



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

Report Nos.: 50-280/88-45 and 50-281/88-45

Licensee: Virginia Electric and Power Company
Richmond, Virginia 23261

Docket Nos.: 50-280 and 50-281

License Nos.: DPR-32 and DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: November 6 through December 17, 1988.

Inspectors:	<u>Mike Scott for</u>	<u>1-17-89</u>
	W. E. Holland, Senior Resident Inspector	Date Signed
	<u>Mike Scott for</u>	<u>1-17-89</u>
	L. E. Nicholson, Resident Inspector	Date Signed
Approved by:	<u>F. S. Cantrell</u>	<u>1/17/89</u>
	F. S. Cantrell, 2A Section Chief	Date Signed
	Division of Reactor Projects	

SUMMARY

Scope: This routine resident inspection was conducted on site in the areas of plant operations, plant maintenance, plant surveillance, licensee event report review, and design, design changes and modifications.

Results: One apparent violation was identified in paragraph 4 with regard to the reversed power supply for the low head safety injection discharge valves to the suction of the high head safety injection pumps. This is another example of 280,281/88-32-01 identified in Inspection Report 280,281/88-32, Unit 2 only.

One inspector followup item was identified in paragraph 4 for followup on discrepancies and corrective actions regarding motor operated valves (280; 281/88-45-01).

A weakness was noted pertaining to the apparent lack of aggressive action in correcting problems such that recurrence is prevented (paragraph 4). In specific, the recurrent problem with rain water leaking into the safeguards room and wetting of the auxiliary feedwater pump motors was discussed as a significant example. In addition, an example of a weakness in the root cause determination program was identified during the followup of the LER discussed in paragraph 7. Although the licensee stated in the LER that a root cause analysis would be performed, the appropriate maintenance engineers were not cognizant of the repair activities and the defective parts were discarded prior to any examination for cause of failure. (IFI 280; 281/88-45-02)

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REPORT DETAILS

1. PERSONS CONTACTED

Licensee Employees

- J. Bailey, Superintendent of Operations
- *R. Bilyeu, Licensing Engineer
- H. Blake, Superintendent of Site Services
- *R. Blount, Superintendent of Technical Services
- D. Erickson, Superintendent of Health Physics
- *E. Grecheck, Assistant Station Manager
- *M. Kansler, Station Manager
- *G. Miller, Licensing Coordinator, Surry
- *H. Miller, Assistant Station Manager
- *J. Ogren, Superintendent of Maintenance
- *J. Price, Site Quality Assurance Manager

*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, F. Cantrell, visited the Surry Power Station on November 17 and 18, 1988. During his visit, Mr. Cantrell attended a management meeting on November 17 at which a discussion of the status of the radiation protection upgrade program was conducted (Report No. 280, 281/88-46, Management Meeting, dated December 2, 1988). Mr. Cantrell also attended a Surry County Board of Supervisors meeting with the Surry Senior Resident Inspector during the evening of November 17. The new Surry Station Manager, M. Kansler, provided the board with an update on the status of outstanding work ongoing at the Surry Power Station. On November 18, Mr. Cantrell attended the NRC Safety System Function Inspection (SSFI) team exit at which time the team's findings were presented. The findings of the SSFI inspection of the service water system are discussed in Report Number 280, 281/88-32.

On November 17 and 18, 1988, the current NRC Surry Project Manager, C. Patel, and the oncoming NRC Project Manager, B. Buckley, visited the Surry Power Station to attend the radiation protection upgrade program management meeting and the SSFI inspection team exit.

2. Plant Status

Unit 1

Unit 1 began the reporting period in a maintenance/modification shutdown with efforts continuing to free the manipulator crane gripper from the assembly in location G-6. The crane gripper was freed in accordance with a special procedure, the gripper was repaired, and all fuel was offloaded

from the core by November 12. Inspections were performed on each fuel assembly and one leaking assembly was identified. After replacement of the leaking assembly and completion of foreign material inspections of the vessel internals, core onload commenced. The core onload was completed on December 8, and the reactor vessel head was reinstalled on December 13. The head studs were being installed as the inspection period ended.

Unit 2

Unit 2 began the reporting period in day 54 of a refueling/maintenance outage. During this period, the cavity seal ring was modified and tested satisfactorily. Fuel offload commenced on December 14, 1988. The offload of fuel was in progress when the inspection period ended.

3. Unresolved Items

No unresolved items were identified.

