



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

July 27, 2007

Carolina Power & Light Company
ATTN: Mr. Robert J. Duncan II
Vice President - Harris Plant
Shearon Harris Nuclear Power Plant
P. O. Box 165, Mail Code: Zone 1
New Hill, NC 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INTEGRATED
INSPECTION REPORT 05000400/2007003

Dear Mr. Duncan:

On June 30, 2007, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Shearon Harris reactor facility. The enclosed integrated inspection report documents the inspection findings, which were discussed on July 5, 2007, with Mr. C. L. Burton and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents one self-revealing finding of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. Additionally, a licensee-identified violation which was determined to be of very low safety significance is listed in Section 40A7 of this report. However, because of the very low safety significance and because it has been entered into your corrective action program, the NRC is treating the self-revealing finding as a non-cited violation, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you contest this non-cited violation, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Shearon Harris facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system(ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA by Scott Shaeffer Acting For/

Randall A. Musser, Chief
Reactor Projects Branch 4
Division of Reactor Projects

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

Enclosure: NRC Inspection Report 05000400/2007003
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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Letter to Robert J. Duncan, II from Randall A. Musser, dated July 27, 2007

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INTEGRATED
INSPECTION REPORT 05000400/2007003

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No: 50-400

License No: NPF-63

Report No: 05000400/2007003

Licensee: Carolina Power and Light Company

Facility: Shearon Harris Nuclear Power Plant, Unit 1

Location: 5413 Shearon Harris Road
New Hill, NC 27562

Dates: April 1, 2007 through June 30, 2007

Inspectors: P. O'Bryan, Senior Resident Inspector
M. King, Resident Inspector
R. Baldwin, Senior Operations Engineer (Section 1R11)
B. Caballero, Operations Engineer (Section 1R11)
C. Kontz, Operations Engineer (In training) (Section 1R11)
P. Capehart, Operations Engineer (In training) (Section 1R11)
R. Chou, Reactor Inspector (Section 1R07)

Approved by: R. Musser, Chief
Reactor Projects Branch 4
Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000400/2007-003; April 1, 2007 - June 30 2007; Shearon Harris Nuclear Power Plant, Unit 1; Maintenance Effectiveness.

The report covered a three-month period of inspection by resident inspectors and announced inspections by regional operator licensing inspectors and a regional reactor inspector. One Green non-cited violation (NCV), was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. Inspector-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. A self-revealing non-cited violation (NCV) of 10CFR50, Appendix B, Criterion XVI, "Corrective Action" was identified for failure to promptly correct a condition adverse to quality. The licensee failed to correct a low refrigerant level in the A essential services chiller, which led to a low refrigerant pressure trip of the chiller after it was started on April 5, 2007. The low refrigerant condition had been identified by the licensee during multiple surveillance testing opportunities prior to the chiller failure on April 5, 2007, but the licensee assigned a low priority to work activities to correct the condition. Therefore, the condition was not corrected prior to the chiller failure. The licensee entered the failure to take effective corrective actions into their corrective action program (AR 228947).

This finding is greater than minor because it affected the availability and reliability objectives of the Equipment Performance attribute under the Mitigating System Cornerstone. The finding is of very low safety significance because there was no loss of safety function of the essential services chill water system, the A essential services chiller was not inoperable in excess of its allowed technical specifications limiting condition for operation (LCO) time, and the finding is not potentially risk-significant due to external events. The system safety function was preserved by the B train of the essential services chill water system which remained operable during the period of time the A train was inoperable. The cause of the finding is related to the Thorough Evaluation of Identified Problems aspect of the Problem Identification and Resolution cross-cutting area. (Section 1R12)

B. Licensee-Identified Violations

A violation of very low safety significance, which was identified by the licensee has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and corrective action tracking numbers are listed in Section 40A7 of this report.

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REPORT DETAILS

Summary of Plant Status

The unit began the inspection period at full rated thermal power, and operated at full power for the entire inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment

a. Inspection Scope

Partial System Walkdowns:

The inspectors performed the following three partial system walkdowns, while the indicated structures, systems and components (SSCs) were out-of-service (OOS) for maintenance and testing:

- A train and B train of auxiliary feedwater with the turbine driven auxiliary feedwater pump out-of-service on April 18, 2007.
- B train of essential services chilled water with A train of essential services chilled water out-of-service on May 2, 2007.
- A train of residual heat removal with the B train of residual heat removal out-of-service on May 16, 2007.

To evaluate the operability of the selected trains or systems under these conditions, the inspectors reviewed valve and power alignments by comparing observed positions of valves, switches, and electrical power breakers to the procedures and drawings listed in the Attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

For the 19 areas identified below, the inspectors reviewed the licensee's control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures, to verify that those items were consistent with final safety analysis report (FSAR) Section 9.5.1, Fire Protection System, and FSAR Appendix 9.5.A, Fire Hazards Analysis. The inspectors walked down accessible portions of each area and reviewed results from related surveillance tests, to verify that conditions in these areas were consistent with descriptions of the applicable FSAR sections. Documents reviewed are listed in the Attachment.

