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

Report No.: 50-400/87-20

Licensee: Carolina Power and Light Company
P. O. Box 1551
Raleigh, NC 27602

Docket No.: 50-400 License No.: NPF-63

Facility Name: Shearon Harris 1

Inspection Conducted: June 1-5, 1987

Inspectors: M. Scott — Date Signed 7-17-87

L. Mellen — Date Signed 7/17/87

R. Moore — Date Signed 7/17/87

Approved by: A. Belisle, Chief — Date Signed 7/17/87
Quality Assurance Programs Section
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of design control and licensee action on previously identified inspection findings.

Results: One violation was identified.

## REPORT DETAILS

1. Persons Contacted

Licensee Employees

*R. Biggerstaff, Principal Engineer, Onsite Nuclear Safety (ONS)
G. Blinde, Senior Specialist, Training
*G. Cambell, Manager, Maintenance
R. Garner, Shift Foreman, Operations
P. Gordy, Harris Plant Construction Section (HPCS) Engineer
T. Gilbert, Quality Assurance (QA) Specialist
*J. Harness, Assistant Plant General Manager
W. Harris, Senior Engineer, Technical Support (TS)
C. Jeffries, Regulatory Compliance Specialist
*R. Lamb, Senior Engineer, Harris Plant Engineering Section (HPES)
*T. Lentz, Engineering Supervisor, TS
*L. Loflin, Manager, HPES
*E. Martin, Senior QA Specialist
*C. McKenzie, Principal QA Engineer
L. Olsen, Engineer, TS
W. Ponder, Senior Engineer, TS
*S. Rea, Senior Engineer, TS
L. Rowell, Senior Engineer, HPES
D. Shockley, QA Auditor
*B. Slover, Project Engineer, TS
L. Sullivan, Regulatory Compliance Specialist
W. Szuba, Engineering Supervisor, HPCS
*D. Tibbitts, Supervisor, Regulatory Compliance
B. Tomlin, Senior Engineer, TS
*M. Wallace, Specialist, Regulatory Compliance
*E. Willet, Manager, Modifications (HPCS)

Other licensee employees contacted included construction craftsmen, engineers, technicians, operators, mechanics, and office personnel.

NRC Resident Inspectors

*George Maxwell, Senior Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on June 5, 1987, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

Violation, Failure to perform adequate safety evaluations, paragraph 8.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Licensee Action on Previously Identified Inspection Findings (92701)

a. (Closed) Inspector Follow-up Item 400/86-53-08: Surveillance Program Procedures

This item identified an incomplete surveillance program in that not all procedures required to perform Technical Specification surveillance requirements had completed the review and approval process. The inspector verified those specific procedure types identified in the initiating report were presently completed. Additionally the inspector performed a sample check to verify technical specification surveillances were scheduled on the master schedule and that procedures were approved to perform the tasks.

b. (Closed) Inspector Follow-up Item 400/86-53-12: Identification and Control of Commitment Related Process Instrumentation

This item identified an incomplete program for installed process instrumentation used for safety-related or technical specification functions in that not all applicable instrumentation was identified or entered into a calibration program. The licensee has developed a Required Instrumentation List (RIL) to identify instrumentation required to meet Final Safety Analysis Report (FSAR) or technical specification requirements. The list used in conjunction with the technical specification Cross Reference List (PGO-031) provides traceability from technical specification surveillances to specific instruments and the calibration procedures for the instruments. The licensee stated that the out - of - tolerance instruments of the RIL would be evaluated for previous useage per the individual instrument calibration procedures. The inspector reviewed the completed instrument list and performed random checks to verify process instruments were included as required. Discrepancies were not identified in this sample.

c. (Closed) Inspector Follow-up Item 400/86-33-06: Onsite Packaging of Equipment and Materials

This item identified the need for the licensee to direct attention to packaging of spare parts and material to prevent damage during transient from receipt inspection and warehouse storage. The inspector reviewed the following procedures to verify the programmatic guidelines for onsite packaging:

HNP-9.3.1, Responsibilities for Packaging Shipping Receiving Handling, Storage and Maintenance of Spare Parts, Material and Components While Under the Control of Warehouse Personnel, Revision 0.

TMM-110, Receiving, Packaging, Storage and Maintenance Requirements for Spare Parts Material and Components, Revision 0.

