



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

July 30, 2009

Mr. Christopher L. Burton  
Vice President  
Carolina Power and 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 05000400/2009003**

Dear Mr. Burton:

On June 30, 2009, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Shearon Harris reactor facility. The enclosed integrated inspection report documents the inspection results, which were discussed on July 15, 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.

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, two licensee-identified violations which were determined to be of very low safety significance are listed in this report. However, because of the very low safety significance and because they are entered into your corrective action program (CAP), the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV, 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. In addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at the Shearon Harris facility. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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/*

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

Docket Nos.: 50-400  
License No.: NPF-63  
Enclosure: NRC Inspection Report 05000400/2009003  
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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Letter to Christopher L. Burton from Randall A. Musser dated July 30, 2009

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INTEGRATED  
INSPECTION REPORT 05000400/2009003

Distribution w/encl:

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-400

License No.: NPF-63

Report No.: 05000400/2009003

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, 2009 through June 30, 2009

Inspectors: J. Austin, Senior Resident Inspector  
P. Lessard, Resident Inspector  
W. Loo, Senior Health Physicist (Sections 2OS2, 4OA1)  
D. Forbes, Health Physicist (Sections 2OS1, 2PS2, 4OA1)  
R. Chou, Reactor Inspector (Section 1R08)  
M. Bates, Senior Operations Engineer (Section 1R11)

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

Enclosure

## SUMMARY OF FINDINGS

IR 05000400/2009003; April 1, 2009 – June 30, 2009; Shearon Harris Nuclear Power Plant, Unit 1; Identification and Resolution of Problems.

The report covered a three month period of inspection by resident inspectors and an announced inspection by two regional health physicist inspectors, a regional operations engineer, 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 Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspect was determined using IMC 0305, Operating Reactor Assessment Program. Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review.

### A. NRC-Identified and Self-Revealing Findings

#### **Cornerstone: Mitigating Systems**

- Green. A self-revealing Green NCV of Technical Specification (TS) 6.8.1, Procedures, was identified when the licensee failed to follow Attachment 4, Manipulator Crane and Auxiliary Hoist Checkout, of Fuel Handling Procedure 20 (FHP-020), Refueling Operations, resulting in damaged grid straps on two fuel assemblies on April 23, 2009. Specifically, the value of the manipulator crane gear limit setpoints for the lower core slow zone exceeded the values allowed by the checkout procedure. This resulted in the fuel handlers damaging the grid straps on two successive fuel assembly moves. The licensee entered this issue into their corrective action program (CAP) as action request (AR) #332368. As corrective actions, the licensee suspended the core offload, reset the lower core slow zone within tolerance, and permanently discharged the affected fuel assemblies. Additionally, the licensee committed to revise FHP-020 prior to the next refueling outage in order to prevent recurrence.

The violation was more than minor because it is associated with the human performance attribute of the Barrier Integrity cornerstone, and it affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. The finding was determined to be of very low safety significance because it was a deficiency associated with fuel handling errors that did not cause damage to fuel clad integrity or a dropped fuel assembly. The finding has a crosscutting aspect of Procedural Compliance, as described in the Work Practices component of the Human Performance cross-cutting area because the licensee accepted the out of tolerance values that were outside the acceptance criteria of the procedure (H.4(b)). (Section 4OA2)

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B. Licensee-Identified Violations

Two violations of very low safety significance, which were identified by the licensee, have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program (CAP). These violations and their CAP tracking numbers are listed in section 4OA7 of this report.



## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period operating at or near Rated Thermal Power (RTP) until April 17, 2009, when the plant was shutdown for refueling outage number 15. The plant was restarted on May 11, 2009. The plant resumed operation at or near RTP on May 13, 2009 and remained at that level for the remainder of the inspection period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R01 Adverse Weather Protection

##### .1 Offsite and Alternate AC Power Readiness

###### a. Inspection Scope

The inspectors performed a review of the licensee's offsite and alternate AC power readiness for selected systems. During the inspection, the inspectors focused on plant specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. Specific documents reviewed during this inspection are listed in the Attachment. The inspectors also reviewed corrective action program items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action procedures. The inspectors' reviews focused specifically on the following plant system:

- Offsite AC Power (Switchyard)
- Emergency Diesel Generators

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

- AR #335322, UAT-1A transformer, cooler 2, fan 3 not running
- AR #334420, Siler City CCVT phase B comp reactor jumper and resistor

###### b. Findings

No findings of significance were identified.

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## .2 External Flood Protection Measures

### a. Inspection Scope

The inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum external flood. The evaluation included a review to check for deviations from the descriptions provided in the Updated Final Safety Analysis Report (UFSAR) for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors checked for obstructions that could prevent draining, checked that the roofs did not contain obvious loose items that could clog drains in the event of heavy precipitation, and determined that barriers required to mitigate the flood were in place and operable. Additionally, the inspectors performed a walkdown of the protected area to identify any modification to the site which would inhibit site drainage during a probable maximum precipitation event or allow water ingress past a barrier.

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

- AR #328855, Turbine building floor drains clogged

### b. Findings

No findings of significance were identified.

## 1R04 Equipment Alignment

### .1 Quarterly Partial System Walkdowns

#### a. Inspection Scope

The inspectors performed three partial system walkdowns of the following risk-significant systems:

- 'B' Component Cooling Water (CCW) while A CCW was inoperable on April 29, 2009;
- 'B' Compressed Air System (CAS) while A CAS was inoperable on May 19, 2009;
- 'A' Essential Services Chilled Water (ESCW) while B ESCW was inoperable due to emergent work on May 28, 2009.

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, applicable portions of the UFSAR, Technical Specification (TS) requirements, outstanding work orders, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could

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have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program with the appropriate significance characterization. Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

During the week of May 25, 2009, the inspectors performed a complete system alignment inspection of the Auxiliary Feed Water System to verify the functional capability of the system. This system was selected because it was considered risk significant in the licensee's probabilistic risk assessment. The inspectors walked down the system to review mechanical and electrical equipment line ups, electrical power availability, system pressure and temperature indications, component labeling, component lubrication, component and equipment cooling, hangers and supports, operability of support systems, and to ensure that auxiliary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding work orders (WOs) was performed to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the corrective action program (CAP) database to ensure that system equipment alignment problems were being identified and appropriately resolved. This complete system walkdown was used to satisfy a portion of the requirements of the Operating Experience Smart Sample FY 2009-02, "Negative Trend and Recurring Events Involving Feedwater Systems." Remaining requirements will be fulfilled in later inspection reports. The documents used for the walkdown and reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

## 1R05 Fire Protection

### .1 Quarterly Resident Inspector Tours

#### a. Inspection Scope

The inspectors conducted five fire protection walkdowns which were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Demineralizer Access Area
- Reactor Auxiliary Building (RAB) HVAC Equipment Room
- RAB Exhaust Fan Area
- Reactor Auxiliary Control Room Complex, Process Instrument Cabinet Room
- Fuel Handling Building, CCW Holdup Tank Area and Purification Pump # 2 Area

The inspectors reviewed the five areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and had implemented adequate compensatory measures for out of service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the attachment, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed, that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's corrective action program.

#### b. Findings

No findings of significance were identified.

## 1R06 Internal Flood Protection Measures

#### a. Inspection Scope

The inspectors reviewed selected risk-important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors walked down the Diesel Fuel Oil Storage Tank Building and the Diesel Generator Building to identify areas and equipment that may be affected by internal flooding due to postulated pipe breaks. In addition, the inspectors reviewed flood analysis and design documents, including the updated final safety analysis report (UFSAR), engineering calculations, and abnormal operating procedures, for licensee

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commitments. The inspectors verified 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.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the licensee's program for maintenance and testing of the A Emergency Diesel Generator (EDG) Jacket Water (JW) heat exchanger. Specifically, the review included the program for testing and analysis of this risk significant heat exchanger which was cleaned, inspected, and evaluated by work order 01129496, MPT-M0091 & EPT-163, 1DJO-E007 (A EDG JW HX) on April 26, 2009. The inspectors observed the condition of the heat exchanger and verified that the frequency of inspection was sufficient to detect degradation prior to loss of heat removal capabilities below design requirements; that the inspection results were appropriately categorized against pre-established engineering acceptance criteria, including the impact of tubes plugged on the heat exchanger performance; and that the licensee had developed adequate acceptance criteria for bio-fouling controls. Additional documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection (ISI) Activities

.1 Non-Destructive Examination (NDE) Activities and Welding Activities

a. Inspection Scope

From April 20 – 24, 2009, the inspectors reviewed the implementation of the licensee's In-service Inspection (ISI) program for monitoring degradation of the reactor coolant system (RCS) boundary and risk significant piping boundaries. The inspectors' activities consisted of an on-site review of NDE and welding activities to evaluate compliance with the applicable edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC), Section XI (Code of record: 2001 Edition with 2003 Addenda), and to verify that indications and defects (if present) were appropriately evaluated and dispositioned in accordance with the requirements of the ASME Code, Section XI acceptance standards.

