



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W., SUITE 2900  
ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-338/94-02 and 50-339/94-02

Licensee: Virginia Electric & Power Company  
5000 Dominion Boulevard  
Glen Allen, VA 23060

Docket Nos.: 50-338 and 50-339

License Nos.: NPF-4 and NPF-7

Facility Name: North Anna 1 and 2

Inspection Conducted: January 22, 1994 - February 19, 1994

Inspectors:

*R. D. McWhorter* 3/17/94  
for R. D. McWhorter, Senior Resident Inspector Date Signed

*D. R. Taylor* 3/17/94  
for D. R. Taylor, Resident Inspector Date Signed

Approved by:

*G. A. Belisle* 3/17/94  
G. A. Belisle, Section Chief Date Signed  
Division of Reactor Projects

SUMMARY

Scope:

This routine resident inspection was conducted on-site in the areas of plant status, prompt response to on-site events, operational safety verification, maintenance observation, surveillance observation, licensee event report followup, and action on previous inspection items. Licensee backshift activities were inspected on January 22, 23, 29 and February 2, 8, 9 and 10, 1994.

Results:

Plant operations functional area

Unit 2 tripped on January 22, 1994, from approximately 95% power when a main feedwater regulating valve failed shut. Licensee operators, maintenance personnel, and management responded appropriately to the event. Repairs were completed and the unit was restarted the next day (paragraphs 3 and 4.a).

Maintenance functional area

A non-cited violation was identified for using incorrect emergency diesel generator fuel oil transfer pump preventive maintenance procedures. This caused four of the eight pumps to be inoperable during cold weather due to excessive grease in the motor bearings. Station management's response to investigate and take corrective actions was prompt and appropriately sensitive to important safety concerns (paragraph 4.b).

Major repair efforts to correct problems with water in the oil for a turbine-driven auxiliary feedwater pump were well planned, used adequate procedures, and displayed strong on-site job supervision. Management expectations for quality job performance were clearly communicated, and management oversight was good. The problem was not fully resolved, but efforts were continuing at the inspection period's end (paragraph 5.a).

A Cause Determination Evaluation performed for a November 1993 solenoid valve failure was found to be ineffective (paragraph 5.b).

Engineering functional area

A strength was identified for the licensee's Technical Specification surveillance review program. Overall, the inspectors judged that the review program was comprehensive and significantly contributed to an improvement in plant safety (paragraphs 7 and 8).

## REPORT DETAILS

### 1 Persons Contacted

#### Licensee Employees

- L. Edmonds, Superintendent, Nuclear Training
- C. Funderburk, Superintendent, Outage and Planning
- J. Hayes, Superintendent, Operations
- D. Heacock, Superintendent, Station Engineering
- \*G. Kane, Station Manager
- \*P. Kemp, Supervisor, Licensing
- \*J. Leberstien, Staff Engineer, Licensing
- \*W. Matthews, Assistant Station Manager, Operations and Maintenance
- J. O'Hanlon, Vice President, Nuclear Operations
- D. Roberts, Supervisor, Station Nuclear Safety
- \*R. Saunders, Assistant Vice President, Nuclear Operations
- D. Schappell, Superintendent, Site Services
- R. Shears, Superintendent, Maintenance
- \*J. Smith, Manager, Quality Assurance
- A. Stafford, Superintendent, Radiological Protection
- \*J. Stall, Assistant Station Manager, Nuclear Safety and Licensing

Other licensee employees contacted included engineers, technicians, operators, mechanics, security force members, and office personnel.

#### NRC Personnel

- \*R. McWhorter, Senior Resident Inspector
- \*D. Taylor, Resident Inspector

\*Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

On January 26-28, 1994, the NRC Section Chief, Mr. G. A. Belisle visited the North Anna Power station. Mr. Belisle toured the plant and met with licensee management and the inspectors to discuss plant status and current issues at the facility. He also attended the January 26 exit interview for the previous inspection period.

### 2. Plant Status

Unit 1 operated the entire inspection period at or near 100% power.

Unit 2 was operating at 100% power when on January 21, 1994, a problem developed with the A MFRV. Power was reduced to 95%, and the valve was taken to local control while repairs were performed. At 6:44 a.m. on January 22, the unit tripped when the valve failed shut while operators

were attempting to return the valve to automatic. Repairs were completed, and the reactor was restarted later that same day. On January 23, the unit returned to commercial service and operated at or near 100% power until the inspection period's end.

3. Prompt On-site Response to Events (93702)

On January 22, 1994, the licensee notified the inspectors concerning a Unit 2 reactor trip, and the inspectors responded to the site. The inspectors attended the licensee's post-trip review and independently verified that safety system performance was as expected. The automatic trip was generated from the RPS when an A SG low level coincident with a steam flow/feed flow mismatch was detected. The trip signal was valid and was caused by losing feedwater to the A SG. All safety systems performed as designed except a source range nuclear instrument which energized but did not indicate. The instrument was repaired and returned to service shortly after the trip.

