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

July 28, 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. 05000338/20003003, 05000339/2003003 AND 07200016/2003001

Dear Mr. Christian:

On June 28, 2003, the Nuclear Regulatory Commission (NRC) completed an integrated inspection at your North Anna Power Station, Units 1 and 2. The enclosed report documents the inspection finding which was discussed on July 9 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 selective procedures and records, observed activities, and interviewed personnel.

Based on the results of the inspection, no findings of significance were identified by the NRC. However, one license-identified violation which was determined to be of very low safety significance is listed in Section 4OA7 of this report. If you contest this non-cited violation, 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.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of

NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at *http://www.nrc.gov/reading-rm/adams.html* (the Public Electronic Reading Room).

Sincerely,

/RA/

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

Docket Nos.: 50-338, 50-339, 72-16
License Nos.: NPF-4, NPF-7, SNM-2507

Enclosures: NRC Integrated Inspection Reports Nos. 05000338/2003003, 05000339/2003003, 07200016/2003001 w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-338, 50-339, 72-16

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

Report Nos.: 05000338/2003003, 05000339/2003003, 07200016/2003001

Licensee: Virginia Electric and Power Company (VEPCO)

Facilities North Anna Power Station, Units 1 & 2

Location: 1022 Haley Drive
Mineral, Virginia 23117

Dates: April 6, 2003 - June 28, 2003

Inspectors: M. Morgan, Senior Resident Inspector
J. Canady, Resident Inspector
R. Carrion, Project Engineer (Sections 2PS3, 4OA1)
B. Crowley, Senior Reactor Inspector (Sections 4OA5.1 and 4OA5.2)
N. Griffis, Health Physics Intern
D. Jones, Senior Radiation Specialist (Section 2OS1)
J. Lenahan, Senior Reactor Inspector (Sections 4OA5.3 and 4OA5.4)
K. Naidu, Senior Reactor Engineer, NRR (Sections 4OA5.1 and 4OA5.2)
E. Testa, Senior Health Physicist (Sections 2OS1, 2OS3 and 2PS1)

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

Enclosure

SUMMARY OF FINDINGS

IR 05000338/2003-003, IR 05000339/2003-003, IR 0720016/2003-001; Virginia Electric and Power Co.; 04/06/2003 - 06/28/2003; North Anna Power Station Units 1 & 2; Routine Integrated Report.

The report covered a three month period of inspection by resident inspectors and announced inspections by a regional senior health physicist and a regional senior reactor inspector. One licensee-identified non-cited violation (NCV) was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609 "Significance Determination Process" (SDP). 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. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violation

One violation of very low safety significance, which was identified by the licensee, has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. The violation and corrective action tracking number are listed in Section 4OA7 of this report.

Report Details

Summary of Plant Status

Unit 1 began the inspection period in Mode 6 (refueling). A reactor vessel head thermocouple CETNA seal leak was noted when operating pressure was achieved. The unit was cooled down and depressurized and returned to Mode 5 on April 15 in order to repair the seal. The unit was synchronized to the grid on April 18 and power was stabilized at 74% on April 19. Later, on April 19, a manual reactor trip was initiated due to the failure of the main turbine control electro-hydraulic control (EHC) system interface valve. The unit was returned back to Mode 3 late on April 19, and the reactor was taken to critical conditions and synchronized to the grid on April 20. Power was stabilized at 100% power on April 22. On June 11, an automatic turbine/reactor trip from 100% power occurred on Unit 1 due to the actuation of a pressure relay in the Unit 1 C main transformer. The main transformer was repaired and the unit was restarted and synchronized to the grid on June 22. Full power was reached on June 23. The unit operated at 100% power level for the remainder of the report period.

Unit 2 began the inspection period at 100% power and remained at full power throughout the reporting period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment

a. Inspection Scope

The inspectors performed a complete equipment alignment of the Unit 1A and 1B High Head Safety Injection (HHSI) pumps. During the local and main control room walkdown of the HHSI system, the inspectors assessed the system for signs of valve leakage, electrical power availability, component labeling, and hanger and support material condition. The inspectors also held discussions with operations and engineering personnel, verified that the appropriate technical specifications action statement were entered, and reviewed the following documents as part of the inspection:

- 1-OP-8.1, “Chemical and Volume Control System;”
- 1-OP-8.1A, “Valve Checkoff - Chemical & Volume Control System Auxiliary Building;”
- 1-AP-49, “Loss of Normal Charging;”
- 1-E-0, “Rector Trip or Safety Injection;” and,
- Plant Drawing 11715-FM-095B, “Chemical & Volume Control System,” sheet 2.

The inspectors also performed two 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 the Unit 2 A, B, and C Control Room Chiller units and the 1J Emergency Diesel Generator (EDG). The inspectors also held discussions with operations and engineering

personnel, verified that the appropriate technical specifications action statement were entered, and reviewed the following documents as part of the inspection:

- ET-CEM 03-0020, “Analysis of Unit 1 and Unit 2 Chiller Piping Supports;”
- 2-PT-77.11A, “Control Room Chiller 2-HV-E-4A Pump and Valve Test;”
- 1-OP-6.6A, “Emergency Generator Pre-operational Check for 1H and 1J Diesel;”
- 1-PT-82.4, “Train A Reactor Protection and ESF Logic Actuation Logic Test,” and;
- 0-PT-80, “AC Sources Operability Verification.”

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 1 Battery Rooms 1-I and 1-III, Elevation 294';
- Unit 1 and 2 Auxiliary Buildings, Elevations 274' and 259';
- Unit 2 Auxiliary Feedwater Pump House Areas;
- Unit 1 H and J Emergency Diesel Generator Rooms;
- Unit 1 C Main Transformer Area; and,
- Unit 2 Cable Tray Room. Elevation 294'.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed licensed operator requalification training involving the “A” shift operations group operators and supervisors. The inspectors noted drills involving a simulated small loss of reactor coolant System (RCS) coolant (less than 5 gpm) and a simulated rapid shutdown of the unit subsequent to the identification of the leak. Routine use of three-way communications and use of the phonetic alphabet was observed.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the equipment issues listed below, the inspectors evaluated the licensee's effectiveness of the corresponding preventive and corrective maintenance. The inspectors performed walk-downs 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." Additionally, the inspectors attended some of the licensee's scheduled Maintenance Rule Working Group Meetings.

- Plant Issue N-2003-1216, Leakage of Unit 2 Steam Generator Power Operated Relief Valve (PORV) - Inspectors witnessed work activities associated with repairs on the Unit 2 C steam generator PORV;

- Plant Issues N-2003-0962, 1184, and 1965, ATWS Mitigation Actuation Circuitry (AMSAC) Issues - Inspectors evaluated the licensee's effectiveness of associated preventive/corrective maintenance actions to repair related power supply problems;

- Plant Issue N-2003-2223, Low Emergency Diesel Generator (EDG) Lube Oil Temperatures - Inspectors assessed licensee activities to troubleshoot/repair associated circuitry. The inspectors assessed weather work performed was in accordance with approved plant maintenance procedures and work orders; and,

- Plant Issue N-2003-1537, Cracked 1H EDG Number 7 Cylinder Liner - Inspectors assessed plant issues involving the cracked liner and the inspectors observed weather work performed was in accordance with plant procedures, technical manual guidance and maintenance work orders.

