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REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-348/94-13 and 50-364/94-13

Licensee: Southern Nuclear Operating Company, Inc.
P.O. Box 1295
Birmingham, AL 35201-1295

Docket Nos.: 50-348 and 50-364 License Nos.: NPF-2 and NPF-8

Facility Name: Farley Nuclear Plant (FNP), Units 1 and 2

Inspection Conducted: April 11 - May 8, 1994

Inspectors: Charles A Hughey for T. M. Ross, Senior Resident Inspector — 5/27/94 Date Signed

Charles A Hughey for M. J. Morgan, Resident Inspector — 5/27/94 Date Signed

Charles A Hughey for M. A. Scott, Resident Inspector — 5/27/94 Date Signed

Charles A Hughey for R. W. Wright, Project Engineer — 5/27/94 Date Signed
April 19-22, 1994

Approved by: Floyd S Cantrell — 5/27/94 Date Signed
Floyd S, Cantrell, Chief
Reactor Projects Section 1B
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## SUMMARY

Scope:

This routine resident inspection was conducted onsite in the principal areas of plant operations, maintenance, surveillance, safety system verification, review of nonroutine events, and follow-up of previous inspection findings; and to a lesser degree, health physics, physical security, fire protection, engineering attributes, and technical support. Deep backshift inspections were conducted on April 11, 12, 21, 22, 23, and 24 and May 7, 1994.

Results, as summarized by SALP functional area:

Operations

In general, operations personnel performed very well in controlling Unit 1 outage and startup activities in accordance with applicable plant procedures and in compliance with Technical Specifications. Both non-licensed and

licensed plant operators consistently demonstrated a high degree of knowledge and attentiveness. The orderly and methodical control of those activities required to restart Unit 1 were particularly well done. One violation was identified regarding poor communications between the Shift Supervisor and responsible personnel that resulted in the adverse operation of safety-related equipment following the implementation of revised tagging orders (see paragraph 3.d.).

Maintenance and Surveillance

Maintenance personnel conducted assigned activities in accordance with applicable procedures. Craft personnel and technicians demonstrated familiarity with approved administrative procedures and radiological controls, and demonstrated good craft skills. Surveillance testing by maintenance personnel was conducted in a strict step-by-step manner according to applicable procedures. Responsible surveillance personnel were very knowledgeable of the details of their assigned activities and consistently coordinated the critical aspects of these activities with operations. One inspector followup item was identified regarding corroded disc holders in stainless steel gate valves (see paragraph 4.c.). No violations or deviations were identified.

Engineering and Technical Support

Engineering and plant technical support was very good. Overall planning, installation, and testing of various modifications was excellent during Unit 1 refueling outage 12. Outage work was consistently well-supported by engineering and technical support staffs. Licensee's effort to assess the effectiveness of their program for maintaining and testing safety-related motor-operated valves (MOV) was thorough and self-critical. No violations or deviations were identified.

Plant Support

Health physics (HP) personnel provided exemplary support of outage-related and other site activities. Security personnel were consistently alert and implemented the site's security plan in an appropriate manner. Entry into the plant's protected areas was well controlled. The fire protection program, including compensatory measures, was properly implemented. No violations or deviations were identified.

## REPORT DETAILS

1. Persons Contacted

Southern Nuclear Operating Company (SNC) Employees

W. Bayne, Safety Audit and Engineering Review Site Supervisor
*C. Buck, Technical Manager
S. Casey, Systems Performance Supervisor
*T. Cherry, Safety Audit and Engineering Review Acting Supervisor
*R. Coleman, PMD Manager
P. Crone, Instrumentation and Controls Superintendent
L. Enfinger, Administrative Manager
*S. Fulmer, Superintendent Operations Support
H. Garland, Mechanical Maintenance Superintendent
*R. Hill, General Manager - Farley Nuclear Plant
*J. Hornbuckle, Safety Audit and Engineering Review Auditor
J. Kale, Chemistry/Environment Superintendent
M. Mitchell, Health Physics Superintendent
C. Nesbitt, Operations Manager
J. Odom, Superintendent Unit Operations
*J. Osterholtz, Assistant General Manager - Plant Support
J. Powell, Superintendent Unit Operations
L. Stinson, Assistant General Manager - Plant Operations
*J. Thomas, Maintenance Manager
*B. Yance, Systems Performance Manager
L. Williams, Training Manager

NRC Personnel

*S. Koenick, Intern
M. Morgan, Resident Inspector
*T. Ross, Senior Resident Inspector
*M. Scott, Resident Inspector

*Attended the exit interview

Other licensee employees contacted included, health physics, operators, technical staff, security, maintenance, I&C and office personnel.

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

2. Plant Status and Activities

a. Unit 1 began the inspection period in a shutdown condition and in the final phases of a planned refueling outage. The reactor was returned to power (critical) April 22 at 3:50 p.m. and low power physics testing was performed. On April 24 at 2:45 a.m. the unit entered Mode 1 (power >5%) operation. At 1:11 p.m., the same day, Unit 1 was synchronized to the grid, which signaled the official end of the twelfth Unit 1 refueling outage (U1RF12). The unit achieved full power operation on April 29.

b. Unit 2 operated throughout the inspection period at about 99.5% power. This unit operated at slightly less than full power due to administrative limits on Tavg (i.e., Average Tavg is being maintained at less than 575 degrees Fahrenheit).

c. Other NRC inspections or meetings at the site

1) During the week of April 18, Region II conducted a routine radiological protection/practices Inspection, Inspection Report (IR) 50-348,364/94-11.

2) During the week of May 2, Region II performed a radiochemistry practices and environmental services inspection (IR 50-348,364/94-14).

3) During the week of April 18, the Region II Project Engineer for FNP provided site coverage.