The inspectors' review of NDE activities specifically covered examination procedures, NDE reports, equipment and consumables certification records, personnel qualification records, and calibration reports (as applicable) for the following examinations:

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- Weld No. II-SI-009SI-FW-277, Report UT-09-010, Ultrasonic Examination (UT) at Pipe to Pipe Weld in Safety Injection Line
- Weld No. II-SI-009SI-FW-280, Report UT-09-011, UT at Pipe to Flue Head Weld in Safety Injection Line
- Weld No. II-FW-FW-003FW-36-FW-499, Report UT-09-019, UT at Pipe to Elbow Weld in Auxiliary Feedwater Line
- Weld No. CT-H-03301, Report PT-09-003, Liquid Penetrant Examination (PT) at Weld Attachment in Containment Spray Pipe

The inspectors reviewed In-service Examination Evaluations from the last refueling outage for recordable indications that were accepted by the licensee for the continued service. Two recordable indications were reviewed:

- PT-07-004, Linear and Rounded Indications on the Saddle Reinforcement in RHR System
- PT-07-005, Linear and Rounded Indications on the Saddle Reinforcement in RHR System

The inspectors' review of welding activities specifically covered the welding activity listed below in order to evaluate compliance with procedures and the ASME Code. The inspectors reviewed the work order, repair and replacement plan, weld data sheets, welding procedures, procedure qualification records, welder qualification records, and NDE reports.

- Work Order (WO) 01374094-01, Replaced Valves 1CS-203 & -204 at C CSIP (Charging Safety Injection Pump) Casing Drain, Class 2
- WO 01375342-01, Replaced Valves 1CT-118 and -119 at Containment Spray Line, Class 2
- WO 01141156-01, Replaced Pressurizer Level II Transmitter Isolation Valve 1RC-98, Class 2

b. Findings

No findings of significance were identified.

.2 PWR Vessel Upper Head Penetration (VUHP) Inspection Activities

a. Inspection Scope

The licensee inspection for the Reactor Head Program during this outage was to perform a visual examination above the reactor pressure vessel upper head to identify potential boric acid leaks from pressure-retaining components. The inspectors specifically reviewed examination procedures, personnel training and qualification records, report VT-09-088 for the visual inspection of pressure-retaining components above the head performed during this outage, and reviewed the licensee's calculations for effective

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degradation years (EDYs) and reinspection years (RIYs). No reactor vessel augmented examination required by 10 CFR.50.55a(g)(6)(ii)(d) was required to be performed during this outage.

b. Findings

No findings of significance were identified.

.3 Boric Acid Corrosion Control (BACC) Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee's BACC program activities to ensure implementation with commitments made in response to NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," and applicable industry guidance documents. Specifically, the inspectors performed an on-site record review of procedures and the results of the licensee's containment walk-down inspections performed during the Unit 1 Spring 2009 outage. The inspectors also interviewed the BACC program owner and conducted a walkdown of the reactor building to evaluate compliance with licensee's BACC program requirements and verify that degraded or non-conforming conditions, such as boric acid leaks identified during the containment walkdown, were properly identified and corrected in accordance with the licensee's BACC and corrective action programs.

The inspectors reviewed a sample of engineering evaluations completed during the last outage for evidence of boric acid found on systems containing borated water to verify that the minimum design code required section thickness had been maintained for the affected components.

The inspector selected the following evaluations for review:

- AR #264311, Inactive Boric Acid Leak on Spent Fuel Pool Backwash Outlet Valve 2FB-57
- AR #267572, Inactive Boric Acid Leak on Containment Isolation Valve 1CS-423
- AR #281524, Inactive Boric Acid Leak on Fuel Pool Cooling Pump Discharge Isolation Valve 2SF-4
- AR #284165, Inactive Boric Acid Leak on Low Head Safety Injection Isolation Valve 1SI-326
- AR #300988, Inactive Boric Acid Leak on Spent Fuel Pool Purification Pump 3SF-FPRP1A

b. Findings

No findings of significance were identified.

.4 Steam Generator (SG) Tube Inspection Activities

a. Inspection Scope

No steam generator tube inspection activities were conducted during this outage nor were any required.

b. Findings

No findings of significance were identified.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a review of ISI-related problems, including welding and BACC, which were identified by the licensee and entered into the corrective action program as Action Requests (ARs). The inspectors reviewed the ARs to confirm that the licensee had appropriately described the scope of the problems and had initiated corrective actions. The review also included the licensee's consideration and assessment of operating experience events applicable to the plant. The inspectors performed this review to ensure compliance with 10CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements. The corrective action documents reviewed by the inspectors are listed in the report attachment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification Program

.1 License Operator Regualification

a. Inspection Scope

Annual Review of Licensee Regualification Examination Results. On February, 5, 2009, the licensee completed the annual regualification operating tests required to be administered to all licensed operators in accordance with 10 CFR 55.59(a)(2). The inspectors performed an in-office review of the overall pass/fail results of the individual operating tests and the crew simulator operating tests. These results were compared to the thresholds established in Manual Chapter 609 Appendix I, Operator Regualification Human Performance Significance Determination Process.

b. Findings

No findings of significance were identified.



.2 License Operator Requalification Examination Observations

a. Inspection Scope

On May 27, 2009, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems and verifying that training was being conducted in accordance with licensee procedures. The simulator scenario tested the crew's ability to respond to the loss of an emergency electrical bus, high reactor coolant pump vibrations that required a reactor trip, loss of all charging/safety injection pumps and a small break loss of coolant accident. The inspectors evaluated the following areas:

- Licensed operator performance
- Crew's clarity and formality of communications
- Ability to take timely actions in the conservative direction
- Prioritization, interpretation, and verification of annunciator alarms
- Correct use and implementation of abnormal and emergency procedures
- Control board manipulations
- Oversight and direction from supervisors
- Ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the corrective action program with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

The inspectors evaluated degraded performance issues involving the following risk significant components:

- AR #322011, Repeat Maintenance on A CCW Pump
- AR #331371, 1A21-SA-8A Breaker for 1RH-40 (B hot leg suction isolation valve) Tripped Free
- AR #333695, A ESW Pump Fails to Develop Normal Discharge Pressure

The inspectors focused on the following attributes:

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- Implementing appropriate work practices
- Identifying and addressing common cause failures
- Scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- Characterizing system reliability issues for performance
- Charging unavailability for performance
- Trending key parameters for condition monitoring
- Ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification
- Verifying appropriate performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2) or appropriate and adequate goals and corrective actions for systems classified as (a)(1)

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- Emergent corrective maintenance on the A Containment Hydrogen Analyzer on May 12, 2009;
- Extended work on the A Compressed Air System during the week of June 1, 2009;
- Emergent work resulting in inoperability of the B ESCW due to the temperature controller responding erratically on May 28, 2009.

These activities were selected based on their potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's staff, including the work week manager and shift technical advisor. The inspectors also verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

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

- AR #337681, #2B Chiller leaving chilled water temperature cycling

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b. Findings

No findings of significance were identified.

1R15 Operability Evaluationsa. Inspection Scope

The inspectors selected the following five potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the Technical Specifications (TS) and Updated Final Safety Analysis Report (UFSAR) to the licensee's evaluations, to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors also reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the attachment.

- AR #329044, EC 68821 (Temporary isolation of leaking number 3 containment fan cooler coil bank) did not consider Generic Letter 96-06 effects
- AR #329904, B-SB Emergency diesel generator inoperability
- AR #337861, 337681, WC-2B (Essential Service Chilled Water 2B) leaving chilled water temperature cycling
- AR #337942, Turbine Driven Auxiliary Feedwater (TDAFW) pump exhaust design basis for missile impact
- AR #340343, Technical specification surveillance of new diesel fuel oil lubricity analysis results did not meet criteria

b. Findings

No findings of significance were identified.

1R18 Plant Modifications.1 Permanent Plant Modificationsa. Inspection Scope

The inspectors reviewed Engineering Change (EC) 71172, Replace diesel generator voltage regulator 54 second timing relays 2-2/1711 and 2-2/1712 design package. This document and related documentation were reviewed for adequacy of the associated 10 CFR 50.59 safety evaluation screening, consideration of design parameters, implementation of the modification, post-modification testing, and relevant procedures,

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design, and licensing documents were properly updated. The inspectors observed ongoing and completed work activities to verify that installation was consistent with the design control documents. The modification replaced degraded voltage relay circuitry timers 2-2/1711 and 2-2/1712 in 6.9 kV safety related switchgear that had repeatability issues resulting in maintenance rule functional failures.

b. Findings

No findings of significance were identified.

.2 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed one temporary modification associated with the installation of temporary cooling for the item listed below to verify regulatory requirements were met, along with the requirements of EGR-NGGC-005, Engineering Change. The inspectors also reviewed the evaluation and requirements of 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 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.

- AR #331886, Increase temp in B-125V battery room and B-SB switchgear

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed the following four post-maintenance (PM) activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

<u>Test Procedure</u>	<u>Title</u>	<u>Related Maintenance Activity</u>	<u>Date Inspected</u>
OST-1801	ECCS Throttle Valve, Charging Safety Injection Pump (CSIP), and Check Valve Verification 18 Month Interval Mode 5,6, or Defueled	Work order 1538933, Replace Balance Coupling on B CSIP	April 27

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OST-1214	Emergency Service Water (ESW) System Operability Train A Quarterly Interval	Work order 1542780, Maintenance performed following air-binding indication on A ESW pump	May 1
OP-155	Diesel Generator Emergency Power System	Work order 1511766, Installation of Flexible Coupling on the A EDG Right Intercooler Adaptor	May 6
OST-1013	1A-SA Emergency Diesel Generator Operability test Monthly Interval Modes 1-2-3-4-5-6	Work order 1129496, MPT-M0091 & EPT-163, 1DJO-E007 (A EDG JW HX), CM-M0194, Emergency Diesel Generator Jacket Water Heat Exchanger Disassembly, Cleaning, and Reassembly	May 11

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following: the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing, and test documentation was properly evaluated. The inspectors evaluated the activities against TS and the UFSAR to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them into the corrective action program and that the problems were being corrected commensurate with their importance to safety.

