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

Report Nos.: 50-280/91-35 and 50-281/91-35

Licensee: Virginia Electric and Power Company
Glen Allen, VA 23060

Docket Nos.: 50-280 & 50-281 License Nos.: DPR-32 & DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: December 9-13, 1991

Inspector: _____ 1/17/92
J. J. Blake Date Signed

_____ 1/17/92
J. J. Lenahan Date Signed

Approved by: _____ 1/24/92
C. Julian, Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of pipe supports, instrumentation maintenance procedures, fire protection, the intake canal design, repairs to the roof on the mainsteam valve house, the local emergency operating facility, IST program for pumps, the licensee's erosion/corrosion program, the ongoing procedure upgrade program, and licensee action on previous inspection findings.

Results:

In the areas inspected, violations or deviations were not identified.

A minor weakness was identified in the licensee's construction procedure for installation of instrument and other metal tubing in that the procedure lacked specific instructions for installation and inspection of compression fittings (paragraph 3).

Management involvement was evident through well-defined procedures and assignment of priorities. The licensee's corrective action program appeared to be effective in identification of non conformances. Staffing and training of personnel was adequate.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*J. Artigos, Supervisor Quality
*R. Blount, Supervisor, Station Procedures
*W. Grady, Supervisor, NDE
D. Hart, Supervisor Quality
*T. Huber, Supervisor, IST/NDE and Engineering Program
*M. Kansler, Station Manager
*J. Price, Assistant Station Manager
*R. Scanlan, Licensing Engineer
M. Whitt, Senior Civil Design Engineer
D. Wong, ISI Engineer

Other licensee employees contacted during this inspection included design engineers, system engineers, operators, mechanics, technicians, and administrative personnel.

NRC Resident Inspector(s)

M. Branch, Senior Resident Inspector
J. York, Resident Inspector
S. Tingen, Resident Inspector

*Attended exit interview

2. Inspection of Pipe Supports - Units 1 and 2 (70370)

The inspectors performed a walkdown inspection to examine mechanical and hydraulic snubbers installed on safety-related piping systems in the Units 1 and 2 Safeguards Building. During the walkdown inspections, the inspectors also examined other types of supports, including spring cans, struts, and rigid supports. The piping systems included portions of the main steam, safety injection, and the steam supply line to the auxiliary feedwater turbine driven pumps. During the walkdown, the inspectors examined the supports for damage and verified that attachment of the supports to the piping and supporting structure was secure. During examination of hydraulic snubbers, the inspectors verified that fluid levels in the snubber reservoirs were higher than target levels, and that leakage of fluid was not occurring. The inspectors noted that the snubber and two spring cans on combination support number II548-PSSK-SI-4.1 were offset. This support is a trapeze type with a vertical hydraulic snubber and two spring cans attached to the piping with a single pipe clamp. The pipe clamp appeared to have been moved approximately two inches and one of the spring can hanger rods was bent. Licensee engineers performed an operability review for this hanger. Based on the measured offset, the offset angle was calculated to be 3.8 degrees, which is within the allowable offset of 5.0 degrees. The inspectors examined the spring cans and verified the settings were

within the specified range and tolerance for their cold set values. Although the support is operable, licensee engineers indicated that a work order will be issued to replace the slightly bent spring can hanger rod and relocate the pipe clamp to return the snubber/support to its originally installed position.

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

3. Review of Maintenance Procedures - Units 1 and 2 (62700)

The inspectors examined the licensee's procedures which control installation of metal tubing and fittings. These procedures were as follows:

a. Mechanical Maintenance Procedure MMP-C-G-290, Metal Tubing and Swagelok Fitting Installation.

b. Instrument Maintenance Procedure IMP-C-G-92, Instrument Tubing Maintenance Procedure.

c. Specification SUI-0001, Installation of Instrumentation.

