records for: W. Callis, T. McGlothin, N. Sadler, A. Tarango, N. Wooten, B. Bachelor, C. Bise
Equipment Certifications for Digital Thermometers, X-Ray Film Step
Materials Certifications for PT Cleaner, Developer, Penetrant
IWE Containment Liner Examination, 4/19/2010, WO59101919553
IWE Containment Examination, 4/17/2010, WO59101919553
IWL Concrete Surface Examination, WO59101703615
IWL Reactor Vessel Support Examination, WO59102385531
Self Assessment, Welding, dated 9/30/2009
Self Assessment, ISI, dated 12/7/2009
Self Assessment, BACCP, dated 10/19/2012
Self Assessment, Alloy 600, dated 9/2004
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Boric Acid Program Health Report, Q4 2012
Self Assessment, Welding, dated 9/30/2009
Self Assessment, ISI, dated 12/7/2009
Self Assessment, BACCP, dated 10/19/2012
Self Assessment, Alloy 600, dated 9/2004
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Boric Acid Program Health Report, Q4 2012
Procedure Qualification Record Nos. 801 Revision 2, 805 Revision 3, 809 Revisions2, 830 and 831
Weld Technique Sheet No. 803
Welding package WO 59102219019, Charging / SI, 02-CH-MOV-2289 Valve Replacement
North Anna Power Station Unit 2 Fourth Interval In-service Inspection Plan, Revision 2/2/2013

North Anna Power Station Unit 2 Interval In-service Inspection Schedule, Revision 3/1/2013
North Anna Unit 2 Reactor Vessel Top Mounted N-729-1 Examination, WO 59102346793, Top Mounted Instrumentation, RFO 21, Summary # N2.B4.30.001
North Anna Unit 2 Reactor Vessel To Mounted N-729-1 Examination, WO59102376793, CRDM Nozzles, RFO 22
Ultrasonic Examination (UT) – Manual, Pressurizer Spray Line, Elbow to Pipe, WO9102532605
Ultrasonic Examination (UT) – Phased Array, Curtiss Wright Report # VE-13-006, Summary # N2.R1.20.0414, RC Loop C- SG Inlet Nozzle, WO 59102532605
Liquid Penetrant Examination (PT), 2-CH-308 check valve to pipe, Reactor Coolant System, WO59102583598
Radiography Examination (RT), Charging/SI, 02-CH-MOV-2289 Valve Replacement, WO59102219019
Visual Examination (VT-2), Charging/SI, 02-CH-MOV-2289 Valve Replacement, WO59102219019
Visual Examination of Bottom Mounted Instrumentation (BMI) Nozzles following ASME Code Case N-722, WO59102099243
Eddy Current (ET) Inspection of Incore Flux Thimble Tubes 2-IC-SEAR-1-TABLE for MRP 227A, WO59102372103
North Anna Power Station Unit 2 Technical Specifications, TSTF 510, Revision 2, Steam Generator Program
Condition Monitoring and Operational Assessment CMOA) for SGISI CM-AA-ETE-101, dated 10/6/2011
Unit 2 Long Range Plan for SGISI, dated 3/13/2013

**Section 1R12: Maintenance Effectiveness**

CR501347, "Weld leak on 2H EDG Lube oil line between 2-EG-P-2h and 4.5 lube oil header"
NA-CALC-PSS-DEO-0580, "Lube oil pipe support," Revision 0
WO59102054604, "EDG Lube oil S-Line Flexible Connections on Unit 2 EDG's IAW DC 09-00170," Revision 0
Drawing, 59-0-G465-CP10A023, "2-EG-REJ-2H4," Sheet 1, Revision 0
Drawing, 59-0-G465-CP10A023, "2-EG-REJ-2H3," Sheet 2, Revision 0
Drawing, 59-0-G465-CP10A023, "2-EG-REJ-2H1, 2-EG-REJ-2H2," Sheet 3, Revision 0

**Section 1R15: Operability Determinations and Functionality Assessments**

CR498184, "Indication of fuel rod failure in North Anna 2 Cycle 22"
CR506560, "Initiate OD for N2C23 to address the fuel rod bow phenomenon"
CR511070, "Suspected Fuel Leakers"
CR511529, "CR created to document identified leaking fuel assembly"
OD000526, "OD for N2C23 to Address Fuel Rod Bow Phenomenon"
IOD000187, "Missing Documentation for Fabrication/Inspection of Flange Alignment Piece"
CR516175, "Missing documentation for fabrication/inspection of flange alignment piece"
CR516312, "2-QS-P-1B suction flange has moist boric acid on bottom and sides of gasket"