- 305' and 324' levels of the reactor auxiliary building including areas 12-A-6-HV7, 12-A-6-CHF1, and 12-A-6-CHF1 (3 areas)
- 190' and 216' levels of the reactor auxiliary building including areas 1-A-1-PA, 1-A-1-PB, and 1-A-2-MP (3 areas)
- 240' and 261' levels of the turbine building including areas 1-G-240 and 1-G-261 (2 areas)
- 261' level of the reactor auxiliary building including areas 1-A-4-COMB, 1-A-4-COME, and 1-A-4-COMI (3 areas)
- 286' and 314 levels of the turbine building including areas 1-G-286 and 1-G-314 (2 areas)
- B diesel generator building including areas 1-D-1-DGB-RM, 1-D-3-DGB-ES, 1-D-DTB, 1-D-1-DGB-ASU, 1-D-1-DGB-ER, and 1-D-3-DGD-HVR (6 areas)

Also, to evaluate the readiness of the licensee's personnel to prevent and fight fires, the inspectors observed fire brigade performance during an unannounced fire drill in the fuel oil storage tank building on April 23, 2007.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

Internal Flooding

The inspectors walked down the 190', 230' and 261' elevations of the reactor auxiliary building containing risk-significant SSCs which are below flood levels or otherwise susceptible to flooding from postulated pipe breaks, to verify that the area configuration, features, and equipment functions were consistent with the descriptions and assumptions used in FSAR section 3.6A.6, Flooding Analysis, and in the supporting basis documents listed in the Attachment. The inspectors reviewed the operator actions credited in the analysis, to verify that the desired results could be achieved using the plant procedures listed in the Attachment.

b. Findings

No findings of significance were identified.

1R07 Biennial Heat Sink Performance

a. Inspection Scope

The inspector reviewed inspection records, test results, and other documentation to ensure that heat exchanger (HX) deficiencies that could mask or degrade performance were identified and corrected. The test procedures and records were also reviewed to verify that these were consistent with Generic Letter (GL) 89-13 licensee commitments, and industry guidelines. Risk significant heat exchangers/Heat Sinks reviewed included

one Component Cooling Water (CCW) HX, one Emergency Diesel Generator (EDG) Jacket Water Cooler, and the emergency service water discharge channel.

The inspector reviewed site and corporate HX programs, procedures, testing, inspections, cleaning, calculations, drawings, modifications, Condition Reports (CRs) or Action Requests (ARs) and system health reports. The inspectors reviewed Heat Exchanger/Component Inspection Reports and Work Orders (WOs) for the CCW HX and EDG Jacket Water Cooler. The reports and work orders included cleaning, debris removal, inspections, tube plugging, gasket replacements, data sheets, evaluations, engineering and Quality Control (QC) Verification Sign-Off Sheets, and Operations Clearance/Release Forms. The inspector also reviewed calculations for pump degradation limits and Emergency Service Water (ESW) flow requirements based on reservoir level. These documents were reviewed to verify inspection methods were consistent with industry standards, to verify HX design margins were being maintained, and to verify performance of the HXs under the current periodic engineering tests and maintenance frequencies were adequate. In addition, the inspector also performed a walkdown of the Intake and Discharge channel structures for the cooling water inlet and outlet to assess general material condition and to identify any degraded conditions of the structures.

The inspector reviewed general health of the Service Water (SW) system via review of design basis documents, system health reports, a video tape of diver inspections of the intake structure, and corrosion monitoring procedures. These items were reviewed to verify that the design basis was being maintained and to verify adequate SW system performance under current preventive maintenance, inspections and frequencies.

The inspector reviewed an Operation Inspection Report conducted by the Federal Energy Regulatory Commission (FERC) for the Harris Nuclear Station West Auxiliary Dam which included Earth Embankments, Concrete Spillway, Outlet Channel, and Reservoir.

The inspector discussed the results of cleaning and inspection of HXs with the SW system engineer for the presence of macroscopic biologic fouling such as Asiatic Clams and Zebra Mussels. The inspector also reviewed modification packages to ensure components, systems repairs, or replacements met the design requirements.

The CRs or ARs were reviewed for potential common cause problems and problems which could affect SW system performance to confirm that the licensee was entering issues into the corrective action program and initiating appropriate corrective actions.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

.1 Quarterly Training Observation

a. Inspection Scope

On May 1, 2007, the inspectors observed licensed-operator performance during requalification simulator training for crew C, to verify that operator performance was consistent with expected operator performance, as described in Exercise Guide DSS-016. This training tested the operators' ability to respond to a main steam line break outside of containment with a failure of the main steam isolation valves. The inspectors focused on clarity and formality of communication, the use of procedures, alarm response, control board manipulations, group dynamics and supervisory oversight.

The inspectors observed the post-exercise critique to verify that the licensee had identified deficiencies and discrepancies that occurred during the simulator training.

The inspectors reviewed the following ARs associated with this area to verify that the licensee identified and implemented appropriate corrective actions:

- AR 226405, Operator miss scheduled training.
- AR 223607, License Operator Continuing Training (LOCT) failure and repeat failure rate TPI-RED.

b. Findings

No findings of significance were identified.