The feedwater loss was caused by an A MFRV failure. Problems were first identified at 11:20 p.m. on January 21, when an A SG high level alarm was received. At that time, operators observed the A MFRV opening without a valid control signal and immediately attempted remote manual operation to shut the valve. When this was unsuccessful, operators remotely throttled shut an MOV upstream of the valve, and were able to regain feed flow control. An operator was dispatched to the A MFRV, and local manual control was established. The A MFRV remained in local manual control until repairs to an air supply regulator for the valve actuator were completed about 6:00 a.m. on January 22.

Following a pre-evolution brief, operators commenced the procedure for returning the valve to remote operation at about 6:30 a.m. The evolution was prolonged by difficulty experienced in balancing the remote actuator with the local operator, but the valve was successfully shifted to remote operation. However, shortly after the local operator was disconnected, the valve began to slowly close. The operators attempted both to remotely drive the valve open and to reattach the local operator, but were unsuccessful. Following the A MFRV closure, the A SG low level occurred, and the plant tripped. The inspectors concluded that the licensee's initial response to the equipment failure and the plant trip was appropriate. The subsequent corrective actions and plant startup are discussed in paragraph 4.a.

No violations or deviations were identified.

4. Operational Safety Verification (71707)

The inspectors conducted frequent control room tours to verify proper staffing, operator attentiveness, and adherence to approved procedures. The inspectors attended daily plant status meetings to maintain awareness of overall facility operations and reviewed operator logs to verify operational safety and compliance with TS. Instrumentation and safety system lineups were periodically reviewed from control room

indications to assess operability. Frequent plant tours were conducted to observe equipment status, fire protection program implementation, radiological work practices, plant security, and housekeeping. DRs were reviewed to ensure that potential safety concerns were properly reported and resolved.

a. Unit 2 Restart Following Reactor Trip

As discussed in paragraph 3 above, on January 22, 1994, Unit 2 tripped from approximately 95% power. The inspectors monitored repair efforts and the January 23 plant restart. Licensee investigations into the cause for the MFRV failure concluded that a valve actuator pneumatic booster relay had failed in a manner such that air was ported to drive the valve shut. The booster relay was replaced, and the valve was retested satisfactorily. The inspectors concluded that repair efforts were adequate and that the startup evolutions were well performed. The licensee's investigations into the booster relay failure cause and long term corrective actions were continuing at the inspection period's end.

On January 25, Unit 2 experienced another problem with the A MFRV. While starting a condensate pump, the valve oscillated and was difficult to control from the control room. The upper and lower booster valves' sensitivities were adjusted and the valve was returned to automatic. DR 94-95 was submitted, and, as with the problem which caused the reactor trip, the licensee's investigations were continuing at the inspection period's end.

b. EDG Fuel Oil Transfer Pump Failures

On January 22, 1994, the licensee informed the inspectors that a problem had developed with several EDG FOTPs. Each EDG has two FOTPs which are identified as either a lead (A) or a standby (B) pump. On a LOOP each EDG supplies power to its respective FOTPs. The FOTPs are located in a building near the fuel oil tanks. Only one FOTP per EDG is needed to meet TS operability requirements. On January 20, one Unit 1 FOTP (1HB) tripped on overload. On January 21, a similar problem was noted with a Unit 2 (2HA) FOTP. About the same time, the licensee successfully tested the 2HB FOTP, and licensee management promptly initiated an investigation into a possible common mode failure.

On January 22, the licensee ran the remaining FOTPs and identified that three ran satisfactorily, but two more (1JA and 1JB) tripped on overcurrent. These two both supplied the 1J EDG, and the licensee declared that EDG inoperable. All other EDGs had at least one operable FOTP. Investigations quickly centered on possible effects from low temperatures in the unheated building caused by abnormally cold weather. The licensee installed temporary heaters and stationed fire watches in the fuel oil transfer building. After several hours, the licensee was able to

demonstrate operability for both of the 1J EDG FOTPs. All FOTPs were operational by January 24.

The inspectors reviewed the event, and verified that for the affected FOTPs and the 1J EDG, the licensee complied with all TS requirements. Both the licensee and the inspectors were concerned about the potential for a common mode EDG failure. This concern was mitigated by the fact that the EDGs all were designed to have three hours of fuel available in the EDG day tanks, which would be used before the FOTPs were called upon for makeup. Additionally, each day tank would alarm on low level, and each EDG supplied power to its own FOTP on a LOOP. The licensee recognized the event's significance, initiated a formal root cause evaluation, and submitted a voluntary LER to document the problem (LER 50-338/94-001).

On February 11, the root cause evaluation preliminary results were issued. The licensee identified the primary FOTP failure mechanism to be improper FOTP motor bearing greasing. The FOTP motor bearings were "double shielded", and the vendor recommended no additional greasing following installation. However, station work order records identified that seven of the eight FOTP motors had been greased every 18 months since 1986. Too much grease in the bearings increased the torque requirements for the motor and resulted in high motor amperage and overload trips during the excessively cold weather. Upon learning about the preliminary findings from the root cause evaluation, the licensee promptly replaced all the FOTP motor bearings. Additional investigations into the root causes for the improper PM performance and long term corrective action development were ongoing at the inspection period's end. The inspectors determined that station management's response to investigate and take corrective actions was prompt and appropriately sensitive to important safety concerns.