**Section 1R19: Post Maintenance Testing**

1-FC-P-1B
WO59102095825 02-EE-BKR-2H1-2S-M1-CKTBRK "Replace Contactor"
WO59101764185 02-EE-BKR-2H1-2S-M1-CKTBRK "Bolt-on Breaker PM"
0-ECM-0312-01, "Replacement of Klockner-Moeller Motor Contactors," Revision 19
0-EPM-0304-01, "Testing/Replacing 480-Volt Breaker Assemblies," Revision 69
CR512654, "1-FC-P-1B red and green lights ON with pump secured"
CR512678, "Wiring terminated to normally closed contact vice a normally open contact"
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Drawing, 12050-FE-9GJ, "Internal Wiring Diagram 480V MCC F.V.N.R. Mot Strs," Sheet 1, Revision 5
Drawing, 12050-ESK-6GH, "Elementary Diagram 480 V Circuits Misc Pumps," Sheet 32, Revision 5
Drawing, 12050-FE-9FA, "Wiring Diagram 480V Emer MCC 2H1-2S Sect M Cable Tunnel – El. 259-6," Sheet 1, Revision 1

**Section 1R20: Refueling and Other Outage Activities**

0-MCM-1110-02, "Installation of Reactor Vessel Head," Revision 48
0-GOP-3.6, "Containment Housekeeping, Closeout, and Cleanliness," Revision 8
2-OP-1.7, "Unit Startup from Mode 3 to Mode 2 Following Refueling," Revision 25
2-OP-1C.1, "Estimated Critical Concentration Calculation," Revision 5

**Section 1R22: Surveillance Testing**

Penetration 31: 2-PT-61.3, "Containment Type C Test," Revision 41
ETE-NA-2013-0025, "Engineering Evaluation of Mechanical Agitation of 2-SI-106," Revision 0
1-PT-52.2A, "Reactor Coolant System Leak Rate (Computer Calculation)," Revision 34

**Section 1EP2: Alert and Notification System Evaluation**

Procedures and Reports
North Anna Power Station Emergency Plan, Rev. 39
FEMA Analysis of Alert Notification System for North Anna Plant dated October 19, 1987
SAFER Alert Notification System upgraded design report, March 21, 2013
Whelen WPS-2800 Series Siren System Operating Manual
0-PT-172.6, Early Warning System Sirens Activation Monitoring, Rev. 2
0-PT-172.7, Early Warning System Polling Functional Test, Rev. 3
0-PT-172.8, Early Warning System Polling (Innsbrook) Functional Test, Rev. 1
Emergency Warning System (EWS) North Anna/Surry, Rev. H
North Anna Power Station public information brochures

Records and Data
Early Warning System Polling Function bi-monthly Tests, test results August 2011 to May 2013

Early Warning System Activation Quarterly Monitoring, test results August 2011 to June 2013
North Anna EWS Test Form Telecommunications Operability Testing Quarterly Siren Maintenance 2011 - 2013
North Anna EWS Test Form Telecommunications Operability Testing Annual Siren Maintenance-2012/2013

Corrective Action documents
500520; siren low voltage readings
504719; elevated voltage on siren #59

**Section 1EP3: Emergency Response Organization Staffing and Augmentation System**

Procedures
NACA-3.05, Augmentation of Emergency Response Organization – Assessment Instructions, Rev. 7
EPCP-0010, Nuclear Emergency Preparedness Training Program, Rev. 5
TR-NA-TPG-2400, Nuclear Emergency Responder Training Program Guide, Rev. 1
EPIP-3.02, Activation of Technical Support Center, Rev. 34
EPIP-3.03, Activation of Operational Support Center, Rev. 20
CPIP-3.2, North Anna LEOF Activation, Rev. 22
EPIP-3.05, Augmentation of Emergency Response Organization, Rev. 8
NAEP Table 5.1 NUREG 0654 Table B1 Site Equivalent, Rev. 39

Records and Data
Travel time calculations for selected ERO members
Training and qualification records for selected ERO members
2012 shift staffing analysis
Current ERO member roster
Augmentation Capability Assessments – ERO response drill results for 2012 and 2013
Management Critique report – Off-Hours Call-In Drill of December 2011