.2 Biennial Licensed Operator Requalification Review

a. Inspection Scope

The inspectors reviewed the facility operating history and associated documents in preparation for this inspection. While onsite the inspectors reviewed documentation, interviewed licensee personnel, and observed the administration of operating tests associated with the licensee's operator requalification program. Each of the activities performed by the inspectors was done to assess the effectiveness of the licensee in implementing requalification requirements identified in 10 CFR Part 55, "Operators' Licenses." The evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." The inspectors evaluated the licensee's simulation facility for adequacy for use in operator licensing examinations using ANSI/ANS-3.5-1998, "American National Standard for Nuclear Power Plant Simulators for use in Operator Training and Examination."

The inspectors observed two crews during the performance of the operating tests. Documentation reviewed included written examinations, Job Performance Measures (JPMs), simulator scenarios, licensee procedures, on-shift records, simulator modification request records and performance test records, the feedback process,

licensed operator qualification records, remediation plans, watchstanding, and medical records. The records were inspected using the criteria listed in Inspection Procedure 71111.11. Documents reviewed during the inspection are listed in the report attachment.

Following the completion of the annual operating tests which ended on June 7, 2007, the inspectors reviewed the overall pass/fail results of the individual JPM operating tests and the simulator operator tests administered by the licensee during the operator licensing requalification cycle. These results were compared to the thresholds established in NRC Inspection Manual Chapter 609, Appendix I, "Operator Requalification Human Performance Significance Determination Process."

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed three degraded SSC/function performance problems or conditions listed below to verify the licensee's handling of these performance problems or conditions in accordance with 10CFR50, Appendix B, Criterion XVI, Corrective Action, and 10CFR50.65, Maintenance Rule. Documents reviewed are listed in the Attachment.

- Failure of the A essential services chilled water chiller on April 5, 2007.
- Elevated vibration levels on A demineralized water transfer pump.
- Damaged shaft and impeller on A reactor makeup water pump.

The inspectors focused on the following attributes:

- Appropriate work practices,
- Identifying and addressing common cause failures,
- Scoping in accordance with 10 CFR 50.65(b),
- Characterizing reliability issues (performance),
- Charging unavailability (performance),
- Trending key parameters (condition monitoring),
- 10 CFR 50.65(a)(1) or (a)(2) classification and reclassification, and
- Appropriateness of performance criteria for SSCs/functions classified (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSCs/functions classified (a)(1).

The inspectors reviewed the following ARs associated with this area to verify that the licensee identified and implemented appropriate corrective actions:

- AR #228525, Trip of A WC-2 Following Start for Train Swaps.
- AR #230508, A Demin Water Transfer Pump Elevated Vibrations

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- AR #221793, Discovery of Impeller Wear and Shaft Cracking - A Reactor Make-up Water Pump.

b. Findings

Introduction: A self-revealing Green non-cited violation (NCV) of 10CFR50, Appendix B, Criterion XVI, "Corrective Action" was identified for failure to promptly correct a condition adverse to quality. The licensee failed to correct a low refrigerant level in the A essential services chiller, which led to a low refrigerant pressure trip of the chiller after it was started on April 5, 2007. The low refrigerant condition had been identified by the licensee during multiple surveillance testing opportunities prior to the chiller failure on April 5, 2007, but the licensee assigned a low priority to work activities to correct the condition. Therefore, the condition was not corrected prior to the chiller failure.

Description: On April 5, 2007, the A essential services chiller tripped on low evaporator pressure approximately six minutes after being started as part of a routine safety train swap. The low evaporator pressure trip was caused by a low refrigerant charge due to leakage from two system components. Once repairs were complete, the chiller was returned to operable status on April 6, 2007. The A chiller was inoperable for a total of 67 hours and 56 minutes, which is less than the 72 hour limit imposed by Technical Specification 3.7.13.

Prior to this chiller failure, refrigerant was last added on June 2, 2006. A performance test which records the refrigerant level was performed eight times between June 2, 2006 and April 5, 2007. The results of five of the eight tests conducted indicated the need for refrigerant to be added. However, three of the five tests which indicated the need for refrigerant to be added did not result in the generation of work requests. The remaining two tests which indicated the need to add refrigerant did result in the generation of work requests; however, refrigerant was not added to the chiller prior to the chiller failure on April 5, 2007. Inspectors found that maintenance personnel incorrectly interpreted test results to indicate that refrigerant level was adequate and therefore, did not properly prioritize corrective actions.

Analysis: The deficiency associated with this finding was that inadequate corrective actions were taken for low refrigerant level in the A essential services chiller which resulted in a trip of the chiller on April 5, 2007 due to low evaporator pressure. This finding is greater than minor because it affected the availability and reliability objectives of the Equipment Performance attribute under the Mitigating System Cornerstone. The finding is of very low safety significance because there was no loss of safety function of the essential services chill water system, the A essential services chiller was not inoperable in excess of its allowed technical specifications limiting condition for operation (LCO) time, and the finding is not potentially risk-significant due to external events. The system safety function was preserved by the B train of essential services chill water which remained operable during the period of time the A train was inoperable. Inspectors also determined that the cause of the finding is related to the 'Thorough Evaluation of Identified Problems' aspect of the Problem Identification and Resolution

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cross cutting area because maintenance personnel incorrectly interpreted test results to indicate that refrigerant level was adequate (P.1C).

