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

JUNE 30, 2000

Virginia Electric and Power Company
ATTN: Mr. D. A. Christian
Senior Vice President - Nuclear
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060

SUBJECT: NORTH ANNA POWER STATION - FIRE PROTECTION TRIENNIAL BASELINE INSPECTION (NRC INSPECTION REPORT NOS. 50-338/00-07, 50-339/00-07)

Dear Mr. Christian:

This refers to the inspection conducted on April 24-28, 2000, at your North Anna Power Station Units 1 and 2. The enclosed report presents the results of that inspection. This was a fire protection triennial baseline inspection which was performed using Procedure 71111.05 under the revised reactor oversight process. The results of that inspection were discussed with Mr. J. Hayes and other members of your staff on June 20 and June 30, 2000.

The inspection was an examination of 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. Within these areas the inspection consisted of a selective examination of procedures and representative records, observations of activities, and interviews with personnel.
Based on the results of this inspection, one issue of very low safety significance (Green) was identified. Additionally, there was one issue that could not be evaluated under the Significance Determination Process. Both findings were determined to involve violations of NRC requirements and have been entered into your corrective action program. These two violations were not cited in accordance with Section VI.A of the NRC Enforcement Policy. If you contest these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 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 and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the ADAMS Public Library component on the NRC web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA NORMAN MERRIWEATHER FOR/

Kerry D. Landis, Chief
Engineering Branch
Division of Reactor Safety

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

Enclosure: NRC Inspection Report
Nos. 50-338/00-07, 50-339/00-07
Attachment: NRC's Revised Reactor
Oversight Process Summary

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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.:	50-338/00-07, 50-339/00-07
Licensee:	Virginia Electric and Power Company (VEPCO)
Facility:	North Anna Power Station, Units 1 & 2
Location:	1022 Haley Drive Mineral, Virginia 23117
Dates:	April 24 - 28, 2000
Inspectors:	D. Billings, Resident Inspector, Oconee, Region II R. Deem, Contractor, Brookhaven National Laboratories P. Fillion, Reactor Inspector, Region II G. Wiseman, Senior Reactor Inspector (Lead Inspector), Region II
Approved By:	Kerry D. Landis, Chief Engineering Branch Division of Reactor Safety

SUMMARY OF FINDINGS

North Anna Nuclear Power Plant, Units 1 and 2
NRC Inspection Report 50-338, 339/00-07

The report covers a one-week period of inspection by a team to perform the triennial fire protection baseline inspection using procedure 71111.05, Fire Protection.

The significance of issues is indicated by their color (GREEN, WHITE, YELLOW, RED) and was determined by the March 8, 2000, revision of the Fire Protection and Post-Fire Safe Shutdown Inspection Findings Evaluation Guidance and the Significance Determination Process, Appendix F, in Inspection Manual Chapter 0609, dated April 21, 2000 (see Attachment). Issues that could not be evaluated under the Significance Determination Process were processed in accordance with the NRC Enforcement Policy without the added benefit of an assigned risk significance (i.e., NO COLOR).

Cornerstone: Mitigating Systems

- NO COLOR. The licensee's analyses for associated circuits was limited to the emergency power system and did not include associated non-safety circuits. The non-safety associated circuits could produce transients due to potential fire induced spurious operations that were not considered by the licensee in their Safe Shutdown Analysis. Although the licensee had not analyzed for associated non-safety circuits, there were no specific examples of associated non-safety circuits identified by the team. A non-cited violation of 10 CFR 50, Appendix R, Section III.G.2, was identified. (Section 1R05.31.b)

- GREEN. The licensee's procedure for implementation of alternative shutdown capability was inadequate. The alternative shutdown procedure for a fire in the main control room (MCR) directed the operator to monitor steam generator level using the indication provided on the alternative shutdown panel located in the emergency switchgear room. This indication was not protected and was not electrically isolated from the MCR. The protected indication was located on the fuel building monitoring panel. The fuel building indication was also specified in the procedure, but was only to be used if an indication could not be obtained from the alternative shutdown panel instrument. A non-cited violation of Technical Specifications 6.8.1.a was identified (Section 1R05.41.b)

