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

Report Nos.: 50-280/87-13 and 50-281/87-13

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: May 3 - June 6, 1987

Inspectors: _____ 6/16/87
W. E. Holland, Senior Resident Inspector Date Signed

_____ 6/16/87
L. E. Nicholson, Resident Inspector Date Signed

Accompanying Inspector: S. G. Tingen

Approved by: _____ 6/16/87
F. S. Cantrell, 2B Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine inspection was conducted in the areas of plant operations, plant maintenance, plant surveillance, followup on inspector identified items,and licensee event report review.

Results: No violations or deviations were identified in this inspection report.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

R. F. Saunders, Station Manager
*D. L. Benson, Assistant Station Manager
*H. L. Miller, Assistant Station Manager
*E. S. Grecheck, Assistant Station Manager
*J. A. Bailey, Superintendent of Operations
D. J. Burke, Superintendent of Maintenance
S. P. Sarver, Superintendent of Health Physics
*R. H. Blount, Acting Superintendent of Technical Services
R. L. Johnson, Operations Supervisor
*J. A. Price, Site Quality Assurance Manager
W. D. Craft, Licensing Coordinator
J. B. Logan, Supervisor, Safety and Licensing

*Attended exit meeting.

Other licensee employees contacted included control room operators, shift technical advisors, shift supervisors and other plant personnel.

The NRC Region II Section Chief, Floyd S. Cantrell, visited the station on May 6 and 28, 1987.

2. Exit Interview

The inspection scope and findings were summarized on June 9, 1987, with those individuals identified by an asterisk in paragraph 1. The following new items were identified by the inspectors during this exit.

One unresolved item (paragraph 6) was identified for reviewing the licensee justification for backseating loop stop valves during normal operation (280; 281/87-13-01).

One inspector followup item (paragraph 5) was identified to inspect the licensee performance in removing decay heat during low reactor coolant water level operations (280; 281/87-13-02).

The licensee acknowledged the inspection findings with no desenting comments. 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 (92702)

This subject was not addressed in the inspection.

4. Unresolved Items*

Unresolved items are matters about which more information is required to determine weather they are acceptable or may involve violations or deviations. One new unresolved item is identified in paragraph 6.

5. Plant Operations

Operational Safety Verification (71707)

The inspector conducted daily inspections in the following areas: Control room staffing, access, and operator behavior; operator adherence to approved procedures, technical specifications, and limiting conditions for operations; examination of panels containing instrumentation and other reactor protection system elements to determine that required channels are operable; review of control room operator logs, operating orders, plant deviation reports, tagout logs, jumper logs, and tags on components to verify compliance with approved procedures.

The inspector conducted weekly inspections in the following areas: Verification of operability of selected ESF systems by valve alignment, breaker positions, condition of equipment or component(s), and operability of instrumentation and support stems essential to system actuation or performance.

Plant tours which included observation of general plant/equipment conditions, fire protection and preventative measures, control of activities in progress, radiation protection controls, physical security controls, plant housekeeping conditions/cleanliness, and missile hazards.

The inspector conducted biweekly inspections in the following areas: Verification review and walkdown of safety-related tagout(s) in effect; review of sampling program (e.g., primary and secondary coolant samples, boric acid tank samples, plant liquid and gaseous samples); observation of control room shift turnover; review of implementation of the plant problem identification system; verification of selected portions of containment isolation valve lineup(s); and verification that notices to workers are posted as required by 10 CFR 19.