Corrective Action documents
478049; ERO Notification delayed during EP drill
500674; Correct gaps identified in on-shift staffing analysis
516302 and 514072; NAPS ERO coverage below minimum standard

**Section 1EP5: Maintenance of Emergency Preparedness**

Procedures
North Anna Power Station Emergency Plan, Rev. 39
EP-AA-101, 10 CFR 50.54(q) Change Evaluation, Rev. 4
EP-AA-303, Equipment Important to Emergency Response, Rev. 5
EP-AA-400, Drill and Exercise Program, Rev. 3
PI-AA-200, Corrective Action, Rev. 21
VPAP-2601, Maintaining Emergency Preparedness, Rev. 23

Records and Data
Training Drill Management Critiques: 2011, 2012, 2013
Nuclear Oversight Audits 12-02 and 13-02: Emergency Preparedness
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Self Assessment Report 2330, ERO Availability Trend Analysis, dated June 13, 2013
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485561; Inaccurate PAR
495166; Inaccurate PAR
503222; Inaccurate GE classification
519724; FMT van NRC observation

**Section 2RS1: Radiological Hazard Assessment and Exposure Controls**

Procedures, Guidance Documents, and Manuals
RP-AA-201, "Access Controls for High and Very High Radiation Areas," Revision 7
RP-AA-202, "Radiological Posting," Revision 6
RP-AA-203, "Radiological Labeling and Marking," Revision 2
RP-AA-225, "Unrestricted Release of Material," Revision 4
RP-AA-226, "Alpha Monitoring," Revision 2
PI-AA-200, "Corrective Action," Revision 21

Records and Data
HP-OPs – General Rules for the U2 Outage – April 2013
Facility Characterization of Alpha Source Term, 1/25/13
RP-AA-270-Attachment 1, Stay Time Tracking Form, RWP 13-2269-1, 4/21/13
RWP 13-1207, Routine Duties, Walkdown, and Valve Line-ups by OPs Personnel, Revision 0
RWP 13-2226, Decon Housekeeping, Revision 0
RWP 13-2230, Walkdowns, Inspections, and Observations, Revision 0
RWP 13-2262, E/C Testing on 2-CH-E-2 & 2-CH-E-1, Revision 1
RWP 13-2269, 2-RC-MOV-2593 Associated Work, Revision 1
Air Sample Count Room Log, 4/9/13 – 4/23/13
Radiological Survey, Aux Building 259' Gas Strippers, 3/7/13
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Radiological Survey, Non-Regen Hx Cubes, 4/24/13
Radiological Survey, Non-Regen Hx Cubes, 4/23/13
Radiological Survey, Aux Building 274', 4/24/13
Radiological Survey, U2 Reactor Containment 241', 4/18/13
Radiological Survey, U1 "A" Loop Room Overhead View, 4/10/13
Radiological Survey, U2 Transfer Canal, Containment Side, 4/9/13
Radiological Survey, Warehouse #9, 4/18/13
Radiological Survey, Warehouse #9, 4/3/13
Radiological Survey, 2-RC-MOV-2593 Inside Valve Body, 4/20/13
Radiological Survey, 2-RC-MOV-2593 Inside Valve Body, 4/19/13

C-HP-1071.010-Attachment 2, Sealed Source Leak Test, Source Nos. KR-4095, 83CS-33, 03127GY, 1792GM; 12/6/12, 6/12/12, 12/7/11, 6/6/11
C-HP-1033.440-Attachment 3, SAM-11 Calibration Certificate, Serial No. 371, 4/23/13
HP-1033.711-Attachment 4, PM-7 Calibration Certificate, Serial No. 432, 2/4/13
HP-1033.723-Attachment 4, iPCM12 Calibration Verification, Serial No. 1105PCM12044, 3/1/12
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0-PT-153-Attachment 1, NST Annual Inventory Report, 1/3/12

CAP Documents
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CR 466432
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**Section: 2RS6: Radioactive Gaseous and Liquid Effluent Treatment**

