



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

Report Nos.: 50-280/85-01 and 50-281/85-01

Licensee: Virginia Electric and Power Company
 Richmond, VA 23261

Docket Nos.: 50-280 and 50-281

License Nos.: DPR-32 and DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: January 5 - February 8, 1985

Inspectors:	<i>[Signature]</i>	<i>28 Feb 85</i>
	D. J. Purke, Senior Resident Inspector	Date Signed
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	M. J. Davis, Resident Inspector	Date Signed
Approved by:	<i>[Signature]</i>	<i>28 Feb 85</i>
	S. Elrod, Section Chief	Date Signed
	Division of Reactor Projects	

SUMMARY

Scope: This inspection involved 200 inspector-hours on site in the areas of plant operations and operating records, plant maintenance and surveillance, plant security, followup of events, and licensee event reports.

Results: In the areas inspected, two violations were identified in the areas of surveillance and operations; failure to conduct required surveillance and failure to provide adequate procedures - paragraphs 6 and 7.

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REPORT DETAILS

1. Licensee Employees Contacted

R. F. Saunders, Station Manager
D. L. Benson, Assistant Station Manager
H. L. Miller, Assistant Station Manager
D. A. Christian, Superintendent of Operations
E. S. Grecheck, Superintendent of Technical Services
H. W. Kibler, Superintendent of Maintenance
D. Rickcard, Supervisor, Safety Engineering Staff
S. Sarver, Superintendent of Health Physics
R. Johnson, Operations Supervisor
R. Driscoll, Site QA Manager
W. R. Runner, Supervisor, Administrative Services

Other licensee employees contacted included control room operators, shift technical advisors (STAs), shift supervisors, chemistry, health physics, plant maintenance, security, engineering, administrative, records, and contractor personnel and supervisors.

2. Exit Interview

The inspection scope and findings were summarized on a biweekly basis with certain individuals 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.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Operations

- a. Units 1 and 2 were inspected and reviewed during the inspection period. The inspectors routinely toured the control room and other plant areas to verify that plant operations, testing, and maintenance were being conducted in accordance with the facility Technical Specifications (TS) and procedures. The inspectors verified that monitoring equipment was recording as required, equipment was properly tagged, and plant housekeeping efforts were adequate. The inspectors also determined that appropriate radiation controls were properly established, clean areas were being controlled in accordance with procedures, excess material or equipment was stored properly, and combustible material and debris were disposed of expeditiously. During tours, the inspectors

looked for the existence of unusual fluid leaks, piping vibrations, piping hanger and seismic restraint settings, various valve and breaker positions, equipment caution and danger tags, component positions, adequacy of fire fighting equipment, and instrument calibration dates. Some tours were conducted on backshifts. Inspections included areas in the Unit 1 and 2 cable vaults, switchgear rooms, control rooms, auxiliary building, and cable penetration areas to verify certain breaker and equipment positions for safety related components. The inspectors routinely conduct partial walkdowns of Emergency Core Cooling System (ECCS) and Engineered Safety Features (ESF) systems.

- b. Unit 1 began the reporting period operating at power. The unit was taken off line on January 12, 1985, for the repair of a packing leak on reactor coolant system valve 1-RC-63, the 'B' loop resistance temperature detector (RTD) bypass line isolation valve. During the subsequent startup attempt on January 13, the reactor tripped from low power on 'B' Steam Generator Low Water Level, while manually controlling feedwater flow. All safety systems functioned normally. The unit was restarted and returned to power operation later in the day.

On the morning of January 22, during unusually cold weather, the licensee began ramping back both units due to decreasing intake canal level caused by a combination of ice buildup on the river and an exceptionally low tide. Electrical current to the circulating water (CW) pump motors at the low level intake structure began to fluctuate and the intake canal level started dropping. This indicated that the pumps were losing suction. Operators commenced ramping power down on both units and throttling condenser water box inlet valves to reduce flow from the intake canal. Unit 1 was ramped down to 29 percent power and Unit 2 to 20 percent power. Operator actions to clear the ice at the low level intake structure combined with an increase in the tidal river level restored suction to the CW pumps. The lowest level in the intake canal was approximately 19.2 feet. With level restored in the intake canal, the units were returned to full power. The licensee subsequently stationed a tugboat at the low level intake structure to aid in clearing the ice for a few days until the ice on the river melted.

