

UNITED STATES NUCLEAR REGULATORY COMMISSION REGION II SAM NUNN ATLANTA FEDERAL CENTER 61 FORSYTH STREET, SW, SUITE 23T85 ATLANTA, GEORGIA 30303-8931

January 29, 2009

Mr. Christopher L. Burton Vice President Carolina Power & Light Company Shearon Harris Nuclear Power Plant P. O. Box 165, Mail Code: Zone 1 New Hill, North Carolina 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INTEGRATED INSPECTION REPORT 05000400/2008005

Dear Mr. Burton:

On December 31, 2008, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Shearon Harris reactor facility. The enclosed inspection report documents the inspection results which were discussed on January 14, 2009, with you 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.

Based on the results of this inspection, the inspectors identified one issue of very low safety significance (Green). This was determined to involve a violation of NRC requirements. However, because of very low safety significance and because it has been entered into your corrective action program (CAP) the NRC is treating this issue 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 within 30 days of the date of this inspection report, with the basis for your denial, 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.

CP&L

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 the 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/

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

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

Enclosure: Inspection Report 05000400/2008005 w/Attachment: Supplemental Information

cc w/encl. (See page 3)

CP&L

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cc w/encl. (See page 3)

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Senior Resident Inspector Carolina Power and Light Company Shearon Harris Nuclear Power Plant U.S. NRC 5421 Shearon Harris Rd New Hill, NC 27562-9998 Letter to Christopher L. Burton from Randall A. Musser dated January 29, 2009

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INTEGRATED INSPECTION REPORT 05000400/2008005

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-400	
License Nos.:	NPF-63	
Report No.:	05000400/2008005	
Licensee:	Carolina Power and Light Company	
Facility:	Shearon Harris Nuclear Power Plant, Unit 1	
Location:	5413 Shearon Harris Road New Hill, NC 27562	
Dates:	October 1, 2008 through December 31, 2008	
Inspectors:	K. Korth, Acting Senior Resident InspectorP. Lessard, Resident InspectorR. Hamilton, Senior Health Physicist (Section 2PS1)	
Approved by:	R. Musser, Chief Reactor Projects Branch 4 Division of Reactor Projects	

SUMMARY OF FINDINGS

IR 05000400/2008005; 10/01/2008 – 12/31/2008; Shearon Harris Nuclear Power Plant, Unit 1; Radioactive Gaseous and Liquid Effluent Treatment and Monitoring System.

The report covered a three-month period of routine inspections by the resident inspectors. One violation of significance was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC 609), "Significant 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. NRC-Identified and Self-Revealing Findings

Cornerstone: Public Radiation Safety

<u>Green.</u> An NRC identified Green non-cited violation of 10 CFR 20.1302 was identified for failure to representatively monitor and assess radioactive effluents from the Spent Fuel Pool Filter Backwash System released via the plant main vent. During the period of approximately July 2000 to April 2007 the plant operated in a configuration that failed to properly implement the effluent monitoring program. With the particulate and iodine monitors being operated without the isokinetic sampling skids, the representativeness of the samples was unknown when the SFP back-wash system was operated. Licensee corrective actions included collection of in-plant samples to bound releases until the monitors are restored to the as designed configuration.

The issue was more than minor because it was associated with the Program/Process attribute of the Public Radiation Safety Cornerstone and potentially affected the cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. The effluent release program finding was determined to be of very low safety significance because it was determined that the finding did not involve exceeding regulatory limits in 10 CFR 20.1301(e) or 10 CFR 50 Appendix I, and it was not a substantial failure to implement the effluent program. The finding was determined to not be representative of current operations and the application of a cross-cutting issue was deemed inappropriate.

B. <u>Licensee Identified Violations</u>

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near Rated Thermal Power (RTP) the entire report period except for one unplanned down power. On October 30, 2008, power was reduced to 99 percent RTP to repair the seal on the A Heater Drain Pump. The unit was returned to RTP on November 1, 2008.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors reviewed licensee Procedure AP-301, Seasonal Weather Preparations and Monitoring, and reviewed licensee actions to implement the procedure in preparation for cold weather conditions. The inspectors also reviewed the list of open Nuclear Condition Reports (NCRs) to verify that the licensee was identifying and correcting potential problems relating to cold weather operations. In addition, the inspectors reviewed procedure requirements and walked down selected areas of the plant, which included emergency service water (ESW) system, ESW Screen wash/Fire Pump Areas, Steam Tunnel, and Emergency Diesel Generator (EDG) building, to verify that affected systems and components were properly configured and protected as specified by the procedure. The inspectors discussed cold weather conditions with Operations personnel to assess plant equipment conditions and personnel sensitivity to upcoming cold weather conditions.

During actual cold weather conditions when outside temperatures dropped below the 35 degrees Fahrenheit (°F) threshold of AP-301, the inspectors conducted walkdown tours of the main control room to assess system performance and alarm conditions of systems susceptible to cold weather conditions. Furthermore, the inspectors verified that the applicable equipment walkdown checklists required by AP-301 were implemented appropriately.

Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

.2 External Flood Protection Measures

a. Inspection Scope

The inspectors reviewed plant design features and licensee procedures intended to protect the plant and its safety-related equipment from external flooding events. The

inspectors reviewed flood analysis documents including the Updated Final Safety Analysis Report (UFSAR), Section 2.4, Flood Protection Requirements, and Section 3.4.1, Flood Protection. The inspectors performed walkdowns of risk-significant areas, susceptible systems and equipment, including the Emergency Service Water (ESW) Screening Structure, ESW and Cooling Tower Makeup Water Intake Structure and Diesel Generator Building. Plant procedures and calculations for coping with flooding events were also reviewed to verify that licensee actions and maintenance practices were consistent with the plant's design basis assumptions.

