

VIRGINIA ELECTRIC AND POWER COMPANY  
 RICHMOND, VIRGINIA 23261

May 19, 1988

D. S. CRUDEN  
 VICE PRESIDENT-NUCLEAR

United States Nuclear Regulatory Commission  
 Attention: Document Control Desk  
 Washington, D.C. 20555

Serial No. 88-230  
 NAPS/DBR/bgp  
 Docket Nos. 50-338  
 50-339  
 License Nos. NPF-4  
 NPF-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY  
NORTH ANNA POWER STATION UNITS 1 AND 2  
NRC INSPECTION REPORT NOS. 50-338/87-32 AND 50-339/87-32  
REPLY TO A NOTICE OF VIOLATION

We have reviewed your letter of April 19, 1988 which referred to the inspection conducted at North Anna between October 5, 1987 and October 9, 1987, and reported in Inspection Report Nos. 50-338/87-32 and 50-339/87-32 and our response is attached. On January 21, 1988, Virginia Electric and Power Company made a presentation to you on our review of the violations and the corrective actions we were proposing to take. The detailed information presented during this conference was documented in your February 16, 1988 letter.

We have no objection to this report being made a matter of public record. If you have any further questions, please contact us.

Very truly yours,

*D. S. Cruden*  
 D. S. Cruden

Attachment

*LEO*  
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cc: U. S. Nuclear Regulatory Commission  
101 Marietta Street, N.W.  
Suite 2900  
Atlanta, GA 30323

Mr. J. L. Caldwell  
NRC Senior Resident Inspector  
North Anna Power Station

RESPONSE TO THE NOTICES OF VIOLATION REPORTED  
DURING THE NRC INSPECTION CONDUCTED FROM  
OCTOBER 5-9, 1987  
INSPECTION REPORT NOS. 50-338/87-32 AND 50-339/87-32

NRC COMMENT

During the Nuclear Regulatory Commission (NRC) inspection conducted on October 5-9, 1987, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR 50 Part 2, Appendix C (1987), the violations are listed below:

- A. 10 CFR 50, Appendix B, Criterion V requires that activities affecting quality be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and that such activities be accomplished in accordance with these instructions, procedures, or drawings.

Contrary to the above, the licensee's maintenance procedures were deficient in the following cases:

Procedure MMP-C-SOV-1 is used to troubleshoot, repair, replace and/or test solenoid valves. When this procedure is used, there are actions that can disturb or partially disassemble the electrical conductor seal assembly (ECSA). The ECSA is required to be torqued to manufacturer's specifications as called for in the ECSA Qualification Document Review (QDR) file when it is disturbed or partially disassembled. Procedure MMP-C-SOV-1 does not address retorquing of ECSAs that may have been disturbed or partially disassembled before returning it to operable status. Therefore, the procedure is inadequate.

The low head safety injection (LHSI) pump motors are to have their bearings replaced after operating a specified number of hours. There was no procedure to track and record the number of operating hours and no procedure to replace the bearings after the specified number of operating hours.

Various safeguard equipment vent fans have an Environmental Qualification (EQ) maintenance requirement to change out the bearing grease or to sample it to ensure that it is satisfactory. This is to be accomplished every refueling outage. This requirement was not addressed in the station maintenance program.

This is a Severity Level IV violation (Supplement 1).

## RESPONSE

### 1. ADMISSION OR DENIAL OF THE VIOLATION

The violation is correct as stated.

### 2. REASONS FOR THE VIOLATION

This violation was caused by inadequate reviews of new/revised Qualification Documentation Review (QDR) packages. There was not sufficient procedural guidance to ensure that the QDRs were reviewed in a uniform manner or to verify which station procedure(s) addressed the qualification requirements. Also, the imposed maintenance requirements in the QDRs were not always verified to be actual qualification requirements or that they were consistent with actual equipment operating duty.

### 3. CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

For each of the three examples cited in the violation, the basis for the QDR requirements were reviewed and to determine the appropriate corrective action:

1. Procedure MMP-C-SOV-1 has been replaced by a new procedure MEMP-C-SOV-1 which was approved by the Station Nuclear Safety and Operating Committee (SNSOC) on November 25, 1987. This new procedure contains specific torquing requirements for replacement as well as reused Conax connectors.
2. A review was conducted of the requirement in QDR-N-4.3 to replace Low Head Safety Injection (LHSI) motor bearings every 32,000 hours. Since the pumps are normally in a standby mode, there should be no need to replace the bearings during the installed service life of the motors. As a result, Engineering Change Request (ECR) 0405 was issued on November 20, 1987 to remove this requirement from TAB E of the QDR.
3. The test report in QDR-N-11.3 was reviewed to determine the source of the requirement to change out or sample the bearing grease every refueling outage for the Safeguards Fan motors. Based on this review, it has been determined that relubrication of the motor bearings is not a qualification requirement. As a result, ECR 0384 was issued on November 3, 1987 to remove this requirement from TAB E of the QDR. It was reverified that the motor vendor's lubrication recommendations have been included in the station's Preventative Maintenance (PM) program.