4) On April 29, a site resident inspector attended a Southern Nuclear Operating Company (SNC)/USNRC Re-engineering Management meeting in the Region II offices. This meeting was documented in a letter from Mr. J. R. Johnson (USNRC) to Mr. D. N. Morey (SNC) dated May 3, 1994.

3. Review of Plant Operations (71707) and Startup (71711)

a. Plant Tours

Routine plant tours, particularly of the control room and the auxiliary building, were performed to verify that the operating license and regulatory requirements were being met. In general, inspectors looked for the existence of unusual fluid leaks, piping vibrations, pipe hanger/seismic restraint settings, valve and breaker positions, equipment caution/danger tags, material and equipment conditions, overall housekeeping, fire protection features, and instrument calibration dates. Tours were conducted both on dayshifts and backshifts.

1) Walkdowns of Safety-related Equipment/Areas

Limited walkdowns of the accessible portions of safety-related systems, equipment and surrounding conditions in the following areas were performed:

- Unit 1 and Unit 2 Spent Fuel Pool Rooms
- Unit 1 Pipe Penetration Rooms
- Unit 1 Electrical Penetration Room
- Unit 1 and 2 Component Cooling Water Areas
- Unit 1 A and B Containment Spray Pump Rooms
- Unit 1 Containment
- Unit 2 Auxiliary Feedwater Pump Rooms

- 1-2A, 1B, 1C, 2B, and 2C Diesel Generator Rooms
- Unit 1 and Unit 2 RWST Spaces
- Unit 1 CHR Heat Exchangers Room

Breaker/switch, valve line-ups, equipment conditions, and housekeeping were examined both locally and in the control room. System lineups were verified to be in accordance with operability requirements. In general, safety-related equipment material conditions and area housekeeping were considered to be very good, except in the Unit 1 electrical and mechanical piping penetration rooms. In these rooms housekeeping conditions were poor and an excessive number of radiological boundaries were still posted. These problems were promptly brought to the attention of the responsible shift supervisor (SS) and health physics management.

The following are examples of some of the minor equipment problems identified by the inspectors during their tours of safety-related areas:

- The Unit 2 RWST level indication, Q2F16LT0501, was missing a mounting fastener and several parts.

- The Unit 1 RWST "non-safety related" fill line appeared to have minor leak.

- The Unit 1 RWST hold down fasteners, which ring the base of the tank, were corroded.

- The Unit 1 RWST level transmitter Q1F16LT0501 had a disconnected/loose flexible conduit wrapping.

- The Unit 1 RWST tank electrical ground strap at a drain point location identified as, "one inch valves at tank location 110", appeared to be loose.

- The balance steam pressure line joint, a one inch stainless steel flanged joint, on the 1B SGFP pump steam drive side, had developed a steam leak.

- A "licensee-identified" tube leak had increased slightly over that listed on the associated 2B CCW room cooler leak deficiency report, #500578.

- The 1B Emergency Diesel Generator (EDG) had a minor diesel fuel oil leak under the twin filter assembly.

- On the 1B EDG SW piping, a SW hanger/piping support, "SWH 726" was missing trim grout around one of the support's mounting plates. This did not, however, noticeably affect the mounting fasteners of the plate.

- The 2B EDG priming pump cover gasket developed a minor leak after the repairs discussed in paragraph 4.

- The 2B EDG "B" air compressor discharge relief valve Q2R43V536 developed a minor leak.

- On the 2B EDG, a non-essential maintenance part, a fuel rack ring used during fuel rack setup, was missing at the #6 EDG engine cylinder.

These "inspector identified" items were reported to the licensee (e.g., Shift Supervisor), who promptly addressed each one. At the end of the inspection period, the inspectors continued to monitor corrective actions associated with the mounting of and loose flex conduit on level transmitters LTG501 (both units). The inspectors noted that an engineering evaluation of a "licensee-identified" room cooler tube leak deficiency was in progress. None of the aforementioned items presented an immediate safety concern. Licensee actions will be examined during follow-up inspection tours.

2) Inspection Tours Prior To Unit 1 Startup

The inspectors conducted general tours of the auxiliary building and containment prior to and immediately after entry into Mode 4 operation. The inspectors did not identify any adverse material or equipment conditions that would unnecessarily delay subsequent mode changes or cause a concern about safety system performance. A number of minor equipment problems and housekeeping deficiencies were identified and brought to the attention of the responsible SS for action similar to the problem described in paragraph 3.a.1 above. Subsequent tours of a selected sample of these findings confirmed that the licensee had or was addressing these items.

3) Implementation of Plant Tagging Orders

During the inspection period, five (involving CCW, AFW and EDGs) clearances were verified to be properly implemented.

4) Inappropriate Attachment of Hold Tags

On March 27, 1994, during the Unit 1 outage, unattached clearance tags, associated with the "1B" reactor coolant pump termination box strip heater breaker, N1T51L002B-N-BRK9, and the "1B reactor coolant pump stator junction box space heater, N1T51L002B-N-BKR7 were found at the bottom of the associated containment breaker cabinet.

During a search for a tripped breaker, a plant systems operator (SO) found two hold tags that had apparently fallen off their associated breakers. The SO immediately reported the situation to the shift foreman. He also confirmed that the breakers were in the proper position called for by the tags and the associated clearance.

The Unit 1 shift foreman and SS attributed the problem to use of a minimal amount of tape in the original attachment of the tag to the breaker switch. They also noted that the breaker handle did not have provisions; (i.e., a "hole in the handle") for proper attachment of tags to the breaker. The tags were promptly and securely re-hung.

b. Routine Plant Operations Review

The inspectors periodically reviewed shift logs and plant operating records including instrument traces, chemistry reports, auxiliary logs, operating/standing orders, night order entries, and equipment tagout records. Inspectors routinely monitored operator alertness/demeanor, control room staffing and access, shift turnovers, and operator performance during routine operations. Random off-hours inspections were conducted to ensure that operations and security performance remained at acceptable levels. Control room annunciator status and alarms were verified.