References
2012 Annual Radioactive Effluent Release Report
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Offsite Dose Calculation Manual, Revision 21
HP-3010-020, "Radioactive Liquid Waste Release Permits," Revision 5
HP-3010-021, "Radioactive Liquid Waste Sampling and Analysis," Revision 22
HP-3010-023, "Abnormal Liquid Release," Revision 11
HP-3010-031, "Radioactive Gaseous Waste Sampling and Analysis," Revision 34
HP-3010-030, "Radioactive Gaseous Waste Release Permits," Revision 11
HP-3010-033, "Abnormal Gaseous Release," Revision 17
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HP-3010.022 Attachment 7, Liquid Effluents Cumulative Dose Summary 2013, 04/04/13
HP-3010.032 Attachment 10, Gaseous Effluents Cumulative Dose Summary 2013, 04/04/13
Unplanned Gaseous Release Record, ID 11-AGR-05, 08/01/11-08/29/11
Unplanned Gaseous Release Record, ID 11-AGR-04, 07/01/11-07/31/11
Reactor Containment Release Record, Permit 12-RXC-11, 10/08/12
0-PT-77.4B, Laboratory Analysis- 1-HV-FL-3B ECCS Preacs, completed 4/10/12
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Corrective Action Program (CAP) Documents
CR437204
CR502590
CR461037
CR442387

**Section 2RS7: Radiological Environmental Monitoring Program (REMP)**

Procedures and Guidance Documents
VPAP-2103N, Offsite Dose Calculation Manual (North Anna), Revision 21
HP-3051.010, Radiological Environmental Monitoring Program, Revision 27
C-HP-1033.620, Portable Air Samplers Calibration and Operation, Revision 9
North Anna Power Station UFSAR Chapter 11, Section 11.6, Offsite Radiological Monitoring Program

Records and Data Reviewed
Work Order 0-PT-40.1, performed 2/22/2012 and 8/24/2012 using the following procedures:
- 0-ICP-MM-ST-100, Backup Weather Tower Sigma Theta Calibration, Revision 12
- 0-ICP-MM-Z-101B, Weather Tower 10 Meter Wind Direction Calibration, Revision 11
- 0-ICP-MM-TEMP-1, Primary Meteorological Tower Ambient Temperature and Differential Temperature Calibration, Revision 14
- 0-ICP-MM-SR-ZR-1A, Primary Meteorological Tower 10 Meter Wind Speed and Wind Direction Calibration, Revision 10---2/23/12
- 0-ICP-MM-SR-ZR-2, Backup Meteorological Tower Wind Speed and Wind Direction Calibration, Revision 11
- 0-ICP-MM-Z-101A, Weather Tower 48 Meter Wind Direction Calibration, Revision 11
- 0-ICP-MM-SR-ZR-1B, Primary Meteorological Tower 48 Meter Wind Speed and Wind Direction Calibration, Revision 11
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- 0-ICP-MM-Z-101C, Backup Weather Tower Wind Direction Calibration, Revision 9
- 0-ICP-MM-S-101C, Backup Weather Tower Wind Speed Calibration, Revision 10
- 0-ICP-MM-SR-ZR-1A, Primary Meteorological Tower 10 Meter Wind Speed and Wind Direction Calibration, Revision 10
- 0-ICP-MM-T-100A, Weather Tower 10 Meter Temperature Calibration, Revision 12
- 0-ICP-MM-T-100B, Weather Tower 10/48 Meter Delta Temperature Calibration, Revision 14
- 0-ICP-MM-SR-ZR-1B, Primary Meteorological Tower 48 Meter Wind Speed and Wind Direction Calibration, Revision 11

Calibration Certificates- Portable Air Sampler for Kits 1 through 15, Dated 10/10/12
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CAP Documents
Audit 11-11: Offsite Dose Calculation Manual, Radiological Environmental Monitoring Program and Environmental Protection Plan, 1/12/2012
CR455493
CR458499
CR458509
CR458515
CR458518

**Section 2RS8: Radioactive Material Processing and Transportation**

Procedures, Manuals, and Guides
CR455493
C-HP-1071.040, "Packaging and Shipment of Radioactive Material," Revision 10
C-HP-1072.010, "Packaging Radioactive Waste," Revision 2
C-HP-1072.030, "Computer Programs for Radwaste and Radioactive Material," Revision 1
C-HP-1072.050, "Radioactive Waste Transfer to Licensed Waste Processors," Revision 9
C-HP-1072.070, "Radioactive Waste Disposal Using the ENERGYSOLUTIONS Containerized Waste Facility," Revision 5
C-HP-1091.272, "Solid Radioactive Waste Control Program: Surveillance and Evaluation," Revision 11
HP-1071.021, "Storing Radioactive Material Outside the Protected Area," Revision 19
HP-1072.020, "Sampling, Analyzing, and Classifying Solid Radioactive Waste," Revision 11
RP-AA-111, "Monitoring and Improving Radiological Performance," Revision 2
RP-AA-232, "Radioactive Material Control," Revision 4
0-OP-20.6, "Dewatering CHEM-NUCLEAR 14-215 or Smaller Liners Containing Bead Resin or Activated Carbon," Revision 13
1-OP-20.1, "Operation of the Spent Resin Holdup Tanks," Revision 22
VPAP-2103N, "Offsite Dose Calculation Manual (North Anna)," Revision 21
VPAP-2104, "Radioactive Waste Process Control Program (PCP)," Revision 8
"Annual Radioactive Effluent Release Report North Anna Power Station (January 01, 2010 to December 31, 2010)," 4/26/11
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Shipping Records and Radwaste Data
NRC Certificate of Compliance, Cask Model No.: CNS 8-120B, S/N: 8-120B-15, CoC No. 9168, Package ID No. USA/9168/B(U), Expiration Date 6/30/2015, Revision 17

