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

January 30, 2003

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

SUBJECT: NORTH ANNA POWER STATION - NRC INTEGRATED INSPECTION REPORT NOS. 50-338/02-04 AND 50-339/02-04

Dear Mr. Christian:

On January 4, 2003, the NRC completed an integrated inspection at your North Anna Power Station, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on January 15, 2003, with Mr. D. Heacock and other members of your staff.

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

This report documents four inspector-identified findings of very low safety significance (Green) that were determined to involve violations of NRC requirements. However, because of the very low safety significance and because the violations were entered into your corrective action program, the NRC is treating these violations as Non-Cited Violations (NCVs) in accordance with Section VI.A.1 of the NRC's Enforcement Policy. Additionally, three licensee-identified violations are listed in Section 4OA7 of this report. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, 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.

Since the terrorist attacks on September 11, 2001, the NRC has issued two Orders (dated February 25, 2002, and January 7, 2003) and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance access authorization. The NRC also issued Temporary Instruction 2515/148 on August 28, 2002, that provided guidance to inspectors to audit and inspect licensee implementation of the interim compensatory measures (ICMs) required by the February 25th Order. Phase 1 of TI 2515/148 was completed at all commercial nuclear power plants during calendar year (CY) '02, and the remaining inspections are scheduled for completion in CY '03. Additionally, table-top security drills were conducted at several licensees to evaluate the impact of expanded adversary characteristics and the ICMs on licensee

protection and mitigative strategies. Information gained and discrepancies identified during the audits and drills were reviewed and dispositioned by the Office of Nuclear Security and Incident Response. For CY '03, the NRC will continue to monitor overall safeguards and security controls, conduct inspections, and resume force-on-force exercises at selected power plants. Should threat conditions change, the NRC may issue additional Orders, advisories, and temporary instructions to ensure adequate safety is being maintained at all commercial power reactors.

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

Sincerely,

/RA/

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

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

Enclosures: NRC Integrated Inspection Reports Nos. 50-338/02-04, 50-339/02-04
w/Attachment: Supplementary Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

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

Report Nos.: 50-338/02-04, 50-339/02-04

Licensee: Virginia Electric and Power Company (VEPCO)

Facilities: North Anna Power Station, Units 1 & 2

Location: 1022 Haley Drive
Mineral, Virginia 23117

Dates: July 15 - 19, 2002 and September 29, 2002 - January 4, 2003

Inspectors: M. Morgan, Senior Resident Inspector
J. Canady, Resident Inspector
B. Bearden, Reactor Inspector (Sections 1R08 and 4OA7)
R. Chou, Senior Reactor Inspector (Section 1R07)
R. Hamilton, Health Physicist (Sections 2OS1, 2OS2, 4OA1.1, 4OA1.2 and 4OA7)
D. Jones, Senior Health Physicist (Sections 2OS1, 2OS2, 4OA1.1, 4OA1.2 and 4OA7)
J. Kreh, Health Physicist (Sections 2OS1, 2OS2, 4OA1.1, 4OA1.2 and 4OA7)
L. Mellen, Senior Operations Engineer (Section 1EP1)
W. Sartor, Senior Emergency Preparedness Inspector (Sections 1EP1, 1EP4, And 4OA1.4)
J. Wallo, Senior Physical Security Inspector (Section 4OA5)

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

Attachment: Supplementary Information

Enclosure

SUMMARY OF FINDINGS

IR 05000338/2002-004, IR 05000339/0202-004; Virginia Electric and Power Co.; 07/15/2002-1/04/2003; North Anna Power Station Units 1 & 2; Heat Sink Performance, Inservice Inspection Activities, Operability Evaluations, and Access Control to Radiologically Significant Areas.

The report covered a three month period of inspection by resident inspectors and announced inspections by a regional senior physical security inspector, senior reactor engineer, reactor engineer, senior health physicists and two health physicists. Four Green non-cited violation (NCVs) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609 "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. Inspector-Identified and Self-Revealing Findings

Cornerstone: Initiating Event

- Green. An ineffective weld repair on Unit 2 control rod drive mechanism (CRDM) Nozzle 51 J-Weld resulted in subsequent through wall leakage.

  A self-revealing non-cited violation of 10 CFR Appendix B Criterion XVI was identified. This finding is more than minor because it resulted in through wall leakage of the reactor coolant system (RCS) boundary. This finding was of very low safety significance because it is reasonable to assume no loss of function of the RCS boundary and to expect the structural integrity of the RCS to be maintained. An important factor influencing the significance was the very low likelihood of an initiating event (a medium loss of coolant accident) resulting from cracks in the CRDM nozzle J-Welds (Section 1R08).

Cornerstone: Mitigating Systems

- Green: Inadequate design controls resulted in four service water supports not being constructed in accordance with design guides. These supports were to protect the safety-related service water piping and pumps from failures during seismic and other loadings.

  An inspector-identified non-cited violation of 10 CFR 50, Appendix B, Criteria III was identified. This finding is more than minor because the supports were incorrectly constructed and allowed potential separation of the supports from the piping. The issue was determined to be of very low safety significance based upon a re-analysis for the as-built condition which concluded that the systems were operable (Section 1R07).

- Green: Non-safety/non-dedicated parts were installed in the Unit 1 safety-related steam generator power-operated relief valves. Use of these parts degraded the qualification of the valves and had the potential to render the valves inoperable from the control room.

An inspector-identified non-cited violation of 10 CFR 50, Appendix B, Criteria XV was identified. This finding was more than minor because it resulted in the inappropriate repair of the valves. The finding was determined to be of very low safety significance because the valves could be locally operated and the licensee's conclusion that the valves were operable but degraded (Section 1R15).

Cornerstone: Occupational Radiation Safety

- Green: The licensee failed to properly monitor a worker's radiation exposure in a High Radiation Area (HRA).

  A self-revealing non-cited violation of Technical Specification 6.12.1 (in effect prior to August 20, 2002) was identified. This finding is more than minor because it involved a failure in the personnel monitoring program which could have contributed to unintended dose to a worker, although no unintended dose appeared to have been incurred. This finding was of very low safety significance because it involved the failure to meet a regulatory requirement but did not significantly impair the licensee's ability to assess radiation dose (Section 2OS1).

B. Licensee-Identified Violations

Three violations of very low safety significance, which were identified by the licensee have been reviewed by the inspectors. 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.

CONTENTS

Report Details

Summary of Plant Status

Unit 1 began the inspection period at 100% power and the unit operated at or near this level throughout the inspection period.

Unit 2 was shutdown on September 8 and remained shutdown and in a defueled condition throughout the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

During the inspection period, the inspectors held discussions with operations personnel concerning cold weather preparation activities. The inspectors toured both the Unit 1 and 2 emergency diesel generator (EDG) rooms and the Station Blackout (SBO) Diesel building area. The inspectors evaluated whether the heaters in these areas were adequate and set in accordance with licensee procedure 0-GOP-4.2, "Extreme Cold Weather Operations." During the tour, the inspectors assessed the condition of temporary herculite curtains installed in the EDG rooms and the condition of the SBO Diesel building insulation. These items mitigated the possibility of cold air moving rapidly into the area upon start of the diesels. The inspectors also reviewed whether the routine change-out of water to coolant in the EDG diesel cooling systems was performed.

During the inspection period, the inspectors inspected conditions in the yard area around the vicinity of the Unit 1 and 2 refueling water storage tanks (RWSTs) and the Unit 1 and 2 casing cooling tanks. Discussions were held with operations personnel concerning cold weather preparation and a review of a partially completed procedure 0-GOP-4.2, "Extreme Cold Weather Operations," was conducted. The inspectors inspected the condition of temporary tents with bulb-type heaters which had been built around the casing cooling tank and RWST instrumentation enclosures and other areas of the tanks which could be susceptible to freezing conditions.

The inspectors reviewed abnormal procedure 0-AP-41.1, "Service Water (SW) Spray Array Nozzle Icing" and discussed the specifics of the procedure with the operations group and risk analyst personnel. These reviews and discussions included elements of risk significance and the impact of potential SW nozzle icing while the B SW header was out of service for system upgrades. In addition, the inspectors evaluated whether the risk information provided to operations personnel agreed with the information produced by the licensee's risk/safety monitor.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

a. Inspection Scope

The inspectors performed partial walkdowns of systems, structures, and components (SSC) to determine if they were correctly aligned in accordance with appropriate procedures and drawings. The partial walkdowns were performed on a redundant train/system while the other train/system was out of service. The following SSCs were assessed for their correct alignment using the referenced documents:

- Unit 1 and Unit 2 (B Train) Service Water Systems, (1-MOP-49.09, “Removing Service Water No. 2 (B) Supply and No. 3 (B) Return Headers from Service and Returning Systems to Service”) and Station Drawing 11715-FM-078C, “Service Water System”, sheet 2 of 2;
- Unit 1 Chemical and Volume Control System, (1-OP-8.1A, “Valve Checkoff – Chemical and Volume Control System Auxiliary Building”) and Station Drawing 11715-FM-095B, “Chemical and Volume Control System”, sheet 2 of 2; and,
- Unit 1 1B Motor Driven Auxiliary Feedwater Pump Suction Alignment (1-OP-31.2A, “Valve Checkoff -- Auxiliary Feedwater”)

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

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

- Unit 2 Main Condenser Area (fire in the main condenser - post-fire observations);
- Unit 1 H and Unit 1J Emergency Diesel Generator Room Areas;
- Unit 1 and Unit 2 Cable Spreading Room Areas, Elevation 294';
- Unit 1 Chiller Room and Turbine Building (Zone 1) Areas’;
- Unit 1 Equipment Area Battery Rooms 1-2 and 1-4, Elevation 294'; and,
- Technical Support Center (TSC) Ventilation Room and Plant Support Areas.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors selected two risk important Recirculation Spray Heat Exchangers 1-RS-E-1B and 1-RS-E-1C for inspection. The inspectors also selected associated components for inspection: Service Water Motor Operated Valves 1-SW-MOV-101A and 1-SW-MOV-104D, Service Water Check Valve 1-SW-116, and Service Water Pumps 1-WS-P-1A and 1-WS-P-1B. The inspectors used NRC Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment for guidelines.

The inspectors observed the sludge depth measurement in the service water reservoir. The inspectors walked down and examined the general condition of the components in the reservoir, intake structures, service water pumps, chemical addition equipment and tanks, corrosion sampling locations, charging pumps, quench spray pumps, recirculation spray heat exchangers, and service water motor operated valves.

The inspectors reviewed selected documents associated with the selected heat exchangers and components for adequacy. The document review included procedures, design guidelines, work orders, maintenance, inspection, cleaning, performance trends, drawings, evaluations, plant issues, test records, and water chemistry data analysis. The inspectors reviewed calculations for service water pump discharge pipe support operability evaluation and modification/repair and compared them to Civil Engineering Nuclear Standard for Welded Pipe Attachments.

b. Findings

1. Introduction

A Green inspector-identified Non-Cited Violation (NCV) was identified for failure to adequately control design for service water pump discharge pipe supports as described in 10 CFR 50, Appendix B, Criteria III, Design Control which in part requires that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions.

2. Description

The inspectors identified on December 13, 2002, that the licensee failed to adequately control design for the pipe supports and provide details in design drawings for construction resulting in four pipe supports (1-WS-A-23, 1-WS-A-25, 1-WS-A-27, and 1-WS-A-29) not meeting integrated design requirements as specified in Standard No. STD-CEN-0021, Revision 5, Civil Engineering Nuclear Standard for Welded Pipe Attachments.

