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

Report Nos. 50-280/82-34 and 50-281/82-34

Licensee: Virginia Electric and Power Company
Richmond, VA 23261

Facility Name: Surry, Units 1 and 2

Docket Nos. 50-280 and 50-281

License Nos. DPR-32 and DPR-37

Inspection at Surry site near Surry, Virginia

Inspectors: Kerry D. Landis for — 1/7/83
D. J. Burke — Date Signed

Kerry D. Landis for — 1/7/83
M. J. Davis — Date Signed

Approved by: C. Julian — 1/7/83
C. Julian, Section Chief, Division of Project and Resident Programs — Date Signed

SUMMARY

Inspection on November 1-31, 1982

Areas Inspected

This inspection involved 230 inspector-hours on site in the areas of plant operations, operating records, plant maintenance, modifications, calibration and testing, followup of events, licensee event reports, and plant security.

Results

Of the eight areas inspected, no violations were identified in seven areas; one violation was identified in the area of plant modifications (Failure to perform or maintain a 10CFR50.59 written safety evaluation when a change to the facility component cooling water system, as described in the FSAR, was made - paragraph 5.g.).

DETAILS

1. Persons Contacted

Licensee Employees

*J. L. Wilson, Station Manager
*R. F. Saunders, Assistant Station Manager
*G. E. Kane, Operations Superintendent
*D. A. Christian, Superintendent of Technical Services
*R. Driscoll, Director QA, Nuclear Operations
D. Rickeard, Supervisor, Safety Engineering Staff
S. Sarver, Health Physics Supervisor
F. Rentz, Station Quality Assurance Engineer

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

*Attended exit interview

2. Management Interviews

The inspection scope and findings were summarized on a biweekly basis with those persons indicated in paragraph 1 above.

3. Licensee Action on Previous Inspection Findings

a. (Closed) Violation(280 281/82-10-02): Failure to follow Abnormal Procedure 5.16. Close attention is being maintained on the radiation monitoring panels for abnormalities and alarms. In addition, modifications have been performed to reduce water ingress problems.

b. (Closed) Violation (280, 281/82-10): Inadequate reviews of fire loads and drying operations in the SG refurbishment building prior to the fire on April 17, 1982. ADM-56 has been revised to address non-safety-related storage areas which may contain significant contaminated materials.

4. Unresolved Items

Unresolved Items were not identified during this inspection.

5. Unit 1 Operations

Unit 1 operations were inspected and reviewed during the inspection period. During this time, the inspector routinely toured the Unit 1 control room and other plant areas to verify that the plant operations, testing and maintenance were being conducted in accordance with the facility Technical Specification (TS) and procedures. Within the areas inspected, one violation was identified when a modification to the component cooling water

system failed and resulted in a gaseous release. The modification was not performed in accordance with 10CFR50.59 requirements.

Specific areas of inspection and review included the following:

a. A review was made of annunciated alarms in the control room. An inspection of safety-related valve and pump alignments on the consoles and in the plant was conducted.

b. At 1928 on November 11, 1982, Unit 1 experienced a turbine and reactor trip from full power due to a trip of the 1A main phase transformer (22/230KV). A diaphragm failure on a fire protection system valve in the 1A transformer deluge system caused spray down of the transformer, which led to the transformer line differential lockout and trip. The pressure relief was also annunciated on the transformer. A large electrical flash over the 1A transformer was observed by station security personnel at the time of the event. Heavy rains and scattered lightning were also occurring in the area at the time of the event. Subsequent examination and testing determined that the transformer was not damaged. Unit 1 was restarted on November 6, 1982, following maintenance on the transformer fire protection system deluge valve diaphragms.

c. Following the Unit 1 reactor trip discussed in paragraph b above, steam generator (SG) blowdown trip valves TV-BD-100A and C did not close as required on low SG level as a result of limit switch problems. The limit switch problems were corrected, and the valves were returned to service on November 15, 1982. Satisfactory valve testing (PT 14.3) was performed following the maintenance. Other safety systems performed as required.