The inspectors also reviewed licensee corrective action documents for flood-related items identified in NCRs written in the previous year to verify the adequacy of the corrective actions. Documents reviewed as listed in the attachment.

b. Findings

No findings of significance were identified.

- 1R04 Equipment Alignment
- .1 Partial Walkdown
 - a. Inspection Scope

The inspectors conducted three equipment partial alignment walkdowns to evaluate the operability of selected redundant trains or backup systems, listed below, with the other train or system inoperable or out of service. The inspectors reviewed the functional systems descriptions, UFSAR, system operating procedures, and Technical Specifications (TS) to determine correct system lineups for the current plant conditions. The inspectors performed walkdowns of the systems to verify that critical components were properly aligned and to identify any discrepancies which could affect operability of the redundant train or backup system. Documents reviewed are listed in the Attachment to this report.

- A Emergency Diesel Generator (EDG) with B EDG out-of-service on October 22
- B Emergency Service Water (ESW) with A ESW inoperable while inspecting and adjusting the A ESW to Normal Service Water (NSW) cross connect isolation valve, 1SW-39, on November 13
- A Emergency Service Water (ESW) with B ESW inoperable due to maintenance on the screen wash system on December 16

b. Findings

No findings of significance were identified.

5

1R05 Fire Protection

a. Inspection Scope

The inspectors reviewed licensee procedures FPP-001 Fire Protection Program Manual and FPP-004, Transient Combustible Control, and conducted a walkdown of the five fire areas listed below. Selected areas were examined in order to verify licensee control of transient combustibles and ignition sources; the material condition of fire protection equipment and fire barriers; and operational lineup and operational condition of fire protection features or measures, to verify that those items were consistent with the UFSAR Section 9.5.1, Fire Protection System, and Appendix 9.5.A, Fire Hazards Analysis. Also, the inspectors verified that selected fire protection impairments were identified and controlled in accordance with procedure FPP-013, Fire Protection – Minimum Requirements, Mitigating Actions and Surveillance Requirements. Furthermore, the inspectors reviewed applicable portions of the Fire Pre-Plans (FPP-012 Series) to verify that the necessary fire fighting equipment was in place, such as fire extinguishers, hose stations, ladders, and communications equipment.

- Fuel Handling Building, 236' elevation
- Steam Tunnel, all elevations
- Mechanical Penetration Area, Reactor Auxiliary Building, 236' elevation
- Process Instrument and Control (PIC) Rooms A and B, Reactor Auxiliary Building, 286' elevation
- Termination Cabinet Room, Reactor Auxiliary Building, 305' elevation

Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R06 Internal Flood Protection Measures

a. Inspection Scope

The inspectors performed a review of the Reactor Auxiliary Building 190', 236', and 261' elevations, for internal flood protection measures. The inspectors reviewed plant design features and measures intended to protect the plant and its safety-related equipment from internal flooding events, as described in UFSAR section 3.6A.6, Flooding Analysis, and in the supporting basis documents.

The inspectors performed walkdowns of risk-significant areas, susceptible systems and equipment, including the A Residual Heat Removal pump room, Containment Spray pump area, all Charging Safety Injection Pump rooms, and the Steam Tunnel to review flood-significant features such as area level switches, room sumps and sump pumps, flood protection door seals, conduit seals and instrument racks that might be subjected to flood conditions.

Plant procedures for mitigating internal flooding events were also reviewed to verify that licensee actions were consistent with the plant's design basis assumptions.

The inspectors also reviewed a sampling of the licensee's corrective action documents with respect to flood-related items to verify that problems were being identified and corrected. Furthermore, the inspectors reviewed selected completed preventive maintenance procedures, work orders, and surveillance procedures to verify that actions were completed within the specified frequency and in accordance with design basis documents. Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. <u>Inspection Scope</u>

On October 21, the inspectors observed a licensed operator requalification simulator examination for one crew. The crew received Simulator Examination Scenario DSS-013, which included an Anticipated Transient Without a Scram (ATWS) and a Loss of Coolant Accident (LOCA).

The inspectors specifically evaluated the following attributes related to the operating crew's performance:

- Clarity and formality of communication
- Ability to take timely action to safely control the unit
- Prioritization, interpretation, and verification of alarms
- Correct use and implementation of Abnormal Operating Procedures (AOPs), and Emergency Operating Procedures (EOPs)
- Timely and appropriate Emergency Action Level declarations per Plant Emergency Procedures (PEP)
- Control board operation and manipulation, including high-risk operator actions
- Command and Control provided by the Unit Senior Control Operator (USCO) and Superintendent Shift Operations (SSO).