Documents reviewed are listed in the attachment.

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

- AR #332376, B CSIP goes into alert during OST-1801

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b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

For the outage that began on April 17, 2009 and ended on May 11, 2009, the inspectors evaluated licensee outage activities as described below to verify that licensees considered risk in developing outage schedules, adhered to administrative risk reduction methodologies they developed to control plant configuration, and adhered to operating license and technical specification requirements that maintained defense-in-depth. The inspectors also verified that the licensee developed mitigation strategies for losses of the following key safety functions:

- Decay heat removal
- Inventory control
- Power availability
- Reactivity control
- Containment integrity

Documents reviewed are listed in the Attachment.

.1 Review of Outage Plana. Inspection Scope

Prior to the outage, the inspectors reviewed the outage risk control plan to verify that the licensee had performed adequate risk assessments, and had implemented appropriate risk-management strategies when required by 10 CFR 50.65(a)(4).

b. Findings

No findings of significance were identified.

.2 Monitoring of Shutdown Activitiesa. Inspection Scope

The inspectors observed portions of the cooldown process to verify that technical specification cooldown restrictions were followed.

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

- AR #331352, B Condensate booster pump rejected to manual
- AR #331423, Failure of CS-1539, base adjuster control switch, when attempting to lower voltage

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b. Findings

No findings of significance were identified.

.3 Licensee Control of Outage Activities

a. Inspection Scope

During the outage, the inspectors observed the items or activities described below to verify that the licensee maintained defense-in-depth commensurate with the outage risk-control plan for key safety functions and applicable technical specifications when taking equipment out of service.

- Clearance Activities
- Reactor Coolant System Instrumentation
- Electrical Power
- Decay Heat Removal (DHR)
- Spent Fuel Pool Cooling
- Inventory Control
- Reactivity Control
- Containment Closure

The inspectors also reviewed responses to emergent work and unexpected conditions to verify that resulting configuration changes were controlled in accordance with the outage risk control plan, and to verify that control-room operators were kept cognizant of the plant configuration.

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

- AR #331728, RCS level transient
- AR #331371, 1RH-40 (RHR BPP Suction Valve) tripped free

b. Findings

No findings of significance were identified.

.4 Refueling Activities

a. Inspection Scope

The inspectors observed fuel handling operations (removal, inspection, and insertion) and other ongoing activities to verify that those operations and activities were being performed in accordance with technical specifications and approved procedures. Also, the inspectors observed refueling activities to verify that the location of the fuel assemblies, including new fuel, was tracked from core offload through core reload.

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

- AR #334380, FHP-010 Core reload verification documentation discrepancy
- AR #333746, Incomplete paperwork for core reload
- AR #331729, Procedure use by refueling not complete
- AR #332967, Fuel handling procedures lack full clarity
- AR #333467, Site focus on fuel handling events

b. Findings

No findings of significance were identified.

.5 Monitoring of Heatup and Startup Activities

a. Inspection Scope

Prior to mode changes and on a sampling basis, the inspectors reviewed system lineups and/or control board indications to verify that TSs, license conditions, and other requirements, commitments, and administrative procedure prerequisites for mode changes were met prior to changing modes or plant configurations. Also, the inspectors periodically reviewed RCS boundary leakage data, and observed the setting of containment integrity to verify that the RCS and containment boundaries were in place and had integrity when necessary. Prior to reactor startup, the inspectors walked down containment to verify that debris has not been left which could affect performance of the containment sumps. The inspectors reviewed reactor physics testing results to verify that core operating limit parameters were consistent with the design.

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

- AR #334388, A EDG failing to stop from main control board
- AR #335265, Elevated containment sump inleakage

b. Findings

No findings of significance were identified.

.6 Identification and Resolution of Problems

a. Inspection Scope

Periodically, the inspectors reviewed the items that had been entered into the CAP to verify that the licensee had identified problems related to outage activities at an appropriate threshold and had entered them into the corrective action program. For the significant problems documented in the corrective action program and listed below, the inspectors reviewed the results of the investigations to verify that the licensee had



determined the root cause and implemented appropriate corrective actions, as required by 10 CFR 50, Appendix B, Criterion XVI, Corrective Action.

- AR #333467, Site focus on fuel handling events
- AR #331728, RCS level transient
- AR #332368, Fuel bundle damage identified during fuel movement

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

.1 Routine Surveillance Testing

a. Inspection Scope

For the five surveillance tests below, the inspectors observed the surveillance tests and/or reviewed the test results for the following activities to verify the tests met TS surveillance requirements, UFSAR commitments, inservice testing requirements, and licensee procedural requirements. The inspectors assessed the effectiveness of the tests in demonstrating that the SSCs were operationally capable of performing their intended safety functions.

- OST-1817, Refueling Machine (Manipulator Crane) Operability Modes: 100 Hours Prior To Fuel Movement in Pressure Vessel on April, 22, 2009;
- OST-1813, Remote Shutdown System Operability 18 Month Interval Modes 5, 6 or Defueled on April, 22, 2009;
- OST-1122, Train A 6.9 KV Emergency Bus Undervoltage Trip Actuating Device Operational Test and Contact Check Modes 1-6, on May 21, 2009;
- OST-1094, Sequencer Block Circuit and Containment Fan Cooler Testing Train A Quarterly Interval All Modes on May 2, 2009;
- OST-1807, Containment Spray System: ESF Response Time 18 Month Interval Modes 5, 6 on May 8, 2009.

b. Findings

No findings of significance were identified.

.2 In Service Testing (IST) Surveillance

a. Inspection Scope

The inspectors reviewed the performance of OST-1824, 1B-SB Emergency Diesel Generator Operability Test 18 Month Interval Modes 1 Through 6 And Defueled on June 3, 2009 to evaluate the effectiveness of the licensee's American Society of Mechanical Engineers (ASME) Section XI testing program for determining equipment availability and reliability. This surveillance satisfies the IST requirements for the diesel

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fuel oil (DFO) day tank inlet valve on the supply line from the main fuel oil storage tank (1DFO-191) in the DFO transfer system. The inspectors evaluated selected portions of the following areas:

- Testing procedures and methods
- Acceptance criteria
- Compliance with the licensee's IST program, TS, selected licensee commitments, and code requirements
- Range and accuracy of test instruments
- Required corrective actions

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

- AR #338961, 1DFO-191 failed to remain shut

b. Findings

No findings of significance were identified.

.3 Reactor Coolant System Leak Detection Inspection Surveillance

a. Inspection Scope

The inspectors observed and reviewed the test results for a reactor coolant system leak detection surveillance, OST-1026, Reactor Coolant System Leakage Evaluation, Computer Calculation, Daily Interval, Modes 1-2-3-4, on June 6, 2009. The inspectors observed in plant activities and reviewed procedures and associated records to determine whether: effects of the testing were adequately addressed by control room personnel or engineers prior to the commencement of the testing; acceptance criteria were clearly stated, demonstrated operational readiness, and were consistent with the system design basis; applicable prerequisites described in the test procedures were satisfied; test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; test data and results were accurate, complete, within limits, and valid; equipment was returned to a position or status required to support the performance of its safety functions; and all problems identified during the testing were appropriately documented and dispositioned in the corrective action program. Documents reviewed are listed in the attachment.

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

- AR #314010, OST-1026 Leakrate calculation result greater than three-sigma
- AR #318026, Incorrect data entered into autolog for OST-1026
- AR #335265, Containment sump in-leakage is elevated

b. Findings

No findings of significance were identified.

.4 Containment Isolation Valve Testing

a. Inspection Scope

The inspectors reviewed the test results for the following containment isolation valves testing to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- OST-1216, Component Cooling Water System Operability (A-SA and B-SB Pumps In Service) Quarterly Interval Modes 1-2-3-4 on May 3, 2009;
- OST-1214, Emergency Service Water System Operability Train A Quarterly Interval Modes 1-2-3-4-5-6-Defueled on May 5, 2009.

Specifically, the operability of containment isolation valves 1SW-240 (inside containment isolation valve on the service water return line) and 1CC-211 (inside containment isolation check valve on the reactor coolant pump seal water supply line) was verified. The inspectors observed in-plant activities and reviewed procedures and associated records to determine whether: any preconditioning occurred; effects of the testing were adequately addressed by control room personnel or engineers prior to the commencement of the testing; acceptance criteria were clearly stated, demonstrated operational readiness, and were consistent with the system design basis; plant equipment calibration was correct, accurate, and properly documented; as left setpoints were within required ranges; and the calibration frequency were in accordance with TS, the UFSAR, procedures, and applicable commitments; measuring and test equipment calibration was current; test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied; test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used; test data and results were accurate, complete, within limits, and valid; test equipment was removed after testing; where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable; where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure; where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished; prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test; equipment was returned to a position or status required to support the performance of its safety functions; and all problems identified during the testing were appropriately documented and dispositioned in the corrective action program. Documents reviewed are listed in the attachment.

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

- AR #334705, 1CC-211 Repeat maintenance

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety and Public Radiation Safety

2OS1 Access Controls To Radiologically Significant Areas

a. Inspection Scope

Access Controls The inspectors' evaluated licensee activities for monitoring and controlling worker access to radiologically significant areas, focusing on those activities associated with Refueling Outage 15 (RFO-15), which was in progress during the onsite inspection period. The inspection included direct observation of administrative and physical controls, appraisal of the knowledge and proficiency of radiation workers and health physics technicians (HPTs) in implementing radiological controls, and review of the adequacy of procedural guidance and its implementation.

