



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

July 26, 2012

Mr. George Hamrick
Vice President
Carolina Power & Light Company
Shearon Harris Nuclear Plant
5413 Shearon Harris Road
New Hill, NC 27562

**SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INTEGRATED
INSPECTION REPORT 05000400/2012003**

Dear Mr. Hamrick:

On June 30, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Shearon Harris reactor facility Unit 1. The enclosed inspection report documents the inspection results which were discussed on July 19, 2012, 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.

One NRC identified and two self-revealing findings of very low safety significance (Green) were identified during this inspection. All of these findings were determined to involve a violation of NRC requirements. Further, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest these NCVs, 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 Sharon Harris facility.

If you disagree with a cross-cutting aspect assignment 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 Shearon Harris facility.

G. Hamrick

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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 Agencywide Document Access and Management 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 05000400/2012003
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

G. Hamrick

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cc w/encl:
Brian Bernard
Manager, Nuclear Services and EP
Nuclear Protective Services
Shearon Harris Nuclear Power Plant
Electronic Mail Distribution

Brian C. McCabe
Manager, Nuclear Oversight
Shearon Harris Nuclear Power Plant
Progress Energy
Electronic Mail Distribution

Robert J. Duncan II
Vice President
Nuclear Operations
Progress Energy
Electronic Mail Distribution

Donald L. Griffith
Training Manager
Shearon Harris Nuclear Power Plant
Progress Energy
Electronic Mail Distribution

R. Keith Holbrook
Manager, Support Services
Shearon Harris Nuclear Power Plant
Electronic Mail Distribution

David H. Corlett
Supervisor
Licensing/Regulatory Programs
Progress Energy
Electronic Mail Distribution

David T. Conley
Senior Counsel
Legal Department
Progress Energy
Electronic Mail Distribution

Donna B. Alexander
Manager, Nuclear Regulatory Affairs
(interim)
Progress Energy
Electronic Mail Distribution

John H. O'Neill, Jr.
Shaw, Pittman, Potts & Trowbridge
2300 N. Street, NW
Washington, DC 20037-1128

Joseph W. Donahue
Vice President
Nuclear Oversight
Progress Energy
Electronic Mail Distribution

W. Lee Cox, III
Section Chief
Radiation Protection Section
N.C. Department of Environmental
Commerce & Natural Resources
Electronic Mail Distribution

Kelvin Henderson
General Manager
Nuclear Fleet Operations
Progress Energy
Electronic Mail Distribution

Public Service Commission
State of South Carolina
P.O. Box 11649
Columbia, SC 29211

Chairman
North Carolina Utilities Commission
Electronic Mail Distribution

Terrence E. Slake
Manager
Nuclear Plant Security
Shearon Harris Nuclear Power Plant
Electronic Mail Distribution

Robert P. Gruber
Executive Director
Public Staff - NCUC
4326 Mail Service Center
Raleigh, NC 27699-4326

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G. Hamrick

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(cc w/encl continued)

Chair
Board of County Commissioners of Wake
County
P.O. Box 550
Raleigh, NC 27602

Ernest J. Kapopoulos Jr.
Plant General Manager
Carolina Power and Light Company
Shearon Harris Nuclear Power Plant
Electronic Mail Distribution

Chair
Board of County Commissioners of
Chatham County
P.O. Box 1809
Pittsboro, NC 27312

G. Hamrick

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Letter to G. Hamrick from Randall A. Musser dated July 26, 2012

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INTEGRATED
INSPECTION REPORT 05000400/2012003

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C. Evans, RII

L. Douglas, RII

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-400

License No.: NPF-63

Report No.: 05000400/2012003

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, 2012 through June 30, 2012

Inspectors: J. Austin, Senior Resident Inspector
P. Lessard, Resident Inspector
A. Nielson, Senior Health Physicist (Section 2RS1, 2RS3, 4OA1)
R. Kellner, Health Physicist (Section 2RS2, 2RS4, 4OA1)
G. Kuzo, Senior Health Physicist (Section 2RS5)
M. Coursey, Reactor Inspector (Section 1R08)
A. Vargas, Reactor Inspector (Section 1R08)

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

Enclosure

SUMMARY OF FINDINGS

IR 05000400/2012003, Carolina Power and Light Company; April 1, 2012, – June 30, 2012, Shearon Harris Nuclear Power Plant, Unit 1; Operability Evaluations, Refueling and Outage Activities, and Radiation Monitoring Instrumentation.

The report covers a three month period of inspection by resident inspectors and announced baseline inspection by regional inspectors. One NRC-identified and two self-revealing findings of very low safety significance (Green) were 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). Cross-cutting aspects are determined using IMC 0310, "Components within the Cross Cutting Areas". 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 for the licensee's failure to implement an adequate preventive maintenance procedure to identify a condition which led to the inoperability of the "A" Emergency Service Water (ESW) system. Specifically, the licensee failed to perform an adequate inspection of the grease in the lower gear box of the "A" ESW strainer motor, resulting in the strainer failing to function and the inoperability of the "A" ESW system. The licensee entered this issue into their CAP as AR #521946. As corrective action, the licensee revised PM-M0014 to include inspection of all similar gear boxes throughout the plant.

The failure to implement an adequate preventive maintenance procedure to identify a condition which led to inoperability of the "A" ESW system was a performance deficiency. The performance deficiency was more than minor because it is associated with the procedure quality attribute of the Mitigating Systems cornerstone, and it affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, it resulted in the unplanned inoperability of the "A" ESW train. Using IMC 0609, "Significance Determination Process," Phase 1 screening worksheet of the SDP, this finding was determined to be of very low safety significance because it was not a design or qualification deficiency confirmed to result in a loss of operability or functionality, did not represent a loss of system safety function, did not result in a loss of safety system function for a single train for greater than TS allowed outage time, did not result in a loss of safety function of one or more non-TS trains of equipment designated as risk significant for greater than 24 hours, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. Due to the historic nature of the development of this preventive maintenance procedure and the fact that this procedure was not performed on either train of ESW within the past two years, this finding has no cross-cutting aspect. (Section 1R15)

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Cornerstone: Barrier Integrity

- Green. A self-revealing Green NCV of TS 6.8.1, Procedures, was identified for the licensee's failure to follow procedure, FHP-014, Fuel and Insert Shuffle Sequence, during core offload resulting in inadvertently placing a spent fuel assembly in the wrong location in the spent fuel pool. Specifically, it resulted in spent fuel assembly HW40 being stored in a location for which it had not been analyzed for 22 days, until it was discovered on May 22, 2012. The licensee entered this issue into their CAP as AR #538457. As corrective action, the licensee verified that all other fuel assemblies moved during offload were located in their correct locations and performed a Human Performance Review Board.

The failure to follow procedure FHP-014 during core offload resulting in inadvertently placing a spent fuel assembly in the wrong location in the spent fuel pool was a performance deficiency. The performance deficiency was more than minor because it was 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. Specifically, it resulted in spent fuel assembly HW40 being stored in a location for which it had not been analyzed for 22 days. IMC 0609, "Significance Determination Process," Phase 1 screening worksheet of the SDP, instructed the inspector to process this finding using IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process." Checklist 4 from IMC 0609, Appendix G, Attachment 1 was determined to be the most appropriate because the water level was greater than 23 feet and the time to boil was greater than two hours in the Spent Fuel Pool. Using Checklist 4, the inspector determined that the finding did not require a quantitative assessment because the licensee met the Technical Specifications for the spent fuel pool, specifically water level and boron concentration. Therefore, this finding was determined to be of very low safety significance (Green). The finding has a cross-cutting aspect of Human Error Prevention, as described in the Work Practices component of the Human Performance cross-cutting area because the designated human error prevention technique of concurrent verification failed to prevent this error (H.4(a)). (Section 1R20).

Cornerstone: Public Radiation Safety

- Green. The inspectors identified two examples of a Green Non-Cited Violation (NCV) of TS 6.8.1, Procedures, for the licensee's failure to implement an adequate Quality Assurance (QA) program for effluent monitoring. Specifically, the secondary calibration (transfer) sources used for effluent monitors 21WL-3541 (Waste Monitor Tanks Discharge) and RM21AV-3509-1SA (Plant Vent Stack Monitor) were not verified to be acceptable prior to use. The licensee has entered these issues into their CAP (AR 537505) and is currently evaluating corrective actions and extent of condition.

Enclosure

The licensee's failure to use appropriate secondary calibration sources to adequately calibrate REM-21WL-3541 and RM-21AV-3509-1SA was a performance deficiency. The finding was more than minor because it is associated with the Public Radiation Safety cornerstone attribute of plant equipment/process radiation monitoring and adversely affected the cornerstone objective of ensuring adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. The finding was assessed using Inspection Manual Chapter (IMC) 0609, Appendix D, Public Radiation Safety Significance Determination Process (SDP). The failure to use adequate secondary calibration sources does not represent a substantial failure to implement the radioactive effluents program since each batch release from a Waste Monitor Tank is sampled and analyzed prior to discharge and releases through the Plant Vent Stack are sampled and analyzed weekly. In addition, 10 CFR 20 and 10 CFR 50 dose limits to a member of the public were not exceeded. Therefore this finding was determined to be Green. No cross-cutting aspect was assigned for this finding because the performance deficiency does not represent current licensee performance (Section 2RS5).

B. Licensee-Identified Violations

A violation of very low safety significance which was identified by the licensee was reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's CAP. That violation and corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near Rated Thermal Power (RTP) until April 4, 2012, when power began to coast down in preparation for refueling outage (RFO) 17. On April 21, 2012, the unit was shutdown and RFO 17 commenced. After the outage was complete, the unit entered Mode 1 on June 7, 2012 and returned to RTP on June 13, 2012. The unit remained at or near RTP for the remainder of the quarter.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

.1 Readiness for Seasonal Extreme Summer Heat Conditions

a. Inspection Scope

The inspectors performed a detailed review of the licensee's procedures and preparations for operating the facility while ambient outside temperature was high and the ultimate heat sink was experiencing elevated temperatures. Additionally, extreme high temperatures were forecasted to continue for a prolonged duration. The inspectors focused on plant specific design features and implementation of procedures for responding to or mitigating the effects of these conditions on the operation of the following risk significant systems:

- Containment Cooling
- Compressed Air
- Essential Services Chilled Water

Inspection activities included a review of the licensee's adverse weather procedures, monitoring of the off-normal environmental conditions, and that operator actions specified by plant specific procedures were appropriate to support operability of the facility's normal and emergency cooling systems.

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

- AR #547230, AP-301, Adverse Weather Potential Procedural Improvements
- AR #476473, High Normal Service Water Temperature
- AR #402132, Security Building HVAC Malfunction
- AR #421223, High Auxiliary Reservoir Temperatures
- AR #416570, "B" Chiller Refrigerant Pressure
- AR #547265, Unit Auxiliary Transformer Trouble due to High Temperatures

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b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

- “A” EDG while it was protected during a planned reduction of inventory in the reactor coolant system (RCS) during refueling operations on April 25, 2012;
- The 1 and 4B Spent Fuel Pool (SFP) Cooling Pump while it was protected with the core offloaded in the SFP on May 2, 2012;
- “B” EDG while it was protected during a planned outage for work on the “A” EDG on May 25, 2012; and
- “B” 6.9kV Switchgear Room (SWGR) while it was protected during a planned bus outage for the “A” 6.9kV SWGR on May 25, 2012.