The inspectors reviewed the licensee's administrative requirements for preventive maintenance. TS 6.8.1 required the licensee to establish and implement procedures including, by reference to Regulatory Guide 1.33, procedures governing preventive maintenance and lubrication schedules. The inspectors identified that this TS was implemented by model work orders which referenced PM procedures. The model work order for seven of the eight pumps used PM procedure E-14-M/C-2, Clean, Inspect and Lubricate Motor, revision 1. This procedure was incorrect for this application since it contained motor bearing lubrication instructions. The correct procedure, E-14-M/C-1, Clean and Inspect Motor, revision 1, was not used. To prevent recurrence, the licensee revised the model work request to reflect the correct procedure.

This failure to use the proper PM procedure was identified as a TS 6.8.1 violation. This violation will not be subject to enforcement action because the licensee's efforts in identifying and correcting the violation meet the criteria specified in

Section VII.B of the Enforcement Policy. This is identified as non-cited violation 50-338, 339/94-02-01: Incorrect Fuel Oil Transfer Pump Lubrication.

c. Auxiliary Operator Tours

On February 2, 1994, the inspectors observed the Auxiliary Building AO perform his morning tours and logs. Also, on February 17, the inspectors observed the Outside AO perform his morning tours and logs. Overall, the inspectors considered the tours to be detailed with the AOs very knowledgeable concerning the expected plant and equipment conditions.

During the Auxiliary Building tour, several problems were identified. First, the AO identified a leaking seal oil cooler connection on the B spent fuel pit cooling pump. A WR was initiated. Second, the inspectors identified an approximately six-inch large through-wall hole adjacent to door F46-1 between the fuel building basement and the auxiliary building. This appeared to be inconsistent with the AO's logs which listed door F46-1 as a "fire door". After review by the licensee, the inspectors were informed and verified that these two areas were recognized as the same fire area in the facility Appendix R report. The licensee indicated that operator logs would be updated to reflect that door F46-1 was not a fire door. Third, the inspectors identified that the AO was not familiar with the details associated with a PAR which added a note to the logs. The note added checks to verify that no leakage was observed from the charging pump suction endplates. This deficiency was discussed with licensee management, and the inspectors judged this to be an isolated case. The licensee later removed the note from the logs after determining it was no longer required.

During the outside area tour, the inspectors noted a good practice in that the shift supervisor was using an available SRO to also monitor an AO on morning rounds. The inspectors observed that general area cleanliness in the Auxiliary Service Water Pump House was poor. The licensee corrected this condition. In addition, the licensee determined that this area was not fully included in the plant housekeeping program. The area was added to the program to prevent recurrence.

d. Freeze Protection

To address problems with the EDG FOTPs and other extreme cold weather issues (such as the RWST level transmitter freezing discussed in NRC Inspection Report Nos. 50-338, 339/93-30), the licensee prepared a new cold weather operations procedure. This new procedure, O-GOP-4.2, Extreme Cold Weather Operations, revision 0, incorporated lessons learned to be used whenever the weather was forecasted to be below 10°F or below freezing for an extended period. This procedure supplemented normal preparations

for cold weather by identifying areas that require additional heating. The inspectors considered the licensee's steps in dealing with these problems adequate, and will continue to monitor corrective actions to prevent cold weather problem recurrence.

e. NRC Notifications

- 1) On January 22, 1994, the licensee notified the NRC as required by 10 CFR 50.72 concerning RPS and ESF actuations generated when Unit 2 tripped from 95% power. The inspectors responded to the site and evaluated the event's significance (paragraphs 3 and 4.a).
- 2) On January 25, 1994, the licensee notified the NRC as required by 10 CFR 50.72 concerning the notification of off-site authorities. Specifically, the licensee notified the Commonwealth of Virginia concerning chromate discharges into Lake Anna from a CCW leak. The leak was from a SG blowdown tank vent condenser, which was later repaired by the licensee. The inspectors reviewed this notification and verified that there were no NRC safety-related concerns associated with the event. The inspectors noted that the licensee's corrective actions included substantially increasing chromate monitoring frequency due to repeated problems with leaks. Later, the licensee promptly identified another leak prior to a discharge. A problem with the blowdown tank sparger that caused vent condenser tube erosion was then found and corrected. This problem was postulated as the cause for previous leaks in the vent condenser.
- 3) On February 12, 1994, the licensee notified the NRC as required by 10 CFR 50.72 concerning the discovery of a condition that could have prevented the operation of a system designed to control the release of radioactive material. During a periodic test performance, it was found that an air ejector divert valve, 2-SV-TV-202-1, would not open when an air ejector radiation monitor high-high alarm was simulated. The licensee's initial investigations revealed that a containment "Phase A" isolation signal was present at the valve and prevented the valve from opening. The "Phase A" signal was reset and the valve operated properly. The PT was subsequently successfully completed.

