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

Report Nos.: 50-348/95-18 and 50-364/95-18

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, Units 1 and 2

Inspection Conducted: September 18 through October 22, 1995

Inspectors: FOR R. W. Wright 11/20/95
T. M. Ross, Senior Resident Inspector Date Signed

FOR R. W. Wright 11/20/95
M. A. Scott, Resident Inspector Date Signed

FOR R. W. Wright 11/20/95
S. G. Tingen, Project Engineer Date Signed

Approved by: 11/21/95
P. H. Skinner, Chief Date Signed
Reactor Projects, Branch 2
Division of Reactor Projects

SUMMARY

Scope:

This routine resident inspection was conducted onsite in the functional areas of operations, maintenance/surveillance, engineering/technical support and general plant support. The inspection included a review of nonroutine events and a follow-up of previous inspection findings. Backshift inspections were conducted on September 19, 24, 26, 27, 28 and October 1, 2, 3, 4, 5, 7, 9, and 18, 1995.

Results:

Operations

Operations personnel and management maintained excellent control over routine full power operation of Unit 2, and Unit 1 shutdown conditions. Operators remained attentive to changing plant conditions and were knowledgeable of plant status and ongoing activities. Unit 1 refueling, midloop, and system return to service activities were well controlled and accomplished according to established operating procedures. The expedited shutdown of Unit 2 for Hurricane Opal, and subsequent restart, were performed in a smooth and deliberate manner by plant operators without incident. A minor problem regarding inadequate signoff of initial conditions for shutdown was

identified. Overall plant response to Hurricane Opal was exemplary. Compared to previous outages, Operations exhibited significant improvement in their preparation and execution of tag orders, clearance and configuration control, and release of work during the Unit 1 outage. General housekeeping and control over Unit 1 physical conditions was poor during the Unit 1 outage. Unit 2 housekeeping and equipment conditions degraded significantly during this same period due to inadequate management attention.

Maintenance/Surveillance

Maintenance and surveillance test activities were generally performed in accordance with work order instructions, applicable procedures, and applicable clearance controls. Responsible personnel demonstrated familiarity with administrative and radiological controls. Surveillance tests were routinely performed in a deliberate step-by-step manner by knowledgeable plant personnel. Almost all major maintenance and test evolutions were well planned and executed. Two notable examples included the safety injection with loss of offsite power and sequencer load shed tests. However, several activities involved poor procedure adherence that resulted in a violation (paragraph 4.c). Two additional violations were also identified involving the indiscriminate use of non-temperature compensated pressure gauges (paragraph 4.b.6), and failure to test or maintain control room pressurization unit humidistats (paragraph 4.a.2). Significant maintenance rework problems were also experienced during the Unit 1 outage on the 1B emergency diesel generator and 1B containment spray pump which resulted in a non-cited violation (paragraph 4.a.5).

Engineering/Technical Support

Overall engineering and technical support of the plant remained excellent. Onsite engineering continued to interface well with the corporate office. A large number of system and equipment modifications were successfully implemented during the Unit 1 outage. Plant modifications and design engineers were routinely on location providing valuable field support. Post-modification testing was almost always well planned and directed by experienced engineers; the only exception being an uncontrolled spill in the radiologically controlled auxiliary building during a Unit 1 hydrostatic test.

Plant Support

Health physics (HP) personnel provided good support of Unit 2 steady-state operations and the Unit 1 outage. Although the ambitious radiation exposure goal for the Unit 1 outage was not reached, extensive dose reductions were achieved for a large number of jobs. However, HP did not perform well in maintaining physical control of equipment, tools or supplies in the RCA or containment during the outage. Foreign material control of refueling areas were well controlled. HP management continued to proactively inform the resident staff of ongoing radiological issues, including the discovery of an unlocked exclusion area. Security personnel were consistently alert and

implemented the site's security plan in an appropriate manner. Personnel entry into the protected area was well controlled at both the primary and secondary access points. Fire protection features were adequately maintained, compensatory measures (i.e., fire watches) were fully implemented, and, except for one instance, work involving open flames was properly controlled. Emergency preparedness, planning and response capabilities were well executed during Hurricane Opal .

REPORT DETAILS

1. PERSONS CONTACTED

Southern Nuclear Operating Company Employees:

*W. Bayne, Chemistry/Environmental Superintendent
C. Buck, Technical Manager
*R. Coleman, Maintenance Manager
*P. Crone, Licensed Training Supervisor
L. Enfinger, Administrative Manager
*D. Grissette, Operations Manager
H. Garland, Mechanical Maintenance Superintendent
C. Hillman, Security Manager
*R. Hill, General Manager - Farley Nuclear Plant
R. Johnson, Instrumentation and Controls Superintendent
*L. Jones, Materials Supervisor
J. Kale, Maintenance Engineering Support Group Supervisor
J. McGowan, Safety Audit and Engineering Review [Corporate] Manager
M. Mitchell, Health Physics Superintendent
R. Monk, Engineering Support Supervisor - Equipment Evaluation
C. Nesbitt, Assistant General Manager - Plant Support
J. Odom, Superintendent Unit 1 Operations
J. Powell, Superintendent Unit 2 Operations
*L. Stinson, Assistant General Manager - Plant Operations
*J. Thomas, Engineering Support Manager
*B. Yance, Plant Modifications and Design Manager
W. Warren, Engineering Support Supervisor - Performance Review
*G. Waymire, Safety Audit and Engineering Review Site Supervisor
P. Webb, Technical Training Supervisor
L. Williams, Training/Emergency Preparedness Manager

NRC Personnel:

*T. Ross, Senior Resident Inspector
M. Scott, Resident Inspector
*S. Tingen, Project Engineer

*Attended the exit interview

Other licensee employees contacted included, HP, operations, technical, engineering, security, maintenance, I&C, and administrative personnel.

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

2. PLANT STATUS AND ACTIVITIES

a. Unit 1 and 2 Status:

Unit 1 began the reporting period in Mode 5, having shutdown on September 16 for its 13th refueling outage. U1RF13 was scheduled to last 33 and a half days, which would have returned Unit 1 to the grid by October 19. At the end of the inspection period, Unit 1 was in

Mode 5 about ten days behind schedule due to Hurricane Opal and unexpected delays in SG ECT activities.

Unit 2 began and ended the reporting period at 100 percent power. The unit was shutdown on October 4 and restarted the next day due to Hurricane Opal.

b. Other NRC Inspections/Meetings:

1) During the weeks of September 18 and October 2, NRC inspector S. Tingen (Region II/DRP) was onsite to support the resident staff in accomplishing the core inspection program and closing out open items.

2) During the weeks of September 25 and October 9, NRC inspector W. Kleinsorge (Region II/DRS) was onsite to examine implementation of the licensee's erosion/corrosion and ISI programs, especially SG ECT. This inspection will be documented in IR 50-348, 364/95-17.

3) On October 4 and 5, NRC/Region II inspectors S. Vias and S. Rudisail were onsite with emergency satellite communications equipment during Hurricane Opal. Region II/DRP Branch Chief D. Verrelli was also onsite during the hurricane as a management liaison.

4) On October 10 - 12, M. Ernstes (Region II/DRS) and a contractor were onsite to prepare for administering initial hot licensed exams during the week of October 25 (IR 50-348, 364/95-300).

5) On October 10 - 12, B. Siegel (NRR Project Manager) and H. Berkow (NRR Project Director) were onsite for a general plant tour, and to meet with the residents and plant management.

3. OPERATIONS

a. Plant Operations (71707)

1) Routine Plant and Facility Tours

Tours of FNP facilities were performed to verify that operating license and regulatory requirements were being met. In general, inspectors looked for indications of equipment degradation, improper tagouts, incorrect operation, poor housekeeping and improper system alignment. Tours were performed on both dayshift and backshifts to ensure conduct of plant Operations and Security remained at acceptable levels.

The inspectors regularly toured the Unit 1 and 2 combined control room. Operator and SS turn over sheets, logs, reports, and night orders were reviewed. CR demeanor, staffing, access, turnovers and operator performance and attentiveness were also monitored during routine and transient plant operations. The MCB and back panels were walked down and annunciator status and alarms were examined. The

licensee continued to maintain the total number of MCB deficiencies at less than 20 for both units. Each deficiency was tracked and actively pursued.

Limited scope walkdowns of accessible portions of safety-related structures, systems and components in the plant were performed in the following areas:

- Unit 1 main steam valve room - MSIVs and MSSVs
- Unit 1 & 2 hot shutdown panels
- Unit 1 & 2 EDGs 1-2A, 1B, 2B, 1C and 2C
- Unit 1 & 2 SFP areas and heat exchanger rooms
- Unit 1 and 2 vital 125 VDC batteries
- Unit 2 waste gas decay tanks (#7 and #8)
- Unit 2 charging pump (HHSI) rooms
- Unit 1 4 KV AC switchgear
- Unit 1 TDAFW and MDAFW pump rooms
- Unit 1 & 2 SWIS
- Meteorological tower
- Unit 1 and 2 CCW pumps and heat exchangers area
- Unit 1 and 2 RHR (LHSI) pump and heat exchanger rooms
- Unit 1 and 2 CS pump rooms
- Unit 1 & 2 piping penetration rooms (100 and 121 ft. elev.)
- Unit 1 containment
- Unit 1 & 2 electrical penetration rooms (139 ft. elev.)
- High and low voltage switchyards

In addition to examining the overall physical conditions, certain breaker/switch positions and valve line-ups were verified, both locally and in the CR, for consistency with operability requirements. No significant findings regarding safety system operability were identified during these walkdowns. All minor equipment problems and housekeeping deficiencies identified by the inspectors were reported to the SS for resolution.