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 Updated Final Safety Analysis Report (UFSAR), 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 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 CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Quarterly Resident Inspector Tours

a. Inspection Scope

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

- “A” Diesel Fuel Oil Storage Tank and Transfer Pump Room
- “B” Diesel Fuel Oil Storage Tank and Transfer Pump Room
- Reactor Auxiliary Building (RAB) HVAC Equipment Area
- Charcoal Filter Areas
- A Train ESW Pump Room
- B Train ESW Pump Room
- ESW Intake Screening Structure

The inspectors reviewed 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.

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

- AR #539668, Fire Detection Trouble Points
- AR #533222, 286’ Turbine Building Switchgear Room Fire

b. Findings

No findings were identified.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the licensee's testing of the "A" EDG Jacket Cooling Water heat exchanger to verify that potential deficiencies did not mask the licensee's ability to detect degraded performance, to identify any common cause issues that had the potential to increase risk, and to ensure that the licensee was adequately addressing problems that could result in initiating events that would cause an increase in risk. The inspectors reviewed the licensee's observations as compared against acceptance criteria, the correlation of scheduled testing and the frequency of testing, and the impact of instrument inaccuracies on test results. Inspectors also verified that test acceptance criteria considered differences between test conditions, design conditions, and testing criteria.

b. Findings

No findings were identified.

1R08 Inservice Inspection (ISI) Activities

.1 Non-Destructive Examination Activities and Welding Activities

a. Inspection Scope

From April 27, 2012, through May 4, 2012, the inspectors conducted an on-site review of the implementation of the licensee's Inservice Inspection (ISI) Program for monitoring degradation of the RCS, auxiliary feedwater systems, risk-significant piping and components, and containment systems in Unit 1. The inspectors' activities included a review of non-destructive examinations (NDEs) 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 Addenda 2003), 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 directly observed the following NDE mandated by the ASME Code to evaluate compliance with the ASME Code Section XI and Section V requirements and, if any indications and defects were detected, to evaluate if they were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement.

- Magnetic Particle (MT) Examinations of the Pressurizer (PZR) Support Bracket II-PZR-01SBW-A1B
- Magnetic Particle (MT) Examinations of the PZR Support Bracket II-PZR-01SBW-A1A
- Ultrasonic (UT) Examinations of the PZR Nozzle Inside Radius Section II-PZR-01NIR-10

Enclosure

The inspectors reviewed documentation for the repair/replacement of the following pressure boundary welds. The inspectors evaluated if the licensee applied the pre-service non-destructive examinations and acceptance criteria required by the construction Code. In addition, the inspectors reviewed the welding procedure specifications, welder qualifications, welding material certifications, and supporting weld procedure qualification records to evaluate if the weld procedures were qualified in accordance with the requirements of Construction Code and the ASME Code Section IX.

- Work Order #198182, Replacement of Valve 1RC-903 (“B” PZR Steam Space Vent Isolation Valve)

During non-destructive surface and volumetric examinations performed since the previous RFO, the licensee did not identify any relevant indications that were analytically evaluated and accepted for continued service. Therefore, no NRC review was completed for this inspection procedure attribute.

b. Findings

No findings were identified

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

a. Inspection Scope

For the licensee vessel head, a 100 percent bare metal visual examination and 100 percent volumetric examination inspection was required this outage pursuant to 10 CFR 50.55a. The inspectors observed portions of the bare metal visual examination and volumetric examination and reviewed NDE reports for VUHPs No. 8, 15, 18, 23, and 41 to determine if the activities, including the disposition of indications and defects, were conducted in accordance with the requirements of ASME Code Case N-729-1 and 10 CFR 50.55a(g)(6)(ii)(D). In particular, the inspectors evaluated if the required visual and volumetric examination scope/coverage was achieved and limitations (if applicable) were recorded in accordance with the licensee procedures. Additionally, the inspectors evaluated if the licensee’s criteria for visual and volumetric examination quality and instructions for resolving interference and masking issues were consistent with 10 CFR 50.55a.

The licensee did not identify any relevant indications that were accepted for continued service during the bare metal visual exam. There were four (4) relevant indications that were recorded during the volumetric examination that required welding repairs to the VUHPs. The repairs were performed on VUHPs 5, 17, 38, and 63. The inspectors evaluated if the licensee applied the pre-service non-destructive examinations and acceptance criteria required by the construction Code. Additionally, the inspectors reviewed the welding procedure specifications, welder qualifications, welding material certifications, and supporting weld procedure qualification records to evaluate if the weld procedures were qualified in accordance with the requirements of Construction Code and the ASME Code Section IX.

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b. Findings

No findings were identified

.3 Boric Acid Corrosion Control (BACC) Inspection Activitiesa. 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," and applicable industry guidance documents. Specifically, the inspectors performed an on-site record review of procedures and the results of the licensee's containment walkdown inspections performed during the current fall refueling outage. The inspectors also interviewed the BACC program owner, conducted an independent walkdown of containment to evaluate compliance with licensee's BACC program requirements, and verified that degraded or non-conforming conditions, such as boric acid leaks, were properly identified and corrected in accordance with the licensee's BACC and corrective action programs.

The inspectors reviewed the following evaluations and corrective actions related to evidence of boric acid leakage to evaluate if the corrective actions completed were consistent with the requirements of the ASME Code Section XI and 10 CFR Part 50, Appendix B, Criterion XVI.

- 2SF-8 (Fuel Pool Cooling Supply Isolation to "C" Fuel Pool) Has Boric Acid Leaking Past its Gasket
- "A" Charging Safety Injection Pump Outboard Seal Boron Accumulation
- Active Boron Leak Near 1SP-20 (RHR System Sample Isolation)

b. Findings

No findings were identified

.4 Identification and Resolution of Problemsa. Inspection Scope

The inspectors reviewed a sample of ISI-related problems that were identified by the licensee and entered into the corrective action program as condition reports (CRs). The inspectors reviewed the CRs to confirm the licensee had appropriately described the scope of the problem 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 Attachment.

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b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program

.1 Quarterly Review

a. Inspection Scope

On April 12, 2012, the inspectors observed a crew of licensed operators in the plant's simulator during Just in Time Training for the upcoming refueling outage to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems and training was being conducted in accordance with licensee procedures. 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
- 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 were identified.

.2 Licensed Operator Performance in the Actual Plant/Main Control Room

a. Inspection Scope

On, April 20-21, 2012, the inspectors observed operators in the plant's main control room during the plant shutdown which commenced RFO 17. On June 6, 2012, the inspectors observed low power physics testing and performance of an abnormal operating procedure for malfunction of the rod control and indicating system (AOP-001). The inspectors evaluated the following areas:

- Operator compliance and use of plant procedures, including procedure entry and exit, performing procedure steps in the proper sequence, procedure place-keeping, and technical specification entry and exit;
- Control board/in-plant component manipulations;

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- Communications between crew members;
- Use and interpretation of plant instruments, indications, and alarms; diagnosis of plant conditions based on instruments, indications, and alarms;
- Use of human error prevention techniques, such as pre-job briefs and peer checking;
- Documentation of activities, including initials and sign-offs in procedures, control room logs, technical specification entry and exit, entry into out-of-service logs; and
- Management and supervision of activities, including risk management and reactivity management.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the three samples listed below, 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 #531811, "B" EDG Jacket Water Leak
- AR #535712, Breaker 1A31-SA-7D ("A" Switchgear Room Cooling Unit) Failed the Instantaneous Trip Value
- AR #541710, 1CC-337 (Letdown Heat Exchanger Component Cooling Water Return Line Flow Control Valve) not Controlling Letdown Temperature

The inspectors focused on the following attributes:

- 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 were identified.

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1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

For the four samples listed below, 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:

- Yellow risk configuration during planned maintenance with the "A" Feed Regulating Valve in manual control on April 2, 2012;
- Yellow risk configuration while lowering inventory in the RCS on April 25, 2012;
- Emergent risk evaluation for the Digital Electro-Hydraulic Turbine Control changing modes from automatic to manual on June 17, 2012, risk remained green; and
- Emergent risk evaluation for the "B" startup transformer being unavailable due to a cable fault on June 25, 2012. Risk remained green.

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 probabilistic risk analyst or shift technical advisor, and 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.

b. Findings

No findings were identified.

1R15 Operability Evaluations

a. 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 TS and 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

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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 #536755, Margin for Unqualified Coatings in Containment Unknown;
- AR #545079, Broken Bolt Clamp, Starting Air Solenoid (1EA-45);
- AR #528764, Fuel Oil Storage Tank Level Indicator (LI-21FO-2431A) out of Allowable Range;
- AR #534585, "A" Steam Generator Lower Support Discrepancy Identified;
- AR #521946, "A" ESW Strainer Failure

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

- AR #507473, "A" EDG Slow Start Solenoid Retaining Plate Missing;
- AR #534767, Valve Leakby Caused Potential Overheating of "C" CSIP
- AR #532019, Noise and Low Amps on "C" CSIP

b. Findings

Introduction: A self-revealing Green NCV of TS 6.8.1, Procedures, was identified for the licensee's failure to implement an adequate preventive maintenance procedure to identify a condition which led to the inoperability of the "A" ESW system. Specifically, the licensee failed to perform an adequate inspection of the grease in the lower gear box of the "A" ESW strainer motor, resulting in the strainer failing to function and the inoperability of the "A" ESW system.

Description: On March 6, 2012, the licensee took manual control of the "A" ESW strainer motor in preparation for planned testing. As part of test preparation, the operator tried to manually rotate the strainer. The operator noticed that the motor was rotating but the lower gear box did not rotate. As a result, the licensee declared "A" ESW inoperable until repairs were completed.

The strainer is located on the discharge side of the pump and is designed to collect any large debris that entered the flow of water. When enough material has collected and differential pressure reaches a setpoint, a motor automatically starts to turn an upper gear box. The upper gear box drives the lower gear box which causes the strainer to rotate in order to remove the debris from the system.

Upon investigation, the licensee determined that the grease in the lower gear box had been contaminated with water. This caused insufficient lubrication, corrosion and eventual failure of the worm drive inside the lower gear box. Further investigation revealed that the licensee's preventive maintenance procedure PM-M0014, Limitorque Inspection and Lubrication, did not ensure that the lower gear box was properly lubricated. PM-M0014 directed an inspection of the upper gear box for proper lubrication. If the upper gear box was adequately lubricated, no further action was

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required. The procedure only directed inspection of the lower gear box if there was indication of an issue in the upper gear box. However, because no issues were ever identified in the upper gear box, the lower gear box was not inspected and the water intrusion was not identified until the failure occurred.