The licensee welded a 24-inch diameter circular pad on the run pipe at the edge of the pad and then welded a 16-inch diameter pipe trunnion on the top of the pad which differed from requirements of Section 8.3 Reinforcing Pad Installation and Attachment 8.2.1-3 of Standard No. STD-CEN-0021, Rev. 5, Civil Engineering Nuclear Standard -

Welded Pipe Attachments. Section 8.3 states " the basic requirement is that the trunnion be welded directly to the run pipe wall prior to the installation of the reinforcing pad. By providing for an integral weld between the trunnion, the run pipe wall, and the reinforcing pad, the design behaves in a manner consistent with the analysis which treats the combined pad and run pipe thickness as effective." The as-built construction did not provide the integral construction as the design calculations assumed. The pad and the run pipe could be separated when they were subjected to the tension and bending moments of the loads. Additionally, the ratio of the trunnion diameter and the run pipe diameter, the reinforcing pad outside diameter, and the minimum weld size between the pad and the run pipe did not meet the requirements stated in Standard No. STD-CEN-0021.

3. Analysis

The inspectors determined that this finding was associated with the pipe support program, engineer knowledge, experience, and process attributes and affected the objective of the Mitigation System Cornerstone to protect safety-related systems and components from failures due to the seismic and other loadings and is therefore greater than minor. If left uncorrected, this finding could result in a more significant safety concern. Failure to control the pipe support design and not provide details in the drawings for an integral construction resulted in incorrect construction of the pipe supports and allowed potential separation of the supports from the pipe. The issue was determined to be of very low safety significance (Green) based upon Plant Issue Resolution N-2002-3404-R1 (Revision 1) which referenced a re-analysis of calculation ME-1553, Revision 0, Add 00B. This calculation re-analysis for the as-built condition concluded that the systems were operable.

4. Enforcement

10 CFR 50, Appendix B, Criteria III, Design Control which in part requires that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, the licensee’s failure to correctly translate requirements into the design drawings to provide details resulted in a condition which failed to meet the design requirements and was not adequately analyzed for design loads. Because the failure to adequately control the design drawings is of very low safety significance and has been entered into the corrective action program (Plant Issue N-2002-3404), this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 50-338, 339/02-04-01, Failure to Control Design Drawings for an Integral Construction of Trunnion, Pad, and Run Pipe in Service Water Pump Discharge Pipe Supports.

1R08 Inservice Inspection (ISI) Activities

a. Inspection Scope

The inspectors observed in-process ISI work activities associated with Unit 2 and reviewed selected ISI records. The observations and records were compared to the

Technical Specifications (TS) and the applicable Code (ASME Boiler and Pressure Vessel Code, Sections V and XI, 1995 Edition, with 1996 Addenda) to verify compliance.

Calibration of Ultrasonic (UT) examination equipment and portions of the ongoing manual UT examination of the reactor vessel head studs was observed. Visual (VT) examination of ten reactor vessel head nuts and washers was observed. The inspectors reviewed selected inspection records for the eddy current examination (ET) of the steam generators (SG). The records were compared to the Technical Specifications (TS), License Amendments and applicable industry established performance criteria to verify compliance. Qualification and certification records for examiners, equipment and procedures for the above ISI examination activities were reviewed.

Additionally, the inspectors observed activities relative to inspection of the Unit 2 reactor vessel head penetrations (VHPs). The inspection included review of nondestructive examination (NDE) procedures, assessment of NDE personnel training and qualification, and observation and assessment of visual (VT), Ultrasonic, Liquid Penetrant (PT) and eddy current (ET) examinations. Discussions were also held with contractor representatives and other licensee personnel. The activities were examined to verify licensee compliance with regulatory requirements. Specifically, the inspectors reviewed or observed: (1) VT inspection using remote video of a sample of Reactor Pressure Vessel (RPV) head penetrations for leakage; (2) in-process acquisition and analysis of "Grooveman" ET examination data of reactor vessel head Control Rod Drive Mechanism (CRDM) nozzle outside diameter (OD) and J-Welds; (3) UT and ET Open Housing scanning analysis activities of the inside diameter (ID) of the nozzle for various CRDM penetrations; (4) ET Gapscan blade probe analysis activities of ID of the nozzle for various CRDM penetrations and (5) weld PT examination reports for J-Welds performed on CRDM Nozzles 51, 53, 55, 57, 62, and 63. A total of 35 Plant Issues associated with the Unit 2 Reactor Head visual inspection and subsequent NDE activities from the licensee's corrective action program were reviewed by the inspectors.

b. Findings

1. Introduction

A Green self-revealing NCV associated with the licensee's VHP inspection results was identified. CRDM nozzle 51 had been previously repaired following identification of leakage during the fall 2001 Unit 2 outage and the method of performing those repairs had not been effective.

2. Description

Evidence of new boric acid leakage at the start of the fall 2002 outage and rejectable PT indications on the J-weld for nozzle 51 indicated that the embedded flaw method for performing overlay repairs on nozzle 51 was not effective after only nine months of operation. The licensee captured this issue in their corrective action program as Plant Issue N-2002-2335. Additionally, the licensee identified that the weld overlay repairs performed on nozzles 51, 62, and 63 during November 2001 had not completely covered the entire Inconel weld and/or "butter" region of the J-Weld. The licensee captured this issue in their corrective action program as Plant issue N-2002-2656.

3. Analysis

This finding affected the Initiating Events objective of limiting the likelihood of loss of coolant accidents (LOCAs). The finding was processed through the significance determination process Phase 1 and was determined to be of very low safety significance (Green). This was based on assumptions for this deficiency that there would have been no loss of function of the reactor coolant system (RCS) pressure boundary and that it is reasonable to expect the structural integrity of the RCS to have been maintained. This is due to the fact that the cracks found in the CRDM welds have minimal potential to structurally fail in a manner that would allow a nozzle to be ejected. Although leakage through the welds creates an environment around the nozzle above the welds that could lead to circumferential cracking of the nozzle and potentially to nozzle ejection, volumetric inspection of nozzle 51 by the licensee did not indicate circumferential cracking. Also considered were the extensive time to reach the critical crack length, the numerous licensee inspections that would take place allowing for identification and repair prior to reaching the critical crack length and the full compliment of emergency core cooling systems that are capable of protecting the core from the potential LOCA that would result from a nozzle ejection. The results of the licensee's CRDM nozzle examinations were documented in licensee letter Serial 02-491A dated October 18, 2002, Response to NRC Bulletin 2002-02.

4. Enforcement

10 CFR Appendix B Criterion XVI requires that conditions adverse to quality be identified and corrected. Contrary to the above, the licensee's weld overlay repair method was not effective in repairing weld cracks in nozzle 51 during the fall 2001 outage, and resulted in additional through wall leakage. This event constituted a violation of NRC requirements. Because this finding was of very low safety significance and has been entered into licensee's corrective action program (Plant Issues N-2002-2335 and N-2002-2656) it is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 50-339/02-04-02, Inadequate Weld Overlay Repairs on CRDM Nozzle 51 J-Weld.

1R11 Licensed Operator Requalification

a. Inspection Scope

During the week of October 13, the inspectors observed licensed operator requalification training involving shift operators and supervisors. The inspectors watched a portion of one session of simulator training. This session involved a simulated loss of nuclear instrumentation with a RCS pressure instrumentation failure. During the observed simulator session, the inspectors evaluated the crew performance in: 1) knowledge of plant technical issues, 2) use of the phonetic alphabet and 3-way communications, and 3) use of command and control techniques by supervisors. The adequacy of evaluator critique was also assessed. In addition, during the week of December 16, the inspectors discussed the licensee's performance of Job Performance Measures (JPMs) with management and training personnel.

b. Findings

No findings of significance were identified. The review of the Plant Issue N-2002-3445 is discussed in Section 4OA2

1R12 Maintenance Effectiveness

a. Inspection Scope

For the equipment issues described in the plant issues listed below, the inspectors evaluated the licensee's effectiveness of the corresponding preventive and corrective maintenance. Inspectors performed walkdown of the accessible portions of the system, performed in-office reviews of procedures and evaluations, and held discussions with system engineers. Inspectors compared the licensee's actions with the requirements of the Maintenance Rule (10 CFR 50.65) using VPAP 0815, "Maintenance Rule Program," and Engineering Transmittal CEP-97-0018, "North Anna Maintenance Rule Scoping and Performance Criteria Matrix."

- N-2001-2381-R3 and N-2002-0606 - Continued unreliability of the charging/HHSI pump seals - Due to continued pump seal unreliability, the licensee's Maintenance Rule Working Group approved recommendations to place all of the pump seals in the a(1) status with a return to an a(2) status no sooner than 8/31/06. This date corresponds to one year after the planned seal replacement on the last charging/HHSI pump.
- N-2002-2883, N-2002-2829, and N-2002-2819 - Maintenance activities associated with major maintenance performed on the 2H emergency diesel generator (EDG). These maintenance activities were performed during an extended shutdown of the EDG for replacement of the EDGs cylinder liners. Activities observed included replacement of various engine temperature switches and an auxiliary oil pump coupling and repairs of EDG oil leaks. Documentation reviewed included unavailability of the EDG and associated information in the licensee's maintenance rule program and equipment reliability database.
- N-2002-2909 - Activities associated with the placement of the Unit 1A feedwater regulating valve 1-FW-FCV-1478 in manual override due to a significant air leak from tubing located inside the positioner. Documents reviewed by the inspectors included applicable technical specifications, the corrective action program data base, the maintenance rule scoping document, and maintenance operation procedure (MOP) 1-MOP-31.5, "Operation of Feedwater Control Valves Using Manual Override." The inspectors attended the pre-job brief and assessed work practices of craft personnel during observation of the corrective maintenance activities. The inspectors also witnessed the performance of the MOP.
- N-2002-3440 - Activities associated with the repair of the Unit 1 A charging pump auxiliary oil pump - The licensee initiated a work request (WR141746) to troubleshoot the system and determined that the pump's beaker had "thermalled - out". The inspectors assessed work practices during the repair.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the licensee's scheduled or emergent work activities to assess the management of plant risk. The inspectors evaluated if the assessments of risk were performed in accordance with requirements of 10CFR50.65 (a)(4) and plant procedures. Additionally, the inspectors reviewed the licensee's actions to minimize the probability of initiating events, maintain the functional capability of mitigating systems, and maintain barrier integrity. The risk impact of performing the following work activities was assessed:

- Work Request 00131370 - Emergent work associated with the Unit 2A Instrument Air (IA) Compressor Accumulator Outlet Pressure Switch (2-IA-PS-220A). The inspectors noted that troubleshooting/repair work was not initially captured by risk assessments; however, an appropriate assessment was performed prior to taking the system out of service and overall risk conditions remained in a "green window;"
- Work Orders 00461506-01 and 00463399-01- Unit 1 Turbine Driven AFW Pump1-FW-P-2 Testing. Review was associated with the risk assessment involving the B service water header out of service with switchyard work being performed along with the AFW pump testing. Analysis presented a 40-day "green window;"
- Work Orders 00435572-01 and 00435571-01 - Station Blackout (SBO) Diesel Troubleshooting and Repair - Incorrect SBO switch setpoint resulted in the SBO failing to shutdown after a post-maintenance test. An appropriate risk assessment was performed prior to taking the system out of service and overall risk conditions remained in a "green window;" and,
- Plant Issues N-2002-3427, N-2002-3427, and N-2002-3457 - The inspectors reviewed documents and held discussions with operations, engineering, and scheduling risk analysis personnel associated with a "yellow window" risk assessment. This "yellow" risk assessment resulted from the performance of site switchyard work while concurrently having the Unit 1 AMSAC , the 2B Component Cooling Water Pump/Heat Exchanger, the 1A Instrument Air Compressor, Unit 1A Motor Driven AFW Pump, and the SBO Diesel out of service.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors evaluated the technical adequacy of operability evaluations to ensure that operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The reviewed operability evaluations were described in the following plant issues:

- N-2002-2490 - Unit 2 B RCS Cold Leg Loop Isolation Valve 2-RC-MOV-2593 - Pieces of valve's guide and pin were missing - Valve repaired during Unit 2 outage;
- N-2002-2922 - Unit 1 B SWS Pump Pipe Support - Use of "filler material" (bar stock) at the baseplate of a fillet weld reinforcement for the support;
- N-2002-3049 - Unit 2 Cable Spreading Room Area Fire Door - Excessive door gap conditions existed on the double door assembly;
- N-2002-3033 - Unit 1 AFW Pipe Supports - Surface corrosion on the these supports (supports located in an underground AFW pipe tunnel;
- N-2002-3265 - 1J Emergency Diesel Generator (EDG) - Cover gasket blew during testing of the EDG; and,
- N-2002-3514 and N-2002-3474 - Use of non-dedicated, non-safety (unqualified) positioner parts in the controllers for the U1 and U2 S/G PORVs - Licensee determined that the PORVs were "operable but degraded". Current licensee program for control of such parts allowed for their use - Potential finding/non-compliance with Part 50, Appendix. B, Criterion XV - Use of non-safety (non-dedicated) parts in safety-related equipment.

b. Findings

1. Introduction

A Green NCV was identified for the licensee's use of non-safety, non-dedicated (unqualified) positioner parts in the Unit 1 safety-related steam generator (S/G) pressure-operated relief valve (PORV) controllers. Use of non-safety parts to repair safety-related equipment is prohibited by 10 CFR 50, Appendix B, Criteria XV, Nonconforming Materials, Parts, or Components. Criterion XV requires that measures shall be established to control parts which do not conform to requirements in order to prevent their inadvertent use or installation.

2. Description

The inspectors discovered on December 19, 2002 that the licensee had placed non-safety, non-dedicated (unqualified) positioner parts in the Unit 2 S/G PORV controllers. The inspectors noted that Unit 2 remained in an outage configuration, was defueled and the installation of such parts did not adversely impact Unit 2 operations. However, the inspectors further investigated the extent of condition and discovered on December 26, 2002, that the licensee had also inappropriately installed non-safety, non-dedicated parts in the Unit 1 S/G PORV controllers. The inspectors also noted that the licensee's program for ensuring that such parts were not in safety-related equipment, was deficient and had apparently allowed for installation of such parts.

3. Analysis

The inspectors determined that this finding was associated with the licensee's safety-related repair parts procurement program, the licensee's safety-related parts repair and replacement program, and the licensee's maintenance program and it affected the objective of the mitigation system cornerstone to protect safety-related systems and components from failures due to inappropriate repairs and is therefore greater than minor. If these failures are left uncorrected, this finding could result in more significant safety concerns. Failures of licensee programs to prevent inadvertent installation of non-safety parts into safety-related components can affect component availability. The finding was determined to be of very low safety significance (green) because the valves could be locally operated and the licensee's conclusion that the valves were operable but degraded.

4. Enforcement

10 CFR 50, Appendix B, Criteria XV, Nonconforming Materials, Parts, or Components Criteria III, Design Control requires that measures shall be established to control parts which do not conform to requirements in order to prevent their inadvertent use or installation. Contrary to the above, the licensee's failure to appropriately control the use of non-safety parts resulted in a condition that could have rendered the valves inoperable from control room operation and a condition which would have then required manual operation of the valves. This could have adversely impacted pressure control of the steam generators. Because the failure is of very low safety significance and has been entered into the corrective action program (Plant Issue N-2002-3514), this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 50-338/02-04-03: Licensee Parts Program Allowed for the Use of Non-Safety Parts in the Safety-Related Unit 1 Steam Generator Pressure-Operated Relief Valve Controllers.

1R16 Operator Work-Arounds (OWAs)

a. Inspection Scope

The inspectors reviewed operator workaround (OWA) 96-OWA-C28, "HP Turbine Gland Steam Header Dump PCV bypass MOVs." The inspectors discussed the OWA with the cognizant engineer. The OWA had been open for a long time due to a proposed design change which was later determined not to be necessary. The item was subsequently addressed by procedural changes to the turbine building and main control room logs which required enhanced monitoring of the components. This OWA will be closed once the UFSAR is updated to reflect the procedure changes.

Additionally, the inspectors reviewed the three priority 'A' OWAs listed in the data base for their cumulative effects. This review included the cumulative effects of the OWAs on equipment reliability, availability, and the ability of the operators to respond in a correct and timely manner to plant transients.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

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

- Unit 2 2H Emergency Diesel Generator (EDG) Slow Start Test (2-PT-82H, "2H Emergency Diesel Generator Slow Start Test");
- Unit 1 Recirculating Spray System (B Train) (1-PT-213.7B, "Valve Inservice Inspection (B Train of Recirculating Spray System)";
- Unit 1 1J EDG Slow Start Test (1-PT-82J, "1J Emergency Diesel Generator Slow Start Test");
- Unit 1 1A Charging Pump Motor Operated Suction and Discharge Valve Tests (1-PT-14.1, "Charging Pump 1-CH-P-1A" and 1-PT-213.2A, "Valve Inservice Inspection Charging Pump 1-CH-P-1A MOVs); and
- Unit 1 1A Service Water Supply Valve Tests (1-PT-213.2A.1, "Valve Inservice Inspection for SW Supply Check Valves to 1-CH-P-1A Lube Oil and Gear Box Coolers").

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

Unit 2 was shutdown on September 8 for a scheduled refueling outage and vessel head inspection. The unit remained shutdown throughout the inspection period due to a licensee decision to replace the existing reactor vessel head with a new reactor vessel head. Refueling outage activities were administratively declared completed on October 8, with vessel head repairs/replacement activities continuing. During the outage, the inspectors observed some of the following activities; 1)core defueling, 2) 2H emergency diesel generator overhaul, 3) 2A/2B/2C reactor coolant pump motor cooler cleaning, 4) 2-1 and 2-2 battery cell replacement and 5) Trains A and B service water system - flexible joint discharge piping replacement. Portions of these activities were observed from the beginning of the outage in September until the official end of the refueling portion of the outage in October.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

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

- 1-PT-71.3Q, "1-FW-P-3B, B Motor-Driven AFW Pump, and Valve Test";
- 1-PT-57.1B, "Emergency Core Cooling Subsystem-Low Head Safety Injection Pump (1-SI-P-1B)";
- 1-PT-64-4B, "Casing Cooling Pump (1-RS-P-3B) Test";
- 1-PT-71.1Q, "1-FW-P-2, Turbine-driven Auxiliary Feedwater Pump and Valve Test";
- 1-PT-213.31, "Valve In-Service Inspection (Main Steam Supply Check Valves to 1-FW-P-2)";
- 1-PT-213.20, "Valve In-Service Inspection (1-MS-TV-111A and 1-MS-TV-111B)";
- 1-PT-57.1A, "Emergency Core Cooling Subsystem-Low Head Safety Injection Pump (1-SI-P-1A); and,
- 1-PT-213.8A, "Valve In-Service Inspection ("A" Train of Safety Injection System).

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the details of temporary modification (TM) 1705 to determine whether system operability/availability was affected; configuration control was maintained; and the associated safety evaluation was justifiably implemented. The purpose of the TM was to change setpoints associated with the compressed air system for the Unit 1 main generator G-12 breaker in an effort to stop the leak by of the system's high pressure receiver tank inlet isolation valve (1-GB-SOV-610B). The inspectors also discussed the TM with the responsible engineer and was informed that the TM will be made permanent during the Unit 1 2003 refueling outage.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP1 Exercise Evaluation

a. Inspection Scope

The inspectors reviewed the objectives and scenario for the North Anna Power Station biennial, full-participation 2002 emergency response exercise to determine whether they were designed to suitably test major elements of the licensee's emergency plan.

During the period July 15-19, 2002, the inspectors observed and evaluated the licensee's performance in the exercise, as well as selected activities related to the licensee's conduct and self-assessment of the exercise. The exercise was conducted on July 16, 2002. Licensee activities inspected during the exercise included those occurring in the Control Room Simulator (CRS), Technical Support Center (TSC), Operational Support Center (OSC), and the Local Emergency Operations Facility (LEOF). The NRC's evaluation focused on the risk-significant activities of event classification, notification of governmental authorities, onsite protective actions, offsite protective action recommendations, and accident mitigation. The inspectors also evaluated command and control, the transfer of emergency responsibilities between facilities, communications, adherence to procedures, and the overall implementation of the emergency plan. The inspectors attended the post-exercise critique to evaluate the licensee's self-assessment process, as well as the presentation of critique results to plant management.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The inspector reviewed Revision Numbers 24, 25, and 26 to the Radiological Emergency Plan (REP), against the requirements of 10 CFR 50.54(q) to determine whether any of those changes decreased REP effectiveness.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety (OS) and Public Radiation Safety (PS)

2OS1 Access Control To Radiologically Significant Areas

.1 Access Controls

a. Inspection Scope

Licensee program activities for monitoring workers and controlling access to radiologically significant areas and tasks were inspected. The inspectors evaluated procedural guidance; directly observed implementation of administrative and established physical controls; assessed worker exposures to radiation and radioactive material; and appraised radiation worker and technician proficiency in implementing radiation protection program activities.

The licensee's procedures for posting, surveying, and controlling access to airborne radioactivity areas, radiation areas, high radiation areas, locked high radiation areas, and very high radiation areas were reviewed by the inspectors for consistency with applicable Technical Specifications (TS) and 10 CFR 20 requirements. During plant tours, the inspectors evaluated radiological postings and barricades against the current radiological surveys in areas of the Auxiliary Building and the Unit 2 Containment Building to determine the appropriateness of the established radiological controls. In addition, the inspectors conducted independent radiological surveys and compared the results to dose rates recorded on current survey maps at various locations in the Unit 2 Containment Building to determine the accuracy of surveys.

The inspectors observed designated locked high radiation doors and evaluated their established controls against TS requirements. The inspectors also evaluated implementation of key controls and postings for Very High Radiation Areas and locked high radiation areas. Internal dose assessments were evaluated and assigned dose calculations were independently assessed for accuracy and consistency with licensee procedures.

The inspectors reviewed selected Radiation Work Permit (RWP) guidance used to access radiologically significant areas associated with the Unit 2 refueling outage work to evaluate incorporation of appropriate access controls and electronic dosimeters setpoints for the expected radiological conditions. Through worker interviews, radiologically controlled area tours, and selected job site observations, the inspectors evaluated radiation worker and radiation protection staff training/skill level, adherence to access control procedures and RWP requirements, and understanding of RWP requirements and dosimetry setpoints.

License procedures and activities related to access controls were evaluated for consistency with 10 CFR 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; and TS 6.12 High Radiation Area (in effect prior to August 20, 2002); TS 5.4, Procedures, and 5.7,

High Radiation Area (in effect after August 20, 2002). Licensee's access control related procedures, reports, and records reviewed during the inspection are listed in the Attachment to this report.

b. Findings

1. Introduction

A Green self-revealing NCV of TS 6.12.1 (in effect prior to August 20, 2002) was identified for failure to properly monitor a worker's radiation exposure in a High Radiation Area (HRA).