The licensee continued to investigate and determined the actual cause to be a solenoid valve failure. At the inspection period's end, the licensee was evaluating withdrawing this notification based on this new information concerning the failure mechanism. The inspectors reviewed the history and maintenance associated with this failure (paragraph 5.b).



- 4) On February 13, 1994, the licensee notified the NRC as required by 10 CFR 50.72 concerning a loss of emergency off-site response capability. At 9:45 a.m., 17 of the plant's 55 emergency sirens were found to be inoperable. The sirens lost normal power due to large area power outages caused by a severe ice storm, and after several hours, the backup batteries became fully discharged. The Commonwealth of Virginia and surrounding counties were notified that other means would be needed for alerting affected area residents in an emergency. By 1:13 p.m. on February 14, a sufficient number of sirens were returned to service such that emergency response capabilities were considered to be restored.

On February 15, 1994, a second large area power outage occurred, and the licensee again notified the NRC concerning the loss of emergency off-site response capability. At 12:00 p.m., 22 sirens were found to be inoperable due to lost power. At about 3:00 p.m., electrical power and most sirens were restored. The inspectors monitored the licensee's actions and found them to be appropriate for the situation.

- 5) On February 13, 1994, the licensee notified the NRC as required by 10 CFR 50.72 concerning the notification of off-site authorities. Specifically, the licensee notified the Federal Energy Regulatory Commission of a Lake Anna Dam emergency diesel generator failure. The inspectors monitored the licensee's actions and found them to be appropriate for the situation.

One non-cited violation was identified.

5. Maintenance Observation (62703)

Station maintenance activities were observed and reviewed to verify that activities were conducted in accordance with TS, procedures, regulatory guides, and industry codes or standards.

- a. On February 7-10, 1994, the inspectors monitored a planned maintenance outage for the Unit 2 turbine driven auxiliary feedwater pump and associated equipment. The maintenance was primarily being performed to identify and correct water leakage into the turbine's lube oil system. Additional work items included repairing seat leakage on a steam admission valve to the turbine and replacing an inoperative drain line steam trap. The maintenance was performed under the following WOs and associated procedures:

- WO Task: 00281324-01, Repair Steam Leak/Change Oil; using O-MCM-1401-01, Disassembly, Inspection, and Reassembly of Terry Turbine, revision 4-P1

- WO Task: 00271737-01, Open/Inspect/Repair Outboard Bearing
- WO Task: 00281301-01, Disassemble and Repair 2-MS-TV-211A; using O-MCM-0400-03, Safety-Related Air-Operated Valve Repair and Inspection in General, revision 2
- WO Task: 00281966-01, 2-MS-TD-3B, Replace New Yarway-515

In order to accomplish the work, the licensee was required to enter TS action statement 3.7.1.2.a, which allowed 72 hours for the maintenance. Due to the time restrictions and maintenance magnitude, licensee management directed supervisors to carefully plan and coordinate the maintenance. Additionally, the licensee obtained assistance from the turbine and pump vendor's representatives during the maintenance.

The inspectors attended several planning meetings for the maintenance activities. The licensee expended considerable resources to properly prepare and review the necessary procedures and work documentation. A detailed schedule was prepared and repeatedly reviewed by the vendor representatives and maintenance and operations personnel. Material and tools required for the job were carefully inventoried and pre-staged in the maintenance area. The inspectors concluded that the job was well planned.

The inspectors observed significant maintenance activities including turbine casing and gland disassembly, turbine casing cleaning, gland reassembly, and steam admission valve disassembly and inspection. Maintenance was properly performed in accordance with all pre-planned work procedures and senior operators, and maintenance engineers were observed supervising and coordinating work at the job site. The inspectors concluded that the work activities were very well performed, and as a result, the outage time for the maintenance was minimized.

The inspectors identified one minor problem with a sign-off step in the work documentation. Procedure O-MCM-1401-01, step 6.3.3, required measuring the thrust bearing axial clearance. The step acceptance criteria stated, "New thrust bearing axial clearance is 0.000 to 0.005 inch. Thrust bearings must be replaced when original clearance is exceeded by 0.005 inch." The thrust bearing uncoupled clearance was measured at 0.007 inch and the step was signed off by QC as satisfactory. The inspectors questioned the sign off because there was no reference to the original clearance. The licensee subsequently confirmed that the original clearance was 0.005 inch so the acceptable clearance range was from 0.005 inch to 0.010 inch. The measured 0.007 inch was therefore acceptable. The licensee and the inspectors confirmed that QC should have referred to the original clearance prior to signing off the procedural step as being satisfactory.