Enforcement: 10 CFR 50 Appendix B, Criterion XVI, states in part that measures shall be established to assure that conditions adverse to quality, such as equipment deficiencies, are promptly identified and corrected. Contrary to the above, a condition adverse to quality was not promptly corrected in the A essential services chiller for a known degradation of the refrigerant level. Because this failure to promptly correct a condition adverse to quality is of very low safety significance and has been entered into the licensee's corrective action program (AR 228947), this violation is being treated as a non-cited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy: NCV 000400/2007003-01, Failure to correct low refrigerant level in the A essential services chiller.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the licensee's risk assessments and the risk management actions for the plant configurations associated with the four activities listed below. The inspectors verified that the licensee performed adequate risk assessments, and implemented appropriate risk management actions when required by 10 CFR 50.65(a)(4). For emergent work, the inspectors also verified that any increase in risk was promptly assessed, and that the appropriate risk management actions were promptly implemented.

- Tornado and thunderstorm watches on April 12, 2007.
- Switchyard maintenance and auxiliary feedwater system testing on May 15, 2007.
- B and C plant air compressors out-of-service for corrective maintenance on June 1, 2007.
- A demineralized water transfer pump out of service during scheduled maintenance that rendered A and B motor-driven auxiliary feedwater pumps unavailable on June 17, 2007.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed four operability determinations addressed in the ARs listed below. The inspectors assessed the accuracy of the evaluations, the use and control of any necessary compensatory measures, and compliance with the TS. The inspectors verified that the operability determinations were made as specified by Procedure OPS-

NGGC-1305, Operability Determinations. The inspectors compared the justifications made in the determination to the requirements from the TS, the FSAR, and associated design-basis documents, to verify that operability was properly justified and the subject component or system remained available, such that no unrecognized increase in risk occurred:

- AR #229793, 1SW-1208 Will Not Open Fully Due to Loose Jam Nut.
- AR #230150, TDAFW T&T Valve Limitorgue Motor has Low Winding Resistance.
- AR #233153, Crack in Battery Jar Lid, 1B-SB Battery.
- AR #236256, B-SB Chiller VMS-2 Switch Not Operating Properly.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

For the five post-maintenance tests listed below, the inspectors witnessed the test and/or reviewed the test data, to verify that test results adequately demonstrated restoration of the affected safety function(s) described in the FSAR and TS. The tests included the following:

- OST-1104, Containment Isolation Inservice Inspection Valve Test Quarterly Interval Modes 1-6 after replacement of the solenoid for valve 1BD-49 on April 4, 2007.
- OPT-1512, Essential Chilled Water Turbopak Units Quarterly Inspection/Checks Modes 1-6 following scheduled maintenance on May 2, 2007.
- OST-1092, 1B-SB RHR Pump Operability Quarterly Interval Modes 1-2-3 after corrective maintenance on valves 1SI-327 and 1SI-341.
- OST-1191, Steam Generator PORV and Block Valve Operability Test Quarterly Interval Modes 1-4 following repair of Nitrogen leak from actuator of valve 1MS-62 on June 5, 2007.
- OST-1093, CVCS System Operability Train B Quarterly Interval Modes 1-4 following scheduled maintenance on valve 1CH-752 on June 13, 2007.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the six surveillance tests identified below, the inspectors witnessed testing and/or reviewed test data, to verify that the systems, structures, and components involved in

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these tests satisfied the requirements described in the TS and the FSAR, and that the tests demonstrated that the SSCs were capable of performing their intended safety functions.

- *OST-1411, Auxiliary Feedwater Pump 1X-SAB Operability Test Quarterly Interval Mode 1,2,3 on April 17, 2007.
- OST-1010, Containment Cooling System Operability Test Monthly Interval Modes 1-4 on May 3, 2007.
- OST-1095, Sequencer Block Circuit and Containment Fan Cooler Testing Train B Quarterly Interval All Modes on May 17, 2007.
- CRC-100, Reactor Coolant System Chemistry Control on June 1, 2007.
- *OST-1093, CVCS System Operability Train B Quarterly Interval Modes 1-4 on June 6, 2007.
- OST-1005, Control Rod and Rod Position Indicator Exercise Quarterly Interval Modes 1-3 on June 26, 2007.

*This procedure included inservice testing requirements.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed an operations simulator examination conducted on May 1, 2007, to verify the licensee's self-assessment of classification, notification, and protective action recommendation development in accordance with 10CFR50, Appendix E.

b. Findings

No findings of significance were identified.

3. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (PI) Verification

a. Inspection Scope

To verify the accuracy of the PI data reported during that period, the inspectors compared the licensee's basis in reporting each data element to the PI definitions and guidance contained in NEI 99-02, Regulatory Assessment Indicator Guideline.

Initiating Events Cornerstone

For the initiating events, Mitigating Systems, and barrier integrity cornerstone performance indicators (PIs) listed below, the inspectors sampled licensee submittals for the period from January 1, 2006 through March 31, 2007.