Certain tours were conducted on backshifts or weekends. Backshift or weekend tours were conducted on May 9, 11, 16, 20, 26, 28, 29 & 30. Inspections included areas in the Units 1 and 2 cable vaults, vital battery rooms, steam safeguards areas, emergency switchgear rooms, diesel

*An Unresolved Item is a matter about which more information is required to determine whether it is acceptable or may involve a violation or deviation.

generator rooms, control room, auxiliary building, cable penetration areas, independent spent fuel storage facility, low level intake structure, Unit 1 containment, and safeguards valve pit and pump pit areas. Reactor coolant system leak rates were reviewed to ensure that detected or suspected leakage from the system was recorded, investigated, and evaluated and that appropriate actions were taken, if required. The inspectors routinely independently calculated RCS leak rates using the NRC Independent Measurements Leak Rate Program (RCSLK9). On a regular basis, radiation work permits (RWPs) were reviewed and specific work activities were monitored to assure they were being conducted per the RWPs. Selected radiation protection instruments were periodically checked, and equipment operability and calibration frequency were verified.

In the course of monthly activities, the inspectors included a review of the licensee's physical security program. The performance of various shifts of the security force was observed in the conduct of daily activities to include: protected and vital areas access controls; searching of personnel, packages and vehicles; badge issuance and retrieval; escorting of visitors; and patrols and compensatory posts.

Unit 1 began the reporting period at power. The unit reduced power to approximately 30 % on May 9 to allow for containment entries in order to clean boric acid out of the control rod drive mechanism (CRDM) coolers. The cleaning was required due to buildup of boric acid in these coolers during past operation with leakage from the reactor head vent valve tailpipe. This blockage was preventing proper operation of the cooling system and allowing containment average temperature to increase where technical specification limits may have been approached during the Summer months. This condition may have resulted in unit shutdown when peak power demand was required if not corrected. The inspector questioned the licensee about the status of the boric acid leakage in conjunction with NRC Information Notice 86-108, Supplement 1 (Degradation of Reactor Coolant Pressure Boundary Resulting From Boric Acid Corrosion). The licensee explained that during the timeframe that leakage was occurring from the reactor head vent valve, all of the boric acid which precipitated out of solution was being sucked into the Control Rod Drive Mechanism ventilation system. This condition resulted in the buildup of boric acid on the coolers. The licensee also evaluated the boric acid buildup condition based on the information provided in NRC Notice 86-108 and concluded that no degradation of Reactor Coolant Pressure Boundary Components had occurred. This conclusion was based on inspection during the reduced power entries. This conclusion was reviewed by the station safety committee on May 11, 1987, and approved by the committee. The inspector reviewed the approved minutes with regards to the boric acid issue. The unit returned to full power operation on May 10.

Unit 1 operated at full power until May 16, when at 0824 hours a reactor trip from full power (low flow - A loop) occurred. The trip was a result of partial loss of flow on the A reactor coolant loop due to partial closing of the loop A hot leg isolation valve. All systems performed as designed during and after the trip. The unit was cooled down and reached

cold shutdown at 2017 hours on May 17, 1987. Repairs were accomplished on the A hot leg isolation valve (MOV-1590 - see paragraph 6) and other minor work was performed. The licensee also conducted a more thorough inspection for boric acid on reactor coolant system pressure boundary components during this outage due to NRC information notice 86-106, Supplement 1. This inspection involved removal of insulation panels from the vessel head in order to inspect for boric acid accumulation. Approximately 80 pounds of boric acid was found on the head in the vicinity of the pad eye support lifting collar at a point directly below the head vent line. The licensee removed the boric acid residue and determined that no degradation of the head, hold down studs, or nuts had occurred. The inspector also reviewed the licensee's pictures taken before and after boric acid cleanup in addition to making containment entries to evaluate the condition. The condition was also discussed with region management on May 26, 1987. The unit commenced heatup above 200 degrees F on May 28 and was critical on May 29, 1987. The unit recommenced power operation on May 30 and operated at power for the remainder of the inspection period.