4. Plant Operations

Operational Safety Verification (71707)

The inspectors 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; and 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 inspectors conducted weekly inspections in the following areas: verification of operability of selected Emergency Safety Feature (ESF) systems by valve alignment, breaker positions, condition of equipment or component(s), and operability of instrumentation and support items essential to system actuation or performance.

Plant tours 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 inspectors routinely monitor the temperature of the auxiliary feedwater pump discharge piping to ensure steam binding is prevented.

The inspectors 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 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 November 6, 7, 8, 17, 20; December 4, 11, and 17. Inspections included areas in the Units 1 and 2 cable vaults, vital battery rooms, steam safeguards areas, emergency switchgear rooms, diesel generator rooms, control rooms, auxiliary building, Units 1 and 2 containments, cable penetration areas, independent spent fuel storage facility, low level intake structure, and the 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.

On November 11, 1988, the licensee made a notification to the NRC in accordance with 10 CFR 50.72 regarding the operability of certain Limatorque motor operated valves (MOV). The specific problems identified included undersized motors, non-environmentally qualified torque switches, and valve operators that were incorrectly assembled. The licensee initiated a field verification of wiring and torque switches on approximately 85 valves per unit. This inspection effort was performed in accordance with Engineering Work Request 88-485 and was ongoing as the inspection period ended. Preliminary problems identified during this inspection included the following:

- White melamine torque switches were found in 16 of 85 valves inspected in Unit 1 and 9 of 75 valves in Unit 2. This style torque switch was determined to be susceptible to failure as identified in a Limatorque 10 CFR Part 21 notification dated November 3, 1988. The licensee has experienced difficulty in obtaining replacement torque switches.
- Limatorque type SMA torque switches were found in 9 of 85 valves in Units 1 and 3 of 75 valves in Unit 2. These particular switches were identified as a problem in Limatorque "Maintenance Update" to the licensee concerning SMA type switch found at another plant. (The "Maintenance Update" was dated August 1988.)

- Incorrect assembly of Limitorque operators - these problems include installing pinion gears backwards and incorrectly installed tripper fingers.
- Inadequate sizing of the motors and operators.
- Incorrect grease and grease separation in the Limitorque operators.

The inspectors are attending the weekly licensee meetings that address MOV problems and routinely monitoring activities in the field. This increased inspection emphasis will continue and is identified as an inspector followup item (280; 281/ 88-45-01).

On November 19, 1988, the licensee made a notification to the NRC in accordance with 10 CFR 50.72 regarding an ESF actuation on valve SOV-VS-101A which resulted in realignment of a portion of the safeguards ventilation system. No other ESF subsystem actuations occurred nor did it appear that any actual safety injection relays changed states (i.e., the spurious signal affected only this small portion of the ventilation system). The licensee documented this event on station deviation S1-88-1371, and an investigation into the cause is ongoing.

On December 8, 1988, the licensee made a notification to the NRC in accordance with 10 CFR 50.72 regarding an electrical cross connection of two safety-related valves (2863A and B). These valves open to provide a flow path from the LHSI pumps to the suction of the HHSI pumps (piggy-back mode). This mode of safety injection is used to recirculate water from the containment sump to the vessel using the HHSI pumps when RCS pressure remains above the LHSI pump shut off head. The consequence of this condition would have been that a loss of either vital bus would have disabled both trains when operating in the "piggy-back" mode. Operator recovery from this condition would have been complicated due to the fact that control room indication would falsely have confirmed that the valve lineups were correct. This condition was only applicable to Unit 2. The licensee is continuing with their evaluations and on December 13, 1988, a significant event review team (SERT) was designated to study the event to determine the implications of the error(s) with regard to all other engineered safeguards systems.

The residents have monitored the licensee's actions from the time that the condition was identified up to the formation of the SERT. The inspection period ended prior to the SERT reporting any results, conclusions, and/or making any recommendations. The residents will continue to monitor licensee actions during the next inspection period. The wiring error that would allow a single failure to disable both trains of ECCS in the "piggy-back" mode is identified as another example of an apparent violation of 280,281/88-32-01 identified in the SSFI Inspection Report 280,281/88-32.

Cold Weather Preparations (71714)

During this inspection period, the inspectors reviewed the licensee's program for implementation of protective measures for extreme cold weather. This program is implemented by performance of monthly (November through March) periodic test PT-52, Cold Weather Protection, dated May 21, 1987, which was detailed in the licensee response to IE Bulletin 79-24, Frozen Lines. The inspector reviewed the licensee response to this Bulletin, the periodic test, and a recent quality control (QC) audit which was performed on the subject. The inspectors findings agreed with the QC review that this program has weaknesses that need to be addressed. Station management agreed with this comment and stated that corrective actions are being developed in this area.