In general, Unit 1 housekeeping during U1RF13 was not well maintained. Physical control over tools, supplies, temporary electrical cords and hoses, and debris in the auxiliary building piping penetration rooms on the 100 and 121 foot elevations, and in containment, were especially poor during the outage. The overall housekeeping, physical condition and appearance of Unit 2 suffered markedly during the Unit 1 outage from lack of attention. Conditions in the Unit 2 RCA portion of the auxiliary building, particularly the charging pump rooms, were noticeably degraded by the end of U1RF13. The maintenance of plant lighting in both units was neglected. These problems were discussed with Operations, Maintenance and HP management.

2) Plant Tagout Orders

Portions of the following tagouts/clearances were reviewed, and verified in the field, by the inspectors and determined to be properly implemented:

- Tag order #95-2045-1, 1B Startup Potential Transformer
- Tag order #95-2564-1, 1C Charging Pump Auxiliary Lube Oil
- Tag order #95-2832-1, B Train SW to CCW Heat Exchanger
- Tag order #95-1822-1, 1B MDAFW Pump Room Cooler
- Tag order #95-2946-1, 1A CCW Pump
- Tag order #95-2662-1, B Train SW to CCW Heat Exchanger
- Tag order #95-3040-1, MS system
- Tag order #95-3034-1, 1B EDG Outage Work

3) Technical Specification LCO Compliance

Selected TS LCO status sheets were reviewed on a regular basis in order to confirm that entries into action areas were recognized, tracked, and in compliance. No problems were identified.

4) Spent Fuel Pool Cooling

During the Unit 1 refueling outage, the entire core was off-loaded into the spent fuel pool. The inspector reviewed section 9.1 of the FSAR and verified that the SFP cooling system was designed to accommodate a full core off-load. One train of the SFP cooling system is required to maintain pool temperatures to less than 170 degrees F. With the core off-loaded, one train of SFP cooling was inoperable due to planned SW and CCW maintenance. The FSAR and TS did not address SFP cooling system operability or single failure design requirements. The inspector reviewed 9.1.3, Spent Fuel Pool Cooling and Cleanup System, of NUREG-0800, Standard Review Plan, dated July 1981 and concluded that a SFP cooling system single failure is not required to be accounted for with the core off-loaded.

5) Unit 1 Refueling Activities (60710)

The inspectors observed significant portions of Unit 1 refueling activities conducted in the CR, SFP and containment during U1RF13. Beginning September 24 and finishing September 26, Unit 1 was completely defueled and offloaded into its SFP. The Unit 1 reactor core reload began on October 8 and finished on October 11. All refueling activities observed by the inspectors were controlled in accordance FNP-1-UOP-4.1, "Controlling Procedure For Refueling," and FP-ALA-R13, "J.M. Farley Unit No. 1 Nuclear Power Plant Cycle XIII - XIV." An inspector reviewed both procedures, independently verified selected prerequisites and precautions, and monitored step-by-step procedure implementation and signoff. Overall, core unload and reload activities were accomplished in a deliberate, consistent, well controlled manner with very few difficulties that involved minor

equipment problems (e.g., snagged shoe horn, manipulator crane electrical problems). Although FME control in and around the SFP CRAB has been a recurring challenge in the past, the inspectors could discern no problems with FME in either the reactor cavity or SFP CRABs.

6) Restart of Unit 2

On October 5 after Hurricane Opal had passed, Unit 2 was restarted and achieved full power operation on October 8. Inspectors observed the approach to criticality and power escalation to Mode 1. The reactor went critical on October 5, well within the predicted ECP. The entire startup evolution was well controlled and proceeded without incident. Operators were attentive to changing plant conditions and demonstrated a conservative, methodical approach in implementing applicable startup procedures.

7) Unit 1 Midloop Operation

An inspector observed licensee preparations for establishing midloop conditions on Unit 1 IAW FNP-1-UOP-4.3, "Midloop Operations." The inspector reviewed UOP-4.3 and GL 88-17, "Loss of Decay Heat Removal," guidelines, and verified selected requirements of UOP-4.3, Section 2.0, "Initial Conditions." The inspector also reviewed ORAM risk projections for midloop operation with the Outage Planning Supervisor.

Midloop conditions were established on October 21 at 123 feet 3 inches and exited the next day. The inspector reviewed the completed official copy of UOP-4.3 and its associated data sheets, and operator logs. Except for level indicating problems during vacuum refill of the RCS, midloop operations went extremely well. Operators exhibited a high degree of familiarity and operating experience with reduced inventory conditions.

This was the first time SNC attempted to conduct a vacuum refill of the RCS. Shortly after evacuation of the RCS atmosphere began, several of the RCS level indicators (including the tygon hose) became unreliable. Only the narrow range ULMS (LT-2384 and 2385) continued to accurately track level. During the initial RCS evacuation, a decision was made to reduce RCS level another inch to 123 feet 2 inches in order to fully uncover the pressurizer surge line and increase the evacuation rate. Although TCN 33D was issued for FNP-SOP-1.3, "Reactor Coolant System Filling And Venting," Operations should have also issued a TCN for UOP-4.3 since it was the principal procedure used for controlling and monitoring reduced RCS level. This additional TCN should have included special guidance regarding the effect of vacuum conditions on RCS level indicators. Plant management is evaluating the lessons they learned during vacuum refill and considering necessary procedure changes.

b. Onsite Response to Events (TAC# V24444)

Hurricane Opal and Expedited Shutdown of Unit 2

On October 4, between 8:00 and 9:00 pm, Hurricane Opal passed approximately 75 miles west of the site. As precautionary measures, Unit 1 refueling outage activities were essentially stopped and Unit 2 was shutdown from 100% power. At the site, maximum sustained wind speeds reached about 50 mph, with maximum gusts near 65 mph. No site damage was experienced except an old tin roof blew off an outside storage building and a 44 KV temporary power line was lost. Although a number of trees and power lines were blown down, most roads within the 10 mile EPZ remained passable during the hurricane.

The inspectors monitored licensee actions in preparation for severe weather conditions and conducted detailed tours of the low and high voltage switchyards, inside and outside the immediate protected area, meteorology tower, and surrounding structures and buildings. Particular attention was paid to the securing, relocation, and/or storage of temporary trailers, loose equipment, tools, power lines and cables. A number of minor discrepancies were identified and brought to the attention of responsible plant personnel. Other precautionary measures included running all five EDGs, shutting the Unit 1 containment equipment hatch, flooding up the Unit 1 reactor cavity, and refilling the A train of Unit 1 SWS.

On October 4, at 10:16 am, the licensee declared an NOUE. The TSC, and EOC were partially manned. Resident inspectors were already onsite monitoring licensee activities and the implementation of AOP-21, "Severe Weather." Region II dispatched two additional inspectors, equipped with an emergency satellite communications system, and a DRP Branch Chief to the site. A Region II state liaison representative was sent to the State of Alabama EOC. The Region II IRC was also activated in the monitoring mode at 11:10 am.

At 4:50 pm, plant management made a conservative decision to rampdown Unit 2; at 6:45 pm the decision was made to shutdown as rapidly as possible. NRC inspectors observed the rampdown of Unit 2 per AOP-17, "Rapid Load Reduction," and subsequent shutdown from minimum load IAW FNP-2-UOP-2.1, "Shutdown Of Unit From Minimum Load To Hot Standby." The rapid rampdown and shutdown of Unit 2 was conducted in an efficient and expeditious manner. Plant operators did an excellent job in safely shutting down the unit considering the high level of urgency. All plant equipment performed per design expectations.

Overall licensee performance in preparation for, and response to, Hurricane Opal was exemplary. The NOUE was terminated at 10:55 pm.

c. Effectiveness of Licensee Control in Identifying, Resolving, and Preventing Problems (40500)

The inspectors scanned all FNPIRs initiated during the inspection period to ensure that plant incidents that effect or could potentially effect safety were properly identified, documented and processed IAW FNP-0-AP-30, "Preparation and Processing of Incident Reports ...". The inspectors routinely reviewed completed incident reports. These reviews were performed to determine licensee's effectiveness in: 1) identifying/describing problems; 2) elevating problems to the proper level of management; 3) problem/root-cause determination and/or analysis; 4) assessing operability and reportability; 5) developing appropriate corrective actions and 6) evaluating cause/corrective action scope for generic implications.

The inspectors did not identify any significant negative findings regarding implementation of the incident report process. In general, plant personnel have exhibited an appropriate threshold for identifying problems and initiating FNPIRs. Each FNPIR received prompt management attention. Resolution of identified problems were routinely assigned to knowledgeable individuals, with the more complex incidents addressed by a formal root cause investigation. Corrective actions were generally comprehensive and effective.