The inspectors reviewed the licencee's evaluation of problems encountered with the residual heat removal pumps (RHR) during the May forced outage of unit 1. The RHR system was placed in service and pump 1-RH-P-1A was started on May 17,1987. Periodic Test Procedure 1-PT-30.1, "RHR System Operability", was performed on May 21 and determined that the developed head, Delta P, for pump 1-RH-P-1A was 108.6 psig. This value corresponds to an alert condition as defined by the above procedure. The 1A pump was subsequently secured and pump 1-RH-P-1B started. The 1B pump was then tested using the same procedure and determined to be inoperable due to low developed head. An Engineering Work Request (EWR 87-225) was written and evaluated to declare 1-RH-P-1A fully operable and 1-RH-P-1B operable but in an alert condition. The 1B pump was retested on May 23 and a revision to the EWR was issued declaring this pump fully operable. The licensee concluded that instrument error and backleakage through check valves resulted in the above condition. The inspectors discussed with station management the importance of having a dependable method of decay heat removal in conjunction with an accurate means of measuring reactor vessel water level as detailed in NRC Information Notice 87-23: "Loss of Decay Heat Removal During Low Reactor Coolant Level Operation". The licensee assessment of this notice and performance in this area is identified as an inspector followup item (280; 281/87-13-02).

Unit 2 began the reporting period at power. The unit operated at power for the duration of the inspection period.

Engineered Safety Feature System Walkdown (71710)

The inspector performed a walkdown of the accessible areas of the containment vacuum leakage and monitoring system for both units to verify its operability. This verification included the following: confirmation that the licensee's system lineup procedure matches plant drawings and

actual plant configuration; hangers and supports are operable; housekeeping is adequate; valves and/or breakers in the system are installed correctly and appear to be operable; fire protection/prevention is adequate; major system components are properly labeled and appear to be operable; instrumentation is properly installed, calibrated and functioning; and valves and/or breakers are in correct position as required by plant procedure and unit status.

Within the areas inspected, no violations or deviations were identified.

6. Maintenance Inspections (62703)

During the reporting period, the inspectors reviewed maintenance activities to assure compliance with the appropriate procedures. Inspections areas included the following:

Repair to Loop A Hot Leg Isolation Valve (MOV - 1590)

On May 16, 1987, the Unit 1 reactor tripped due to MOV - 1590 inadvertent closure. The unit was cooled down and corrective maintenance was performed on the MOV. The work was accomplished using Mechanical Corrective Maintenance Procedure MMP-C-RC-105 (30" Darling Loop Stop Valves Disassembly, Repair, Reassembly "Safety Related"). The inspector reviewed the completed work order (Job Number 3800053467) and also visited the job site in containment while the work was being accomplished. No discrepancies were identified. The inspector did note that the valve procedure required several deviations (changes) in order to remove the internals due to the stem break at the backseat.

After the failure mechanism of the valve stem was identified, the inspector was informed that a similar failure occurred on one of the Unit 1 loop stop isolation valves in 1973. The failure mechanism was fully evaluated by Westinghouse, and a failure report "Surry Unit No. 1 Reactor Coolant Loop Isolation Valve Stem Failure Report" dated March 7, 1974, was prepared. In that report the failure mechanism was identified as a high strain - low cycle failure resulting from a severe notch at the steam collar. The report further recommended that the subject valves should not be electrically backseated on torque; and that should backseating become necessary during maintenance, it should be accomplished manually with minimum applied load and without exceeding the springback deflection specified in the revised instruction manual. The inspector then reviewed the technical manual "Instruction Manual Motor Operated Reactor Coolant 30" Loop Stop Valves for Reactor Coolant System Westinghouse WNES 546-CAK-70497B Darling Valve S. O. E-5004". The manual stated in a caution that manual backseating is permissible only to the extent that the open deflector indicator reading does not exceed 1/16" maximum, and that manual backseating may be used only when the packing needs replacement. The inspector then reviewed the Surry Power Operating Procedure 1-OP-1B, "Containment Checklist". In that procedure the inspector noted that step 22 torqued the subject valves on their

backseats to 1/16" deflection while the unit was in cold shutdown prior to startup. The same procedure reverified torque of the subject valves to 1/16" deflection on their backseats when the unit reached hot shutdown. The inspector questioned the licensee as to why the valves were backseated during startup and was informed that the backseat operation minimized stem leakage during operation. The inspector then requested that the licensee provide additional information to justify backseating of the loop stop valves during normal operation. This item is unresolved pending review of the licensee's reply (280; 281/87-13-01).