To ensure in the future that more thorough reviews of new/revised QDRs are performed, instructions have been added to station Administrative Procedure, ADM 3.10. These instructions provide review guidelines for identifying and documenting changes to TABs A and E of the QDR which require changes in station maintenance procedures. If the QDR requirements are not consistent with station operation of the equipment,

an Engineering Change Request (ECR) is required to be submitted. The revision to ADM 3.10 was approved by SNSOC on February 26, 1988.

4. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

A cross reference document, the EQ Reference Manual, is being developed which will include an index of QDR maintenance requirements and the corresponding implementing maintenance procedures. This reference will be treated as a controlled document.

5. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

The EQ Reference Manual will be approved and implemented by October 31, 1988.

B. 10 CFR 50.49(f) requires that each item of electrical equipment important to safety must be qualified by one of the following methods:

- (1) Testing an identical item of equipment under identical conditions or under similar conditions with a supporting analysis to show that the equipment to be qualified is acceptable.
- (2) Testing a similar item of equipment with a supporting analysis to show that equipment to be qualified is acceptable.
- (3) Experience with identical or similar equipment under similar conditions with a supporting analysis to show that the equipment to be qualified is acceptable.
- (4) Analysis in combination with partial type test data that supports the analytical assumptions and conclusions.

Contrary to the above, the licensee operated after the November 30, 1985, deadline for compliance with 10 CFR 50.49 with Raychem splices that were not qualified in that they were installed in a configuration that was not tested and which was not supported by supplementary analysis.

This is a Severity Level IV violation (Supplement 1).

#### RESPONSE

##### 1. ADMISSION OR DENIAL OF THE VIOLATION

The violation is correct as stated.

##### 2. REASONS FOR THE VIOLATION

During the initial qualification phase for Raychem splices, there was a lack of appreciation for the level of control which needed to be maintained for installing the splices in accordance with manufacturer's recommendations. Installation was left to the "skill of the craft." As a result, inadequate training and installation instructions were provided to craft personnel. Additionally, the procedures did not require that craft personnel have the tools needed at the job site to make the critical measurements needed to properly size the heat shrinkable tubing.

##### 3. CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

In response to IEIN 86-53, Improper Installation of Heat Shrinkable Tubing, and based on limited experience with discrepant splices identified at North Anna during the 1985 Unit 1 refueling outage, it was concluded that a generic problem did not exist. Based on the testing initiated by Virginia Power for oversized bolting and small bend radius as well as other testing which was being performed within the industry

for various Raychem configurations, the criteria provided by Raychem appeared to be very conservative. Therefore, a management decision was made to continue gathering and reviewing the industry test reports to establish meaningful acceptance criteria for determining operability of the splices before initiating additional inspections. Also, it was decided to perform an inspection at Surry Power Station before starting North Anna's inspection because the Surry units were the next units scheduled for refueling outages. By the time the inspections at Surry were completed in January, 1987, it became evident that variances from Raychem's recommendations were greater than previously evaluated. Therefore, in February, 1987 when the technical resources involved in evaluating Surry's splices became available, inspections were initiated at North Anna. On February 18 and 20, 1987 conference calls were held with the NRC to discuss the plan which had been developed for the Raychem inspections at North Anna. The priority and scope of the inspection effort, as well as the acceptance criteria for determining the need for repair and operability of the splices, were covered during these calls.

The initial scope of the inspection and repair effort was splices outside containment for both units. During the 1987 refueling outages for both units, splices inside containment were also inspected and repaired as required. By October, 1987 the inspection and repair program for Raychem splices was completed for both units. Of the over 3500 splices inspected for both units, approximately 1900 splices, while still operable, were repaired to restore them to a full 40 year qualified service life. Approximately 42 splices were repaired to address operability concerns which, at the time, could not be resolved by existing industry test reports. Justifications for Continued Operation (JCO) were provided for these splices. Based on the currently available test results for Raychem splices, the majority of the configurations outside the Raychem guidelines have proven to be qualifiable. Valid concerns did exist concerning work procedure controls and craft training deficiencies, but the deficient splices did not result in any significant safety concerns.

To address the underlying cause of this violation, upgrades to procedures and training have been implemented. Detailed instructions have been developed by engineering for installing Raychem splices in accordance with manufacture's requirements. These instructions were incorporated into specification NAS-3014, Specifications for Electrical Equipment Installation, and approved by Station Nuclear Safety and Operating Committee (SNSOC). The Qualification Documentation Review (QDR) package for Raychem has been updated to reference the applicable test reports. Installation and work procedures addressing Raychem splices include reference to this splice installation procedure. Training on Raychem installation practices has been conducted for craft personnel and selected engineering personnel involved in the inspection and repair of splices. Installation practices for Raychem splices have also been addressed as appropriate in continuing training and development programs for station craft responsible for the installation of splices.

4. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

No additional corrective action is required.

5. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance has been achieved.



C. 10 CFR 50.49(f) requires that each item of electrical equipment important to safety must be qualified by one of the following methods:

- (1) Testing an identical item of equipment under identical conditions or under similar conditions with a supporting analysis to show that the equipment to be qualified is acceptable.
- (2) Testing a similar item of equipment with a supporting analysis to show that the equipment to be qualified is acceptable.
- (3) Experience with identical or similar equipment under similar conditions with a supporting analysis to show that the equipment to be qualified is acceptable.
- (4) Analysis in combination with partial type test data that supports the analytical assumptions and conclusions.

Contrary to the above, the licensee operated after November 30, 1985 with nine motors (MOV-SW-103B, 103C, 104A, 104B, 104C, 203C, 213A, MOV 2350 and MOV 2890A) installed on Motor-Operated Valves, which differed from the tested motors and for which the qualification was not supported by supplementary analysis.

This is a Severity Level IV violation (Supplement 1).

#### RESPONSE

##### 1. ADMISSION OR DENIAL OF THE VIOLATIONS

The violation is correct as stated.

##### 2. REASONS FOR THE VIOLATION

The cause of this violation is a failure to include as part of the procurement process, specific requirements for qualification documentation to be provided by the vendor. In addition, there was a failure to perform a complete review of the procurement documentation before it was placed in the QDR package.

##### 3. CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

On February 27, 1987, engineering notified the station that potential qualification concerns existed with nine Limitorque actuator motors and on March 3, 1987 a station Deviation Report was submitted. A Justification for Continued Operation (JCO) was prepared and approved by the Station Nuclear Safety and Operating Committee (SNSOC) to support station operations pending resolution of the qualification issue. Subsequently, the nine motors were replaced with motors with adequate qualification documentation.

Procedures have been strengthened by adding guidance to engineering standards and specifications for procurement requirements when ordering equipment from Limatorque and other vendors as required. Materials must be documented to be qualified to specific test reports.

4. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

Procedures will be revised to require that corporate engineering receive a copy of the procurement documentation provided by the vendor for purchase orders for EQ equipment. This will allow engineering to obtain and review the qualification records (Test Reports, Certificate of Compliance, etc.) to independently verify that the equipment is qualified.

5. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

The requirements for corporate engineering to receive copies of procurement documentation directly from the vendor will be proceduralized and implemented by August 31, 1988.

- D. 10 CFR 50.49(d)(1) requires that the qualification file for electrical equipment important to safety specify the performance requirements under conditions existing during and following design basis accidents and 10 CFR 50.49(j) requires that a record of such must be maintained in an auditable form.

Contrary to the above, at the time of the inspection, the performance characteristics of electrical equipment important to safety were not adequately addressed in the licensee's equipment qualification files.

The following examples were noted by the Inspection Team:

- The Rockbestos cable (Firewall III and Pyrotrol III) files did not specifically address the effects of leakage currents and the acceptability of such for North Anna.
- The Brand Rex 300V and 600V cable file did not contain specific acceptance criteria for calculated errors due to insulation resistance effects.

This is a Severity Level IV violation (Supplement 1).

#### RESFJNSE

#### 1. ADMISSION OR DENIAL OF THE VIOLATION

The violation is correct as stated.

#### 2. REASONS FOR THE VIOLATION

The significant performance requirements were addressed in the individual QDR packages for the equipment described. Specifically, the performance measures were not summarized with a concise discussion of how the test reports demonstrate that these measures are met for the conditions existing during and following design basis accidents. This violation was caused by a failure to require a summary of performance requirements in the QDR when the organization and format of the QDR packages was developed.

#### 3. CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

During the EQ inspection, a number of questions were raised about the requirements for individual pieces of equipment. Most of the questions dealt with how insulation resistance and loop accuracies were considered in verifying that the test reports in the QDRs showed that critical performance requirements were met. These concerns were addressed by a review of the QDR packages in question to show that, at a minimum, the effects were partially considered by a worst case analysis. A document

was developed which demonstrated, in a more systematic fashion, how the appropriate performance measures are bounded by analysis assuming the worst case environmental conditions. The results of this analysis show that total installed system accuracies are within design allowable levels for the worst case.

4. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

The Equipment Qualification Program standard which describes the requirements for QDR packages will be revised to clarify that critical performance measures and the basis for the supporting analysis be clearly identified in future QDR packages. In addition, the existing QDRs will be reviewed and revised as required to clearly delineate what the relevant equipment performance measures are and how the test reports and analysis verify they are met.

5. DATE WHEN FULL COMPLIANCE WILL BE MET

The engineering standard will be revised by August 31, 1988 and the QDR packages upgraded by December 30, 1989.