REPORT DETAILS

REACTOR SAFETY

CORNERSTONES: INITIATING EVENTS and MITIGATING SYSTEMS

1R05 FIRE PROTECTION

.1 Systems Required to Achieve and Maintain Post-Fire Safe Shutdown

a. Inspection Scope

The team reviewed the North Anna Power Station (NAPS) fire protection program for selected risk significant fire areas, in order to verify that the post-fire safe shutdown capability and the fire protection features provided for ensuring that at least one post-fire safe shutdown success path was maintained free of fire damage. The fire areas chosen for review during this inspection were: (1) Main Control Room (MCR), [Fire Area 2]; (2) Unit 1 Emergency Switchgear Room, [Fire Area 6-1]; (3) Unit 1 Cable Vault and Tunnel, [Fire Area 3-1]; and (4) Auxiliary Building, Charging Pumps and Component Cooling Water (CCW) Pumps Areas, [Fire Area 11]. For each of these fire areas, the team focused its inspection on the fire protection features, and on the systems and equipment necessary for the licensee to achieve and maintain safe shutdown conditions.

The team reviewed Chapters 3 and 5 of the licensee’s 10 CFR 50, Appendix R Report, Safe Shutdown Analysis (SSA), to determine the identified components and systems necessary to achieve and maintain safe shutdown conditions. The objective of this evaluation was to assure the safe shutdown equipment and post-fire safe shutdown analytical approach were consistent and satisfied the Appendix R reactor performance criteria for safe shutdown.

b. Issues and Findings

Review of the licensee’s SSA indicated that heating, ventilation, and air conditioning (HVAC) was required for charging pump operation while maintaining the plant in hot shutdown conditions. Flexible ducts were provided as an alternate ventilation supply for the charging pump cubicles in the event the normal ventilation system was damaged by a fire. These ducts were to be attached to a supply duct on the 259' elevation of the auxiliary building which was connected to back-up ventilation fans located on the auxiliary building roof. Plant design change (DC 95-163) relocated the flexible duct from the originally stored location in the Thermo-Lag coated HVAC enclosure to the bottom of a stairwell adjacent to the auxiliary building in a separate fire area. The 10 CFR 50.59 evaluation for the plant design change stated that the duct was being relocated to eliminate the reliance on Thermo-lag. The Thermo-Lag coating on the HVAC enclosure remained in place but no longer performed a required fire protection function. The 10 CFR 50.59 evaluation concluded that the flexible duct installation was an operator action and not a repair.

The Fire Contingency Action (FCA) procedures indicated that providing HVAC for the charging pumps would be accomplished by: (1) opening the door to a Thermo-Lag coated HVAC enclosure located on the 259' elevation of the auxiliary building; (2) sending an operator to the 244' elevation of the stairwell adjacent to the auxiliary building to obtain approximately 50' length of 22" diameter flexible duct; (3) carrying the flexible duct back to the 259' elevation enclosure; and (4) connecting the flexible duct to the fixed duct located in that enclosure.

The team questioned the licensee about their basis for these actions and why this was not considered a hot shutdown repair action to equipment and systems used to achieve and maintain hot shutdown. The licensee stated that since tools were not required, it was considered an operator action and referenced NRC approved North Anna Exemption No. 28. Review of the exemption showed that the subject dealt with installation of the new exhaust fans on the auxiliary building roof and separation distances of those fans. The statement made in the exemption regarding the flexible duct was that it was being installed. There was no reference to the type of flexible duct installation. After consultation with NRR, based upon the fact that Exemption No. 28 was not specific as to how the flexible duct was to be connected and the licensee's ability to connect the flexible duct within the prescribed time, the FCA procedure for providing HVAC for the charging pumps using the flexible duct was considered acceptable.

There were no findings identified.

.2 Fire Protection Safe Shutdown Capability

.21 Fire Detection Systems

a. Inspection Scope

The team walked down the fire detection systems in the emergency switchgear rooms, cable vault and tunnel areas and charging pump areas to evaluate the adequacy of the installed configurations. The team also reviewed engineering evaluations for the detection design and spacing criteria and an independent fire protection consultant's technical evaluation of the detector locations for the installed detection systems in the selected plant areas to verify compliance with the National Fire Protection Association (NFPA) code.

b. Issues and Findings

There were no findings identified.