Within the areas inspected, no violations or deviations were identified.

7. Surveillance Inspections (61726, 61700)

During the reporting period, the inspectors reviewed various surveillance activities to assure compliance with the appropriate procedures as follows:

- Test prerequisites were met.
- Tests were performed in accordance with approved procedures.
- Test procedures appeared to perform their intended function.
- Adequate coordination existed among personnel involved in the test.
- Test data was properly collected and recorded.

Inspection areas included the following:

Emergency Diesel Generator Operability

On May 5, 1987, the inspector witnessed surveillance testing of the No. 3 Emergency Diesel Generator per test procedure 1-PT-22.3C, "Diesel Generator No.3 Test". This monthly test demonstrates that the emergency diesel generator will respond promptly and properly to a manual start, synchronization, and assumption of load as required by technical specification 4.6. The licensee also performed an overspeed trip test per procedure EE-EDG-M/A1, "Emergency D/G Engine One year Service & Inspection". No discrepancies were noted.

Electrical Penetration Leakage Test

On May 7, 1987, the inspector witnessed portions of surveillance test 2-PT-34, "Electrical Penetration Leakage Test". This test records the as found pressure in the electrical penetrations and recharges those penetrations as required. A five minute drop test is required for penetrations requiring repressurization. No discrepancies were noted.

Containment Isolation Trip Valve Test

On May 11, 1987, the inspector witnessed the quarterly testing of miscellaneous containment trip valves per periodic test procedure 1-PT-18.6B. This test cycles the containment trip valves that are not operated as part of other tests to their required positions for an accident and records the closing time. The inspector verified that problems encountered during this test were adequately documented and evaluated. No discrepancies were noted.

Low Head Safety Injection Pump Test

The inspectors performed an extensive review of periodic test procedure 1-PT-18.1, "LO Head SI Test & Flushing Of Sensitized Stainless Steel Piping". This inspection included a review of all test results and station deviations generated since 1985 regarding the low head safety injection pumps SI-P-1A & B for both units. On May 11, 1987, the inspector witnessed the performance of the above test on both unit 1 pumps. Although no specific discrepancies were noted the inspector commented that increased management attention was needed to improve the housekeeping in the safeguards pump room.

Turbine Driven auxiliary Feedwater (AFW) Pump

On June 2,1987 the inspector witnessed testing of the turbine driven AFW pump 1-FW-P-2 per deviated periodic test procedure 1-PT-15.1C. This special test was mandated as a result of the station safety committee concern with water in the steam lines to the AFW turbine that resulted in three consecutive overspeed trips prior to the two successful runs that were used to declare the pump operable for unit 1 restart on May 30, 1987. Excessive water was previously noted in the main steam lines and documented via station deviation report S1-87-446. The inspector noted the following observations to station management:

a. While preparing for the pump start, the operator drained approximately one gallon of water from the steam line downstream of the steam admission valves. While this practice may be recommended for equipment protection, it may also mask the suspected problem of overspeed trip from steamline moisture. Although the procedure did not call for draining the steamline, the operator indicated it to be a general practice used prior to all turbine driven AFW pump runs.

b. The three overspeed trips mentioned above all occurred using the train "B" steam admission valve SOV-MS-102B. The retest on June 2 used the train "A" valve SOV-MS-102A. The inspector noted that from a steamline moisture concern, the use of the "B" train valve would constitute worst case system configuration.

c. The inspector noted a general lack of understanding among the operators involved in the test with regards to the purpose of the test. Proper briefings with all parties involved could possibly have precluded the above problems.

Station management noted the above comments and subsequently repeated the test on June 3, 1987. The pump ran successfully using the "B" train valve with no overspeed trip. The licensee also instituted periodic draining and quantifying of water from the steamline and is further evaluating possible steam drain modifications. The inspectors will continue to monitor this item during subsequent inspections.