- Unplanned Scrams PI
- Scrams with Loss of Normal Heat Removal PI
- Unplanned Transients PI

The inspector reviewed a selection of licensee event reports, operator log entries, daily reports (including the daily corrective action reports), monthly operating reports, and PI data sheets to verify that the licensee had adequately identified the number of scrams and unplanned power changes greater than 20 percent that occurred during the previous four quarters. The inspectors compared this number to the number reported for the PI during the current quarter. The inspectors also reviewed the accuracy of the number of critical hours reported and the licensee's basis for crediting normal heat removal capability for each of the reported reactor scrams. In addition, the inspectors interviewed licensee personnel associated with the PI data collection, evaluation, and distribution.

Mitigating Systems Cornerstone

- Safety System Functional Failures PI

The inspectors compared graphical representations from the most recent PI report to the raw data to verify that the data was correctly reflected in the report. Licensee event reports (LERs) issued during the referenced time frame were also reviewed for safety system functional failures.

Barrier Integrity Cornerstone

- Reactor Coolant System Specific Activity PI
- Reactor Coolant System Leak Rate PI

The inspectors reviewed licensee sampling and analysis of reactor coolant system samples, and compared the licensee-reported performance indicator data with records developed by the licensee while analyzing previous samples. In addition to record reviews, the residents observed a chemistry technician obtain and analyze an RCS sample. The inspectors also reviewed operating logs and other licensee records of daily measurements of RCS identified leakage and compare it to the licensee-reported performance indicator data.

b. Findings

No findings of significance were identified.

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4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

.1 Routine Review of ARs

To aid in the identification of repetitive equipment failures or specific human performance issues for followup, the inspectors performed frequent screenings of items entered into the CAP. The review was accomplished by reviewing daily AR reports.

.2 Annual Sample Review

a. Inspection Scope

The inspectors selected AR #163435 for detailed review. This AR was associated with a design modification deficiency in the essential services chilled water system. The inspectors reviewed this report to verify that the licensee identified the full extent of the issue, performed an appropriate evaluation, and specified and prioritized appropriate corrective actions. The inspectors evaluated the report against the requirements of the licensee's corrective action program as delineated in corporate procedure CAP-NGGC-0200, Corrective Action Program, and 10 CFR 50, Appendix B.

b. Observations and Findings

No findings of significance were identified.

.3 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of inspector CAP item screenings, licensee trending efforts, and licensee human performance results. The inspector's review nominally considered the six-month period of January through June, 2006, although some examples expanded beyond those dates when the scope of the trend warranted. The review also included issues documented outside the normal CAP in system health reports, self assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's latest semi-annual trend reports.

The inspectors also evaluated the licensee's trend reports against the requirements of the CAP as specified in CAP-NGGC-0200, Corrective Action Program.

b. Assessments and Observations

There were no findings of significance identified. The inspectors observed that the licensee performed adequate trending reviews. The licensee routinely reviewed cause codes, involved organizations, key words, and system links to identify potential trends in the CAP data. The inspectors compared the licensee process results with the results of the inspectors' daily screening and did not identify any discrepancies or potential trends in the CAP data that the licensee had failed to identify. The inspectors did, however, note that although the licensee identified a negative trend for the performance of the essential services chilled water system, corrective actions to improve system performance have not prevented avoidable system failures. The NCV detailed in 1R12 of this report is evidence of this observation.

4OA3 Event Follow-up

- .1 (Closed) Licensee Event Report (LER) 05000400/ 2007001-00. Control Rod Shutdown Bank Anomaly Causes Entry into Technical Specification 3.0.3.

On March 9, 2007, the licensee was performing a surveillance test which required control rods to be inserted into the core ten steps and then withdrawn back to their normal operating positions. During the test, shutdown bank A was inserted ten steps and as they were being withdrawn, a rod control urgent failure alarm occurred and the rods became inoperable. Since more than one shutdown bank rod were not fully withdrawn and were inoperable, the licensee was in a condition prohibited by Technical Specifications. Trouble-shooting revealed that a slave cyclor logic card failed and repairs were completed two hours and fifty-three minutes after the failure occurred. All control rods were always capable of being manually or automatically inserted into the core, via a reactor trip. The LER was reviewed by inspectors and no findings of significance were identified and no violation of NRC requirements occurred. The licensee documented the failed equipment in AR #225187. This LER is closed.

4OA6 Meetings, Including Exit

On July 5, 2007, the resident inspectors presented the inspection results to Mr. Burton and other members of the licensee's staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

4OA7 Licensee-Identified Violations

The following finding of very low significance was identified by the licensee and is a violation of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600 for being dispositioned as a non-cited violation (NCV).

- Technical Specification 6.8.1 requires that written procedures be established, implemented and maintained covering the procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. That appendix

discusses procedures for performing maintenance. Contrary to the above, in August, 2005, the licensee failed to implement established maintenance procedures resulting in severe damage to the A reactor water make-up pump impeller and shaft. This failure to implement established maintenance procedures has been entered into the licensee's corrective action program (AR 221793). This finding was determined to be of very low safety significance because it did not represent a loss of system safety function.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

D. Alexander, Superintendent, Environmental and Chemistry
C. Burton, Director, Site Operations
D. Corlett, Supervisor - Licensing/Regulatory Programs
R. Duncan, Vice President Harris Plant
M. Findlay, Superintendent, Security
W. Gurganious, Training Manager
K. Henderson, Maintenance Manager
C. Kamiliaris, Manager - Nuclear Assessment
E. McCartney, Plant General Manager
T. Natale, Manager - Site Support Services
S. O'Connor, Manager - Engineering
J. Pierce, Supervisor - Nuclear Assessment
K. Voesling, Supervisor - Emergency Preparedness
G. Simmons, Superintendent - Radiation Control
J. Warner, Manager - Operations
E. Wills, Manager - Outage and Scheduling