1) Technical Specification Compliance

Compliance with selected Technical Specifications (TS) LCOs were verified throughout the inspection report period. LCO status sheets for Unit 1 and 2 were reviewed on a regular basis to confirm that entries into TS action statements were recognized, tracked, and within compliance. No problems were identified.

During the weekend of April 9, the 2B EDG failed to operate properly during a normal surveillance run. The EDG was shutdown, evaluated, repaired and satisfactorily retested within time constraints of the applicable LCO. Further discussion of this problem is located in the section 4.0 of this report.

2) Control Room Observations During Preparations For Unit 1 Startup (Mode 4 to Mode 2 Transition)

The inspectors observed control room activities from Hot Shutdown (Mode 4) to preparations for approach to criticality (Mode 2). Operations personnel exercised good command and control over all activities being performed in the control room area and in the field. Access controls were met and external distractions were kept to a minimum. Control room staffing met technical specification requirements.

Good communications and interactions were noted between the systems operators (SO), field technicians and control room operators. Inspector questions concerning status of plant systems/equipment were answered in a manner which demonstrated that personnel were aware of ongoing plant conditions. Alarms received were promptly acknowledged/evaluated and changes to plant conditions were accurately reported and logged.

Shift turnovers were thorough and professional. The shift supervisor (SS) briefing to on-coming shift personnel was effective and accurate in description of plant status, condition of equipment/systems, active LCOs and evolutions planned for the on-coming shift.

c. Unit 1 Restart Activities

1) Reactor Start-up and Low Power Physics Testing - Mode 3 to Mode 2 Transition

On April 22, at 3:50 p.m., Unit 1 successfully achieved criticality following U1RF12. Inspectors observed licensed operators perform a reactor startup in accordance with unit procedure UOP-1.2, "Startup from Hot Standby to Minimum Load". A resident inspector was present for the transition to Mode 2 operation and subsequent initiation of low power physics testing.

Prior to criticality, a pre-evolution briefing, in accordance with procedure AP-92, was held for operations and reactor engineering personnel by the test director and operations management on the details of expected reactor core and plant responses. Personnel expectations were also addressed. Applicable test document, 0-ETP-3601, Zero Reactor Power Physics Test, was included in the briefing. This procedure interfaced smoothly with implementation of UOP 1.2.

Criticality was achieved in a smooth, deliberate fashion, and occurred very close to the expected point of criticality (i.e., within 100 gallons of the predicted dilution point). The dilution rate was kept slow to limit the startup rate and make entry into the critical region readily observable. Good communications between the "at-the-controls" operators and reactor engineering personnel was exhibited throughout the evolution.

During these startup evolutions, operator and engineer actions were controlled, well-coordinated and demeanor was relaxed but attentive. The operators displayed a good "questioning attitude" and were well aware of the reactor's expected positive MTC at beginning of core life and possible effects at low power. Special test exceptions of TS 3/4.10 for rod position requirements were in effect for various portions of the test.

2) Post-Outage Mode 1 Reactor Operation/Start-up

On April 24 Unit 1 entered Mode 1 (reactor power greater than five percent) operation at 2:45 a.m. The reactor power was increased to about 20 percent in accordance with UOP-1.2. The operators did not experience any "at-the-controls" difficulties during start-up or initial reactor power increase. The main turbine was brought up on-line smoothly, but with some higher-than-expected vibrations on the number 5 bearing (discussed below). During subsequent power increases, these vibrations were observed to subside on their own. Power was momentarily held at approximately 30 and 48 percent power for chemistry holds and incore flux mapping. After these holds, Unit 1 was brought up to 100 percent power in accordance with UOP-3.1, prior to the end of the inspection period.

3) Turbine Overspeed Testing and Electrical Connection to the Grid

On April 24, in accordance with plant procedures UOP-1.2, and STP-151.5, "Main Turbine Overspeed Test", the Unit 1 turbine overspeed test was performed satisfactorily. Once testing was completed, the main turbine-generator was successfully "latched" (electrically) to the grid. A site resident inspector was present for both of these evolutions.

During main turbine roll and "no load" operation, vibration levels at the #5 shaft bearing were slightly elevated. The turbine vendor, after reviewing the vibration problem with maintenance personnel, issued a letter providing specific directions on acceptable vibration levels for the overspeed trip test and subsequent normal operation. These directions

were incorporated into UOP-1.2 as temporary change #7A. The "vendor suggested" a 14 mils limit for bearing #5 and 7 mils (i.e., normal alarm level) for the other eight bearings. During overspeed testing, the #5 bearing vibration continued to increase in amplitude; however, balance adjustment proved to be unnecessary. As the load was increased, vibration levels dropped to below alarm limits.

During the first turbine overspeed test, the #9 bearing alarmed. This alarm was promptly responded to by operations personnel and turbine shaft speed was reduced. While turbine speed was increased, there was a pause of about 5 minutes to evaluate a number of unrelated alarms. This pause most likely allowed the nodal vibration at the #9 bearing to build in. For the second attempt, no pause was taken during the turbine speed increase sequence. The turbine tripped at 1969 rpm which was well below the acceptance criteria for a maximum limit of 1998 rpm. No bearings exceeded vendor recommended vibration levels, and the turbine tripped as required/expected.

After the above test, the turbine was relatched and synchronized onto the electrical system grid. Generator load rates were limited to a reactor power increase of three percent/hour as required by procedure.

d. Inadequate Evaluation of Plant Conditions To Support Tag Removal During Outage Activities

During U1RF12, Unit 1 Shift Supervisors were responsible for three (3) separate incidents in which poor communications resulted in the failure to establish the proper plant conditions required for subsequent system testing or return to service. In each incident, the Shift Supervisor did not obtain sufficient information to allow an adequate evaluation of the impact that the revised tagging orders would have upon plant safety-related equipment. In all three cases, during preparations for system testing or return to service, the removal of tags and the associated actions to reposition plant components resulted in unexpected and adverse operation of safety-related equipment. An unresolved issue (URI) 50-348/94-07-03 was identified in the last monthly resident inspector report (IR) 50-348/94-07, regarding these incidents.

