



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30323

Report Nos.: 50-338/85-19 and 50-339/85-19

Licensee: Virginia Electric and Power Company  
Richmond, VA 23261

Docket Nos.: 50-338 and 50-339

License Nos.: NPF-4 and NPF-7

Facility Name: North Anna 1 and 2

Inspection Conducted: July 8 - 12, 1985

Inspector: J. H. Mumma for  
M. F. Runyan

8/13/85  
Date Signed

Approved by: R. W. Wright  
G. A. Belisle, Acting Section Chief  
Division of Reactor Safety

8/13/85  
Date Signed

SUMMARY

Scope: This routine, unannounced inspection entailed 30 inspector-hours on site in the areas of QA program review, surveillance testing and calibration control, measuring and test equipment program, and licensee action on previously identified inspection findings.

Results: Two violations were identified - Failure to Comply With Unit 1 Technical Specification Surveillance Test Frequency, and Failure to Establish Environmental Controls for Calibration of Measuring and Test Equipment.

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*R. Bergquist, Instrument Supervisor
- J. Bowers, Senior Nuclear Instrument Technician
- \*J. Harper, Maintenance Superintendent
- L. Hartz, Engineering Supervisor
- R. Johnson, Supervisor, QA Operations
- \*J. Leberstien, Licensing Coordinator
- I. Liberatore, Performance Engineer
- M. Morgan, Engineer, Performance and Test
- P. Quarles, Staff Engineer, QA
- A. Russell, Nuclear Instrument Technician
- L. Silman, Staff Engineer, QA
- \*E. Smith, Assistant Station Manager
- \*J. Smith, Supervisor, Performance and Test
- \*J. Stall, Superintendent, Technical Services
- G. Wood, Maintenance Mechanic

Other licensee employees contacted included technicians and office personnel.

#### NRC Resident Inspectors

- \*M. Branch, Senior Resident Inspector
- \*J. Luehman, Resident Inspector

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on July 12, 1985, with those persons indicated in paragraph 1 above. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. The inspector described the areas inspected and discussed in detail the inspection findings listed below.

Violation: Failure to Comply With Unit 1 Technical Specification Surveillance Test Frequency, Paragraph 5.

Violation: Failure to Establish Environmental Control for Calibration of Measuring and Test Equipment, paragraph 6. The licensee admitted that vendor calibration test conditions were valid but denied general environmental requirements since the laboratories are Level III as defined by the Instrument Society of America (ISA). Recommended Environments for

Standard Laboratories, published in 1976 by ISA, defines an Echelon III Laboratory as the level at which measuring instruments are calibrated prior to use by the user. Specific guidance for environmental conditions for this type of calibration laboratory are not given by the standard.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. QA Program Review (35701)

Reference: 10 CFR 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants

The inspector reviewed the licensee QA Program required by the reference to verify that these activities were conducted in accordance with regulatory requirements. The following criteria were used during this review to assess overall established program acceptability:

- Personnel responsible for preparing implementing procedures understand the significance of changes to these procedures.
- Licensee procedures are in conformance with the QA Program.

The procedures mentioned throughout this report were reviewed to verify conformance with the QA Program. The QA program was essentially unchanged from the last inspection.

The inspector interviewed the Supervisor of QA Operations who stated that the primary emphasis was to fully divorce the QA organization from line functions. This problem resulted from an old policy that placed QA in the review chain for procedure changes and other programmatic developments and revisions. The licensee recognized the conflict caused by this situation and plans to correct it in the near future.

The inspector reviewed QA program implementation in surveillance testing and measuring and test equipment. Each area is detailed in specific paragraphs of this report. Problem areas are detailed in the specific areas inspected.

Within this area, no violations or deviations were identified.

5. Surveillance Testing and Calibration Control (61725)

- References:
- (a) 10 CFR 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
  - (b) Regulatory Guide 1.33, Quality Assurance Program Requirements (Operations), Revision 2

(c) ANSI N18.7-1976, Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants

(d) Technical Specifications, Section 4

The inspector reviewed the licensee surveillance testing and calibration control program required by references (a) through (d) to verify that the program had been established in accordance with regulatory requirements, industry guides and standards, and Technical Specifications. The following criteria were used during this review to determine the overall acceptability of the established program:

- A master schedule for surveillance testing and calibration delineated test frequency, current status, and responsibilities for performance.
- The master schedule reflected the latest revisions of the Technical Specifications and operating license.
- Responsibilities were assigned to maintain the master schedule up-to-date and to ensure that required tests are performed.
- Detailed procedures with appropriate acceptance criteria had been approved for all surveillance testing requirements.
- The program defined responsibilities for the evaluation of surveillance test data as well as the method of reporting deficiencies and malfunctions.