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 the 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 Order (WO) 00469208-24, Unit 2 1B Service Water System (SWS) pump motor lugs replacement activity - Inspectors assessed the plant risk profile related to work performed on this pump in conjunction with other plant maintenance activities;

- Work Request (WR) 153588, Coolant Issue, Site Security Diesel Generator - Licensee personnel noted that the security diesel coolant system copper content was abnormally high causing the licensee to perform a system flush and refill on an emergent basis;

- WO 00492877-01, Unit 1 1H EDG Start Relay Problems - Issue associated with emergent work performed on the Unit 1 1H EDG 4A (start relay 4A troubleshooting and replacement activities). During performance of 1-PT-82.12H, EDG start by ESF actuation, the EDG failed to start. The 1H EDG was immediately tagged out for troubleshooting and repair/replacement activities. The start relay was replaced with a newer style relay (installed under temporary modification TM N1-1727).

- WR 154316, Unit 1 1C Charging Pump Outboard Seal Repairs - During pump operation, the pump seal leakage exceeded allowable leakage of <600 cc/hr. Subsequent to this initial leakage assessment, the seal leakage increased to > 1gal/hr. The 1C charging pump was tagged out for seal troubleshooting and repair/replacement activities. The inspectors reviewed documentation associated withe the problem and discussed the proposed corrective management with maintenance personnel.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-Routine Plant Evolutions

a. Inspection Scope

This inspection observed operator response for the two listed non-routine plant evolutions. These observations included assessment of operator adherence to the emergency and/or abnormal operating procedures, adequacy of those procedures for the event, communications between the operators, applicability of technical specifications action statements, response to alarms and indications, and the need for any additional training as result of the non-routine evolutions. The inspectors also evaluated and observed the performance of safety related equipment during the non-routine events. If problems were noted, the inspector evaluated if the licensee appropriately initiated adequate corrective actions. The inspectors also attended post-trip meetings related to the two listed non-routine evolutions. The two non-routine evolutions followed-up by the inspectors were:

- The April 19, 2003 manual reactor trip due to the main turbine EHC interface valve diaphragm failure (Section 4OA3.1), and;

- The June 11, 2003 automatic reactor trip due to “C” main transformer failure (Section 4OA3.2).

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 and that no unrecognized increase in risk occurred. The inspectors also assessed if any technical specification requirements were exceeded due to the operability concerns. The reviewed operability evaluations were described in the following plant issues:

- N-2003-1669 - CETNA Seal Leakage - Leakage occurred from the Unit 1 #4 CETNA (formerly vessel head conoseal) seal just after heat-up and pressurization of the RCS Seal was considered inoperable and required repair;

- N-2003-1829 - Unit 1 BIT Temperature Sensor Mispositioned - The sensor was mispositioned within its installed thermowell. It was considered operable but degraded. Sensor was repositioned and seated fully within its well;

- N-2003-2098 - High EDG Glycol Concentrations - a recent change-out of coolant in the 1J EDG placed the EDG coolant system in a degraded but operable condition due to the initially high (out of specification) glycol concentration. Chemistry readjusted the concentration to within its specification;

- N-2003-2233 - Cracked 1H EDG Number 7 Cylinder Liner - Cylinder liner change-out was required. In April, the EDG was determined to be operable but degraded with this noted cracked liner in place. Liner was later repaired during a planned EDG outage. EDG was returned to fully operable status after testing;

- N-2003-2274 - 2-QS-MOV-201A; A Quench Spray Pump Discharge Valve Operator Thrust Value High Out Of Specification - During required testing of the valve, MOV engineer determined that the thrust values were higher than expected and the MOV was declared inoperable. The thrust of the valve operator was re-adjusted. The MOV was subsequently declared operable.

b. Findings

No findings of significance were identified.

1R16 Operator Work-Arounds (OWAs)

a. Inspection Scope

The inspectors reviewed Plant Issue N-2003-2311 - potential problem identified by licensee procedure 0-GOP-5.3, Review of Operator Work Arounds (OWAs). Specifically, the inspectors reviewed recently added OWA involving boron and dilution valve positioning to the Unit 1 blender and licensee corrective actions related to the newly added OWA. The inspectors discussed the added OWA with the licensee in context of the licensee operator being able to perform the OWA during and following transients.

The inspectors also reviewed the aggregate OWAs. The inspectors reviewed licensee procedure for addressing and managing OWA to determine if licensee established threshold for aggregate OWAs had been exceeded. Further, the inspectors reviewed and monitored licensee planned and completed corrective actions to address the underlying equipment issues causing the OWA. As part of this, the inspectors specifically monitored the progress in addressing the boron dilution valve positioning OWA.

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 1 1J Emergency Diesel Generator (EDG) - 1-PT-82J, “1J EDG Slow Start Test” & 1-MOP-6.91, “Emergency Diesel Generator 1-EE-EG-1J;”
- Unit 1 1H EDG -1-PT-82H, “1H Emergency Diesel Generator Slow Start Test” and 1-MOP-6.90, “Emergency Diesel Generator 1-EE-EG-1H;”
- Unit 1 1C Charging Pump - 1-PT-14.2, “Charging Pump 1-CH-P-1C” Test;”
- Unit 1 1H EDG - 1-PT-83.12H, “1H Diesel Generator Test (Start by ESF actuation) Followed by 24 Hour Run/Hot Restart test;" and,
- Unit 2 Steam Generator PORV 201C - 2-PT-210.25, “Valve Inservice Testing Steam Generator PORVs and 2-PT-213.38, “Valve Inservice Cycling Steam Generator PORVs (2-MS-PCV-201A, 2-MS-PCV-201B, 2-MS-PCV-201c.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

.1 Refueling Outage

a. Inspection Scope

The inspectors performed the inspection activities described below for the Unit 1 refueling outage that began on February 23, 2003, and ended April 17, 2003. The inspectors reviewed the licensee's outage risk control plan, the refueling outage safety assessment," and VPAP-2805, "Shutdown Risk Program" to verify that the licensee had appropriately considered risk, industry experience and previous site specific problems, and to confirm that the licensee had mitigation/response strategies for losses of key safety functions.

During the cooldown which preceded the outage, the inspectors reviewed portions of the cooldown process to verify technical specification cooldown restrictions were followed.

The inspectors assessed that when equipment was removed from service, the licensee maintained defense-in-depth commensurate with the outage risk control plan for key safety functions and applicable technical specifications (TSs). The inspectors also reviewed configuration changes (due to emergent work) and other unanticipated conditions were controlled in accordance with the licensee's outage risk control plan.

During the outage, the inspectors:

- Reviewed RCS pressure, level, and temperature instruments to verify that those instruments were installed and configured to provide accurate indications, and that instrumentation error was accounted for;

- Reviewed the status and configuration of electrical systems to verify that those systems met TS requirements and the licensee's outage risk control plan;

- Observed decay heat removal parameters to verify that the system was properly functioning;

- Observed spent fuel pool operations to verify that outage work was not impacting the ability of the operations staff to operate the spent fuel pool cooling system during and after core offload;

- Reviewed system alignments to verify that the flow paths, configurations, and alternative means for inventory addition were consistent with the outage risk plan;

- Reviewed selected control room operations to verify that the licensee was controlling reactivity in accordance with the TSs;

- Reviewed the outage risk plan to verify that activities, systems, and/or components which could cause unexpected reactivity changes were identified in the outage risk plan and were controlled accordingly;

- Observed licensee control of containment penetrations to verify that the licensee controlled those penetrations in accordance with the refueling operations TSs and could achieve containment closure for required conditions; and,

- The inspectors also reviewed fuel handling operations to verify that those operations and related activities were being performed in accordance with TSs and approved procedures.

The inspectors reviewed the licensee's plans for changing plant configurations to verify on a sampling basis that TSs, license conditions, and other requirements, commitments, and administrative procedure prerequisites were met prior to changing plant configurations. The inspectors reviewed RCS boundary leakage and the setting of containment integrity. The inspectors examined the spaces inside the containment building prior to reactor startup to verify that debris had not been left which could affect performance of the containment sumps.