2. Description

On November 9, 2001, a contract worker entered a posted HRA on the 216 foot (') elevation of the Unit 2 Containment Building without a digital alarming dosimeter (DAD), a survey instrument, or continuous Health Physics (HP) coverage. The worker carried cables and equipment through the HRA to the entrance of a posted VHRA. The HP Technician providing continuous HP coverage in the VHRA did not notice that the worker was not wearing a DAD but was notified by the HP Shift Supervisor that the worker's DAD had been found in the clean change room. The worker was escorted out of the HRA by a HP Technician.

The worker was wearing a thermoluminescent dosimeter (TLD) during the Radiologically Controlled Area (RCA) entry. The worker's assigned dose was 44 mrem for the period October 5, 2001 through October 9, 2001, which included the subject RCA entry. Although the worker did not constantly accompany the two other job crew members during the entire RCA entry, the co-worker's DAD readings for similar activities during the entry were less than one mrem each.

3. Analysis

This finding was determined to be greater than minor because it involved a failure in the personnel monitoring program which could have contributed to unintended dose to a worker, although no unintended dose appeared to have been incurred. In accordance with the Occupational Radiation Exposure Significance Determination Process, the finding was determined to be of very low safety significance (Green) because it involved a failure to meet a regulatory requirement, but the licensee's ability to assess the individual's dose was not significantly compromised.

4. Enforcement

TS 6.12.1 requires personnel entering a High Radiation Area (HRA) to have a DAD, a survey instrument, or continuous Health Physics coverage. Failure to properly monitor a worker's radiation exposure in a HRA on November 9, 2001, is identified as a violation of TS 6.12.1. Because this finding was of very low safety significance and has been entered into licensee's corrective action program (Plant Issue N-2001-3301), it is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: Failure to Properly Monitor Worker Radiation Exposure in a High Radiation Area.

.2 Problem Identification and Resolution

a. Inspection Scope

The inspectors reviewed an audit and self assessments related to controlling access to radiologically significant areas, as listed in the Attachment to this report. The audit and self assessments were evaluated against the periodic program review requirements specified in 10 CFR 20. The inspectors reviewed radiation protection records and interviewed workers and management to determine if any events had occurred which involved dose rates greater than 25 R/hr at 30 centimeters or greater than 500 R/hr at 1 meter. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with Virginia Power Administrative Procedure (VPAP) 1601, Corrective Action, Revision (Rev.) 15.

b. Findings

No findings of significance were identified.

.3 Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope

Access control and surveillance results for the licensee's ISFSI were evaluated. The evaluation included review of ISFSI radiation control surveillance procedures and assessment of radiological survey data. The inspectors toured the ISFSI and observed access controls, thermoluminescent dosimeter (TLD) locations and material condition, and radiological postings on the perimeter security fence. The inspectors observed a licensee technician perform gamma and neutron radiation surveys of the most recently placed spent-fuel cask and at the perimeter fence. Survey results were compared to the most recent survey records.

Program guidance, access controls, postings, equipment material condition and surveillance data results were reviewed against applicable sections of the ISFSI Safety Analysis Report (SAR), ISFSI TS, 10 CFR Parts 20 and 72, and applicable licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in Section 2OS1 of the report Attachment.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls

.1 As Low As Is Reasonably Achievable (ALARA) Planning and Controls

a. Inspection Scope

The plant collective exposure history for the years 1999 through 2001, based on the data reported pursuant to 10 CFR 20.2206 (c), was reviewed and discussed with the

licensee. Implementation of the licensee's ALARA program during the Unit 2 refueling outage was observed and evaluated by the inspectors during the weeks of September 9, and 30, 2002. The inspectors reviewed ALARA planning, dose estimates, and prescribed ALARA controls for the five outage work activities expected to incur the maximum collective exposures. Those activities were: valve maintenance, installation and removal of scaffolding, repair of valve 2-RC-MOV-2593, Disassemble/Reassemble reactor head, and reactor head inspections. Incorporation of the planning, established work controls, and expected dose and dose rates into ALARA pre-job briefings and Radiation Work Permits (RWPs) for those activities was also reviewed. Those elements of the ALARA program were evaluated for consistency with the methods, practices, and philosophy delineated in the licensee's Station ALARA Program. The inspectors also conducted independent confirmatory radiation surveys of selected job sites to assess the accuracy of the dose rates recorded on pre-job survey maps for work areas in the Unit 2 Containment Building.

Records of year-to-date individual radiation exposures sorted by work groups were examined by the inspectors for significant variations of exposures among workers. Exposure tracking during the Unit 2 outage and records of exposures to declared pregnant workers incurred since November 2000 were also examined.

Selected elements of the licensee's source term reduction and control program were examined. Program data and information for hot spot identification and removal, radiation field monitoring and trending, temporary shielding, and primary chemistry shutdown controls were examined by the inspectors to determine whether the program was effective in reducing exposure.

The licensee's ALARA program implementation and practices were evaluated by the inspectors for consistency with TS 5.4.1, Procedures, and 5.7, High Radiation Area Controls (in effect after August 20, 2002); 10 CFR Part 20 requirements; and procedural guidance documented in the Attachment to this report. Incurred exposures were evaluated for consistency with 10 CFR Part 20 dose limits, the guidance provided in Regulatory Guide 8.29 and licensee administrative procedures.

b. Findings

No findings of significance were identified.

.2 Problem Identification and Resolution

a. Inspection Scope

The inspectors reviewed an audit and self assessments related to the ALARA program, as listed in the Attachment to this report. The audit and self assessments were evaluated against periodic program review requirements specified in 10 CFR 20. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with VPAP-1601, Corrective Action, Rev. 15.

b. Findings

No findings of significance were identified.

2PS2 Radioactive Material Processing and Transportation

.1 Waste Processing and Characterization

a. Inspection Scope

The inspectors walked down operational and abandoned radwaste processing systems. The operational systems were examined for unmonitored release pathways and the abandoned equipment was examined to determine whether it been properly drained. The operational components and equipment were compared to system descriptions contained in the process control plan and UFSAR. Process changes made since the last inspection of this area were reviewed.

Inspectors reviewed the licensee's procedures for sampling and analysis of wastes streams pursuant to 10 CFR 61.55 requirements. Analytical results were reviewed to determine whether all waste streams were being periodically sampled, trended and evaluated as required. Analyses were also reviewed to determine whether appropriate scaling factors for activated materials, fission products and transuranics were current. The review included the licensee's procedures for transferring, sampling and mixing radioactive resins and documentation for vendor and licensee's laboratory inter-comparison analyses.

b. Findings

No findings of significance were identified.

.2 Transportation

a. Inspection Scope

The inspectors reviewed Type B shipping cask opening, closing and performance testing procedures for consistency with the vendor manual for irradiated fuel shipping cask USA/9225/B(U)F-85. Multiple revisions of the Certificate of Compliance (COC) for cask USA/9225/B(U)F-85 were reviewed. Additionally, the documentation for a Type A WTR-4 cask used to ship an activated reactor head sample was reviewed.

The inspectors assessed training for individuals responsible for shipping radioactive material. This was accomplished by observation of work, review of completed shipping records, and evaluation of training courses and lesson plans for initial qualification.

The inspectors reviewed the records for the following types of shipments: highway route controlled quantity (HRCQ), Low Specific Activity (LSA) exclusive use, Surface Contaminated Object (SCO) exclusive use, LSA nonexclusive use, and instruments and articles.

The inspectors observed licensee's preparation of a shipment of pressurizer safety valves to a vendor for inspection, refurbishment, and calibration. The observed activities included: package inspection, surveys, labels and markings, vehicle placarding, vehicle checks, emergency instructions, verification of drivers training certification, shipping papers provided to driver, and licensee verification of shipment readiness.

Personnel training, shipment preparations, and shipping documentation was reviewed for compliance with 10 CFR 61, 10 CFR 71, and 49 CFR 171-189 requirements.

b. Findings

No findings of significance were identified.

.3 Problem Identification and Resolution

a. Inspection Scope

The inspectors reviewed an audit and self assessments related to radioactive material processing and transportation, as listed in the Attachment to this report. The audit and self assessments were evaluated against periodic program review requirements specified in 10 CFR 20. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with VPAP-1601, Corrective Action, Rev. 15.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

.1 Occupational Radiation Safety Performance Indicator Verification

a. Inspection Scope

The inspectors interviewed responsible personnel and reviewed corrective action program records for the period August 1, 2001 to September 9, 2002 to verify the accuracy of the data submitted by the licensee for the Occupational Exposure-Control Effectiveness PI. Records were reviewed for events associated with access control, unplanned exposures, and untimely identification and resolution of problems. The licensee's disposition of the reviewed issues and events was evaluated against NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 2.

b. Findings

No findings of significance were identified.

.2 Public Radiation Safety Performance Indicator Verifications

a. Inspection Scope

The inspectors interviewed responsible personnel and reviewed corrective action program records for the period August 1, 2001 to September 9, 2002 to verify the accuracy of the data submitted by the licensee for the Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual PI. Records were reviewed for liquid or gaseous effluent releases that were reported to the NRC. The licensee's disposition of the reviewed issues and events was evaluated against NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 2.

b. Findings

No findings of significance were identified.

.3 Plant Operations Verifications

a. Inspection Scope

The inspectors performed a periodic review of the PI data reported to the NRC for the following performance indicators:

- Unplanned scrams per 7000 critical hours (Initiating Events) - PI data reviewed for the fourth quarter of 2001 through the third quarter of 2002.
- Scrams with loss of normal heat removal (Initiating Events) - PI data reviewed for the fourth quarter of 2001 through the third quarter of 2002.
- RCS specific activity (Barrier Integrity) - PI data reviewed for the fourth quarter of 2001 through the third quarter of 2002.
- Emergency AC Power System Unavailability (Mitigating Systems) - PI data reviewed for the fourth quarter of 2001 to third quarter of 2002.
- Residual Heat Removal System Unavailability (Mitigating Systems) - PI data reviewed for the fourth quarter of 2001 to the third quarter of 2002.

The data reviewed for the PIs above was compared to that displayed on the NRC's web site. The documents reviewed included monthly operating reports, licensee event reports, inspection reports, Technical Specifications, the licensee's corrective action program database and NEI 99-02, "Regulatory Assessment Performance Indicator Guideline." The inspectors also discussed the PIs with licensee personnel responsible for the PI data input and reporting to the NRC. During a review of the licensee's corrective action program database, the inspectors noted that an administrative error was made wherein unplanned unavailability hours was counted in the planned unavailability hours for the 2J emergency diesel generator. This error did not result in the color threshold being exceeded since the total number of hours remained the same. The error was documented in Plant Issue N-2002-2818.

b. Findings

No findings of significance were identified.