The inspectors reviewed licensee procedures regarding access control to radiologically significant areas. Selected procedural details for posting, surveying, and access control to airborne radioactivity, radiation area, high radiation area (HRA), locked high radiation area (LHRA), and very high radiation area (VHRA) locations were reviewed and discussed with cognizant licensee representatives. The inspectors reviewed administrative guidance documents and procedures for control of non-fuel radioactive material stored in the spent fuel pools, and evaluated several radiation work permits (RWPs) used for work in radiologically significant areas associated with RFO-15. The selected RWPs were assessed for adequacy of access controls and specified electronic dosimeter (ED) alarm setpoints against expected work area dose rates and work conditions. Access control procedures for posted LHRA and VHRA locations were reviewed and discussed with selected Radiation Protection (RP) management, supervision, and technicians.

During facility tours, the inspectors evaluated selected radiological postings, barricades, and surveys associated with radioactive material storage areas and radiologically significant areas within the reactor containment building, reactor auxiliary building, waste processing building, and fuel handling building. The inspectors conducted independent dose-rate measurements at various building locations and compared those results to licensee radiation survey map data. The surveyed locations included the Reactor Containment general area, Reactor Auxillary Building, Radwaste Processing Building, and outside storage areas. The inspectors independently assessed implementation of

LHRA controls, and evaluated the adequacy of the licensee's LHRA and VHRA key controls through procedural reviews and supervisory interviews.

During the inspection, the proficiency and knowledge of the radiation workers and RP staff in communicating and applying radiological controls for selected tasks were evaluated. The inspectors attended briefings for work activities associated with reactor head/core activities, fuel movement activities, and radiography activities. Radiological worker and HPT training/skill levels, procedural adherence, and implementation of RWP-specified access controls, including those associated with changing radiological conditions, were observed and evaluated by the inspectors during selected job site reviews and tours within the licensee's radiological control area. In addition, the inspectors interviewed selected management personnel regarding radiological controls associated with RFO-15 activities.

RP activities were evaluated against Updated Final Safety Analysis Report (UFSAR) Section 12, Radiation Protection; Technical Specification 6.12, High Radiation Area; 10 CFR 19.12; 10 CFR Part 20, Subparts B, C, F, G, H, and J; and approved procedures. The procedures and records reviewed are listed in Section 2OS1 of the report Attachment.

Problem Identification and Resolution Corrective Action Program (CAP) Action Request (AR) documents associated with access control to radiologically significant areas, radiation worker performance, and HPT proficiency were reviewed and assessed. The ARs listed in the Attachment were reviewed and evaluated in detail during inspection of this program area. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with approved CAP procedures.

The inspectors completed 21 of the required 21 samples for Inspection Procedure (IP) 71121.01. All samples have now been completed for this IP.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls

a. Inspection Scope

As Low As Reasonably Achievable (ALARA) Implementation of the licensee's ALARA program during the RFO-15 outage was observed and evaluated by the inspectors. The inspectors reviewed ALARA planning, dose estimates, and prescribed ALARA controls for the various outage work tasks expected to incur the maximum collective exposures. Reviewed activities included reactor headwork and refueling activities, installation of temporary lead shielding for charging lines, miscellaneous valve work, C reactor coolant pump motor replacement and preventative maintenance activities, radiography activities, and other various work activities associated with RFO-15. Also, incorporation of planning, established work controls, expected dose rates and dose expenditure into the

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ALARA pre-job briefings and RWPs for those activities were reviewed. The inspectors also independently verified that selected job site dose rates were consistent with the dose rates recorded on pre-job survey maps for containment and auxiliary building work areas and equipment. The inspectors made direct field or closed-circuit-video observations of selected work activities and evaluated the licensee's use of engineering controls, low dose waiting areas, and on-the-job supervision for selected activities that were conducted in the reactor containment building.

Selected elements of the licensee's source term reduction and control program were examined to evaluate the effectiveness of the program in supporting implementation of the ALARA program goals. Reviewed areas included primary chemistry shutdown controls, radiation field monitoring and trending, and temporary/emergent shielding. Trends in individual and collective personnel exposures at the facility were reviewed. Records of year-to-date individual radiation exposures sorted by work groups were examined for significant variations of exposures among workers.

Exposure tracking during the RFO-15 outage, and records of exposures to declared pregnant workers incurred from September 2007 to present as well as associated guidance for controlling such exposures, were also reviewed. Trends in the plant's three-year rolling average collective exposure history, outage, non-outage and total annual doses were reviewed and discussed with licensee representatives.

The licensee's ALARA program implementation and practices were evaluated for consistency with UFSAR Chapter 12, Sections 1-5, Radiation Protection; 10 CFR Part 20 requirements; Regulatory Guide 8.29, Instruction Concerning Risks from Occupational Radiation Exposure, February 1996; and licensee procedures. Documents reviewed during the inspection of this program area are listed in Section 2OS2 of the report Attachment.

Problem Identification and Resolution The inspectors reviewed CAP AR documents and audits listed in Section 2OS2 of the report Attachment that were related to the ALARA program. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with CAP-NGGC-0200, Corrective Action Program, Revision (Rev.) 27.

The inspectors completed 15 of the required 15 samples for IP 71121.02. All samples have now been completed for this IP.

b. Findings

No findings of significance were identified.

## 2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

### a. Inspection Scope

The inspectors reviewed the licensee's actions in response to ground water samples results that indicated an increase in tritium along the Cooling Tower Blowdown Line (CTBL).

### b. Findings

Introduction: The inspectors identified an unresolved item associated with the leakage of radioactive liquid effluents into the ground from cracks in the CTBL. This item is unresolved pending further review and evaluation of the licensee's final dose assessment for the CTBL pathway.

Description: The inspectors reviewed with licensee representatives the licensee's vendor report regarding the assessment and evaluation of the increase in tritium identified in ground water samples wells along the CTBL as documented in AR #00309035. The licensee discharges permitted and monitored radioactive liquid effluents into the CTBL for dilution with a release point into the Harris Lake. On December 15, 2008, the licensee had observed water in Air Relief System Manhole (ARSM) Number (No.) 2 located on the CTBL upstream from the permitted release point. The licensee obtained water samples from ARSM No. 2 for analysis and identified tritium levels ranging from less than the detection limit to 2,120 picoCuries per liter (pCi/L). As a result, the licensee conducted a hydrology report and assessment of the CTBL. From that assessment the licensee installed nine groundwater monitoring wells at various points along the CTBL and ARSM No. 2 from January 21 – March 4, 2009. At the time of the onsite inspection, the licensee had collected several monthly samples with tritium levels ranging from less than the detection limit to 2,450 pCi/L. Some wells were found to be dry. At the time of the onsite inspection the licensee was still evaluating the results of the groundwater monitoring wells.

The licensee also evaluated the inside of the CTBL. The licensee identified numerous cracks and plant roots growing into the CTBL. In addition, there was approximately 3,000 feet of the CTBL (located downstream of the Cooling Tower but upstream from ARSM No. 2) that was not evaluated due to worker safety conditions (e.g., slippery conditions due to mud, low oxygen concentrations, etc.). At the time of the onsite inspection, the vendor had not submitted its final assessment and evaluation report of the CTBL to the licensee. As a result, the licensee had not evaluated and assessed the amount of radioactive liquid effluents released into the ground from cracks in the CTBL.

An unresolved item (URI) was identified regarding the significance of the CTBL leakage pathway with regard to meeting the requirements of the Offsite Dose Calculation Manual (ODCM). The ODCM states that radioactive materials released in liquid effluents to unrestricted areas are required to demonstrate compliance with 10 CFR 50 Appendix I. The calculated annual total quantity of all radioactive materials above background to be released from each light-water-cooled nuclear power reactor to unrestricted areas will not result in an estimated annual dose or dose commitment from liquid effluents for any

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individual in an unrestricted area from all pathways of exposure in excess of 3 millirems to the total body or 10 millirems to any organ. The dose commitment had not been determined due to an unevaluated release pathway where releases were occurring at a location other than designed. Specifically, radioactive liquid effluents were being released into the ground from cracks in the CTBL. In accordance with the ODCM, the liquid effluent release point is at the point of discharge from the CTBL into Harris Lake. This item is unresolved pending NRC review and evaluation of the final dose assessment for the CTBL pathway. URI 05000400/2009003-01, Review the Cooling Tower Blowdown Line Pathway Dose Compared to Doses from All Other Pathways.

## 2PS2 Radioactive Material Processing and Transportation

### a. Inspection Scope

Waste Processing and Characterization The inspectors evaluated licensee methods for processing and characterizing radioactive waste (radwaste). Inspection activities included direct observation of processing equipment for solid and liquid radwaste and evaluation of waste stream characterization data.

Solid and liquid radwaste equipment was inspected for material condition, configuration compliance with the UFSAR, and consistency with Process Control Program (PCP) requirements. Inspected equipment included liquid radwaste hold-up tanks; resin transfer piping; and abandoned radwaste equipment. The inspectors discussed system changes, component function, and equipment operability with licensee staff during system walkdowns. In addition, procedural guidance for resin transfer was evaluated and compared with current equipment configuration.