A brief summary of these incidents is as follows:

1) On March 31, the SS approved the implementation of tagging order 94-0137-0 Revision 4 to reenergize the 208 VAC section of MCC 1G in order to return the "B" Train Control Room Ventilation System (CRVS) to service. The MCC was reenergized, prior to completion of scheduled post-modification testing (PMT), in order to allow exiting of the

CRVS TS Action Statement as soon as possible. About six (6) hours later, operators realized that several computer room and control room ventilation fans, powered by MCC 1G, were rotating backwards.

A subsequent licensee investigation determined that during MCC 1G electrical modifications, certain power leads had been inadvertently reversed. Had the SS understood the status of MCC 1G modifications and scope of PMT to be performed, this problem could have been identified before the implementation of revision 4 to tag order 94-0137-0.

2) On April 2, a SS approved implementation of tagging order 94-0697-1 Revision 2 during preparations to perform FNP-1-STP-16.10, "Containment Spray System Check Valves and Pump Flow Test - A Train." The tagging order was intended to restore "A" train CS system integrity following installation of a spool piece which would direct CS discharge to the reactor cavity during STP-16.10. However, revision 2 of tagging order 94-0697-1 failed to close two test connection isolation valves on the discharge side of the 1A CS pump.

   While establishing initial conditions for STP-16.10, the responsible Unit 1 SS failed to adequately review the status of active tagging orders affecting the "A" train CS system. Consequently, when the 1A CS pump was started, RWST water was discharged into containment and 1A CS pump room. Three individuals were sprayed with water and received minor contamination on their shoes and clothes.

3) On April 2, the Unit 1 SS approved implementation of tagging order 93-3379-1 Revision 1 to place the "A" Train Solid State Protection System (SSPS) Mode Selector Switch in the OPERATE position in preparation for surveillance testing on the containment sump to residual heat removal (RHR) system interlock (i.e., FNP-1-STP-11.13). Although the SS was aware that I&C technicians were in the process of performing other unrelated tests in the "A" train SSPS, he failed to fully understand or explore the status of these testing activities. When the SSPS mode selector switch was placed in "OPERATE", per STP-11.13, an "A" train CS Actuation occurred causing several SSPS CS relays to pickup as a result of an electrical short circuit via the I&C test equipment installed for STP-256.11 time response testing. Since the CS system was already tagged out, the only safety-related equipment that operated, (except for the chattering of SSPS relays), was the CS Additive Tank Outlet Valve.

These three incidents are considered examples of a failure to follow FNP-0-AP-14, Revision 15, "Safety Tagging," Sections 5.3 and 7.35 which require the SS, as the "approving official", to be

responsible for execution of tagging orders with regard to their effect on plant status. This is also applicable during removal of tags when particular attention is required to assure plant components are restored to the desired status. This failure to follow plant procedures is considered a violation and identified as VIO 50-348/94-13-01, "Inadequate Evaluation of Plant Conditions Prior to Removing Tags."

One cited violation and no deviations were identified. In general, operations personnel performed very well in controlling Unit 1 outage and startup activities in accordance with applicable plant procedures and in compliance with the Technical Specifications. Both non-licensed and licensed plant operators consistently demonstrated a high degree of knowledge and attentiveness. The orderly and methodical control of those activities required to restart Unit 1 were particularly well done. One violation was identified regarding poor communications between the SS and responsible personnel that resulted in the adverse operation of safety-related equipment following the implementation of revised tagging orders (VIO 50-348/94-13-01).

4. Maintenance Observation (62703)

The inspectors observed/reviewed portions of various licensee preventative and corrective maintenance activities, to determine conformance with facility procedures, work requests and NRC regulatory requirements. Work requests and instructions were also evaluated to determine the status of outstanding jobs and to ensure that proper priority was assigned to safety-related equipment.

a. Portions of the following maintenance activities were observed:

1) MWR-281004; Changeout of filter elements in the Unit 1 spent fuel pool "Tri-Nuc" filter

Mechanical maintenance (MM), operations, and HP organizations co-operated in a joint effort to replace the spent fuel pool (SFP) filter elements with an improved (higher micron sized) filter. The "older" (lower micron sized) filters required frequent cleaning and, at times, caused higher amperages than desired in the pumps. HP instituted strict radiological controls while operations provided positive direction over MM activities. All groups practiced proper foreign material exclusion while in the vicinity of the SFP and change-out was performed satisfactorily.

2) WO275380; 1B EDG - Repair leak in the jacket water (JW) heat exchanger

The inspectors observed portions of trouble-shooting and repair efforts associated with a suspected leak in the

jacket water heat exchangers as part of scheduled maintenance on the 1B EDG. A leak was found in the basket area of the heat exchanger and subsequently repaired by tube plugging. Follow-up testing of the heat exchanger and jacket water system indicated a successful repair. Work observed by the inspectors was performed satisfactorily in accordance with directions contained in the work order, repair package and EDG technical manual.

3) WO404711; Inspect 1B EDG alternator and clean collector rings and field windings per the electrical maintenance procedure

The inspectors observed portions of the generator cleaning activities associated with scheduled maintenance of the 1B EDG. Appropriate cleaning equipment was present at the job site and proper safety precautions were followed by the craft (i.e., glasses, gloves and filtered face masks were worn while working and cleaning in dust areas of the generator). The work performed was satisfactory and in accordance with directions contained in the work order, cleaning package, maintenance procedure and the EDG technical manual.