In particular, an inspector reviewed and verified the corrective actions for the following FNPIR :

- 2-95-186; Low Instrument Air Pressure

  This FNPIR was completed and its corrective action should produce a more viable instrument air system. The licensee incorporated the dryer skid control air solenoid valves in a routine PM program. These SOVs will be replaced on a yearly basis with the first changeout having already occurred.

d. Operations Followup (92901)

(Closed) VIO 50-348,364/95-08-03, Inadequate Tagging Order Preparation and Execution

SNC submitted its response to VIO 50-348,364/95-08-03 by letter dated June 7, 1995. In this letter a number of immediate and longer term corrective actions were described.

An inspector reviewed the applicable CAR (#2138) and met with Operations management to go over the status of all corrective actions. The inspector also reviewed the Broadness Review report associated with this item and discussed the conclusions and recommendations with Operations management. Based on this meeting; review of related documentation, procedure revisions, applicable TANs, and the Broadness Review report; and discussions with responsible SFMs, the licensee's corrective actions

appear to be fully implemented. Furthermore, during U1RF13, only three FNPIRs were written regarding tag orders; each of these were minor in nature, two of which were caught in process by the individuals executing the tag order. This VIO is closed.

Operations personnel and management maintained excellent control over routine full power operation of Unit 2, and Unit 1 shutdown conditions. Operators remained attentive to changing plant conditions and were knowlegeable of plant status and ongoing activities. Unit 1 refueling, midloop, and system return to service activities were well controlled and accomplished according to established operating procedures. The expedited shutdown of Unit 2 for Hurricane Opal, and subsequent restart, were performed in a smooth and deliberate manner by plant operators without incident. Although a minor problem regarding inadequate signoff of initial conditions for shutdown was identified (see VIO 50-348,364/95-18-05), overall plant response to Hurricane Opal was exemplary. Compared to previous outages, Operations exhibited significant improvement in their preparation and execution of tag orders, clearance and configuration control, and release of work during U1RF13. General housekeeping and control over Unit 1 physical conditions was poor during U1RF13. Unit 2 housekeeping and equipment conditions degraded significantly during this same period due to inadequate management attention.

4. MAINTENANCE/SURVEILLANCE

a. Maintenance Observations (62703)

Inspectors observed and reviewed portions of various licensee corrective and preventive maintenance activities, to determine conformance with procedures, work instructions and regulatory requirements. Work orders were also evaluated to determine status of outstanding jobs and to ensure that proper priority was assigned to safety-related equipment. The following maintenance activities were observed.

1) WO 533220; RCS Pressure Comparator Card Replacement

An inspector observed the replacement and subsequent calibration of the Unit 1 signal comparator card, C4-326. The signal comparator card had failed and this maintenance was accomplished IAW FNP-1-STP-201.17, "RCS Pressure Wide and Narrow Range Loop Calibration," Revision 22. The inspector verified that the equipment used to perform the calibration was calibrated, test jumpers were properly installed and removed, the as-left bistable trip points were within the acceptance criteria specified by the procedure and test switches were returned to their normal position following completion of the calibration. The inspector noted good communication/coordination between operations and I&C technicians in performing this maintenance and concluded that the technicians were adequately trained. The procedure was well written and easy to follow.

2) Control Room Pressurization Unit Humidistats

During the month of August 1995, SNC conducted a SSSA of the CREVS PASS. On August 9, the SSSA team identified a concern that the humidistat heater controls for the charcoal filters of both trains of the control room pressurization units were not included in any PM or surveillance program. After confirming the SSSA finding, Operations took compensatory actions by placing the pressurization unit heater control switches in the "test" position on August 11. In this position, the pressurization unit heaters would actuate whenever the fan started regardless of intake air temperature or relative humidity. The safety function of these humidistats is to control air intake temperature and humidity by cycling pressurization unit heaters on and off, to ensure charcoal filter removal efficiencies are not degraded due to moisture buildup. Per FSAR Section 9.4.1.1, the control room and CREVS were designed to meet the dose requirements of 10 CFR 50, Appendix A, GDC 19, which are defined by FSAR DBA analyses (Section 15.4.1.8.3) to be no greater than 5 rem whole body or 30 rem thyroid for the duration of the accident.

On August 17, SNC completed a safety evaluation using conservative assumptions that concluded the postulated DBA dose to control room operators would exceed the 30 rem thyroid FSAR design limit in approximately 24 hours, if the humidistat controllers failed. The same calculation concluded that operator dose could reach 47 rem thyroid in 30 days.

Subsequent bench testing of the A train pressurization unit humidistat controller on September 8 determined that a power supply had failed rendering it incapable of performing its intended safety function. Bench testing of the B train humidistat controller on September 26 determined that it could not be calibrated which also rendered it incapable of performing its intended safety function. Based on the results of this testing, SNC concluded that the train A and B control room pressurization unit charcoal filter heaters had been incapable of performing their safety function for an indeterminate period of time.

Although the postulated accident dose could have exceeded the FSAR design basis limit, it would have been less than the 10 CFR 20 limit of 50 rem allowed for annual occupational exposure to the thyroid. Doses at this level would not impair the ability of operators to safely shutdown the reactor. The licensee's accident dose calculations also indicated that dose to the whole body and skin would be essentially unaffected. Furthermore, had a DBA occurred resulting in releases to the environment, FNP-0-EIP-4.0, "Health Physics Support To The Emergency Plan," guideline 1, step 13, requires HP to implement in-plant iodine monitoring as needed. This kind of monitoring has been practiced in past emergency drills and routinely included the CR. Once elevated iodine levels were detected

in the CR, mitigation measures would be taken (e.g., don SCBAs, locate source and start heaters, etc.).

Inoperability of the charcoal heater humidistats for both trains of CR pressurization units is a violation of TS LCO 3.7.7 which requires that two independent CR emergency air cleanup systems shall be operable for all modes of operation. This violation is identified as VIO 50-348, 364/95-18-01, Inoperable Control Room Pressurization Unit Humidistats.

3) WO 68565 and 68568; Unit 1B Motor-Driven Auxiliary Feedwater Pump Room Cooler Coil Replacement and Service Water Pipe Modification

An inspector observed limited portions of the grinding and welding activities performed to support installation of a new cooler coil assembly for the 1B MDAFW pump room, and modification of associated SWS piping to add new vent and drain valves, as part of PCN 90-1-6986. Work activities were appropriately released by Operations and being conducted IAW WO instructions. A continuous fire watch was established.

4) WA 438547, 48, 50-53, 55, and 58; Unit 1 Auxiliary Feedwater Flow Control Valve Actuator Diaphragm Replacement

An inspector observed substantial portions of the work performed by contract mechanics to replace the valve actuator diaphragms of six AFW FCVs (i.e., HV-3227A, B, & C; and HV-3228 A, B, & C) and two MS line TDAFW bypass valves (HV-3234A & B). After replacing the diaphragm in each air operated valve, the mechanics retorqued the actuator to 10 foot pounds. The activities observed by the inspector had been appropriately cleared and released for work, and were performed IAW the limited WA instructions. Most of the mechanics' work was conducted using skill of the craft which appeared to be adequate. However, these mechanics became confused at one point regarding the smaller sized diaphragms used on HV-3234A & B. They had assumed all the diaphragms were the same, and were surprised when the smaller diaphragm wouldn't fit on a larger AFW FCV actuator. Although the mechanics were able to straighten out the mixed up replacement parts, it was evident their knowledge of the FNP parts control program was inadequate. This problem was discussed at length with the maintenance manager.

5) WO 189714; 1B Containment Spray Pump rotating element and Mechanical Seal Package Replacement

An inspector observed replacement of the 1B CS pump seal, including the rotating element, and post-maintenance testing activities. In general, proper work controls were in place and the mechanics had complete understanding of the work being performed. The mechanics realized that the pump rotating element [single impeller, double suction] was slightly different dimensionally than the removed element and had compensated for this in locating the element in the

casing. The inspector did not observe the pump to motor coupling attachment.

While observing the initial PMT run of the pump, the inspector saw that the pump and motor rotating assemblies were moving in an erratic manner. The connected assemblies would periodically shift in the axial direction in a rhythmic sharp movement toward the motor. Although pumps such as this one that operate at or near shutoff head are expected to experience some axial motion, the inspector suspected that this motion was due to the motor rotating element not being aligned with its electrical center. This concern was communicated to maintenance management Also, the two mechanical seals to the pump were leaking slightly as the shaft shifted axially.

Subsequent checks after disassembling the pump to motor solid mechanical coupling, and uncoupled operation of the motor, reveaied that the motor rotating element was misaligned from its electrical center by 3/16 inch. This displacement could cause increased pump thrust bearing wear and possible accelerated motor bearing degradation. The inspector reviewed details of the pump assembly TM and repair procedure. The pump TM, U 169164F, contained no specific instruction for attaching pump and motor. The TM contained a reference dimension for the motor shaft to coupling. FNP-0-MP-95.0, Inspection of Containment Spray Pumps, directed the mechanics to attach the coupling with no specific accompanying instructions. Due to lack of detailed instructions in the repair procedure and the TM, the mechanics restored the coupling and relative pump position to the as-found condition. The licensee identified that the slight misalignment from the motor electrical center was probably induced during original plant construction. TS 6.8.1 requires written procedures for maintenance to be established and implemented as recommended by Section 9 of RG 1.33, Appendix A so that maintenance which can affect safety-related equipment is properly performed. At the licensee's request, the pump vendor had reviewed the existing procedure prior to the job (pre-outage) and provided certain comments. However, he did not take exception to the limited scope and detail associated with the coupling attachment instructions.