The inspectors also observed post-maintenance testing using 2-PT-71.1Q, 2-FW-P-2, Auxiliary Feedwater Pump and Valve Test, revision 11-P2-OT01. The test was well coordinated, and no problems were encountered with test execution. The test results demonstrated that satisfactory repairs had been made to the steam admission valve, the steam line drain trap, and the turbine gland. However, steam was leaking from the turbine casing joint, and turbine lube oil samples continued to indicate that small water amounts were present. The licensee quickly planned and performed minor corrective repairs, but these were unsuccessful in stopping the joint leakage. A SNSOC meeting was held to review the post-maintenance test results, and it concluded that the pump could be returned to operable status. The inspectors reviewed in detail the licensee's evaluations and agreed that the continued water intrusion problem did not affect pump operability. At the inspection period's end, the licensee was planning additional repair efforts to address long term pump bearing degradation concerns.

The inspectors evaluated the overall maintenance performance for these repairs. The inspectors concluded that the maintenance was well planned, procedures were adequate, and on-site job supervision was strong. Management expectations for quality job performance were clearly communicated and management oversight was good.

b. 2-SV-TV-202-1 Troubleshooting and Repair

On February 12, 1994, an air ejector discharge divert to containment valve failed to open during periodic testing (paragraph 4.e.3). The inspectors reviewed the licensee's evaluation and troubleshooting associated with the valve, 2-SV-TV-202-1. The valve was required to open to direct air ejector discharge to containment upon receiving a high-high radiation signal from the air ejector discharge process radiation monitor. The valve's function to close on a containment isolation signal was not affected. If the valve had failed to open upon receiving an actual high-high radiation signal, an unmonitored release path would have been created to the turbine building via the air ejector after condenser loop seals. The licensee initially believed the failure to be caused by an erroneous containment isolation Phase A signal at the valve. However, after further review the licensee ruled out this conclusion and focused on other potential causes.

Through discussion with the licensee, the inspectors were informed that the same valve had failed to stroke full open during testing in October 1993 and had failed shut during testing in November 1993. For both failures, the valve's air supply SOV was determined to be the cause, and the SOV was replaced. The inspectors reviewed the November 1993 DR (93-1856) which included a CDE to evaluate the SOV's repetitive failures. The CDE noted

that for both failures the solenoid was not retained for maintenance engineering inspection. In the report, both the cause summary and the proposed corrective action sections indicated that the SOV might not be the cause for the failures and pointed to a "nearly crimped shut" air supply line. The DR's review and closure section was signed off by SNSOC based on WO 00279541-01 to repair the crimped air line. However, the WO was not scheduled to be performed until the next outage. The inspectors were informed that the crimped air line was discussed in SNSOC and it was determined that the air line was not an operability concern. The inspectors considered that ruling out the crimped air line as the problem left the cause determination for the two failures unresolved.

On February 19, 1994, the inspectors observed troubleshooting for the most recent failure. To simulate the failed condition, the licensee initiated an air ejector divert to containment signal. When the signal was generated, the valve did not open until after approximately one minute. An engineer and an STA stationed at the solenoid valve noted that the SOV received a signal to actuate as expected, started venting air after about 20 seconds, and stopped venting air about 30 seconds later just prior to 2-SV-TV-202-1 opening. The engineer also noted that the crimped air line did not appear to restrict flow as indicated by the air regulator pressure gage. Instead, it appeared that the SOV was sticking. To correct the condition, the licensee removed and replaced the SOV, the air regulator to the SOV, and the bent tubing. The licensee also indicated that the SOV was sent to the vendor for a cause evaluation.

The inspectors considered the CDE performed for the November 1993 could have been more thorough. Specifically, the only mechanical corrective action recommended by the CDE was discounted and not promptly implemented. Further, the CDE's ruling out the SOV as the failure's cause appeared to be incorrect. The CDE was impeded by the fact that the SOV was not retained for failure analysis. The licensee informed the inspectors that another CDE would be performed and would include the results of the vendor's evaluation of the SOV which had recently failed.

No violations or deviations were identified.

6. Surveillance Observation (61726)

Station surveillance testing activities were observed and reviewed to verify that testing was performed in accordance with procedures, test instrumentation was calibrated, LCOs were met, and any deficiencies identified were properly reviewed and resolved.

On February 15, 1994, the inspectors observed operators performing 1-PT-17.1, Control Rod Operability, revision 14. The PT was performed monthly to meet TS 4.1.3.1.2 requirements for exercising control rod

banks. No problems were encountered during the test, and the inspectors observed that operator performance was very careful and methodical. Strong management awareness and oversight for the sensitive evolution was also apparent.

No violations or deviations were identified.

7. Licensee Event Report Followup (92700)

The following LERs were reviewed and closed. The events and deficiencies reported in the LERs were identified by the licensee during a detailed TS surveillance review. This review was performed as corrective action for violations 50-339/92-04-01 and 50-338, 339/92-04-02 and unresolved item 50-338, 339/92-04-03 (paragraph 8).