d. Several hours after the trip discussed in paragraph b above, the licensee experienced difficulties in maintaining vacuum conditions in the main condenser. Three cracks were found in the 12 inch steam header piping (SLP-11-151) between the main steam dump (bypass) valve TCV-MS-105A and the condenser hotwell. The cracks measured several inches in length and appeared to originate in the area where the 8 inch vertical piping from TCV-MS-105A joined the 12 inch horizontal piping (SLP-11-151) to the hotwell. The carbon steel (CS) steam dump lines are 600 psi design, while the 12 inch CS piping to the hotwell is 150 psi design. Since water from the hotwell may enter the 12 inch piping during normal operation with the dump valves closed, the licensee determined that momentary overpressurization of the 150 psi piping may occur when the steam dump valves open. The licensee is reviewing this matter to determine if the 150 psi piping should be replaced during the refueling outages of Units 1 and 2. Weld repairs were completed on the cracks and no problems were encountered during the subsequent Unit 1 trip and steam dump operation on November 29, 1982. Licensee examination of the 12 inch steam piping verified no significant thinning of the pipe wall.

e. At 10:22 a.m. on November 29, 1982, Unit 1 experienced a reactor trip from full power due to tripping of the A reactor coolant pump during periodic testing of the loop stop valve logic (Section 5.7 of PT 8.3A). A limit switch on valve MOV-1590A incorrectly indicated that the loop stop valve was closed when the redundant train was tested. The additional indication of the closed loop stop valve tripped the reactor coolant pump breaker. The licensee is considering additional revisions to PT 8.3A, to correct these challenges to the safety systems.

Following the reactor trip, the Iodine-131 dose equivalent activity peaked at some 6.5 uci/ml due to known fuel defects in Unit 1; the transient limit is 10.0 uci/ml.

f. During Unit 1 restart on November 29, 1982, a slight overboration of the primary system led to additional control rod withdrawal (but within that permitted by the ECP calculation and the Technical Specifications), which resulted in an axial flux difference (AFD) outside the target band. Technical Specification 3.12.B.4.C required the limiting of reactor power to less than 50 percent until the accumulated penalty minutes and the 24 hours expired.

g. On November 9, 1982, the control room received a high alarm on radiation monitor RM-VG-104, which monitors the ventilation vent effluent gaseous activity. The gaseous activity increased to approximately 30% of the Technical Specifications (TS) 3.11.B.1 limit, and was primarily Xenon-133. The release occurred when makeup water was added to the component cooling water (CCW) surge tank. Due to the known fuel defects in Unit 1 and the previously known leakage of small amounts of primary water into the CCW system, the activity of the CCW was some 2E-2 uci/ml (primarily XE-133).

Due to this activity, the surge tank vent valve (HCV-CC-100) was closed to prevent gaseous releases into the process vent system. When makeup water was added to the 2810 gallon CCW surge tank with the vent valve closed, the pressure buildup blew a 2 inch diameter tygon hose off the surge tank level indicator piping. The hose was connected in parallel with the level instrumentation and piping. The event released radioactive gases and some liquid into the surge tank room in the auxiliary building, and led to the alarm on the ventilation vent stack monitor. No individual contaminations or exposures occurred during the release. The inspectors determined that no documentation, safety evaluation reviews, or approvals were made with regard to the tygon tube installation, which apparently occurred some years ago. The lack of appropriate records, reviews, and safety evaluations for this change to the CCW system as described in the FSAR is contrary to 10 CFR 50.59, and is a violation (280/82-34-01). The surge tank relief valves (e.g. RV-CC-122) are set at 35 psig, and apparently did not open during the event due to relief through the blown tubing.

6. Unit 2 Operations

Unit 2 operations were routinely inspected during the inspection period. During this time. the inspectors toured the Unit 2 control room and other plant areas to verify that the plant operations, testing and maintenance were being conducted in accordance with the facility Technical Specifications (TS) and procedures. Within the areas inspected, no violations were identified.