The inspector also verified that similar controls had been established for calibration of instruments used to verify safety functions but not specifically identified in the Technical Specifications. The documents listed below were reviewed to verify that these criteria had been incorporated into the surveillance testing and calibration control program:

QAM, Section 5	Instructions, Procedures, and Drawings, Revision 3
QAM, Section 11	Test Control, Revision 2
QAM, Section 14	Inspection, Test, and Operating Status, Revision 2
QAM, Section 16	Corrective Action, Revision 3
ADM 5.0	Instructions, Procedures, Drawings, dated 3/31/83
ADM 5.14	Calibration Procedure Format, dated 1/11/84
ADM 11.0	Test Control Procedure, dated 8/24/83
ADM 11.2	Periodic Test Program, dated 6/13/85

ADM 11.3 ASME XI IWP/IWV Program, dated 3/29/85  
 ADM 11.4 Instrument Calibration Program, dated 5/11/84  
 ADM 16.1 Station Deviations

The following audits were reviewed to determine the status of the licensee's inspection in this area:

N-84-28, Periodic Testing and Technical Specification  
 Surveillance Requirements, dated 10/11/84

N-85-02, Inservice Inspection Program, dated 1/28/85

Audit N-85-02 identified a failure to document trend analysis for pumps. IWP pump periodic tests (PT) will be revised to include signoffs for trend evaluation by October 1, 1985. Other findings identified in these audits were primarily administrative in nature.

Surveillance tests required by Technical Specifications (TS), American Society of Mechanical Engineers (ASME) Code Section XI, and other sources were scheduled within a computer data base called the Periodic Test History Report. This report functioned as the master surveillance test schedule and included PT number, test description, responsible department, applicable plant modes, test frequency, previous test performance dates with test results, and next scheduled date. To verify master schedule completeness, the following Unit 2 surveillance test TS requirements were chosen at random. Each was researched to the PT which implemented the TS surveillance test.

<u>TS Requirement</u>	<u>PT</u>
4.1.3.3	2-PT-25.0
4.2.3.1.b	2-PT-21.2
4.3.3.8.2.b	2-PT-26.2
4.4.3.2.1.a	1-PT-44.9
4.4.9.3.1.b	2-PT-44.3
4.5.4.2.a	2-PT-59.3
4.6.1.1.a	2-PT-60.1
4.6.4.3.a.1	1-PT-69.1
4.7.9.2.a.1	2-PT-78.1

All of the PTs referenced above were scheduled for performance in the master schedule.

To verify program implementation, the following completed surveillance test data packages were reviewed for administrative and technical adequacy:

1-PT-57.1A ECCS - Low Head SI Pump (1-SI-P-1A), dated June 3, 1985  
 1-PT-63.1A Quench Spray System (1-QS-P-1A), dated June 1, 1985

1-PT-64.1A	Recirculation Spray Subsystem - "A" Pumps, dated June 2, 1985
1-PT-75.2A	Service Water Pump (1-SW-P-1A), dated June 8, 1985
2-PT-30.4.1	Source Range Nuclear Instrumentation Calibration, dated January 13, 1984
2-PT-44.2.8	Post-Accident Instrumentation Calibration, dated July 6, 1984

The data packages were complete, properly reviewed, and met the stated acceptance criteria. Although portable testing devices were verified current in their calibration cycle, a similar check was not made for installed process instrumentation. For these instruments, the licensee relies on the instrument calibration program to maintain all instruments current although in some instances local calibration stickers were apparently used. Two small discrepancies were discovered in the above data packages. In 1-PT-75.2A, the high end of the alert range for discharge pressure did not meet the low end of the required action range, leaving an undefined gap. The licensee stated that this would be corrected. In the source range instrument calibration, the graphical computation of discriminator voltage was inaccurate in that the line was not drawn tangential to the first part of the curve as required by the procedure. However, the next time this calibration was performed, an expanded graph was used and the discriminator voltage was correctly computed.