In response to the coupling installation problem, the licensee performed the following:

- determined the proper electrical center for the motor;
- adjusted the coupling to accommodate the new center;
- performed the pump surveillance test satisfactorily;
- and, issued a revision to FNP-0-MP-95.0 for aligning the motor shaft to its electromagnetic operating center.

Due to the low safety significance of the problem, and prompt licensee corrective action, this violation will not be subject to enforcement action since it meets the criteria specified in Section VII.B of the NRC Enforcement Policy. This is identified as NCV 50-348/95-18-02, Inadequate CS Pump Repair Procedure.

6) WA 60005; 1B RHR Pump Modification (DCP 91-1-7661)

An inspector observed significant portions of the 1B RHR pump modification, including pump assembly, and motor installation. This modification installed a coupling between the pump and motor, added a new pump shaft bearing, and replaced the upper casing - to increase the ease of maintenance. Material and tools were staged properly. Material for the job was properly controlled. Health physics personnel had remote cameras and airborne sampling equipment for monitoring on-going work. Observed work practices by HP staff and mechanics was good. No personnel contaminations occurred on the job. The mechanics performed their work IAW work instructions and good craft skills, with a minor exception (see below). The shop modification work sequence and ALARA considerations were well planned.

The inspector noticed mechanics install the pipe threaded sight glass tubes for the motor bearing oil level/fill with a pipe dope not listed in FNP-0-SHP-26, "Hazard Communication Program," for safety-related pump applications. The installation procedure also did not list the dope. This pipe dope was listed in SHP 26 for use in SG sludge lance work. After an evaluation, corporate chemistry approved this specific dope for use during the RHR work, before the pumps were returned to service. This was based on a chemistry profile and previous vendor approval for use on RCP lube oil systems.

7) WA 440270; 1B EDG Outage

After outage work by a Vogtle maintenance team on the 1B EDG was nearly complete, an inspector observed a number of minor rework/repair activities prior to the initial maintenance start. While attempting to release clearance on the 1B EDG, several air leaks were noted. The EDG was re-tagged several times to conduct minor re-work/repairs. There were air start solenoid cartridge filter tubing fitting leaks and an air start valve body to cap leak. Filter cartridge 534A had a tubing fitting that was loose and cartridge 534B had a cracked ferrule in one of the cartridge air fittings. The air start valve cap/bonnet had been misaligned when it was installed causing un-even loading of the cap to body joint gasket and crimped the gasket. The inspector observed proper installation of a new gasket and functional testing of the air side of the clearance/tag-out. The 1B EDG subsequently passed its maintenance start some time later. All re-work items, along with most other job details, were discussed in a post-job debrief.

8) WO 510052; SW to CCW Heat Exchanger Manual Discharge Isolation Valve Replacement and Flow Straightener Removal

In paragraph 3.a.1 of IR 95-16, the inspector discussed with the licensee some observed discrepancies with valve Q1P16V007C. This valve was replaced during U1RF13. Upon removal, the licensee discovered that a flow straightener in the SW pipe had broken loose

from welds that held it in the pipe. The inspector examined the torn welds and the flow straightener. The straightener had been stopped by the downstream butterfly valve. These straighteners had been installed during U1RF12 outage to reduce flow induced pipe vibration. Small pieces of the Q1P16V007C flow straightener assembly had broken off and were most likely discharged from the plant. Of the two remaining flow straighteners in the SW piping for CCW heat exchangers, one was removed while it was still welded and intact. The last flow straightener will be removed shortly after U1RF13 is completed and as manpower becomes available. This course of action was supported by a licensee 10 CFR 50.59 evaluation (REA-0966). During the course of the work the inspector discussed the REA work activites with maintenance and engineering personnel.

b. Surveillance Observation (61726)

Inspectors witnessed surveillance activities performed on safety-related systems/components in order to verify that activities were performed IAW licensee procedures, FNP Technical Specifications and NRC regulatory requirements. Portions of the following surveillance were observed:

1) 1-STP-627; Local Leak Rate Testing of Containment Penetrations

An inspector witnessed the LLRT of Unit 1 containment penetration No. 18. This penetration provides for the train B RHR pump loop suction piping and MOV 8702A was the CIV being leak tested. MOV 8702A was recently overhauled and failed its initial leak test. Prior to initiating any repairs, the penetration piping was filled with water, the valve cycled, the piping was drained and the valve was retested satisfactorily. Why the valve failed initially was not determined. The licensee believes one possible explanation was that there was foreign material on the seats that was flushed away when the piping was filled with water and the valve cycled or that with the piping full of water, the valve was better lubricated which enabled the valve to properly seat when cycled. The inspector verified that the test equipment was calibrated, personal performing the test were knowledgeable, the procedure was followed and leakage test results met the procedures acceptance criteria. The inspector concluded that penetration No. 18 was properly tested.

2) 1-STP-40.1; A Train Sequencer Operability and Load Shedding Circuit Test

An inspector witnessed the portion of this Unit 1 test where a safety injection signal was simulated with off-site power available. The inspector verified that test jumpers were installed/removed IAW STP-40.1, the test procedure was followed step-by-step and established acceptance criteria were met. It was evident that the operations department did a good job in planning and preparing for this test. There were good communications between operations, maintenance and the test director. This infrequently performed complex test was accomplished without encountering any significant delays or

committing any errors. The test procedure worked as written and did not require any revisions to accomplish.

3) 1-STP-201.20; Reactor Coolant System Loop C Temperature Calibration

An inspector observed limited portions of the calibration and functional test of RCS loop C hot leg and cold leg temperature elements (TE-432B1, 2, & 3, and TE-432D). The I&C technicians were knowledgeable and familiar with the STP. Procedure steps and data sheets were being performed in sequence and signed off appropriately. All test equipment was in calibration. This work activity was properly cleared and authorized by WA #426330.

4) 0-IMP-228.4; Unit 2 Nuclear Instrumentation System Intermediate Range Compensating Voltage Adjustment Following Shutdown

An inspector observed the performance of Unit 2 NIS intermediate range compensating voltage adjustments of channels N35 and N36 by qualified I&C technicians IAW IMP-228.4. These channels were adjusted within the prescribed 20 to 60 minutes after shutdown of Unit 2.

5) 1-STP-40.0; Safety Injection With Loss of Offsite Power test

Inspectors reviewed STP-40.0, verified selected initial conditions, attended the AP-92.0 pre-evolution brief for infrequently performed tests by Ops management and Test director, and witnessed conduct of the test. This test evolution is a highly complex, integrated test to verify plant response to a simulated LOSP coincident with a manually initiated SI. All effected safety systems are expected to actually load onto their respective EDG and inject or isolate as required per design. Plant equipment and personnel performed well, except for certain equipment-related problems - Train A and B RHR loop flow was just below the acceptance criteria of 3981 gpm, 1C air compressor started but tripped, 1D containment cooler tripped and Phase A MOV 3624 failed to close. Each of these identified problems were subsequently resolved and\or repaired.

In the case of low RHR pump flow, no repairs were needed as both trains of RHR were simply retested under different initial conditions that were more conducive to higher flow (i.e., higher RWST level and lower reactor cavity level). An inspector questioned the validity of the retest on whether it or STP-40.0 more accurately represented assumptions used in the DBA safety analysis. In response to the inspector's concern, SNC examined its technical basis for minimum required RHR flow and concluded that RHR performance was directly dependent upon suction and discharge head elevations. Recognizing this, the minimum required flowrate for determining acceptable RHR performance would vary as RWST and reactor cavity levels changed. Whereas, 3981 gpm was overly conservative for the conditions established during STP-40.0.

6) Use Of Non-Temperature Compensated Heise Gauges

During a tour an inspector noted that non-temperature compensated pressure gauges were installed in a test panel. When using non-temperature compensated test gauges in areas where ambient temperature is less or greater than approximately 70 degrees F, corrections are required to be calculated and applied to gauge readings. The inspector questioned the licensee about non-temperature compensated test gauge corrections and concluded that non-temperature compensated test gauges were being used indiscriminately to perform calibrations and testing without evaluating the need to correct gauge readings for temperature.

The inspector reviewed the Units 1 and 2 WO packages that calibrated pressurizer pressure transmitters. WOs 426345, 426346 and 426348 dated September 22, 1995 stated that the test equipment number of the pressure gauge used for calibrating the Unit 1 pressurizer pressure transmitters was FNP-HTG-8795. Per calibration lab personnel, FNP-HTG-8795 was a non-temperature calibrated test gauge with a range of 3000 psi. Review of the Unit 1 trend recorder data for that time period indicated that containment temperature was approximately 90 degrees F. The inspector verified that the gauge readings obtained during these calibrations were not corrected for temperature. WOs 426489, 426491 and 426488 dated March 29, 1995 stated that the test equipment number of the pressure gauge used for calibrating the Unit 2 pressurizer pressure transmitters was FNP-HTG-8770. Per calibration lab personnel FNP-HTG-8770 was a non-temperature compensated test gauge with a range of 5000 psi. Review of the Unit 2 trend recorder data for that time period indicated that containment temperature was approximately 80 degrees F. The inspector verified that the gauge readings obtained during these calibrations were not corrected for temperature.