Specific areas of inspection and review included the following:

a. Review of annunciated alarms in the control room and inspection of safety-related valve and pump alignments on the consoles and in the plant.

b. Unit 2 operated at power during the reporting period. No reactor trips or shutdowns occurred during the month.

c. Inspection and review of maintenance and testing during the reporting period.

d. The inspector reviewed the October 31 and November 1, 1982 events which led to a Unit 2 power reduction to 70% as required by limiting condition for operation. The boric acid storage tanks (BAST) B and C were diluted when a primary grade (PG) or pure water valve was opened instead of being verified closed as directed. The reactor operator noted the level increase in C BAST and requested valve alignment verifications until the PG valve was closed. The C BAST and the boron injection tank (BIT) were sampled and determined to contain a 9.2% solution of boric acid (BIT was on recirculation with the C BAST). Technical Specification 3.2.B requires a minimum boric acid concentration of 11.5%. A Licensee Event Report (LER) will be submitted on the event. While inspecting components in the boric acid equipment area, the inspectors noted that the identification tags on several valves were either missing, not legible, or not in accordance with the latest P&ID's (such as 1148-FM-88A). As an example one P&ID shows a valve labeled 1-PG-163 which has 1-CH-74 as its identification on the valve. The licensee is taking corrective action on these matters (Inspector Followup Item 280/82-34-02).

7. General Items

a. The Surry Power Station Emergency Exercise was conducted on November 10, 1982. Within the areas inspected, no violations or deviations were identified. Details of the annual radiological emergency exercise are discussed in Inspection Report 50-280, 281/82-32.

b. The inspectors reviewed a 10 CFR Part 21 report to VEPCO, dated October 11, 1982 concerning certain Conval Inc. forged valves. These manual valves may experience galling of the valve stem or bonnet when

repeated operation of the valve occurs. Six of these valves were delivered to Surry, two 2 inch and four 1½ inch manual valves. Five of the valves are in a QA Hold/Reject area and tagged, until the proper Conval replacement parts are received; one 1½ inch valve is currently installed in the Unit 1 secondary drain system, as MS-74 in the steam trap line from the A main steamline trip valve. The valve is open and seldom manipulated; no galling or leakage from the valve was observed during visual inspection of the valve by the inspectors. The valve will be replaced or repaired during the February 1983 outage. The inspector had no further questions at this time.

c. Due to the activity in the component cooling water system (CCW) and the routine makeup to the CCW surge tank to maintain tank level, the inspectors reviewed the service water sample results of PT 38.37. The PT requires sampling the service water side of the CCW heat exchangers every shift (every 8 hours) to assure that gross CCW leakage into the service water system is not occurring. No activity was detected in the service water samples. However, the heat exchangers were isolated and leak tested due to the high frequency makeup being required. Two minor leaks were found in the B CCW heat exchanger. The leaks were repaired on November 16, 1982, and makeup to the surge tank has not been required since that time. The licensee is continuing his determination of the source of the activity and its isolation; the Unit 1 excess letdown heat exchanger is suspect and has been isolated.

8. LER Review

The inspector reviewed the LER's listed below to ascertain that NRC reporting requirements were being met and to determine the appropriateness of corrective action taken and planned. Certain LER's were reviewed in greater detail to verify corrective action and determine compliance with the Technical Specifications and other regulatory requirements. The review included examinations of log books, internal correspondence and records, review of SNSOC meeting minutes, and discussions with various staff members. No violations were identified.

LER 280/81-15 concerned an unplanned release when the spent fuel pit overflowed due to inleakage of primary grade water. The event was discussed in Inspection Report 50-280/81-22, and is closed.

LER 280/81-18 concerned the lifting of the PORV's to limit an overpressure condition while the unit was shutdown and solid, at 190 degrees F and 350 psig. The overpressure condition was caused by a charging flow increase which occurred when the charging flow control valve was unisolated and placed in service. The charging flow control valve failed open. The FCV was subsequently repaired, tested, and returned to service. The periodic test covering test and calibration of the charging flow controllers was changed to correct the controller low flow limit typographical error, and personnel were briefed to verify actual FCV position during calibration of the controller. This LER is closed.