Inside Recirculation Spray Pumps

The inspector reviewed results of Periodic Test 1-PT-17.2, "Containment Inside Recirculation Spray Pumps". Technical Specification 4.5 requires all inside recirculation spray pumps to be dry tested at least once per month. The test is considered satisfactory if the motor and pump shaft rotates, starts on signal, and exhibits the correct ammeter readings. The inspector noted that the April test for pump 1-RS-P-1A was somewhat inconclusive in that the shaft rotation light on the main control board did not illuminate as expected. Although motor amperage should indicate shaft rotation, no other pump performance indication is available. This item was discussed with the licensee and was subsequently corrected during the forced outage for unit 1.

Within the areas inspected, no violations or deviations were identified.

8. Followup on Inspector Identified Items (92701)

(Closed) Inspector Followup Item (IFI) 280; 281-T2500/16, IE Information Notice No. 85-45 informed the licensee of a potentially generic problem involving seismic interactions within the movable flux mapping system at Westinghouse Plants. The licensee was requested to review the information for applicability and consider actions, if appropriate, to preclude a similar problem from occurring at their facility. Inspection of Unit 1 identified the Thimble Support Frame as the only area of concern. The Frame itself was found to be sufficiently rigid; however, the connecting studs at the wall attachments were retorqued to a "finger-tight" condition in order to ensure even loading of the floor supporting channel assemblies. Inspection of Unit 2 identified the Thimble Storage Frame and overhead power cable trays and conduit as the only areas of concern. The cable tray and conduit was found to be seismically adequate; however, a lateral brace was installed on the Thimble Storage Frame. The inspector has reviewed the applicable documentation and considers that the licensee has taken appropriate action to assure that the seal table and flux mapping system would not be endangered by falling equipment/structures during a seismic event. This item is closed.

(Closed) IFI 280; 281/86-40-02, Followup on feed and steam flow differences. The issue involved thermal power calculations utilizing the computer program TPDWR2 which is described in NUREG-1167. This program calculates thermal power higher that the licensee's thermal power calculations. The major difference between these calculations was that the calculation done by the inspector using TPDWR2 used feedwater flow as the mass input; whereas, the licensee used steam flow as the mass input. Subsequent review of the licensee's program as outlined in the Surry Power Station Secondary Plant Performance Evaluation dated August, 1984, revealed that the Surry Units 1 and 2 feedwater flow is up to 2 % greater than steam flow. The resulting study conclusion was that steam flow should be used for thermal power calculations. Based on the inspectors review of this study, this issue is closed.

9. Licensee Event Report (LER) Review (92700)

The inspector reviewed the LERs listed below to ascertain whether NRC reporting requirements were being met and to determine appropriateness of the corrective action(s). The inspector's review also included followup on implementation of corrective action and review of licensee documentation that all required corrective action(s) were complete.

(Closed) LER 280/86-22, Engineered Safety Feature Relay Failures. The issue involved failure of a reactor protection relay on two separate occasions resulting in a partial Train B Engineered Safety Feature actuation. The cause of both failures was determined to be a failure of the relay coil, apparently from overheating. Corrective action included replacement of the failed coils and subsequent testing of the new components. The licensee is also conducting additional studies to minimize this type of failure. The inspector reviewed corrective action and is also tracking additional corrective actions as an open inspector followup item. This item is closed.

(Closed) LER 280/86-23, Containment Sump Trip Valve. The issue involved testing of the inside containment isolation valve which identified excessive leakage. Immediate corrective action included manual isolation of the valve. Additional corrective action included identification that the leakage flowpath was the valve packing and subsequent tightning of the packing follower corrected this condition. In addition, the system had a check valve and the control logic modified to minimize cycling of the trip valve during the feedwater piping outage. The inspector reviewed the LER and verified that the modification was installed during the outage. This item is closed.