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Spreadsheet, "RAM Storage Areas," 3/19/2013
Spreadsheet, "Active/ Pending Waste Streams," 4/23/2013
Spreadsheet, "Filter Waste Classification Dose Rate Limits" [used to generate approved HP-1072.020, Attachment 6, "Limiting Radiation Levels for Cartridge Filters and Required Actions"]
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Radioactive Waste Shipment Log(s) for Calendar Year (CY) 2011, 2012, and 2013 (through 4/5/2013
Radioactive Material Shipment Log for Calendar Year (CY) 2011, 2012, and 2013 (through 3/13/2013
Report of Analysis, SRHUT Sample #1, Sample ID: 12-MAR-12-400055, LIMS Number: L44991-1, 2/23/2011
Report of Analysis, RPIX Sample #1, Sample ID: 12-MAR-12-400055, LIMS Number: L49811-1, 5/1/2012
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2011 Radioactive Shipment Record, 11-CWF-01, Shielded cask containing DAW/Charcoal/Soil/Metal, Type A Package
2011 Radioactive Shipment Record, 11-DUR-11, DAW and Activated Metal, Low Specific Activity (LSA-II)
2011 Radioactive Shipment Record 11-SPF-01, Dewatered Bead Resin, Type B Package
2012 Radioactive Shipment Record 12-CWF-01, Mechanical Filters/DAW/Sand, Type A Package
2012 Radioactive Shipment Record 12-DUR-08, DAW, Cartridge Filters, Low Specific Activity (LSA-II)
2013 Radioactive Shipment Record 13-SPF-01, Dewatered Bead Resin, Type B Package

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CR436092

**Section 4OA1: Performance Indicator (PI) Verification**

RP-AA-124-Attachment 6, Electronic Dosimeter Dose/Dose Rate Alarm Log, 1/3/12 – 4/12/13
RP-AA-124-Attachment 5, Electronic Dosimeter Does/Dose Rate Alarm Reports, 1/5/12, 4/18/13, 2/5/13
CR 501537
EP-AA-103, Emergency Preparedness Performance Indicators, Rev. 2

Documentation of Performance Indicator data from April 1, 2012 through March 31, 2013 for DEP, ANS, and ERO
519400; 50.54(t) reviews extent not explicit

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

ACE019363, ACE: Weld Leak 2H EDG Lube oil line
ACE019394, ACE to Engineering for 1-FC-P-1B ("B" spent fuel cooling pump) secured for motor HI temp
ACE019411, 2-CH-P-1A outboard pump seal has a 120 ML/min leak
ACE019440, 2H EDG Standby Lube Oil Circ pump found not running

## LIST OF ACRONYMS

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|---|---|
| ACE | Apparent Cause Evaluation |
| 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 |
| ISFSI | Independent Spent Fuel Storage Installation |
| JPM | Job Performance Measures |
| LHSI | Low Head Safety Injection |
| NCV | Non-cited Violation |
| NEI | Nuclear Energy Institute |
| NRC | Nuclear Regulatory Commission |
| OD | Operability Determination |
| PARS | Publicly Available Records |
| PI | Performance Indicator |
| PRT | Pressurizer Relief Tank |
| QS | Quench Spray |
| RCE | Root Cause Evaluation |
| RCP | Reactor Coolant Pump |
| RCS | Reactor Coolant System |
| RTP | Rated Thermal Power |
| SBO | Station Blackout |
| SDP | Significance Determination Process |
| SR | Surveillance Requirements |
| TDAFWP | Turbine Driven Auxiliary Feedwater Pump |
| TI | Temporary Instruction |
| 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 |