Licensee radionuclide characterizations for selected waste streams were reviewed and discussed with radwaste staff. For primary resin, radwaste filters, and dry active waste the inspectors' evaluated analyses for hard-to-detect nuclides and appropriate use of scaling factors. Comparison results between licensee waste stream characterization data and outside laboratory data were reviewed for 2007 and 2008. For selected shipment records, waste classification calculations were evaluated and the methodology used for resin waste stream mixing and concentration averaging was evaluated. The inspectors also interviewed radwaste staff and reviewed procedural guidance to evaluate the licensee's program for monitoring changing operational parameters.

Radwaste processing activities were reviewed for consistency with the licensee's PCP, Rev. 9; and UFSAR, Chapter 11, Amendment 52. Waste stream characterization analyses were reviewed against regulations detailed in 10 CFR Part 61.55 and guidance provided in the Branch Technical Position on Waste Classification and Waste Form, 1983. Reviewed documents are listed in Section 2PS2 of the report Attachment.

Transportation The inspectors evaluated the licensee's activities related to transportation of radioactive material. The evaluation included a review of shipping related documents for six shipments of radioactive material that had been performed



since the last inspection. No shipments were performed during the onsite inspection for direct observation.

As part of the document review, the inspectors evaluated five shipping records for consistency with licensee procedures and compliance with NRC and DOT regulations. In addition, training records for individuals currently qualified to ship radioactive material were checked for completeness and the training curriculum provided to these workers was evaluated. Documents reviewed during the inspection are listed in Section 2PS2 of the report Attachment.

Transportation program implementation was reviewed against regulations detailed in 10 CFR Parts 20 and 71, 49 CFR Parts 170-189; as well as the guidance provided in NUREG-1608. Training activities were assessed against 49 CFR Part 172 Subpart H.

Problem Identification and Resolution Selected CAP AR documents associated with radwaste processing and transportation were reviewed and discussed with cognizant licensee representatives. The inspectors assessed the licensee's ability to characterize, prioritize, and resolve the identified issues in accordance with licensee procedure CAP-NGGC-0200, Corrective Action Program, Rev. 27. Reviewed documents are listed in Section 2PS2 of the report Attachment.

The inspectors completed 6 of the required 6 samples for IP 71122.02. All samples have now been completed for this IP.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors sampled licensee data for the performance indicators (PIs) listed below. To verify the accuracy of the PI data reported during the period reviewed, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Indicator Guideline," Rev. 5, were used to verify the basis for each data element.

Occupational Radiation Safety (OS) Cornerstone

To evaluate the Occupational Exposure Control Effectiveness PI the inspectors reviewed data collected from January 2008 through April 2009. For the reviewed period, the inspectors assessed CAP records to determine whether HRA, VHRA, or unintended radiation exposures, resulting in TS or 10 CFR 20 non-conformances, had occurred. In addition, the inspectors reviewed selected personnel contamination event data, internal dose assessment results, and ED alarms associated with dose rates exceeding 1 rem per hour and cumulative dose rates exceeding established set-points from January 2008

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through April 2009. Reviewed documents relative to this PI are listed in Sections 2OS1, 2OS2, and 4OA1 of the report Attachment.

Public Radiation Safety (PS) Cornerstone

To evaluate the Radiological Effluent Technical Specification/Offsite Dose Calculation Manual Radiological Effluent Occurrences PI the inspectors reviewed data from January 2008 through April 2009. The inspectors reviewed documents listed in Section 4OA1 of the report Attachment. In addition, the inspectors reviewed out-of-service effluent monitor logs and six effluent release permits.

The inspectors completed 2 of the required 2 samples for IP 71151.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Routine Review of items Entered Into the Corrective Action Program

a. Inspection Scope

To aid in the identification of repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed frequent screenings of items entered into the licensee's corrective action program. The review was accomplished by reviewing daily AR reports and frequently attending the daily AR Review Meeting.

b. Findings

No findings of significance were identified.

.2 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 daily inspector CAP item screening discussed in Section 4OA2.1 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the six month period of January through June, 2009, although some examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues documented outside the normal CAP in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance

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reports, self assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

b. Findings

No findings of significance were identified.

.3 Selected Issue Follow-up Inspection: Fuel Bundle Damage

a. Inspection Scope

The inspectors selected AR #332368, Fuel bundle damage identified during fuel movement for detailed review. This AR was associated with grid straps that were damaged on two fuel bundles during the refueling outage. 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. Findings

Introduction: A self-revealing Green NCV of Technical Specification (TS) 6.8.1, Procedures, was identified when the licensee failed to follow Attachment 4, Manipulator Crane and Auxiliary Hoist Checkout, of Fuel Handling Procedure 20 (FHP-020), Refueling Operations, resulting in damaged grid straps on two fuel assemblies on April 23, 2009. Specifically, the value of the manipulator crane gear limit setpoints for the lower slow zone exceeded the values allowed by Attachment 4.

Description: On April 23, 2009, the refueling senior reactor operator (SRO) and the manipulator crane operator (MO) latched fuel assembly HT57 in preparation for transfer to the spent fuel pool during refueling outage #15 (RFO 15). When the MO raised fuel assembly HT57 from its core location, it moved vertically until the slow zone interlock light extinguished at approximately 18 inches from the lower reactor core plate. The extinguished slow zone interlock light is expected at about 10 inches and is used by the SRO and MO as indication that the fuel assembly has reached the minimum height to allow horizontal movement of the fuel assembly. Raising the fuel assembly to 18 inches created the possibility of grid strap interaction with the grid straps on an adjacent fuel assembly, HT51.

The MO then moved HT57 toward open water (away from other fuel assemblies). At this point, contact between the two fuel assemblies occurred, thereby engaging the two grid straps. After continuing toward open water, a small deflection of HT57 was observed, resulting in an approximately five square inch section of a grid strap being torn from assembly HT57. The torn grid strap managed to remain with HT57 as it was sent to the spent fuel pool for inspection. The SRO and MO did not wait for the results of HT57's

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inspection before continuing operation. However, the damage that occurred was not identified during this first inspection of HT57.

The SRO and MO proceeded to position the crane to remove fuel assembly HT58. While moving HT58, the SRO and MO experienced similar indications as HT58 also interacted with HT51. Approximately two square inches of the grid strap were completely torn off of the assembly HT58. This portion of the grid strap came to rest on the lower reactor core plate.

During the investigation of this issue, it was discovered that the slow zone interlock light was not set for the required 10 inches, but approximately 18 inches. The slow zone interlock light was set at this level during the previous refueling outage (RFO 14) after reports that fuel assembly bottom nozzles were potentially rubbing the shoe horn (an adapter used during core reload to properly align fuel assemblies in the core).

The investigation also revealed that during preparations for unloading the fuel assemblies in RFO 15, the licensee missed an opportunity to prevent this issue. The plant procedure governing the manipulator crane checkout is Attachment 4 of FHP-020. Attachment 4 directs the technician to check ZZ Tape reading (indication of fuel assembly height above the lower reactor core plate) between 6' 5-3/4" and 6' 9-3/4", Digital reading (a diverse indication of fuel assembly height) between 1146 units and 1174 units, and that the lower slow zone light is illuminated (light is extinguished when the fuel assembly has reached a minimum height to allow horizontal movement). Contrary to this requirement, the technician observed that the lower slow zone light was illuminated while both independent height measurement values were out of specification (ZZ Tape reading was 7' 1-1/2" and the digital reading was 1193 units). This was indication that the slow zone interlock light was not set as the required 10" above the lower reactor core plate. This issue was raised to the Refueling Project Manager (RPM). The RPM questioned the technician and vendor about the possibility of grid strap interaction, but was convinced that the setting of the lower slow zone was conservative. The RPM believed the acceptance of these values was within his realm of authority and decided to accept the out of tolerance values. Investigation of these out of tolerance values would likely have identified that the lower slow zone interlock light setpoint was incorrect, thereby preventing the grid strap damage previously described.

As immediate corrective actions, the licensee suspended the core offload and reset the lower core slow zone to 10 inches. Core offload then resumed with no further incidents. The affected fuel assemblies were inspected for further damage, including increased scrutiny of the fuel rods in the areas of the torn grid straps. No additional damage was noted and the fuel cladding barrier integrity was maintained. The piece of grid strap that was torn from HT58 was removed from the core and placed in the spent fuel pool for storage along with the piece that was transported with HT57. Fuel assemblies HT57, HT58 and HT51 were scheduled for permanent discharge and will not be used in the core again. As a long term corrective action to prevent recurrence, the licensee committed to revise FHP-020 prior to the next refueling outage.

Analysis: The failure to follow Attachment 4, Manipulator Crane and Auxiliary Hoist Checkout, of FHP-020 was identified as a performance deficiency. The performance

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deficiency was more than minor because it is associated with the procedure quality attribute of the Barrier Integrity cornerstone, and it affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. This finding was assessed using the Phase 1 screening worksheet of the SDP (Attachment 4 of Manual Chapter 0609, Significance Determination Process) and determined to be of very low safety significance because it was a deficiency associated with fuel handling errors that did not cause damage to fuel clad integrity or a dropped fuel assembly. The finding has a crosscutting aspect of Procedural Compliance, as described in the Work Practices component of the Human Performance cross-cutting area because the licensee accepted the setpoint for the ZZ tape reading and the digital reading outside the procedural prescribed limits. (H.4(b)).