The licensee was required to establish a calibration program for installed process instrumentation associated with safety-related systems but not specifically required by the TS. The following installed instruments were chosen at random from surveillance test procedures to verify their inclusion in this program:

<u>Instrument</u>	<u>Function</u>
TI-QS-100A, B	RWST Temperature
LI-QS-100A,B,C,D	RWST Level
FI-1941	Low Head SI Pump Flow
PI-1943	Low Head SI Pump Discharge Pressure
PI-QS-103	Quench Spray Line Pressure
PI-QS-104A	Quench Spray Pump Suction Pressure
PI-QS-105A	Quench Spray Pump Discharge Pressure
PI-SW-101A	Service Water Pump Discharge Pressure
FI-SW-103A	Service Water Pump Flow

The above instruments were included in the program and scheduled for calibration every two years.



Within this area, one violation was identified. Unit 1 TS, Table 4.3-14 Item 2, requires a monthly channel functional test in all plant operating modes of the waste gas hold p system explosive gas monitoring system. A portion of this surveillance is covered by 1-PT-45.9.3, Waste Tank Outlet Oxygen Test. TS 4.0.2.b states that the total maximum combined interval time for any three consecutive surveillance intervals shall not exceed 3.25 times the specified surveillance interval. The specified interval is 31 days, so the maximum time for three intervals is  $31 \times 3.25$  or 100.75 days. The PT was performed on the following dates:

December 20, 1984  
January 23, 1985  
February 27, 1985  
April 2, 1985

The three surveillance intervals defined by the above performance dates comprise 103 days, or 2.25 days in excess of the maximum allowed by the TS. This was apparently caused by a computer problem which scheduled the PT for March 30, 1985, with seven days grace period when, in fact, no grace period remained. The licensee stated that this computer problem may already be corrected in that the program was fine tuned recently and subsequent monitoring of the system had revealed no discrepancies in the computation of grace period. Failure to comply with Unit 1 TS surveillance test requirements is identified as violation 338/85-19-01.

#### 6. Measuring and Test Equipment Program (61724)

- References:
- (a) 10 CFR 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
  - (b) Regulatory Guide 1.33, Quality Assurance Program Requirements (Operations), Revision 2
  - (c) ANSI N18.7-1976, Administrative Controls and Quality Assurance of the Operational Phase of Nuclear Power Plants
  - (d) Regulatory Guide 1.30, Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment, August 11, 1972
  - (e) ANSI N45.2.4-1972, IEEE Standard, Installation, Inspection, and Testing Requirements for Instrumentation and Electric Equipment During the Construction of Nuclear Power Generating Stations

The inspector reviewed the licensee measuring and test equipment (M&TE) program required by references (a) through (e) to verify that the program had been established in accordance with regulatory requirements and industry guides and standards. The following criteria were used during this review to determine the overall acceptability of the established program:

- Responsibility was delegated and criteria established to assign and adjust calibration frequency for each type of M&TE.
- An equipment inventory list identified all M&TE used on safety-related components, the calibration frequency and standard, and the calibration procedure.
- Formal requirements existed for marking the latest calibration date on each piece of equipment.
- The program assured that each piece of equipment was calibrated on or before the date required or stored in a location separate from inservice M&TE.
- Written requirements prohibited the use of M&TE which had not been calibrated within the prescribed frequency.
- When M&TE was found out of calibration, the program required documented evaluations to determine the cause of the out-of-calibration condition and the acceptability of items previously tested.
- The program assured that new M&TE was added to the inventory list and calibrated prior to use.

The documents listed below were reviewed to verify that these criteria had been incorporated into the M&TE program:

Topical Report VEP 1-4A, 17.2.12, Control of Measuring and Test Equipment

QAM, Section 12, Control of Measuring and Test Equipment, Revision 2

QAM, Section 16, Corrective Action, Revision 3

ADM 12.0, Control of Measuring and Test Equipment, dated 8/23/83

ADM, 12.1, Measuring and Test Equipment Calibration Program, dated 3/27/85

Audit N-85-04, Measuring and Test Equipment, dated 2/26/85, was reviewed for findings relevant to the correct inspection. The following findings had the greatest significance:

- Some M&TE manufacturer's manuals were missing.
- Failure to issue instrument restrictions when M&TE is overdue for calibration.
- M&TE usage was not properly documented.
- Lack of training for personnel testing M&TE.



From the audit documentation it was apparent that corrective action on these items was either complete or in process of being resolved.