.22 Fixed Fire Suppression Systems

a. Inspection Scope

The team reviewed the adequacy of the design and installation of the carbon dioxide (CO_2) fire suppression systems for the cable vault and tunnel areas, the fire sprinkler system in the charging and CCW pump areas of the auxiliary building and the Halon system for the emergency switchgear rooms. The team also reviewed audits of the fire protection program performed by the Nuclear Oversight Department, exemptions, engineering evaluations for NFPA code deviations, and walked down the suppression systems to verify the installed configurations were within the parameters of the engineering evaluations. Additionally, the team reviewed several drawings, schematics, flow diagrams, and evaluations associated with floor drain and ventilation systems and components to verify that systems and operator actions required for hot shutdown would not be inhibited (through potential leakage or flooding) from fire suppression activities or rupture of the fire suppression systems. The team reviewed vendor design calculations to verify that the required quantity of CO_2 for each area was adequate.

b. Issues and Findings

There were no findings identified.

.23 Fire Barrier Enclosures

a. Inspection Scope

The team reviewed the selected fire areas to evaluate the adequacy of fire area barriers, penetration seals, and fire doors by observing the material condition and configuration of the installed fire barriers, as well as, construction details and supporting fire tests for the installed fire barriers. In addition, the team reviewed the licensing documentation, such as exemptions and NFPA code deviations to verify that the fire barrier installations met licensing commitments.

b. Issues and Findings

There were no findings identified.

.24 Electrical Raceway Fire Barrier Systems (ERFBS) Used to Protect Safe Shutdown Capability

a. Inspection Scope

The team reviewed the material condition and configuration of the installed electrical raceway fire barriers for the selected fire areas in order to evaluate the adequacy of the ERFBS. In addition, the team reviewed the license documentation, such as exemptions, supporting fire tests, and NFPA code deviations to verify that the fire barrier installations met license commitments. The team also reviewed vendor documents, fire test data, and performed walk down inspections of the installation to verify that the installed ERFBS met the vendor's installation requirements. Additionally, the team reviewed an independent laboratory evaluation of the vendor's installation design and test data confirm that the installation met a 1-hour fire endurance rating and met the separation requirements of 10 CFR 50, Appendix R, Section III.G.2.b.

b. Issues and Findings

There were no findings identified.

.25 Fire Brigade Drill Program

a. Inspection Scope

The team reviewed the fire brigade drill program and observed a fire brigade response associated with an unannounced fire brigade drill in order to verify that the fire brigade response and drill performance met the established drill objectives. The team also reviewed the licensee's critiques of other operating shifts' drill performance to determine if the fire brigade drill program and fire drill participation met the requirements of the site fire protection program.

b. Issues and Findings

There were no findings identified.

.3 Post-Fire Safe Shutdown Circuit Analysis

a. Inspection Scope

The team reviewed information associated with systems and components required for post-fire safe shutdown to verify that power and control cables related to safe shutdown equipment and associated non-safety circuits in the selected fire areas had been identified by the licensee and had been analyzed to show that they would be free of fire damage. Included in this review were pumps and valves for the service water system, quench spray system, chemical and volume control system, high pressure safety injection system, main feed water (MFW) system, and the auxiliary feed water (AFW) system.

The team also reviewed system piping and instrumentation drawings to identify the components in each of the safe shutdown systems necessary for system success, components that could cause flow diversion or system isolation, and valves interfacing with the primary reactor coolant system boundary whose maloperation could initiate a transient or result in a loss of coolant accident. This review included fire-induced spurious operation of equipment that could affect post-fire safe shutdown capability; circuit breaker coordination; periodic testing of control panels installed to meet 10 CFR 50, Appendix R; 10 CFR 50.48; and NRC Information Notice 92-18. The team's review was principally focused on two areas:

(1) The maloperation of required equipment due to fire induced damage to associated cabling or instrument sensing lines. Examples included false control and instrument indications that may be initiated as a result of fire induced grounds, shorts or open circuits in connected cables.

(2) The inadvertent operation of components (shutdown related or non-shutdown related) that could adversely affect the plant's post-fire safe shutdown capability. Examples include motor-operated valves, pumps, motors, and logic circuitry.

b. Issues and Findings

A finding (NO COLOR) related to the licensee's failure to analyze for associated non-safety circuits is discussed in Section 1R05.31.b of this inspection report (IR). An unresolved item related to the risk significance and compliance with 10 CFR 50, Appendix R, for a fire in the emergency switchgear room and the cable vault and tunnel is discussed in Section 1R05.32.b of this IR.