The licensee reviewed Unit 1 calibration records for ESF and RPS instrumentation and discovered that during U1RF13 five of the nine RCS loop flow transmitters were calibrated with non-temperature compensated test gauges. The pressurizer pressure and RCS loop flow transmitters were recalibrated with temperature compensated test gauges prior to restart of Unit 1.

In Memorandum NEL-95-0245, dated October 9, 1995 the licensee evaluated the use of non-temperature compensated test gauges on reactor trip, ESF and other control parameters and calorimetrics for Units 1 and 2. The evaluation concluded that after accounting for the uncertainties associated with the use of non-temperature compensated test gauges, current safety analysis limits and nominal trip setpoints remained acceptable and no additional sensor calibrations were required. The inspectors reviewed this evaluation and agreed with the conclusion.

The licensee also identified the use of non-temperature compensated test gauges during MSSV setpoint testing. The licensee concluded

that after combining the potential shift associated with use of non-temperature compensated gauges with other test system errors, the accuracy of the test system used to test the MSSVs was within the required accuracy specified by the ASME Code. The inspector agreed with the licensee's conclusion that MSSV test results obtained with non-temperature compensated gauges were acceptable.

TS 6.8.1.a requires that written procedures be established, implemented and maintained to cover the applicable procedures recommended in Appendix A of RG 1.33, Revision 2, dated 1978. RG 1.33, Appendix A, Section 8.a, specifies that procedures of a type appropriate to the circumstances should be provided to ensure that gauges are properly controlled, calibrated and adjusted at specified periods to maintain accuracy. Step 4.1.3 of 0-AP-11, Control and Calibration of Test Equipment, Test Instrumentation and Plant Instrumentation, Revision 9, requires that a restricted use tag be placed on any instrument requiring special precaution in its plant usage. The tag will show instrument identification and list special restrictions on instrument usage. The failure to provide the restrictions associated with the use of non-temperature compensated test gauges in accordance with step 4.1.3 of AP-11 was identified as VIO 50-348, 364/95-18-03, Uncontrolled Use Of Non-Temperature Compensated Heise Gauges.

During the review of the pressurizer pressure calibration procedure the inspector noted that a 3000 psi precision gauge or equivalent gauge was required to be used. During the Unit 2 pressurizer pressure transmitter calibrations a 5000 psi precision gauge was used. The inspector questioned what equivalent meant and if the 5000 psi gauge was equivalent to a 3000 psi gauge. The inspector reviewed the calibration results of the 5000 psi gauge and concluded that the actual gauge accuracy was equivalent to the allowable accuracy for a 3000 psi precision gauge. However, there were no established guidelines on how to determine if a gauge was equivalent. At the end of the inspection period the licensee issued a memorandum to all plant personnel describing how to determine when a gauge is equivalent.

On June 15, 1995 Virginia Power issued a Nuclear Network report describing the use of test gauges that were not temperature compensated. The Farley OER program reviews Nuclear Network reports but these reviews are not documented. The inspectors concluded that the licensee's review of the June 15, 1995 Nuclear Network report did not identify that Farley had a similar problem.

7) 0-STP-80.1 and 0-STP-80.2; 1-2A and 1C DG Monthly Operability Tests

An inspector observed the satisfactory performance of monthly operability tests of the 1-2A and 1C EDGs. Additionally, during performance of FNP-1-STP-40.0 (discussed above) all required EDGs performed as expected with safety loads well within the EDG capacities.

8) 1-STP-45.12; Seal Return and B Train Emergency Core Cooling System Cold Shutdown Valves Inservice Test

An inspector observed significant portions of this test with all MOVs operating as required and within required time stroke. Operators at the valves coordinated well with operators in the control room who were manipulating the valves.

9) 1-ETP-1042; Reactor Heat Removal Heat Exchanger Discharge Valve Q1E11HCV603 A and B Mechanical Stop Position Verification

On October 7, prior to the Unit 1 RHR pumps being returned to service, an inspector observed portions of this test. In general, the test supervisor, operators in the CR, and shop personnel performed well and followed the details of the test. HCV 603A and B operated as expected. However, this effort had one set back in that an I&C technician had not locked down a jam nut on a stem spacer on HCV 603B after a previous flow test. This error presented a potential for valve drift during the subject "B" train test but did not jeopardize the previous test's data. A MM personnel noticed that the jam nut was backed off approximately 1/8 inch. The jam nut was then properly tighten, HCV 603B was checked, and the "B" train portion of the test was re-performed satisfactorily. The licensee initiated an incident report on the occurrence. Resolution of this incident will be followed by the inspectors and is identified as IFI 50-348/95-18-04, HCV 603 Jam Nut Improperly Installed.

c. Failure To Follow Procedures

During the inspection report period there were multiple examples of plant personnel who failed to adhere to procedural requirements while performing maintenance, testing and unit shutdown activities. These examples are detailed as follows:

1) Unit 1 Loop A Main Steam Safety Valves Failed To Close

On September 16, immediately after the shutdown of Unit 1 for U1RF13, operators attempted to perform FNP-1-STP-21.2, "MSIV Air System Leak Test," while the unit was still in Mode 3. As a part of this surveillance test, the loop A MSIVs (3369A and 3370A) were stroked closed and then re-opened. However, subsequent operator efforts to shut the MSIVs using the MCB handswitches were ineffectual. Resident inspectors were in the CR when Unit 1 operators first discovered they could not re-shut the loop A MSIVs. The inspectors observed licensee actions as they worked to resolve the problem. An SO was promptly ordered to secure the air supply and vent off the air pressure locally at both MSIVs allowing them to go shut. The total time both MSIVs were incapable of closing to fulfill their safety function was about 34 minutes. Closing the valves fulfilled their intended safety function and restored compliance with the TS LCO 3.7.1.5 action statement. FNPIR 1-95-260 was initiated and a one hour non-emergency report was made pursuant to 10 CFR 50.72. Although, the one-hour

report was retracted a few hours later, the licensee later made a four-hour report pursuant to 10 CFR 50.72 after its incident investigation was completed.

The licensee's incident investigation concluded that the most probable cause was personnel error. While performing valve manipulations in the MSVR IAW STP-21.2, an SO apparently misaligned instrument air for both loop A MSIVs in a such way as to preclude the applicable solenoid valves from being able to vent off air pressure when the MCB hand switch was operated. This misalignment prevented remote or automatic closure of the MSIVs. Shortly after the loop A MSIVs were closed locally, the air system misalignment was discovered and corrected. In addition to the apparent MSIV air system misalignment, the licensee also determined that the operator was not initialing each step of STP-21.2 as they were performed, and that this lack of attention to procedure compliance contributed to the incident. An LER on this event was submitted (see paragraph 4.d.7).

2) Removal of Unit 1 Reactor Upper Internals

On September 22, the inspectors observed vendor and plant personnel set the upper internals lifting rig on the reactor in order to remove the upper internals IAW FNP-1-MP-1.0," Maintenance Refueling Procedure," and WO 67784. Step 7.8.4 of this procedure requires raising the upper internals lifting rig and moving it to the operating deck for inspection and lubrication per step 6.9.3. However, contrary to established administrative controls the inspector noticed that this step of the procedure was omitted by the vendor and plant personnel without an approved TCN. A responsible MM foreman stated later, that he had performed the required visual inspections several days earlier when the rig was on its storage stand and the reactor cavity was dry. But, he forgot to clean, inspect and lubricate the lifting rig engaging threads as prescribed by steps 6.9.3.1. Furthermore, it was obvious to the inspector that rusted areas on the lifting rig had not been cleaned and painted per step 6.9.3.3.

3) Shutdown of Unit 2

On October 4, Unit 2 was shutdown due to anticipated high winds from hurricane Opal (see paragraph 3.b.1). An inspector observed the controlled shutdown of Unit 2 IAW FNP-2-UOP-2.1, "Shutdown Of Unit From Minimum Load To Hot Standby," Revision 16. After the unit achieved hot standby, the inspector noticed that none of the steps in Section 2.0, Initial Conditions, were initialed or dated and timed as required. Due to the urgent circumstances surrounding the Unit 2 shutdown, the Unit 2 SS had thought to address these requirements at a later juncture - after unit shutdown. According to AP-6, "Procedure Adherence," deviations from plant procedures are allowed for emergency conditions. Although the need to shutdown Unit 2 was considered urgent, plant management did not consider it an emergency situation. Even if it had been, AP-6 requires any departure from

plant procedures, in cases of emergency, to be documented by an FNPIR. This FNPIR is to be prepared by the person invoking the emergency change at the time the emergency is terminated. FNPIR # 2-95-307 regarding Hurricane Opal and the Unit 2 shutdown wasn't issued until the first week of November.