The maintenance procedures listed in a. and b. above are utilized by plant maintenance personnel when installing or replacing tubing and compression fittings. The specification is utilized by contractor/construction personnel when installing new tubing/fittings under design changes and plant modifications. Review of the maintenance procedures disclosed that the procedures contained detailed instructions for installing instrument and other metal tubings and associated compression fittings. The procedures also contained instructions for retightening of fittings which are disconnected during maintenance and other activities. Welded or soldered tube connections are not within the scope of these procedures. The procedures specify precautions and limitations, post maintenance checkout instructions, acceptance criteria, and troubleshooting instructions. Review of Specification SUI-0001 disclosed that this specification covers the overall requirements for installation of instrumentation, including tubing and supports, instrument supports and racks, welded and mechanical (compression) fittings, concrete expansion anchor installation instructions, specifications for various classes of tubing, details for installation of various types of instruments, painting, various other miscellaneous installation details, and QA/QC requirements. However, the inspectors noted that there were only minimal instructions regarding installation of compression fittings, and that the specification did not reference the above listed maintenance procedures.

On April 25, 1991, a piece of tubing on the backup air supply system for the control room breathing air blew out. This system which has numerous air bottles interconnected by metal tubing was installed by construction personnel under a design change (DCP). The tubing failure occurred when an operator was attempting to depressurize the system by loosening a fitting. Note that this practice is against the tubing/fitting

manufacturer's recommended practices. This problem was documented on Deviation Report S91-0488. Examination of the tubing showed that the fitting which was being loosened had not been tightened enough during original installation. The ferrule did not grip the tubing sufficiently to prevent the tubing from slipping when the fitting was loosened under pressure. The tubing was replaced and new fittings were installed. The fittings in the new installation were checked using go/no-go gauges and found to be acceptable. When the remaining compression fittings in the system were checked with the go/no-go gauges, approximately 30 to 35 fittings were found with excessive gaps between the fitting and compression nut indicating that they had not been sufficiently tightened. These fittings were tightened and rechecked with the go/no-go gauge to verify that they met the manufacturer's installation recommendations. Review of installation procedures performed as a result of this problem showed that maintenance procedures were acceptable, but that the construction procedures/specifications lacked sufficient detail for installation of compression fittings. The inspectors discussed the lack of instructions in the specification and construction work procedure (WP-I01) for installation of compression fittings with licensee engineers. Procedure WP-I01, Instrumentation Installation, does not specify instructions for installation of compression fittings.

Licensee management personnel indicated that construction personnel would be provided with copies of the maintenance procedures for use when installing compression fittings. The inspectors concluded that the maintenance procedures contain adequate instructions for proper installation of compression fittings. However, the inadequate instructions in specification SUI-001 and the lack of a construction work procedure to control installation of compression fitting was identified as a minor weakness in the licensee's construction procedure program.

In the areas inspected, violations or deviations were not identified.

4. Review of Intake Canal Design (37701)

The inspectors reviewed Deviation Report (DR)SI-90-124. The DR concerned conditions when the plant was operated with the water level in the intake canal exceeding elevation 30.0. Based on discussions with operations personnel, licensee station engineers determined that the plant was sometimes operated with the water level in the canal at elevation 34.0. The canal High water level annunciator is set at elevation 30.0. After review of the UFSAR and other documents, station engineering personnel were not able to determine the effect of the water level exceeding elevation 30.0 on the canal embankment design. Another problem concerned the effect of the higher water levels on instrumentation installed to measure the canal water level. The design of the intake canal is described in UFSAR Section 15.6 which states the canal embankments are designed to seismic conditions. The top of the canal embankments are elevation 36. The canal is lined with a reinforced concrete slab. The licensee is in the process of completing