.31 Fire-Induced Spurious Operation of Equipment That Could Affect Post-Fire Safe Shutdown Capability

a. Inspection Scope

The team reviewed the licensee's SSA, inspected cables in the emergency switchgear room, cable vault and tunnel, and the control room to verify that cable routing for selected safe shutdown systems and equipment was consistent with 10 CFR 50, Appendix R, Section III.G.2.

b. Issues and Findings

The team reviewed the SSA and identified that the licensee's analysis for associated circuits was limited to the emergency power system and did not include associated non-safety circuits. The non-safety associated circuits could produce transients due to potential fire induced spurious operation that was not considered by the licensee in their SSA. Although the licensee had not analyzed for associated non-safety circuits, there were no specific findings of associated non-safety circuits identified by the team.

The team reviewed the safety related quench spray system and identified that the licensee did not have documentation to support the conclusion that quench spray valve 1-QS-MOV101A was not an associated circuit. The cables for this valve were routed through the emergency switchgear room, cable vault and tunnel and the control room and were not protected to be free of fire damage from a fire in these areas. The licensee performed an analysis during the inspection which showed that the fire induced spurious operation of valve 1-QS-MOV101A would not affect the shutdown systems and confirmed that it was not an associated circuit.

Contrary to the requirements of 10 CFR 50, Appendix R, Section III.G.2, the licensee failed to analyze for associated non-safety circuits which could produce transients due to potential fire induced spurious operation. This issue was determined to be a violation and is being treated as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. This violation is designated as NCV 50-338/00-07-01, Failure to Analyze for Associated Non-Safety Circuits Which Could Produce Transients Due to Potential Fire Induced Spurious Operation. The licensee added this issue to existing corrective action program item N-02-98-2218-001 to address this issue for both units.

.32 Separation of Cables Related to Main Feed Water System and Reactor Coolant System Power Operated Relief Valves

a. Inspection Scope

The team reviewed selected drawings and cable routing information associated with the main feed water (MFW) system and components in the reactor coolant system (RCS) required for post-fire safe shutdown to verify that the cables associated with the equipment would be free of fire damage.

b. Issues and Findings

The team identified that cables for the control of pumps and valves associated with the main feed water (MFW) system and/or cables associated with the power source for the MFW pumps were routed through the emergency switchgear room. The routing of the MFW system cables was not specifically traced by the licensee as part of the SSA. Additionally, the licensee's SSA identified that the automatic operation of the turbine driven auxiliary feed water (TDAFW) system was affected by the fire in the emergency switchgear room such that the TDAFW pump must be manually recovered and controlled. These systems and cables relate to the decay heat removal safe shutdown function and were not protected from the effects of a fire.

Cables for control of the pressurizer power operated relief valves (PORVs) and block valves, which also relate to the decay heat removal function, were inside the emergency switchgear room and also in the cable vault and tunnel. These cables were also not protected from the effects of a fire. The RCS inventory control employing natural circulation cooldown was different from a normal reactor trip cooldown. With normal letdown isolated, required makeup would have to be carefully controlled to prevent the pressurizer from going solid. At North Anna, the charging system was used to provide RCS boration, and reactor coolant pump (RCP) seal cooling, since component cooling water may not be available for achieving and maintaining hot shutdown. The PORVs on the fire affected unit would not be used for RCS pressure and level control because power to the solenoid on the PORVs would be isolated to prevent their spurious operation. This would be done very early in the safe shutdown process for both a fire in the cable vault and tunnel area, and in the emergency switchgear room because the cables were not protected from a fire in these areas. The manual isolation of the PORVs would make them unavailable for use in RCS pressure control on the fire affected unit. Since pressurizer heaters on the affected unit were not credited in the licensee's SSA, and therefore, may be unavailable, it was uncertain that the reactor system transition to commencement of cold shutdown was achievable within Appendix R performance goals without the PORVs being available to keep the pressurizer from going solid during the cooldown phase of the shutdown process. This action may eliminate the "feed and bleed" mitigation capability and may also make the safety relief valves on the pressurizer the only remaining RCS pressure control capability.