NRC personnel

R. Musser, Chief, Reactor Projects Branch 4

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

000400/2007003-01	NCV	Failure to correct low refrigerant level in the A essential services chiller. (Section 1R12)
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Closed

05000400/2007001-00	LER	Control Rod Shutdown Bank Anomaly Causes Entry into Technical Specification 3.0.3. (Section 4OA3)
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LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Partial System Walkdown

Auxiliary feedwater system:

- Procedure OP-126, Main Steam, Extraction Steam and Steam Dump Systems
- Procedure OP-137, Auxiliary Feedwater System
- Drawing 2165-S-0542, Simplified Flow Diagram Main Steam System
- Drawing 2165-S-0544, Simplified Flow Diagram Feedwater System
- Drawing 2165-S-0542, Simplified Flow Condensate & Air Evacuation Systems

Essential services chilled water system:

- Procedure-148, Essential Services Chilled Water System
- Drawing 2165-S-0999S02, Simplified Flow Diagram HVAC Essential Services Chilled Water-Condenser Unit 1-SB

Residual heat removal system:

- Procedure OP-111, Residual Heat Removal System
- Drawing 2165-S-1324, Simplified Flow Diagram Residual Heat Removal Systems

Section 1R05: Fire Protection

- FPP-012-02-RAB305-324, Reactor Auxiliary Building Elevations 305 and 324 Fire Pre-Plan
- FPP-012-02-RAB190-216, Reactor Auxiliary Building Elevations 190 and 216 Fire Pre-Plan
- FPP-012-07-TB, Turbine Building Fire Pre-Plan
- FPP-012-02-RAB261, Reactor Auxiliary Building Elevation 261 Fire Pre-Plan
- FPP-012-04-DBG, Diesel Generator Building Fire Pre-Plan
- FPP-012-08-SEC, Out Building Fire Pre-Plan

Section 1R06: Flood Protection Measures

FSAR Sections:

- 2.4.10, Flooding Protection Requirements
- 3.6A.6, Flooding Analysis

Calculations:

- Appendix I to the HNP Probabilistic Safety Assessment, Internal Flooding Analysis
- Calculation #PRA-F/E-4, RAB Unit 1 Elevation 190' & 216' Flood Analysis
- Calculation #PRA-F/E-5, RAB Unit 1 Elevation 236 Compartment Flood Analysis
- Calculation #PRA-F/E-6, RAB Unit 1 Elevation 261 Compartment Flood Analysis
- Calculation #PRA-F/E-7, RAB Unit 1 Elevation 286 Compartment Flood Analysis

Procedures:

- AOP-022, Loss of Service Water
- OP-139, Service Water System

Section 1R07 : Biennial Heat Sink Performance

Procedures

- OST-1215, Emergency Service Water System Operability Train B Quarterly Interval Modes 1-2-3-4-5-6-Defueled, Rev. 42
- LP-P-8750A, Emergency Service Water Screen Wash Pressure Safety Channel A, Rev. 5
- CM-M0007, Jamesburry Butterfly Wafer-Sphere Valves 3 - 12 Inch Disassembly and Maintenance, Rev. 20
- CM-M0195, Emergency Service Water Screen Wash Pump Disassembly, Inspection, and Reassembly. Rev. 10
- NGG-PMB-HXC-02, NGG Equipment Reliability Template Tube Type Heat Exchanger, Rev. 0
- EPT-251, B Train ESW Flow Verification/Balance, Rev. 16
- OPT-1523, ESW Strainer Actuation on High Differential Pressure Quarterly Interval Mode 1 - 4, Rev. 2
- EPT-163, Generic Letter 89-13 inspections (Raw Water Systems and Local Area Air Handler Inspection and Documentation), Rev.13
- MPT-M0091, Heat Exchanger Opening/Closure for NRC Generic Letter 89-13 Inspections, Rev. 11
- PLP-620, Service Water Program (Generic Letter 89-13), Rev. 12

Condition Reports (CRs) OR Action Requests (ARs)

- AR 00160549, Failure of 1SW-227 During Performance of OST-1215
- AR 00166150, Apparent Fouling of the A ESW Header
- AR 00184601, 1SW-222 Will not Isolate
- AR 00187994, Bearing Failure on the "B" ESW Screen Wash Pump

Miscellaneous

- Calculation HNP-M/MECH-1011, Pump Degradation Limits for ESW, CCW, & ESCW, Rev. 12
- Calculation SW-0080, ESW Flow Requirements Based on Reservoir Level, Rev. 11
- Work Order (WO) 00524858, Main Reservoir Bay 6 Traveling Screen Inspection
- WO 00291096, ESW Screen Wash Pressure Safety Channel "A" (Loop Portion)
- WO 00291093, ESW Screen Wash Pressure Safety Channel "A" (Transmitter Portion)
- WO 00703117, Install Stainless Steel Service Water Piping and Controlotron
- WO 00720040, AH-4 Service Water Supply Thermally Overloaded During Stroking for OST-1215
- WO 00748736, Replace Valve Seat per CM-M0007
- WO 00751990, Inspect/Rebuild 1B-SB ESW Screen Wash Pump