These procedures appeared to supply adequate guidance for protection of spare parts and material onsite. In addition, the inspector discussed the potential for damage of parts and materials with warehouse personnel. Problems were not identified in this area and it appeared that the guidelines of the above procedures were adequately implemented.

6. Field Change Requests

As a result of the Quality Assurance preoperational review of the licensee Design Control Program, areas were identified which required a review to a greater depth, especially with respect to implementation. These areas included Field Change Requests (FCR) and Plant Change Requests (PCR). Field Change Requests were changes to plant design processed during the construction phase utilizing guidelines of the construction QA program. Following the establishment of a system as "operable" any changes were required to be made via the PCR process. This process required additional reviews of the specific change for maintenance, operations and training impact. During inspection 50-400/87-09 the inspector identified a number of modifications being processed via the FCR process although the associated systems had been declared operable and released to operations. This inspection, in part, reviewed this aspect of the design control program with regards to volume of FCRs open or processed following issuance of the low power operating license and the actions of the licensee to evaluate and closeout remaining FCRs. The FCR procedure was cancelled on April 21, 1987, which ended the mechanism for initiating future FCRs. The licensee identified 829 FCRs which were open or resolved following issuance of the low power operating license on October 24, 1986. Of these, 606 were resolved prior to the specific system's operational date and included in the system release to operations. These FCRs appeared to be appropriately processed. Systems under construction, i.e., waste treatment systems, accounted for 25 FCRs which were properly addressed as FCRs. The remaining 196 FCRs received a multi-discipline review by Technical Support, associated discipline, and Environmental and Radiological Control (E&RC) to determine impact on plant systems, procedures, operations, and training. The result of this review was the identification of ten FCRs with potential impact on system operations, tests, or training. Of this ten FCRs, two were identified as safety-related. The safety-related FCRs and impact were as follows:

1) FCR-I-1735 impacted on training notes and was a document change only.

2) FCR-I-3952 impacted operations procedures with respect to a set point change.

The following is a list of the eight non-safety related FCRs and their impact:

FCR-I-3248, Revision 2, impacted a system description which is due for issuance in August 1987.

FCR-SI-847, Revision 2, required adding computer points to scaling documents SCN 034 and SCN 036.

FCR-HV-1728 and FCR HV-1730 involved minor installation details which impacted information in training notes.

FCR-I-3962 and FCR-I-400 impacted setpoints and a procedure revision.

FCR-I-3995 involved an annunciator window modification which changed a procedure reference.

FCR-M-2032 affected the chemical feed system and impacted class training notes.

Additionally, 101 of the 196 FCRs open after system turnover remain open; 36 of these were partially implemented. Those FCRs not under implementation will be deleted, converted to PCRs, or receive an equivalent review and evaluation process similar to the PCRs. The remaining FCRs will be incorporated into an implementation schedule by July 15, 1987. The following activities by the licensee demonstrate positive aggressive action to resolve the FCR issue:

1) Cancellation of the FCR procedure to prevent further initiation of FCRs.

2) Identification of the scope of this issue through review of FCRs and associated system impact.

3) Organization and completion of multi-discipline reviews of each open FCR.

For the sample reviewed, the licensee appeared to have achieved adequate control of the FCR process to provide a timely and sufficient resolution of potential problems and closeout of the FCR program. Per CP&L (Harris Nuclear Project) letter NRC-555 dated May 1, 1987, (File Number SHF/10-10000), the licensee had committed to review the entire FCR process.

7. Plant Change Requests (PCRs) - Implementation

The inspector reviewed selected PCRs to determine if adequate design controls were utilized to ensure appropriate reviews were performed, drawings were accurately revised, safety evaluations were correct and thorough, required training was complete and timely, and modifications were accurately installed. The following PCRs were reviewed:

PCRs REVIEWED

| PCR # | TITLE |
|---|---|
| 81 | 7.5 KVA Instrument Power Supply Inverter |
| 153 | Demineralizer Bypass Around CST and RWST |
| 187 | I/P Transducers |
| 234 | Indicator Scale Changes |
| 253 | Appendix R Power Panel Protection |
| 259 | Auxiliary Feedwater (AFW) Venting Provisions |
| 292 | Design Change - Turbine Driven AFW Pump Oil |
| 301 | 7.5 KVA Inverter Ferro-Resonant Transformer |
| 353 | Valves Not on Plant Drawings |
| 423 | RHR/SI System Vent Valves |
| 466 | AFW Pump Low-Low Suction Pressure Switch |
| 467 | AFW Pump Suction from CST |
| 489 | NRC Concern ESW/AF |
| 667 | Containment Spray Miniflow Orifice Replacement with Throttle Valves |
| 668 | AFW Pump Vents |
| 785 | Service Air Leakage Outside Diesel Generator Building |
| 824 | AFW Pump Thrust Bearing Coil Spring |
| 825 | Evaluation of PCR 824 |
| 842 | AFW Pump Bearing Walkdown |
| 854 | RWST Transmitter Replacement |
| 932 | Essential Chiller Recirculation Seal Piping |
| 1026 | AH(1A-SA) E-28(1A-SA) |
| 1119 | Thermolag Interference |
| 1145 | AFW Check Valve |
| 1157 | Condensate Storage Tank |
| 1190 | AFW Pump Low Flow Trip Delay |
| 1191 | Instrument Loop F-113 Controller Card Update |
| 1286 | AFW Check Valve Backleakage Problem |
| 1388 | AFW Check Valve Backleakage |
| 1515 | Steam Hammer Line number 3BD4-13-SN-1 |
| 1571 | Steam Generator Blowdown Valve-Temporary Repair |

The inspectors found no evidence that PCRs were not receiving appropriate reviews or that single line electrical and flow diagrams did not accurately depict the as-built configuration of the plant. It was noted that drawing details are not always revised in a timely manner which could lead to work being performed without updated drawings; however, the inspectors did not identify any evidence of this.

The safety evaluations and 10 CFR 50.59 evaluations included in the selected PCR packages were reviewed by the inspectors. It appeared that the justification for the conclusions reached in the evaluations were not always well documented. This is addressed in more detail in paragraph 8 of this report.

The inspectors reviewed the training provided for modifications installed under the PCR and FCR programs. The training of the onshift operators appeared to be adequate; however, there appeared to be an excessive amount of time required to include modifications in the operator qualification and requalification training. Specifically, the inspectors reviewed the training guide and system description for the auxiliary feedwater system; neither of which completely addressed the recent modifications to the system.

The inspectors field verified system modifications and drawing accuracy by extensive walkdowns of selected PCRs. The following PCRs were field verified.

FIELD VERIFIED PCRs

| | |
|---|---|
| 153 | Demineralizer Bypass Around CST and RWST |
| 259 | AFW Feedwater Venting Provisions |
| 292 | Design Change - Turbine Driven AFW Pump Oil |
| 423 | RHR/SI System Vent Valves |
| 466 | AFW Pump Low-Low Suction Pressure Switch |
| 467 | AFW Suction From CST |
| 489 | NRC Concern ESW/AF |
| 667 | Containment Spray Miniflow Orifice Replacement |
| 668 | AFW Pump Vents |
| 785 | Service Air Leakage Outside Diesel Generator Building |
| 932 | Essential Chiller Recirculation Seal Piping |
| 1145 | AFW Check Valve Accessibility |
| 1190 | Feedwater Pump Low Flow Trip Delay |
| 1286 | AFW Check Valve Backleakage Problem |
| 1388 | AFW Check Valve Backleakage Temporary Modification |
| 1571 | Steam Generator Blowdown Valve Temporary Repair |

There was no evidence of any discrepancies between the as-built configuration and the modification.

8. PCR Package Contents

The inspector examined the methodology, interfaces, and output associated with work package development for mechanical PCRs. After a design package has been developed by engineering and administratively processed by Technical Support, Harris Plant Construction Section (HPCS) developed work packages for implementation of the modification. The packages include work instructions, additional drawings, Quality Control hold points, and material for the job.

The inspector examined the following new procedures that had been written for package development:

| PROCEDURE | TITLE | REVISION |
|---|---|---|
| MAP-1 | Harris Plant Modification Unit of Conduct of Operations | 0 |
| MAP-2 | Preparation, Approval, and Control of Modification Unit Procedures | 0 |
| MAP-3 | Training of Harris Modification Unit Personnel | 0 |
| MAP-4 | Process Control | 0 |

These procedures were issued in May 1987 and were in the process of being implemented. Site personnel stated that these documents varied minimally from previous construction procedures. These procedures reference some existing pre-operational procedures. HPCS was phasing out the older referenced procedures and appeared to have firm control of that evolution.