Implementation of the M&TE program was assessed in the "electrical" and "physical" calibration facilities. The electrical shop (ETEC) controls instrumentation and control M&TE, whereas the physical shop (PTEC) controls mechanical M&TE. In the ETEC shop, the following items of M&TE were selected at random to assess control and accountability:

<u>NQC#</u>	<u>Description</u>
20	Oscilloscope
45	Heise Pressure Gauge
81	Fluke Digital Multimeter
133	Decade Resistance Box
145	Keithley Picoampere Source
182	Heise Digital Pressure Indicator
503	Wheatstone Bridge
607	Fluke Temperature Probe

All items except the digital multimeter were properly stored and calibration stickers matched the information provided on the master index. The digital multimeter was checked out according to the work history card.

The following M&TE calibration procedures were reviewed:

ETEC-P-MM-1, NQC Multimeters, dated 4/18/84  
 ETEC-P-PA-1, NQC Picoampere Devices, dated 9/28/83  
 ETEC-P-VA-1, NQC Vibration Analyzers, dated 4/28/83  
 ETEC-P-TH-1, Temperature and Humidity Measuring Devices, dated 11/2/83

These procedures appeared adequate to control the quality of calibration activities with clearly described step-by-step instructions and acceptance criteria. However, a violation involving prerequisite environmental test conditions was identified and discussed in a later paragraph.

In the PTEC shop, the following M&TE was selected for review:

<u>NQC#</u>	<u>Description</u>
562	Proto Torque Wrench
1015	Starrett Dial Indicator
1077	Ametek Pressure Gauge
1151	Ashcroft Thermometer
1212	Starrett Outside Micrometer
1253	Williams Torque Wrench

All of the above items were located and observed to be properly stored. Calibration status was properly marked on all items.

The following PTEC calibration procedures were reviewed:

Accuracy Calibration and Calibration Procedure for Micrometer (Outside and Depth Gauge), dated 5/10/84

Torque Wrench Calibration, dated 2/19/84

These procedures appeared to provide adequate guidance for performing the calibration.

When M&TE is found out of calibration, the licensee is required to evaluate the previous usage since the last calibration to determine whether previous test results are valid. The following out-of-tolerance evaluations were reviewed:

<u>NQC#</u>	<u>Description</u>	<u>Date Discovered</u>	<u>Evaluation Completed</u>
085	Fluke DMM	5/13/85	5/28/85
158	Electrostatic Voltmeter	5/30/85	6/13/85
355	Fluke DMM	7/25/84	9/21/84
4118	Dry Film Thickness Gauge	5/31/85	6/10/85

These evaluations appeared to have been conducted at a level of detail adequate to fully assess the situation. In one case, the three most recent tests were repeated to determine whether the out-of-tolerance condition developed before or after those tests. ADM 12.1, Section 9.2, requires that the evaluations be completed within two weeks, if possible. The licensee recently dissolved a large backlog of evaluations during which time many had taken much longer than two weeks to complete. It now appears that evaluations are completed within two weeks and that sufficient priority is being given this activity.

Within this area, one violation was identified. 10 CFR 50, Appendix B, Criteria II, states that activities affecting quality shall be accomplished under suitably controlled conditions including suitable environmental conditions. Important environmental factors are temperature and humidity and others include noise, dust, electrical and magnetic fields, lighting, vibration, and voltage regulation. In both the ETEC and PTEC calibration facilities, temperature and humidity are measured and recorded for each calibration but criteria establishing acceptable conditions have not been established. Lab personnel were unaware of any specific environmental restrictions for calibration. An example where this may cause a problem is the calibration of the Fluke 8110A Digital Multimeter (DMM). The vendor manual states calibration test conditions of  $25 \pm 5$  degrees C and relative humidity less than 70 percent. On two occasions (August 8, 1983 and May 13, 1985) a Fluke 8110A DMM was calibrated at 70 percent humidity. During the inspection, the humidity in the ETEC lab was 72 percent. The licensee's

M&TE program does not preclude calibration when environmental conditions do not meet manufacturer's specifications. Failure to establish measures controlling environmental conditions for M&TE calibration is identified as violation 338, 339/85-19-02.

7. Licensee Action on Previously Identified Inspection Findings (92701)

(Open) Inspector Followup Item 338/84-14-01, 339/84-13-01: Clarification of Valve Tests and Inspection Requirements

The inspector discussed this item with the cognizant maintenance supervisor. Long term corrective action for this item will include the construction of a valve testing building and the modification of valve testing procedures. The estimated completion date is November 1, 1985. Until the long term corrective action is complete, this item will remain open.