The team concluded that the unprotected cable routing of the PORVs, block valves, and MFW cables within the emergency switchgear room and cable vault and tunnel may represent a nonconformance with Appendix R and an increased probability that the post-fire safe shutdown capability may be adversely affected by fire-induced failures. This is an unresolved item pending NRC review, URI 50-338, 339/00-07-02, Compliance with Appendix R and Risk Significance of Fire Induced Failures on Unprotected Cable Routing of the PORVs, Block Valves, and MFW Cables Inside the Emergency Switchgear Room and in the Cable Vault and Tunnel.

.4 Alternative Shutdown Capability

.41 Alternative Safe Shutdown Procedures

a. Inspection Scope

The team performed a review of the licensee's alternate safe shutdown procedures for a fire in the MCR (0-FCA-1), the emergency switchgear room (1-FCA-2), the Unit 1 cable vault and tunnel (1-FCA-3), and fire area 11 for the auxiliary building (2-FCA-4). Fire area 11 was common to both units. The review focused on ensuring that all required functions for post-fire safe shutdown and the corresponding equipment necessary to perform those functions were included in the procedures. The objective of this review was to assure that the safe shutdown equipment, shutdown procedures, and the post-fire safe shutdown analytical approach were consistent and satisfied the Appendix R reactor performance criteria for safe shutdown. The team's review considered the issues identified in licensee event report (LER) 50-338, 339/1999-003, Potential Loss of HHSI Due to Postulated Main Control Room Fire. Review of the licensee's corrective actions for closure of this LER, and any related findings, will be documented in a future NRC inspection report.

b. Issues and Findings

Review of Fire Contingency Action Procedure 0-FCA-1

The team identified that step 25c of alternate safe shutdown procedure 0-FCA-1, directed the operator at the alternative shutdown panel located in the emergency switchgear room to monitor steam generator level using indication which was not electrically isolated from the MCR. Table 5.2 of the SSA stated that this indication was not electrically isolated from the MCR, and the protected indication was located on the fuel building monitoring panel. The fuel building indication was also specified in procedure 0-FCA-1, but was only to be used if an indication could not be obtained from the alternative shutdown panel instrument.

The procedure specified that steam generator indication would be used to control hot shutdown operations, including steam generator level control and decay heat removal rate. Adjusting AFW based on level readings subject to false indications could lead to overcooling of the RCS, steam generator dry out, or, since the TDAFW pump was being used, overfill of the steam generators to the degree that steam required for the turbine may no longer be adequate from a pressure or quality standpoint. The team concluded that alternate safe shutdown procedure 0-FCA-1 provided inadequate procedural guidance to properly implement the alternative shutdown requirement.

The team and a Region II senior reactor analyst (SRA) evaluated the risk significance of this issue using the March 8, 2000, revision of the Fire Protection and Post-Fire Safe Shutdown Inspection Findings Evaluation Guidance and IMC 0609, dated April 21, 2000. The evaluation considered the following:

- A fire ignition frequency (IF) of 7.00×10^{-3} per year for Fire Area 2 was taken from the generic data for control rooms (Table 5.4).

- None of the cables providing steam generator level indications on the alternative shutdown panel were protected and were not electrically isolated from the MCR. Therefore, fire barrier degradation (FB) was determined to be high (FB = 0).

- A fire brigade drill was observed and the brigade performance was found to be satisfactory; therefore, manual suppression (MS) was considered to be in its normal operating state (MS = -1.5).

- The MCR was constantly manned and was also protected by area smoke detection and ventilation duct detection system and a manually actuated Halon suppression system under the control room floor. Therefore, no degradation was assigned for automatic suppression term (AS = -1.25).

- A fire mitigation frequency (FMF) was calculated to be $10^{-4.95}$ per year using the formula, FMF = log IF + FB + AS + MS + CC.

- This FMF corresponded to an initiating event likelihood rating of E since the condition existed for greater than 30 days.

- The inspection finding was assessed using the transient, stuck-open PORV, and the loss of offsite power (LOOP) worksheets. The mitigating actions included the availability of the protected indication located on the fuel building monitoring panel. Therefore, credit was given for operator action under high stress + recovery of failed train as equivalent to having “1 train” available. The resulting low fire mitigating frequency resulted in a delta core damage frequency which had very low safety significance.

The analysis concluded that this issue was of very low safety significance (GREEN).