4) WO277873; Inspect and repair the 1B EDG air intake header for possible cracks

Inspectors observed the NDE portions of this work order being performed as part of scheduled outage maintenance on the 1B EDG. Dye penetrant testing revealed cracking similar to that found in the air intake header manifolds of the 2B EDG during the recent Unit 2 outage in October/November, 1993. In a follow-up field inspection of this work order, the inspectors noted that three of the six suspected manifolds had been replaced with "previously repaired" 2B EDG manifolds and that the remaining three are still in-place while the licensee waits for parts from the EDG manufacturer. SNC engineering studies and analysis determined that the small surface cracks found in joints of the "still to be replaced/repaired" manifolds pose no real problem with 1B EDG function or operability.

Both the NDE testing and repair work performed was satisfactorily accomplished in accordance with directions contained in the field work order, NDE and repair packages, manufacturer's welding recommendations memorandum and the EDG technical manual.

5) WO0409887; Inspection and PM of the 1C DG air start systems

Inspectors observed MM personnel perform routine PM activities on the 1C air compressor in accordance with plant procedure MP-12-12.3. The air start system was properly tagged out and work was appropriately authorized. Craft personnel demonstrated a high level of familiarity with the air start system and adequately followed work instructions.

6) MWR-253385 and MWR-253386; Replace Rosemount transmitters for compliance with NRC Bulletin 90-01, Supplement 1

The above MWRs were administrative control packages for the replacement of two Unit 1 Rosemount transmitters pursuant to prior SNC commitments to comply with Bulletin 90-01. The transmitters involved were for AFW pump flow to the 1A SG (Q1N23FT3229A) and a RCS pressure transmitter (Q1B21PT0402). An inspector reviewed the completed work packages on the replaced transmitters for testing documents, material traceability sheets, M&TE records, and installation notes. The inspector also observed both instruments in normal operation, and physically examined the installed 1A SG flow transmitter. The documentation, operation, and installation of these transmitters were considered acceptable.

7) MWR-278454; Disassemble, inspect, and repair valve Q2N23V003

This work package involved inspection and replacement of the stellite bushings in the Unit 2 turbine driven AFW pump discharge check valve (Q2N23V003) and was performed as a part of the normal PM program for valves. The inspectors observed disassembly of the valve and subsequent examination of the parts removed from the valve body. Valve parts were in good condition with some wear on the stellite hinge pin bushings; however, the bushings were still serviceable. Parts were systematically replaced prior to the onset of a possible failure. The disk and seat were found to be in good condition. MM personnel followed applicable work instructions including, housekeeping (i.e.; the "bagging and tagging" of parts) and cleanliness controls for the open system. Appropriate work package documentation was located at the jobsite.

8) WO00064107; 1B CCW heat exchanger maintenance

On May 4, the inspector observed MM personnel plug tubes in the Unit 1 "B" CCW heat exchanger. These tubes were identified by eddy current inspections conducted by a contractor controlled by the site's System Performance (SP) Group. SP provided a drawing to MM indicating which tubes needed plugging. MM personnel then selected the correct

tubes for plugging and proceeded to drive plugs. The mechanic used a 24 ounce hammer to install (ring home) the brass plugs. His technique was good and the plugs appeared to be firmly seated without overstressing the tube sheet. The plugs had been correctly drawn from stores. The WO package contained little in the way of detailed repair instructions on plugging, relying heavily on the skill of the craft. After MM completed the job, a SP supervisor checked the plugs for correct positioning.

The mechanics had received SNC entry-level training on heat exchangers. The inspector reviewed the training material, viewed a vendor provided training tape on heat exchangers, and discussed the training with an instructor. Although the training material was general and generic in nature, the training staff did provide additional details during the training. Although practical application is not demonstrated or experienced by the trainee, on-the-job training was used to provide mechanics with these practical facts as they become journeyman. Based on this review and the fact that MM mechanics performed their job well, the inspector had no further concerns.

b. Investigate Fuel Oil Injection Problem and Repair If Necessary (W000505550 and W000062510)

On April 11 the 2B EDG failed to run properly after a routine surveillance start. The above work control documents were but two of several WOs written to troubleshoot indications of fuel oil (FO) starvation. The inspectors were present during implementation of the two WOs, including other aspects of the root cause investigation which occurred over a two day period. The first WO authorized an examination, and removal of the foot valve and piping, of the FO day tank.

The second WO authorized removal, inspection, and replacement of the twin fuel filters on the EDG. Although there were no identified problems during disassembly of the foot valve or its piping, the foot valve was replaced. No trash or debris was observed in the valve or FO tank that could have blocked the valve open. The foot valve was replaced based on previous experiences with valve piping air in-leakage problems in the 1B EDG two years ago. Although no abnormal FO pressures had been observed, the FO filters were inspected and replaced. No visual abnormalities were observed with the removed FO filters or their housings.

During their investigation, the following were performed within the allowed EDG LCO action statement time limit:

- Pressurized the suction piping to the day tank
- Inspected a check valve upstream of the FO priming pump

- Pressurized the FO piping up to the filter housing
- Disassembled the manual priming pump
- Disassembled the diesel driven mechanical fuel pump
- Conferred with the EDG vendor
- Multiple maintenance starts of the 2B EDG after various corrective actions were implemented

Even after the above troubleshooting, no direct cause for the failure was identified. The air pressure test of the FO system revealed a very small air leak at about 30 psig; however, this leak was not obvious at the normal FO pump suction pressure of less than 5 psig. The leak, which was found at a FO line coupling, would not have been detectable during normal operation and was not thought to be a major contributor to a FO starvation problem. An examination of the FO mechanical pump revealed some worn parts, but did not identify any major problems. An internal relief valve (i.e., spring-loaded ball check in the mechanical pump) was changed out during disassembly. The new relief valve increased previous FO pressure from a minimal acceptable value to approximately 17 psig higher (which is indicative of better FO pump pressure/performance). By the time that the investigation was completed, mechanical maintenance department personnel and the inspectors were confident that the FO system was reliable.