The inspectors attended a post-examination critique to assess the effectiveness of the licensee evaluators, and to verify that licensee-identified issues were comparable to issues identified by the inspector. The inspectors also reviewed simulator physical fidelity (i.e., the degree of similarity between the simulator and the reference plant control room, such as physical location of panels, equipment, instruments, controls, labels, and related form and function). Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed three specific equipment issues listed below for structures, systems and components (SSC) within the scope of the Maintenance Rule (MR) (10 CFR 50.65) with regard to some or all of the following attributes: (1) work practices; (2) identifying and addressing common cause failures: (3) scoping in accordance with 10 CFR 50.65(b) of the MR; (4) characterizing reliability issues for performance; (5) trending key parameters for condition monitoring; (6) charging unavailability for performance; (7) appropriateness of performance criteria in accordance with 10 CFR 50.65(a)(2); (8) system classification in accordance with 10 CFR 50.65(a)(1); and (9) appropriateness and adequacy of (a)(1) goals and corrective actions. The inspectors also compared the licensee's performance against procedure ADM-NGGC-0101, Maintenance Rule Program; ADM-NGGC-0107, Equipment Reliability Process Guideline; and CAP-NGGC-0200, Corrective Action 0200, Corrective Action Program. The inspectors also reviewed, as applicable, work orders, surveillance records, NCRs, system health reports, engineering evaluations, and MR expert panel minutes; and attended MR expert panel meetings to verify that regulatory and procedural requirements were met.

- Repetitive failures of the position indication for Target Rock Containment Isolation Valves (System 9001)
- Multiple failures of Rod Control System (System 1065) due to component aging
- Repetitive failures of RVLIS Power Supplies (System 1050)

Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

For planned online work and/or emergent work that affected the combinations of risk significant systems listed below, the inspectors reviewed three licensee maintenance risk assessments and actions taken to plan and control work activities to effectively manage and minimize risk. The inspectors verified that risk assessments and applicable risk management actions (RMA) were conducted as required by 10 CFR 50.65(a)(4) and applicable plant procedures such as ADM-NGGC-01014, Work Management Process, and WCM-001, On-Line Maintenance Risk Management. The inspectors also evaluated the adequacy of the licensee's risk assessments and implementation of RMAs.

- Emergent repair of a jacket water leak on the A EDG while the B Charging Safety Injection Pump (CSIP) was out of service on November 7
- Emergent repair of a jacket water leak at a pressure switch on the B EDG while the B Charging Safety Injection Pump (CSIP) was out of service on November 21
- Planned maintenance on B EDG and B Emergency Service Water while the B Charging Safety Injection Pump (CSIP) was out of service on December 16

Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified

- 1R15 Operability Evaluations
 - a. Inspection Scope

The inspectors reviewed the three operability/functional evaluations listed below to verify technical adequacy and ensure that the licensee had adequately assessed TS operability. The inspectors also reviewed applicable sections of the UFSAR to verify that the system or component remained available to perform its intended function. In addition, where appropriate, the inspectors reviewed licensee procedure OPS-NGGC-1305, Operability Determinations, to ensure that the licensee's evaluation met procedure requirements. Furthermore, where applicable, inspectors examined the implementation of compensatory measures to verify that they achieved the intended purpose and that the measures were adequately controlled. The inspectors also reviewed NCRs on a daily basis to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations.

- NCR 301086, 1A-SA EDG Right Bank Intercooler Inlet Adapter Nozzle Crack
- NCR 305661, 1A-SA RHR Pump Upper Oil Reservoir Discoloration
- Licensee response to Generic Letter 96-06, Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions. This response was reviewed to determine the acceptability of an identified valve slam at the B ESW booster pump bypass check valve, 1SW-220.

Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R18 Plant Modifications

.1 <u>Temporary Plant Modifications</u>

a. Inspection Scope

The inspectors reviewed the one temporary modification listed below to verify regulatory requirements were met, along with the requirements of EGR-NGGC-005, Engineering Change. The inspectors also reviewed the associated 10 CFR 50.59 screening and evaluation and compared each against the UFSAR and TS to verify that the modification did not affect operability or availability of the affected system. Furthermore, the inspectors walked down the modification, when practical, to ensure that it was installed in accordance with the modification documents and reviewed post-installation and removal testing to verify that the actual impact on permanent systems was adequately verified by the tests.

• EC 71592, Temporary Isolation of Leaking Coil Bank on AH-4.

Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed the six post-maintenance tests (PMT) listed below to verify that procedures and test activities confirmed SSC operability and functional capability following maintenance. The inspectors reviewed the licensee's completed test procedures to ensure any of the SSC safety function(s) that may have been affected were adequately tested, that the acceptance criteria were consistent with information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test and/or reviewed the test data, to verify that test results adequately demonstrated restoration of the affected safety function(s). The inspectors verified that PMT activities were conducted in accordance with applicable WO instructions, or procedural requirements, including PLP-400, Post-Maintenance Testing. Furthermore, the inspectors reviewed problems associated with PMTs that were identified and entered into the Corrective Action Program (CAP).

 Work order 1435415; OST-1038, Sampling, Chemical Addition and Main Steam Drain Systems ISI Valve Test Quarterly Interval Mode 1-4, and OST-1840, Steam Generator Blowdown Sample Valve Position Indication Test 2 Year Interval Modes 1-4, following replacement of the valve operator for 1SP-222, B Steam Generator Sample Line containment isolation valve on October 23

Enclosure

- Work order 1430270-01; OST-1013, A Emergency Diesel Generator (EDG), following repair of fuel oil leak on the fuel pump injection line for #8 left bank cylinder on November 5
- Work order 1444463; OST-1013, A Emergency Diesel Generator (EDG), following replacement of multiple dresser couplings to repair a jacket water leak on November 7
- Work order 855804; OST-1214, Emergency Service Water System Operability train A Quarterly Interval Modes 1-2-3-4-5-6-Defueled, following inspection and adjustment of the tripper fingers for 1SW-39 on November 13
- Work order 1452942-04; OPT-1510, Emergency Diesel Generators Weekly Inspection/Checks Modes at All Times, and OP-155, Diesel Generator Emergency Power System, following replacement of a failed pressure sensor in the jacket water system on November 21
- Work order 1457735-01; OST-1038, Sampling, Chemical Addition and Main Steam Drain Systems ISI Valve Test Quarterly Interval Mode 1-4, and OP-101, Sampling System, following maintenance on 1SP-84, C Cold Leg Accumulator Sample Line containment isolation valve on December 3

Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

- 1R22 Surveillance Testing
 - a. Inspection Scope

The inspectors witnessed portions and/or reviewed completed test data for the following five surveillance tests of risk-significant and/or safety-related systems to verify that the tests met TS surveillance requirements, UFSAR commitments, and in-service testing and licensee procedure requirements. The inspectors' review confirmed whether the testing effectively demonstrated that the SSCs were operationally capable of performing their intended safety functions and fulfilled the intent of the associated surveillance requirement.

Reactor Coolant System Leak Detection Tests:

 OST- 1226, Reactor Coolant System Leakage Evaluation, Computer Calculations, Daily Interval, Modes 1-2-3-4 performed on December 12

In-Service Tests:

• OST-1211, Auxiliary Feedwater Pump 1A-SA Operability Test Quarterly Interval Modes 1-4, performed on November 3

Routine Surveillance Tests:

- OST-1118, Containment Spray Operability, Train A Quarterly Interval Modes 1 4, performed on October 16
- ORT- 1408, Security Diesel Operability Run, Monthly Interval, Modes: All, performed on November 7

Containment Isolation Valve Tests:

- EST-221, Type C LLRT of Containment Purge Make-up Penetration (M-57) performed on October 28
- b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

a. Inspection Scope

<u>Effluent Monitoring and Radwaste Equipment</u> During inspector walk-downs, accessible sections of the liquid radioactive waste (radwaste) system including liquid waste processing tanks and associated system piping and valves, and selected gaseous and effluent monitors were assessed for material condition and conformance with current system design diagrams. Inspected components of the gaseous effluent process and release system included sample line configurations for the plant vent and waste processing building air particulate/ noble gas/iodine monitor skids. Particular attention was paid to the configuration of the isokinetic sampling skid and the length and diameters of sample lines from the sample points to the particulate and iodine monitors. The inspectors also performed walk-down of components associated with liquid isolation valves. The inspectors interviewed chemistry and system engineering staff regarding radwaste equipment configuration, effluent monitor operation, and system modifications.

The operability, availability, and reliability of selected effluent process sampling and detection equipment used for routine and accident monitoring activities were reviewed and evaluated. The inspectors reviewed results of calibrations and/or performance surveillances for selected effluent monitors including the Condenser Off-Gas Monitor, Secondary Waste Sampling Tank Pump Discharge Monitor, Service Water Waste Monitoring Tank Discharge and Plant Vent Stack Monitors.

The two most recent surveillances on the reactor auxiliary building normal exhaust ventilation High Efficiency Particulate Air (HEPA)/charcoal air treatment systems were also reviewed. Technical bases for effluent monitoring in the (Off–site Dose Calculation Manual) ODCM and/or system design related changes were reviewed and discussed.

Installed configuration, material condition, operability, and reliability of selected effluent sampling and monitoring equipment were reviewed against details documented in the following: 10 CFR Part 20; RG 1.21, Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials In Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plants, June 1974; ANSI-N13.1-1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities; RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operations - Effluent Streams and the Environment, Rev. 1); the ODCM, Rev. 19; and FSAR, Chapters 11 and 12. Procedures and records reviewed during the inspection are listed in Section 2PS1 of the report Attachment.

b. Findings

<u>Introduction</u>: An NRC identified Green non-cited violation of 10 CFR 20.1302 was identified for failure to representatively monitor and assess radioactive effluents from the Spent Fuel Pool Filter Backwash System released via the plant main vent.

<u>Description</u>: The plant main vent stack radiation monitoring systems at Harris were designed to assure representative sampling of airborne effluents by means of isokinetic sampling and were compliant with ANS/ANSI N13.1-1969 that was in effect when the plant was built. In 1999, a revised standard ANS/HPS N13.1 -1999 was released that relaxed the requirements for isokinetic sampling if it could be demonstrated that the sampling was representative of the sampled stream.

In July 1998, the licensee tagged the isokinetic skid for the plant main vent stack out of service due to a component failure. In 2000, the licensee placed the skid under clearance with the intention of permanently abandoning the equipment. Subsequent failures in other isokinetic sampling skids resulted in similar clearances. This reduced the sample flow to approximately 8 percent of the designed flow when the skids were removed from service.

During the period of approximately July 2000 to April 2007 the plant operated in a configuration that failed to properly implement the effluent monitoring program. With the particulate and iodine monitors being operated without the isokinetic sampling skids, the representativeness of the samples was unknown when the SFP back-wash system was operated.

At the time of the inspection in August 2008, the inspectors determined that the licensee had not performed the actions necessary to demonstrate that the sampling systems were providing representative samples to the monitors. The licensee had not performed a particle size study on the actual stack effluents, nor had they calculated the dose to the public from the larger particulates from the SFP filter-backwash system. The inspectors determined that without such a calculation there was no assurance that the licensee complied with the applicable regulatory limits.

On September 10, 2008, the licensee completed a particle size study on the plant vent stacks and determined that during normal steady state operations the vent stack monitors were capable of monitoring a representative sample of particulates. The study did not address the change in particle sizes that would occur during maintenance evolutions such as backwashing the SFP filter.