Analysis: The failure to implement an adequate preventive maintenance procedure to identify a condition which led to inoperability of the "A" ESW system was identified as a performance deficiency. The performance deficiency was more than minor because it is associated with the procedure quality attribute of the Mitigating Systems cornerstone, and it affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, it resulted in the unplanned inoperability of the "A" ESW train. Using IMC 0609, "Significance Determination Process," Phase 1 screening worksheet of the SDP, this finding was determined to be of very low safety significance because it was not a design or qualification deficiency confirmed to result in a loss of operability or functionality, did not represent a loss of system safety function, did not result in a loss of safety system function for a single train for greater than TS allowed outage time, did not result in a loss of safety function of one or more non-TS trains of equipment designated as risk significant for greater than 24 hours, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. Due to the historic nature of the development of this preventive maintenance procedure and the fact that this procedure was not performed on either train of ESW within the past two years, this find has no cross-cutting aspect.

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 9.b of Appendix A of Regulatory Guide 1.33, Revision 2, February 1978 states that preventive maintenance schedules should be developed to specify lubrication schedules, inspections of equipment, replacement of such items as filters and strainers, and inspection or replacement of parts that have a specific lifetime such as wear rings. PM-M0014, Limitorque Inspection and Lubrication, is the licensee's preventive maintenance procedure used for the service water strainer inspection.

Contrary to this requirement, licensee procedure PM-M0014 was not properly established and failed to outline instructions for the inspection of the lower gear box. This resulted in the licensee's failure to identify water intrusion into the lower gear box which caused insufficient lubrication, corrosion and eventual failure of the worm drive. As corrective action, the licensee revised procedure PM-M0014 to include inspection of all similar gear boxes throughout the plant. Because the finding is of very low safety significance and has been entered into the CAP (AR #521946), and consistent with the NRC Enforcement Policy, this violation is being treated as an NCV, and is designated as NCV 05000400/2012003-01, "Inadequate Preventive Maintenance Results in Failure of the "A" Emergency Service Water System."

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1R18 Plant Modifications

a. Inspection Scope

The following engineering design packages were reviewed and selected aspects were discussed with engineering personnel:

- Engineering Change (EC) #69609, Permanent Replacement of the “A” EDG Governor with an Upgraded Version
- EC #87028, Temporary Installation of Oil Filled Cable Reservoir Tank

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, 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 permanent modification upgraded the governor controls for the “A” EDG from analog to a digital control system. The temporary modification installed an additional oil reservoir to serve as a makeup volume to the oil filled cables for the Startup Transformer.

b. Findings

No findings were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

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

<u>Procedure</u>	<u>Title</u>	<u>Related Maintenance Activity</u>	<u>Date</u>
OST-1801 and EST-926	Emergency Core Cooling System, CSIP, and Check Valve Verification, 18 Month Interval, Modes 5, 6 or Defueled and Multi Point Pump Curve Determination Test	Work Order (WO) #1856864, B CSIP Disassembly and Rotating Element Replacement	May 16, 2012

OST-1214	"A" ESW System Operability, Quarterly Interval Modes 1-2-3-4-5-6 Defueled	WO #1832636, "A" ESW Strainer Generic Letter 89-13 Inspections (Raw Water Systems And Local Area Air Handler Inspection) and WO #2079493, "A" ESW Strainer Internal Damage Identified During Generic Letter 89-13 Inspections	May 17, 2012
OST-1118	"A" Containment Spray Operability Train Quarterly Interval Modes 1-4	WO #1832995, Lubricate 1CT-50 ("A" Containment Spray Pump Discharge Containment Isolation Valve (CIV)) Valve Stem and WO #1899653, Replace Control Switch for 1CT-50	May 17, 2012
OST-1823	"A" EDG Operability Test	WO #2090192, CR2/1702 Relay Replacement	May 26, 2012
OST-1215	Emergency Service Water System Operability Train "B" Quarterly Interval Modes 1-6 Defaulted	WO #02090338, Perform Stroke Time Test on 1SW-118 (Containment Fan Cooler Air Handler Service Water Return Orifice) after Adjusting Stop Screws	June 2, 2012
OST-1082	Air Lock Door Interlock Verification, 6 Month Interval, Modes 1-5	WO #2094483, Personnel Air Lock Blowing Fuses While Operating	June 4, 2012
Per vendor Guidance	Pressure Drop Test and Power Factor Test	WO #2015394, Repair Leaking Oil Filled "A" Phase Cable on "B" Startup Transformer	June 27, 2012

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 in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment.

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

- AR #537376, OST-1214 Stroke Time Test 1SW-92 (Air Handler #3 Service Water Supply CIV) was Outside Code Criteria
- AR #537375, OST-1214 Stroke Time Test for 1SW-240 (Containment Fan Coil Units Service Water Return CIV) was Outside Code Criteria
- AR #537491, EST-926 Results Unsatisfactory for "B" CSIP

b. Findings

No findings were identified.

1R20 Refueling and Outage Activities

For the outage that began on April 21, 2012, and ended on June 7, 2012, 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 Plan

a. 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).

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

- AR #533693, Reactor Vessel Head Lift Calculation not Stored as a Quality Assurance Record

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b. Findings

No findings were identified.

.2 Monitoring of Shutdown Activities

a. Inspection Scope

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

b. Findings

No findings 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
- RCS 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 #539425, "A" Feed Regulating Valve Bypass not Shut Fully
- AR #537972, "A" MDAFW Pump Auto Start While System Disabled
- AR #536414, Non-Destructive Examination Personnel Certifications

b. Findings

No findings 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 #531091, Environmental Qualification Rosemont Transmitters
- AR #534484, Standpipe Level Transmitter (LT-403) Shipping Plug
- AR #541096, Reactor Vessel Level Indicating System Discrepancies

b. Findings

Introduction: A self-revealing Green NCV of TS 6.8.1, Procedures, was identified for the licensee's failure to follow procedure, FHP-014, Fuel and Insert Shuffle Sequence, during core offload resulting in inadvertently placing a spent fuel assembly in the wrong location in the spent fuel pool. Specifically, it resulted in spent fuel assembly HW40 being stored in a location for which it had not been analyzed for 22 days, until it was discovered on May 22, 2012.

Description: On April 30, 2012, the licensee was offloading the spent fuel assemblies from the reactor into the spent fuel pool as part of the scheduled refueling outage. To accomplish this, the licensee was using FHP-014, Fuel and Insert Shuffle Sequence. This procedure provides the initial and final location for each fuel assembly to ensure proper tracking and accountability. However, while moving HW40 to its final position in the spent fuel pool, the fuel handler placed HW40 into fuel rack position B-D2B2 instead of the intended B-D2A2. During this process, the licensee was using a second fuel handler to provide concurrent verification that the spent fuel assemblies were being retrieved and deposited at the proper location according to FHP-014. However, this individual failed to identify the error. As a result, the mistake was not discovered until May 22, 2012 when the fuel onload of the reactor was in progress. The licensee classified this event as a Significance Level 3 Reactivity Management Event, which represents a violation of procedures that did not violate reactivity constraints. The subcriticality and decay heat removal functions of the spent fuel pool were not significantly impacted by this event.

Analysis: The failure to follow procedure FHP-014 during core offload resulting in inadvertently placing a spent fuel assembly in the wrong location in the spent fuel pool was a performance deficiency. The performance deficiency was more than minor because it was 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. Specifically, it resulted in spent fuel assembly HW40 being stored in a location for which it had not been analyzed for 22 days. IMC 0609, "Significance Determination Process," Phase 1 screening worksheet of the SDP, instructed the inspector to process this finding using IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process." Checklist 4 from IMC 0609, Appendix G, Attachment 1 was determined to be the most appropriate because the water level was greater than 23 feet and the time to boil was greater than two hours in the Spent Fuel Pool. Using Checklist 4, the inspector determined that the finding did not require a quantitative assessment because the licensee met the Technical Specifications for the spent fuel pool, specifically water level and boron concentration. Therefore, this finding was determined to be of very low safety significance (Green). The finding has a cross-cutting aspect of Human Error Prevention, as described in the Work Practices component of the Human Performance cross-cutting area because the designated human error prevention technique of concurrent verification failed to prevent this error (H.4(a)).

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 2.1 of Appendix A of Regulatory Guide 1.33, Revision 2, February 1978 states that written procedures should be provided for Refueling and Core Alterations. Procedure FHP-014, Fuel and Insert Shuffle Sequence is the licensee procedure used for offloading the spent fuel assemblies from the reactor into the spent fuel pool.

Contrary to the above, on April 30, 2012, the licensee failed to properly implement procedure FHP-014 as written during fuel offload. As a result, spent fuel assembly HW40 was stored in a location for which it had not been analyzed for 22 days. As corrective action, the licensee verified that all other fuel assemblies moved during offload were located in their correct locations and performed a Human Performance Review Board. Because the finding is of very low safety significance and has been entered into the CAP (AR #538457), and consistent with the NRC Enforcement Policy, this violation is being treated as an NCV, and is designated as NCV 05000400/2012003-02, "Failure to Follow Fuel Handling Procedure."

.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

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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.

b. Findings

No findings 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 CAP. For the significant problems documented in the CAP 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 #536755, Containment Coatings
- AR #538962, "A" Bus did not Re-energize
- AR #539327, "A" Main Steam Isolation Valve (MSIV) not Opening

b. Findings

No findings were identified.

1R22 Surveillance Testing

.1 Routine Surveillance Testing

a. Inspection Scope

For the four 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.

- MST-I0145, Steam Generator "A" Narrow Range Level Loop Operational Test on April 2, 2012;

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- OST-1124, Train "B" 6.9 kV Emergency Bus Undervoltage Trip Actuating Device Operational Test and Contact Check Modes 1-6 on April 13, 2012;
- OST-1033, Daily Surveillance Requirements Interval Mode 5, 6 and Defueled on May 21,2012; and
- OST-1081, Containment Visual Inspection when Containment Integrity is Required, Mode 5 on June 3, 2012.

b. Findings

No findings were identified.

.2 Inservice Testing (IST) Surveillance

a. Inspection Scope

The inspectors reviewed the performance of OST-1869, Main Feedwater Check Valve Closure Verification Test, Refueling Interval on April 21, 2012, 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 1FW-158, "A" Steam Generator Feed Line Check Valve in the feed water 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
- Required corrective actions

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

- AR #531875, 1FW-158, Failed OST-1869 with Greater than 60 GPM Leakage
- AR #331359, OST-1869 Test Failure
- AR #424580, Engineering Evaluation of OST-1869 Data

b. Findings

No findings were identified.

.3 Reactor Coolant System Leak Detection Inspection Surveillance

a. Inspection Scope

The inspectors observed and reviewed the test results for OST-1023, RCS Leakage

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Evaluation, Computer Calculation, Daily Interval, Modes 1-4, on June 15, 2012. 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 CAP.

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

- AR #542927, Elevated RCS Leakage

b. Findings

No findings were identified.