4) Unit 1 Hydrostatic Test

On October 3, a contaminated spill of about 10 gallons of water occurred in the Unit 1 PPR on the 121 foot elevation during a CVCS hydrostatic test. An inspector reviewed applicable test procedures and data sheets that were used, and interviewed responsible parties. The inspector determined that the test supervisor failed to verify the test position of all boundary valves listed in the hydrostatic test VLU prior to filling and pressurizing the CVCS. Two of the boundary valves (QV540A & B, charging pump discharge vent valves) were unintentionally left open during the hydrotest allowing water to spill into the PPR. The test supervisor had not signed the test position verification of any valve on the hydrostatic VLU sheet, nor had he signed the test sequence sheet verifying the VLU was complete before commencing the hydrostatic test.

In addition to the above examples of failure to follow procedures, two other examples were identified by a resident inspector in July 1995. These prior examples are discussed in IR 50-348, 364/95-14, (1) Failure to initial and date the FATF IAW FNP-0-FHP-3.0, "Receipt and Storage of New Fuel" during receipt and transfer of new fuel assemblies for Unit 1, and (2) Failure to complete the data sheets and procedure signoffs of STP-123.0, "Control Room Emergency Ventilation Performance Testing," in a timely manner. Lack of adherence to AP-6 requirements is identified as VIO 50-348, 364/95-18-05, Failure To Follow Procedures, Multiple Examples.

d. Followup Maintenance/Surveillance (92902)

1) (Closed) IFI 50-348/94-07-02; Spent Fuel Pool Hoist Limit Switch Misadjustment

On March 18, 1994 the licensee determined that the SFP hoist limit switches were improperly set. An inspector reviewed FNPIR 1-94-76 which documented the licensee's investigation of how the SFP limit switches were improperly set. The licensee concluded that the procedural guidance for setting the limit switches was too general and revised the procedure. The inspectors reviewed 0-EMP-1230.01, "Maintenance of Cranes and Monorail Hoists," Revision 3, and verified that the procedure was revised to provide specific instructions for setting SFP limit switches. The inspectors considered that the licensee's investigation and corrective action for this issue were adequate. This IFI is closed.

2) (Closed) VIO 50-348, 364/94-07-04; Nuclear Instrumentation System Power Range Channel Inoperability

This issue involved not placing PR NIS channels in trip per TS Table 3.3-1 when performing a calibration. In a letter dated June 1, 1994 the licensee responded to this violation and as corrective action stated that I&C procedures for NIS PR testing were revised to ensure conformance with TS requirements. The inspectors reviewed NIS PR calibration procedures and verified that the procedures required the channel to be placed in the trip condition prior to exceeding six hours in the bypass condition. This VIO is closed.

3) (Closed) IFI 50-348, 364/94-13-02; William Powell Gate Valve Disc Holder Corrosion

This issue involved evaluation of the potential for corrosion of WP valve carbon steel internals installed in systems other than the SW and CCW systems. Maintenance histories for selected WP valves were reviewed by the licensee and no signs of degradation due to corrosion were noted. The licensee concluded that there was not a design problem with WP valves installed in systems other than the SW system. Based on the inspectors review of the licensee's actions, this IFI is closed.

4) (Closed) IFI 50-348/94-30-02; No. 1 Diesel-Driven Fire Pump Failed to Manually Start

On May 23, 1995 the No. 1 DDFP failed to start during surveillance testing. This issue was identified as an IFI pending performance of a root cause evaluation. The inspector reviewed the licensee's root cause evaluation documented in FNPIR 1-95-128. The evaluation concluded that a residue of metal filings found in the starter caused the starter to bind. These metal filings developed because station personnel incorrectly assembled the starter in 1990. As corrective action the licensee procured a spare starter and in future will replace starters in lieu of rebuilding. The inspectors concluded that the root cause evaluation and corrective action were adequate. This IFI is closed.

5) (Closed) LER 50-348/94-003; Main Steam Safety Valves Setpoint Test Errors

During U1RF12 and U2RF9, several MSSVs were found to have lift settings outside the TS tolerance band. The licensee attributed the cause to be test equipment accuracy and inaccuracy in the mean seat area term of the equation used to calculate the lift setpoint for the Furmanite Trevitest system. To account for test equipment accuracy the licensee revised TS surveillance requirements to expand the allowable band for MSSV setpoint. The inspector reviewed the Furmanite procedure used to test Farley MSSVs and verified that the mean seat area term was revised. This LER is closed.

6) (Closed) URI 50-348, 364/95-16-02, Control Room Pressurization Unit Humidity Control Failure

After bench testing the A train CR pressurization unit humidistat on September 8, and the B train humidistat on September 26, the licensee concluded that both trains were incapable of performing their intended safety function. Bench testing of the B train humidistat heater control on September 26 determined that the controller could not be calibrated which also rendered it incapable of performing its intended safety function. Based on the results of this testing, SNC concluded that the train A and B control room pressurization unit charcoal filter heaters had been incapable of performing their safety function for an indeterminate period of time. With the issuance of VIO 50-348, 364/95-18-01, this LER is closed.

7) (Closed) LER 50-348/95-008; Loop A MSIVs Fail To Close

This event and the licensee's immediate corrective actions are described above (see paragraph 4.c.1). The longer term corrective actions to prevent recurrence, included coaching the responsible operator and revising applicable test procedures to prevent testing more than one MSIV at a time. This procedure change was incorporated into STP-21.2 for Unit 1 and 2, as Revision 8 and TCN 7A, respectively. An inspector verified the Unit 1 procedure revision and Unit 2 TCN. This LER is closed.

Maintenance and surveillance test activities were generally performed in accordance with work order instructions, applicable procedures, and applicable clearance controls. Responsible personnel demonstrated familiarity with administrative and radiological controls. Surveillance tests were routinely performed in a deliberate step-by-step manner by knowledgeable plant personnel. Almost all major maintenance and test evolutions were well planned and executed. Two notable examples included the SI with LOSP (STP-40.0) and sequencer load shed tests (STP-40.1). However, several activities involved poor procedure adherence that resulted in a violation (paragraph 4.c). Two additional violations were also identified involving the indiscriminate use of non-temperature compensated pressure gauges (paragraph 4.b.6), and failure to test or maintain control room pressurization unit humidistats (paragraph 4.a.2). Significant maintenance rework problems were also experienced during U1RF13 on the 1B EDG and 1B CS pump which resulted in a NCV (paragraph 4.a.5).

5. ENGINEERING AND TECHNICAL SUPPORT

Onsite Engineering (37551)

a. Inspectors periodically inspected onsite engineering/technical support activities (e.g., design control, configuration management, system performance monitoring, plant modification, etc.). Effectiveness of on-site engineering and technical group support of licensee efforts to identify, resolve and prevent incidents or problems were also inspected.

1) DCP S93-1-8684; Unit 1 Reactor Coolant Pump Undervoltage and Underfrequency Relay Modification And Post-Modification Testing

In response to a SSSA finding that determined the RCP UV/UF protection feature was vulnerable to single failure, all three RCP UV and UF protection channels were modified such that their relays "drop out" rather than "pick up" to initiate RPS actuation. Furthermore, the 1C RCP protection channel power supply was modified to come from an Auxiliary Building battery, so that each protection channel would have its own separate power supply (1A and 1B are supplied from the turbine building batteries). An inspector reviewed WO's #68629 - 68635 after the new UV and UF relays were installed, and the 1C power supply was modified. All documented electrical work was properly signed off and verified as complete.

The inspector observed the conduct of PMT for the new RCP 1A, 1B, and 1C UV/UF protection relays and modified 1C protection channel power supply IAW FNP-1-PMP-1214. A PMD engineer was responsible for directing and supervising all testing activities as performed by a contract electrician. PMT activities went smoothly, all modified electrical circuits performed per design. The conduct and control of testing was excellent. The PMD engineer was quite familiar with the test procedure and knowledgeable of the design change details.

2) DCP 91-1-7661; 1B RHR Pump Modification

Inspectors observed a considerable amount of ES and PMD planning, technical support and oversight of the 1B RHR pump modification (see paragraph 4.a.6). Engineering controls over the associated maintenance activities appeared effective.

3) DCP S-94-1-8737; Rod Control Timing Modification

An inspector observed satisfactory performance of the PMT for the Unit 1 rod control timing modification committed to in response to GL 93-04. WO 68576 administratively controlled testing that was completed on October 11. The test was IAW procedure O-ETP-3643, Verification of Rod Control System Operability, Appendix E, Logic Cabinet Timing Change Acceptance Test. This change was a licensee commitment to enhance the rod control system reliability. The I&C personnel involved in the test were aware of the details of the changes to the circuit cards, the implications of the changes, and were knowledgeable about the purposes and expectations of the test. By letter dated November 9, 1995, SNC confirmed that it had fully implemented its GL 93-04 commitments to modify the Unit 1 and 2 rod control system current order timing and incorporate vendor guidelines regarding enhanced surveillance testing.

