



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-338/82-37 and 50-339/82-37

Licensee: Virginia Electric and Power Company
Richmond, VA 23261

Facility Name: North Anna 1 and 2

Docket Nos. 50-338 and 50-339

License Nos. NPF-4 and NPF-7

Inspection at North Anna plant site near Mineral, Virginia

Inspector: *P. T. Burnett*
P. T. Burnett

18 OCT 82
Date Signed

Approved by: *Frank Jape*
F. Jape, Section Chief
Engineering Inspection Branch
Division of Engineering and Technical Programs

10/18/82
Date Signed

SUMMARY

Inspection on September 20-24, 1982

Areas Inspected

This routine, unannounced inspection involved forty inspector-hours on site in the areas of reactor coolant system leak-rate monitoring, followup of special reports and followup of outstanding items.

Results

Of the three areas inspected, no violations or deviations were identified in one area; one apparent violation was found in each of two areas (Inadequate procedure for RCS leak rate surveillance, paragraph 5.b, and failure to issue a required report, paragraph 6).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- W. R. Cartwright, Station Manager
- E. W. Harrell, Assistant Station Manager
- *D. L. Benson, Superintendent of Operations
- *J. L. Hanson, Superintendent of Technical Services
- R. A. Bergquist, Instrument Supervisor
- *F. T. Terminella, Safety Engineering Supervisor
- R. C. Sturgill, Engineer
- G. L. Amodeo, Engineer
- D. E. Clark, Engineer
- F. H. Timpano, Engineer
- *C. R. Swope, QA Engineer
- *M. E. Fellows, Staff Assistant

Other licensee employees contacted included four shift supervisors, three reactor operators and four office personnel.

NRC Resident Inspector

- *M. B. Shymlock

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on September 24, 1982, with those persons indicated in paragraph 1 above. Licensee management acknowledged the following commitments, inspector followup items, and violations:

Inspector Followup Item 338/82-37-01 and 339/82-37-01: Review mechanisms for retaining engineers' calculations (Paragraph 5.a).

Inspector Followup Item 338/82-37-02 and 339/82-37-02: Include calculations in procedure review package for new procedures (Paragraph 5.a).

Inspector Followup Item 338/82-37-03 and 339/82-37-03: Make calculations and bases part of the master file during the biennial review of existing procedures (Paragraph 5.a).

Inspector Followup Item 338/82-37-04 and 339/82-37-04: Determine and specify duration of RCS leak rate surveillance tests (Paragraph 5.a).

Violations 338/82-37-05 and 339/82-37-05: Procedures PT 52.2 were inadequate to account for RCS inventory with a change in system temperature (Paragraph 5.b).

Violation 339/82-38-06: Failed to report abnormal degradation of fuel cladding (Paragraph 6).

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Reactor Coolant System Leak Rate Monitoring

a. Review of Licensee Procedures

Procedures 1-PT-52.2 and 2-PT-52.2, both titled "Reactor Coolant System Leak Rate" and applying to units 1 and 2 respectively were reviewed. Neither the master files for the procedures nor any other available file contained a record of the calculations of constants used in the procedures or identified the sources of numbers used in the calculations. Some constants were traceable to the unit curve books, but all had been adjusted for tank operating temperature. No record of the presumed temperatures exists. One engineer remembered that either 110°F or 115°F was taken as the reference temperature for which all tank slopes (gallons per percent level) were adjusted. No justification of that reference temperature was recorded.

This lack of record of assumptions, data sources and calculations appeared to limit the utility and depth of periodic review of the procedures required by administrative procedure 13.0. This concern was discussed at length during the exit interview and licensee management made the following commitments:

- (1) Review the need and possible mechanism for retaining engineers' calculations in a permanent file, and complete the review by November 1, 1982 (Inspector followup items 338/82-37-01 and 339/82-37-01).
- (2) Make calculations associated with new procedures part of the procedure review package and retain the calculations and bases in the master file of the procedure (Inspector Followup Items 338/82-37-02 and 339/82-37-02).

- (3) For existing procedures assure the calculations and bases are made a part of the master file during the biennial review (Inspector Followup Items 338/82-37-03 and 339/82-37-03).

Completed copies of 2-PT-52.2 were reviewed for the period June 1 to September 11, 1982. The review confirmed that the limiting conditions of technical specification 3.4.6.2, as well as the frequency of surveillance required by technical specification 4.4.6.2d, were satisfied. Fifteen of the completed tests were given close scrutiny. It was observed that the observation periods for the test ranged from 16 to 243 minutes. Eight of the 15 tests were carried out for periods less than one hour. The procedure does not specify or recommend a test duration. Based upon experience in independently measuring reactor coolant system leak rate at this and other facilities and discussions of the problems with licensed operators at this and other facilities, the inspector suggested a specification of two to four hours. Licensee management committed to review the procedure and to specify a test duration based upon that review (Inspector Followup Items 338/82-37-04 and 339/82-37-04).