Technical Specification (TS) 6.8.1.a and Regulatory Guide 1.33, Appendix A, Item 6.p, require written procedures to be established, implemented, and maintained for plant operations during emergencies such as a forced evacuation of the control room due to a control room fire. Embodied in this requirement is that the procedures have to be adequate.

Contrary to the above, the licensee failed to maintain adequate procedural guidance for the implementation of the alternative shutdown capability in the event of a MCR fire. The team determined that this failure was a violation of TS 6.8.1.a.

This violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy. The licensee was tracking this issue in their corrective action program as item N-02-2218-001. This violation is designated as NCV 50-338, 339/00-07-03, Inadequate Procedural Guidance for Implementing Alternate Shutdown for a Fire in the Main Control Room.

<u>Review of Fire Contingency Action Procedure 1-FCA-2</u>

The team's review found a note on page 8 that directed the operator to continue depressurization of the steam generators even if the pressurizer level was lost or if voiding occurred in the reactor vessel upper head. Placing the plant in this condition would not be consistent with Appendix R, Section III.L.2 performance goals for a PWR. Section III.L.2.b. of Appendix R to 10 CFR Part 50, states that the reactor coolant makeup function shall be capable of maintaining the reactor coolant level within the level indication in the pressurizer for PWRs.

The licensee stated that the IRT had previously found this discrepancy and was tracking the item as PI N-2000-0469R1 in their corrective action system. This issue is considered to be an URI pending further NRC review to determine the risk significance of this condition. This issue is identified as URI 50-338, 339/00-07-04, Determination of the Risk Significance of Allowing Depressurization of the Steam Generators if the Reactor Coolant Level is not Within the Level Indication in the Pressurizer.

.42 Thermal-Hydraulic Time-line Analysis and Verification and Validation of the Fire Contingency Action Procedures

a. Inspection Scope

The team reviewed Figure 5-1, "Post-Fire Safe Shutdown Activities to Achieve Hot Standby," of the licensee's 10 CFR Appendix R Report to assess the time constraints placed on performing required operator manual actions, given the minimum manning level of operators specified in the SSA to implement post-fire safe shutdown in alternative shutdown fire areas. The team also reviewed procedure VPAP-0502 to evaluate the licensee's validation process for a change to the FCA procedures.

b. Issues and Findings

There were no findings identified.

.5 Operational Implementation of Alternative Shutdown Capability

a. Inspection Scope

The team reviewed the operational implementation of the alternative shutdown capability for the emergency switchgear rooms, cable vaults, MCR, and auxiliary building fire areas to verify that: (1) the training program for licensed personnel included alternative or dedicated safe shutdown capability; (2) personnel required to achieve and maintain the plant in hot shutdown following a fire using the alternative shutdown system could be provided from normal onsite staff, exclusive of the fire brigade; (3) the licensee had incorporated the operability of alternative shutdown transfer and control functions into the plant TSs; and (4) the licensee periodically performed operability testing of the alternative shutdown instrumentation and transfer and control functions, including imposing appropriate compensatory measures during testing when the alternative shutdown capability may be declared inoperable.

b. Issues and Findings

There were no findings identified.

.6 Communications for Performance of Alternative Shutdown Capability

a. Inspection Scope

The team inspected the remote shutdown equipment in the emergency switchgear rooms (auxiliary shutdown panels), fuel building (auxiliary monitoring panels), auxiliary feed water local controls, and the cable vaults as identified in procedure 0-FCA-1. The team also inspected selected sound powered phone jack locations to verify that the jacks were in good condition, free of foreign material, and installed at the proper locations to support required shutdown actions identified in the procedures. The team also inspected the Appendix R locker outside the control room to verify that there was a sufficient number of radios and batteries for use during the procedure. Additionally, the team interviewed operations personnel to determine if there were any areas where the radios could not be used.

b. Issues and Findings

There were no findings identified.

.7 Emergency Lighting for Performance of Alternative Shutdown Capability

a. Inspection Scope

The team reviewed the design and operation of the 8-hour battery powered emergency lighting systems. The team walked down remote shutdown equipment identified in procedure 0-FCA-1 and inspected 25 lighting units. The purpose of the walk down was to verify that the emergency lighting unit lamps were operational and the lighting heads were aimed to provide adequate illumination to perform the required shutdown actions denoted in the procedure.

b. Issues and Findings

There were no findings identified.