The TS surveillance review resulted in ten LERs being submitted to the NRC. The inspectors considered the individual events associated with the ten LERs as additional examples of the two above cited violations. The event associated with each LER was reviewed when identified, and none were deemed to be safety significant. During this inspection period, the inspectors verified TS surveillance requirements had been met, and corrective actions were appropriate for all ten LERs. Case-specific review details for the ten LERs are discussed below.

a. (Closed) LER 50-338, 339/92-009: Missed Surveillance of Containment Purge and Exhaust Isolation System

This LER reported a failure to test the entire containment purge and exhaust isolation system in accordance with TS surveillance requirements. Supplement one to the LER also reported that the pressurizer PORV position indication channel calibration procedure did not include associated alarm actuation verification.

The inspectors verified that the applicable procedures were updated to include testing the additional circuitry. Additionally, the alarms associated with the PORVs were tested when identified and documented in NRC Inspection Reports Nos. 50-338, 339/92-14.

b. (Closed) LER 50-338/92-011: Missed Surveillance Requirements Due to Personnel Error During Initial Procedure Development

This LER reported a failure to verify that SI throttle valves were tagged and a failure to test a portion of the SI accumulator MOV auto-open circuitry. For both events, TS 4.0.3 was entered which allowed 24 hours to complete the surveillances, and the licensee subsequently verified the components operable. The inspectors verified that applicable procedures were updated prior to the next performance. Also, for the SI throttle valves, the inspectors verified that the TS-required surveillance was performed during the most recent outage for each unit.

- c. (Closed) LER 50-338, 339/92-012: Missed Surveillance on Two Containment Isolation Instrument Air Supply valves and Four LMC Valves Due to Personnel Error Resulting in Inadequate Test Procedures

This LER reported a failure to test two instrument air supply containment isolation trip valves and a failure to verify four LMC valves were closed and capped. For the instrument air valves, TS 4.0.3 was entered, and the valves were then successfully tested. Also, the LMC valves were verified closed and capped. The inspectors verified that the applicable procedures were updated. In addition, the inspectors found that this LER was covered during station training topic "Procedure Usage and Compliance" completed in December, 1992.

- d. (Closed) LER 50-338/92-013: Missed Surveillance on Engineered Safety Feature Response Time Testing for Auxiliary Feedwater Pump Starts Due to Station Blackout and Main Feedwater Pumps Tripped Caused by Personnel Error Resulting in an Inadequate Test Procedure

This LER reported a failure to response time test AFW automatic starting circuits associated with station blackout and main feedwater pump trips. Upon identification, TS 4.0.3 was entered, and the licensee successfully tested the station blackout relays. The licensee decided not to test the main feed pump trip relays at power due to the risk associated with the test and subsequently requested from the NRC a temporary waiver of compliance. The NRC granted the waiver, and a subsequent emergency TS change. NRC Inspection Report Nos. 50-338, 339/92-23 discussed the inspections associated with this event.

The inspectors verified that main feed pump trip AFW response time was performed during the Spring 1993 Unit 1 RFO. The inspectors also verified that the applicable procedures were updated.

- e. (Closed) LER 50-338, 339/92-014: Missed Surveillances Due to Personnel Errors During Initial Procedure Development

This LER reported a failure to fully test the EDG fast start circuitry. Specifically, several relays were not included in the response time testing. Additionally, the undervoltage/degraded voltage trip for two CW screen wash pumps, the SW valve house exhaust fans and heaters, the ASW pumps, and the boric acid storage tank heater circuits were not tested. This LER also reported a failure to properly test the response time for the RCP undervoltage and underfrequency sensors.

For each missed surveillance, the licensee entered TS 4.0.3 and subsequently verified the components operable. The inspectors reviewed several EDG PTs to verify that they were updated to include the required TS surveillances. NRC Inspection Report Nos.

50-338, 339/92-14 also documented initial reviews for this issue, and noted that during the SW pump house heater and ventilation fan load shed verification, fan 2-HV-UH-70B remained operating for two minutes following the UV signal. The report also stated that the licensee intended to eliminate the two minute delay. During this review, the inspectors noted that the two minute delay was not eliminated. Instead, the station load list was updated to reflect the additional load, and engineering had determined that the additional load was within the EDG analysis.

- f. (Closed) LER 50-338/92-015: Missed Surveillance on Service Water Valve Position Verification For Valves Servicing The Safety Related Main Control Room and Emergency Switchgear Room Chiller Condensers Due to Personnel Error

This LER reported failures to verify the above valve positions and failures to verify positions for SW valves to the spent fuel pit coolers, ASW supply and return, and charging pump lube oil coolers. When these omissions were discovered, TS 4.0.3 was entered and the verifications completed. The inspectors verified that the applicable procedures were updated to include the missing valves.