The inspectors reviewed various problems that arose during the outage to verify that the licensee was identifying problems related to refueling outage activities at an appropriate threshold and entering them in the corrective action program.

b. Findings

No findings of significance were identified.

.2 June 22 Reactor Trip

a. Inspection Scope

The inspectors monitored and or reviewed portions of plant shutdown and startup activities associated with the June 22 forced outage following the automatic reactor trip caused by the Unit 1 main transformer fault. The inspectors reviewed the equipment problems, licensee troubleshooting and investigation efforts, repairs, and root cause determination, related to the fault. The inspectors also monitored startup activities.

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 and data packages to

determine whether the scope of testing adequately demonstrated that the affected equipment was functional and operable:

- 2-PT-15.1, “Boric Acid Transfer Pump (1-CH-P-2C) Test;” (Inservice Test)
- 2-PT-75.5, “Auxiliary Service Water Pump (2-SW-P-4) Test;” (Inservice Test)
- 2-PT-82J, “2J Emergency Diesel Generator Slow Start Test;"
- 1-PT-83.12H, “1H Emergency Diesel Generator Start By ESF Actuation;” and,
- 2-PT-71.1Q, “2-FW-P-2, Turbine-Driven AFW Pump, and Valve Test." (Inservice Test)

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors discussed plant issues involving problems noted in the manual remote operators for the Low Head Safety Injection (LHSI) and Recirculation (RS) systems for both Unit 1 and Unit 2. The issue with the remote operators was initially presented when operations attempted to electrically operate 1-SI-MOV-1890B, Loop B Hot Leg Injection Valve, during testing, and the valve failed to operate. The issue is detailed in Plant Issue N-2003-1520. The licensee installed a temporary modification to ensure that an identified “deadband” (approximately 2 to 3 degrees of the 360 degree rotation) was not met. Whenever the valve is manually operated and left in this deadband position it places the valve in an inoperable condition. The inspectors reviewed maintenance conducted to modify the remote operators, marking of the deadband region, and wire-locking of the hand wheels to ensure the valves do not vibrate into the region.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

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

2OS1 Access Controls To Radiologically Significant Areas (71121.01)

.1 Access Controls

a. Inspection Scope

Licensee program activities for monitoring workers and controlling access to radiologically significant areas and tasks were evaluated. The inspectors assessed the

adequacy of 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 knowledge of, and proficiency in, implementing radiation protection program activities.

Routine work activities within the Radiological Controlled Area (RCA) were observed. Through procedure reviews, direct observation of established controls, and interviews with workers, the inspectors evaluated the adequacy of established physical and administrative controls including postings; barricades; procedural guidance; Radiation Work Permits (RWPs); and key controls, as applicable, for High Radiation Areas (HRAs), Locked High Radiation Areas (LHRAs) and Very High Radiation Areas (VHRAs). The inspectors performed independent confirmatory radiation surveys in selected areas on the 244 and 274 foot elevations of the Auxiliary Building. The results of those surveys were compared to current licensee survey documentation. Electronic alarming dosimeter (EAD) set points were reviewed for consistency with expected work area dose rates. The inspectors attended a pre-job briefing for a containment entry on June 18, 2003, and assessed the scope of the information provided to the workers against procedurally established guidance for conducting briefings. Radiation worker performance with respect to procedural guidance and Health Physics Technician (HPT) proficiency were assessed based on interviews and work observation. Worker knowledge of their expected response to EAD dose or dose rate alarms was assessed through interviews. Occupational exposure data associated with potential radioactive material intakes were reviewed and assessed independently. The inspectors reviewed procedural guidance for control of access to highly radioactive irradiated materials stored in the spent fuel pool and discussed those controls with Radiation Protection supervision.

Radiation protection program activities were evaluated against 10 CFR 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; Updated Final Safety Analysis Report (UFSAR) details in Section 11, Radioactive Waste Management and Section 12, Radiation Protection; Technical Specification (TS) Section 5.4.1, Procedures, and Section 5.7, High Radiation Area; and approved licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in Section 2OS1 of the Attachment to this report.

b. Findings

No findings of significance were identified.

.2 Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope

Access controls and surveillance results for the licensee's ISFSI facility were evaluated. The evaluation included review of ISFSI radiation control surveillance procedures and assessment of radiological surveillance data. During tours of the ISFSI cask storage facilities, the inspectors observed access controls, thermoluminescent dosimeter (TLD) locations, material condition, and radiological postings on the perimeter security fence. The inspectors conducted independent radiation surveys of the ISFSI general areas and

sixteen casks currently located on the storage pads. Survey results were compared to current licensee survey data.

Program guidance, access controls, postings, equipment material condition and surveillance data results were reviewed against details documented in applicable sections of the UFSAR; ISFSI License No. SNM-1507, Technical Specification; 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.

.3 Problem Identification and Resolution

Licensee Corrective Action Program (CAP) plant issue documents associated with radiological controls, personnel monitoring, and exposure assessments were reviewed and discussed with responsible licensee representatives. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with Station Administrative Procedure (VPAP)-1601, Corrective Action, Revision (Rev.) 17 and VPAP-1604, Cause Evaluation Program, Rev. 6. Specific plant issue documents reviewed and evaluated in detail for this inspection area are identified in Section 2OS1 of the Attachment to this report.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03)

. 1 Area Radiation Monitoring and Post-Accident Sampling Systems

a. Inspection Scope

The operability, availability, material condition, and reliability of selected direct area radiation monitor (ARM) equipment used for routine and accident monitoring activities were reviewed and evaluated. The inspectors observed material condition and installed configurations, where accessible, and evaluated the results of performance checks and calibrations for selected ARMs listed in Section 2OS3 of the report Attachment.

Licensee program activities in this area were reviewed against requirements specified in applicable procedures and in Sections 11 and 12 of the UFSAR. Licensee guidance documents, records, and data reviewed are listed in Section 2OS3 of the report Attachment.

b. Findings

No findings of significance were identified.

.2 Respiratory Protection - Self Contained Breathing Apparatus (SCBA)

a. Inspection Scope

The licensee's respiratory protection program guidance and its implementation for SCBA equipment use were evaluated. The SCBA units staged for use in the Control Room and selected locations were inspected for material condition, air pressure, and number of units available. The inspectors reviewed and evaluated current records associated with supplied air quality and maintenance of SCBA equipment. Proficiency and knowledge of staff responsible for maintaining SCBA equipment were evaluated through discussions and demonstration of an SCBA functional test. Control Room operations personnel were interviewed to determine their knowledge of available SCBA equipment locations and proper use.

Licensee activities associated with maintenance and use of SCBA equipment were reviewed against 10 CFR Part 20.1703; Regulatory Guide (RG) 8.15, Acceptable Programs for Respiratory Protection, Rev. 1, October 1999; American National Standards Institute (ANSI)-Z88.2-1992, American National Standard Practices for Respiratory Protection; and applicable procedures as listed in Section 2OS3 of the report Attachment.

b. Findings

No findings of significance were identified.

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems (71122.01)

.1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

a. Inspection Scope

The operability, availability, and reliability of selected effluent process sampling and detection equipment used for routine and accident monitoring activities were reviewed and evaluated. Inspection activities included record reviews and direct observation of equipment installation and operation.

During the week of June 16, 2003, the inspectors directly observed process effluent sampling and monitoring equipment material condition, installed configurations (where accessible), and operability; evaluated selected effluent release and sample flow rate data; and reviewed and evaluated established release set-points. In addition, five effluent release permits completed and documented between July 1 and December 31, 2002, were reviewed, discussed, and evaluated. The evaluation assessed effluent sample representativeness, radionuclide concentration sensitivities, achieved analyses accuracies; pre-release dose calculation completeness, and adequacy of effluent radiation monitor set-point determinations.