HPCS appeared to interface well with the other plant groups. HPCS personnel directly interfaced with trades personnel in work accomplishment and, thus, were spokesmen to the other plant groups on job status. When required, HPCS routed changes to modifications and to HPES. HPCS was developing a working relationship with the Technical Support group.

The inspector reviewed several modification work packages with HPCS personnel. With the personnel involved, the process appeared to be thorough. With so few PCRs in process and with the new procedures, HPCS was taking their time with the first few packages in order that the mechanics of the package creation could be understood.

The inspectors examined the following PCR packages for content and completeness:

| PCR NO. | TITLE |
|---|---|
| 1134 | Flow Element Flowing from Duct Work Lining |
| 1145 | AFW Check Valve Accessibility |
| 310 | Vendor Mobile Solidification System Hookup |

These yet-to-be closed packages appeared to be complete to the point of the exceptions noted in the packages. Some of the Field Revisions in PCR 1145 were difficult to follow, but all packages had the essential elements required by site and regulatory documents.

The inspectors extensively reviewed PCR 1286, Auxiliary Feedwater (AFW) system modification to prevent back-fill in auxiliary feed lines, and PCR 842, AFW pump thrust bearing coil springs. The remaining paragraphs discuss these PCRs.

PCR 1286 installed three additional check valves in the AFW system motor driven pump train (one per line to each of the steam generators). The check valves were to prevent back leakage from the steam generators and main feed lines. The two previously existing check valves in each line (six total) did not prevent the back leakage. The primary check valves (Pacific, Inc.) in each line which were adjacent to the steam generators that were to prevent leakage had been previously unsuccessfully worked (PCR 1145). Each of three new valves (Anchor-Darling, Co.) were welded into the system between the two existing check valves in each line.

In discussions with site personnel, the following options for new Anchor-Darling valves had been considered: replacement of the Pacific valves nearest the generator with the new valves, using flanged valves instead of welding the valves, using hangers on the proposed flanged valves, using another valve type, using soft seated valves, leaving the existing Pacific valves in place in case soft seats were eventually used (to prevent thermal deterioration of the soft seat), and installing a motor operated valve in lieu of a check valve. Due to operational time limits, the welded valve configuration was chosen. None of the above two paragraphs of background information was present in the PCR package.

The licensee had contingency plans should the new Anchor-Darling valves fail to prevent back leakage. As indicated above, soft seats for the new Anchor-Darling valves and motor operated valves were considered. The site had ordered soft seat kits (a new PCR would be required) for the newly installed valves but, per the licensee, they had not ordered hard disks for the existing valves.

The new valves appeared to be preventing back leakage. Aside from the operability/functional tests for the system, the new valves had not been challenged with system transients. Per the licensee, operational procedures had been changed to prevent the usage of the AFW system during startup which would limit the cycling of the system check valves. Further, AFW system testing (surveillance) and usage will determine whether or not the modification will be viable.

Due to the awareness of historical operation problems with check valves and the likelihood that the new Anchor-Darling valves will probably require cyclical preventative maintenance (PM), the inspector discussed valve PM with the licensee. NRC Information Notices such as 86-01 and 86-09 had addressed problems with check valves in feedwater and AFW systems. It has been historically recognized that check valves leak, internal parts separate from the valve body, and the valves have active failures (fail to open). Per discussion with the Technical Support Group AFW system engineer, he was unaware of any PMs on the valves, but directed

the inspector to the Maintenance Group. The Maintenance Manager was aware of an Institute of Nuclear Power Operations Significant Operating Experience Report (SOER 86-3) which Harris Plant Engineering Section (HPES) was reported to be addressing. The maintenance manager said that no PMs were currently being performed on check valves. Per HPES personnel, they were in the preliminary stages of developing background information towards implementation of PMs.

10 CFR 50.59 and Section 6.5.1.4.1 of the Plant's Technical Specification (TS) require that a safety evaluation be written should a change or modification to a safety system occur. Both documents require that certain questions be addressed in preparing the evaluation. One of the questions is whether the change or modification represents an increase in probability of occurrence or the consequences of an accident or malfunction. 10 CFR 50.59 and the TS state that the evaluation shall include a written determination, with bases. Procedure AP-011, Safety Reviews, Revision 1, implements the TS and 10 CFR 50.59 requirements. Paragraph 5.2.c, of the procedure addresses what the evaluator shall analyze addressing the above question. The paragraph states that an action which makes even a single failure to safety related equipment more probable must be considered.

