



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

November 7, 2017

Ms. Tanya Hamilton  
Site Vice President  
Shearon Harris Nuclear Power Plant  
M/C HNP01  
New Hill, North Carolina 27562-0165

**SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT – NUCLEAR REGULATORY  
COMMISSION INTEGRATED INSPECTION REPORT 05000400/2017003**

Dear Ms. Hamilton:

On September 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Shearon Harris Nuclear Power Plant, Unit 1. On October 12, 2017, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspectors documented a licensee-identified violation, which was determined to be of very low safety significance, and an NRC-identified Severity Level IV violation in this report. The NRC is treating these violations as non-cited violations (NCVs), consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; and the NRC resident inspector at the Shearon Harris Nuclear Power Plant.

T. Hamilton

2

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

*/RA/*

Steven D. Rose, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

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

Enclosure:  
IR 05000400/2017003  
w/Attachment: Supplemental Information

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COMMISSION INTEGRATED INSPECTION REPORT 05000400/2017003  
November 7, 2017

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 50-400

License Nos.: NPF-63

Report No.: 05000400/2017003

Licensee: Duke Energy Progress, LLC

Facility: Shearon Harris Nuclear Power Plant, Unit 1

Location: 5413 Shearon Harris Road  
New Hill, NC 27562

Dates: July 1, 2017 through September 30, 2017

Inspectors: J. Zeiler, Senior Resident Inspector  
A. Patz, Resident Inspector  
M. Donithan, Operations Engineer (Section 1R11.3)  
S. Shah, Operations Engineer (Section 1R11.3)  
R. Kellner, Senior Health Physicist (Sections 2RS7, 4OA1)  
J. Panfel, Health Physicist (Section 2RS6)  
W. Pursley, Health Physicist (Section 2RS8)  
J. Rivera, Health Physicist (Section 2RS1)  
S. Sanchez, Senior Emergency Preparedness Inspector  
(Sections 4OA2, 4OA7)  
J. Hickman, Emergency Preparedness Inspector (Sections 4OA2,  
4OA7)

Approved by: Steven D. Rose, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

Enclosure

## SUMMARY

Integrated Inspection Report 05000400/2017003; July 1, 2017, through September 30, 2017; Duke Energy Progress, LLC, Shearon Harris Nuclear Power Plant, Unit 1, Problem Identification and Resolution.

The report covered a three-month period of inspection by resident inspectors and regional inspectors. There was one NRC-identified violation documented in this report. The significance of inspection findings are indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," (SDP) dated April 29, 2015. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated November 1, 2016. The NRC's program for overseeing the safe operations of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Emergency Preparedness

Severity Level IV. The NRC identified a Severity Level (SL) IV non-cited violation (NCV) of 10 CFR 50.9, "Completeness and accuracy of information," for failure to provide complete and accurate information for prior approval of a new emergency action level (EAL) scheme. The documents submitted to the NRC were, "Shearon Harris Nuclear Power Plant, Unit 1 Changes to the Emergency Action Level Scheme," dated April 25, 2010, and "License Amendment Request to Adopt Emergency Action Level Scheme Pursuant to NEI 99-01, Revision 6," dated April 30, 2015. The submitted documents specified the licensee's EAL scheme for Category F – Fission Product Barrier EAL, which contained declaration EAL threshold values for the containment high range radiation monitor that were lower than the correct values due to use of an improper calculation methodology. The calculation methodology that was used was not in accordance with the license. It was used to calculate the loss of fuel clad barrier and potential loss of containment threshold values. The licensee implemented compensatory corrective actions by issuing Standing Instruction 2017-017 to inform operators and emergency response organization decision-makers of the proper application of the EAL scheme and appropriate threshold values to be implemented. Additionally, the licensee plans to submit a license amendment request to update the EAL scheme. The licensee entered this violation into their corrective action program (CAP) as nuclear condition report (NCR) 02155272.