The inspectors' initial calculations showed that a large percentage of the particulate above 2 microns in diameter could gravitationally settle out in the sample lines before reaching the detectors due to the reduction in transport flow rate. The licensee identified an unfiltered pathway from the spent fuel pool (SFP) filter-backwash system to the plant main vent. The system uses high-pressure nitrogen gas to periodically blow particulates off a filter. A licensee particle size study of the SFP backwash system found that approximately 40 percent of the particulate effluents from the backwash process could be expected to gravitationally settle out in the sample lines and be unmonitored.

The licensee performed a bounding dose calculation based on a sample taken inside the stack when a filter backwash occurred. The result of the licensee's calculation was a maximum additional committed lung dose of 0.212 mrem/year to the maximally exposed member of the public from this pathway which was well within the limits of 10 CFR 50 Appendix I. The inspectors reviewed the licensee's bounding dose calculation and concluded that the calculation was adequate.

<u>Analysis</u>: The inspectors identified a performance deficiency in that the plant main vent stack radiation monitor was not representatively sampling the effluent resulting from the periodic pneumatic backwash of the SFP filter system. The issue was more than minor because it was associated with the Program/Process attribute of the Public Radiation Safety Cornerstone and potentially affected the cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation.

By removing the isokinetic sampling skids from service, the licensee could not be assured that the samples were representative of the effluents being released, and therefore the magnitude of the releases was unknown. The finding was evaluated using the SDP in accordance with Inspection Manual Chapter (IMC) 0609, Appendix D, for the Public Radiation Safety cornerstone. The effluent release program finding was determined to be of very low safety significance because it was determined that the finding did not involve exceeding regulatory limits in 10 CFR 20.1301(e) or 10 CFR 50 Appendix I, and it was not a substantial failure to implement the effluent program. The finding was determined to not be representative of current operations and the application of a cross-cutting issue was deemed inappropriate.

<u>Enforcement</u>: 10 CFR 20.1302 (a) requires that the licensee make or cause to be made, as appropriate, surveys of radiation levels in unrestricted and controlled areas and radioactive materials in effluents released to unrestricted and controlled areas to demonstrate compliance with the dose limits for individual members of the public as defined in 10 CFR 20.1301. Contrary to the above, the licensee failed to make adequate surveys of radioactive materials in effluents released to unrestricted areas in that the licensee altered the configuration of the effluent radiation monitors without determining the impact the change would make on the capability of the monitors to detect and measure radioactive materials in the effluent stream from the plant vent stack and thus demonstrate compliance with the dose limits for individual members of the public as defined in 10 CFR 20.1301. This condition existed from approximately July 2000 to approximately September 2008. The change resulted in the licensee failing to monitor and attribute potential doses to the public from particulate material

originating in the SFP filter backwash system, which resulted in underestimating the dose to a member of the public by up to 40 percent.

The licensee provided a reasonable basis for the determination that in a bounding case neither the limits in 10 CFR 20.1301, 10 CFR 50 Appendix I nor 40 CFR 190 were exceeded. Licensee corrective actions included collection of in-plant samples to bound releases until the monitors are restored to the as designed configuration. The issue is documented in the licensee's corrective action program as AR 231941. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy. NCV 05000400/2008005-001, Failure to representatively monitor and assess radioactive effluent releases from the SFP Filter Backwash System.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

.1 Review of items Entered into the Corrective Action Program:

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by reviewing daily NCR report summaries and periodically attending daily management review meetings.

.2 <u>Semi-Annual Review to Identify Trends</u>

a. <u>Inspection Scope</u>

As required by Inspection Procedure 71152, 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 did not identify any trends that were not previously identified by the licensee. The inspectors' review included the results from daily screening of individual NCRs (see Section 4OA2.1 above), licensee trend reports and trending efforts, and independent searches of the NCR database and WO history. The review also included issues documented outside the normal CAP in system health reports, self assessment reports, Harris Self Evaluation Steering Committee meeting minutes and Maintenance Rule assessments.

The inspectors' review nominally considered the six-month period of July 2008 through December 2008, although some NCR database and WO searches expanded beyond these dates. Furthermore, the inspectors verified that adverse or negative trends identified in the licensee's NCRs, periodic reports and trending efforts were entered into the CAP. The inspectors also evaluated the licensee's trending program against the requirements of CAP-NGGC-0206, Corrective Action Program Trending and Analysis.

b. Findings and Observations

No findings of significance were identified.

.3 Focused Annual Sample Review

a. Inspection Scope

The inspectors selected NCR 290961 for detailed review. This NCR was associated with the events surrounding the manual reactor trip due to degrading condenser vacuum on August 11, 2008. The inspectors reviewed the licensee's root cause analysis to assess the adequacy of the problem statement, extent of condition, identified root causes, and corrective action prioritization. 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. The cause of the loss of vacuum was determined to be a failure of the main condenser's expansion joint due to aging. The expansion joint is a flexible rubber element that provides a connection between the low pressure turbine and the main condenser. The root cause was determined to be a lack of engineering rigor used to justify deferring the expansion joint replacement which was originally scheduled for the refueling outage in the fall of 2007 (RFO-14). The operating experience cited in the justification did not include the vendor's recommended service life for the joint of eight to ten years: the 15-year service life assumed in the justification was based on a modification to the joint hardware that had not been accomplished; and the previous visual inspection of the joint that showed no signs of degradation had only inspected the condenser side of the joint which was inadequate to fully evaluate the condition of the joint. These erroneous assumptions and failures to use all available operating experience resulted in the deferral of the scheduled expansion joint replacement beyond its useful life. Although the engineering justification for the deferral lacked rigor, the licensee had followed the deferral procedure, including obtaining the required reviews and approvals, and therefore no performance deficiency existed as defined in Inspection Manual Chapter 0612. The failed expansion joint was replaced during the August 2008 forced outage. The corrective actions to prevent recurrence include establishing a technical basis for expansion joint PM replacement frequency based on operating experience and vendor recommendations; performing a review of all PM deferral requests prepared since June 2005 to ensure their technical adequacy; and revising licensee procedures to provide additional guidance for deferring maintenance on components which pose a single-point vulnerability.