4) WA 433172; 1A RCP Mechanical Seal Package (Response to GL 88-20)

An inspector reviewed the above identified work package and discussed the performance of actual work with the responsible contractor. The

contractor, who also represented the pump manufacturer had inspected and replaced the seal package parts on the 1A RCP. As documented in Appendix G (sheet 2) High Temperature "O"-Ring Documentation Sheet, of the vendor procedure, ALA-PMS-P1.20, "Seal Inspection Procedure," the inspector verified appropriate "O" rings were installed. The drawing and part numbers listed in the appendix matched the numbers on the licensee's material release forms found in the work package. Two additional RCP seals on each unit will require "O"-rings replacement/upgrade. These replacements are scheduled for future refueling outages.

5) DCP 91-1-7578; Sequencer Relay Replacement Testing

DCP 91-1-7578 replaced relays used in Unit 1 safety related 4160 Volt load sequencers. Previously, multiple contacts on 27G2 relays in the sequencer cabinets had been difficult to adjust to close at the same time. This had been reported via the licensee problem evaluation program as FNPIR 91-80. DCPs 7578 and 7479 were generated to change out these potentially problematic relays on Unit 1 and replace them with three new auxiliary relays (GIX series) per sequencer cabinet.

The inspector observed PMT setup and performance, and return to normal alignment of the B1G sequencer. The EM personnel performing the test setup and return to normal condition were thorough and methodical in their actions. They worked well with the two PMD engineers supporting the testing. The PMT methodology and results were satisfactory and properly documented IAW PMP-1211, "Functional Testing of Sequencers - B1G," and WO 68581 that had administratively released the sequencer for test.

These same DCPs changed all the 27G2 relays in all the Unit 1 sequencers. Subsequently, during the LOSP tests and LOSP test with safety injection (see paragraph 4.b.2 and 5), all of the Unit 1 sequencers operated as required which further confirmed the PMT. This modification had been previously performed on Unit 2.

6) ETP-4410; Unit 1 RHR Pump Testing

On October 2, the inspector observed major portions the ETP-4410 performance on the 1A RHR pump. This procedure for "RHR Pump Curve Development," established the actual head curve for the recently modified pump. Operations staff worked closely, clearly and effectively communicating with EM and ES personnel on establishing the conditions for the collection of data. The generated flow values were similar to the pump vendor's pump flow curves and the measured flow met system and FSAR requirements.

During this outage, the Unit 1 RHR pumps had new specially undercut impellers installed. This was done to increase pump flow. The above testing gathered additional information on pump motor amperage that was expected to increase with the new impellers. During outage pre-planning, the inspector attended the initial discussions on the new

impeller's impact. During the 1A RHR pump test performance and the test of the 1B pump, increased pump flow output and additional motor amperage was observed by the inspector. This data was evaluated, reviewed, and appropriately approved by PORC (10 CFR 50.59 evaluation ABN 95-7053, dated 10-6-95).

b. Followup Engineering\Technical Support (92903)

(Closed) URI 50-348, 364/92-17-05, Degraded Grid Voltage Relay Settings Specified by Technical Specifications are Inadequate

This URI was identified during the original EDSFI at FNP and first described in paragraph 2.2 of IR 50-348, 364/92-17. Subsequent followup inspections closed out all the EDSFI open inspection items except this one. In order to close out this particular URI, additional technical review was conducted by NRR. The results of NRR's review have been documented in an NRC SER which is attached to this inspection report.

To address NRC concerns regarding potential delays in relying upon switchyard or dispatch center personnel to inform the CR of degraded vital 4160 VAC bus conditions, SNC installed control room alarms (annunciators VE2, WE2, YE2, and ZE2 above the EPB) that immediately alert the operators of degraded voltage conditions on either unit. The annunciator alarm setpoint for undervoltage is 3950 VAC. Operator actions are directed by annunciator response procedures FNP-0-ARP-2.1, 2.2, 2.4 and 2.5; and FNP-1/2-AOP-5.2, Revision 0, "Degraded Grid." The resident inspectors have reviewed these procedures to confirm they contain the provisions of the attached SER Section 3.5; and verified the degraded vital 4160 VAC bus annunciator alarms are in place. In addition to these annunciators, inspectors have observed operators monitoring vital 4160 VAC bus digital voltmeters on a routine basis. Inspectors have also observed operators enter into AOP-5.2 when voltage readings dropped below 4000 VAC and begin logging the reduced voltage every half hour per the AOP. Based on this review, this item is closed.

Section 4.0 of the attached SER identifies two pending commitments made in SNC letter to the NRC dated June 6, 1995. These commitments involve changing TS to include LCO and surveillance requirements for degraded grid alarm relays; and, describing the offsite system operating voltage range in the next FSAR update (Spring 1996). The completion of these commitments will be tracked by IFI 50-348, 364/95-18-06, EDSFI - Degraded Voltage Commitments.

Overall engineering and technical support of the plant remained excellent. Onsite engineering continued to interface well with the corporate office. A large number of system and equipment modifications were successfully implemented during the Unit 1 outage. PMD engineers were routinely on location providing valuable field support. Post-modification testing was almost always well planned and directed by experienced engineers. The only exception being an uncontrolled spill in the RCA during a Unit 1 hydrostatic test (see VIO 50-348, 364/95-18-05).

6. PLANT SUPPORT (71750)

a. Routine Inspection of Fire Protection Activities

During normal tours, inspectors routinely examined aspects of the plant FP Program including transient fire loads, flammable materials storage, fire brigade readiness, ignition source/risk reduction efforts and FP features. The inspectors paid particular attention to the use of continuous fire watches during welding and grinding activities in preparation for U1RF13. Only one minor finding was identified. It concerned an inadequate open flame permit used to cover grinding and welding performed IAW WO 504304 to replace a drain valve off the SW discharge from the 1C CCW heat exchanger. This open flame permit was erroneous in that it did not require a continuous fire watch. However, a MM foreman was in the immediate area monitoring the job and indicated he could have served as the required fire watch. The improperly filled out open flame permit was discussed with the onsite Fire Marshall.

b. Routine Security Inspection Activities

During routine inspection activities, inspectors verified that security program plans were being properly implemented. This was evidenced by: proper display of picture badges; appropriate key carding of vital area doors; adequate stationing/tours of security personnel; proper searching of packages/personnel at the PAP; and the adequacy of compensatory measures during disablement of vital area barriers. Licensee activities observed during the inspection period appeared to be adequate to ensure proper plant physical protection. Guards were alert and particularly attentive to open doors. They responded promptly to door alarms. Posted positions were well manned with frequent relief. During most of U1RF13 the SAP was used to control access to the protected area by contractor personnel. An inspector observed security guards processing personnel through the SAP on several occasions. Proper access controls were in place at the SAP during its use.

c. Routine Health Physics Inspection Activities

Inspectors routinely examined postings and surveys of radiological areas and labelling of radioactive materials in the RCA. Work activities of plant personnel in the RCA were observed to verify their adherence to established administrative guidelines for radiation protection and ALARA work practices. Effluent and environmental radiation monitors were monitored on a routine basis for any significant changes in radiological conditions or indications of uncontrolled releases. No significant inspector findings were identified. HP technicians maintained good control over the RCA during U1RF13 and Unit 2 steady-state operations. The HP manager continued to inform the resident inspectors of radiological incidents, personnel contaminations, and other related-events of interest.

1) Unit 1 Exclusion Area Left Unlocked

On September 19, HPS personnel discovered that the Unit 1 filter monorail crane breaker panel was unlocked. Lock #41 on this panel should have been locked as part of the HP Exclusion Area Lock Program. This panel was last verified as being locked on September 16, when it was unlocked for a RCS filter changeout. The senior HP technician and HPS personnel involved in the filter changeout forgot to secure the lock when they finished. Although left unlocked for three days, there was no immediate danger that an unsuspecting individual could have entered the exclusion area since it was located below the floor underneath a large concrete plug. Upon discovery, lock #41 was promptly secured, FNPIR #1-95-236 was initiated, and responsible personnel were coached. The resident staff was briefed on this incident the following day.

2) Personnel Contamination Events

A Region II inspector reviewed selected PCEs with an emphasis on those events considered outliers either with respect to a relatively high dose assignment, difficulty of decontaminating, or other radiological aspect during 1994 and 1995 that had not been previously reviewed. The licensee documented PCEs for contamination levels of 5,000 dpm/100 cm square beta/gamma; 50,000 dpm/particle; and any contamination above background levels for alpha radiation. The licensee's documentation and follow up of individual PCEs was adequate and skin dose assessments were determined to have been performed IAW procedures when required. For those PCEs that were reviewed, all resultant exposures were of minor radiological significance, and were well within regulatory and licensee administrative limits.

3) Radiological Material And Personnel Contamination Control

HP has demonstrated aggressive control of radiological material, tools and equipment, and personnel coming onto the site and leaving the site. However, the physical control over tools and equipment in the RCA following the completion of work activities was poor (see paragraph 3.a.1). Surveys are routinely conducted of all equipment leaving the protected area, whether it entered the RCA or not. Multiple surveys for both gamma ray and beta particles of plant and contractor personnel are conducted when entering and exiting the protected area. These initiatives by HP have been exemplified by recent incidents involving a contaminated contractor and a vendor welding machine (RIR 95-10), neither of which had been inside the RCA. In both cases the contamination appeared to have originated from work on overseas plants.

d. Emergency Preparedness - Hurricane Opal

During Hurricane Opal (see paragraph 3.b), SNC activated the FNP TSC and Corporate EOC with limited staffing. An onsite NRC inspector also manned the TSC. The State of Alabama and Houston County also activated their respective EOCs. After the hurricane, onsite EP personnel determined that three offsite sirens had been adversely affected by power outages. Work crews were dispatched from the site to verify operability of the offsite sirens at Ashford, Columbia and Gordon. Prior to the restart of Unit 2, FNP management confirmed in conversations with the resident staff and Region II that all three sirens were fully functional. Normal power had been restored to the Ashford siren, and emergency generators were connected to the other two sirens. The principal evacuation routes on highway 95 north and south of the plant were clear.