PCR 1286, (AFW check valves) did contain a safety evaluation (Form 2, pages 15 to 17). Part 2, paragraph 7.3, of the evaluation which restates the probability increase question of AP-011 was answered "no" and the bases for this answer was stated to be that the modification to the auxiliary feed system will not affect the design conditions of safety-related equipment. Answers to other questions in evaluation were similarly terse. PCRs 310 and 489 had extensive safety evaluations which more formally addressed the design envelope of the modification that they performed. Neither the PCR 1286 evaluation nor the PCR package itself contained any information or analysis that discussed this extra internal check valve parts (disk, disks pin, and fasteners) and/or valve failure potential caused by the valves' addition to the AFW system. Aside from the one line answer to paragraph 7.3, Part 2, of the safety evaluation, there was no information from which to draw the conclusion that the three check valves installation did not increase the probability of system failure or malfunction.

The above identified inadequate safety evaluation is but one example. PCR 825 contains another example of an inadequate evaluation, the specifics of which are detailed below. Both examples represent a violation, 400/87-20-01, of 10 CFR 50.59, Inadequacy of Safety Evaluations.

There were three similar PCRs generated by the site on the AFW pumps. They are as follows:

| PCR NUMBER | ISSUED DATE FORM 1, INITIATION | SAFETY EVALUATION DATE | PUMP AFFECTED/ COMMENTS |
|---|---|---|---|
| 824 | 1-17-87 | 1-17-87 and 4-27-87 | 1A - SA/ Temporary Modification |
| 825 | 1-17-87 | 1-17-87 | 1B-SB and 1X-SAB/ Evaluation |
| 842 | 1-20-87 | 2-3-87 | All Three |

Two modifications (PCR 824 and 842) were to remove three thrust springs from each of the three AFW pumps and one modification (PCR825) was to evaluate not performing the spring removal until a later date. The pumps were modified on dates as follows; 1A-SA on 1-17-87, 1X-SAB on 2-5-87, and 1B-SB on 3-15-87. Per the licensee, PCR 842 was to provide closure of work on all the pumps but maintenance had yet to forward the completed work packages to Technical Support Group (not in the PCR package). PCR 824 was to perform a temporary modification on the 1A-SA pump; a Nonconformance Report (87-012) which was still open at the time of the inspection indicated that the work had been performed prior to issuance of the PCR and work ticket.

The initiating impetus to all pump work was the fact that the 1A-SA pump did not meet its pump curve during operability testing. There were several contacts made with the pump vendor (Ingersoll-Rand), some of which were not documented in the PCR packages. PCR 825 references a memo from the vendor and telephone conversation with the vendor and documentation for these were not in the PCR packages. PCR 842 contained instructions to remove the thrust springs from the pumps and replace them with a spacer.

PCR 825 which is an engineering evaluation with a safety evaluation included provided justification for continued operation of the two unmodified pumps. The engineering evaluation states that the insufficient head problem (1A-SA pump) was analyzed to be attributable primarily to improper assembly and/or missing parts and secondarily to abnormal wear of the balancing drum. The analysis was not a part of the PCR package unless it was the referenced vendor memo. The discovery findings at the disassembly of the 1A-SA was not available in the three PCR packages.

The safety evaluation (Form 2, pages 15 to 17) found in PCR 825 did not adequately support continued operation of the two unmodified pumps. The Part 2, paragraph 7.3 question of the safety evaluation asked the question as follows; Will the probability of occurrence of malfunction of equipment important to safety be increased?

The utility answered the question as no and the bases was that AFW pump and system reliability is not affected. Although the two unmodified pumps were not exhibiting low head output as the pump 1A-SA, no explanation as to the potential missing or rubbing parts in the unmodified pumps was given. The removal and replacement of the 1A-SA springs was thought to be a reduction in probability of a malfunction (and a repair method). As with PCR 1286, this aspect of an inadequate safety evaluation represents another example of a violation of 10 CFR 50.59, 400/87-20-01.