The licensee's counting laboratory quality control (QC) program activities for liquid and airborne sample radionuclide analyses were evaluated. The inspectors discussed and reviewed, as applicable, laboratory QC activities including current gamma spectroscopy and liquid scintillation detection equipment calibrations and daily system performance results; preparation, processing and storage of composite samples; radionuclide lower limit of detection (LLD) capabilities and achieved accuracies; and results of the quarterly cross-check spiked radionuclide samples.

Equipment configuration, material condition, and operation for the effluent processing, sampling, and monitoring equipment were reviewed against details documented in TS; 10 CFR Part 20, UFSAR Section 11, Offsite Dose Calculation Manual (ODCM), Rev. 6; ANSI-N13.1-1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities; ANSI-N13.10-1974, American National Standard (ANS) Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents, approved procedures, and drawings listed in Section 2PS1 of the report Attachment.

Effluent sampling task evolutions, and offsite dose results were evaluated against 10 CFR Part 20 requirements, Appendix I to 10 CFR Part 50 design criteria, TS, UFSAR details, ODCM, and applicable procedures listed in Section 2PS1 of the Attachment to this report. Laboratory QC activities were evaluated against RG 1.21, Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials In Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plant, June 1974; and RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment, December 1977.

b. Findings

No findings of significance were identified.

.2 Problem Identification and Resolution

a. Inspection Scope

Licensee CAP documents associated with radiological controls, personnel monitoring, and exposure assessments were reviewed and discussed with responsible licensee representatives. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with Administrative Procedure VPAP-1601, Corrective Action, Rev. 17 and VPAP-1604, Cause Evaluation Program, Rev. 6. Specific CAP documents reviewed and evaluated in detail for these program areas are identified in Section 2PS1 of the report Attachment.

b. Findings

No findings of significance were identified

2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program (71122.03)

.1 Radiological Environmental Monitoring Program Implementation

a. Inspection Scope

The inspectors reviewed and discussed with licensee personnel the results published in the North Anna Annual Radiological Environmental Operating reports for calendar years (CY) 2001 and 2002, including the land use census report for CY 2002. Program changes, including the recent changes in the vendor responsible for analyzing the stations's environmental samples, were also discussed. The inspectors assessed material condition and operability of equipment at air monitoring station numbers 2, 3, 5, 5A, 6, 7, 22, and 23 through direct observation and review of calibration data. Knowledge and proficiency of staff were evaluated through interviews and direct observation of sampling activities at the air sampling stations and the broadleaf vegetation sampling location numbers 14 and 23. The inspectors also verified that the observed collection station locations were within the sectors specified in the ODCM.

Program guidance, implementation, and results were reviewed against TS; 10 CFR 20 and 10 CFR 50, Appendix I; design criteria requirements; UFSAR details; ODCM guidance; and applicable procedures listed in Section 2PS3 of the report Attachment.

b. Findings

No findings of significance were identified.

.2 Meteorological Monitoring Program

a. Inspection Scope

The inspectors reviewed the operability of the meteorological monitoring equipment and operator access to meteorological data. Current meteorological monitoring equipment performance and calibration were reviewed with the system engineer. Licensee technicians primarily responsible for equipment maintenance and surveillance were interviewed by the inspectors concerning equipment performance, reliability, and routine inspections.

Meteorological monitoring program implementation and results were reviewed against TS, ODCM guidance, and procedures listed in Section 2PS3 of the report Attachment.

b. Findings

No findings of significance were identified.

.3 Unrestricted Release of Materials from the Radiologically Controlled Area (RCA)

a. Inspection Scope

The inspectors reviewed and evaluated radiation protection program activities associated with the unconditional release of licensed materials from RCA locations. The adequacy of selected equipment used by the licensee to prevent the unrestricted release of licensed materials from the RCA was evaluated through exposure of the monitoring instrumentation to radioactive sources having a source strength of approximately 5000 disintegrations per minute (dpm). The evaluated equipment included small article monitor (SAM) Number (No.) 247 and No. 117A; personnel contamination monitors (PCMs)-2 No. 389 and No. 390; and portal monitors (PMs)-7 No. 432 and No. 433.

Licensee guidance and implementation of RCA exit monitoring activities were evaluated against 10 CFR Part 20 requirements and applicable procedures documented in Section 2PS3 of the report Attachment.

b. Findings

No findings of significance were identified.

.4 Problem Identification and Resolution

a. Inspection Scope

The inspectors reviewed selected plant issues associated with REMP operations and the program for unrestricted release of materials from the RCA. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedures VPAP-1601, Corrective Action, Rev. 17 and VPAP-1604, Cause Evaluation Program, Rev. 6. Specific plant issue documents reviewed and evaluated in detail for these program areas are identified in Section 2PS3 of the report Attachment.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

.1 Mitigating System Cornerstone

a. Inspection Scope

The inspectors performed a periodic review of the Unit 1 and 2 PI data reported to the NRC for the following performance indicators:

- Safety System Functional Failures (Mitigating Systems); and
- Unplanned transients per 7000 critical hours (Initiating Events).

The inspectors reviewed data for the third quarter 2002 to first quarter 2003 from the licensee event reports, maintenance rule records, operating logs and technical specifications. Discussions with the PI and maintenance rule coordinators were held by the inspectors regarding the data reviewed. The data was compared with that displayed on the NRC's public web site. The PI method of assessment was compared with the guidelines contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline."

b. Findings

No findings of significance were identified.

.2 RCS Leakage (Barrier Integrity Cornerstone)

a. Inspection Scope

The inspectors performed a periodic review of the Unit 1 and 2 PI data reported to the NRC for RCS Leakage performance indicator.

The inspectors reviewed data for the third quarter 2002 to first quarter 2003 from the licensee event reports, maintenance rule records, operating logs and technical specifications. Discussions with the PI and maintenance rule coordinators were held by the inspectors regarding the data reviewed. The data was compared with that displayed on the NRC's public web site. The PI method of assessment was compared with the guidelines contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline."

b. Findings

No findings of significance were identified.

.3 Occupational Exposure Control Effectiveness (Occupational Radiation Safety Cornerstone)

a. Inspection Scope

The inspectors reviewed PI records for HRA, VHRA, and unplanned exposure occurrences for the period of October 1, 2002 through March 31, 2003, to ensure that TS and 10 CFR 20 non-conformances were properly classified as within the Performance Indicator Program. The inspectors also reviewed individual RCA exit transaction dose records exceeding 100 mrem against expected RWP doses. The licensee's disposition of the reviewed issues and events was evaluated against NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 2. Reviewed documents are listed in Section 4OA1 of the report Attachment.

b. Findings

No findings of significance were identified.

.4 RETS/ODCM Radiological Effluent Occurrences (Public Radiation Safety Cornerstone)

a. Inspection Scope

The inspectors reviewed the licensee's PI records and annual release reports for liquid or gaseous effluent releases to assess performance indicator data reported to the NRC for the period of October 1, 2002 through March 31, 2003. The inspectors also discussed this performance indicator with licensee representatives. The licensee's disposition of the reviewed issues and events was evaluated against NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 2. Reviewed documents are listed in Section 4OA1 of the report Attachment.

b. Findings

No findings of significance were identified.