a design reconstitution project which will result in formal documentation of all design calculations and the design basis documents. During the design basis reconstitution, the licensee engineers discovered that the existing calculations for the intake canal were incomplete and did not document all design input values and applicable loading conditions. This issue was documented as PPR 88-50. The existing calculations were reviewed and it was determined that the canal slopes were stable for seismic conditions when the water level was at elevation 30.0. This design water elevation is documented in a Stone and Webster letter dated December 18, 1989, Subject: Intake Canal Service Water System. As a result of DR SI-90-124, an informal engineering review was conducted of the canal slope stability with the water level at elevation 34.0. Based on this review, licensee design engineers concluded that there was reasonable assurance that the canal slopes were stable under seismic loading when the canal water level was at elevation 34.0. However, design engineering recommended that the canal water level be maintained below elevation 30.0 during normal plant operations, and that operators take any necessary actions when the high canal water level annunciator indicates the water level exceeds elevation 30.0. These instructions may be revised when the design basis documents and detailed slopes stability calculations are updated to formally document design input values and design loading conditions. The inspectors examined water level instruments and determined that the canal water level was at elevation 28.5 during day three of this inspection. Regarding the water level instrumentation, licensee engineers determined that newly installed canal water level trip probes are not submergence proof when the canal water level is above elevation 32.5. However, when the probes fail, they will fail in the safe direction indicating low canal water level, which will require operator response to correct.

In the areas inspected, violations or deviations were not identified.

5. Fire Protection System Design - Alternate Water Supply (37701)

The inspectors reviewed Deviation Report S-91-1693 which addresses discrepancies between the description of the backup water supply for the fire protection system in the UFSAR and the licensee's fire protection procedures. The design bases for the fire protection system are discussed in Section 9.10 of UFSAR. The yard hydrant piping system, diesel fire pump, and diesel oil storage tank are designed to class 1 (seismic) criteria. The UFSAR states that water for fire fighting is obtained from two 300,000 gallon water storage tanks, each with 250,000 gallons reserved for fire fighting. These tanks are not seismically qualified. UFSAR Section 9.10.2.2.1. states that backup water for fire fighting can be obtained in an emergency from either of the condensate storage tanks, which are also not seismically qualified, or from a fire truck taking suction from the intake canal and pumping water into the yard hydrant piping. A recent review by licensee engineers determined that the emergency procedures have not been prepared for using either of the backup water supplies, and that equipment is not in place to use the backup water supplies for fire fighting. This problem was documented in

DR-S-91-1693, dated November 7, 1991. The licensee is developing the corrective actions to resolve this problem. The corrective actions involve installation of piping and valves, purchase of the necessary hose, development of procedures, and completion of any necessary training for fire protection personnel. The requirements for the water supply available for fire protection are stated in Technical Specification 3.2.1.A.2.c which requires that the two 250,000 gallon tanks be available. TS 3.2.1.B.2 specifies that inoperable portions of the fire suppression system be restored in seven days, or in the event no fire suppression system is available, e.g., loss of both tanks, a backup system be established in 24 hours. Thus, the licensee complies with the Technical Specification. The water level in the tanks is monitored by instrumentation in the control room, with annunciators for low fire water tank levels.

In the areas inspected, deviations or violations were not identified.

6. Repairs to Main Steam Valvehouse (MSVH) Roof (37701)

The inspectors examined DCP 89-14, Replacement of MSVH Roof Plug Covers. This DCP was initiated as part of the corrective action for violation 280,281/89-06-02, Failure to take prompt corrective action on potential wetting of safety-related components. This issue involved the wetting of the AFW motors during periods of heavy rain. For example, two work requests were issued in 1989 to dry the AFW pump motors, perform a meggar check on the motors, and perform periodic tests on the pumps to demonstrate operability of the pumps/motors. The inspectors reviewed these work requests, numbers 078859 and 084852. The removable roof plug covers leaked and permitted rain water to wet the AFW motors. DCP 89-14 was classified as non-safety related. The modification involved fabrication of removable covers which are installed over the plugs in the MSVH roof. The plugs are missile shields which are removable for access to equipment in the MSVH. The inspectors reviewed documentation associated with the DCP, including the 50.59 review, Appendix R review, design drawings, procedures for installation of associated hardware, and QC inspection records. The inspectors reviewed the results of functional tests performed on the new covers which demonstrated the leak tightness of the new covers. The work was completed in June 1990. The inspectors noted that the DCP was still open pending final review of licensee engineers. The inspectors discussed the need for timely closeout of DCPs after completion of field work with licensee management personnel and questioned the 18-month delay in final closeout of the DCP.