.4 Containment Isolation Valve Testing

a. Inspection Scope

The inspectors reviewed the test results for the following activities 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:

- EST-212, Type C Local Leak Rate Tests

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; 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; tests were performed in accordance with the test procedures and other applicable procedures; 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; equipment was returned to a position or status required to support the performance of its safety functions; and all

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problems identified during the testing were appropriately documented and dispositioned in the corrective action program. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

2. RADIATION SAFETY

2RS1 Radiological Hazard Assessment and Exposure Controls

a. Inspection Scope

Hazard Assessment and Instructions to Workers: During facility tours, the inspectors directly observed labeling of radioactive material and postings for radiation areas, high radiation areas (HRAs), and airborne radioactivity areas established within the radiologically controlled area (RCA) of the Reactor Auxiliary Building (RAB), Reactor Containment Building (RCB), and radioactive waste (radwaste) processing and storage locations. The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys for selected RCA areas. The inspectors reviewed survey records for several plant areas including surveys for alpha emitters, discrete radioactive particles, airborne radioactivity, gamma surveys with a range of dose rate gradients, and pre-job surveys for upcoming tasks. The inspectors also discussed changes to plant operations that could contribute to changing radiological conditions since the last inspection. For selected outage jobs, the inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details to assess communication of radiological control requirements and current radiological conditions to workers.

Hazard Control and Work Practices: The inspectors evaluated access barrier effectiveness for selected Locked High Radiation Area (LHRA) locations. Changes to procedural guidance for LHRA and Very High Radiation Area (VHRA) controls were discussed with health physics (HP) supervisors. Controls and their implementation for storage of irradiated material within the spent fuel pool (SFP) were reviewed and discussed. Established radiological controls (including airborne controls) were evaluated for selected Refueling Outage 17 (RFO17) tasks including Residual Heat Removal (RHR) pump replacement, reactor vessel head work, and reactor lower internals removal. In addition, licensee controls for areas where dose rates could change significantly as a result of plant shutdown and refueling operations were reviewed and discussed.

Occupational workers' adherence to selected RWPs and HP technician (HPT) proficiency in providing job coverage were evaluated through direct observations and interviews with licensee staff. Electronic dosimeter (ED) alarm set points and worker stay times were evaluated against area radiation survey results for selected work activities. The use of personnel dosimetry (ED alarms, extremity dosimetry, multi-badging in high dose rate gradients, etc.) was reviewed as part of Inspection Procedure

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(IP) 71124.04. Worker response to dose and dose rate alarms during selected work activities was also evaluated.

Control of Radioactive Material: The inspectors observed surveys of material and personnel being released from the RCA using small article monitor, personnel contamination monitor, and portal monitor instruments. As part of IP 71124.05, the inspectors reviewed the last two calibration records for selected release point survey instruments and discussed equipment sensitivity, alarm setpoints, and release program guidance with licensee staff. The inspectors compared recent 10 Code of Federal Regulations (CFR) Part 61 results for the Dry Active Waste (DAW) radioactive waste stream with radionuclides used in calibration sources to evaluate the appropriateness and accuracy of release survey instrumentation. The inspectors also reviewed records of leak tests on selected sealed sources and discussed nationally tracked source transactions with licensee staff.

Problem Identification and Resolution: Nuclear Condition Reports (NCRs) associated with radiological hazard assessment and control were reviewed and assessed. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with procedure CAP-NGGC-0200, "Condition Identification and Screening Process", Rev. 34. The inspectors also reviewed recent self-assessment results.

Radiation protection activities were evaluated against the guidance and requirements of Final Safety Analysis Report (FSAR) Section 12; TS Section 6; 10 CFR Parts 19 and 20; Regulatory Guide (RG) 8.38, "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants"; and approved licensee procedures. Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, "Control of Radioactively Contaminated Material". Documents reviewed are listed in Sections 2RS1, 2RS2, 2RS3, and 2RS5 of the Attachment.

b. Findings

No findings were identified.

2RS2 As Low As Reasonably Achievable (ALARA)

a. Inspection Scope

Work Planning and Exposure Tracking: The inspectors reviewed planned work activities and their collective exposure estimates for the previous RFO 16 and the current RFO17 outage. ALARA planning packages were reviewed for the following high collective exposure tasks: reactor head inspection and subsequent repair activities (RFO17), Alloy 600 Reactor Vessel Nozzle Mitigation (RFO16), reactor head disassembly and re-assembly (RFO16 and RFO17), seal table maintenance (RFO16 and RFO17), and miscellaneous valve repair (RFO17). For the selected tasks, the inspectors reviewed established dose goals and discussed assumptions regarding the bases for the current estimates with responsible ALARA planners. The inspectors evaluated the incorporation

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of exposure reduction initiatives and operating experience, including historical post-job reviews, into RWP requirements. Day-to-day collective dose data for the selected tasks were compared with established dose estimates and evaluated against procedural criteria (trigger points) for additional ALARA review. Where applicable, changes to established estimates were discussed with ALARA planners and evaluated against work scope changes or unanticipated elevated dose rates.

Source Term Reduction and Control: The inspectors reviewed the collective exposure three-year rolling average from 2008 - 2010 and reviewed historical collective exposure trends from 1988 - 2009. The inspectors reviewed historical dose rate trends during post shutdown crudburst/cleanup and compared them to current RFO17 data. Source term reduction initiatives were reviewed and discussed with HP staff.

Radiation Worker Performance: Radiation worker performance was observed and evaluated as part of IP 71124.01 and is documented in section 2RS1. While observing job tasks, the inspectors evaluated the use of remote technologies to reduce dose including teledosimetry and remote visual monitoring. In addition, inspectors observed daily update briefings for high risk work associated with reactor head repair activities.

Problem Identification and Resolution: The inspectors reviewed and discussed selected CAP documents associated with ALARA program implementation. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedure CAP-NGGC-0200, "Condition Identification and Screening Process", Rev. 34. The inspectors also evaluated the scope and frequency of the licensee's self-assessment program and reviewed recent assessment results.

ALARA program activities were evaluated against the requirements of FSAR Section 12, TS Sections 6.8, Procedures and Programs, and 6.11, Radiation Protection Program; 10 CFR Part 20; and approved licensee procedures. Records reviewed are listed in Sections 2RS1 and 2RS2 of the Attachment.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation

a. Inspection Scope

Engineering Controls: The inspectors reviewed the use of temporary and permanent engineering controls to mitigate airborne radioactivity during the RFO17 refueling outage. The inspectors observed the use of portable air filtration units for work in contaminated areas of the RCB and reviewed filtration unit testing certificates. The inspectors evaluated the effectiveness of continuous air monitors and air samplers placed in work area "breathing zones" to provide indication of increasing airborne levels.

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Respiratory Protection Equipment: The inspectors reviewed the use of respiratory protection devices to limit the intake of radioactive material. This included review of devices used for routine tasks and devices stored for use in emergency situations. As part of IP 71124.02, the inspectors reviewed ALARA evaluations for the use of respiratory protection devices during work underneath the reactor vessel head. Selected Self-Contained Breathing Apparatus (SCBA) units and negative pressure respirators (NPR)s staged for routine and emergency use in the Main Control Room (MCR) and other locations were inspected for material condition, SCBA bottle air pressure, number of units, and number of spare masks and air bottles available. The inspectors discussed SCBA repair and maintenance with licensee staff and reviewed maintenance records for selected SCBA units for the past two years. The inspectors evaluated SCBA and NPR compliance with National Institute for Occupational Safety and Health certification requirements. The inspectors also reviewed records of air quality testing for supplied-air devices and SCBA bottles.

The inspectors discussed training for various types of respiratory protection devices with HP staff and interviewed radworkers and control room operators on use of the devices including SCBA bottle change-out and use of corrective lens inserts. Respirator qualification records (including medical qualifications) were reviewed for several MCR operators and emergency responder personnel in the Maintenance and HP departments.

Problem Identification and Resolution: NCRs associated with airborne radioactivity mitigation and respiratory protection were reviewed and assessed. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with procedure CAP-NGGC-0200, "Condition Identification and Screening Process," Rev. 34. The inspectors also reviewed recent self-assessment results.

Licensee activities associated with the use of engineering controls and respiratory protection equipment were reviewed against FSAR Section 12; TS Section 6; 10 CFR Part 20; RG 8.15, "Acceptable Programs for Respiratory Protection"; and applicable licensee procedures. Documents reviewed during the inspection are listed in Sections 2RS1, 2RS2, and 2RS3 of the Attachment.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment

a. Inspection Scope

External Dosimetry: The inspectors reviewed National Voluntary Laboratory Accreditation Program (NVLAP) certification data (including Thermoluminescent Dosimeter (TLD) testing for neutron, gamma, and beta exposures) and discussed program guidance for storage, processing, and results for active and passive personnel dosimeters currently in use. Licensee procedures for shallow and deep dose assessments for workers with identified skin contaminations were reviewed and

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discussed. Comparisons of ED and personnel dosimeter data were reviewed and discussed in detail. In addition, inspectors evaluated the use of extremity dosimetry,

multi-badging, and re-positioning of whole body dosimetry during RFO17 maintenance activities

Internal Dosimetry: Program guidance (including Derived Air Concentration (DAC)-hr tracking), instrument detection capabilities, and assessment results for internally deposited radionuclides were reviewed in detail. The inspectors reviewed selected routine *in vivo* (Whole Body Count) analyses from December 2011 to April 2012. In addition, capabilities for collection and analysis of special bioassay samples were evaluated and discussed with licensee staff.

Special Dosimetric Situations: The inspectors evaluated the licensee's use of multi-badging, extremity dosimetry, and dosimeter relocation within non-uniform dose rate fields and discussed worker monitoring in neutron areas with licensee staff. The inspectors also reviewed the licensee's use of Effective Dose Equivalent from External Exposure (EDEX) to calculate total effective dose equivalent (TEDE) for individuals performing repair activities under the reactor head during RFO17 and monitoring records for declared pregnant workers (DPW) since December 2011. In addition, the adequacy of shallow dose assessments for selected Personnel Contamination Events (PCE)s occurring between December 2011 and April 2012 were reviewed and discussed.

Problem Identification and Resolution: The inspectors reviewed and discussed selected CAP documents associated with occupational dose assessment. The inspectors evaluated the licensee's ability to identify and resolve the identified issues in accordance with procedure CAP-NGGC-0200, "Condition Identification and Screening Process", Rev. 34. The inspectors also discussed the scope of the licensee's internal audit program and reviewed recent assessment results.

Occupational dose assessment program activities were evaluated against the requirements of FSAR Section 12; TS Sections 6.8, Procedures and Programs and 6.11, Radiation Protection Program; 10 CFR Parts 19 and 20; RG 8.40, Methods for Measuring Effective Dose Equivalent from External Exposure; and approved licensee procedures. Records reviewed are listed in Section 2RS1, 2RS2, and 2RS4 of the Attachment.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation

a. Inspection Scope

Walkdowns and Observations: During tours of selected RAB, RCB, and MCR locations, the inspectors observed and evaluated material condition of installed radiation detection

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equipment including area radiation monitor (ARM), continuous air monitor (CAM), personnel contamination monitor (PCM), portal monitor (PM), and small article monitor (SAM) equipment types. In addition, selected effluent monitoring equipment monitoring RAB and Turbine Building effluent release pathways were observed for material condition and evaluated for operability.

Selected portable instrumentation types staged for, or in use were evaluated for current calibration status. Proficiency of HPT staff in conducting operability checks and using select portable instrumentation was evaluated during field observations. Licensee actions and records for portable instrumentation found out-of-tolerance were reviewed and discussed. In addition, PCM and SAM equipment responses to a low-level plant-mix radionuclide source were evaluated.