Enforcement: TS 6.8.1, Procedures, requires that written procedures shall be established, implemented, and maintained, covering applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Section 2.k of Appendix A of Regulatory Guide 1.33, Revision 2, February 1978 states that preparations for refueling and refueling equipment operation are activities that should be covered by written procedures. The plant procedure governing the manipulator crane checkout is Attachment 4, Manipulator Crane and Auxiliary Hoist Checkout, of Fuel Handling Procedure 20 (FHP-020). Attachment 4 directs the technician to check ZZ Tape reading between 6' 5-3/4" and 6' 9-3/4", Digital reading between 1146 units and 1174 units, and that the lower slow zone light is illuminated. Contrary to this requirement, on April 23, 2009 the technician observed that the lower slow zone light was illuminated while both independent height measurement values were out of specification (ZZ Tape reading was 7' 1-1/2" and the Digital reading was 1193 units). The period of time from when Attachment 4 was completed and the licensee suspended the core offload was approximately five hours. As immediate corrective actions, the licensee suspended the core offload and reset the lower core slow zone to 10 inches. This finding is in the licensee's corrective action program as AR #332368. Because this violation was of very low safety significance and it was entered into the CAP, this violation is being treated as a non-cited violation (NCV), consistent with the NRC Enforcement Policy. This violation is therefore designated as NCV 05000400/2009003-02, "Failure to Follow Procedures to Control and Adjust the Manipulator Crane Gear Limit Setpoint."

#### 4OA3 Followup of Events

##### .1 (Closed) Licensee Event Report (LER) 05000400/2009-001-00, Emergency Bus 1A-SA Undervoltage Relay as Found Dropout Voltage did not meet TS Allowable Values

The licensee failed to meet Technical Specification (TS) 3.3.2, Engineered Safety Features Actuation System (ESFAS) Instrumentation, for Loss of Offsite Power 6.9 kV Emergency Bus primary undervoltage (UV) trip setpoint. Table 3.3-3 of TS 3.3.2 requires a minimum of two operable channels per bus for that function to be considered operable. During a Maintenance Surveillance Test on January 26, 2009, the licensee found the 6.9 kV 1A-SA Emergency Bus primary UV relays 27-2/1729 and 27-3/1729 were set at 77.0 V and 77.5 V respectively, below the TS minimum allowable value of

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78.2 V. The safety consequence of this error was that these lower voltages correlated to approximately 1 millisecond (msec) of delay for the 1A-SA Emergency Bus primary UV protection and the emergency start signal for the A EDG. The licensee determined that the root cause for this event was unavailability of information regarding the effect of relay coil voltage level on a dropout setting. Corrective actions included the recalibration of the affected relays, verification of the 1B-SB Emergency Bus UV relays and testing of other UV relays of the same model. Future corrective actions include adding testing parameters and process verification steps for procedures performed with Pulsar software; and implementing setpoint changes for emergency bus UV relays to increase the margin value between the allowable values and the setpoint. This licensee-identified finding represents a violation of TS 3.3.2, ESFAS Instrumentation. The enforcement aspects of this finding are discussed in Section 4OA7. The licensee documented the failed equipment in the AR #316381. This LER is closed.

#### 4OA5 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 findings of significance were identified.

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On July 15, 2009, the inspector presented the inspection results to Mr. Burton, and other members of the licensee staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection period.

On May 1, 2009, the inspectors discussed results of the onsite radiation protection inspection with Mr. Burton, and other members of the licensee staff. In addition, a follow-up exit was conducted on May 14, 2008, with Mr. Corlett, Supervisor, Licensing/Regulatory Programs. The inspectors noted that proprietary information was reviewed during the course of the inspection but would not be included in the documented report.

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On April 24, 2009, an exit meeting for the ISI portion was conducted with the licensee management.

#### 4OA7 Licensee-Identified Violations

.1 The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCVs.

- Technical Specification 6.12. a requires, in part, that each high radiation area, in which the intensity of radiation is  $> 100$  mrem/hr but  $< 1000$  mrem/hr, measured at 30 cm from the radiation source or from any surface the radiation penetrates, shall be barricaded and conspicuously posted as a high radiation area. Contrary to the above, on March 23, 2009, the licensee constructed scaffolding that provided a potential access to the Filter Backwash Transfer Tank room that was not conspicuously posted or barricaded.

Licensee evaluations performed after the event showed that the intensity of radiation was  $>100$  mrem/hr but  $<1000$  mrem/hr measured at 30 cm from the pipe surfaces in those areas. This finding was entered in the licensee's corrective action program March 25, 2009 as AR #327372. This finding is of very low safety significance because there was no evidence of unauthorized worker entry into the area and no unexpected /unintended radiation exposures to licensee personnel.

- Technical Specification 3.3.2 requires, in part, a minimum of two operable channels of Loss of Offsite Power primary undervoltage (UV) protection on each 6.9 kV Emergency bus. Contrary to this, between January 26, 2006 and January 26, 2009 the licensee failed to maintain the proper 1A-SA Emergency Bus primary UV trip setpoint. This finding was assessed using the Phase 1 screening worksheet of the SDP (Attachment 4 of Manual Chapter 0609, Significance Determination Process) and determined to be of very low safety significance because the 1A-SA Emergency Bus and A EDG would have still performed their safety function even though they would have been delayed by approximately 1 msec. Additional details are located in section 4OA3 of this report. This was identified in the licensee's CAP as AR #316381.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee personnel**

B. Bernard, Superintendent, Security  
C. Burton, Vice President Harris Plant  
D. Corlett, Supervisor, Licensing/Regulatory Programs  
J. Dills, Manager, Operations  
K. Harshaw, Manager, Outage and Scheduling  
K. Henderson, Plant General Manager  
J. Jankens, Supervisor, Radiation Control  
G. Kilpatrick, Training Manager  
S. O'Connor, Manager, Engineering  
M. Parker, Superintendent, Radiation Protection  
B. Parks, Manager, Nuclear Oversight Section  
J. Robinson, Superintendent, Environmental and Chemistry  
J. Warner, Manager, Support Services

#### **NRC personnel**

R. Musser, Chief, Reactor Projects Branch 4, Division of Reactor Projects, Region II



## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000400/2009003-01	URI	Review the Cooling Tower Blowdown Line Pathway Dose Compared to Doses from all other pathways (Section 2PS1)
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### Opened and Closed

05000400/2009003-02	NCV	Failure to Provide Procedures to Control and Adjust the Manipulator Crane Gear Limit Setpoints (Section 4OA2)
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05000400/2009-01-00	LER	Emergency Bus 1A-SA Undervoltage Relay As Found Dropout Voltage did not meet TD Allowable Values (Sections 4OA3 and 4OA7)
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## LIST OF DOCUMENTS REVIEWED

### Section 1R01: Adverse Weather Protection

#### Procedures

- OMM-001, Operations -Conduct of Operations
- AOP-028, Grid Instability
- NGGM-IA-0003, Transmission Interface Agreement for Operation, Maintenance, and Engineering Activities at Nuclear Plants
- SORMC-NUC-040, Harris Plant Voltage Support and Coordination
- WCM-001, On-Line Maintenance Risk Management
- Drawing PD-5165-B-C-0001, AC Power Distribution System Unit 1
- FSAR 8.3.1, Onsite Power
- FSAR 8.2, Offsite Power System
- AP-300, Severe Weather Response
- AP-301, Seasonal Weather Preparations and Monitoring

### Section 1R04: Equipment Alignment

#### Partial System Walkdown

##### Component Cooling Water system:

- Procedure OP-145, Component Cooling Water System
- Drawing 2165-S-1320, Simplified Flow Diagram Component Cooling Water System
- Drawing 2165-S-1321, Simplified Flow Diagram Component Cooling Water System
- FSAR 9.2.2, Component Cooling Water

##### Compressed Air system:

- Procedure OP-151.01, Compressed Air
- Drawing 2165-S-0800, Simplified Flow Diagram Service Air System
- Drawing 2165-S-0801, Simplified Flow Diagram Instrument Air System
- FSAR 9.3.1, Compressed Air System

##### Essential Services Chill Water system:

- OP-148, Essential Services Chill Water System
- Drawing 2165-S-0998, Simplified Flow Diagram HVAC Essential Services Chill Water Systems
- FSAR 9.2.8 Essential Services Chill Water System

#### Complete System Walkdown

- Procedure OP-137, Auxiliary Feedwater System
- Student Text, Auxiliary Feedwater System
- Design Basis Document-114, Auxiliary Feedwater System

- Simplified Flow Diagram 2165-S-0542
- FSAR 10.4.9, Auxiliary Feedwater
- FSAR 10.2, Condensate and Feedwater
- Vendor Manuals (VMs), Operating Experience (OE) reports, Significant Operating Experience Reports (SOERs), Significant Event Notices (SENs), Information Notices (INs), system health report:

### **Section 1R05: Fire Protection**

- FPP-001 Fire Protection Program Manual
- FPP-004, Transient Combustible Control
- FPP-013, Fire Protection – Minimum Requirements, Mitigating Actions and Surveillance Requirements
- FPP-012-02-RAB286, Reactor Auxiliary Building Elevation 286 Fire Pre-Plan, A46-Demineralizer Access Area
- FPP-012-02-RAB286, Reactor Auxiliary Building Elevation 286 Fire Pre-Plan, A39-RAB HVAC Equipment Room
- FPP-012-02-RAB286, Reactor Auxiliary Building Elevation 286 Fire Pre-Plan, A47-RAB Exhaust Fan Area
- FPP-012-02-RAB305-324, Reactor Auxiliary Building Elevations 305 and 324 Fire Pre-Plan, A55- Reactor Auxiliary Control Room Complex, Process Instrument Cabinet Room
- FPP-012-03-FHB, Fuel Handling Building Fire Pre-Plan, F01-CCW Holdup Tank Area and Purification Pump #2 Area