.4 Focused Annual Sample Review

a. Inspection Scope

The inspectors selected NCR 229698 for detailed review. This NCR was associated with inconsistencies between the UFSAR maximum allowed temperatures for certain

plant areas and those contained in PLP-114, Relocated Technical Specifications and Design Basis Requirements. 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. The cause of this condition could not be determined because these discrepancies had existed since initial plant licensing. The investigation was completed in September of 2007 and found that there were seven areas that had non-conservative temperature limits listed in PLP-114 compared with the UFSAR limits. Further, the investigation revealed that the B Process Instrumentation Control (PIC) Room had historically exceeded the UFSAR limit of 80 degrees during the summer months. Corrective actions included revising PLP-114 temperature limits to be consistent with the UFSAR temperature limits; revising the associated surveillance procedure OST-1021, Daily Surveillance Requirements Modes 1 and 2; and implementing an engineering change (EC) to provide more air flow to the B PIC Room. These actions were originally due to be completed well before the summer of 2008, but were extended beyond the summer without any additional interim actions or compensatory measures. This led to the temperature exceeding the UFSAR limit during the summer of 2008 without evaluating the continued operability of the equipment contained in the B PIC Room. The licensee determined and the inspectors confirmed that the actual temperatures in the B PIC Room had never exceeded the temperature ratings for the safety related equipment contained in the room and therefore there were no adverse consequences for the delay in taking corrective actions. This failure to take prompt action was entered into the corrective action program (NCR 304025).

Documents reviewed are listed in the attachment.

4OA3 Event Follow-up

.1 (Closed) LER 05000400/2008002, Manual Actuation of the Reactor Protection System due to Main Condenser Exhaust Boot Failure

On August 10, 2008, the Harris Plant experienced an increase in condenser backpressure and changes in the Steam Generator secondary side chemistry. A decision was made to shut the unit down due to the condenser backpressure. On August 11, 2008 at approximately 21 percent power, the unit was manually tripped due to reaching predetermined administrative limits. The loss of vacuum was caused by a failure of the condenser boot seal due to aging. The root cause was determined to be the lack of adequate rigor in the preparation of the deferral for the replacement preventative maintenance activity in the previous outage.

The licensee replaced the boot seal. The LER was reviewed by the inspectors and no findings of significance were identified and no violation of NRC requirements occurred. The licensee documented the failed equipment in NCR 290961 (Section 40A2.3). This LER is closed.

.2 (Closed) LER 05000400/2008003, Manual Actuation of the Reactor Protection System during Shutdown Rod Position Indication Surveillance Testing

On August 19, 2008, at 0859 a partial Rod Position Indication (RPI) test was being performed following the post maintenance disconnection/ testing of two RPI coil stacks during a forced outage. A "rod control urgent" alarm was received upon initial withdrawal of Control Bank C. Local inspection revealed phase failure on the movable gripper in cabinet 1AC. A manual reactor trip was initiated at 0905. The cause of the loss of phase voltage was a blown control bus duct fuse due to aging. The root cause of this event was attributed to the existing PM not being adequate to prevent age related failures. The PM to perform Westinghouse Rod Control System Enhanced Maintenance provides for an inspection of the rod control bus duct disconnects and fuses but does not require the actual replacement of the fuses on a periodic basis. Because there is no vendor requirement to periodically replace the fuses and no operating experience that previously identified age related failures of these fuses, the cause was not reasonably within the licensee's ability to foresee and therefore no performance deficiency existed as defined in Inspection Manual Chapter 0612. Corrective actions included replacement of the blown fuse and inspection of other bus duct fuses; replacement of all rod control bus duct and DC Hold cabinet fuses during the next refueling outage; and the establishment of a PM to replace these fuses on a periodic basis. The LER was reviewed by the inspectors and no findings of significance were identified and no violation of NRC requirements occurred. The licensee documented the failed equipment in NCR 292337. This LER is closed.

40A5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status reviews and inspection activities.

b. Findings

No significant findings were identified.

4OA6 Meetings, Including Exit

.1 Exit Meeting Summary

On January 14, 2009, the resident inspector presented the inspection results to Mr. Burton and other members of his staff, who acknowledged the findings. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

<u>Licensee</u>

- C. Burton, Vice President Harris Plant
- D. Corlett, Supervisor, Licensing/Regulatory Programs
- J. Dills, Manager, Outage and Scheduling
- J. Dufner, Manager, Maintenance
- K. Harshaw, Manager, Site Support Services
- K. Henderson, Plant General Manager
- J. Jankens, Radiation Protection, Lead Specialist
- G. Kilpatrick, Training Manager
- L. Martin, Superintendent, Design Engineering
- S. O'Connor, Manager, Engineering
- J. Pierce, Acting Manager, Nuclear Assessment
- J. Robinson, Superintendent, Environmental and Chemistry
- W. Saunders, Manager, Operations
- G. Simmons, Superintendent, Radiation Control
- T. Slake, Acting Superintendent, Security
- J. Warner, Superintendent, Plant Support
- M. Wallace, Licensing Engineer