The inspectors evaluated the underlying technical issue and determined that the licensee's failure to maintain the effectiveness of its emergency plan was a performance deficiency. The issue was documented as a Green licensee-identified violation (LIV) in Section 40A7 of this report. The reactor oversight process (ROP), significance determination process, does not specifically consider the regulatory process impact in its assessment of licensee performance. Therefore, it was necessary to address this violation which impeded the NRC's ability to regulate, using traditional enforcement to adequately deter non-compliance. Using the NRC Enforcement Policy, Section 2.3.11, "Inaccurate and Incomplete Information," and Section 6.9, "Inaccurate and Incomplete Information or Failure to Make a Required Report," this issue was determined to be a SL IV violation. Though the NRC would have questioned the issue with a request for additional information, it would not have resulted in substantial further inquiry.

Additionally, the associated technical violation was determined to be of very low safety significance. Traditional enforcement violations are not assessed for cross-cutting aspects. (Section 4OA2.2).

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

## REPORT DETAILS

### Summary of Plant Status

Unit 1: The unit operated at or near 100 percent rated thermal power until September 28, 2017, when a planned downpower to 30 percent power was initiated to repair a condenser tube leak. The downpower was halted at 71 percent due to an unexpected urgent failure alarm in the rod control system. On September 30, 2017, following resolution of the rod control system problem, the plant was returned to essentially full power operation.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R01 Adverse Weather Protection (71111.01 – 2 samples)

##### a. Inspection Scope

##### .1 Impending Adverse Weather Conditions

The inspectors reviewed the licensee's preparations to protect risk-significant systems from adverse weather conditions expected during the following events:

- Tornado watch/warning on September 8, 2017
- Hurricane Irma during September 7-11, 2017

The inspectors evaluated the licensee's implementation of adverse weather preparation procedures and compensatory measures, including operator staffing, before the onset of and during the adverse weather conditions. The inspectors reviewed the licensee's plans to address the ramifications of potentially lasting effects that may result from the adverse weather conditions. The inspectors verified that operator actions specified in the licensee's adverse weather procedure maintain readiness of essential systems. The inspectors verified that required surveillances were current, or were scheduled and completed, if practical, before the onset of anticipated adverse weather conditions. The inspectors also verified that the licensee implemented periodic equipment walkdowns or other measures to ensure that the condition of plant equipment met operability requirements. Documents reviewed are listed in the Attachment.

##### .2 Readiness to Cope with External Flooding

The inspectors evaluated the licensee's implementation of flood protection procedures and compensatory measures during impending conditions of flooding or heavy rains. The inspectors reviewed the updated final safety analysis report (UFSAR) and related flood analysis documents to identify those areas containing safety related equipment that could be affected by external flooding and their design flood levels. The inspectors walked down flood protection barriers, reviewed procedures for coping with external flooding, and reviewed corrective actions for past flooding events. The inspectors verified that the procedures for coping with flooding could reasonably be used to achieve the desired results. For those areas where operator actions are credited, the inspectors assessed whether the flooding event could limit or preclude the required actions. Documents reviewed are listed in the Attachment.

The inspectors conducted walkdowns of the following plant areas containing risk-significant structures, systems, and components that are below flood levels or otherwise susceptible to flooding:

- Diesel Fuel Oil Storage Building
- Reactor Auxiliary Building (RAB) 261' elevation and rooftops
- Emergency Service Water Intake Structure

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04 – 4 samples)

a. Inspection Scope

Partial Walkdown

The inspectors verified that critical portions of the selected systems were correctly aligned by performing partial walkdowns. The inspectors selected systems for assessment because they were a redundant or backup system or train, were important for mitigating risk for the current plant conditions, had been recently realigned, or were a single-train system. The inspectors determined the correct system lineup by reviewing plant procedures and drawings. Documents reviewed are listed in the Attachment.