LER 280/81-25 concerned a loss of feedwater analysis error. The original analysis assumed a loss of offsite power causing a loss of main feedwater would also result in the loss of reactor coolant pumps. The reanalysis indicated that the loss of feed accident with RCP heat input would be more limiting. Operators were instructed to obtain the required 500 gpm AFW flow in the event of a loss of main feedwater, preferably by starting an additional feedwater pump on the affected unit. Additional flow could also be obtained via the cross-connect from the unaffected unit. If unable to obtain the required flow, operators have been instructed to secure the reactor coolant pumps within 10 minutes of the loss of feedwater. TS 3.6 was also changed to require three operable auxiliary feedwater pumps with at least one addition operable pump on the opposite unit. This LER is closed.

LER 280/81-29 concerned a malfunctioning IRPI indication for rod F-12. Indirect monitoring of rod position was implemented in accordance with TS 3.12.E.1.a. A poor connection between the rod position coil and the signal conditioning module was subsequently repaired. This LER is closed.

LERs 280/81-37, 280/81-63, 281/81-51, 281/81-64, 281/81-60, 281/82-60, 281/82-69, 280/82-87, 281/82-50, 261/82-53, and 281/82-57 concerned low charging pump service water pump discharge pressure due to insufficient NPSH. Flow through the air conditioning chiller units was throttled and the pumps vented and/or packing adjusted to correct the problem. A design change is in progress to upgrade the service water system. In the interim, the licensee has increased surveillance on the system to reduce the chance of recurrence. These LERs are closed.

LER 280/81-44 concerned a review of the periodic test program which disclosed that monthly testing of 4KV underfrequency reactor protection circuits was not being performed in accordance with TS 4.1.A, Table 4.1.1. The design of the 4KV underfrequency circuits does not permit online functional testing. Due to a system logic change (deleting underfrequency as a direct reactor trip) subsequent to FSAR submittal, the UF trip was not interpreted as a reactor protection. A technical review of the 4KV UF circuit design determined that such testing is not possible. A review of the technical specifications was conducted to verify that the test program adequately addresses the surveillance requirements. TS Table 4.1-1 requires testing of reactor protection circuitry only, which is performed. This LER is closed.

LER 280/81-45 concerned incorrect diameter RWST spray nozzles. When Design Change 77-09 changed the model of the spray nozzle on the crane wall header to nozzles with a smaller orifice diameter, the field change failed to change the RWST nozzles to ensure no particulate matter in the RWST and Containment Spray system could plug or cause deterioration of spray nozzle effectiveness. Design Change 81-110 changed the RWST nozzles to smaller diameter model. This LER is closed.

LER 280/81-58 concerned component cooling radiation monitors RM-CC-105 and 106 having alarm setpoints above the 2 times background limit. The cause

was fluctuation in activity levels resulting from the leakage in the excess letdown heat exchanger. The heat exchanger was repaired and the periodic test was revised to clarify and emphasize the present Technical Specification limits. This LER is closed.

LER 280/81-75 concerned high water level in the sump containing MOV-SW-102A causing grounding of the motor. The motor operator was removed, the stator dried, and the valve reassembled and satisfactorily tested. The service water valve pits for both units have had dikes and handrails constructed around them and gratings replacing the solid deck plate to facilitate inspection. The water detectors and alarms were also inspected. This LER is closed.

LER 280/82-77 concerned the steam pressure transmitter on loop A failing low. The bistables for feedwater flow less than steam flow and high differential pressure (header to line) for SG A Channel III were placed in trip until the transmitter was replaced and the channel returned to service. This LER is closed.

LER 280/82-89 concerned the failure of the B Core Cooling Monitor caused by the failure of relays on printed circuit boards. The failed boards were repaired, the monitor tested and returned to service. This LER is closed.

LER 280/82-91 concerned an oil cooler tube leak on 1-CH-P-1A. The leaking oil cooler was replaced and the oil changed. The pump was returned to service within the time span required by the Technical Specifications. This LER is closed.