In the areas inspected, violations or deviations were not identified.

7. Local Emergency Operation Facility (LEOF) (37701)

The LEOF is an onsite support facility for management of the overall licensee emergency response. The LEOF was developed by the licensee in response to Generic Letter 82-33 and various NUREGs. The LEOF is housed in a reinforced concrete building designed in accordance with the BOCA

Basic Building Code. The structure provides a radiation protection factor of at least ten. The HVAC system for the LEOF can be isolated if high radiation levels are detected in the intake air path, and the ventilation system pressurizes the LEOF with respect to the atmosphere to reduce the chance of radioactive material entering the building. The facility contains technical data displays and plant records to assist in the diagnosis of plant conditions to permit evaluation of actual or potential release of radioactive materials. The LEOF also is equipped with a reliable communications system to the control room, TSC, NRC, State and local emergency operations centers, and the licensee's Corporate Emergency Operations Facility which is located in Richmond, Virginia. Fire suppression systems are a computer room halon system and a sprinkler system for the balance of the LEOF. The source of electric power is the 34.5 kV line which provides service to the onsite training center and the onsite construction buildings. An alternate feed to the LEOF is available from the Smithfield switchyard. In order to tie in the alternate source, it is necessary to manually disconnect the power supply from the primary source and manually shift to the backup power supply. The LEOF is not a safety related facility. In the event of a high radiation release from the site, loss of electric power, fire in the LEOF, or other emergency, the licensee emergency response management function is shifted to the corporate operations facility in Richmond and the LEOF is abandoned. This scenario is sometimes part of onsite emergency exercises.

In the areas inspected, violations or deviations were not identified.

8. Inservice Testing Program or Pumps and Valves - Unit 1 (73056)

The inspectors reviewed the results of monthly periodic tests performed to demonstrate operability of the Unit 1 motor driven auxiliary feedwater pump.

The inspectors reviewed the following procedures which control the testing:

- 1-PT-15.1A, Motor Driven Auxiliary Feedwater Pump 1-FW-P-3A

- 1-PT-15.1B, Motor Driven Auxiliary Feedwater Pump 1-FW-P-3B

These procedures specify test initial conditions, precautions, test instructions, and acceptance criteria. Data recorded during the test include pump discharge pressure and pump vibration data. The PTs are performed per the requirements of TS 4.8.A.1 and 4.8.A.5.A and the licensee's Inservice Testing Program for Pumps and Valves. The PT is also required to be completed after performing maintenance on either the pump or motor to demonstrate pump operability. The following PT test results were reviewed:

- Pump 1-FW-P-3A (PT 15.1A) Monthly PTs performed from June 1989 through June 1990

- Pump 1-FW-P-3B (PT 15.1B) Monthly PTs performed from June 1989 through June 1990.

On pump 1-FW-P-3A, work order 083813 was issued to correct a problem regarding contamination of oil in inboard and outboard motor bearing reservoirs. The reservoirs were cleaned, flushed and refilled and the PT was performed following completion of the work in February 25, 1990. On pump 1-FW-P-3B, a packing leak was identified during the February 5, 1990 test. The packing was adjusted and the PT repeated on February 6, 1990.

Review of the above data showed the PT results were acceptable and pumps were operable.

In the areas inspected, deviations or violations were not identified.