The inspectors selected the following systems or trains to inspect:

- 'A' residual heat removal (RHR) system while 'B' RHR system was out of service for valve maintenance
- 'B' emergency diesel generator (EDG) while 'A' EDG was out of service for preventive maintenance
- Turbine-driven auxiliary feedwater (TDAFW) pump after maintenance outage
- 'A' start-up transformer (SUT), 'A' EDG, and 'B' EDG while 'B' SUT was out of service for scheduled modification

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05Q – 5 samples)

a. Inspection Scope

Quarterly Inspection

The inspectors evaluated the adequacy of selected fire plans by comparing the fire plans to the defined hazards and defense-in-depth features specified in the fire protection program. In evaluating the fire plans, the inspectors assessed the following items:



- control of transient combustibles and ignition sources
- fire detection systems
- water-based fire suppression systems
- gaseous fire suppression systems
- manual firefighting equipment and capability
- passive fire protection features
- compensatory measures and fire watches
- issues related to fire protection contained in the licensee's CAP

The inspectors toured the following fire areas to assess material condition and operational status of fire protection equipment. Documents reviewed are listed in the Attachment.

- 'A' and 'B' RHR heat exchanger rooms; RAB 236' elevation (fire zones 1-A-34-RHXA and 1-A-34-RHXB)
- 'A,' 'B,' and 'C' charging/high-head safety injection pump (CSIP) rooms; RAB 236' elevation (fire zones 1-A-3-PB and 1-A-BAL-H)
- 'B' EDG, and associated electrical, starting air, and fuel oil day tank rooms; 261' elevation (fire zones 1-D-1-DGB-RM, 1-D-DTB, 1-D-1-DGB-ASU, and 1-D-DGB-ER)
- Diesel Fuel Oil Storage Building (fire zones 1-O-PA, 1-O-PB, 5-O-BAL, 12-O-TA, 12-O-TB, and 5-O-YARD)
- 'A' and 'B' Emergency Service Water Pump Intake Structure (fire zones 12-I-ESWPA, 12-I-ESWPA-BAL, 12-I-ESWPB, and 12-I-ESWPB-BAL)

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

a. Inspection Scope

Underground Cables

The inspectors reviewed related flood analysis documents and inspected the areas listed below containing cables whose failure could disable risk-significant equipment. The inspector directly observed the condition of cables and cable support structures and, as applicable, verified that dewatering devices and drainage systems were functioning properly. In addition, the inspectors verified the licensee was identifying and properly addressing issues using the CAP. Documents reviewed are listed in the Attachment.

- Manhole M511A-SA
- Manhole M512A-SA
- Manhole M512C-SA
- Manhole M516A-SA
- Manhole M516C-SA

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance (71111.11 – 2 samples)

a. Inspection Scope

.1 Resident Inspector Quarterly Review of Licensed Operator Regualification

On August 23, 2017, the inspectors observed an evaluated simulator scenario administered to an operating crew as part of the annual requalification operating test required by 10 CFR 55.59, "Requalification." The simulator scenario involved a loss of cooling to station power transformer, a partially open pressurizer spray valve, failure of a steam generator pressure channel, followed by a faulted/ruptured steam generator.

The inspectors assessed the following:

- licensed operator performance
- the ability of the licensee to administer the scenario and evaluate the operators
- the quality of the post-scenario critique
- simulator performance

Documents reviewed are listed in the Attachment.

.2 Resident Inspector Quarterly Review of Licensed Operator Performance in the Actual Plant/Main Control Room

The inspectors observed licensed operator performance in the main control room during the following non-routine activities:

- Unexpected trip of the 'C' instrument air compressor on August 18, 2017
- Power reduction to 71 percent power for planned condenser tube leak repair on September 28, 2017
- Power ascension from 71 percent to full power following resolution of rod control problem on September 30, 2017

The inspectors assessed the following:

- use of plant procedures
- control board manipulations
- communications between crew members
- use and interpretation of instruments, indications, and alarms
- use of human error prevention techniques
- documentation of activities
- management and supervision

Documents reviewed are listed in the Attachment.