In addition, the inspectors expressed concern over a continuing problem with rain water leaking into the safeguards room and wetting the auxiliary feedwater pump (AFW) motors. It appears that heavy rainfall causes water to run in around access plugs in the safeguards building roof where the pumps are located. This water intrusion has occurred a number of times during the past couple of years and has sometimes resulted in the licensee declaring an AFW pump inoperable. The licensee has traditionally draped plastic over these areas to divert rainwater away from the AFW motors. This item was discussed with the licensee at the exit and the station manager stated that corrective actions were being evaluated. The inspector commented that this item was an example of a weakness in aggressively pursuing comprehensive solutions that will prevent recurrence. (IFI 280; 281/88-45-02)

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

5. Maintenance Inspections (62703)

During the reporting period, the inspectors reviewed maintenance activities to assure compliance with the appropriate procedures. Inspection areas are discussed below.

TROUBLESHOOTING 480 VOLT SWITCHGEAR

The inspector reviewed the licensee evaluation and corrective actions regarding a failure of 480 volt switchgear 1-SI-BKR-123 that occurred on October 28, 1988. During performance of special test ST-227, LHSI pump 1-SI-P-1B would not start on demand. It was noted that the pump's breaker charging spring would not charge. The breaker worked after operators racked the breaker out approximately one-eighth inch and racked it back in. Following testing, the breaker was observed to again not recharge. This condition was documented on station deviation report S1-88-1231.

Maintenance engineering troubleshooting of the breaker, which was performed under work order 74050 in accordance with procedure EMP-C-EPL-61, Corrective Maintenance Procedure For Safety Related 480 Volt Switchgear,

revealed dirty breaker compartment secondary disconnects. These disconnects supply the 125 VDC control power for the charging spring motor. The contacts were cleaned and the breaker tested satisfactorily. These contacts normally remain energized during breaker maintenance and consequently are not included in a general, preventive maintenance schedule. The inspector discussed this failure mechanism with the maintenance engineering staff, and reviewed their preliminary recommendations to implement additional secondary contact cleaning for other breakers into the preventive maintenance schedule. No discrepancies were noted.

FREEZE SEALING PIPE FOR MAINTENANCE

On November 22, the inspector performed a walkdown and review of the freeze seal being used to isolate the maintenance area for valves 2-SI-24 and 153. This freeze seal was installed on a 10-inch pipe (10-SI-206-153) by work order 74750 in accordance with corrective maintenance procedure MMP-C-FS-260. The inspector verified the work order and procedure were at the job site and being used. In addition, the inspector verified through observation the following:

- Adequate communications between the freeze seal operator located in the safeguards area basement and the maintenance personnel in the auxiliary building basement.
- That adequate piping existed between the freeze plug and the nearest piping obstruction (i.e. closed valve).
- Adequate liquid nitrogen was staged to perform the intended task.
- Adequate pre-freeze seal nondestructive testing had been performed on the piping.
- Adequate temperature monitoring equipment was installed and being used to record data.
- That the liquid nitrogen piping did not contact adjacent piping to cause inadvertant freezing.

The inspector discussed the above items with the technicians involved and considers the precautions taken to be adequate. No discrepancies were noted.

CLEANING THE REFUELING WATER STORAGE TANK (RWST)

The inspectors monitored the activities relating to the draining, inspection and cleaning of the Unit 1 RWST (1-CS-TK-1). Radiation levels around the RWST have traditionally been high with resin bead intrusion being the primary suspect. A previous failure of a containment spray valve to seat due to resin bead blockage caused the inspectors to question

the licensee regarding the effects of this foreign material in the RWST. The licensee drained the tank, opened the top manway, and discovered approximately four cubic feet of resin beads in the tank. This discrepancy was identified on station deviation report S1-88-1372. The resin was removed, and the tank and piping were cleaned and flushed.

It is surmised by the licensee that the resin entered the RWST during the previously used operational practice of dewatering the refueling cavity to the RWST across the top of the spent fuel pool ion exchangers. The licensee did not violate any requirements during this occurrence but no longer use this flow path during dewatering. The inspector reviewed the work order (WO 74527), cleanliness inspection results, and the special test that flushed the containment spray lines connected to the RWST. No discrepancies were noted.

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

6. Surveillance Inspections (61726)

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 are discussed below.