NRC personnel

R. Musser, Chief, Reactor Projects Branch 4

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Closed

05000400/2008002-00	LER	Manual Actuation of the Reactor Protection System due to Main Condenser Exhaust Boot Failure (Section 4OA3.1)
05000400/2008003-00	LER	Manual Actuation of the Reactor Protection System During Shutdown Rod Position Indication Surveillance Testing (Section 4OA3.2)
Opened and Closed		
05000400/2008005-01	NCV	Failure to monitor effluent releases from SFP filter backwash (Section 2PS1)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures:

ORT-1415, Electric Unit Heater Check Monthly Interval OP-161, Radwaste Freeze Protection and Temperature Maintenance Systems OP-161.01, Operations Freeze Protection and Temperature Maintenance Systems OP-161.01, Operations Freeze Protection and Temperature Maintenance Systems AP-300, Severe Weather AP-301, Seasonal Weather Preparations and Monitoring

Work Orders:

WO 1417908: HT-18751P Breaker Tripped While Perform CL-E0010 WO 1435417: Heat Trace Panel FPP-HT-18751A WO 1443047: Back Up Circuit C1-13 Does Not Read Out On Display WO 1443048: Primary Circuit C1-13 Is Having Intermittent Circuit Failure WO 1455591: HT-18751M (Cooling Tower),Ckt 15 Is Tripped WO 1447062: HT-18751F Ckt 23, Causing Repeated RWCR Alarms

NCRs:

NCR 304592: Heat Trace Panel 18753BB Not Functioning NCR 308441: Heat Trace Panel 18751M Alarmed and Ckt 15 Was Found Bkr Tripped NCR 310971: AP-301 Siren Monitoring

Section 1R04: Equipment Alignment

A EDG system:

Procedure OP-155, Emergency Diesel Generator Drawing 2165-S-0563, Simplified Flow Diagram Diesel Fuel Oil System Drawing 2165-S-0663 S01, Simplified Flow Diagram Emergency Diesel Generator Lube Oil and Air Intake and Exhaust System Drawing 2165-S-0663 S02, Simplified Flow Diagram Emergency Diesel Generator 1A-SA & 1B-SB Jacket Water System

B ESW system:

Procedure OP-139, Service Water System Drawing 2165-S-0547 Circulating and Service Water System Drawing 2165-S-0548 Circulating and Service Water System

Section 1R05: Fire Protection

FPP-001, Fire Protection Program Manual FPP-004, Transient Combustible Control

- FPP-012-03-FHB, Fuel Handling Building Fire Pre-Plan, F02-Fuel Pool Cooling Equipment Room, Skimmer Pump #1 & #2 Area
- FPP-012-02-RAB261, Reactor Auxiliary Building Elevation 261 Fire Pre-Plan, A30-Steam Tunnel
- FPP-012-02-RAB 236, Reactor Auxiliary Building Elevation 236 Fire Pre-Plan, A11 Mechanical Penetration (Scalloped Area)
- FPP-012-02-RAB286, Reactor Auxiliary Building Elevation 286 Fire Pre-Plan, A41 PIC Room A and A43 B PIC Room B
- FPP-012-02-RAB305-324, Reactor Auxiliary Building Elevations 305 and 324 Fire Pre-Plan, A49 Termination Cabinet Room

Section 1R06: Flood Protection Measures

UFSAR Sections:

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

Calculations:

Calculation #PRA-F-E-0002, Steam Tunnel Flooding Analysis Calculation #PRA-F-E-0004, RAB Unit 1 Elevation 190' & 216' Flood Analysis Calculation #PRA-F/E-5, RAB Unit 1Elevation 236 Compartment Flood Analysis Appendix I to the HNP Probabilistic Safety Assessment, Internal Flooding Analysis

Procedures:

AOP-022, Loss of Service Water AOP-022BD, Loss of Service Water Basis Document

Other Documents:

Work order 01120721-01, MPT-I0024, 'A-SA' Train Magnetrol Environmentally Qualified Level Switch Inspection

Work order 01147374-01, MPT-I0024, 'B-SB' Train Magnetrol Environmentally Qualified Level Switch Inspection

Drawing CAR-2165-G-184, Flow Diagram Reactor Auxiliary Building Drainage Systems

Section 1R11: Licensed Operator Regualification Program

EOP-Path-1, Path 1 EOP-FRP-S.1, Response to Nuclear Power Generation/ATWS PEP-110, Emergency Classification and Protective Action Recommendations PEP-310, Notifications and Communications AOP-010, Feedwater Malfunctions AOP-019, Malfunctions of RCS Pressure Control OMM-001, Operations - Conduct of Operations TS 3/4.4.4, Relief Valves NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants
ADM-NGGC-0101, Maintenance Rule Program
NCR 225187, Rod Cntl Urgent Failure/TS 3.0.3 During OST-1005
NCR 236248, Rod Control Urgent Failure and TS 3.0.3 During OST-1005
NCR 281431, AOP-001 Entry Due To Urgent Failure Alarm During OST-1005
NCR 292337, Manual Rx Trip During The Performance of OST-1112
NCR 252234, Hot Calibration Of Target Rock Valves
EC 69248, Replacement of Pressurizer and RCS Sample Valves
NCR 299768, RVLIS B Plasma Display Repetitive Failure
NCR 298294, B Train RVLIS Display Blank, System 1050