- g. (Closed) LER 50-338/92-016: Two Conditions Outside the Technical Specification Occurred Due to Inadequate Initial Development of Test Procedures and Lack of Specific TS Guidance

This LER reported a failure to place an inoperable NI channel in the trip condition within one hour as required by TS 3.3.1.1, Table 3.3-1. The condition was identified as a non-cited violation and was discussed in NRC Inspection Report Nos. 50-338, 339/92-29 and 50-338, 339/92-32. The inspectors verified that procedure revisions were incorporated into the functional and calibration procedures to reflect entering a one-hour action statement when required. In addition, the site licensing organization developed a TS change request which proposed increasing the time for surveillance testing and maintenance and eliminated unnecessary surveillance testing. The change request was being held for later submission with other changes.

This LER also reported a condition encountered during emergency bus UV testing which resulted in entry into TS 3.0.3 for the containment recirculation spray system. NRC Inspection Report Nos. 50-338, 339/93-29 documented the inspectors' review of this condition. The inspectors verified that a TS change for the containment recirculation spray system was initiated by the licensee. The change was subsequently approved by the NRC on September 2, 1993, (Amendments 172 and 153). The inspectors also verified that the applicable procedures were updated to no longer require entry into TS 3.0.3 when performing the surveillance.

- h. (Closed) LER 50-338/93-008: Missed Surveillances to Functionally Test the Reactor Coolant System Loop Stop Valve Position Limit Switch Inputs to the Solid State Protection System and Manual Safety Injection Switch Input to the Reactor Trip and Bypass Breakers Due to Personnel Error

This LER reported a failure to test the RCS loop stop valve position limit switch input to SSPS and the SI switch input to the reactor trip and bypass breakers. When this issue was identified, Unit 1 was in a refueling outage and was not immediately affected by either missed surveillance. The surveillances were completed prior to MODE 4 entry for Unit 1. This issue was reviewed by the inspectors and discussed in NRC Inspection Report Nos. 50-338, 339/93-10.

To address the failure to test the Unit 2 RCS loop stop valve position limit switches, the licensee proved that the inputs from the valves to the SSPS were functional by a document review. The inspectors verified that the applicable procedures for both units were updated to ensure testing during future outages. The inspectors reviewed the Fall 1993 Unit 2 outage test results and considered the licensee's actions met the LER's intent. However, at the inspection period's end, the inspectors were continuing to review the method used to resolve a problem encountered during testing.

To address the failure to test the Unit 2 SI switch input to reactor trip, the licensee requested and received enforcement discretion. This was discussed in NRC Inspection Report Nos. 50-338, 339/93-10. The inspectors verified that applicable Unit 2 procedures had been updated. A new commitment item was being tracked to ensure the Unit 1 procedure would be updated prior to the Fall 1994 Unit 1 outage.

- i. (Closed) LER 50-338/93-015: Missed Surveillance on Portions of the Containment Pressure High-High Protection Channel Circuitry Due to Personnel Error

This LER reported a failure to test portions of the containment high-high pressure circuitry. When identified, the periodic test procedures were changed and the affected circuits' operability was verified. The inspectors verified that the applicable procedures were updated.

- j. (Closed) LER 50-338/93-017: Containment Hydrogen Analyzer Heat Trace Channel Calibration not Performed on a Staggered Test Basis as Required by Technical Specifications Due to Inadequate Implementation of Technical Specification Amendment

This LER reported a failure to test hydrogen analyzer heat trace circuits on a staggered test schedule. The inspectors verified that the licensee updated the applicable procedures and schedules



for testing containment hydrogen analyzer heat trace to conform to TS requirements.

No violations or deviations were identified.

8. Action on Previous Inspection Items (92701, 92702)

The following previous inspection items were reviewed and closed:

- a. (Closed) VIO 50-339/92-04-01: Failure to Perform Monthly Functional Tests on RCP Bus Undervoltage and Underfrequency Relays

This violation concerned the licensee's failure to test RCP bus underfrequency and undervoltage relays monthly as required by TS Table 4.3-1. The licensee modified surveillance procedures and schedules to meet the TS requirements and submitted a TS amendment which was approved and issued by the NRC. Additionally, the licensee initiated and completed the comprehensive TS surveillance review as discussed in paragraph 8.c. The inspectors concluded that the licensee's response, dated May 14, 1992, to the violation and the corrective actions were adequate.

- b. (Closed) VIO 50-338, 339/92-04-02: Inadequate Procedures for Refueling Frequency Undervoltage Relay Surveillance

This violation concerned the licensee's failure to calibrate the entire RCP undervoltage relay channels at refueling intervals. Specific to this violation, the licensee failed to test alarm and trip functions during the test. The licensee developed and implemented surveillance procedures to fully test the circuitry. This violation occurred coincident with the violation discussed in the paragraph 8.a and also prompted the licensee to initiate a detailed TS surveillance review (paragraph 8.c). The inspectors concluded that the licensee's response, dated May 14, 1992, to the violation and the corrective actions were adequate.