It was concluded that multiple minor degradations discovered in the FO system had caused the fuel starvation symptoms. The inspector observed the last two post-maintenance starts of the 2B EDG prior to its release to the operations group for surveillance testing. The licensee's efforts were comprehensive and commensurate with the importance of the EDG to plant safety.

The 2B EDG was satisfactorily tested immediately after completion of the maintenance activity and this surveillance test was completed prior to the end of the LCO time limit. Since then, the EDG has passed a second surveillance test.

c. William Powell (WP) Gate Valve Disc Holder Corrosion Problems

In December 1991, the licensee replaced a SW to CCW room cooler gate valve stem, disc and disc holder assembly. The assembly was replaced because the boss edges (i.e., the "ears") of the disc holder were severely corroded, causing the holder and disc to separate from the valve stem. Although the valve indicated outward, "open", movement, when operated, the detached disc and holder remained in a "closed" position and obstructed SWS flow to the CCW system room cooler.

An engineering evaluation indicated that metallic corrosion of the carbon steel disc holder had occurred. The holder, mounted between a stainless steel stem and disc, and suspended in service water, was subjected to localized galvanic corrosion.

The licensee purchased these stainless steel valves specifically for use in the SW system. However, in retrospect, it would appear they were unaware that the valves contained carbon steel disc holders. The Unit 1 valves had been in service approximately 14 years, and Unit 2 valves about 9 years, prior to the problems noted in 1991. To date, only one valve, the severely corroded CCW system room cooler valve, actually failed and was considered to be inoperable by the plant staff.

In July 1992, the vendor identified 22 SWS valves (11 per unit), supplied with carbon steel holders which were considered susceptible to the form of corrosion experienced in 1991. Four of these valves were deleted by other plant modifications.

During a 1992 Unit 1 outage and a 1993 Unit 2 outage, the remaining 18 suspect valves, all 10-inch gate valves used in normal and emergency containment cooler discharge isolation valve applications, were inspected for evidence of corroded valve holders. Nine of valves showed little or no signs of galvanic corrosion or holder deformation. However, these valves had been repaired between 1989 and 1991, using an upgraded, all-stainless steel stem, disc and holder assembly package. The remaining valves which had not been repaired/replaced exhibited signs of holder deterioration and galvanic corrosion. These valves were subsequently repaired.

This type of corrosion may not be limited to SWS environments and further investigation into the extent of this problem is warranted. Because the licensee identified the rudiments of the problem and initiated specific corrective actions, URI 50-348/92-24-04 and 50-364/92-24-02, "Unreported defect - corrosion of WP gate valve disc holders" are now considered closed. Licensee engineering personnel are conducting further investigation into the extent of the problem to determine the full scope of the issue. This is identified as Inspector Followup Item (IFI) 50-348,364/94-13-02; FNP WP Gate Valve Disc Holder Corrosion.

Maintenance personnel conducted assigned activities in accordance with applicable procedures. Craft personnel and technicians demonstrated familiarity with approved administrative procedures and radiological controls, and demonstrated good craft skills. One inspector followup item was identified regarding corroded disc holders in William Powell stainless steel gate valves (See paragraph 4.c.)

5. Surveillance Observation (61726)

The inspectors witnessed surveillance test activities performed on safety-related systems and components in order to verify that such activities were performed in accordance with facility procedures, and NRC regulatory and licensee technical specification requirements. Portions of the following surveillance tests were observed:

a. FNP-1-STP-5.0, Full Length Control Rod Operability Test

An inspector observed operations personnel demonstrate operability of full length control rods while in Mode 3 (all rods fully inserted). Highlighted procedural steps were performed for all shutdown bank rods. The entire surveillance activity was performed satisfactorily in accordance with STP-5.0. Each full length rod responded appropriately to control signals and moved at least 10 steps.

b. FNP-1-STP-35.0, Reactor Coolant System Pressure and Temperature/Pressurizer Temperature Limits Verification

This surveillance was performed to ensure that RCS pressure and temperature limits and pressurizer temperature limits were not exceeded during RCS heat-up (H/U). An inspector observed portions of RCS H/U between Modes 4 and 3, where RCS and pressurizer temperature changes were not allowed to exceed 100 degrees F in any one hour. Inspector review of the "RCS H/U Limitations" graph confirmed that RCS and pressurizer temperatures/pressures remained within the acceptable operating range.

c. FNP-1-STP-108, Incore Thermocouples

A channel check of the incore thermocouples, as required by Unit 1 TS 4.3.3.8 was observed by the inspectors during Mode 3 operation. The entire surveillance was performed satisfactorily; however, three out of tolerance (i.e., greater than $\pm$10 degrees F of the average T-hot temperature) core exit thermocouples were identified. The plant technical review group proposed to reevaluate the three out of tolerance thermocouples during hot full power conditions.

d. FNP-0-STP-80.2, 1C Diesel Generator Operability Test

The inspectors observed a successful operability demonstration of the 1C DG and its associated air start system solenoid valves in accordance with STP-80.2. This surveillance test was performed satisfactorily with a total run time of 2 hours and 43 minutes. The 1C DG operated as expected. Plant operators conformed with the step-by-step instructions of STP-80.2.

e. 1-STP-151.5, Main Turbine Overspeed Test

This surveillance was discussed in section 3.c.3 of this report.

f. 1-STP-16.2, Containment Spray Pump 1B Inservice Test

On April 28 an inspector observed the successful performance of STP-16.2. However, during pump operation, the 1B CS pump

exhibited unusual performance characteristics regarding seal leakage and bearing oil level.

The 1B CS pump outboard mechanical seal had an existing water leak (about one drop per minute). During this test, the leakage slowly increased to approximately 20 dpm, stabilized, and then decreased to a leakage rate of about 2 to 5 dpm. This kind of leakage does not usually pose any immediate concern of degraded pump performance. Often, such minor seal leakage can continue indefinitely.