9. Licensee Erosion/Corrosion Program

The inspectors discussed the licensee's erosion/corrosion inspection program with the responsible site engineer. The discussion included recent events involving erosion/ corrosion at other facilities as well as the licensee's plans for the Surry 1 refueling outage scheduled to start in February 1992. The licensee's erosion/corrosion engineering staff had attended a recent EPRI CHEC™, CHECKMATE™ user's group meeting where other licensees discussed their recent discoveries in the area of erosion/corrosion.

During the discussion of the planning for the upcoming Surry 1 outage, the licensee stated that the program was being expanded to include the remaining steam systems that had not yet been inspected. The systems that are to be added to the Unit 1 program are the Gland Seal Steam System and the Auxiliary Steam System. These are being added because inspections of the Gland Seal Steam System during the last Unit 2 refueling outage revealed components which had to be replaced. Other items which will be added to the inspection program are small-bore piping which are outside the scope of the EPRI computer programs and are not easily inspectible. The licensee intends to inspect the small-bore piping on a best-effort basis as a preventive maintenance tool.

The inspectors' impression is that the licensee appears to have a very pro-active program for the identification of erosion/corrosion problems. The inspectors informed the licensee that the results of the erosion/corrosion inspections would be reviewed during the review of the ISI inspections during the outage.

In the areas inspected, violations or deviations were not identified.

10. Procedure Upgrade Program

The inspectors reviewed the licensee's technical procedure upgrade program (TPUP). The inspection included a review of Station

Administrative Procedure, "Procedure Process Control," VPAP-0502, Rev. 1, dated December 17, 1990; discussion with the Supervisor Station Procedures; and review of the November 1991 Report on the Status of Station Procedures.

During the review of VPAP-0502, the inspectors noted that Section 6.3 of VPAP-0502 provides the requirement: "If deviating from a procedure is required, the activity controlled by the procedure shall be suspended until a procedure change (or procedure revision) is approved." The subparagraphs 6.3.1, 6.3.2, and 6.3.3 provide guidance for processing changes and revisions using a Procedure Action Request (PAR). When asked if station personnel were aware of the PAR process, the Supervisor Station Procedures referred to the November Status of Station Procedures report, graphic presentation, showing that between January 1991 and November 1991, 648 PARs had been received by the station procedures group. (This number was derived from the graph of PAR Incorporations, which shows the following: January - Outstanding PAR Changes 1335 and Incorporated PAR Changes 7; November - Outstanding PAR Changes 1355 and Incorporated PAR Changes 635.)

The inspectors also reviewed some of the qualifications and backgrounds of members of the Station Procedures Organization during discussions with the Supervisor Station Procedures.

The TPUP program appears to contain all of the elements necessary to produce workable technical procedures: the procedure writing staff contains people with years of experience in the technical areas that they are writing for; the program requires that procedures be verified and validated; the program provides a workable feedback mechanism for problems identified during use.

In the areas inspected, violations or deviations were not identified.

11. Action on Previous Inspection Findings (92701)

(Open) Unresolved Item 50-280,281/91-26-02, PSI/ISI Deviations. One of the concerns addressed by this unresolved item involved the fact that there may be undocumented longitudinal welds in piping components in safety related systems which were not being inspected as required by ASME Section XI. This concern was discussed with representatives of the site and corporate ISI organizations. During the discussions, the inspectors were shown the results of the research of the piping fabrication and erection records from the plant construction records. The result was a set of marked-up piping drawings which have the known seamless and seam-welded piping components color-coded. These drawings also show which piping components will be inspected for longitudinal seams during the upcoming outages.

The licensee appears to be doing a thorough and comprehensive job of determining the full extent of the problem in the areas of identifying all longitudinal seams in safety related piping systems. The inspectors informed the licensee that further review of the work to resolve this

item would be done during the upcoming Unit 1 refueling outage which is scheduled for February 15 through May 4, 1992.

12. Exit Interview

The inspection scope and results were summarized on December 13, 1991, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.