- WO 00626550, Assist Engineering with Performance of EPT-163 and Inspect and Clean Heat Exchanger IAW MPT-M0091
- WO 00407689, Assist Engineering with Performance of EPT-163 and Inspect and Clean Heat Exchanger IAW MPT-M0091
- Engineering Change (EC) 0000061687, Rev. 0 & EC 0000058448, Rev. 6, Pipe Replacement of ESW Lines to "B" Charging Safety Injection Pump (CSIP) Coolers and Installation of Flow Instrumentation
- EC 0000063518, Evaluate Material Substitution from SA-515 GR. 70 to Supplied SA-516 GR.70 for Flange Replacement, Rev. 0
- EC 0000063911, 1A-SA Emergency Service Water Pump Refurbishment, Rev. 2
- EPT-251, B Train ESW Flow Verification/Balance, Rev. 16, Tested on 1/19, 4/21, 6/14, & 8/24, 2006
- OPT-1523, ESW Strainer Actuation on High Differential Pressure Quarterly Interval Mode 1 - 4, Rev. 2, Tested on 5/30, 7/28, & 10/20/2006 & 4/2/2007
- EPT-163, Generic Letter 89-13 inspections (Raw Water Systems and Local Area Air Handler Inspection and Documentation), Rev.13 Tested for CCW HX on 4/24/2006
- EPT-163, Generic Letter 89-13 inspections (Raw Water Systems and Local Area Air Handler Inspection and Documentation), Rev.13 Tested for EDG "B" Jacket Water Cooler on 10/28/2004
- 2005 Water Control Structures Inspection Report by MACTEC on 11/28/2005
- Operation Inspection Report on West Auxiliary Reservoir Dam of Shearon Harris Nuclear Station for the Nuclear Regulatory Commission Inspected by the Federal Energy Regulatory Commission, Atlanta Region Office on March 4, 2005
- IST Program Basis Document such as valve 1MP-70
- Design Basis Document - Service Water System, Traveling Screens and Screen Wash System, and Waste Processing Building Cooling Water System, Rev. 14
- Drawing CAR-2167 G-2895, Emergency Service Water System Discharge Structure - M -SH-1, Units 1 & 2, Rev. 5
- Drawing CAR-2165 G-209, Emergency Service Water Intake Screening Structure Piping, Unit 1, Rev.16

Section 1R11: Licensed Operator Requalification

Procedures:

- TPP-206, Rev 9, Simulator Program
- TPP-306, Rev 15, Licensed Operator Continuing Training Program
- TAP-403, Rev 10, Examination & Testing
- TAP-409, Rev 9, Scenario Based Testing
- TRN-NGGC-0002, Performance Review & Remedial Training
- TRN-NGGC-0500, Rev 1, Evaluation Phase
- OMM-001, Operations - Conduct of Operations

Simulator Service Requests:

- 070031, AFW MDAFW flow oscillations
- 060330, Simulation failure during EP drill
- 060480, AFW (TOPMERET)

A-5

- 060496, Steam dump caused SG/AFW oscillation
- 050237, AFW oscillations w/o pump
- 060301, Validation delays of annual exam
- 060378, Early SIAS on low SG pressure
- 060331, SI flow w/o flowpath
- 060290, RMS response on SGTL
- 070096, Rad monitor reading higher than expected
- 050086, Aux steam rad monitors
- 050227, SGBD rad monitors alarm
- 050291 RMS trends
- 060359 FK-114 incorrect setting for IC#4
- 050354 TSC OAI continuously in alarm
- 060289 RMS 3502A gas channel 2GS303
- 070055 RM-23 module software reset
- 070058 RM-23 module filter advance button

Cycle 14 Core Simulator Documents:

- Initial Criticality & Low Power Physics Testing EST-923, Rev 16
- Simulator review group meeting minutes, 10/09/06: cycle 14 core testing results
- Simulator review group meeting minutes, 10/26/06: cycle 14 core re-testing results

Simulator Transient Tests:

- Turbine trip below P-10, 4/30/07
- Max size RCS leak inside containment w/ LOOP, 4/30/07
- Max size steam leak inside containment, 4/30/07
- Max design load rejection, 4/30/07

Simulator Steady State Tests:

- 100% steady state accuracy & stability test, 4/4/07
- 75% steady state accuracy & stability test, 4/4/07
- 30% steady state accuracy & stability test, 4/4/07

Scenario Based Tests:

- DSS-16, Rev 11, 2/27/07; DSS-031, Rev 10, 2/26/07; DSS-020, Rev 11, 3/5/07; DSS-004, Rev 12, 3/8/07; DSS-025, Rev 7, 2/28/07; DSS-013, Rev 13, 2/26/07; DSS-035, Rev 5, 3/8/07; DSS-019, Rev 12, 2/27/07; and DSS-032, Rev 7, 2/27/07

Feedback:

- TRN-NGGC-0500, Rev 1, Evaluation Phase
- Feedback reports from LOCT sessions 05-03, 05-04, 05-05, 05-06, 06-02, 06-03, 06-04, 06-05, 07-01, & 07-02