Calibration and Testing Programs: The inspectors reviewed and discussed recent calibration and/or functional test results for the following ARM, process, and effluent monitors: MCR ARM, Plant Vent Stack Monitor, Containment Ventilation Isolation Monitor, Waste Monitor Tanks Discharge Monitor, Steam Generator Blow-down Liquid Radiation Monitor, and Containment High Range Accident Monitor. The inspectors reviewed and evaluated traceability of current calibration sources to the original primary calibrations and National Institute of Standards and Technology (NIST) and National Bureau of Standards (NBS) certifications. The most recent 10 CFR Part 61 analysis for DAW was reviewed to determine if calibration and check sources are representative of the plant source term. In addition, establishment of alarm set-point values for selected process and effluent monitoring instrumentation were reviewed and discussed with responsible licensee representatives.

Calibration documentation was reviewed for selected ARM, CAM, PCM, PM and whole body counter (WBC) equipment. In addition, calibration activities for selected portable instrumentation and use of the onsite instrument calibrator were discussed with responsible licensee staff. For the WBC system, the inspectors reviewed the last calibration and laboratory inter-comparison records, selected quality control check records, and discussed operability and availability issues.

Quality assurance data for selected gamma spectroscopy systems were reviewed and discussed with counting room and chemistry department technical staff. The capabilities of gamma spectroscopy instrumentation used for analysis of routine and post accident liquid samples were reviewed and evaluated. Capabilities to obtain and analyze highly radioactive samples of reactor coolant for classifying fuel damage were discussed in detail.

Effectiveness and reliability of selected radiation detection instruments were reviewed against details documented in the following: 10 CFR Part 20; NUREG-0737, Clarification of TMI Action Plan Requirements; TS Sections 3/4.3.3, Radiation Monitoring for Plant Operations, 6.8, Procedure and Programs, 6.11, Radiation Protection Program, and 6.14 Offsite Dose Calculation Manual (ODCM); FSAR Chapter 11; applicable licensee procedures; and the Safety Evaluation Related to License Amendment Number 108 to

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Facility Operating License Number NPF-63. Documents reviewed during the inspection are listed in section 2RS5 of the Attachment.

Problem Identification and Resolution: The inspectors reviewed and discussed selected CAP documents associated with radiological instrumentation. The reviewed items included NCRs, self-assessment, and quality assurance audit documents. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve identified issues in accordance with licensee procedures CAP-NGGC-0200, "Condition Identification and Screening Process", Rev. 34 and CAP-NGGC-0205, "Condition Evaluation and Corrective Action Process", Rev. 15. Documents reviewed are listed in section 2RS5 of the Attachment.

b. Findings

Introduction: The inspectors identified two examples of a Green Non-Cited Violation (NCV) of TS 6.8.1, Procedures, for the licensee's failure to implement an adequate Quality Assurance (QA) program for effluent monitors 21WL-3541 (Waste Monitor Tanks Discharge Monitor) and RM21AV-3509-1SA (Plant Vent Stack Monitor).

Description: The inspectors found that the primary calibration (circa 1986) for 21WL-3541 (Waste Monitor Tanks Discharge Monitor) was performed with six radioactive sources in order to expose the detector to a range of gamma energies and source activities. Subsequent to the primary calibration, 21WL-3541 was exposed to radioactive sources 85-0026C (Barium-133) and 85-0026E (Cesium -137) to determine a count rate for future calibration checks. Unlike the six sources used in the primary calibration, the inspectors determined that the two secondary calibration (transfer) sources did not appear to be traceable to a national standard via NIST or NBS. After a search of plant and vendor records, the licensee was unable to find certification documents linking radioactive sources 85-0026C and 85-0026E, currently used for calibration checks, to NIST/NBS standards.

Additionally, during a review of effluent monitor calibration records, the inspectors found that one of the three Chlorine-36 sources (source ID 91-078D) used to calibrate the low-range detector of RM21AV-3509-1SA (Plant Vent Stack Monitor), was not used in the original primary calibration. Discussions with licensee staff revealed that one of the original secondary calibration sources developed a leak and had to be replaced in calendar year 2000. The inspectors reviewed an evaluation comparing the replacement source with the old source to show continued traceability to the primary calibration. The inspectors noted that the evaluation only compared the sources' activities and mylar covering thicknesses and did not address geometry differences between the two sources (point source versus one inch diameter active area). Thus, traceability of source 91-078D to the primary calibration was not adequately established. The licensee has since performed a supplemental evaluation and shown that, in this case, geometry differences between the old source and new source have only a minimal effect on detector response.

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The inspectors noted that guidance contained in RG 1.21, “Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light Water Cooled Nuclear Power Plants”, RG 4.15, “Quality Assurance for Radiological Monitoring Programs (Normal Operations) – Effluent Streams and the Environment”, and ANSI N13.10 – 1974, “Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents” states that radioactive sources used to calibrate effluent monitors should be traceable to NIST/NBS standards and that secondary sources should be traceable to the primary calibration. The licensee has entered these issues into their CAP (AR #537505) and is currently evaluating corrective actions and extent of condition.

Analysis: The inspectors determined that the licensee’s failure to use appropriate secondary calibration sources to adequately calibrate 21WL-3541 and RM21AV-3509-1SA was a performance deficiency. The finding is greater than minor because it is associated with the Public Radiation Safety Cornerstone plant equipment/process radiation monitoring attribute and adversely affected the associated cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operations. Failure to use the correct radioactive sources to calibrate effluent monitors could impact the licensee’s ability to establish monitor operating parameters (e.g. set-point determinations) used to control releases of radioactivity to the environment. This finding was evaluated using Inspection Manual Chapter 0609, Appendix D, Public Radiation Safety Significance Determination Process (SDP). The failure to use adequate secondary calibration sources does not represent a substantial failure to implement the radioactive effluents program since each batch release from a Waste Monitor Tank is sampled and analyzed prior to discharge and releases through the Plant Vent Stack are sampled and analyzed weekly. In addition, 10 CFR 20 and 10 CFR 50 dose limits to a member of the public were not exceeded. Therefore, the finding was determined to be GREEN. No cross-cutting aspect was assigned for this finding because the performance deficiencies do not represent current licensee performance.

Enforcement: TS 6.8.1.g requires implementation of a QA program for radioactive effluent monitoring. Contrary to this, on two occasions (initial calibration in 1986 and secondary source evaluation in 2000), the licensee failed to implement an adequate QA program for effluent monitoring in that secondary calibration sources used for effluent monitors 21WL-3541 and RM21AV-3509-1SA were not verified to be acceptable prior to use. Because this violation was of very low safety significance and it was entered into the licensee’s corrective action program (AR #537505), this violation is being treated as an NCV, consistent with the Enforcement Policy: NCV 05000400/2012003-03, “Failure to use Appropriate Radioactive Sources to Calibrate Effluent Monitors.”

4. OTHER ACTIVITIES

40A1 Performance Indicator (PI) Verification

a. Inspection Scope

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To verify the accuracy of the PI data reported to the NRC, the inspectors compared the licensee's basis in reporting each data element to the PI definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, Regulatory Assessment Performance Indicator Guideline.

Mitigating Systems Cornerstone

- Safety System Functional Failures

The inspectors reviewed licensee submittals for the Safety System Functional Failures performance indicator for the period from the second quarter 2011 through the first quarter 2012. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, issue reports, event reports and NRC Integrated Inspection reports for the period to validate the accuracy of the submittals. Specific documents reviewed are described in the Attachment.

Barrier Integrity Cornerstone

- RCS Specific Activity

The inspectors reviewed licensee submittals for the RCS Specific Activity performance indicator for the period from the second quarter 2011 through the first quarter 2012. The inspectors reviewed the licensee's RCS chemistry samples, TS requirements, issue reports, and event reports for the period to validate the accuracy of the submittals. Specific documents reviewed are described in the Attachment.

- RCS Leakage

The inspectors sampled licensee submittals for the RCS Leakage performance indicator for the period from the second quarter 2011 through the first quarter 2012. The inspectors reviewed the licensee's operator logs, RCS leakage tracking data, and issue reports for the period to validate the accuracy of the submittals. Specific documents reviewed are described 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 #520619, Transfer Relay Panel Failures
- AR #475602, Chiller Trip on Low Oil Pressure
- AR #472641, TDAFW Pump Steam Inlet Valve Failed to Open
- AR #473269, Personnel Air Lock leakage
- AR #498794, "B" Train Containment Spray Aid Tank Outlet Valve Failure
- AR #505470, "B" EDG Governor Actuator Speed Setting

Occupational Radiation Safety Cornerstone: The inspectors reviewed the Occupational Exposure Control Effectiveness PI results for the Occupational Radiation Safety Cornerstone from July 2011 through April 2012. For the assessment period, the

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inspectors reviewed ED alarm logs and selected NCRs related to controls for exposure significant areas. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in sections 2RS1, 2RS4, and 4OA1 of the Attachment.

Public Radiation Safety Cornerstone: The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results for the Public Radiation Safety Cornerstone from July 2011 through April 2012. For the assessment period, the inspectors reviewed cumulative and projected doses to the public contained in liquid and gaseous release permits and NCRs related to Radiological Effluent Technical Specifications/ODCM issues. Documents reviewed are listed in section 4OA1 of the Attachment.

b. Findings

No findings 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 action request reports.

b. Findings

No findings 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 2012 through June 2012, 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 reworks 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 were identified. The inspectors observed that the licensee performed adequate trending reviews. The licensee routinely reviewed cause codes, involved organizations, key words, and system links to identify potential trends in the CAP data. The inspectors compared the licensee process results with the results of the inspectors' daily screening to identify any discrepancies or potential trends in CAP data that the licensee had failed to identify.

The inspectors identified that an adverse trend exists in the area of Human Error Prevention. Specifically, the failure to adequately implement plant procedures has recently resulted in several adverse issues. The following issues illustrate the presence of the trend:

- AR #532652, Adverse Trend in Clearance and Tagging Performance
- AR #539220, Attempted Sample of Posted Protected Train Equipment
- AR #538457, Spent Fuel Assembly Found in Wrong Location in the Spent Fuel Pool

This trend was entered into the licensee's CAP as AR #550399, Cross Cutting Issue, Work Practices and HU tool improvement, to address the need for increased management attention.

4OA3 Follow-up of Events

.1 "B" and "C" MSIVs Fail to Close during Surveillance Testing

a. Inspection Scope

The inspectors reviewed the plant's response to the "B" and "C" MSIVs failure to close during surveillance testing on April 21, 2012. Inspectors evaluated this issue including operator response in order to provide input to regional management in determining the need for further inspection. Region II determined that a Special Inspection (SI) was warranted. The results of that inspection are documented in IR 05000400/2012008.

b. Findings

No findings were identified.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

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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 were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On July 19, 2012, the inspector presented the inspection results to Mr. George Hamrick, and other members of the licensee staff. The inspector confirmed that proprietary information was not provided or examined during the inspection period.