LERs 280/82-96, 280/82-103, 281/82-61 concerned failures of heat tracing in which the redundant tapes were verified operable. The failed tapes were replaced within the time specified by the Technical Specifications. These LERS are closed.

LER 280/82-98 concerned a high setpoint on Radiation Monitor RM-LW-108 caused by a defective log rate board, which allowed the setpoint to drift. The front panel meter and log rate board were replaced and the instrument recalibrated and returned to service. This LER is closed.

LER 280/82-09 concerned a blown fuse causing loss of power to several radiation monitors. The blown fuse was caused by the inadvertent shorting of a control relay to ground by instrument technicians investigating a monitor malfunction. The fuse was replaced and the monitors returned to service. This LER is closed.

LER 280/82-100 concerned the air binding of the charging pump service water pump, 1-SW-P-10B due to maintenance personnel using air to clear sensing lines on the service water strainers Delta P gauges. The redundant pump was verified to be operating and the air bound pump was vented and returned to service. Maintenance personnel were briefed on the occurrence. This LER is closed.

LER 281/82-62 concerned the inability to adjust the high steam flow trip setpoint comparator, FC-2-494 (SG C), into the acceptable range. The high steam flow bistable was placed in trip and a new comparator was installed, tested and placed into service. This LER is closed.

LER 281/82-63 concerned the failure of the vital bus III inverter causing a loss of vital bus III. A turbine runback occurred, which led to a reactor trip and safety injection. An inductor in the station battery inverter failed (shorted) which caused the loss of the inverter. Vital bus III was reenergized by cross connecting it with vital bus I. The inductor was replaced and vital bus III was transferred to its normal power source. This LER is closed.

LER 281/82-65 concerned low discharge pressure on charging pump service water pump 2-SW-P-10A due to a corroded carbon steel stud on the pump packing gland housing which allowed the packing gland to become cocked, which in turn allowed air inleakage and air binding of the pump. The packing was replaced and both studs were replaced with new stainless steel studs. The pump was tested and returned to service. This LER is closed.

LER 281/82-66 concerned low air pressure on the left air bank for the No. 3 Emergency Diesel Generator. The redundant air start system remained operable. The No. 2 air compressor was tripped by its thermal overload unit causing the low air pressure. The motor overload was caused by improper belt tension. The thermal overload unit was reset and the air pressure returned to within specifications. Subsequently the compressor belt tension was adjusted and the solder pots in the thermal overload unit were replaced. This LER is closed.

LER 281/81-70 concerned containment isolation valves which failed Type C leak testing during the Fall, 1981, refueling outage. Each valve, which demonstrated excessive leakage was repaired and retested satisfactorily. This LER is closed.

LER 281/81-72 concerned the failure of MOV-2869B to open when operated from the control room during testing. The valve motor and associated control circuit were checked. Subsequent operation of the valve was satisfactory. The licensee has implemented a program to assess and evaluate MOV failures. This LER is closed.

LER 281/82-49 concerned low discharge pressure on charging pump service water pump 2-SW-P-10B due to air leakage in the suction line through the service water pump strainer. The strainer plug and body had worn threads resulting in an improper plug to body seal. The redundant pump was operational. The strainer was replaced and the pump was returned to service. This LER is closed.

LER 280/82-101 concerned inoperable snubbers discovered during the performance of snubber inspection periodic tests. The inoperable snubbers were replaced or repaired as required. This LER is closed.

LER 280-82-111 concerned a radial flux tilt condition greater than two percent caused by a dropped rod during startup at 62 percent power. The dropped rod was caused by a loss of power to the stationary gripper coil of the CRDM due to one of the contact pins in the electrical connector plug at the reactor head having slipped out of position and not making contact. The dropped rod caused an automatic turbine runback to 32 percent power. The rod was declared inoperable. The high neutron flux trip and rod stop/turbine runback setpoints were reduced as required by Technical Specifications. The connector was repaired; the rod was tested and retrieved. The unit was subsequently returned to full power operation. This LER is closed.

9. Plant Physical Protection

The inspector verified the following by observations:

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.

No violations were identified.