.3 Licensed Operator Requalification – Biennial (71111.11 – 1 sample)

The inspectors reviewed the facility operating history and associated documents in preparation for this inspection. During the week of August 7-11, 2017, the inspectors reviewed documentation, interviewed licensee personnel, and observed the administration of operating tests associated with the licensee's operator requalification program. Each of the activities performed by the inspectors was done to assess the effectiveness of the licensee in implementing requalification requirements identified in 10 CFR Part 55, "Operators' Licenses." The evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," and Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program." The inspectors also evaluated the licensee's simulation facility for adequacy for use in operator licensing examinations using ANSI/ANS-3.5-2009, "American National Standard for Nuclear Power Plant Simulators for Use in Operator Training and Examination." The inspectors observed two crews during the performance of the operating tests. Documentation reviewed included written examinations, Job Performance Measures, simulator scenarios, licensee procedures, on-shift records, simulator modification request records, simulator performance test records, operator feedback records, licensed operator qualification records, remediation plans, watchstanding records, and medical records. The records were inspected using the criteria listed in IP 71111.11. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12 – 2 samples)

a. Inspection Scope

The inspectors assessed the licensee's treatment of the issues listed below to verify the licensee appropriately addressed equipment problems within the scope of the maintenance rule (10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"). The inspectors reviewed procedures and records to evaluate the licensee's identification, assessment, and characterization of the problems as well as their corrective actions for returning the equipment to a satisfactory condition. The inspectors also interviewed system engineers and the maintenance rule coordinator to assess the accuracy of performance deficiencies and extent of condition. Documents reviewed are listed in the Attachment.

- NCR 02123384, 'B' EDG auxiliary lube oil pump failed to start
- NCR 02139306, Turbine digital electro-hydraulic (DEH) control and governor valve fluctuation

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 samples)

a. Inspection Scope

The inspectors reviewed the maintenance activities listed below to verify that the licensee assessed and managed plant risk as required by 10 CFR 50.65(a)(4) and licensee procedures. The inspectors assessed the adequacy of the licensee's risk assessments and implementation of risk management actions. The inspectors also verified that the licensee was identifying and resolving problems with assessing and managing maintenance-related risk using the CAP. Additionally, for maintenance resulting from unforeseen situations, the inspectors assessed the effectiveness of the licensee's planning and control of emergent work activities. Documents reviewed are listed in the Attachment.

- July 12, 2017, Review of 'C' CSIP outage
- July 28, 2017, Plant evolutions while turbine DEH is in manual control
- July 31, 2017, Emergent work activities associated with control rod urgent failure alarm
- August 15, 2017, 'B' SUT out of service for scheduled implementation of open phase monitoring modification
- September 13-14, 2017, Review of 'B' EDG maintenance outage

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 5 samples)

a. Inspection Scope

Operability and Functionality Review

The inspectors selected the operability determinations or functionality evaluations listed below for review based on the risk-significance of the associated components and systems. The inspectors reviewed the technical adequacy of the determinations to ensure that technical specification (TS) operability was properly justified and the components or systems remained capable of performing their design functions. To verify whether components or systems were operable, the inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR to the licensee's evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment.

- NCR 02134953, 'C' main transformer sudden pressure rise relay actuations
- NCR 02139306, Unexpected turbine governor valve movements due to speed control degradation

- NCR 02140194, Rod control system urgent failure alarm during manual control rod insertion
- NCR 02141557, Loss of local alarm panel function to the 'B' EDG
- NCR 02147993, Intermittent momentary losses of plant computer (ERFIS) function due to system communication interruptions

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)

a. Inspection Scope

The inspectors verified that the plant modification listed below did not affect the safety functions of important safety systems. The inspectors confirmed the modification did not degrade the design bases, licensing bases, and performance capability of risk significant structures, systems and components. The inspectors also verified modifications performed during plant configurations involving increased risk did not place the plant in an unsafe condition. Additionally, the inspectors evaluated whether system operability and availability, configuration control, post-installation test activities, and changes to documents, such as drawings, procedures, and operator training materials, complied with licensee standards and NRC requirements.