Remedial Training Packages:

- All remedial training packages since last biennial requalification inspection

In-Plant JPMs: (observed performance)

- JPM-IP-209, Perform local actions for placing an OTΔT Channel in Test, Rev 0
- JPM-IP-212, Locally torque shut the VCT outlet valves w/ lo VCT level during loss of air when the reactor is critical, Rev 0
- JPM-CR-007, Start EDG 1A-SA from the Main Control Board, Rev. 11
- JPM-CR-221, Reactor Trip Response, RCS, Small Break LOCA, Rev. 6

In-Plant JPMs: (reviewed packages)

- JPM-IP-050, Rev 13, Transfer control to the ACP
- JPM-IP-109, Rev 9, Shut MSIVs by isolating air
- JPM-IP-144, Rev 8, Local inspection of annunciator cabinet
- JPM-IP-141, Rev 11, Inhibit both trains of SSPs

Simulator JPMs:

- JPM-CR-207, Rev 0, Place containment cooling in the max cooling mode
- JPM-CR-214, Rev 0, Terminate SI
- JPM-CR-062, Rev 14, ATWS
- JPM-CR-195, Rev 2, Classify event
- JPM-CR-037, Rev 11, Emergency Boration
- JPM-CR-221, Rev 0, Rx trip response small break LOCA foldout criteria
- JPM-CR-220, Rev 0, Isolate a faulted SG
- JPM-CR-126, Rev 4, Classify event

Simulator Scenarios Reviewed:

- DSS-035, Rev 5, 4/19/07
- DSS-018, Rev 12, 3/6/07

AR's:

- AR# 233946, LPPT procedure (EST-923) not fully initialed
- AR# 234286, Written Weekly Exam Remediation took 6 months
- AR# 191857 Cycle 14 core testing problems

Records:

- Badge Access Transaction Reports for Reactivation of Licenses (4)
- Licensed Operator Medical Records (10)

Written Examinations:

- Six examinations (3 RO and 3 SRO) administered for the 2006 - 2007 biennial requalification cycle and two weekly examinations

Simulator Deficiencies:

- Open and closed Simulator Service Requests since last biennial requalification inspection

Section 1R12: Maintenance Effectiveness

Corrective Action Program Documents:

- AR 228947 "Chiller Monitoring and Resolution Failure"
- AR 228525 "Trip of 'A' WC-2 Following Start for Train Swaps"
- AR 196381 "Freon Addition to 'A' Chiller"
- AR 196382 "A Chiller High Condenser Pressure and Surging Conditions"

Procedures, Basis Documents and Manuals:

- NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants
- ADM-NGGC-0101, Maintenance Rule Program
- DBD-132 "Essential & Nonessential Services Chilled Water Systems"
- OPT-1512 "Essential Chilled Water Turbopak Units Quarterly Inspection/Checks Modes 1-6"
- OP-148 "Essential Services Chilled Water System"
- CM-M0202 "Essential Chiller (Refrigerant Side) Leak Testing, Evacuation and Dehydration"
- CP&L Manual ID: VM-OAJ-V01, "Chiller, Water (WE2, NS)"

Work Control Documents:

- WO 983926 "M, 1CH-E005, 'A' WC-2 Chiller needs refrigerant added"
- WO 1020183 "M, 1CH-E005, Needs refrigerant as directed by OPT-151"

Section 1R13: Maintenance Risk Assessments and Emergent Work Evaluation

- OMP-003, Outage Shutdown Risk Management.
- WCM-001, On-line Maintenance.

Section 1R15: Operability Evaluations

Work Control Documents:

- WO 896521, "On-site spare hydramotor refurbishment"
- WO 739093, "Replace valve actuator 1SW-1208:002"

Procedures and Manuals:

- OPS-NGGC-1305, Operability Determinations
- PIC-I058, "Calibration of ASCO/ITT Hydramotor Actuator Models 92 and 94 (Direct Acting)"
- PIC-I059, "Calibration of ITT Hydramotor Bumper Actuator Models 92, 94, & 96 (Direct Acting)"

Section 1R19: Post Maintenance Testing

- WO 96808, "1 MPT-I0018 EQ Solenoid Valve Replacement, S/G 1C BD ISV"
- Drawing 2166-B-401, Control Wiring Diagram, Steam Generator 1C Blowdown Containment Isolation Valve 2BD-V19SA-1

- Drawing 2165-S-0551, Simplified Flow Diagram Steam generator Blowdown System Unit 1
- Procedure-148, Essential Services Chilled Water System
- Drawing 2165-S-0998S02, Simplified Flow Diagram HVAC Essential Services Chilled Water-Condenser Unit 1-SA
- Drawing 2165-S-0542, Simplified Flow Diagram Main Steam System

Section 40A1: Performance Indicator Verification

- NEI 99-02, Regulatory Assessment Performance Indicator Guideline
- Calculation HNP-F/PSA-0068, NRC Mitigating System Performance Index Basis Document for Harris Nuclear Plant

Section 40A2: Identification and Resolution of Problems

- CAP-NGGC-0200, Corrective Action Program.
- HNP-Site Trend Report - first quarter, 2007 and second quarter, 2007.