.4 Emergency Preparedness Performance Indicator Verifications

a. Inspection Scope

On July 17, 2002, licensee records were reviewed to determine whether the submitted PI statistics (through the second quarter of 2002) were calculated in accordance with the guidance contained in Section 2.4 (Emergency Preparedness Cornerstone) of NEI 99-02, Revision 2, "Regulatory Assessment Performance Indicator Guideline." The following PIs were reviewed:

- Emergency Response Organization Drill/Exercise Performance PI
- ERO Drill Participation PI
- Alert and Notification System Reliability PI

The inspectors assessed the accuracy of the PI for ERO drill and exercise performance (DEP) through review of a sample of drill records and simulator evaluation reports. The latest reported DEP PI value (an aggregate of data from the past eight quarters) was 95.6 percent. The accuracy of the PI for ERO drill participation was assessed through review of the training records for selected individuals assigned to key positions in the ERO as of the end of the second quarter of 2002. The latest reported ERO drill participation PI value was 93.0 percent. The inspectors assessed the accuracy of the PI for the alert and notification system reliability through review of a sample of the licensee's records of the quarterly full cycle tests, and the biweekly silent tests conducted for the past 4 quarters. The latest reported ANS reliability PI value was 99.5 percent.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

a. Inspection Scope

In order to periodically assess licensee corrective action program (CAP) effectiveness, the inspectors; 1) attended various licensee CAP meetings, 2) discussed the results of the CAP meetings with appropriate licensee personnel, and 3) reviewed various corrective action program documents.

These activities were performed in order to note if the licensee's CAP demonstrated ; 1) a complete/accurate identification of problems, 2) proper dispositioning of performance issues (specifically those associated with maintenance effectiveness), 3) appropriate evaluation and dispositioning of operability/reportability issues, 4) consideration for extent of condition, generic implications, common cause, and previous problem occurrences, 5) appropriate classification/prioritization for problem resolution, 6) proper and accurate identification of root/contributing causes, 7) appropriate identification of proposed corrective actions, and 8) if applicable, timely completion of corrective actions commensurate with the issue's safety significance. During the inspection period, the following items were reviewed by the inspectors:

1. N-2002-3017 - Use of a Westinghouse fuel accident analysis for NRC approval of Framatome fuel;

2. N-2002-3271 - Sufficiency of RCS flow through Unit 2 PZR spray valve 2-RC-PCV-2455A - Engineering documentation related to spray flow versus valve discharge opening was thoroughly reviewed by the inspectors and discussed with engineering personnel; and,

3. N-2002-3445 - Inadequate supervisory observation of operations department Job Performance Measures (JPMs).

b. Findings

N-2002-3017

Corporate engineering identified that Framatome accident analysis for a Framatome fuel was deficient in addressing sub-atmospheric containment and decided to use a Westinghouse analysis to support use of Framatome fuel. Because of the differences between Framatome and Westinghouse fuel designs the NRC determined that the Westinghouse accident analysis was not applicable. North Anna plant management initiated a plant issue to address the circumstances surrounding the submittal of an inadequate analysis for the Framatome fuel. The failure of engineering to recognize the inadequacy of their submittal is of regulatory concern. Framatome fuel will not be loaded until the issue is resolved. The plant issue remained open.

N-2002-3445

From discussions with the supervisors and after specific review of the plant issue, the inspectors noted that the licensee's supervisory observation of operations JPMs was less than 1% of the total JPMs performed in 2002. Specifically, only two (2) JPMs were observed by supervisors of the over 1000 JPMs performed in 2002. Although licensee training department assessment of JPMs was adequate, this lack of JPM observance and actual involvement by both supervisory and management personnel was of concern. The inspectors discussed specific concerns with licensee training personnel, plant management, and the operations department manager. The licensee has listed this item as a licensee-identified weakness and as a recognized improvement issue for their management team.

4OA3 Event Followup

(Closed) Licensee Event Report (LER) 50-338,339/2002-001-00: incorrect waste gas decay tank (WGDT) oxygen analyzer setpoint due to inadequate procedure. The inspectors reviewed the licensee's corrective actions associated with the non-conservative alarm setpoint for the WGDT oxygen analyzer that could have potentially allowed the oxygen concentration to exceed that required by technical specifications . A review of calibration and test procedures for the six months prior to the event indicated that the oxygen concentration had never exceeded the 2% requirements of the technical specifications. The cause of the event was attributed to personnel error that resulted in the establishment of inadequate procedures that did not satisfy technical specifications

requirements. No new findings were identified in the inspectors's review. This is a minor violation not subject to formal enforcement. This item was placed in the licensee's corrective action program as plant issue N-2002-1471.

4OA5 Other

Temporary Instruction (TI) 2515/148, Appendix A, Pre-inspection Audit for Interim Compensatory Measures (ICMs) at Nuclear Power Plants

The inspectors conducted an audit of the licensee's actions in response to a February 25, 2002 Order, which required the licensee to implement certain interim security compensatory measures. The audit consisted of a broad-scope review of the licensee's actions in response to the Order in the areas of operations, security, emergency preparedness, and information technology as well as additional elements prescribed by the TI. The inspectors selectively reviewed relevant documentation and procedures; directly observed equipment, personnel, and activities in progress; and discussed licensee actions with personnel responsible for development and implementation of the ICM actions.

The licensee's activities were reviewed against the requirements of the February 25, 2002 Order; the provisions of TI 2515/148, Appendix A; the licensee's response to the Order; and the provisions of the NRC-endorsed NEI Implementation Guidance, dated July 24, 2002.

No findings of significance were identified. A more in-depth review of the licensee's implementation of the February 25, 2002 Order, utilizing Appendix B and C of TI 2515/148 is scheduled for Fall 2003.

4OA6 Meetings, including Exit

Exit Meeting Summary

The resident inspectors presented the inspection results to Mr. D. Heacock, Site Vice President, and other members of the licensee's staff on January 15, 2003. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which met the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for disposition as NCVs.

1. TS 5.7.1.d requires each individual who enters a High Radiation Area (HRA) to possess: a radiation monitoring instrument; or an alarming dosimeter; or a telemetric alarming dosimeter; or a self-reading dosimeter and be under surveillance of qualified radiation protection personnel. On September 24, 2002, a worker traversed the basement of the Unit 2 Containment Building without one of the required controls. Upon exiting the Unit 2 Containment Building, the worker self-identified that he had left his telemetric

alarming dosimeter at the hot particle area step off pad, located at the reactor head stand work area. This finding was determined to be of low safety significance because it involved the failure to meet a regulatory requirement but did not significantly impair the licensee's ability to assess radiation dose, in that the workers exposure was being monitored by a TLD. The licensee documented and evaluated this TS noncompliance in Plant Issue N-2002-2526.

2. TS 5.7.2.e requires that entries into High Radiation Areas with dose rates greater than 1.0 rem/hour at 30 centimeters from the source, but less than 500 rads/hour at 1 meter from the source, shall be made only after dose rates in the area have been determined and entry personnel are knowledgeable of them. Entry personnel shall also receive a pre-job briefing prior to entry. On September 15, 2002, after HP personnel in the work control center observed a worker's DAD in dose-rate alarm, the licensee identified that a worker entered an overhead area in the basement of the Unit 2 Containment Building which had not been surveyed. The worker had not been informed of the dose rates in the area and had not been provided with a pre-job briefing for entry to the overhead area which was later determined to have a hot spot reading approximately 3 rem/hour at 30 centimeters. This finding was determined to be of low safety significance because it involved the failure to meet a regulatory requirement but did not significantly impair the licensee's ability to assess radiation dose. The licensee documented and evaluated this TS noncompliance in Plant Issue N-2002-2306.

3. Technical Specification 3.4.6.2 requires that operational RCS leakage shall be limited to no pressure boundary leakage. Based on results of the Unit 2 reactor head visual examination, the licensee identified six of 65 CRDM penetrations (nozzles 10, 21, 31, 35, 51, and 57) with visual evidence of leakage which required further evaluation.

   The leaks were determined to have resulted from weld cracking in CRDM nozzle J-welds. The licensee captured this issue in their corrective action program as Plant Issue N-2002-2335. Repairs to the head were not performed since the licensee decided to replace the reactor head. Because UT examinations performed during the outage revealed no circumferential cracks in any of the leaking nozzles, this violation is not more than of very low significance, and is being treated as a non-cited violation.

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee

D. Christian, Senior Vice President and Chief Nuclear Officer
K. Barnette, Supervisor, Site Industrial Safety/Fire Protection
J. Crossman, Supervisor, Nuclear Engineering
J. Davis, Director, Station Nuclear Safety and Licensing
M. Dunston, Manager, Site Services
T. Fredette, Electrical Engineering (Emergency Diesel Generator) Systems Engineer
C. Funderburk, Director, Station Operations and Maintenance
D. Heacock, Site Vice President
E. Hendrixson, Manager, Station Engineering
P. Kemp, Manager, Nuclear Oversight
L. Lane, Manager, Operations
J. Leberstien, Supervisor Licensing
T. Maddy, Manager, Station Security
G. Modzelewski, Project Engineer - VHP Inspection
F. Mladen, Manager, Maintenance
Q. Parker, Maintenance Rule Coordinator
W. Renz, Director, Security and Emergency Preparedness
H. Royal, Manager, Nuclear Training
A. Stafford, Manager, Radiological Protection
M. Whalen, Supervisor Licensing

ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

50-338, 339/02-04-01	NCV	Failure to Control Design Drawings for an Integral Construction of Trunnion, Pad, and Run Pipe in Service Water Pump Discharge Pipe Supports (Section 1R07)
50-339/02-04-02	NCV	Inadequate Weld Overlay Repairs on CRDM Nozzle 51 J-Weld (Section 1R08)
50-338/02-04-03	NCV	Licensee Parts Program Allowed for the Use of Non-Safety Parts in the Safety-Related Unit 1 Steam Generator Pressure-Operated Relief Valve Controllers (Section 1R15)
50-338, 339/02-04-04	NCV	Failure to Properly Monitor Worker Radiation Exposure in a High Radiation Area (Section 2OS1)

Attachment

Closed

50-338, 339/2002-001-00	LER	Incorrect Waste Gas Decay Tank (WGDT) Oxygen Analyzer Setpoint Due to Inadequate Procedures (Section 4OA3)

Discussed

2515/148	TI	Pre-inspection Audit for Interim Compensatory Measures (ICMs) at Nuclear Power Plants (Section 4OA5)

LIST OF DOCUMENTS REVIEWED

1R07 Heat Sink Performance

Procedures and Standards

- Administrative Procedure VPAP-0811, Rev. 3, Service Water System Inspection and Maintenance Program
- Administrative Procedure VPAP-2201, Rev. 12, Nuclear Plant Chemistry Program Standard No. STD-CEN-0021, Rev. 5, Civil Engineering Nuclear Standard - Welded Pipe Attachments

Documents Reviewed

- Work Orders 00327116, 00382431, and 00436294 Perform Boroscope Inspections on Heat Exchanger 1-RS-E-1C
- Letter Serial No. 89-572E, Virginia Electric Power Company to NRC for Supplemental Response to Generic Letter 89-13 Service Water System Problems affecting Safety-Related Equipment
- Test for Procedure 1-PT-210.1, Valve Inservice Inspection (Service Water MOVs to RSHXS) for 1-SW-MOV-101A, Dated Sep. 20, 2001 and March 15, 2000
- Test for Procedure 1-PT-214.1, Rev. 5, Valve Inservice Inspection (RSHE Service Water Valve Position Indication) for 1-SW-MOV-101A, Dated March 14, 2000
- Work Orders 00436855 and 00407795, MOV/Greasecase/Bolting Inspection for 1-SW-MOV-101A, Dated Sep. 16, 2001 and March 14, 2000
- Test for Procedure No. 1-PT-61.3, Rev. 23, Containment Type C Test for 1-SW-MOV-104D, Dated Sep. 9, 2001
- Test for Procedure 1-PT-213.11, Rev. 18, Valve Service Inspection (Service Water) for 1-SW-MOV-104D, Dated Oct. 11, July 3, and April 11, 2002
- Test for Procedure No. 1-PT-214.18, Rev. 7 and 6, Valve Inservice Inspection (Misc. Outside Containment Isolation Valve Position Indication) for 1-SW-MOV-104D, Dated Oct. 1, 2001and April 1, 2000
- Work Orders 00454097, 00436878, 00448956,00436877, 00424906, and 00408457 for Maintenance on Valve 1-SW-MOV-104D
- Test for Procedure No. 1-PT-210.24, Rev. 0, Valve Inservice Inspection (Service Water Check Valves to RSHXs) for Check Valve 1-SW-116, Dated Sep. 22, 2001