On January 26, 1985, Unit 1 experienced a reactor trip from full power due to a voltage spike on Vital Bus I causing a spurious over power delta temperature (T) signal. Temperature Channel II had previously been placed in the trip mode due to failed RTD instrumentation in the 'B' loop. Breaker number 13 on Vital Bus I was found tripped and is believed to have caused the voltage spike. Electricians reset the breaker and cycled the trip valves fed from it. No problems were found that would have caused the breaker to trip. All safety systems responded normally during the transient. The 'A' main feed pump tripped shortly after the reactor trip, apparently due to low suction

pressure. 'B' loop RTD 1421B was subsequently switched from a control function to a protection function and Channel II of over power delta T was taken out of the trip mode. Subsequently, the inspectors examined the Vital Bus feeder breaker number 13 and its loads as specified on electrical distribution documentation. Nine solenoid operated trip valves are fed by breaker number 13; TV-CC-107, MS-109A and 110, RM-100A and C, SV-102 and 103, DA-100A, and DA-100. However, the inspectors noted that TV-DA-100 did not exist; TV-DA-100B exists and was cycled and tested, but is on Vital Bus II for independence. TV-LM-100C was labeled to be on Vital Bus I breaker number 13, but is not. The substitution of TV-DA-100 appears to be a typographical error on the electrical distribution sheet. Correction of the electrical documentation sheets will be followed as open item (280/85-01-07).

During the subsequent startup attempt on January 27, Unit 1 experienced a reactor trip by turbine trip from approximately 10 percent power. Following criticality, reactor power was slowly increasing due to leakage past the steam dump valves. Electro-Hydraulic Control (EHC) pressure was low due to the availability of only one EHC pump. The turbine latching attempt indicated that the turbine had latched but the turbine stop valves had reclosed. Apparently, the latch pushbutton was not held down long enough for the stop valves to fully open with reduced EHC pressure. The failure to latch was subsequently duplicated prior to startup. The turbine trip caused a reactor trip. Safety systems responded normally during the transient. A blown fuse was subsequently found in the steam dump control circuitry for valves TCV-MS-105A and B. Valve TCV-MS-105B was also found to have a broken valve positioner. Corrective action included repairing the second EHC pump and verifying the ability to latch the turbine. Steam dump control circuitry and TCV-MS-105B were also repaired.

- c. Following the subsequent startup on January 28, 1985, the reactor tripped from a turbine trip at about 13 percent power due to a main generator anti-motoring turbine trip. Inspections by plant personnel found that the low pressure side of the anti-motoring differential pressure transmitter 63/AMI was isolated due to a closed root valve (1-MS-214) on the crossunder piping. The closed valve was apparently leaking or slightly open enough to permit a pressure buildup on the transmitter, and to permit the slow bleed off or depressurization rate following high pressure (HP) turbine pressure drops. This led to the anti-motoring trip, which is actuated at 7 psid between the high and low pressure side of the HP turbine. Some pressure was still found in this low pressure side piping several minutes after the reactor trip (with the HP turbine under vacuum conditions) when instrument technicians disconnected the lines to calibrate the transmitter. Root valve 1-MS-214 was opened for Unit 1 restart. During subsequent review, certain items were identified by the inspectors and licensee personnel as requiring followup actions. The main steam Piping and

Instrument Diagrams (P&ID) and procedures require corrections. For example, Unit 1 print FM-64A depicts valve 1-MS-214 as a normally open drain valve on the crossunder piping, while the Unit 1 MS valve line-up procedure or checkoff sheets, OP-28A, specify 1-MS-214 as a piping drain valve which is normally closed (during operations). The Unit 2 print FM-64A specifies 2-MS-214 as a normally closed drain valve also. The inspectors verified that the Unit 2 low pressure side of the anti-motoring transmitter was not isolated, however, the root valve from the crossunder piping was labeled 2-MS-210, which is a normally closed drain valve on the Unit 2 print FM-64A. Neither valve (2-MS-210 or 214) is on the Unit 2 valve line-up procedure OP-28A. In addition, FM-64A and -14A for Units 1 and 2 do not depict the anti-motoring transmitter 63/ANI and the anti-motoring transmitters are not periodically calibrated (last calibration on Unit 1 was 9/81 and Unit 2 on 5/76). The review and correction of main steam prints, operating, and calibration procedures will be followed as Open Item (280 and 281/85-01-03).