On May 4, 2012, the inspector presented the results of the ISI inspections to licensee management. All proprietary information that was provided to the inspector during the inspection was returned to the licensee. Section 1R08

On May 18, 2012, the inspectors discussed the results of the Radiation Protection inspection with Mr. Chris Burton, Site Vice-president, and members of his staff. The inspectors noted that no proprietary information was reviewed. Additionally, on July 2, 2012, the inspectors held a teleconference with licensee staff to discuss resolution of issues identified during the inspection.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

10 CFR 20.1501 requires, in part, that each licensee make surveys that are reasonable under the circumstances to evaluate potential radiological hazards. Contrary to this, on June 6, 2012, during restart from refueling outage RFO17, two radiation workers and a HPT entered the reactor bio-shield wall (LHRA) to perform maintenance work near the "A" Reactor Coolant Pump and encountered radiological conditions that had not been evaluated. The work crew was briefed on radiological conditions in the travel path general areas of 5-20 mrem/hr corresponding to 0 percent reactor power (shutdown). However, immediately prior to entry, reactor power was raised above one percent and fluctuated between approximately 1.1 percent and 1.9 percent during their time inside

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the RCB. This caused an increase in the travel path general area dose rates inside the bio-shield to approximately 400 mrem/hr and resulted in multiple ED dose rate alarms. The increased dose rates were discovered by the accompanying HPT who briefed the workers in the field that ED alarms may be received upon exiting the bio-shield. This finding was of very low safety significance (Green) because there was no substantial potential for overexposure. This is due to the fact that the workers were accompanied by a HPT, the time spent inside the bio-shield was brief, and dose rates were not sufficiently high enough in the planned travel path which was adhered to by the work crew. The licensee entered the event into their CAP as AR 541773.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

C. Burton, Vice President Harris Plant
D. Corlett, Supervisor, Licensing/Regulatory Programs and Acting Manager, Support Services
J. Dufner, Director, Engineering
D. Griffith, Training Manager
G. Hamrick, Vice President Harris Plant
E. Kapopoulos, Plant General Manager
B. McCabe, Manager, Nuclear Oversight
K. Miller, Supervisor, Engineering Programs
M. Parker, Superintendent, Radiation Control
M. Robinson, Superintendent, Environmental and Chemistry
G. Simmons, Emergency Preparedness Supervisor
T. Slake, Manager, Security
J. Warner, Manager, Outage and Scheduling
F. Womack, Manager, Operations

NRC personnel

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

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000400/2012003-01	NCV	Inadequate Preventive Maintenance Results in Inoperability of the "A" Emergency Service Water System. (Section 1R15)
05000400/2012003-02	NCV	Failure to Follow Fuel Handling Procedure. (Section 1R20)
05000400/2012003-03	NCV	Failure to Use Appropriate Radioactive Sources to Calibrate Effluent Monitors. (Section 2RS5)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

AP-300, Severe Weather

AP-301, Seasonal Weather Preparations and Monitoring

Work Orders

WO #1870193, Degrease and Clean "C" A/C Oil Coolers

WO #1177916, Security HVAC Issues

WO #1767686, Computer Room HVAC not Cooling

WO #1615007, Retube "B" Chiller Condenser

Section 1R04: Equipment Alignment

Partial System Walkdown:

Emergency Diesel Generator System:

Procedure OP-155 Emergency Diesel Generator System,

Drawing 2165-S-0633, Simplified Flow Diagram Starting Air System

Drawing 2165-S-0563, Simplified Flow Diagram Fuel Oil Systems

Fuel Pool Cooling System:

Procedure OP-116 Fuel Pool Cooling System,

Drawing 2165-S-0805, Simplified Flow Diagram Fuel Pool Cooling System

Section 1R05: Fire Protection

FPP-001 Fire Protection Program Manual

FIR-NGGC-0009, NFPA 805 Transient Combustibles And Ignition Source Controls Program

FPP-013, Fire Protection – Minimum Requirements, Mitigating Actions and Surveillance Requirements

FPP-012-02-RAB261, Reactor Auxiliary Building Elevation 261 Fire Pre-Plan

FPP-012-08-SEC, Out Building Fire Pre-Plan

FPP-012-02-RAB305-324, Reactor Auxiliary Building Elevations 305 and 324 Fire Pre-Plan

Section 1R07: Heat Sink Performance

Procedures:

EPT- 163, Generic Letter 89-13 Inspections

PLP- 620, Service Water Program (Generic Letter 89-13)

Section 1R08: Inservice Inspection (ISI) Activities

Procedures:

NDEP-0201, Liquid Penetrant Examination, Rev. 28

NDEP-0425, Ultrasonic Examination of Austenitic Pipe Welds (PDI), Rev. 8

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

54-151-367-11, Visual Examination for Leakage of Reactor Head Penetrations, Rev. 1/25/10

54-ISI-178-009, Ultrasonic Examination of Temper Bead Weld Repairs on PWR Upper Head Nozzles and BWR Lower Head Housings, Rev. 5/1/12

54-ISI-244-013, Liquid Penetrant Examination of Reactor Vessel Head Penetrations from the Inside Surface, Rev. 01/14/11
 54-ISI-245-03, Color Contrast Water Washable Liquid Penetrant Examination Procedure, Rev. 05/17/10
 54-ISI-356-02, Remote Visual Examination of Welds and Surface Conditions of CRDM Housing and Thermal Sleeves, Rev. 01/02/09
 54-ISI-356-02, Visual Inspection of Pressure Vessel Internals, Attachments and Internal Surfaces, Rev. 08/16/11
 54-ISI-460-003, Multi-Frequency Eddy Current Examination of Nozzle Welds and Regions, Rev. 03/17/2011
 54-ISI-493-005, Multi-Frequency Rotating Eddy Current Examination of Thick-Walled Tubular Products, Rev. 05/21/11
 54-ISI-603-006, Penetration UT Using Blade Probes, Rev. 1/25/12
 54-ISI-604-011, Open Penetrations- Rotating Head, Rev. 1/25/12

Calculations:

HNP-M/MECH-1091, Effective Degradation Years for Reactor Vessel Head, Rev. 5

Corrective Action Documents:

AR #533264, CRDM Penetration 38 Ultrasonic Exam Results
 AR #533268, CRDM Penetration 29 Ultrasonic Exam Results
 AR #533289, CRDM Penetration 35 Ultrasonic Exam Results
 AR #533305, CRDM Penetration 59 Ultrasonic Exam Results
 AR #533323, CRDM Penetration 63 Ultrasonic Exam Results
 AR #533365, CRDM Penetration 58 Ultrasonic Exam Results
 AR #499683, ISI HNP 11-017 10CFR50.55A Memo Contains Typo
 AR #498707, RFO-16 ISI Outage Report Not Submitted to Doc Control
 AR #435175, ISI Outage Report Not Submitted IAW ISI-100 Time Requirement
 AR #423792, IWE/IWL Program Not Maintained to Current Requirements
 AR #526910, Missing ISI Data Packages
 AR #483468, 'A' CSIP Outboard Seal Boron Accumulation
 AR #441541, 2SF-8 Has Boric Acid Leakage Past its Gasket

Other:

Drawing No. 02-9175500E, Shearon Harris CRDM ID Temper Bead Weld Repair, Rev. 000
 Magnetic Particle (MT) Examination Record Sheet of the PZR Support Bracket II-PZR-01SBW-A1A

Magnetic Particle (MT) Examination Record Sheet of the Pressurizer (PZR) Support Bracket II-PZR-01SBW-A1B

Progress Energy NDE Examiner Certification Review (Hacker), dated 4/18/12

Progress Energy NDE Examiner Certification Review (Jasken), dated 4/18/12

RPV Head CRDM Nozzle UT Data Sheet (Pre-Repair) No. 570-00-UT-17

RPV Head CRDM Nozzle UT Data Sheet (Pre-Repair) No. 570-00-UT-38

RPV Head CRDM Nozzle UT Data Sheet (Pre-Repair) No. 570-00-UT-5

RPV Head CRDM Nozzle UT Data Sheet (Pre-Repair) No. 570-00-UT-63

RPV Head CRDM Nozzle Weld Repair UT Data Sheet No. 570-00-UT-17

RPV Head CRDM Nozzle Weld Repair UT Data Sheet No. 570-00-UT-38

RPV Head CRDM Nozzle Weld Repair UT Data Sheet No. 570-00-UT-5

RPV Head CRDM Nozzle Weld Repair UT Data Sheet No. 570-00-UT-63
 Ultrasonic (UT) Examination/Calibration Record Sheets of the PZR Nozzle Inside Radius
 section II-PZR-01NIR-10
 Work Order 00198182 Replace PZR Steam Space Vent Isolation VLV B
 Vision Test Report (Bingel), dated 8/8/10
 WCAP-16911-P, Thermal Sleeve Wear, Rev. 0
 Code-Case N-729-1, Alternative Examination Requirements for PWR Reactor Vessel Upper
 Heads with Nozzles Having Pressure-Retaining Partial Penetration Welds Section XI, Division I,
 Approval Date 03/28/06
 TB-07-2, Westinghouse Technical Bulletin Thermal Sleeve Wear, Rev. 1

Section 1R11: Licensed Operator Requalification Program

OPS-NGGC-1000, Fleet Conduct of Operations
 AOP- 001, Malfunction of the Rod Control and Indicating System
 JITT Package for Reactor Shutdown
 JITT Package for Reactor Startup

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
 OMM-001, Operations Administrative Requirements
 OPS-NGGC-1000, Fleet Conduct of Operations
 OPS-NGGC-1311, Protected Equipment
 ADM-NGGC-0006, Online Equipment out of Service (EOOS) Models for Risk
 Assessment

Section 1R15: Operability Evaluations

OPS-NGGC-1305, Operability Determinations

Section 1R20: Refueling and Outage Activities

FHP-020, Refueling Operations
 FHP-014, Fuel and Insert Shuffle Sequence
 FHP-010, Core Loading Verification
 AOP-020, Loss of RCS Inventory or Residual Heat Removal While Shutdown
 AP-013, Plant Nuclear Safety Committee
 ESR 9500808, Removable Equipment Hatch Cover Bolting Requirements
 GP-006, Normal Plant Shutdown
 GP-007, Normal Plant Cooldown
 GP-008, Draining the RCS
 OMP-003, Outage Shutdown Risk Management
 OMP-004, Control of Plant Activities During Reduced Inventory Conditions
 OST-1091, Containment Closure Test Weekly Interval During Core Alterations and Movement
 of Irradiated Fuel Inside Containment
 HNP-C/STRU-1117, IRVH Load Drop Analysis

Section 1R22: Surveillance Testing

WO #2074727, 1FW-158, Failed OST-1869 with Greater than 60 GPM Leakage

ISI-801, ISI Testing of Valves

WO #1833044, Disassemble and Inspect 1FP-349 (Inside CIV for the Fire Protection Fire Water Supply)

WO #1857906, Replace 1FP-349

Section 2RS1: Radiological Hazard Assessment and Exposure ControlsProcedures, Guidance Documents, and Manuals:

HPS-NGGC-0003, "Radiological Posting, Labeling and Surveys", Rev. 15

AP-535, "Performing Work in Radiological Control Areas", Rev. 27

AP-504, "Administrative Controls for Locked and Very High Radiation Areas", Rev. 32