- c. (Closed) URI 50-338, 339/92-04-03: In Depth Review of TS Surveillance Procedures

In early 1992, the licensee initiated a TS surveillance test program review with the intent to reduce previously identified TS surveillance problems. The licensee completed this review in June 1993. The effort included reviews in TS chapters one through eleven and resulted in correcting numerous surveillance inadequacies. The licensee identified and notified the NRC for problems such as those reported in the LERs discussed in paragraph 7. The inspectors periodically monitored the program's progress and verified that appropriate actions were taken for deficiencies identified during the review. Past problem reviews were discussed in NRC Inspection Report Nos. 50-338, 339/92-13, 92-22, 92-23, 92-29, and 92-32. Overall, the inspectors concluded that the TS review program was comprehensive, provided excellent

results, and significantly contributed to an improvement in plant safety. The program was considered a strength.

No violations or deviations were identified.

9. Exit Interview

The results were summarized on February 24, 1994, with those persons identified in Paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results addressed in the Summary section and those listed below.

<u>Type</u>	<u>Item Number</u>	<u>Status</u>	<u>Description</u>
NCV	50-338, 339/94-02-01	Closed	Incorrect Fuel Oil Transfer Pump Lubrication (paragraph 4.b)
LER	50-338, 339/92-009	Closed	Missed Surveillance of Containment Purge and Exhaust Isolation System (paragraph 7.a)
LER	50-338/92-011	Closed	Missed Surveillance Requirements Due to Personnel Error During Initial Procedure Development (paragraph 7.b)
LER	50-338, 339/92-012	Closed	Missed Surveillance on Two Containment Isolation Instrument Air Supply Valves and Four Leakage Monitoring Connection Valves Due to Personnel Error Resulting in Inadequate Test Procedure (paragraph 7.c)
LER	50-338/92-013	Closed	Missed Surveillance on Engineered Safety Feature Response Time Testing for Auxiliary Feedwater Pump Starts Due to Station Blackout and Main Feedwater Pumps Tripped Caused by Personnel Error Resulting in an Inadequate Test Procedure (paragraph 7.d)
LER	50-338, 339/92-014	Closed	Missed Surveillances Due to Personnel Errors During Initial Procedure Development (paragraph 7.e)

LER	50-338/92-015	Closed	Missed Surveillance on Service Water Valve Position Verification for Valves Servicing the Safety Related Main Control Room and Emergency Switchgear Room Chiller Condensers Due to Personnel Error (paragraph 7.f)
LER	50-338/92-016	Closed	Two Conditions Outside the Technical Specification Occurred Due to Inadequate Initial Development of Test Procedures and Lack of Specific TS Guidance (paragraph 7.g)
LER	50-338/93-008	Closed	Missed Surveillances to Functional Test the Reactor Coolant System Loop Stop Valve Position Limit Switch Inputs to the Solid State Protection System and Manual Safety Injection Switch Input to the Reactor Trip and Bypass Breakers Due to Personnel Error (paragraph 7.h)
LER	50-338/93-015	Closed	Missed Surveillance on Portions of the Containment Pressure High-High Protection Channel Circuitry Due to Personnel Error (paragraph 7.i)
LER	50-338/93-017	Closed	Containment Hydrogen Analyzer Heat Trace Channel Calibration Not Performed on a Staggered Test Basis as Required by Technical Specifications Due to Inadequate Implementation of Technical Specification Amendment (paragraph 7.j)
VIO	50-339/92-04-01	Closed	Failure to Perform Monthly Functional Tests on RCP Bus Undervoltage and Underfrequency Relays (paragraph 8.a)

VIO	50-338, 339/92-04-02	Closed	Inadequate Procedures for Refueling Frequency Undervoltage Relay Surveillance (paragraph 8.b)
URI	50-338, 339/92-04-03	Closed	In Depth Review of TS Surveillance Procedures (paragraph 8.c)

Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

#### 10. Acronyms and Initialisms

AFW	Auxiliary Feedwater
AO	Auxiliary Operator
ASW	Auxiliary Service Water
CCW	Component Cooling Water
CDE	Cause Determination Evaluation
CFR	Code of Federal Regulations
CW	Circulating Water
DR	Deviation Report
EDG	Emergency Diesel Generator
ESF	Engineered Safety Feature
FOTP	Fuel Oil Transfer Pump
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LMC	Leakage Monitoring Connection
LOOP	Loss of Offsite Power
MFRV	Main Feedwater Regulating Valve
MOV	Motor-operated Valve
NCV	Non-cited Violation
NI	Nuclear Instrumentation
NRC	Nuclear Regulatory Commission
PAR	Procedure Action Request
PM	Preventive Maintenance
PORV	Power Operated Relief Valve
PT	Periodic Test
QC	Quality Control
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RFO	Refueling Outage
RPS	Reactor Protection System
RWST	Refueling Water Storage Tank
SG	Steam Generator
SI	Safety Injection
SNSOC	Station Nuclear Safety and Operating Committee
SOV	Solenoid-Operated Valve
SRO	Senior Reactor Operator
SSPS	Solid State Protection System
STA	Shift Technical Advisor
SW	Service Water

TS	Technical Specification
URI	Unresolved Item
UV	Undervoltage
VIO	Violation
WO	Work Order
WR	Work Request