- Test for Procedure No. 1-PT-75.6, Rev. 13, Service Water System Flow Balance , Dated Sep. 28, 2001
- Work Orders 00456731, 00417623, and 00389929, Maintenance for Check Valve 1-SW-116
- Work Order 00439005 for Service Water Pump House 1-SW-P-1A Traveling Screen and Intake Bay Inspection, Dated March 1, 2001
- Work Order 00466365, Intake Bay Inspection, Dated April 28, 2002
- Category 3 Root Cause Evaluation N-2002-3261-E1 for 1-SW-P-1A
- Plant Issue Resolution N-2002-0307-R1 & R2 for Pump 1-SW-P-1B
- Work Order 00354512 to perform PM 0-ECM-1410-01 Teardown,, Inspection , and Test for Pump 1-SW-P-1A
- Work Order 00329017 to Perform PM 0-EPM-1412-01 Maintenance for Pump 1-SW-P-1A
- Work Orders 00461914 and 00469758 to Perform Motor Oil Sample for Pump 1-SW-P-1A
- Work Order 00400714 to Perform 5-year Maintenance Work for Pump 1-SW-P-1A
- Test for Procedure No. 1-PT-75.2A, Service Water Pump (1-SW-P-1A) Quarterly Test, Dated July 18, 2002, Oct. 14, 2002
- Test for Procedure No. 1-PT-75.2A.1, Service Water Pump (1-SW-P-1A) Head Curve Verification, Dated April 26, 2002
- Test for Procedure No. 1-PT-75.2B, Service Water Pump (1-SW-P-1B) Quarterly Test, Dated July 18,2002 and Nov. 2, 2002
- Test for Procedure No. 1-PT-75.2B.1, Service Water Pump (1-SW-P-1B) Head Curve Verification, Dated April 26, 2002
- Long Term Trend for Service Water PH Coupon Corrosion Rate from 6/22/87 to 6/18/02
- Short Term Trend for Service Water PH Coupon Corrosion Rate from 1/1/99 to 8/13/02
- Service Water Chemistry Results for pH and Chloride
- Data Analysis Reports for Water Collected from Bearing Cooling System, Service Water System, and Lake Anna on Oct. 7, Sep. 19, and Aug. 14, 2002
- Test for Procedure No. 0-PT-75.15, Rev. 4, Generic Letter 89-13 Service Water System Testing Requirements Coordination, Dated Aug. 28, 2002 and Sep. 11, 2001
- Measurement for Procedure No. 0-PT-75.22, Rev. 2, Service Water System Reservoir Sludge Depth Measurement, Dated Oct. 30, 2001 and Dec. 10, 2002
- Calculation No. ME-0200, Rev. 0, Evaluation of 0-PT-75.22 Result of 10-30-01 and Evaluation of Allowable Service Water Piping Leakage Rate, Dated Nov. 16, 2001
- Calculation No. CE-1596, Rev. 0 & 1, Anchor Evaluation - SW Pump Discharge Piping Repair/Replacements
- Calculation No. CE-1553, Rev. 0, Support Modification - SW Pump Discharge Piping Repair/Replacement
- Drawing No.11715-FP-5T-5, Rev. 5, Service Water Lines Pipe Support Details Sheet 3
- Drawing No. 11715-FM-8A, Rev. 15, Arrangement - Service Water Pump House, Sheet 1
- Drawing No. 11715-FM-6A, Rev. 14, Arrangement - Intake Structure Sheet 1
- Drawing No. 11715-WMKS-0105C, Rev. 3, Inservice Inspection Isometric WS Sys.: 36" & 20" Pipe From SW Pumps
- Dominion Pipe Support Drawing No. 1-WS-A-23 (Line 20"-WS-407-151-Q3) Sheet 1, Rev. 0 &1, and Sheet 2, Rev.4
- Stone and Weber Drawing No. 11715-PSSK-105C.4, Sheets 1 to 3, Rev. 1 for Support No. 1-WS-A-23

- Dominion Pipe Support Drawing No. 1-WS-A-25 (Line 20"-WS-405-151-Q3) Sheet 1, Rev. 0 and Sheet 2, Rev. 3
- Stone and Weber Drawing No. 11715-PSSK-105C.03, Sheets 1 to 3, Rev. 1 for Support No. 1-WS-A-25
- Dominion Pipe Support Drawing No. 1-WS-A-27 (Line 20"-WS-7-151-Q3) Sheet 1, Rev. 0 and Sheet 2, Rev. 3
- Stone and Weber Drawing No. 11715-PSSK-105C.2, Sheets 1 to 3, Rev. 1 for Support No. 1-WS-A-27
- Dominion Pipe Support Drawing No. 1-WS-A-29 (Line 20"-WS-5-151-Q3) Sheet 1, Rev. 1 and Sheet 2, Rev. 4
- Stone and Weber Drawing No. 11715-PSSK-105C.1, Sheets 1 to 3, Rev. 1 for Support No. 1-WS-A-29
- Plant Issue N-2002-0279 for Pipe Support 1-WS-A-23
- Plant Issue N-2002-0490 for Pipe Support 1-WS-A-25
- Plant Issue N-2002-2922 for Pipe Support 1-WS-A-27
- Plant Issue N-2002-3203 for Pipe Support 1-WS-A-29
- Plant Issue N-2002-3223 for Pipe Support 1-WS-A-29
- Installation Problem Report (IPR) No. IPR 02-447 for DCP00003
- Plant Issue N-2002-3404, Rev. 0, for Deviation of Construction of Pipe Supports 1-WS-A-23, -25, -27, and -29
- Plant Issue Resolution N-2002-3404-R1, Rev. 1

1R08 Inservice Inspection (ISI)

Procedures

- Brook Associates, Inc. Field Services Procedure 83-0044, Revision 1, Reactor Vessel Head Penetration Remote Visual Inspection
- Westinghouse Field Services Procedure MRS-SSP-1353, Revision 1, North Anna Unit 2 Reactor Vessel Head Inspection Tool Operation
- Westinghouse Field Services Procedure WDI-ET-002, Revision 1, Intraspect Eddy Current Analysis Inspection of J-Groove Welds in Reactor Vessel Head Penetrations
- Westinghouse Field Services Procedure WDI-ET-003, Revision 3, Intraspect Eddy Current Imaging Procedure for inspection of Reactor Vessel Head Penetrations
- Westinghouse Field Services Procedure WDI-ET-004, Revision 1, Intraspect Eddy Current Analysis Guidelines for Inspection of Reactor Vessel Head Penetrations
- Westinghouse Field Services Procedure WDI-ET-008, Revision 0, Intraspect Eddy Current Imaging Procedure for inspection of Reactor Vessel Head Penetrations with Gap Scanner
- Westinghouse Field Services Procedure WDI-UT-010, Revision 3, Intraspect Ultrasonic procedure for Inspection of Reactor Vessel Head Penetrations, Time of Flight Ultrasonic, Longitudinal Wave and Shear Wave
- Westinghouse Field Services Procedure WDI-UT-013, Revision 1, CRDM UT Analysis Guidelines
- Westinghouse Field Services Procedure WCAL-002, Revision 1, Pulsar/Receiver Linearity Procedure
- Virginia Power Engineering Inspection Procedure 0-GEP-05, Revision 1, Visual Examination of Reactor Pressure Head Penetration Nozzles

- Dominion Nondestructive Examination Procedure NDE-PT-701, Revision 2, Liquid Penetrant Examination
- Dominion Nondestructive Examination Procedure NDE-UT-804, Revision 1,Ultrasonic Examination of Bolting Greater than 2 Inches

Plant Issues (PIs)

- N-2002-2287, CRDM Penetration 21 appears to have exhibited some amount of boric acid leakage during last cycle
- N-2002-2288, CRDM Penetration 31 appears to have exhibited some amount of boric acid leakage during last cycle
- N-2002-2289, CRDM Penetration 53 masked by boric acid residue
- N-2002-2294, CRDM Penetration 33 masked by boric acid residue
- N-2002-2301, CRDM Penetration 65 masked by boric acid residue
- N-2002-2302, CRDM Penetration 41 masked by boric acid residue
- N-2002-2303, CRDM Penetration 24 masked by boric acid residue
- N-2002-2304, CRDM Penetration 60 masked by boric acid residue
- N-2002-2305, CRDM Penetration 42 masked by boric acid residue
- N-2002-2307, CRDM Penetration 10 appears to have exhibited some amount of boric acid leakage during last cycle
- N-2002-2311, CRDM Penetration 7 masked by paint residue
- N-2002-2312, CRDM Penetration 2 masked by paint residue
- N-2002-2313, CRDM Penetration 59 masked by boric acid residue
- N-2002-2314, CRDM Penetration 64 masked by boric acid residue
- N-2002-2315, CRDM Penetration 63 masked by boric acid residue
- N-2002-2316, CRDM Penetration 51 masked by boric acid residue
- N-2002-2319, CRDM Penetration 57 appears to have exhibited some amount of boric acid leakage during last cycle
- N-2002-2330, CRDM Penetration 35 appears to have exhibited some amount of boric acid leakage during last cycle
- N-2002-2335, CRDM Penetration 51 appears to have exhibited some amount of boric acid leakage during last cycle
- N-2002-2338, CRDM Penetration 27 masked by boric acid residue
- N-2002-2339, CRDM Penetration 32 masked by boric acid residue
- N-2002-2340, CRDM Penetration 47 masked by boric acid residue
- N-2002-2341, CRDM Penetration 52 masked by boric acid residue
- N-2002-2342, CRDM Penetration 66 masked by boric acid residue
- N-2002-2343, CRDM Penetration 50 masked by old loose boric acid and other residue
- N-2002-2344, CRDM Penetration 46 masked by old loose boric acid and other residue
- N-2002-2345, RPV head vent masked by old loose boric acid and other residue
- N-2002-2346, CRDM Penetration 62 masked by boric acid residue
- N-2002-2547, Open head (7010) scan of CRDM Penetration 19 showed 1 circumferential OD and 1 axial ID indications
- N-2002-2549, Open head (7010) scan of CRDM Penetration 54 showed 2 circumferential OD indications
- N-2002-2550, Open head (7010) scan of CRDM Penetration 53 showed 1 weld defect and 3 axial ID indications
- N-2002-2551, Open head (7010) scan of CRDM Penetration 55 showed 1 circumferential OD and 2 axial ID indications

- N-2002-2552, Open head (7010) scan of CRDM Penetration 56 showed 1 circumferential axial OD indication
- N-2002-2555, Open head (7010) scan of CRDM Penetration 51 showed 1 circumferential ID and 2 axial ID indications
- N-2002-2656, Westinghouse weld overlay performed on Unit 2 CRDM Penetrations 51, 62, 63 during fall 2001 did not completely cover the entire Inconel weld and/or butter region of the J-welds

Vendor Exam Evaluation Reports (VEs)

- North Anna Unit 2 Reactor Vessel Head Penetration September 2002 J-Groove Weld and Tube OD Surface Eddy Current Inspection Results