HPS-NGGC-0024, "Alpha Monitoring Guidelines", Rev. 4

HPP-800, "Handling Radioactive Material", Rev. 56

CAP-NGGC-0200, "Condition Identification and Screening Process", Rev. 34

Records and Data:

Radiological Control Planning Valve Breach Checklist, 1RH-20

RWP 5885, Valve Work in Higher Dose Areas

RWP 5896, Valve Work in Low Dose Areas (BOP)

RWP 6353, "A" RHR Motor/Pump Replacement

RWP 5863, Operations Activities Balance of Plant

RWP 5876, Rx Head/Core Barrel Lift & Set

Radiological Survey 0501-24, 1CS-10 Valve Breach

Radiological Survey 0503-037, Setup Associated with "A" RHR Work

Radiological Survey 0501-034, VCT Room

Radiological Survey 0504-008, VCT Valve Gallery

Radiological Survey 0506-011, VCT Valve Gallery

Radiological Survey 0503-036, Pull "A" RHR Pump and Move to 216'

Radiological Survey HNP-M-20120221-2, Quarterly Survey of RAB 216'

Radiological Survey 0409-014, RAB 216' Quarterly Routine

Air Sample Survey AS-20120512-001, Under Rx Head

Air Sample Survey AS-20120512-004, Under Rx Head

Air Sample Survey AS-20120512-011, Under Rx Head

Air Sample Survey AS-20120512-006, Under Rx Head

Leak Testing of Sealed Sources - Leak Test Summary, 10/24/11, 4/27/12

CAP Documents:

QHSA – Radiological Hazard Assessment and Exposure Controls, 5/11/11

NCR 00534000

NCR 00503550

NCR 00513412

NCR 00518630

Section 2RS2: Occupational ALARA Planning and Controls

Procedures and Guidance Documents:

HNP Plant Operating Manual, AP-530, "ALARA", Rev. 15
 ADM-NGGC-0105, "ALARA Planning", Rev. 10
 CAP-NGGC-0200, "Condition Identification and Screening Process", Rev. 34
 CAP-NGGC-0201, "Self-Assessment/Benchmark Programs", Rev. 17
 CAP-NGGC-0202, "Operating Experience and Construction Experience Program", Rev. 20
 CAP-NGGC-1000, "Conduct of Performance Improvement", Rev. 6
 EGR-NGGC-0201, "Incorporation of ALARA for Engineering and Design Work", Rev. 4
 HPS-NGGC-0019, "Conduct of Radiological Briefings", Rev. 3
 MNT-NGGC-0003, "Radiation Shielding Use", Rev. 14

Records and Data Reviewed:

ALARA Work Plan 2030 for RWP 11-5877, R17 Seal Table Maintenance Activities
 ALARA Work Plan 2021 for RWP's 11-5875/5876/6507, RFO-17 Reactor Headwork / Refueling
 ALARA Work Plan 2015 for RWP's 11-5871/5885/5896/5879, Miscellaneous Valve Repair, AOV's and MOV's
 ALARA Work Plan 2044 for RWP 11-6433/6434, Reactor Head Repair R17
 ALARA Work Plan 10-033 for RWP 10-5557, R16 Seal Table Maintenance Activities {initial, in-progress reviews, multiple revisions, and post-job critique}
 ALARA Work Plan 10-022 for RWP 10-5537/5685, Alloy 600 Reactor Vessel Nozzle Mitigation {initial, revision 1, and post-job critique}
 ALARA Work Plan 10-007 for RWP 10-5555/5556, RFO-16 Reactor Headwork / Refueling {initial, in-progress review, revision 1, and post-job critique}
 Current Source Term Reduction {status through April 2012}
 Crudburst/Clean Up and Trending Point Data {RFO14 through RFO16}, April 2012
 HNP ALARA Committee Meeting Minutes, 1/26/12
 HNP ALARA Committee Meeting Minutes {DRAFT}, 2/29/12
 HNP ALARA Committee Meeting Minutes {DRAFT}, 3/26/12
 HNP Five Year Dose Reduction Plan 2011-2015
 Memo, Subject: 2012 On-line and Outage Dose Budget {Approval}, 2/24/12
 Radiological Survey Record 0507-008, RV Head Repair Area
 Radiological Survey Record 0508-006, Head Stand Bull Pen
 Radiological Survey Record 0508-031, RCB 286' Head Stand
 Radiological Survey Record 0509-012, Elevated Head Stand Bullpen
 Radiological Survey Record 0509-021, Elevated Head Stand Bullpen
 Radiological Survey Record 0514-012, Elevated Head Stand Bullpen
 Report, 'HNP Outage Daily Radiological Status' for 5/3/12, 5/14/12
 Report, "HNP ALARA Review WO Tasks With Actuals", 5/4/12
 RWP / ALARA Tasks {cross reference} report
 RWP 11-6434, Reactor Head Repair Support Activities
 RWP 11-6433, Underhead Repair RFO-17 SOER 01-1
 R17 Scope Summary
 Vendor Task Breakdown and Exposure Estimates for Reactor Head Penetration Repair of 3 CRDM Nozzles, 2/22/12 DRAFT
 2011 On-Line Dose Performance

Corrective Action Program Documents:

AR 509855, Industry Operating Experience - Unplanned Personnel Exposures From Highly Radioactive In-Core Components
 AR 480170, Quick Hit Self Assessment – R16 ALARA Work Plan Reviews
 AR 458279, Quick Hit Self Assessment – Potential Trend Evaluation of Keywords DOSGOAL and ALARA
 NCR 429016, AWP 10-033 FPR Seal Table Requires Additional Dose
 NCR 430992, High Accumulated Dose During Seal Table Activities in R-16
 NCR 441854, R16 Seal Table Maintenance Activities, Quick Cause Evaluation Report
 NCR 448637, Clearance Order Activity Reviews
 NCR 518630, Deficiencies exist in development and implementation of radiological control plans and RP job coverage in the field
 NCR 527234, “C” Incore Detector Contingency Planning

Section 2RS3: In-Plant Airborne Radioactivity Control and MitigationProcedures, Guidance Documents, and Manuals:

AP-512, “Use of Respiratory Protection Equipment”, Rev. 35
 HPP-630, “Respiratory Protection”, Rev. 25
 HPP-631, “Certification and Operation of Breathing Air Supplies”, Rev. 25
 HPP-730, “Operation of Portable Ventilation Units and Vacuums”, Rev. 16
 EPM-420, “Emergency Equipment Inventory”, Rev. 10
 OP-168, “Containment Ventilation and Vacuum Relief”, Rev. 32
 Radiation Protection Technical Report 07-001, “Pressure Drop Test for Delta Suits”, Rev. 0
 Radiation Protection Technical Report 08-001, “Alarm Setpoints for AMS-4 Continuous Monitors”, Rev. 0
 CAP-NGGC-0200, “Condition Identification and Screening Process”, Rev. 34

Records and Data:

Compressed Air/Gas Quality Testing, Eagle Air Compressor, 6/3/11, 1/6/12
 Compressed Air/Gas Quality Testing, Service Air Compressor, 6/3/11, 1/6/12
 Grade D Certification and Radioisotope Testing of Breathing Air, LSR-16 Compressor, 5/4/12
 Grade D Certification and Radioisotope Testing of Breathing Air, LSR-16 Compressor, 5/12/12
 Grade D Certification and Radioisotope Testing of Breathing Air, Equipment Hatch Temporary Compressor, 5/12/12
 TEDE ALARA Evaluation, RWP 6433, 5/11/12
 TEDE ALARA Evaluation, RWP 6433, 5/12/12
 HNP EP Duty Roster, 4/23/12 – 5/21/12
 Respirator Qualifications by Worker for HNP, Maintenance, Health Physics, and Operations
 Percent Penetration and Bypass Leakage Test Record, UTC# 2140527 and 2140528, 2/21/12
 SCBA PosiChek3 Test Results, Regulator NH0305053, 6/16/11
 SCBA PosiChek3 Test Results, Regulator NH0305036, 6/16/11
 SCBA PosiChek3 Test Results, Regulator 0412020408HH, 12/6/11

CAP Documents:

QHSA – In-Plant Airborne Radioactivity Control and Mitigation
 NCR 00530290
 NCR 00536418
 NCR 00536141
 NCR 00535920
 NCR 00537696

Section 2RS4: Occupational Dose AssessmentProcedures and Guidance Documents:

HNP Plant Operating Manual, HPP-086, "Use of an Alternative Method to Determine Effective Dose Equivalent from External Radiation", Rev. 0
 HNP Plant Operating Manual, HPP-625, "Performance of Radiological Surveys", Rev. 36
 DOS-NGGC-0001, "Dosimetry Records Management", Rev. 14
 DOS-NGGC-0002, "Dosimetry Issuance", Rev. 27
 DOS-NGGC-0004, "Administrative Dose Limits", Revision Rev. 12
 DOS-NGGC-0005, "Skin Dose from Contamination", Rev. 12
 DOS-NGGC-0006, "Personnel Exposure Investigations", Rev. 14
 DOS-NGGC-0007, "Internal Dose Investigations", Rev. 13
 DOS-NGGC-0008, "In-Vitro Bioassay", Rev. 12
 DOS-NGGC-0010, "Area Thermoluminescent Dosimeter Process", Rev. 9
 DOS-NGGC-0016, "MGP Electronic Personal Dosimeter (EPD) Configuration Control" Rev.17
 DOS-NGGC-0017, "Electronic Personal Dosimeter (EPD) Remote Monitoring System Configuration", Rev. 4
 DOS-NGGC-0021, "Whole Body Counter (WBC) System Operation", Rev. 19
 HPS-NGGC-0013, "Personnel Contamination Monitoring, Decontamination, and Reporting", Rev. 14
 HPS-NGGC-0024, "Alpha Monitoring Guidelines", Rev. 4

Records and Data Reviewed:

Dosimetry Technical Report 95-04, "Personnel Contamination Monitor Sensitivity to Internal Gamma Emitting Radionuclides at HNP", 7/15/95
 Dose Rate Profile under Rx Head for EDEX calculations
 Gamma Scan # 12-0843, Gamma Spectroscopy analysis of particle for PCE# 12-003
 Gamma Scan # 12-0895, Gamma Spectroscopy analysis of particle for PCE# 12-005
 Health Physics Shift Log {log entry for exit monitor alarm @ security exit point (PCE# 12-003)}, 4/23/12
 Memo, Evaluation of Area TLD Results - Fourth Quarter 2011, 2/29/12
 NVLAP Scope of Accreditation to ISO/IEC, 10/1/2011 – 9/30/2012
 NVLAP On-Site Assessment Report, 3/20/2012
 Part 61 Sample Data Loading Form, HNP DAW (D-18), 5/10/11
 Passport Report – TLD/ED Differences {TLD/ED >25 percent different}, 9/1/2011-12/31/2011 and 1/1/2012-4/30/2012
 Personnel Contamination Event (PCE) Records: PCE # 10-011, 10-016, 12-002, 12-003, 12-004, 12-005, and 12-016.
 Radiation Protection Technical Report 05-003, "Radiation Emitted by Harris Nuclear Plant Dry Active Waste", Rev. 0