In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with the modification. Documents reviewed are listed in the Attachment.

- Engineering Change (EC) 407017, 'B' start-up transformer open phase fault detection and protection (permanent modification)

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 6 samples)

a. Inspection Scope

The inspectors either observed post-maintenance testing or reviewed the test results for the maintenance activities listed below to verify the work performed was completed correctly and the test activities were adequate to verify system operability and functional capability.

- Work Orders (WOs) 20009106, 20009107, and 20013806, Perform functional testing using OST-1804, RHR Remote Position Indication and Timing Test 18-Month Interval, following scheduled preventive maintenance on 'B' RHR heat exchanger outlet control valve 1RH-66, July 11, 2017
- WO 20187357, Perform functional testing using OP-104, Rod Control System, following emergent repair of 1BD rod control power, July 31, 2017

- WO 20025469, Perform check valve testing using PM-M0077 on TDAFW pump discharge check valve, 1AF-117, August 2, 2017
- WO 20139792, Post modification testing following implementation of open phase fault detection modification on 'B' SUT, August 15, 2017
- WO 201087575, Perform functional testing using MPT-M0035, EDG Overspeed Trip and Pneumatic Response Time, of the 'B' EDG following valve replacement, September 14, 2017
- WOs 12018384, 20036632, 20046150, 20165938, and 20187949, Perform functional testing using OST-1073, 1B-SB Emergency Diesel Generator Operability Test Monthly Interval Modes 1-6, of the 'B' EDG following preventive maintenance, September 14, 2017

The inspectors evaluated these activities for the following:

- Acceptance criteria were clear and demonstrated operational readiness
- Effects of testing on the plant were adequately addressed
- Test instrumentation was appropriate
- Tests were performed in accordance with approved procedures
- Equipment was returned to its operational status following testing
- Test documentation was properly evaluated

Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with post-maintenance testing. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 5 samples)

a. Inspection Scope

The inspectors reviewed the surveillance tests listed below and either observed the test or reviewed test results to verify testing adequately demonstrated equipment operability and met TS and licensee procedural requirements. The inspectors evaluated the test activities to assess for preconditioning of equipment, procedure adherence, and equipment alignment following completion of the surveillance. Additionally, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with surveillance testing. Documents reviewed are listed in the Attachment.

Routine Surveillance Tests

- OST-1092, 1B-SB RHR Pump Operability Quarterly Interval Modes 1-3
- OPT-1509, Turbine Trip Tests Quarterly Interval Modes 1 and 2
- EST-222, Procedure for the Type B LLRT of the Personnel Air Lock Barrel

In-Service Tests

- OST-1080, Auxiliary Feedwater Pump 1X-SAB Full Flow Test Quarterly Interval Mode 1, 3

RCS Leakage

- OST-1026, Reactor Coolant System Leakage Evaluation, Computer Calculation, Daily Interval, Modes 1-4

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 – 1 sample)a. Inspection Scope

The inspectors observed the licensed operator requalification examination conducted on August 23, 2017, that required implementation of emergency preparedness actions for the declaration of a Site Area Emergency. The inspectors observed licensee activities in the simulator to evaluate implementation of the emergency plan, including event classification and notification. The simulator scenario involved a faulted/ruptured steam generator. The inspectors evaluated the licensee's performance against criteria established in the licensee's procedures.