- d. Unit 2 operated at power for the duration of the reporting period. The inspectors verified that Unit 2 was operated in accordance with TS 3.12.B.4 following the power decrease on January 22, 1985, when flux penalty minutes were accumulated during delta flux deviations from the target band.

6. Startup and Shutdown Procedure Reviews

The inspectors reviewed operating procedures used for the following Unit 1 evolutions. A restart of the Unit 1 reactor was attempted some 14 hours after the reactor trip on January 26, 1985. All shutdown and control rods were withdrawn, but the reactor remained subcritical; the completed operating procedure used to predict the estimated critical conditions (ECC) for this startup (1-OP-1C) has not been found. An unplanned boration which added approximately 100 ppm of boron to the RCS from the Refueling Water Storage Tank (RWST) occurred after the trip when the Volume Control Tank was emptied and the charging pumps automatically took suction from the RWST. The subsequent startup at 0230 on January 27, 1985, exceeded the administrative rod position limits of 23 to 81 steps on control bank (CB) D, as calculated in 1-OP-1C (the minimum insertion limit for CB D is 23 steps). The actual critical condition was 102 steps on CB D, however, the rods were not inserted and the estimated critical position (ECP) re-evaluated as required by the procedure (1-OP-1C). This failure to follow procedures is a violation (280/85-01-01). Following the reactor trip at 0748 on January 27, 1985, a new ECC was calculated using 1-OP-1C. The predicted rod positions would have been below the rod minimum insertion limits based on the 900 ppm boron concentration in the RCS at that time, due primarily to Xenon decay. Adequate shutdown margin was verified at these conditions because all rods were inserted. The boron concentration in the Reactor Coolant System (RCS) was increased by about 200 ppm and the subsequent startup at 1941 on January 27, 1985 was within predictions.

However, during the restart of Unit 1 on January 28, 1985, following the anti-motoring trip, the actual critical conditions on control Bank D again exceeded the 1-OP-1C Administrative Limits; no evidence of the ECP re-evaluation was found. This is another example of violation (280/85-01-01). Since four of the five 1-OP-1C Estimated Critical Conditions were in error or required corrective actions, the inspectors recommended that 1-OP-1C be reviewed and/or revised to improve accuracy of the ECPs. Open Item (280/85-01-04).

7. Equipment Surveillance Reviews

- a. The inspectors reviewed the surveillance requirements associated with recent Technical Specification Amendments 100 and 99 for Units 1 and 2, respectively. The inspection was initiated when the licensee identified the failure to perform monthly periodic testing on the control room Chlorine detectors as required by the amended TS, Table 4.1-1; a Deviation Report (S1-85-64) was issued, and the detectors calibrated. The failure to test the chlorine detectors between October 15, 1984 and January 30, 1985, is a violation of TS Table 4.1-1 (280/85-01/02).

Although the channel checks and the majority of the surveillance testing required by the TS Amendments were being performed, the inspectors identified additional examples of testing which was not being performed as required. For example, Table 4.1-2A of the TS Amendment 100, issued and effective on October 15, 1984, required monthly and quarterly testing of the containment hydrogen monitors. However, as of February 1, 1985, periodic test procedures were not issued to implement this testing program. A calibration procedure (CAL-175) for the hydrogen monitors was available, but did not specify test frequency, and was last performed on July 5, 1984. The failure to conduct the monthly channel functional test on the Unit 1 Containment Hydrogen Analyzers is second example of a violation of a Technical Specification (Table 4.1-2A) (280/85-01-02); the quarterly testing interval ends in March.

The inspectors determined that the Administrative Procedure (ADM-24), which specifies the responsibilities for updating the surveillance programs when TS Amendments are issued, was not properly followed. This resulted in the above two examples of violation 280/85-01-02. A review of the licensee's implementation of ADM-24 is IFI 280/85-01-05. The Unit 2 TS Amendment (99) must be implemented prior to startup from the 1985 Refueling Outage. The inspectors determined that both the Chlorine detectors and the Hydrogen monitors were capable of performing their intended function during the entire period in question.