Radiation Protection Technical Report 08-002, "RCA Exit Monitor Internal Contamination Sensitivities", Rev. 0, 5/20/08
 Radiation Protection Technical Report 07-003, "Alpha Monitoring", Rev. 0, 12/6/07
 Radiological Survey Record 0423-030, Follow-up Survey for PCE 12-003
 Radiological Survey Record 0423-032, Follow-up Survey for PCE 12-003
 Report of ED vs. TLD for the period 1/1/1996-8/30/2011
 Report, EDEX Doses as of 0230 5/14/12 {individual EDEX totals 5/5-5/14/12}
 Report, Functions of the "RVH EDEX Calcs.xlsm" Spreadsheet, Rev. 0, 4/23/12
 Report of HNP Worker Dose Totals – Total TEDE Annual, for the period 1/1/11-12/31/11 and 1/1/12-5/1/12
 Scaling Factor Verification Form, 3R-STAT Analysis, Analysis period: Cycle-17; October 1 – December 31, 2011
 Selected Whole Body Count Records, 12/2011-5/2012
 Software Quality Assurance Documentation, CRTN# 528337, "RVH EDEX CALCS Excel Spreadsheet" Version 4/3/12
 Personnel Exposure Investigation (PEI), PEI # 4584, EDEX Multi-pack #3633
 Personnel Exposure Investigation (PEI), PEI # 4585, EDEX Multi-pack #3634
 Personnel Exposure Investigation (PEI), PEI # 4634, EDEX Multi-pack #3652
 Personnel Exposure Investigation (PEI), PEI # 4652, EDEX Multi-pack #3670
 Personnel Exposure Investigation (PEI), PEI # 4682, EDEX Multi-pack #3681
 Personnel Exposure Investigation (PEI), PEI # 4676, EDEX Multi-pack #3682
 Personnel Exposure Investigation (PEI), PEI # 4721, EDEX Multi-pack #3717
 Plot of 2012 HNP EDEX_{EPD} vs. EDEX_{TLD} Results, 5/16/12

Corrective Action Program (CAP) Documents:

NCR 509717, TLD not turned in to RP
 NCR 526874, ED put through x-ray machine
 NCR 429122, Personnel Contamination Event, facial contamination
 NCR 536403, Personnel Contamination Event, skin contamination due to glove puncture
 NCR 534227, Incorrect source ID numbers on HNP WBC documentation
 NCR 539354

Section 2RS5: Radiation Monitoring Instrumentation

Procedures and Guidance Documents:

SIC-700, Operation and Certification of Calibration Standards, Rev. 12
 RCP-704, Operation of the Genie Gamma Spectroscopy System, Rev. 5
 RCP-703, Calibration and Quality Control Set-Up of the Genie Gamma Spectroscopy System, Rev. 9
 CHE-NGGC-0200, Radiochemistry Quality Assurance/Quality Control Program, Rev. 6
 CRC-821, Post Accident Sampling, Rev. 31
 PLP-201, Emergency Procedure, Rev. 57
 PEP-260, Activation and Operation of the Operations Support Center, Rev. 12
 PEP-330, Radiological Consequences, Rev. 9
 PEP-342, Core Damage Assessment, Rev. 4
 DOS-NGGC-0019, "Whole Body Counter (WBC) Inter-comparison Testing", Rev. 8
 DOS-NGGC-0020, "Whole Body Counter (WBC) System Calibration", Rev. 10
 MST-I0327, Waste Monitor Tanks and Waste Evaporator Condensate Tanks Discharge
 Radiation Monitor REM-21WL-3541 Calibration, Rev.13

MST-I0376, Plant Vent Stack Accident Monitor RM-21AV-3509-1SA Calibration, Rev.20
 PIC-I906, Liquid Radiation Monitor Assembly Numbers 0352-2601-01 and 0352-2901-01
 Calibration, Rev.11

Records and Data Reviewed:

WO 01575509 01, Perform Maintenance Surveillance Test "(MST)-I0376, Radiation Monitoring System (RMS),RM-21AV-3509-1SA, Plant Vent Stack Accident Monitor Channel Calibration, 05/05/2011
 WO 01976534 01, Perform PIC-I930, Inspect & Calibrate Control Room Area Monitor, 10/07/2011
 WO 00100575 01, Perform PIC-I930, Inspect & Calibrate Control Room Area Monitor, 10/07/2011
 WO 01541690 01, Perform MST-I0347, RMS Containment Ventilation Isolation Monitor RM-01CR3561ASA Calibration, 11/03/2010
 WO 01146776 01, Perform MST-I0347, RMS Containment Ventilation Isolation Monitor RM-01CR3561ASA Calibration, 05/10/2009
 WO 01720895, Perform MST-I0327, Waste Monitor Tanks Discharge Monitor REM-21WL-3541 Calibration, 12/02/2011
 WO 00739784 01, Perform PIC-I906 – Calibration of General Atomic Liquid Radiation Monitor Assembly REM-01BD-3527, 08/17/2007
 WO 01179632 01, Perform PIC-I906 – Calibration of General Atomic Liquid Radiation Monitor Assembly REM-01BD-3527, 08/17/2007
 WO 01854241 01, Perform MST-I0403, Radiation monitoring System Monitor RM-01CR-3590SB, Containment High Range Accident Monitor Calibration, 04/26/2012
 WO 01984549 01, REM-3520 Tank Area Drain Falsely Indicates Sample Flow, 10/06/2011
 WO 01949931 01, RM-01CZ-350BSB, MCR Normal Outside Air Intake Rad Monitor Lost Communication with the RM – 23 in the MCR,
 WO 02001933 01, FT-3536 Would Not Pass Calibration Check in MST I0339, 11/02/2011
 Work Request No. 86-AKBT1, Initial Calibration of Steam Gen Blowdown RMS, REM-01BD-3527, 6/26/86
 Radiation Surveillance Test, RST-011, Primary Calibration of RD-53 Liquid Radiation Monitor REM-21WL-3541, Waste Monitor Tank Discharge, 7/3/86
 Radiation Surveillance Test, RST-012, Primary Calibration of GA Technologies Gaseous Radiation Monitors RM-21AV-3509-1SA, Plant Vent Stack WRGM, 11/14/86
 Validation Test for Hopewell BX3 Irradiator, 01/16/2012
 ESR 00-00293, REM 3509-1SA Chlorine Source Replacement
 Supplement to ESR 00-00293, 6/20/12
 Calibration Report, Model BX-3 Box Irradiator, 12/04/2011
 Gamma Spectroscopy System Number 2 Quality Assurance Data, October 1, 2012, through May 1, 2012 including: FWHM 122 keV, 779 keV and 1408 keV Peaks; and Decay Corrected Activity
 Cronos 4 Calibration Record, Serial Number (S/N) 0912-138, 09/29/2011
 SAM 9/11 Calibration Record, SN 154, 07/11/2011
 LMC-177 Calibration Record, S/N 19641, 04/24/2011
 LMC-177 Calibration Record, S/N 45576, 4/22/2012
 ARGOS 5WBAB Calibration Record, S/N 1111-168, 04/20/2012
 AMS-4 Calibration Record, S/N 1135, 01/04/2012
 AMS-4 Calibration Record, S/N 1360, 04/22/2012

4-SPM Calibration Record, S/N 90682, 03/06/2012
 Instrument Source Check Failure Forms, January 1, 2010, through May 1, 2012
 System Health Report HNP, Unit 1, 7005/2105 – Rad Monitoring/GFFD, Q1-2012, Q4 – 2011
 Radiation Protection Technical Report 05-003. Radiation Emitted by Harris Nuclear Plant Dry
 Active Waste, Rev. 0
 WBC Stand-up No.1, Inter-comparison Results, 8/25/11
 WBC Stand-up No.1, Calibration Record, 8/25/11
 WBC Stand-up No.1, Quality Control Check Records: 1/12/12, 1/30/12, 2/29/12, 4/18/12,
 4/20/12, 4/23/12, 4/26/12, 5/1/12

Corrective Action Program (CAP) Documents:

NCR 00464887, QHSA- Radiation Monitoring Instrumentation,
 NCR 00464261, Periodic RM 3504BSB Detector Spikes
 NCR 00474176, RM-23 for RM-01CZ-3504BSB Has Lost Communication
 NCR 00474664, Communication Failure for RM-3504B-SB
 NCR 00528213, Monitor Alarms REM-01TV-3534 Loss of Sample Flow
 NCR 00489407, RM-3530 Tank Area Drain Falsely Indicates Sample Flow
 NCR 00497278, The Collector Box for FT-01TV-3536 In TP 261' Reads Too High
 NCR 00519074, RM-1WV-3547-1, Loss of Flow Control
 NCR 00467288, 3547-1 Loss of Process Flow
 NCR00466894, REM-3544 for WPB CCW Went into High Alert
 NCR 00477904, REM-1FL-3508BSB, Los of Sample Flow, Channel OOS
 NCR 00477569, PM Calibration Task Deleted for Run-To-Failure Rad Monitors
 NCR 00474314, RM-23 for RM-01CZ-3504BSB Has Lost Communication
 NCR 00469779, REM 3546 Stack PIG High Activity
 NCR 506886, Whole Body Counter Out of Service due to Electronics Failure
 NCR 183653
 NCR 537505

Section 40A1: Performance Indicator Verification

REG-NGGC-0009, "NRC Performance Indicators and Monthly Operating Report Data", Rev. 11
 DRDE 503400, Alarm message when returning ED
 2011 Annual Radioactive Effluent Release Report
 120012.002.005.L, Liquid Waste Release Permit
 120058.011.013.G, Gaseous Waste Release Permit
 NCR 440301, Alarm message when returning ED
 NCR 502426, Dose rate alarms during source transfer
 NCR 506032, Dropped ED, dose rate alarm when logging out
 NCR 507157, Dose rate alarm when logging out of RCA
 NCR 522035, Dose rate alarm when logging out of RCA
 NCR 531834, Dose rate alarm while performing walk down in RHR pump room
 NCR 533340, Dose and dose rate alarm on transmitting ED while in dress out area
 NCR 00536849
 NCR 00480784

Section 40A7: Licensee Identified Violations

AP-545, "Containment Entries", Rev. 46

HPS-NGGC-0019, "Conduct of Radiological Briefings", Rev. 3

PLP-511, "Radiation Control and Protection Program", Rev. 25

Radiation Protection Shift Order 12-006, Containment Bio-shield Entries with the Reactor Critical

Reactor Power Trend, 6/6/12

Dose Rates Inside Bioshield, RCB 236' S/G Hot Legs, Versus Reactor Power

Radiological Survey 0606-039, Repair Conduit on "A" RCP Platform

Radiological Survey 0605-048, Walkdown Inside Bioshield

Radiological Survey 0605-049, Walkdown Inside Bioshield

AR 541773

Section 40A1: Performance Indicator Verification

NEI 99-02, Regulatory Assessment Performance Indicator Guideline

Calculation HNP-F/PSA-0068, NRC Mitigating System Performance Index Basis Document for Harris Nuclear Plant

Section 40A2: Identification and Resolution of Problems

CAP-NGGC-0200, Condition Identification and Screening Process

CAP-NGGC-0205, Condition Evaluation and Corrective Action Process

CAP-NGGC-0206, Performance Assessment and Trending