Additionally, the inspectors attended the post-exercise critique to assess the licensee's effectiveness in identifying emergency preparedness weaknesses and verified the identified weaknesses were entered in the CAP. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

## 2. RADIATION SAFETY

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 7 samples)a. Inspection Scope

Hazard Assessment and Instructions to Workers: During facility tours, the inspectors directly observed radiological postings and container labeling for areas established within the radiologically controlled area (RCA) of the Unit 1 auxiliary building 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 airborne radioactivity, gamma surveys with a range of dose rate gradients, surveys for alpha-emitters and other hard-to-detect

radionuclides, 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. The inspectors attended the pre-job briefing for radiography on the 'A' waste gas decay tank drain line and reviewed radiation work permit (RWP) details to assess communication of radiological control requirements and current radiological conditions to workers.

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. The inspectors discussed equipment sensitivity, alarm setpoints, and release program guidance with licensee staff. The inspectors also reviewed records of leak tests on selected sealed sources and discussed nationally tracked source transactions with licensee staff.

Hazard Control: The inspectors evaluated access controls and barrier effectiveness for selected High Radiation Area, Locked High Radiation Area (LHRA), and Very High Radiation Area (VHRA) locations and discussed changes to procedural guidance for LHRA and VHRA controls with radiation protection (RP) supervisors. The inspectors reviewed implementation of controls for the storage of irradiated material within the spent fuel pool. Established radiological controls, including airborne controls and electronic dosimeter (ED) alarm setpoints, were evaluated for selected work activities. In addition, the inspectors reviewed licensee controls for areas where dose rates could change significantly as a result of plant operations. The inspectors also reviewed the use of personnel dosimetry including extremity dosimetry and multi-badging in high dose rate gradients.

Radiation Worker Performance and RP Technician Proficiency: Occupational workers' adherence to selected RWPs and RP technician proficiency in providing job coverage were evaluated through direct observations and interviews with licensee staff. Jobs observed included radiography on the "A" waste gas decay tank drain line. The inspectors also evaluated worker responses to dose and dose rate alarms for selected work activities.

Problem Identification and Resolution: The inspectors reviewed and assessed condition reports associated with radiological hazard assessment and control. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also reviewed recent self-assessment results.

Inspection Criteria: RP activities were evaluated against the requirements of UFSAR Section 12, TS Section 6, 10 CFR Parts 19 and 20, 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 the Attachment.

b. Findings

No findings were identified.



## 2RS6 Radioactive Gaseous and Liquid Effluent Treatment: (71124.06 – 6 samples)

### a. Inspection Scope

Radioactive Effluent Treatment Systems: The inspectors walked down selected components of the gaseous and liquid radwaste processing and effluent discharge systems. To the extent practical, the inspectors observed and evaluated the material condition of in-place waste processing equipment for indications of degradation or leakage that could constitute a possible release pathway to the environment. Inspected components included the treated laundry and hot shower tank, the secondary waste sample tank, and the waste monitor and associated piping and valves. The inspectors interviewed licensee staff regarding equipment configuration and effluent monitor operation. The inspectors also walked down and reviewed surveillance test records for reactor building emergency exhaust filters.

Effluent Sampling and Discharge: The inspectors observed the collection and processing of gaseous effluent samples from waste processing building (WPB) vent stack, the turbine building vent stack, and the plant vent stack. Technician proficiency in collecting, processing, and preparing the applicable release permits was evaluated. The inspectors reviewed recent liquid and gaseous release permits including pre-release sampling results, effluent monitor alarm setpoints, and public dose calculations. For containment high range monitors and the plant vent stack accident monitor, the inspectors reviewed calibration and functional test records and evaluated traceability of radioactive calibration sources to National Institute of Standards and Technology standards. The inspectors also evaluated the licensee's capability to collect high-range post-accident effluent samples from these monitoring systems. The inspectors reviewed and discussed with licensee staff methodology for determining vent and stack flow rates and compared current vent flows to design values in the Offsite Dose Calculation Manual (ODCM).