...e personnel provided good support of Unit 2 steady-state operations and U1RF13. Although the ambitious radiation exposure goal for U1RF13 was not reached, extensive dose reductions were achieved for a large number of jobs. HP did not perform well in maintaining physical control of equipment, tools or supplies in the RCA or containment during the outage, although FME in refueling CRAB areas was well controlled. HP management continued to proactively inform the resident staff of ongoing radiological issues, including the discovery of an unlocked exclusion area. Security personnel were consistently alert and implemented the site's security plan in an appropriate manner. Personnel entry into the protected area was well controlled at both the PAP and SAP. Fire protection features were adequately maintained, compensatory measures (i.e., fire watches) were fully implemented, and, except for one instance, work involving open flames were properly controlled. Emergency preparedness, planning and response capabilities were well executed during Hurricane Opal .

7. EXIT INTERVIEW

On October 27, 1995, the inspectors met with licensee representatives identified in paragraph 1. During this meeting the inspectors summarized the scope and findings of the inspection as detailed in this report. An additional meeting was held on November 8 with the FNP General Manager and his direct reports to discuss VIO 50-348, 364/95-18-05. SNC management at FNP acknowledged these findings and did not identify as proprietary any material provided to or reviewed by the inspectors nor did they express any dissenting comments.

ITEM NUMBER	DESCRIPTION AND REFERENCE
URI 50-348, 364/92-17-05 (Closed)	Degraded Grid Voltage Relay Settings Specified by TS are Inadequate (paragraph 5.b)
IFI 50-348/94-07-02 (Closed)	SFP Hoist Limit Switch Misadjustment (paragraph 4.d.1)

VIO 50-348, 364/94-07-04 (Closed)	Nuclear Instrumentation System Power Range Channel Inoperability (paragraph 4.d.2)
IFI 50-348, 364/94-13-02 (Closed)	William Powell Gate Valve Disc Holder Corrosion (paragraph 4.d.3)
IFI 50-348/94-30-02 (Closed)	No. 1 DDFP Failed to Manually Start (paragraph 4.d.4)
LER 50-348/94-003 (Closed)	Main Steam Safety Valves Setpoint Test Errors (paragraph 4.d.5)
VIO 50-348, 364/95-08-03 (Closed)	Inadequate Tagging Order Preparation and Execution (paragraph 3.d)
URI 50-348, 364/95-16-02 (Closed)	Control Room Pressurization System Humidity Control System Failure (paragraph 4.d.6)
LER 50-348/95-008 (Closed)	Loop A MSIVs Fail To Close (paragraph 4.d.7)
VIO 50-348, 364/95-18-01 (Open)	Inoperable Control Room Pressurization Unit Humidistats (paragraph 4.a.2)
NCV 50-348/95-18-02 (Closed)	Inadequate CS Pump Repair Procedure (paragraph 4.a.5)
VIO 50-348, 364/95-18-03 (Open)	Uncontrolled Use Of Non-Temperature Compensated Heise Gauges (paragraph 4.b.6)
IFI 50-348/95-18-04 (Open)	HCV 603 Jam Nut Improperly Installed (paragraph 4.b.9)
VIO 50-348, 364/95-18-05 (Open)	Failure To Follow Procedures, Multiple Examples (paragraph 4.c.4)
IFI 50-348, 364/95-18-06 (Open)	EDSFI - Degraded Voltage Commitments (paragraph 5.b)

8. ACRONYMS AND ABBREVIATIONS

AFW - Auxiliary Feedwater System
ALARA - As Low As Reasonably Achievable
AOP - Abnormal Operating Procedure
AP - Administrative Procedure
ARP - Annunciator Response Procedure
ASME - American Society of Mechanical Engineers
CAR - Corrective Action Report
CCW - Component Cooling Water

CDT - Central Daylight Time
CFR - Code of Federal Regulations
CIV - Containment Isolation Valve
CR - Control Room
CRAB - Controlled Refueling Area Boundary
CREVS - Control Room Emergency Ventilation System
CS - Containment Spray
CVCS - Chemical Volume and Control System
DBA - Design Basis Accident
DCP - Design Change Package
DDFP - Diesel-Driven Fire Pump
DRP - Division of Reactor Projects [NRC Region II]
DRS - Division of Reactor Safety [NRC Region II]
ECP - Estimated Critical Position
ECT - Eddy-Current Testing
EDSFI - Electrical Distribution System Functional Inspection
EDG - Emergency Diesel Generator
EIP - Emergency Implementing Procedure
EM - Electrical Maintenance [Department]
EMP - Electrical Maintenance Procedure
EOC - Emergency Operations Center
EP - Emergency Planning
EPB - Emergency Power Board
EPZ - Emergency Planning Zone
ES - Engineering Support [Department]
ESF - Engineered Safety Features
ETP - Engineering Test Procedure
F - Fahrenheit
FATF - Fuel Assembly Transfer Arm
FCV - Flow Control Valve
FHP - Fuel Handling Procedure
FME - Foreign Material Exclusion
FNP - Farley Nuclear Plant
FNPIR - Farley Nuclear Plant Incident Report
FP - Fire Protection
FSAR - Final Safety Analysis Report
GDC - General Design Criteria
GL - Generic Letter
HCV - Hydraulic Control Valve
HHSI - High-Head Safety Injection
HP - Health Physics
HPS - Health Physics Support
HV - Hydraulic Valve
I&C - Instrumentation and Control [Department]
IAW - In Accordance With
IFI - Inspector Followup Item
IMP - Instrumentation Maintenance Procedure
IR - Inspection Report
IRC - Incident Response Center
ISI - Inservice Inspection
KV - Kilovolt
LCO - Limiting Condition for Operation

LER - Licensee Evaluation Report
LHSI - Low-Head Safety Injection
LLRT - Local Leak Rate Test
LOSP - Loss of Offsite Power
LT - Level Transmitter
MCB - Main Control Board
MDAFW - Motor-Driven Auxiliary Feedwater
MM - Mechanical Maintenance [Department]
MP - Maintenance Procedure
MOV - Motor-Operated Valve
MPH - Miles Per Hour
MS - Main Steam
MSIV - Main Steam Isolation Valve
MSSV - Main Steam Safety Valve
MSVR - Main Steam Valve Room
NCV - Non-cited Violation
NIS - Nuclear Instrumentation System
NOUE - Notification of Unusual Event
NRC - U.S. Nuclear Regulatory Commission
NRR - Office of Nuclear Reactor Regulation [NRC]
OER - Operating Experience Review
ORAM - Outage Risk Assessment and Management
PAP - Primary Access Point
PASS - Post Accident Sampling System
PCE - Personnel Contamination Event
PCN - Plant Change Notice
PM - Preventative Maintenance
PMD - Plant Modifications and Design [Department]
PMT - Post-Modification Testing
PPR - Piping Penetration Room
PORC - Plant Onsite Review Committee
PR - Power Range
PSI - Pounds Per Square Inch
RCA - Radiological Control Area
RCP - Radiological Control Procedure
RCS - Reactor Coolant System
REA - Request For Engineering Assistance
RG - Regulatory Guide
RIR - Radiological Incident Report
RPS - Reactor Protection System
RHR - Residual Heat Removal
RWST - Refueling Water Storage Tank
SAP - Secondary Access Point
SCBA - Self-Contained Breathing Apparatus
SER - Safety Evaluation Report
SFM - Shift Foreman
SFP - Spent Fuel Pool
SG - Steam Generator
SI - Safety Injection
SNC - Southern Nuclear Operating Company
SO - Systems Operator
SOV - Solenoid Operated Valve

SS - Shift Supervisor
SSSA - Safety System Self-Assessment
STP - Surveillance Test Procedure
SW - Service Water
SWS - Service Water System
SWIS - Service Water Intake Structure
TAN - Training Advisory Notice
TCN - Temporary Change Notice
TDAFW - Turbine-Driven Auxiliary Feedwater
TE - Temperature Element
TM - Technical Manual
TS - Technical Specification
TSC - Technical Support Center
U1RF12 - Unit 1 Twelfth Refueling Outage
U1RF13 - Unit 1 Thirteenth Refueling Outage
U2RF10 - Unit 2 Ninth Refueling Outage
U2RF10 - Unit 2 Tenth Refueling Outage
UF - Underfrequency
ULMS - Ultrasonic Level Monitoring System
URI - Unresolved Item
UOP - Unit Operating Procedure
UV - Undervoltage
VAC - Volts - Alternating Current
VDC - Volts - Direct Current
VLU - Valve Lineup
VIO - Notice of Violation
WA - Work Authorization
WO - Work Order