### **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
- Calculation #PRA-F/E-8, RAB Unit 1 Elevation 305' Compartment Flood Analysis
- Ebasco Services Incorporated #SD-4, Turbine Building Sump Size
- Ebasco Services Incorporated #SD-1, Turbine Building Sump Data Sheet

Procedures

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

Other Documents

- Specification CAR-SH-E-14B, Electric Cables
- Carolina Power & Light Company Quality Release No. 5984, Power and Coaxial Cable
- The Vendor Quality Assurance Report Release for Shipment for Purchase Order N4435045, Release 12
- Cable-qualification test reports obtained from the Kerite Company under Kerite Factory Order D-857
- Kerite Engineering Memorandum No. 223, Determining Temperature 'Rating' of High Temperature Kerite Insulated Cables for Operation in Wet and Alternate Wet/Dry Locations, 5/4/77

**Section 1R07: Heat Sink Performance**Procedures

- EPT- 163, Generic Letter 89-13 Inspections
- MPT-M0091, Heat Exchanger Opening/Closing for NRC Generic Letter 89-13 Inspections
- Generic Letter 89-13, Service Water System Problems Affecting Safety related Equipment
- Work Order 01129496, MPT-M0091 & EPT-163, 1DJO-E007 (A EDG JW HX) for April 26, 2009
- Work Order 667856, MPT-M0091 & EPT-163, 1DJO-E007 (A EDG JW HX) for April 23, 2006
- CM-M0194, Emergency Diesel Generator Jacket Water Heat Exchanger Disassembly, Cleaning, and Reassembly
- FSAR 9.5.5, Diesel Generator Cooling Water System

Drawings

- Drawing 2165-S-0633 Sheet 02, Simplified Flow Diagram, Emergency Diesel Generator 1A-SA and 1B-SB Jacket Water System, Unit 1

**Section 1R08: Inservice Inspection Activities**Procedures

- Attachment T of NDE Appendix B, Rev. 7, Preservice and Inservice Inspection of Nuclear Power Plant Components
- NDEP-0201, Rev. 28, Liquid Penetrant Examination
- NDEP-0425, Rev. 8, Ultrasonic Examination of Austenitic Pipe Welds (PDI)

- NDEP-0437, Rev. 3, Manual Ultrasonic Examination Procedure for Ferritic Pipe Welds (PDI)

#### Calculations

- Calculation HNP-M/MECH-1091, Effective Degradation Years for the Reactor Vessel Head

#### Corrective Action Documents-Action Requests (AR)

- \*AR #20090423, Incorrect Entry on ISI Report Data Field
- \*AR #00332316, NRC Identified Leaks at Valves 1ED-92, 1ED-93, and 1SI-70
- AR #00249502, Missing Code Requirement on Preoutage
- AR #00249513, Information Omitted from the RF-13 NIS-1 Owners Report
- AR #00263371, Non-NDE Materials Stored in Chemical Cabinet
- AR #00331149, Near Miss on R15 Scope
- AR #00281744, ISI Basis Document Flow Diagrams Need to be Created
- AR 264311, Inactive Boric Acid Lead on Spent Fuel Pool Backwash Outlet Valve 2FB-57
- AR 267572, Inactive Boric Acid Leak on Containment Isolation Valve 1CS-423
- AR 281524, Inactive Boric Acid Leak on Fuel Pool Cooling Pump Discharge Isolation Valve 2SF-4
- AR 284165, Inactive Boric Acid Leak on Low Head Safety Injection Isolation Valve 1SI-326
- AR 300988, Inactive Boric Acid Leak on Spent Fuel Pool Purification Pump 3SF-FPRP1A

\* Documents created as a direct result of this inspection.

#### Other

- R15 Boric Acid Walkdown List
- Weld No. II-SI-009SI-FW-277, Report UT-09-010, Ultrasonic Examination (UT) at Pipe to Pipe Weld in Safety Injection Line
- Weld No. II-SI-009SI-FW-280, Report UT-09-011, UT at Pipe to Flue Head Weld in Safety Injection Line
- Weld No. II-FW-FW-003FW-36-FW-499, Report UT-09-019, UT at Pipe to Elbow Weld in Auxiliary Feedwater Line
- Weld No. CT-H-03301, Report PT-09-003, Liquid Penetrant Examination (PT) at Weld Attachment in Containment Spray Pipe
- VT-09-088, Visual Examination for Leakage (VT-2)
- PT-07-004, Linear and Rounded Indications on the Saddle Reinforcement in RHR System
- PT-07-005, Linear and Rounded Indications on the Saddle Reinforcement in RHR System
- Work Order (WO) 01374094-01, Replaced Valves 1CS-203 and -204 at C CSIP Casing Drain, Class 2
- WO 01375342-01, Replaced Valves 1CT-118 & -119 at Containment Spray Line, Class 2

- WO 01141156-01, Replaced Pressurizer Level II Transmitter Isolation Valve 1RC-98, Class 2
- WO 00379381, Clean Valve 1ED-92 for Inactive Boric Acid on Packing Gland
- WO 00379385, Clean Valve 1ED-93 for Inactive Boric Acid on Packing Gland
- Material Qualifications
- NDE Personnel Qualifications
- Welder Qualifications

### **Section 1R11: Licensed Operator Requalification**

- AOP-025 Loss of One Emergency AC Bus (6.9kv) or One Emergency DC Bus (125V)
- AOP-018 Reactor Coolant Pump Abnormal Conditions
- EOP-FRP-C.2 Response To Degraded Core Cooling

### **Section 1R12: Maintenance Effectiveness**

- NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants
- ADM-NGGC-0101, Maintenance Rule Program

### **Section 1R13: Maintenance Risk Assessments and Emergent Work Evaluation**

- OMP-003, Outage Shutdown Risk Management
- WCM-001, On-line Maintenance
- OMM-001, Conduct of Operations

### **Section 1R15: Operability Evaluations**

- OPS-NGGC-1305, Operability Determinations
- OST-1086, 1B-SB Diesel Generator Operability Test Semiannual Interval Modes 1-6
- OST-1073, 1B-SB Diesel Generator Operability Test Monthly Interval Modes 1-2-3-4-5-6
- FSAR 9.5.4, Diesel Generator Fuel Oil Storage and Transfer
- Drawing 2165-S-0563, Simplified Flow Diagram, Fuel Oil System, Unit 1
- Generic Letter 96-06, Assurance of Equipment Operability and Containment Integrity during Design-Basis Accident Conditions
- EC 68821, Temporary Isolation of Leaking Coil Bank on AH-3
- FSAR 6.2.2, Containment Systems
- Drawing 2165-S-0550, Simplified Flow Diagram, Containment Spray System

### **Section 1R19: Post Maintenance Testing**

- OST-1801, ECCS Throttle Valve, Charging Safety injection Pump (CSIP), and Check Valve Verification 18 Month Interval Mode 5,6, or Defueled
- OST-1093, CVCS/SI System Operability Train B Quarterly Interval Modes 1-4
- ISI-800, Inservice Testing of Pumps
- CM-M0194, Emergency Diesel Generator Jacket Water Heat Exchanger

- Disassembly, Cleaning, and Reassembly
- OST-1013, 1A-SA Emergency Diesel Generator Operability test Monthly Interval Modes 1-2-3-4-5-6
- FSAR 9.5.5, Diesel Generator Cooling Water System

### **Section 1R20: Refueling and Outage Activities**

- FHP-020, Refueling Operations
- FHP-014, Fuel and Insert Shuffle Sequence
- OST-1818, Auxiliary Hoist Operability 100 Hours Before Control Rod Drive Movement In The Reactor Vessel Modes 5, 6
- AOP-020, Loss of [Reactor Coolant System] Inventory or Residual Heat Removal While Shutdown
- AP-013, Plant Nuclear Safety Committee
- ESR 9500808, Removable Equipment Hatch Cover Bolting Requirements
- ESR 9800297, Containment Closure Procedure
- GP-008, Draining the Reactor Coolant System
- HNP-C/CONT-1009, Containment Building Removable Equipment Hatch
- OMP-003, Outage Shutdown Risk Management
- OMP-004, Control of Plant Activities During Reduced Inventory Conditions
- OST-1034, Containment Penetrations Test Weekly Interval During Core Alterations and Movement of Irradiated Fuel Inside Containment
- OST-1091, Containment Closure Test Weekly Interval During Core Alterations and Movement of Irradiated Fuel Inside Containment

### **Section 1R22: Surveillance Testing**

- Drawing 2165-S-0563, Simplified Flow Diagram Diesel Fuel Oil System
- Drawing 2165-S-0633S03, Simplified Flow Diagram Emergency Diesel Generator 1A-SA & 1B-SB Fuel Oil and Drainage Systems
- ISI-801, Inservice Testing of Valves
- HNP-IST-003, HNP IST Program – 3rd Interval
- FSAR 9.5.4, Diesel Generator Fuel Oil Storage and Transfer
- OST-1073, 1B-SB Emergency Diesel Generator Operability Test Monthly Interval Modes 1-2-3-4-5-6
- Work Order 1111779, PM-M0104 ITT Hammel Dahl Conoflow MDL V676, 1SW-240
- PLP-114, Relocated Technical Specifications and Design Basis Requirements, Attachment 2, Refueling Operations
- EST-201, ASME System Pressure Tests
- EST-212, Type C Local Leak Rate Tests, Attachment 11 - Penetration M-35 (CCW to RCPs) LLRT for 1CC-208 & 211
- Drawing 2165-S-1321S3, Simplified Flow Diagram Component Cooling Water System