4OA3 Event Followup

.1 On April 19, 2003, a manual reactor/turbine trip was initiated on Unit 1 due to the failure of the electro-hydraulic control (EHC) system interface diaphragm (1-EH-TV-100-HOST) valve. The diaphragm was noted to be deformed at the outer edges of the seal. This deformity allowed equalization of oil pressure across the diaphragm and the equalization in turn caused the valve to slowly open. The opening of the valve slowly dumped EHC oil/pressure which caused the turbine throttle valves to drift to a closed/shut position. The inspectors noted that prescribed trip and post-trip activities were performed in a satisfactory and approved manner and that required operator actions following the trip were in accordance with the Unit 1 reactor trip procedure E-0. This event is documented in Plant Issue N-2003-1761 and an associated level one root cause evaluation was performed. No other problems were found and there were no findings of significance identified.

.2 On June 11, 2003, an automatic turbine/reactor trip from 100% power was initiated on Unit 1 due to the actuation of the "sudden pressure relay" on the Unit 1 "C" main transformer. This triggered the main transformer differential lockout relay (86T). The inspectors noted that prescribed trip and post-trip activities were performed in a satisfactory and approved manner and that required operator actions following the trip were in accordance with the Unit 1 reactor trip procedure E-0. During troubleshooting of the transformer, craft personnel discovered that the lead for the #6 tap connection was loose and they also noted arc marks on the transformer tank close to where the loose lead was found. Other tap connections in the "C" main transformer - as well as those in the "B", "A", and spare transformers) were also loose. All unit main transformer tap connection leads were torqued to proper specifications and the transformers and unit were returned to service on June 22, 2003. This event is documented in Plant Issue N-2003-2322. No other problems were found and there were no findings of signification identified.

4OA5 Other Activities

.1 North Anna Unit 1 RPVH (Reactor Pressure Vessel Head) Reconciliation Plan

a. Inspection Scope

To reconcile the RPVH built to the French Nuclear Construction Code (RCC-M Code) in accordance with Article IWA-4000 of ASME Code, Section XI, the licensee and its contractor, Frametome ANP, compared the actual fabrication and inspection requirements to the requirements of the ASME Code, Section III, 1995 Edition with Addenda through 1996. The inspectors reviewed the Reconciliation Report, a sample of associated Equivalency Reports, and a sample of fabrication records to verify that: (1) the licensee's reconciliation process was equivalent to that performed for Unit 2 (NRC Inspection Report 50-00338,339/2003-002), and (2) the report and associated records provided reasonable confidence that the fabrication of the replacement head was accomplished in accordance with requirements equivalent to ASME requirements and provided documentation of adequate quality to maintain safety. The reports reviewed are listed in the list of documents reviewed in the Attachment to this report. The fabrication records reviewed were as follows:

- Weld R/D 336 (Flange Cladding) - (1) Production Weld Data Sheet, including quality control (QC) signoffs for surface examinations and (2) Liquid Penetrant (PT) Examination Report,
- R/D 339 (Flange/Dome Butt Weld Cladding) - (1) Production Weld Data Sheets, including QC signoffs for surface examinations and (2) Ultrasonic (UT) Examination Reports,
- Weld S/P 326 (CRDM J-Groove) - (1) Production Weld Data Sheets, including root pass, intermediate, and final surface examination QC signoffs and (2) PT Examination Reports,
- Weld S/C 205 (Flange to Dome Girth Weld) - (1) Production Weld Data Sheet, including QC signoffs for the surface examinations, (2) UT Examination Report, and (3) Radiographic Examination Report, including film evaluation sheets,
- Weld R/D 336 (Dome cladding) - (Production Weld Data Sheet, including QC signoffs for the surface examinations, (2) PT Examination Report, identifying rejectable indications, and (3) Weld Repair Records,
- Weld B/D 325 (Buttering for vent pipe), and B/D 326 (Buttering for J-Groove control rod drive mechanism (CRDM) welds) - (Production Weld Data Sheet, including QC signoffs for the surface examinations, (2) UT Examination Report, and (3) PT Examination Report, and
- Fabrication of 66 CRDM Nozzles - (1) procurement documents, (2) receipt inspection documents indicating that the material delivered by Tecphy was inspected when it arrived for friction welding and rough machining, and Thermodyne for final machining and threads, (3) Certified Material Test Reports for the material - Inconel tubes and Type 304L flanges, (4) Visual Inspection Reports, (5) Liquid Penetrant Examination Reports, and (6) Ultrasonic Examination Reports.

In addition, the inspectors verified that the Weld Procedure Specifications, supporting Procedure Qualification Records, welding material records, and nondestructive examination (NDE) procedures were available. All of these records were in French.

b. Findings

No findings of significance were identified.

.2 Preservice Inspection (PSI) Report for the Unit 1 Replacement RV Head

a. Inspection Scope

The inspectors reviewed the PSI report, including: a sample of NDE inspection records for the dome to flange weld (UT and MT), the CRDM J-groove welds (PT), the CRDM nozzles (UT), and the CRDM friction welds (PT and UT); a sample of NDE examiner qualification and certification records; and a sample of NDE materials and equipment certification records. The report and records were reviewed to verify compliance with the applicable code, ASME Section XI, 1995 Edition with the 1996 Addenda.

b. Findings

No findings of significance were identified.

.3 Replacement of North Anna Unit 1 RPVH - Containment Restoration Activities

a. Inspection Scope

The inspectors reviewed containment restoration activities associated with the temporary construction opening, which was approximately 13 feet by 17 feet in the containment liner and 20 feet by 25 feet at the face of the concrete wall, as detailed in the licensee's Design Change Package (DCP) 02-205, "Restoration of Temporary Construction Opening in the Containment Structure for Reactor Pressure Vessel Head Replacement / North Anna Power Station / Unit 1."

Relative to installation of concrete, the inspectors reviewed results of quality control acceptance testing performed on materials (cement, fine and coarse aggregate, and admixtures) used for batching the concrete. The inspectors also reviewed records documenting inspection of the concrete batch plant and the concrete truck mixers. Activities were reviewed to determine if: the licensee's inspection of the trucks and batch plant were performed in accordance with the guidance of the National Ready Mixed Concrete Association (NRMCA); the batch plant scales were calibrated in accordance with NRMCA recommendations; and, mixer efficiency tests were performed on the truck mixers in accordance with STMA C-94. The inspectors reviewed the concrete mix data to ensure that mix proportions for delivered concrete were selected based on trial concrete mix results, that QC acceptance criteria for the plastic concrete were based on the trial mixes, and that the trial mix met concrete strength requirements. In addition, the inspectors reviewed the concrete pour card (pre-placement inspection), results of in process tests performed on the plastic concrete (slump, entrained air, temperature, and

unit weight), results of unconfined compression tests performed on concrete test cylinders which showed concrete exceeded design strength requirements, and records documenting post-placement inspection of concrete curing.

b. Findings

No findings of significance were identified.

.4 Containment Integrity Test

a. Inspection Scope

The Inspectors reviewed test procedures and witnessed the pressure test performed on the Unit 1 containment following completion of concrete restoration in the containment wall after replacement of the Unit 1 reactor vessel head. The inspectors reviewed the results of the pre-test inspection performed on the concrete repair area. The inspectors verified test prerequisites met, witnessed pressurization of the containment, examined the repair area during containment pressurization, and observed the calibrated pressure gauges which recorded the containment pressure. The inspectors verified that the specified containment test pressure was attained and held for one hour prior to performing visual inspection of the concrete repair area and witnessed inspection of the repair area by qualified licensee engineers. The inspectors also conducted an independent inspection of the concrete repair area while the containment was pressurized at full test pressure to ensure that the repair area met design requirements. The inspectors also reviewed the results of the pressure test performed on Unit 2 following restoration of the reactor containment wall after replacement of the Unit 2 reactor vessel head.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On July 9, 2003, the resident inspectors presented the inspection results to Mr. Heacock and other members of his staff who acknowledged the findings. Proprietary documents were reviewed during the inspections, but proprietary information is not included in this report.