- North Anna Unit 2 Reactor Vessel Head Penetration September 2002 Open Housing Scanner and Gap Scanner Inspection

Other Documents

- North Anna Liquid Penetrant (PT) Examination Report 6622, CRDM 51, 62, 63, Nov, 2001
- North Anna PT Examination Report 6676, CRDM 51 Weld repair (final) Nov, 2001
- North Anna PT Examination Report 7334, CRDM 51 Sep, 2002
- North Anna PT Examination Report 7338, CRDM 53 Sep, 2002
- North Anna PT Examination Report 7337, CRDM 55 Sep, 2002
- North Anna PT Examination Report 7336, CRDM 57 Sep, 2002
- North Anna PT Examination Report 6677, CRDM 62 Weld sample (excavation) Nov, 2001
- North Anna PT Examination Report 6678, CRDM 62 Weld repair (intermediate) Nov, 2001
- North Anna PT Examination Report 6687, CRDM 62 Weld repair (intermediate) Nov, 2001
- North Anna PT Examination Report 6690, CRDM 62 Weld repair (intermediate) Nov, 2001
- North Anna PT Examination Report 6713, CRDM 62 Weld repair (intermediate) Nov, 2001
- North Anna PT Examination Report 6714, CRDM 62 Weld repair (final) Nov, 2001
- North Anna PT Examination Report 7351, CRDM 62 Sep, 2002
- North Anna PT Examination Report 6688, CRDM 63 Weld repair (intermediate) Nov, 2001
- North Anna PT Examination Report 6691, CRDM 63 Weld repair (intermediate) Nov, 2001
- North Anna PT Examination Report 6705, CRDM 63 Weld repair (intermediate) Nov, 2001
- North Anna PT Examination Report 6712, CRDM 63 Weld repair (intermediate) Nov, 2001
- North Anna PT Examination Report 6715, CRDM 63 Weld repair (intermediate) Nov, 2001
- North Anna PT Examination Report 6716, CRDM 63 Weld repair (final) Nov, 2001
- North Anna PT Examination Report 7352, CRDM 63 Sep, 2002

- Licensee Letter Serial 02-491 dated September 12, 2002, Response to NRC Bulletin 2002-02
- Qualification and Training Records for NDE Examiners
- Steam Generator Program Pre-Outage Assessment, North Anna Unit 2, Fall 2002
- Steam Generator Conditioning Monitoring and operational Assessment North Anna Unit 2 (EOC4-SGR) dated June 4, 2001
- North Anna Site Specific Eddy Current Analysis Guidelines NAP-SGPMS-001, Rev. 4
- Qualification and Training Records for NDE Examiners
- Virginia Electric and Power Company Letter Serial 02-491A dated October 18, 2002 Response to NRC Bulletin 2002-02

2OS1 Access Control To Radiologically Significant Areas (71121.01)

Procedures, Instructions, Lesson Plans, and Manuals

- Virginia Power Administrative Procedure (VPAP)-2101, Radiation Protection Program, Revision (Rev.) 21
- VPAP-1601, Corrective Action, Rev. 15
- VPAP-1501, Deviations, Rev. 14
- C-HP-1032.060, Radiological Posting and Access Control, Rev. 0
- C-HP-1032.061,High Radiation Area Key Control, Rev. 0
- C-HP-1031.021, Dosimetry Requirements for Site Restricted Areas, Rev. 4
- C-HP-1061.110, Radiological Control Areas, Rev. 2
- C-HP-1031.022, RWP Dosimetry: Exposure Control Support, Rev. 4
- C-HP-1020.011, Radiological Protection Action Plan During Diving Activities, Rev. 2
- HP-1071.020, Controlling Contaminated Material, Rev. 3
- Radiation Protection Job Guideline - Use of the Green Cask for Removal of Items from the Spent Fuel Pool or the Reactor Cavity, dated 8/1/02
- Technical Specifications for North Anna Independent Spent Fuel Storage Installation, 6/30/98
- North Anna Power Station Independent Spent Fuel Storage Installation - Safety Analysis Report, 6/30/98
- North Anna Power Station Independent Spent Fuel Storage Installation - Environmental Report, 6/30/98
- 0-PT-4.6, ISFSI Health Physics Radiation Survey Surveillance, Rev. 2
- 0-PT-4.7, ISFSI Health Physics TLD Survey Surveillance, Rev. 3

RWPs

- 02-2-2008, Health Physics surveys in Very High Radiation Areas, Rev. 0
- 02-2-2013, Minor Work by Mechanical, Electrical, and Instrumentation personnel, Rev. 0
- 02-2-2019, Perform Elec/Mec PMs & inspections on MOVs, Rev. 0
- 02-2-2023, Disassemble, inspect, repair, repack, cut out and replace valves and flanges in support of the Unit -2 Outage., Rev. 0

Records and Data

- C-HP-1041.023, Attachment 3, Committed Effective Dose Equivalent (CEDE) - Ingestion Intake Data, Revision 0, for evaluation dated 12/10/01
- Radiological Survey Map for Unit 2 Containment, 231 foot (') Elevation, 9/10/02
- Radiological Survey Map for Unit 2 Containment, 262' Elevation, 9/10/02
- Radiological Survey Map for Unit 2 Containment, 262' Elevation, A Cubical, 9/10/02
- Radiological Survey Map for Unit 2 Containment, 262' Elevation, B Cubical, 9/10/02
- Radiological Survey Map for Unit 2 Containment, 262' Elevation, C Cubical, 9/10/02
- Radiological Survey Map for Unit 2 Containment, 241' Elevation, A Loop Room, 9/9/02
- Radiological Survey Map for Unit 2 Containment, 241' Elevation, B Loop Room, 9/9/02
- Radiological Survey Map for Unit 2 Containment, 241' Elevation, C Loop Room, 9/9/02

Audits and Self-Assessments

- Audit 01-07: Radiological Protection/Chemistry
- C-HP-1091.232, Attachment 1, Radiological Survey Program Evaluation, Rev. 1, Covering Period 5/99 to 2/02

Plant Issues

- N-2001-3301, Individual entered a posted High Radiation Area and subsequently a Locked High Radiation Area in U-2 Reactor Containment 216' elevation without a digital alarming dosimeter, 11/9/2001
- N-2002-2526, Worker exited the work area at the reactor head stand located on the 216' elevation of Unit 2 Containment without a digital alarming dosimeter, 9/24/2002
- N-2002-2306, Worker made an unauthorized entry in to an unidentified locked high radiation area in the overhead area of the 216' elevation of Unit 2 Containment, 9/15/02
- N-2002-2129, Contract employee entered the protected area without his TLD, 9/5/02
- N-2002-2640, Individual entered the protected area with the wrong TLD, 9/30/02

2OS2 As Low As Reasonably Achievable (71121.02)

Procedures, Instructions, Lesson Plans, and Manuals

- VPAP-2101, Radiation Protection Program, Rev. 21
- VPAP-2102, Station ALARA Program, Rev. 8
- C-HP-1041.024, Declared Pregnant Woman, Rev. 2
- VPAP-1601, Corrective Action, Rev. 15
- VPAP-1501, Deviations, Rev. 14
- Source Term Reduction Initiatives at North Anna Power Station, dated 7/31/02
- Radiation Protection Job Guideline - Hot Spot Flushing
- CH-93.120, Chemistry Controls: Refueling Outage, Rev. 15
- VPAP-2105, Temporary Shielding Program, Rev. 5

RWPs

- 02-2-2001, Disassemble and reassemble Reactor Vessel Head, Rev. 0
- 02-2-2023, Disassemble, inspect, repair, repack, cut out and replace valves and flanges in support of the Unit -2 Outage., Rev. 0
- 02-2-2050, Reactor Head penetration eddy current inspection, Rev. 2
- 02-2-2065, Repair 20RC-MOV-2593, Rev. 2

Records and Worksheets

- ALARA Evaluation & RWP Man-Rem Data as of 9/30/02
- Pre-Job ALARA Worksheets and ALARA Action Plans for ALARA Evaluations Numbers:
  - 02-008 Install & Remove Scaffolding
  - 02-016 Disassemble/Reassemble Reactor Head
  - 02-019 Valve Maintenance
  - 02-034 Reactor Head Inspections
  - 02-036 Repair Valve 2-RC-MOV-2593
- Quarterly Hot Spot Program Report - Third Quarter 2002
- List of Source Term Removed from 1/01/97 to 9/30/02
- Memorandum, dated 9/23/02, North Anna Unit 2 - End of Cycle 15 - September 2002 Primary Coolant Shutdown Chemistry Evaluation
- Temporary Shielding Request (TSR) Numbers: 02-TSR-004, 02-TSR-005, 02-TSR-007, and 02-TSR-012

Audits and Self-Assessments

- Audit 01-07: Radiological Protection/Chemistry
- C-HP-1091.231, Attachment 1, Exposure Control Program Evaluation, Rev. 0, Covering Period 1/1/99 to 12/31/00

Plant Issues

- N-2002-2624, An individual alarmed the radiation monitor at the main security exit point after having cleared the radiation monitors at the RCA exit point, 9/29/02
- N-2002-2612, Shielding water was syphoned from the reactor head thermal sleeve storage tank by an inadvertently disconnected hose, 9/28/02
- N-2002-2297, Unnecessary radiation exposure to scaffold crew, approximately 120 mrem total for the crew. Scaffolding was erected and disassembled for a job which had been completed and did not require the use of scaffolding, 9/15/02
- N-2002-2370, Spurious alarms occurred for personnel being monitored by the remote radiation monitoring system, 9/17/02
- N-2002-2213, Individual entered Unit 2 Containment without an emergency self reading dosimeter during a first aid emergency, 9/11/02

2PS2 Radioactive Material Processing and Transportation (71122.02)

Procedures, Instructions, Lesson Plans, and Manuals

- North Anna Power Station -Updated Final Safety Analysis Report (UFSAR), Sections 11.2 and 11.3, Rev. 36
- 1-OP-20.1, Operation of the Spent Resin Holdup Tanks, Rev. 17
- 0-OP-20.6, Dewatering Chem-Nuclear 14-215 or Smaller Liners Containing Bead Resin or Activated Carbon, Rev. 7
- 0-OP-20.7, Dewatering Chem-Nuclear 14-195 or Smaller Liner Containing Ecodex, Powdex Resin, or Diatomaceous Earth, Rev. 1
- C-HP-1091.232, Radiological Survey Program: Surveillance and Evaluation
- HP-1071.030, Receiving Radioactive Material, Rev. 8
- HP-1071.040, Packaging and Shipment of Radioactive Material, Rev. 9
- HP-1072.010, Packaging Radioactive Waste, Rev. 5
- HP-1072.030, Computer Programs for Radwaste and Radioactive Material, Rev. 4
- HP-1072.050, Radioactive Waste Transfer to Licensed Waste Processors, Rev. 12
- HP-1072.051, Radioactive Waste Transfer to Chem-Nuclear Consolidated Facility, Barnwell. S.C., Rev. 7
- HPTDP-S4U3/ HPSDP-IR-S3U3, Self Study Module Radioactive Material Control and Solid Radioactive Waste, Rev. 0, 10/26/1998
- HPTCTP-5-LP-1, Radioactive Material/ Waste Shipping-Radioactive Material, Rev. 2, 7/27/1998
- HPTCTP-5-LP-2, Radioactive Material/ Waste Shipping-Activity Limits, Rev. 3, 7/27/1998
- HPTCTP-5-LP-3, Radioactive Material/ Waste Shipping-Communications, Rev. 4, 7/27/1998
- HPTCTP-5-LP-4, Radioactive Material/ Waste Shipping-Radiation Levels, Rev. 2, 7/27/1998
- HPTCTP-5-LP-5, Radioactive Material/ Waste Shipping-Contamination Levels, Rev. 5, 7/27/1998
- HPTCTP-5-LP-6, Radioactive Material/ Waste Shipping-Container Requirements, Rev. 2, 7/27/1998
- HPTCTP-5-LP-7, Radioactive Material/ Waste Shipping- Shipping Requirements and Limitations, Rev. 3, 7/27/1998
- HPTCTP-5-LP-8, Radioactive Material/ Waste Shipping- Low Specific Activity, Rev. 3, 7/27/1998
- HPTCTP-5-LP-9, Radioactive Material/ Waste Shipping-Waste Classification, Rev. 3, 7/27/1998
- VPAP-1601, Corrective Action, Rev. 15
- VPAP-1501, Deviations, Rev. 14