During the test run, just after the pump was started, the inboard pump pillowblock [bearing housing] bearing oiler level went from approximately 45 percent to zero as indicated in the bearing oiler fill/level jar. With the pump operating, the fill/level jar was removed and the oil level in the oiler inner chamber was verified. This confirmed that the pillow block bearing reservoir was still full of oil and there was no immediate danger of pump damage. The surveillance test being run was continued. The bearing housing exhibited no visible external leaks. No recent housing maintenance had been performed. The operators stated that such changes in oil level on this type of pump bearing have occurred before and did not consider it to be unusual. Generally, after such a pull down of oil level, the level would return after the pump was shut down. However, when this pump was shutdown, the oil level did not return. The oiler jar was refilled and level remained constant (which further supported the fact that the pillow block reservoir was full). The inspector concurred with the licensee that the pump was still operable.

The licensee's operations and maintenance staff are investigating these conditions as part of the inservice test program for pumps, and plan to reevaluate them for any trends indicative of degrading pump performance during the next scheduled surveillance test.

g. 2-STP-228.9, NI System Power Range Channel 4N41 Overpower Trip Calibration Functional Test

A new procedure was completed satisfactorily on April 13 which represents a radical reduction in scope from the previous quarterly STP. I&C personnel involved with this test had initially exercised the new procedure on the plant simulator to ensure it would work correctly. All instrumentation and annunciation responded as expected. The responsible I&C personnel were familiar with the details of the test and followed its instructions in a deliberate step-by-step manner.

No violations and no deviations were identified in this area. Surveillance testing by maintenance personnel was conducted in a strict step-by-step manner according to applicable procedures. Responsible surveillance personnel were very knowledgeable of the details of their

assigned activities and consistently coordinated the critical aspects of their activities with operations.

6. Engineering and Technical Support

a. Installation and Testing of Modifications (37828)

Engineering provided timely support of the following described PCNs.

Portions of the following PCNs were reviewed and/or observed in the field by the resident staff:

1) PCN S94-1-8700 (WOS00060107); Install lightning protection grounding on the circulating water pump (CWP) motors

The inspectors observed electrical maintenance personnel providing lightning and surge protection enhancements for the Unit 1 CWP A and B motors. These enhancements consisted of the following:

- Removal of the surge counters from the surge packs
- Improvements in the CWP motor housing grounding straps/circuits
- Connecting of surge capacitors directly to the buss bars

These enhancements were recommended following a lightning strike on the 2B CWP motor last year to reduce the likelihood for future lightning damage to the subject motors.

2) PCN B91-1-7850; Manual start with automatic loading of the 2C diesel generator for station blackout conditions

To comply with the Station Blackout (SBO) Rule (i.e., 10 CFR 50.63), the licensee made certain commitments to the NRC including modification of the 2C emergency diesel generator (EDG) into an alternate AC (AAC) source. Plant change notice (PCN) B91-1-7850 represented the Unit 1 portion of the SBO design change to convert the 2C EDG into an AAC power source for Unit 1. This PCN was implemented during U1RF12. The Unit 2 portion of this design change was implemented last year during U2RF09 in accordance with PCN B91-2-7851. The principal purpose of PCNs B91-1-7850 and B91-2-7851 was to provide for manual start and automatic loading of the 2C DG during SBO conditions on either Unit 1 or Unit 2.

In addition to performing a routine surveillance start of the 2C SBO EDG, PCN B91-1-7850 also specified two other special system tests to fulfill post-modification testing requirements following completion of modifications. These two PMTs were FNP-0-PMP-1207, "Functional Test Of Diesel Generator 2C Controls Following PCN B91-1-7850," and FNP-1-STP-40.2, "B Train Sequencer Operability, Load Shedding Circuit, and 2C DG SBO Start Test." An inspector reviewed the completed official test copies of PMP-1207 and STP-40.2, and discussed the results with responsible plant personnel. Both PMTs were conducted without incident. In both cases, plant equipment performed according to design and met established PMT acceptance criteria. With the completion of U1RF12 modifications, management considers its SBO commitments for FNP to be fully implemented.

b. Motor-Operated Valve Program - Licensee Self-Assessment (37551)

With the completion of safety-related motor-operated valve testing and maintenance activities during U1RF12, SNC management considers its scheduled commitments for implementing the actions of Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance" to be fulfilled. However, in order to confirm the acceptability of its GL 89-10 program prior to the end of U1RF12, SNC Corporate contracted a team of consultants to conduct an onsite assessment during the week of April 11. This team appeared to be knowledgeable of industry and NRC issues related to implementation of a satisfactory MOV program. Their assessment was thorough and critical. During the exit on April 15, the SNC consultants concluded that the overall GL 89-10 program was acceptable. They highlighted some program strengths but also identified a number of areas that could be improved. These areas of improvement appeared to be significant and meaningful observations. (Additional review of this program is discussed in IR 50-348,364/94-10)

Engineering and plant technical support was very good. Overall planning, installation, and testing of various modifications during U1RF12 was excellent. Unit 1 outage work was consistently well-supported by engineering and technical support staffs. Licensee's effort to assess the effectiveness of their program for maintaining and testing safety-related motor-operated valves (MOV) was thorough and self-critical.

7. Plant Support

a. Fire Protection Review (64704)

During the course of their normal tours, the inspectors routinely examined aspects of the Fire Protection Program such as transient fire loads, flammable materials storage. fire brigade readiness,

ignition source/fire risk reduction efforts, and fire protection features. During the inspection period, the inspectors verified that appropriate fire watches were in place to compensate for fire protection features removed from service during U1RF12. The use of fire watches observed by the inspectors conformed with the site Fire Protection Program.

b. Physical Protection (81054)

The inspectors verified by observation during routine activities that security program plans were being implemented as evidenced by proper display of picture badges, tours/stationing of security personnel, searching of packages/personnel at the plant entrance and vital area portals being locked and alarmed.