The inspectors reviewed the 2015 and 2016 Annual Radioactive Effluent Reports to evaluate reported doses to the public, and to review any anomalous events and ODCM changes. The inspectors also reviewed compensatory sampling data for time periods when selected radiation monitors were out of service. The inspectors reviewed the results of interlaboratory cross-checks for laboratory instruments used to analyze effluent samples. The inspectors also reviewed licensee effluent source term characterizations and changes to effluent release points. In addition, the inspectors evaluated recent land use census results.

Problem Identification and Resolution: The inspectors reviewed and discussed selected CAP documents associated with gaseous and liquid effluent processing and release activities including licensee sponsored assessments. The inspectors evaluated the licensee's ability to identify and resolve issues.

Inspection Criteria: Radwaste system operation and effluent processing activities were evaluated against requirements and guidance documented in the following: 10 CFR Part 20; 10 CFR Part 50, Appendix I; ODCM; UFSAR Section 11; Regulatory Guide (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 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating

Compliance with 10 CFR Part 50, Appendix I;” and TS Section 6. Documents reviewed during the inspection are listed in the Attachment.

b. Findings

No findings were identified.

2RS7 Radiological Environmental Monitoring Program (REMP) (71124.07 – 3 samples)

a. Inspection Scope

REMP Implementation: The inspectors reviewed the 2015 and 2016 Annual Radiological Environmental Operating Reports and the 2015 and 2016 Annual Radioactive Effluent Release Reports. Selected environmental measurements were reviewed for consistency with licensee effluent data, evaluated for radionuclide concentration trends, and compared with detection level sensitivity requirements as described in the ODCM. The inspectors assessed the licensee’s response to any missed or anomalous environmental samples. The inspectors also reviewed the results of interlaboratory cross-checks for laboratory instruments used to analyze environmental samples. Any changes to the ODCM, Land Use Census, or environmental program processes were discussed with licensee staff.

The inspectors observed routine collection of airborne particulate and iodine air samples and verified placement of environmental dosimeters and surface water sampling equipment at selected locations as required by the licensee’s ODCM. The inspectors noted the material condition of the continuous air samplers, water samplers, and environmental dosimeters. The inspectors also reviewed calibration and maintenance records for the selected environmental sampling equipment.

Meteorological Monitoring Program: The inspectors observed the physical condition of the meteorological tower and its instrumentation and discussed equipment operability and maintenance history with licensee staff. The inspectors evaluated transmission of locally generated meteorological data to other licensee groups such as emergency operations personnel and main control room operators. Calibration records for the meteorological measurements of wind speed, wind direction, and temperature were reviewed. The inspectors also reviewed meteorological measurement data recovery for 2015 and 2016.

Ground Water Protection: The inspectors reviewed the licensee’s continued implementation of the industry’s Ground Water Protection Initiative (Nuclear Energy Institute (NEI) 07-07) and discussed any changes to the program. The inspectors discussed program guidance for dealing with spills, leaks, and unexpected discharges with licensee staff and reviewed recent monitoring well results and any voluntary communications. The inspectors also reviewed recent entries into the 10 CFR 50.75(g) decommissioning file. The inspectors reviewed and discussed the licensee’s program for monitoring of structures, systems, and components with the potential to release radioactive material to the environment. Potential effluent release points due to onsite surface water bodies were also evaluated.

Problem Identification and Resolution: The inspectors reviewed CAP documents in the areas of radiological environmental monitoring and meteorological tower maintenance. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

Inspection Criteria: The inspectors evaluated REMP implementation and meteorological monitoring against the requirements and guidance contained in: 10 CFR Part 20; Appendices E and I to 10 CFR Part 50; TS Section 5.0 and 6.8; Shearon Harris Nuclear Power Plant ODCM, Revision 27; UFSAR Chapter 11; RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment; Branch Technical Position, "An Acceptable Radiological Environmental Monitoring Program" – 1979; Safety Guide 23 "Onsite Meteorological Programs"; NEI 07-07, "Industry Groundwater Protection Initiative – Final Guidance Document"; and approved licensee procedures. Documents reviewed during the inspection are listed in the Attachment.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08 – 6 samples)

a. Inspection Scope

Radioactive Material Storage: The inspectors walked down indoor and outdoor areas inside the protected area as well as the WPB. During the walkdowns, the inspectors observed the physical condition and labeling of storage containers and the radiological postings for satellite radioactive material storage areas. The inspectors also reviewed the licensee's radwaste procedures for routine surveys and waste storage.