- b. Preparation for Independent Measurement of RCS Leak Rate (61727)

The inspector reviewed the following documents:

- . Updated FSAR for North Anna Power Stations, particularly Chapters 5.1 and 5.5,
- . Plant Curve Book for Unit 2,
- . Plant Manual, Volume 4,
- . ICP-P-1-BP-2, Instrument Calibration Procedure Safety-Related Process Instruments, including the following data packages:
 - .. L-DG201, Primary Drain Transfer Tank Level,
 - .. L-125, Volume Control Tank Level,
 - .. L-470, Pressurizer Relief Tank Level, and
- . ICP-P-2-L-459, Pressurizer Level Protection Channel I.

From the documents reviewed and discussions with plant personnel, the inspector obtained parametric data describing tank level calibrations, system capacity, normal volume, temperature and pressure ranges and design features. From these data plant specific data cards were prepared for use with a program (RCSLK7) prepared for operation on a Hewlett-Packard 41C calculator. [The program is described in a memorandum, SUBJECT: PLANT DATA FOR REACTOR COOLANT LEAKAGE CALCULATIONS, by R. L. Baer, Chief, Engineering and Technical Support Branch, Division of Engineering and Quality Assurance, IE, dated February 16, 1982.]

In preparing the constants for use in the program, one non-conservative error in a constant used in procedures PT-52.2 was identified. The factor used to convert a change in average RCS temperature to a change in system inventory was in error by approximately thirty percent when applied at full power. The procedure did not limit the amount of RCS temperature change allowed during the leakage measurement. A 0.6°F temperature increase over a one-hour observation period would lead to underestimating RCS leakage by 0.2 gpm, which is a significant portion of the 1 gpm allowed for unidentified leakage. Procedures PT 52.2 were judged to be inadequate to perform a reliable evaluation of RCS leakage and, hence, to be in violation of technical specification 6.8.1.C (VIOLATION 338/82-37-05 and VIOLATION 339/82-37-05).

c. Measurement of RCS Leak Rate (61728)

Data from eight surveillance tests on Unit 2 were input to RCSLK7. It was necessary to assume constant pressure during the tests since PT52.2 does not require logging pressure or making corrections for changes in pressure. In all cases the RCSLK7 calculation agreed with the PT 52.2 result within less than 0.2gpm, an acceptable level of agreement.

With the assistance of Unit 2 operators, who manipulated the plant computer, observations of the necessary system parameters were taken six times between 0820 and 1330 on September 17, 1982. During the period the unit was at a nominal 100 percent power, but was undergoing a xenon transient following returning to power after a brief shutdown for maintenance. Consequently xenon was increasing and frequent additions of water to the volume control tank (VCT) were necessary to reduce RCS boron concentration. The amount of water added was monitored using the makeup water batch integrator. However using the volumes indicated in the RCSLK7 calculation led to unacceptably high leakage rates. During a period without water addition the RCSLK7 calculated unidentified leakage rate was only 0.38 gpm. Hence the conclusion was made that the batch integrator was in error. This observation was reported to the licensee. The licensee's procedures require that no water be added during the performance of RCS leak rate measurements. Hence no safety significance to the integrator error was identified.

No other violations or deviations were identified.

6. Review of Special Report

The licensee's startup report for cycle two for Unit 2 was reviewed in the Region II office. Two topics, fuel damage and quadrant power tests, mentioned briefly in the report were followed up on site.

In discussions with station personnel, the fuel damage was described as follows:

- . NO 7 The corner of grid strap number six was torn such that four fuel pins on face 1 and three or four pins on face 4 were unsupported at that elevation. How the grid was damaged was not determined.
- . NO 3 One pin had a hole evidenced by white streaks along the pin.

No licensee event report (LER) was issued to describe the abnormal degradation of fuel cladding. Failure to issue such a report is an apparent violation of technical specification 6.9.1.8C (VIO 339/82-37-06).

Following discussions of the reported quadrant power tilt ratio with licensee personnel and observation of an acceptable ratio in current operation the inspector had no further questions.

7. Followup of Outstanding Items

a. Licensee Event Reports (92700)

Based upon discussions with licensee engineers and discussions with licensed operators, the inspector had no further questions regarding the following LERs.

(Closed) 339/82-027: Axial flux difference out limits for brief periods on three occasions.

(Closed) 339/82-038: Missed surveillance with quadrant power tilt alarm inoperable.

b. Inspector Followup Items (92706)

(Closed) 338/77-18-01: This issue related to polar cranes is now being addressed in the licensee's response to NUREG-0612.

(Closed) 339/80-19-01: Identification of sampling valves. This item should have been closed based upon observations and discussions during inspection 339/80-25.