During outage, U1RF12, contractor access to the protected area was controlled through the Secondary Access Point (SAP) and after the outage, the SAP was properly secured. All site personnel resumed entry via the Primary Access Point (PAP). Security personnel and equipment at the PAP and SAP performed well both during and after the outage.

Licensee activities observed during the inspection period appeared adequate to ensure physical protection of the plant. Guards were alert and particularly attentive to open doors. Their posted positions were well manned with frequent relief.

c. Health Physics

Health physics technicians demonstrated a constant vigilance for changing radiological conditions. Their support and coverage of ongoing activities provided a positive contribution to the safety of plant personnel during the inspection period.

Health physics (HP) personnel provided exemplary support of outage-related and other site activities. Security personnel were consistently alert and implemented the site's security plan in an appropriate manner. Entry into the plant's protected areas was well controlled. The fire protection program, including compensatory measures, were properly implemented.

8. Action on Previous Inspection Findings (92700) and Licensee Event Reports (90712)

a. (Closed) URI 50-348/92-09-01; Discharge of CO2 in DG Building

The licensee replaced each of the 4160V cabinet fire detectors due to a possible breakdown in the sensor dielectric material. Since this event in March 1992, similar activations of the CO2 system to these cabinets have not occurred. Based on these licensee

corrective actions and because the problem has not reappeared, this URI is considered closed.

b. (Closed) URI 50-348/92-24-04 and URI 50-364/92-24-02, Unreported Defect - Corrosion of WP Gate Valve Disc Holders

These URIs are now considered closed based on the issuance of IFI 50-348,364/94-13-02 (see paragraph 4.c).

c. (Closed) LER-364/93-01, Inadvertent Safety Injection Due To Personnel Error

The individual involved was disciplined for his failure to fully use all available self-verification techniques and for his failure to effectively communicate with other crew personnel. The procedure that contributed to the error, STP-33.0, was revised to include expected lamp indications (for plant conditions). This incident was presented as an example of personnel error during surveillance testing in the licensed operator requalification program. Based upon the implementation of these corrective actions, this item is considered closed.

d. (Closed) LER-364/92-09; Agastat Timers on EDG Sequencers Failed to Meet Acceptance Criteria

The previous, Unit 1 Agastat relays, Models E7012 and 7014, were replaced during the Unit 1 outage (per PCN B92-1-8266) with solid state Agastat, series ETR14, timer relays. A similar PCN is presently planned for the existing Unit 2 Agastat timer relays. Due to the successful testing results of the Unit 1 series ETR14 relays, and current plans for replacement of Unit 2 relays, this item is considered closed.

e. (Closed) URI 50-348/94-07-03; Improper Release of Equipment

This URI is now considered closed based on the issuance of VIO 94-13-01 (see paragraph 3.d).

9. Exit Interview

Inspection scope/findings were summarized during management interviews throughout the report period and on May 12, 1994, with the plant manager and selected members of his staff. Inspection findings were discussed in detail and the licensee acknowledged these findings. The licensee did not identify as proprietary any material reviewed by the inspectors during this inspection.

| ITEM NUMBER | DESCRIPTION AND REFERENCE |
|---|---|
| 50-348/94-13-01 (VIO) | Inadequate Evaluation of Plant Conditions Prior to Removing Tags |

50-348,364/94-13-02 (IFI) WP Gate Valve Disc Holder Corrosion

10. Acronyms and Abbreviations

AFW - Auxiliary Feedwater
AP - Administrative Procedure
ASME - American Society of Mechanical Engineers (construction Code)
CCW - Component Cooling Water
CR - Control Room
CRT - Cathode Ray Tube
EDG - Emergency Diesel Generator
DRP - Division of Reactor Projects
DRS - Division of Reactor Safety
DRSS - Division of Reactor Safeguards and Security
ECCS - Emergency Core Cooling System
EHC - Electro-hydraulic Control System
ESF - Engineered Safety Features
FHP - Fuel Handling Procedure
FNP - Farley Nuclear Plant
FP - Fire Protection
FW - Feedwater
GMP - General Maintenance Procedure
HP - Health Physics
ISI - In-service Inspection
I&C - Instrumentation and Control
KW - Kilowatt
LCO - Limiting Condition for Operation
LER - Licensee Event Report
L/D - Letdown
LOSP - Loss of Offsite Power
MCC - Motor Control Center
MFP - Main Feedwater Pump
MOV - Motor-Operated Valve
MSIV - Main Steam Isolation Valve
MTC - Moderator Temperature Coefficient
MW - Megawatt
MWR - Maintenance Work Request
NDE - Non-Destructive Examination
NCV - Non-cited violation
NI - Nuclear Instrument or NIS (system)
OOS - Out Of Service
PCN - Plant Change Notice
PM - Preventive Maintenance
PMT - Post Modification Testing
PRF - Penetration Room Filtration System
psig - pounds per square inch
RCS - Reactor Coolant System
RHR - Residual Heat Removal
RWT - Reactor Water Storage Tank
SBO - Station Blackout
SFI - Shift Foreman Inspecting

| | | |
|---|---|---|
| SFO | - | Shift Foreman Operating |
| SFP | - | Spent Fuel Pool |
| S/G | - | Steam Generator |
| SGFP | - | Steam Generator Feedwater Pump |
| SNC | - | Southern Nuclear Operating Company |
| SO | - | Systems Operator |
| SOP | - | System Operating Procedure |
| SSPS | - | Solid State Protection System |
| SS | - | Shift Supervisor |
| STAR | - | "Stop", "Think", "Act", "Review" |
| STP | - | Surveillance Test Procedure |
| SW | - | Service Water System |
| Tavg | - | Temperature (average) in the RCS |
| TCN | - | Temporary Change Notice |
| UOP | - | Unit Operating Procedure |
| URI | - | Unresolved Issue |
| WP | - | William Powell |