4OA7 Licensee-Identified Violations

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

TS 5.4.1.a, Applicable Procedures Recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978, requires that written procedures be implemented. Contrary

to this requirement, on May 25, 2003, the operators failed to implement operations procedure 2-OP-6.5A, “2H and 2J Emergency Diesel Generator Post-Operational Check,” which caused the 2H EDG to inadvertently start while rolling the EDG with air. Steps that would have prevented fuel injection into the EDG, thus precluding the start, had not been performed. The main cause for this error was a failure of the operators to have the procedure in-hand and not properly following the procedure steps in the prescribed order. This item is documented in Plant Issue N-2003-2106. This finding is of very low safety significance because the inadvertent start of the EDG did not constitute a EDG failure and did not result in the EDG being out-of-service for any significant additional time.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

D. Christian, Senior Vice President and Chief Nuclear Officer
K. Barnette, Supervisor, Site Industrial Safety/Fire Protection
J. Breeden, Supervisor Transportation
L. Carter, Project Nuclear Oversight Lead
W. Corbin, Director Nuclear Projects
J. Crossman, Supervisor, Nuclear Engineering
E. Dreyer, HP Technical Services
M. Dunston, Manager, Site Services
J. Davis, Director, Station Operations and Maintenance
M. Hall, Welding Engineer
D. Heacock, Site Vice President
E. Hendrixson, Manager, Station Engineering
P. Kemp, Manager, Operations
L. Lane, Director, Station Nuclear Safety and Licensing
M. Lane, ALARA Supervisor
J. Leberstien, Supervisor Licensing
R. Lee, Nuclear Projects Engineer
T. Maddy, Manager, Station Security
F. Mladen, Manager, Maintenance
N. Nichols, Staff Health Physicist
Q. Parker, Maintenance Rule Coordinator
P. Quarles, Nuclear Oversight
W. Renz, Director, Security and Emergency Preparedness
H. Royal, Manager, Nuclear Training
A. Stafford, Manager, Radiological Protection
M. Whalen, Supervisor Licensing
L. Yates, Nuclear Oversight Team

Licensee's Contractors

H. Behnke, Technical Consultant - Framatome
D. Killan, Advisory Engineer - Framatome
P. Ulmer, Project Manager - Framatome
M. Pierce, Quality Assurance
D. Miller, Bechtel Project Manager

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

2OS1 Access Control To Radiologically Significant Areas (71121.01)

Procedures, Guidance Documents, and Manuals

Common (C) Health Physics (HP) Procedure C-HP-1020.011, Radiological Protection Action Plan During Diving Activities, Revision (Rev.) 3
C-HP-1031.022, RWP Dosimetry: Exposure Control Support, Rev. 5
C-HP-1032.060, Radiological Position and Access Control, Rev. 1
C-HP-1032.061, High Radiation Area Key Control, Rev. 2
HP-1041.056, Accuscan II Whole Body Counter: Whole Body Counting Individuals, Rev. 1
C-HP-1061.110, Radiological Control Areas, Rev. 3
HP-1071.020, Controlling Contaminated Material, Rev. 3
C-HP-1081.020, Radiation Work Permits: RWP Briefing and Controlling work, Rev. 2
HP-1031.035 Neutron Dose Monitoring: Neutron Bubble Dosimeters, Rev. 11
Virginia Electric and Power Company North Anna Power Station Units 1 and 2 Independent Spent Fuel Storage Installation (ISFSI) Annual Radioactive Effluent Release Report Serial No. 02-287, dated April 25, 2002
Virginia Electric and Power Company North Anna Power Station Units 1 and 2 Independent Spent Fuel Storage Installation (ISFSI) Annual Radioactive Effluent Release Report Serial No. 03-301, dated April 22, 2003

Radiation Work Permits (RWPs)

RWP 03-2-1012, Touch-up Painting, Rev. 1
RWP 03-2-1014, Charging Pump Maintenance, Rev. 0
RWP 03-2-1015, Containment General Entry During Subatmospheric Conditions for Minor Maintenance, Rev. 1
RWP 03-2-1030, Maintenance Activities with Low Radiological Risk, Rev. 0
RWP 03-2-1026, Load, Transport, and Store Spent Fuel Dry Storage Casks, Rev. 1
RWP 01-2-3050, Reactor Head Inspection, Rev. 2
RWP 02-2-2050, Reactor Head Inspection, Rev. 3

Records and Data

Radiological Survey Map and Record Number (No.) 8, dated 5/24/03
Radiological Survey Map and Record No. 27, dated 6/3/03
Radiological Survey Map and Record No. 6, dated 6/15/03
Radiological Survey Map and Record No. 70, dated 05/22/03
Radiological Survey Map and Record No. 70, dated 06/10/03
High Radiation Area Key Logs
C-HP-1041.023, Rev. 1, Attachment 3, Committed Effective Dose Equivalent (CEDE)-Ingestin Intake Data, TLD 7609 dated 4/6/03 and TLD 7809 dated 4/6/03
Containment Entry Pre-Job Briefing Checklist, dated 6/18/03

Corrective Action Program Documents

Audit 02-07: Radiological Protection and Process Control Program, dated 10/1/02
Plant Issue (PI) N-2003-0942, Worker Entered Contaminated High Radiation Area Without RWP Required Protective Clothing and Dosimetry (3/4/03)
PI N-2003-1017, Two Workers Entered In High Radiation Area Without Knowledge Of Work Area Dose Rates (3/7/03)
PI N-2003-1159, High Radiation Area Boundary Rope and Placard Found Lying On Unit 1 Containment Floor (3/13/03)
PI N-2003-1208, High Radiation Area Boundary Placard Found Improperly Positioned In Unit 1 Containment (3/16/03)

2OS3 Portable Radiation Monitoring Instrumentation (71121.03)

Procedures, Guidance Documents, and Manuals

Administrative Procedure (VPAP)-0106 Subatmospheric Containment Entry, Rev. 5
C-HP-1042.510 Atmosphere-Supplying Respiratory Equipment Performance Verification, Rev. 4
RWP 03-2-1015 RWP Briefing Attendance Roster, dated 06/18/03
Nuclear Employee Training Manual Volume II, Rev. 11
O-1CP-RMS-153, Fuel Pit Bridge Area Radiation Monitor Calibration , Rev. 5
O-G1P-4.0, RM Calibration Sources, Rev. 2
O-1CP-RMS-RM-158, Laboratory Area Radiation Monitor Calibration, Rev. 6
O-1CP-RMS-RM-164. Incore Instrument Area Radiation Monitor, Rev. 8

Records and Data

1/2-RMS-RM-161/261, Personnel Hatch Area Calibration Records
1-RMS-RM-157, Main Control Room Calibration Records
1-RMS-RM-153, Fuel Building Calibration Records
1-RMS-RM-158, Lab Area Radiaton Monitor System (RMS)
1-RMS-RM-164, Incore Instrument Area RMS

Corrective Acton Program Documents

PI N-2003-2218, Process Vent Gaseous Rad Monitor Intermittent Scale Problem

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems (71122.01)

Procedures, Guidance Documents, Manuals and System Drawings

HP-1033.105 EG&G Ortec Gammavision MCA: Performance Checks, Rev. 003
HP-3010.020 Radioactive Liquid Waste Release Permits, Rev. 003
HP-3010.030 Radioactive Gaseous Waste Release Permits, Rev. 008
HPAP-2104 Confirmatory Measurements Using Spiked Samples, Rev. 001