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

WCM-001, On-line Maintenance Risk Management ADM-NGGC-0003, Conduct of Probabilistic Safety Assessment Unit Operations ADM-NGGC-0006, Online EOOS Models for Risk Assessment OST-1013, 1A-SA Emergency Diesel Generator Operability Test Monthly Interval Modes 1-6

Section 1R15: Operability Evaluations

System Description SD-155.01, Emergency Diesel Generator System Design Basis Document DBD-201, Emergency Diesel Generator System Vendor Manual VM-OQE, Elliot Type "G" High Pressure Turbochargers VM-OUB, Intercoolers Technical Specifications (TS) 3.8.1, A.C. Sources UFSAR Section 8.3.1, A.C. Power Systems UFSAR Section 9.5.8, Diesel Generator Combustion Air Intake and Exhaust System

OST-1008, 1A-SA RHR Pump Operability, Quarterly Interval, Modes 1, 2, 3 VM-BJH-V04, Ingersall-Rand Pumps, Residual Heat Removal NGG-PMB-PMP-02, Equipment Reliability Template, Horizontal Pumps UFSAR Section 6.3, Emergency Core Cooling System TS 3.5.2, ECCS Subsystems – T_{ave} greater than or equal to 350°F

OPS-NGGC-1305, Operability Determinations

Validation Package for HNP-07-004, Generic Letter 96-06 Closure Letter

- HNP-C/STRA-1064, Fatigue Evaluation of Containment Fan Cooler Unit AH-3 Service Water Piping
- Generic Letter 96-06, Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions
- PLP-631, Water Hammer Assessment Program
- EPRI TR-1003098, Generic Letter 96-06 Waterhammer Issues Resolution, Technical Basis Report

EPRI TR-1006456, Generic Letter 96-06 Waterhammer Issues Resolution, User's Manual

Section 1R18: Plant Modifications

Design Basis Document DBD-128, Service Water System, Traveling Screens and Screen Wash System, Waste Processing Building Cooling Water System, Rev. 15
Design Basis Document DBD-136, Containment Ventilation & Cooling Systems
Final Safety Analysis Report Section 6.2.2, Containment Heat Removal System
Final Safety Analysis Report Section 9.2.1, Service Water System
TS 3/4.6.2.3, Containment Cooling System
TS 3/4.7.4, Emergency Service Water System
Vendor Manual VM-PCD, American Air Filter Inc., Air Cleaning Units and Filters
OST-1010, Containment Cooling System Operability Test, Monthly Interval, Modes 1 – 4
WO-1434118, EC 71592, AH-4 "SB" Coil Leaking, Install Blind Flanges
EC 68821, Temporary Isolation of Leaking Coil Bank on AH-3
PLP-620, Service Water Program (Generic Letter 89-13)

Section 1R19: Post-Maintenance Testing

OST-1038, Sampling, Chemical Addition, and Main Steam Drain Systems ISI Valve Test, Quarterly Interval, Mode 1-4

- OST-1840, Steam Generator Blowdown Sample Valve Position Indication Test, 2 Year Interval, Modes 1-4
- OST-1013, 1A-SA Emergency Diesel Generator Operability Test Monthly Interval Modes 1-6
- OST-1214, Emergency Service Water System Operability train A Quarterly Interval Modes 1-2-3-4-5-6-Defueled

OPT-1510, Emergency Diesel Generators Weekly Inspection/Checks Modes at All Times OP-155, Diesel Generator Emergency Power System

OP-101, Sampling System

Section 1R22: Surveillance Testing

OST-1118, Containment Spray Operability, Train A, Quarterly Interval, Modes 1 – 4 OST-1211, Auxiliary Feedwater Pump 1A-SA Operability Test, Quarterly Interval, Modes 1-4 ORT-1408, Security Diesel Operability Run, Monthly Interval, Modes: All

Section 2PS1: Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

Records and Data

SHNPP Annual Radioactive Effluent Release Report-2006 SHNPP Annual Radioactive Effluent Release Report-2007 ERC-08-002, Evaluation of the Use of Area Samplers as Supplemental Information for Effluent Monitoring, Rev.0 Summary of Troubleshooting Plan for Sampling Fuel Handling Building Ventilation Radiation Safety & Control Services Inc. TSD#07-007, Evaluation of the Particulate and Iodine Primary Vent Stack Sampling System at the Shearon Harris Nuclear Power Plant Rev.0 SHNPP UFSAR Section 6.5 Fission Product Removal and Control Systems SHNPP UFSAR Section 9.4 Air Conditioning, heating cooling ventilation system SHNPP UFSAR Section 11.3, Gaseous Waste Systems SHNPP UFSAR Section 11.5, Process Effluent Radiation Monitoring Particulate Size Study of Plant Vent Stacks, 9/10/08

Section 4OA2: Identification and Resolution of Problems

CAP-NGGC-0200, Corrective Action Program CAP-NGGC-0206, Corrective Action Program Trending and Analysis EGR-NGGC-0010, System & Component Trending Program and System Notebooks NCR 300161 Engineering Rigor & Product Quality-NGG Fleet Adverse Trend NCR 304228 Rod Control System Health NCR 305219 Adverse Trend Identified For MRFF Events Based On 3Q-08 CAP

NCR 305852 Perform Common Cause Evaluation for A EDG Broken Bolt Events NCR 308913 Common Cause Evaluation for EDG Dresser Coupling Leaks NCR 311239 Site Focus on Dose - Adverse Trend