4. OTHER ACTIVITIES

4OA5 Management Meetings

.1 Briefings and Exit Meeting Summaries

The lead inspector presented the inspection results to licensee management and other members of the licensee's staff at the conclusion of the onsite inspection on April 28, 2000. Subsequent to the onsite inspection, the lead inspector and Region II management held follow up exits by telephone with Mr. J. Hayes and other members of licensee management on June 20 and June 30, 2000, to update the licensee on changes to the preliminary inspection findings. The licensee acknowledged the findings.

The team asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Bourdeau, Fire Protection Engineer
T. Carlisle, Appendix R Engineer, Nuclear Engineering
J. Crossman, Supervisor, Licensing
J. Danberman, Supervisor, Shift Operations
B. Foster, Superintendent Station Engineering
J. Graf, Supervisor, Electrical Engineering
L. Hartz, Vice President, Engineering
J. Hayes, Manager, Station Safety and Licensing
E. Hendrason, Supervisor, Auxiliary Systems
L. Kidd, Supervisor, Configuration Control
J. Martin, System Engineer, Nuclear Engineering
W. Matthews, Vice President, Nuclear Operations
H. Royal, Superintendent, Nuclear Training

Other licensee employees contacted included engineers, operations personnel, fire services personnel, and administrative personnel.

NRC

J. Canady, Resident Inspector
M. Morgan, Senior Resident Inspector

ITEMS OPENED, CLOSED, OR DISCUSSED

Opened

50-338, 339/00-07-02	URI	Compliance with Appendix R and Risk Significance of Fire Induced Failures on Unprotected Cable Routing of the PORVs, Block Valves, and MFW Cables Inside the Emergency Switchgear Room and in the Cable Vault and Tunnel. (Section 1R05.32.b)
50-338, 339/00-07-04	URI	Determination of the Risk Significance of Allowing Depressurization of the Steam Generators if the Reactor Coolant Level is not Within the Level Indication in the Pressurizer (1R05.41.b)

Opened and Closed

50-338/00-07-01	NCV	Failure to Analyze for Associated Non-Safety Circuits Which Could Produce Transients Due to Potential Fire Induced Spurious Operation. (Section 1R05.31.b)
50-338, 339/00-07-03	NCV	Inadequate Procedural Guidance for Implementing Alternate Shutdown for a Fire in the Main Control Room. (Section 1R05.41.b)

APPENDIX

LIST OF DOCUMENTS REVIEWED

PROCEDURES

VPAP-2401, Fire Protection Program, Revision 13

Periodic Test Procedure 1-PT-100, Revision 7, Appendix R Equipment and Circuitry Functional Test

Periodic Test Procedure No. 1-PT-41.1, Revision 32, “Auxiliary Shutdown Panel Monitoring Instrumentation - Channel Check”

Periodic Test Procedure No. 1-PT-41.3, Revision 9, “Safe Shutdown Equipment Control Verification”

Procedure 0-FCA-1, Revision 18, “Control Room Fire,” dated 9/22/99

Procedure 1-FCA-2, Revision 11, “Emergency Switchgear Room Fire,” dated 9/23/98

Procedure 1-FCA-3, Revision 8, “Cable Vault and Tunnel Fire,” dated 9/23/98

Procedure 2-FCA-4, Revision 7, “Auxiliary Building Fire,” dated 9/23/98

Procedure 1-FS-AB-1, Revision 1, “Firefighting Strategy - Auxiliary Building”, dated 5/28/92

CALCULATIONS

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Calculation No. 0361, Revision 1, Attachment J, page 1, Ground Relays on Buses 2H and 2J