Drawing No: 11715-FM-089C Flow/Valve Operating Numbers Diagram Sampling System North Anna Power Station Unit 1 Virginia Power, Rev. 23
Drawing No: 11715-FM-098B Flow/Valve Operating Numbers Diagram Sampling System North Anna Power Station Unit 1 Virginia Power, Rev. 24
Drawing No: 11715-FM-087C Flow/Valve Operating Numbers Diagram Sampling System North Anna Power Station Unit 1 Virginia Power, Rev. 30
Drawing No: 11715-FM-097B Flow/Valve Operating Numbers Diagram Sampling System North Anna Power Station Unit 1 Virginia Power, Rev. 0
Drawing No: 11715-FB-006A Flow/Valve Operating Numbers Diagram Air Cooling & Purging System North Anna Power Station Unit 1 Virginia Power, Rev. 30
Drawing No: 11715-FM-097B Flow/Valve Operating Numbers Diagram Gaseous Waste Disposal System North Anna Power Station Unit 1 Virginia Power, Rev. 0
Drawing No: N-99006-)-E-0600 Phase 2,3. &4 Process & Instrument Diagram Radiation Monitoring System North Anna Power Station, Rev. 1

Records and Data Reviewed

Liquid Waste Batch Release Permit and Record, December 2002
Liquid Waste Batch Release Permit and Record, July 2002
Miscellaneous Gaseous Release Record, 07/24/02
Miscellaneous Gaseous Release Record, 09/12/02
Miscellaneous Gaseous Release Record, 07/14/02
Results of Radio chemistry Cross Check Program Dominion North Anna Station First Quarter 2003, 05/16/03

Corrective Action Program Documents

Audit 02-07: Radiological Protection and Process Control Program, 10/01/02
PI N-2003-2218 1-GW-RM-102 Process Vents Gaseous Rad Monitor (6/3/03)
PI N-2003-2125 Rain Water in front of Fuel Receiving Building #1 entering building under roll up door (5/27/03)
PI N-2001-1918 Potential unmonitored release in Unit 2 Quench spray basement (6/29/01)
PI N-2003-2056 VPAP-2103N step 6.4.5 potential procedure conflict (5/9/03)

Annual Reports

Virginia Electric and Power Company North Anna Power Station Units 1 and 2 Independent Spent Fuel Storage Installation (ISFSI) Annual Radioactive Effluent Release Report Serial No. 02-287, dated April 25, 2002
Virginia Electric and Power Company North Anna Power Station Units 1 and 2 Independent Spent Fuel Storage Installation (ISFSI) Annual Radioactive Effluent Release Report Serial No. 03-301, dated April 22, 2003

2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program (71122.03)

Procedures, Guidance Documents

VPAP-2103N, Offsite Dose Calculation Manual (ODCM), Rev. 5 and Rev. 6
C-HP-1033.620, Portable Air Samplers Calibration and Operation, Rev. 2
HP-3051.010, Radiological Environmental Monitoring Program, Rev. 14
Instrument Calibration Procedure (ICP) 0-ICP-MM-DP-1, Primary Meteorological Tower Dew Point Measuring System Calibration, Rev. 4
0-ICP-MM-RG-1, Primary Meteorological Tower Precipitation Monitor Calibration, Rev. 3
0-ICP-MM-SR-ZR-1A, Primary Meteorological Tower 10-Meter Wind Speed and Wind Direction Calibration, Rev. 5
0-ICP-MM-SR-ZR-1B, Primary Meteorological Tower 48-Meter Wind Speed and Wind Direction Calibration, Rev. 5
0-ICP-MM-ST-100, Backup Weather Tower Sigma Theta Calibration, Rev. 8
0-ICP-MM-TEMP-1, Primary Meteorological Tower Ambient Temperature and Differential Temperature Calibration, Rev. 9

Records

Nuclear Oversight Audit 01-11, Offsite Dose Calculation Manual (ODCM), Radiological Environmental Monitoring (REM), and Environmental Protection Plan (EPP)
Nuclear Oversight Audit 02-07, Radiological Protection and Control Program
Trend Evaluation Response - N-2002-2284-E1
0-PT-40.1, Meteorological Monitoring System Calibration, Rev. 6
0-ICP-MM-DP-1, Primary Meteorological Tower Dew Point Measuring System Calibration, Rev. 4
0-ICP-MM-RG-1, Primary Meteorological Tower Precipitation Monitor Calibration, Rev. 3
0-ICP-MM-S-101A, Weather Tower 48-Meter Wind Speed Calibration, Rev. 7
0-ICP-MM-S-101B, Weather Tower 10-Meter Wind Speed Calibration, Rev. 7
0-ICP-MM-S-101C, Backup Weather Tower Wind Speed Calibration, Rev. 7
0-ICP-MM-SR-ZR-1A, Primary Meteorological Tower 10-Meter Wind Speed and Wind Direction Calibration, Rev. 5
0-ICP-MM-SR-ZR-1B, Primary Meteorological Tower 48-Meter Wind Speed and Wind Direction Calibration, Rev. 5
0-ICP-MM-SR-ZR-2, Backup Meteorological Tower Wind Speed and Wind Direction Calibration, Rev. 7
0-ICP-MM-ST-100, Backup Weather Tower Sigma Theta Calibration, Rev. 8
0-ICP-MM-T-100A, Weather Tower 10-Meter Temperature Calibration, Rev. 8
0-ICP-MM-T-100B, Weather Tower 10/48 Meter Delta Temperature Calibration, Rev. 9
0-ICP-MM-TEMP-1, Primary Meteorological Tower Ambient Temperature and Differential Temperature Calibration, Rev. 9
0-ICP-MM-Z-101A, Weather Tower 48-Meter Wind Direction Calibration, Rev. 7
0-ICP-MM-Z-101B, Weather Tower 10-Meter Wind Direction Calibration, Rev. 7
0-ICP-MM-Z-101C, Backup Weather Tower Wind Direction Calibration, Rev 5
Calibration Report for PM-7, dated January 29, 2003
North Anna Meteorological Data for 2002

Corrective Action Program Documents

Nuclear Oversight Audit 01-11, Offsite Dose Calculation Manual (ODCM), Radiological Environmental Monitoring (REM), and Environmental Protection Plan (EPP)
Nuclear Oversight Audit 02-07, Radiological Protection and Control Program
PI N-2003-1203, Loose Surface Radioactive Contamination Found on Wooden Blocks outside of RCA (3/16/03)
PI N-2003-1244, Seven RCA Tools Found Outside of the Decon Facility (3/18/03)
PI N-2003-2354, Worker Observed Exiting the Decon Facility without Required Whole Body Frisk (6/11/03)
PI N-2003-2422, ODCM Indicates Incorrect Location of Environmental Sampling Station 05A (6/18/03)

4OA1 Performance Indicator Verification (71151)

Occupational Exposure Control Effectiveness

Procedures, Guidance Documents

Department Administrative Procedure HPAP-2802, NRC Performance Indicator Program, Rev. 1

Records

Radiological Protection Incident Investigation Report N-2003-1017
RWP 02-2-2050, Unit 2 Reactor Head Work, Rev. 3
RWP 02-2-2056, Unit 2 Reactor Head CRDM Penetration Work, Rev. 2
RWP 02-2-2065, Unit 2 MOV 2593 Work, Rev. 3
RWP 03-2-3077, Unit 1 Removal of Thermal Sleeve from 12" SI Line, Rev. 4
Licensee-generated list of personnel with radiologically controlled area (RCA) exit transactions with exposures greater than 100 mrem from July 2002 through June 2003
North Anna Power Station (NAPS) NRC Performance Indicator Data for months of October, November, and December, 2002; and January, February, and March, 2003.
PI N-2002-2176, Digital Alarming Dosimeter Malfunction (9/9/02)
PI N-2002-2181, Digital Alarming Dosimeter in Dose Rate Alarm (9/9/02)
PI N-2002-2297, Unnecessary Radiation Exposure to Scaffold Crew (9/15/02)
PI N-2002-2306, Mechanic Did Not Respond to Dose Rate Alarms on DAD (9/15/02)
PI N-2002-2370, Spurious Alarms for Personnel on the Remote Radiation Monitoring System (9/17/02)
PI N-2002-2464, Workers Inadvertently Exchanged DADs (9/21/02)
PI N-2002-3118, Individual Failed to Wear DAD while Entering ISFSI (11/14/02)
PI N-2003-0984, Discrepancy between Values for Dose Rate Alarm Set Point Programmed into DAD and that Entered into PREMS (3/6/03)

RETS/ODCM Radiological Effluent Occurrences

Procedures, Guidance Documents

VPAP-2103N, Offsite Dose Calculation Manual (ODCM), Rev. 6
HPAP-2802, NRC Performance Indicator Program, Rev. 1

Records

Annual Radiological Environmental Operating Report 2002
NAPS NRC Performance Indicator Data for months of October, November, and December, 2002; and January, February, and March, 2003.