Records

- Memo: C.A. Tarantino to A. H. Stafford, Third Quarter 2001, Confirmatory Measurements, 10/31/2001
- Results of Radiochemistry Cross Check Program Dominion Generation Framtome ANP DE&S, 1st Quarter 2002

Shipment 02-1032

- Certificates of Compliance for Radioactive Material Package, Certificate Number 9225, Revisions 29 thru 31, Docket Number 71-9225, Package ID Number USA/9225/B(U)F-85
- US Department of Transportation- Research and Special Projects Administration, Competent Authority Certification for a Type B(U) Fissile Radioactive Materials Package Design Certification USA/9225/B(U)F-85 Rev. 25, 9/25/2001
- Procedure T-HP-1071.049, Shipment of Irradiated Nuclear Fuel Rods to Sweden Using NAC-LWT Shipment Cask, Rev. 0 (One Time Use Procedure) (This included several checklists)
- Several memos detailing the coordination and execution of various administrative requirements to include coordinating with the Swedish Nuclear Power Inspectorate on the acceptability of the shipping cask, identifying VEPCO as a registered user of the cask , coordination with various state and federal government agencies involved in the shipment and documents of understanding.
- Various shipping papers to include: IMO Dangerous Goods Declaration, Shippers Export Declaration, NRC Form 250 (Authorizing Export), Surveys of vehicle and cask, Manifests, Bills of Lading, Various calculations of fuel burnup/ isotopic abundance and shipment classifications, NRC/DOE Form 741 Nuclear Material Transaction Report.
- Transport Vehicle Inspection Checklist and Record, Tri-State Motor Transport Tractor 59527 and trailer 237902 for shipment 02-1032, 6/3/2002
- International Certificate of Fitness for the Carriage of INF Cargo, Ship: MV Panthera, Number V2FA5, IMO Number 9226700, Issued Hamburg 10/26/2002
- Shipboard Emergency Plan, MV Panthera, Rev. 0, 6/21/2001
- Driver Instructions PWR Spent Nuclear Fuel Shipment North Anna to Newport News Marine Terminal, Released 6/19/2002
- Procedure STS-315-P-02, Rev. 10, 5/23-6/02/2002, NAC-LWT Cask Generic Operating Procedure
- Tri-State Motor Transit Company, Spent Nuclear Fuel Transportation Management Plan for N.A.C. International and North Anna Reactor: Mineral VA, 6/2002

Shipment 02-1021

- HP-1071.040 Attachment 6, Instrument or Article Radioactive Material Shipment Checklist, Rev. 9 4/23/2002
- North Anna Power Station Radiological Survey Map and Record (Pre-shipment Survey of Damaged Exit Signs), 4/23/2002
- HP-1071.040, Attachment 18, Calculation and Data Sheet, Rev. 9, Article and RQ Calculations, 4/23/2002

Shipment 01-1125

- HP-1071.040, Attachment 9, SCO, Type A, Exclusive Use Vehicle Shipment Checklist, Rev. 8, 10/25/2001
- Radioactive Material Manifest -Shipping Paper, 10/25/01
- North Anna Power Station Radiological Survey Map and Record (Vehicle and Package), 10/25/2001
- HP-1071.040, Attachment 14, Special Instructions to Carrier, Rev. 8, 10/25/2001
- Straight Bill of Lading-Short Form,10/25/2001
- SCO Package Characterization Input Calculations, 10/25/2001

- Package Characterization Report, 10/25/2001
- DOT Classification Summary, Package B3007 & B3008, 10/25/2001

Shipment 01-1128

- HP-1071.040, Attachment 8, LSA, Type A, Exclusive Use Vehicle Shipment Checklist, Revision 8, 11/1/2001
- Radioactive Material Manifest -Shipping Paper, 11/1/2001
- North Anna Power Station Radiological Survey Map and Record (Vehicle and Package), 11/01/2001
- HP-1071.040, Attachment 14, Special Instructions to Carrier, Rev. 8, 11/1/2001
- Straight Bill of Lading-Short Form,11/1/2001
- SCO Package Characterization Input Calculations, 11/1/2001
- Package Characterization Report, 11/1/2001
- DOT Classification Summary, Package 790027, 11/1/2001

Shipment 01-1135

- HP-1071.040, Attachment 10, Type A, non-exclusive Use Vehicle Shipment Checklist, Rev. 8, 11/20/2001
- Sample Report, Boat Sample, 11/19/2001
- Boat Sample Transportation Calculation,11/20/2001
- Radioactive Material Manifest -Shipping Paper, 11/20/2001
- North Anna Power Station Radiological Survey Map and Record (Sample), 11/20/2001
- DOT Classification Summary for Type A/B and RQ, Shipment Number 01-1135, 11/20/2001
- HP-1071.040, Attachment 15, Specification Package Use Inspection Checklist and Record, Rev. 8, 11/20/2001
- HP-1071.040, Attachment 14, Special Instructions to Carrier, Rev. 8, 11/20/2001
- Work Order 00457775 Supplemental Work Instructions, Westinghouse radioactive material shipping container, 11/19/2001
- Sample Report, Smear from Boat Sample for Isotopic Analysis, Spectrum AN193F.An1, 11/19/2001
- Information Package: Westinghouse Electric Company Nuclear Services to Mr. Gary Modzelewski Dominion Generation Innsbrook Technical Center, Document number VRA-01-098 (Package contains shipping advice, Isotopics, Survey report, container specification and handling procedures for WTR-4/ WTR-5 Shielded Shipping Containers), 11/19/2001
- DOT Classification Summary, Package ID WTR-4, 11/20/2001
- Radioactive Material Manifest Shipping Paper, Shipment 01-1135, 11/20/2001

<u>Audits and Self-Assessments</u>

- NUPIC Audit of Teledyne Brown Engineering Environmental Services, 3/12/2001
- Vendor Corrective Action Request To Teledyne Brown Engineering-ES, 2/2/2001
- C-HP-1091.271, Attachment 1, Radioactive Material Control Program Evaluation, Revision 0, Covering Period 4th Quarter 1997 to 4th Quarter 2000
- C-HP-1091.232, Attachment 1, Radiological Survey Program Evaluation, Revision 1, Covering period 5/1999 to 2/2002

- C-HP-1091.272, Attachment 1, Solid Radioactive Waste Program Evaluation, Rev. 4, Covering period 1/1/2000 to 12/31/200

Plant Issues

- N-2002-1963, Trailer delivering cask for resin shipment [02-CNS-04]was identified as having 2 superficial cracks in a rear cover plate. 8/14/2002
- N-2002-0113, Differences among Millstone, North Anna and Surry purchase orders for shipping casks. 1/16/2002
- N-2002-0548, Received radioactive shipment with improper package certification statement, 3/8/2001
- N-2002-0573, Waste characterization data for shipment and disposal of excore detectors was found to be inappropriate. 3/13/2002
- N-2001-1255, A package containing radioactive material (calibration sources) was distributed from warehouse 5 to intended recipient prior to radiological Surveys being performed. 4/23/2001
- N-2002-1199, Spent fuel shipping cask NAC-LWT-1 arrived on site with an incomplete DOT marking. 5/29/2002
- N-2002-0304, A sea land container labeled as EMPTY was received at the plant with the security seal broken.
- N-2001-2390 The transport vehicle for radioactive waste shipment 01-4001 was rejected for a unsatisfactory tire on the trailer.

4OA1 Performance Indicator Verification (71151)

Procedures

- HPAP-2802, NRC Performance Indicator Program, Rev. 1
- 0-PT-452.01, Radioactive Liquid Effluents, Dose Calculations, Rev. 5 (reviewed results of monthly procedural performance for July 2001 to July 2002)
  0-PT-454.01, Radioactive Gaseous Effluents, Dose Calculations, Rev. 5 (reviewed results of monthly procedural performance for July 2001 to July 2002)
- VPAP-1601, Corrective Action, Rev. 15
- VPAP-1501, Deviations, Rev. 14

Plant Issues

- N-2001-2989, A Dominion employee's CEDE of 31 mrem on his whole body count exceeds the TEDE-ALARA evaluation's internal dose estimate of 5.85 mrem,10/4/2001
- N-2001-3301, Individual entered a posted High Radiation Area and subsequently a Locked High Radiation Area in U-2 Reactor Containment 216' elevation without a digital alarming dosimeter,11/9/2001
- N-2002-2072, ASP-1 (neutron radiation detector) #3695 failed the return performance check, 8/28/2002
- N-2002-2141, Survey meters used to measure neutron dose rates at the ISFSI perimeter fence provide inconsistent readings, 9/5/2002
- N-2002-2167, Westinghouse employee arrived on site with clothing and shoes contaminated with Co-58, Co-60, and Ag-110m, 9/9/2002

LIST OF ACRONYMS

ALARA - As Low As Is Reasonably Achievable
CAP - Corrective Action Program
CEDE - Committed Effective Dose Equivalent
CFR - Code of Federal Regulations
COC - Certificate of Compliance
CRDM - Control Rod Drive Mechanism
CRS - Control Room Simulator
CY - Calendar Year
DAD - Digital Alarming Dosimeter
DEP - Drill and Exercise Performance
EDG - Emergency Diesel Generator
ET - Eddy Current Examination
HP - Health Physics
HRA - High Radiation Area
HRCQ - Highway Route Controlled Quantity
IA - Instrument Air
ICM - Interim Compensatory Measures
ID - Inside Diameter
IMC - Inspection Manual Chapter
ISFSI - Independent Spent Fuel Storage Installation
LEOF - Local Emergency Operations Facility
LOCA - Loss-of-coolant Accident
LSA - Low Specific Activity
NCV - Non-Cited Violation
NDE - Nondestructive Examination
OS - Occupational Radiation Safety
OSC - Operational Support Center
OWA - Operator Workaround
PARS - Publicly Available Records
PMT - Post-maintenance Test
PORV - Pressure-operated Relief Valve
PT - Liquid Penetrant Examination
RCS - Reactor Coolant System
REP - Radiological Emergency Plan
RPV - Reactor Pressure Vessel
RWP - Radiation Work Permit
RWST - Refueling Water Storage Tank
S/G - Steam Generator
SBO - Station Blackout
SCO - Surface Contaminated Object
SDP - Significance Determination Process
SSC - Systems, Structures, and Components
SW - Service Water
TLD - Thermoluminescent Dosimeter
TM - Temporary Modification
TS - Technical Specification

TSC - Technical Support Center
UT - Ultrasonic Examination
VT - Visual Examination
VHP - Vessel Head Penetration
VPAP - Virginia Power Administrative Procedure
WGDT - Waste Gas Decay Tank