## **Section 20S1: Access Controls to Radiologically Significant Areas**

### Procedures, Manuals, and Guidance Documents

- AP-504, Administrative Controls for Locked and Very High Radiation Areas, Revisions (Rev.) 28
- AP-535, Performing Work in Radiological Control Areas, Rev. 23
- CAP-NGGC-0200, Corrective Action Program, Rev. 27
- HPP-600, Radiation Work Permits, Rev. 22
- HPP-625, Performance of Radiological Surveys, Rev. 25
- HPP-800, Handling Radioactive Material, Rev. 52
- HPS-NGGC-0003, Radiological Posting, Labeling and Surveys, Rev. 13
- HPS-NGGC0014, Radiation Work Permits, Rev. 4
- HPS-NGGC-0016, Access Control, Rev. 4

### Licensee Records and Data

- Contamination Events Reports Data for 2008-2009
- Internal Dose Calculation List for 2008-2009
- Locked High Radiation Area, Very High Radiation Area Key Control Inventory Data, April 29, 2009
- Occupational Cornerstone Performance Indicator Data for 2008 and 2009
- Radiation Work Permit (RWP) Number (No.) 4440, Refueling Activities RFO-15
- RWP No. 4441, Rx Head Lift and set Activities RFO-15 SOER 01-1
- RWP No. 4446, Inspections/Walkdowns
- RWP No. 4450, Maintenance Activities (RCB) RFO-15
- RWP no. 4883, Radiography R-15
- Radiological Survey Record Nos. 0420-042, Conoseal Breach Upper/Lower Cavity; 0420-008, Reactor Auxiliary Building General Area; 0421-002, Daily Containment Survey; 0421-012, Reactor Coolant Drain Tank; 0420-042, Upper and Lower Reactor Cavity; and 0421-010, Reactor Control Building Post Survey Cleanup
- Spent Fuel Pool Inventory Data for Non-Fuel Items 2009

### Action Requests and Quality Assurance (QA) Documents

- NAS Report HNAS-08-093, Harris Radiation Protection Assessment
- AR #275570, Facial Contamination
- AR #294178, Failure to Perform Survey for Downposting
- AR #306853, Dose rate Alarm Investigation
- AR #310510, Unanticipated Dose rate Alarm
- AR #327372, Unposted High Radiation Area
- AR #331445, Gate Alarm on High Rad Boundry
- AR #332948, Personnel Contamination event
- Self-Assessment Report No. 263011, Radiation Protection Self Assessment



**2OS2: As Low As Reasonably Achievable**Procedures, Manuals, and Guidance Documents

- ADM-NGGC-0105, ALARA Planning, Rev. 8
- AP-530, ALARA, Rev. 10
- AP-535, Performing Work in Radiological Control Areas, Rev. 23
- CAP-NGGC-0200, Corrective Action Program, Rev. 27
- CAP-NGGC-0206, Corrective Action Program Trending and Analysis, Rev. 3
- DOS-NGGC-0002, Dosimetry Issuance, Rev. 26
- HPP-600, Site Specific Guidance for Radiation Work Permits, Rev. 22
- HPS-NGGC-0014, Radiation Work Permits, Rev. 4

Licensee Records and Data

- 2008 HNP ALARA Dose Goal
- 2009 Dose Budget memo, dated 12/11/08
- ALARA Work Plan (AWP) 09-006, Rev. 0, RFO-15 Reactor Headwork/Refueling
- AWP 09-011, Rev. 0, Miscellaneous Valve Work Activities
- AWP 09-012, Rev. 0, Maintenance RCB
- AWP 09-013, Rev. 0, C Reactor Coolant Pump Motor Replacement and RCP Preventative Maintenance Activities
- AWP 09-020, Rev. 0, Pressurizer Safety Valves and Piping Modifications
- AWP 09-024, Rev. 0, Radiography R15
- Dose Records of all declared pregnant workers (6) during the period 09/07 to Present
- Harris Nuclear Plant ALARA Committee Meeting Minutes Dated 11/12/07, 02/18/08, 12/08, 08, 01/15/08, and 02/02/09
- HNP Five Year Dose Reduction Plan 2008-2012
- Radiological Survey Record Nos. 0415-013, East Hot Machine Shop; 0418-002, C Loop; 0419-033, C Loop; 0420-018, Pressurizer Safety Relief Valve; 0421-010, Pressurizer; 0423-009, Pressurizer; 0423-017, Pressurizer; and 0424-006, Pressurizer
- Reduction of Co-58 Source Term Report
- RWP No. 4252, Pressurizer Safety Valves and Piping Modifications
- RWP No. 4440, Refueling Activities RFO-15
- RWP No. 4441, Rx Head Lift and set Activities RFO-15 SOER 01-1
- RWP No. 4442, Snubber Inspections and Maintenance RFO-15
- RWP No. 4449, AOV/MOV/Miscellaneous Valve Work RFO-15
- RWP No. 4450, Maintenance Activities (RCB) RFO-15
- RWP No. 4451, RCP Activities RFO-15
- RWP No. 4883, Radiography R-15
- Temporary Shielding Requests (TSR) 09-008, Rev. 0, Maintenance on valves
- TSR 09-010, Rev. 0, Install shielding inside lower shroud doors, around thermocouple conduits and control rod drive mechanisms
- TSR 09-019, Rev. 0, I&C work on the valves

ARs and QA Documents

- AR #261961, Dose projection for feler movement exceeded
- AR #311239, Site focus on dose – Adverse trend
- AR #320202, Projected dose exceeded threshold for creating an AWP
- AR #321349, Work activity dose estimate exceeded by >25%
- Report File No. H-OM-07-02, Harris Nuclear Plant Refueling Outage 14 Assessment
- Report File No. H-OM-FR-09-01, Focused Review of ALARA Work Plans (AWPs) and Radiation Work Permits (RWPs) to support R15
- Report File No. H-RP-07-01, Harris Radiation Protection Assessment
- Report File No. H-RP-08-01, Harris Nuclear Plant Radiation Protection Assessment
- Self Assessment No. 173496, NGG Source Term Reduction and Dose Reduction Initiatives
- Self Assessment No. 219442, Radiation Protection Job Coverage Standards

**2PS1: Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems**Records and Data

- Cooling Tower Blowdown Line Assessment Report, Shearon Harris Nuclear Power Plant, April 2009
- Shearon Harris Nuclear Power Plant, Off-Site Dose Calculation Manual (ODCM), Rev. 19

ARs and QA Documents

- AR #00309035, Water in Cistern Box Air Relief Valve #1 Cooling Tower Blowdown
- AR #00328551, Leak from the Cooling Tower Blowdown Line
- AR #00316427, Storm Drain Sample
- AR #00328325, Tritium Found in Combined Outfall Cistern

**2PS2: Radioactive Material Processing and Transportation**Procedures, Manuals, and Guidance Documents

- CAP-NGGC-0200, Corrective Action Program, Rev. 7
- HPP-880, Spent Nuclear Fuel Shipping and Receipt, Rev. 27
- HPS-NGGC-0001, Radioactive Material Receipt and Shipping Procedure, Rev. 22
- HPS-NGGC-0002, Vendor Cask Utilization Procedure, Rev. 13
- PLP-300, Process Control Program, Rev. 9

Records and Data

- 2007 Annual Radioactive Effluent Release Report
- Radman Database report, Change 47 (10 CFR 61.55 analysis data)

- Radioactive Materials Receipt Log 2005 and 2006 (Year-To-Date)
- Radioactive Materials Shipment Logbook 2005 and 2006 (Year-To-Date)
- Radwaste Shipment: 05-004, 21 filter drums in 21-300 cask to Duratek
- Radwaste Shipment: 05-013, Boron-10 samples (4 gallon overpack)
- Radwaste Shipment: 06-002, Fuel handling tool to Westinghouse
- Radwaste Shipment: 06-010, 20 ft sealand container of used Orex protective clothing to ETI
- Radwaste Shipment: 06-025, Spent resin in 8-120 cask to Studsvik
- Radwaste Shipment: 06-033, Pressurizer relief valve and snubbers

#### AR and QA Documents

- AR #00141185, Inadequate Radioactive Material Labeling
- AR #00159463, Ambiguously Labeled Drum Containing Radwaste Material
- AR #00169189, Rad waste Shipping Documentation Inattention to Detail
- AR #00169354, Transposition Error on Shipment Documentation
- Nuclear Assessment H-RP-05-01, Harris Radiation Protection Assessment

#### **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

#### Records and Data

- 2007 and 2008 Annual Radioactive Effluent Release Report
- AR Searches for High Radiation, HRA, LHRA, and Postings
- REG-NGGC-0009, NRC Performance Indicators and Monthly Operating Report Data, Rev. 9
- Searches for ED alarms >100 mr above setpoint, dose rate alarms >1000mr/hr
- Shearon Harris Nuclear Power Plant, Off-Site Dose Calculation Manual (ODCM), Rev. 19

#### **Section 40A2: Identification and Resolution of Problems**

- CAP-NGGC-0200, Corrective Action Program
- AR # 332622, Manipulator hoist slow zone setpoints set incorrectly
- FHP-020, Refueling Operations
- Root cause investigation for AR # 332368, Fuel Bundle Damage Identified During Fuel Movement

#### **Section 40A3: Event Follow-up**

- AR # 316381, Relay 27-3/1729 fails MST-E0075
- AR # 231046, Undervoltage relays for the 1A-SA Bus was found out of calibration.