4OA5 Other Activities

Sections 4OA5.1 and 4OA5.2

Document 51-5025362-00, North Anna 1RV Closure Head Report of Reconciliation
RCCM/ASME Equivalency Report EFFNM DT 1517, Filler Materials, Revision A
RCCM/ASME Equivalency Report EFFNM DT 1520, Post Weld Heat Treatment, Revision A
Post Weld Heat Treatment and Strip Chart for Post weld Heat Treatment of Dome to Flange Weld
Equivalency Report EFFQM 03/17020, SNT-TC-1A / NF EN 473 Equivalency Report, Revision A
RCCM/ASME Equivalency Report 03/17011, Examination During Manufacturing, Revision B
Dominion Generation / North Anna Unit 1 Replacement Reactor Vessel Head CC / CP32R Preservice NDE Report Summary 51-5023416-00, Revision 0
RCCM/ASME Equivalency Report EFFNE DT 3009, Hydrostatic Test, Revision 2
Hydrotest Report
Design Specification 08-5032915-00, Reactor Vessel Closure Head Replacement North Anna Unit 1
RCCM/ASME Equivalency Report EFFNM DT 1519, Welders Performance Qualifications, Revision A

Sections 4OA5.3 and 4OA5.4

Specifications & Procedures

Specification No. 24841-120-C-321, Technical Specification for Purchase of Ready-Mix Concrete Qualified as Safety Related, Rev. 7
Specification No. 24841-120-C-322, Technical Specification for Placement of Ready-Mix Concrete Qualified as Safety Related, Rev. 3
Specification No. 24841-120-C-101, Technical Specification for Material Testing Services, Rev. 5
Work Plan and Inspection Record No C-CON-28, Concrete Restoration of Reactor Containment Wall
Procedure 1-PT-61.1, Reactor Containment Pa Test, Rev. 15-OTO1

Technical report No. CE-0109, Inservice Inspection Containment Concrete, ASME Section XI, Subsection IWL, Rev. 3
Design Change DCP 02-205, Restoration of Temporary Construction Opening in the Containment Structure for Reactor Pressure Vessel Head Replacement / North Anna Power Station / Unit 1, dated 2/20/03

Quality Records

National Ready Mixed Concrete Association (NRMCA) Certificate For Bechtel Rustler II Plant, Truck Mix, dated 12/23/02
National Ready Mixed Concrete Association (NRMCA) Certificates for Concrete Truck Mixers, Williams Concrete truck numbers 26, & 28
Records for calibration of cement and aggregate scales
Concrete Mixer Uniformity (ASTM C-94) tests performed on truck numbers 26 & 28
Concrete Mix Design data
Result of testing performed on concrete materials: cement (ASTM C-150), concrete admixtures, Micro Air lot number 211151639 and Rheobuld lot number 2115780, fine aggregate (ASTM C-33), and number 57 coarse aggregate (ASTM C-33)
Concrete placement records which included the pre-pour check list, the concrete pour card, dated 3/27/03, the results of testing performed on the plastic concrete (slump, air content, temperature and unit weight), and the post placement checklist dated 4/3/03
Betchel nonconformance report numbers NCR N1- 010, -011 and -013
Pressure gage number NQC - 7761, calibration due date 9/7/03, and number NQC - 7762, calibration due date 11/13/03
Procedure 2-PT-61.1A, Containment Structural Inspection, Rev. 7.
Procedure 2-PT-61.1M, Leak Testing Individual Containment Liner Locations, Rev. 2-OTO1 - Results of leak testing performed on welds completed to restore Unit 2 containment liner plate.
Plant Issue (PI) N-2003-0242, Small deformation (bulge) in containment liner following completion of containment pressure test.
Plant Issue (PI) N-2003-0276, Eight locations with small deformations (bulge) in containment liner following completion of containment pressure test.

LIST OF ACRONYMS

ALARA	-	As Low As Is Reasonably Achievable
AMSAC	-	ATWS Mitigation Actuation Circuitry
ATWS	-	Anticipated Transient Without Scram
ANS	-	American National Standard
ANSI	-	American National Standards Institute
ARM	-	Area Radiation Monitor
ASME	-	American Society of Mechanical Engineers
CAP	-	Corrective Action Program
CETNA	-	Core Exit Thermocouple Nozzle Assembly
CFR	-	Code of Federal Regulations
CRDM	-	Control Rod Drive Mechanism
CY	-	Calendar Year
DCP	-	Design Change Package

dpm	-	disintegrations per minute
EAD	-	Electronic Alarming Dosimeter
EDG	-	Emergency Diesel Generator
EHC	-	Electro-Hydraulic Control
HHSI	-	High Head Safety Injection
HP	-	Health Physics
HPT	-	Health Physics Technician
HRA	-	High Radiation Area
ISFSI	-	Independent Spent Fuel Storage Installation
LHRA	-	Lcked High Radiation Area
LHSI	-	Low Head Safety Injection
LLD	-	Lower limit of Detection
MT	-	Magnetic Particle Examination
NAPS	-	North Anna Power Station
NCV	-	Non-Cited Violation
NDE	-	Nondestructive Examination
NEI	-	Nuclear Energy Institute
No.	-	Number
NRC	-	Nuclear Regulatory Commission
NRMCA	-	National Ready Mixed Concrete Association
ODCM	-	Offsite Dose Calculation Manual
OS	-	Occupational Radiation Safety
OWA	-	Operator Work-Around
PARS	-	Publicly Available Records
PCM	-	Personnel Contamination Monitor
PI	-	Performance Indicator
PM	-	Portal Monitor
PMT	-	Post-Maintenance Test
PORV	-	Power Operated Relief Valve
PS	-	Public Radiation Safety
PSI	-	Preservice Inspection
PT	-	Liquid Penetrant Examination
QC	-	Quality Control
RCA	-	Radiological Controlled Area
RCS	-	Reactor Coolant System
REMP	-	Radiological Environmental Monitoring Program
RG	-	Regulatory Guide
RPV	-	Reactor Pressure Vessel
RPVH	-	Reactor Pressure Vessel Head
RS	-	Recirculation Spray
RWP	-	Radiation Work Permit
SAM	-	Small Article Monitor
SCBA	-	Self Contained Breathing Apparatus
SDP	-	Significance Determination Process
SSC	-	Systems, Structures, and Components
SWS	-	Service Water System
TM	-	Temporary Modification
TLD	-	Thermoluminescent Dosimeter
TS	-	Technical Specification

UFSAR	-	Updated Final Safety Analysis Report
UT	-	Ultrasonic Examination
VHRA	-	Very High Radiation Area
VPAP	-	Virginia Power Administrative Procedure
VT	-	Visual Examination
WO	-	Work Order
WR	-	Work Request