DRAWINGS

11715-FB-21B, Revision 14

11715-FB-24C, Revision 21

11715-FB-26A, Revision 18

11715-FB-21B, Revision 14

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11715-DAR-093B, Revision 2

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11715-DAR-095B, Revision 2

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11715-DAR-074A, Revision 4

11715-DAR-079A, Revision 2

11715-DAR-079B, Revision 3

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11715-DAR-040D, Revision 2

11715-DAR-070B, Revision 2

11715-DAR-078A, Revision 10

11715-DAR-078B, Revision 0

11715-DAR-078C, Revision 1

11715-DAR-078G, Revision 6

11715-DAR-078H, Revision 2

11715-DAR-093A, Revision 3

Elementary Diagram, 12050-ESK-5AS, Revision 11, Service Water Pump 2-SW-P-1A

Elementary Diagram, 34.5 kV Circuit Breaker 142

Elementary Diagram, 11715-ESK-6CL, Motor Operated Valve 1-FW-100B, D & 154A

10 CFR PART 50 APPENDIX R, EXEMPTION REQUESTS

No. 1, Auxiliary Building - Partial Area Fire Suppression and Detection

No. 7, Charging Pump Cubicle Wall - Fire Barrier Rating

No. 14, Emergency Switchgear Room/Chiller Room - No Fire Damper

No. 15, Emergency Switchgear Room/Chiller Room - Fire Door Frame

No. 24, Auxiliary Building/Turbine Building Pipe Tunnel - Lack of a Fire Barrier

No. 28, Auxiliary Building Ventilation Equipment Area - Partial Area Detection - Lack of Fixed Suppression

ENGINEERING EVALUATIONS

No. 5, Evaluation of Sprinkler Head Placement for the Partial Area Sprinkler System in the Auxiliary Building

No. 6, Evaluation of the Potential for Flooding in the Emergency Switchgear Rooms

No. 9, Evaluation of Smoke Detector Design Criteria - Emergency Switchgear Rooms, July 1990

No.10, Evaluation of Fire Detector Locations - Safe Shutdown Areas, July 1990

PLANT ISSUES REPORTS

N-2000-0469-R1, Revision to Emergency switchgear room FCA Procedures 1-FCA-2 and 1-FCA-2 to Coordinate Cool Down of RCS in Accordance with the Appendix R Analysis

N-98-0229

ASSESSMENT/AUDIT REPORTS

Nuclear Oversight Department Audit No. 98-02, dated April 2, 1998

Nuclear Oversight Department Audit No. 99-02, dated March 30, 1999

CODES AND STANDARDS

NFPA 12 Standard on Carbon Dioxide Extinguishing Systems, 1998 Edition

NFPA 12A Standard on Halon 1301 Extinguishing Systems, 1997 Edition

NFPA 72E Standard on Automatic Fire Detectors, 1983 Edition

OTHER DOCUMENTS

Professional Loss Control (PLC), “Fire Detection Study - Safe Shutdown Areas,” January 1985

NRC Inspection Report No. 50-338, 339/99-01, dated April 12, 1999

Task Interface Agreement 97-004, February 19, 1997

NRC memorandum S. Black, NRR to L. Plisco, RII, “Re-evaluation of Manually Actuated Halon 1301 Fire Suppression System for North Anna Emergency Switchgear Rooms,” January 12, 2000

Underwriter's Laboratories, Inc., Letter to Virginia Electric and Power Co., dated July 7, 1993

3M Fire Protection Products, Letter to Virginia Electric and Power Co., dated July 1, 1993

Appendix R Safe Shutdown Analysis for North Anna Power Station, Revision16, dated 7/98

Design Change D95-163, “Relocation of Appendix R Flexible Ducting in the Aux. Bldg.,” dated 5/24/95

Report DR-99-795, dated 3/31/99

Memorandum “North Anna Power Station Licensed Operator Requalification Program Training Synopsis,” dated 4/2/99

LIST OF ACRONYMS USED

AFW	Auxiliary Feed Water
CCW	Component Cooling Water
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
ERFBS	Electrical Raceway Fire Barrier System
FCA	Fire Contingency Action
GL	Generic Letter
HVAC	Heating, Ventilation and Air Conditioning
IMC	Inspection Manual Chapter
IPEEE	Individual Plant Examination External Events
IRT	Integrated Review Team
LOOP	Loss of Offsite Power
MCR	Main Control Room
MFW	Main Feed Water
MOV	Motor Operated Valve
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
NSR	Non-Safety Related
PI	Plant Issue
PORV	Power Operated Relief Valve
PWR	Pressurized Water Reactor
QS	Quench Spray
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RWST	Refueling Water Storage Tank
SDP	Significance Determination Process
SRA	Senior Reactor Analyst
SSA	Safe Shutdown Analysis
TDAFW	Turbine Driven Auxiliary Feed Water
TS	Technical Specification
URI	Unresolved Item
VEPCO	Virginia Electric and Power Company

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness

Radiation Safety

- Occupational
- Public

Safeguards

- Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html.