- b. The inspectors reviewed licensee monitoring of the Unit 1B Reactor Coolant Pump (RCP) fire protection systems and the compensatory measures taken for operation with the interim RCP oil leak collection arrangements (see Inspection Report 50-280/84-36, paragraph 5). The inspectors observed on January 24, 1985, that the B RCP stator winding

temperature was at about 278 degrees F, significantly above the 220 to 234 degrees F observed on B RCP in December 1984, and early January 1985, and on the A and C RCPs, and above the alarm setpoint or limit of 255 degrees F. The licensee's November 16, 1984 letter stated that, "Increased surveillance of temperature related parameters will be conducted. Increasing motor temperature indicates a possible oil leak." Although increased surveillance of temperatures was conducted (15 min. printouts), no action was apparent on the adverse trend. The RCP bearing temperatures and other parameters remained normal. Containment entries and inspections were conducted and no problems were identified in the RCP cubicle. The B RCP motor inspection ports were removed, and the motor temperatures decreased to normal (223). The computer alarm setpoint, which was increased to 280 was subsequently returned to 255 degrees F when the B motor temperature decreased to normal. Additional instructions have been given to the operators and STAs for monitoring and trending these parameters.

- c. Due to the unusually cold weather, on January 21, 1985, and the days surrounding it, the inspectors toured various buildings and site facilities to verify equipment operability and cold weather protection. The buildings and facilities were adequately sealed, heated and protected. The upper levels of the auxiliary building, however, were in the mid-forty degree F range. The inspectors identified a 1 by 6 foot open area above a roll-up door where sheet metal had been removed; the licensee sealed the open area and reworked certain air intake louvres and systems to reduce in-leakage and improve heating. Temperatures increased to the 60 degree range. One item of concern to the inspectors was that the cold weather protection periodic test procedures (PT 52) still had outstanding items to be completed at this time. Completion of cold weather protection procedures and maintenance before winter arrives will be followed as Open Item (280/85-01-06).
- d. During routine inspections in the auxiliary building basement on January 30 and 31, 1985, the inspectors observed certain piping caps missing from a few drain lines on pipes in the penetration areas of Unit 1 and 2 containments. Although the manual isolation valves were closed in the drain lines, the licensee is reinstalling pipe caps on the fire main header drain (valve 158), the Primary Drain Tank piping drain, 1-VA-2, etc. The limit switch on trip valve TV-DG-108B also appeared loose, and was adjusted by the licensee.

8. LER Review

The inspectors reviewed the Licensee Event Reports (LERs) listed below to ascertain that NRC reporting requirements were being met and to determine the appropriateness of corrective action taken and planned. Certain LERs were reviewed in greater detail to verify correction action and determine compliance with TS and other regulatory requirements. The review included examination of logbooks, internal correspondence and records, review of Station Nuclear Safety and Operating Committee (SNSOC) meeting minutes, and discussions with various staff members. Within the areas inspected, no violations were identified.

(Closed) LER 280/84-23 concerned a spurious Safety Injection during refueling shutdown. With the existing plant conditions no component actuation occurred and no safety system was challenged. An electrical transient in the instrument loops caused two of the three low pressure comparators to change state. The cause of the electrical transient could not be determined, however, the systems were satisfactorily inspected and tested prior to startup.

(Closed) LER 281/84-20 concerned a reactor trip from 22 percent power while transferring feed flow from the bypass valves to the main feedwater regulating valves. Manual overfeed of Steam Generators 'A' and 'C' reduced steaming, which caused an increase in steaming on the 'B' generator and a reduced water level and trip.

(Closed) LER 280/84-27 concerned the number 3 Emergency Diesel Generator fire. A leaking fitting on a fuel injector line following allowed fuel oil to leak into the lube oil. The lube oil became diluted to approximately 40 percent fuel oil. The fuel oil changed the viscosity of the lubricating oil system causing failure of the turbocharger thrust bearings. A minor explosion in the crankcase occurred and a fire in the turbocharger ensued. The fire protection CO2 system was actuated to extinguish the fire. A factory representative and technical consultants were called to the station to evaluate the cause of the fire and recommend corrective actions. Following their recommendations, repairs were made and the #3 diesel was returned to service. Lube oil samples from the other diesels were analyzed and no fuel oil was detected. (See inspection report 50-280/84-36, paragraph 6).

9. Plant Physical Protection

The inspectors verified the following by observation:

- a. Gates and doors in protected and vital area barriers were closed and locked when not attended.
- b. Isolation zones described in the physical security plans were not compromised or obstructed.
- c. Personnel were properly identified, searched, authorized, badged and escorted as necessary for plant access control.