TESTING OF UNIT 2 REACTOR CAVITY J-SEAL

On November 6, the inspectors monitored the partial performance of special test ST-224, OPERABILITY REACTOR CAVITY J-SEALS, for Unit 2. The cavity level was raised to approximately 18 inches and the J-seal leakage was measured. The leakage was determined to be less than 0.05 gallons per minute. Subsequently, the test was repeated with satisfactory results by deflating the inflatable seal with the water level at 26 feet 6 inches. The inspector reviewed the official copy of the special test procedure after the above portion of the test was completed. No discrepancies were noted.

On December 9, the inspector witnessed leak testing of the reactor cavity J-seal for Unit 2 from inside the Unit 2 containment. Special test 224 was being used to control testing evolutions. The inspector attended the pre-test briefing held in the health physics conference room and monitored

all actions in preparation for deflation of the inflatable seal. The inspector independently witnessed the amount of leakage past the J-seal when the inflatable seal was deflated and considers that leakage was similar to the results of the Unit 1 test results (approximately 0.3 gallons per minute). The inspectors consider that the test results for the Unit 2 cavity seal adequately demonstrate satisfactory performance of the seal. No discrepancies were noted.

COMPONENT COOLING (CC) HEAT EXCHANGER THROTTLED FLOW TEST

The inspectors witnessed selected portions of field testing and reviewed the completed results of special test 1-ST-233, CC Heat Exchanger Throttled Flow Test, Revision 2. The purpose of this test was to demonstrate the capability of the service water (SW) system to accept current heat loads from the CC system through the CC heat exchangers while the intake canal level is lowered to approximately 20 feet. Further, this temporary reduction in canal level was necessary for the installation of passive vacuum breakers on each of eight circulating water supply lines located at the lower intake structure to remedy a design deficiency identified by the previously mentioned SSFI.

A review of the completed data sheets and evaluations indicates that the test objectives were met. At this level the service water flow has adequate margin to reject the current plant heat loads and at the same time maintain intake canal levels during a postulated loss of offsite power. No discrepancies were noted during this inspection effort.

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

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

The inspectors reviewed the LER's 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 281-88-01, Improper Administrative Control of Containment Isolation Valves Due to Personnel Error. This report identified a failure to properly control inoperable containment isolation valves by lifting the wrong leads. The cause was given as a misinterpretation of drawings by electrical maintenance personnel. The inspector reviewed the failure analysis performed on valve 2-SS-TV-201B that caused the original failure and discussed the findings with the station staff. A comprehensive failure analysis was hampered by the failure to notify the appropriate engineers during disassembly and repair of this valve. In addition, the replaced parts were discarded prior to any examination. This situation was documented via a station deviation (written by engineering) and serves as an additional example of weaknesses with the licensee's root cause

evaluation program. The licensee is aware of these weaknesses in their root cause development, and they are actively working on the program. This LER is closed.

Within this area, no violations or deviations were identified.

8. Design, Design Changes, and Modifications (37700)

During this inspection period, the inspectors selected several design change packages which were being implemented or which had been implemented in the recent past for review. One of the reviewed changes was:

Spent Resin Catch Tank Modification/Installation, DC-85-16B-3. This change replaced the old resin catch system to allow for an enhanced capability to collect and properly dispose of spent radioactive resins.

The inspector reviewed the licensee's engineering review and analysis for the modification and also conducted a walkdown of the facility. The review included a determination that design changes were processed and controlled by established procedure, and that post modification testing was adequate to demonstrate operability of the facility. No discrepancies were noted.

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

9. Exit Interview

The inspection scope and findings were summarized on December 19, 1988, with those individuals identified by an asterisk in paragraph 1. The following new items were identified by the inspectors during this exit. One apparent violation was identified in paragraph 4 with regard to licensee review and conclusions of the installation errors associated with the low head safety injection discharge valves to the suction of the high head safety injection pumps. This is another example of 280,281/88-32-01 identified in Inspection Report 280,281/88-32. One inspector followup item was identified in paragraph 4 for followup on discrepancies and corrective actions regarding motor operated valves (280; 281/88-45-01).

The inspector expressed concern over the repeated wetting of the AFW pump motors during heavy rains as discussed in paragraph 4. This was given as an example of a weakness in aggressively pursuing comprehensive solutions that prevent recurrence. In addition, an example of a weakness in the root cause program was identified during the followup of the LER discussed in paragraph 7. Although the licensee stated in the LER that a root cause analysis would be performed, the appropriate maintenance engineers were not cognizant of the repair activities and the defective parts were discarded prior to any examinations for failure. (IFI 280; 281/88-45-02)

The licensee acknowledged the inspection findings with no dissenting comments. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.