Radioactive Waste System Walkdown, Characterization and Classification: The inspectors walked down accessible sections of the liquid and solid radwaste systems which included inspection of the recent modification that implemented the granulated activated charcoal F50/60 system in the WPB. The inspectors assessed material condition and conformance of this equipment with system design diagrams. The inspectors discussed the function of radwaste components with the radwaste operator. The processes for the dewatering of resins, spent resin tank recirculation, resin sampling, and transfer of resins from the processing pads to the shipping casks and temporary storage casks were reviewed and discussed with the licensee staff.

The inspectors reviewed the 2015 and 2016 Radioactive Effluent Release Reports and the 2016 radionuclide characterization and classification for the Dry Active Waste and dewatered resin waste streams. The inspectors evaluated analyses for hard-to-detect nuclides, reviewed the use of scaling factors, and examined quality assurance comparison results between licensee waste stream characterizations and outside laboratory data. The inspectors also evaluated how changes to plant operational parameters were taken into account in waste characterization.

Shipment Preparation and Records: There were no radioactive shipments available to observe during the week of the inspection. The inspectors reviewed and discussed the licensee's training and qualification program for shippers of radioactive material. The inspectors reviewed six shipping records for consistency with licensee procedures and compliance with NRC and Department of Transportation (DOT) regulations. This included review of emergency response information, waste classification, radiation survey results, information on the waste manifest, and the authorization of the receiving licensee to receive shipments. Training records for selected individuals currently qualified to ship radioactive material were reviewed for compliance with 49 CFR Part 172, Subpart H.

Problem Identification and Resolution: The inspectors reviewed CAP documents in the areas of radwaste/shipping. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

Inspection Criteria: Radioactive material and waste storage activities were reviewed against the requirements of 10 CFR Part 20. Radwaste processing activities and equipment configuration were reviewed for compliance with the licensee's Process Control Program. Waste stream characterization analyses were reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 61, and guidance provided in the Branch Technical Position on Waste Classification (1983). Transportation program implementation was reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 71 (which requires licensees to comply with DOT regulations in 49 CFR Parts 107, 171-180, and 390-397), as well as the guidance provided in NUREG-1608. Training activities were assessed against 49 CFR Part 172, Subpart H. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

40A1 Performance Indicator Verification (71151 – 5 samples)

a. Inspection Scope

The inspectors reviewed a sample of the performance indicator (PI) data, submitted by the licensee, for the PIs listed below. The inspectors reviewed plant records compiled between July 2016 and June 2017 to verify the accuracy and completeness of the data reported for the station. The inspectors verified that the PI data complied with guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," and licensee procedures. The inspectors verified the accuracy of reported data that were used to calculate the value of each PI. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with PI data.

Cornerstone: Mitigating Systems

- residual heat removal system
- high pressure injection system

- emergency AC power system

Cornerstone: Occupational Radiation Safety

The inspectors reviewed the Occupational Exposure Control Effectiveness PI results for the Occupational Radiation Safety Cornerstone from October 2016 through May 2017. For the assessment period, the inspectors reviewed ED alarm logs and CAP documents related to controls for exposure significant areas.

Cornerstone: Public Radiation Safety

The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results for the Public Radiation Safety Cornerstone from October 2016 through May 2017. For the assessment period, the inspectors reviewed cumulative and projected doses to the public contained in liquid and gaseous release permits and CAP documents related to Radiological Effluent TSs/ODCM issues. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data.

Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 2 samples)

.1 Routine Review

The inspectors screened items entered into the licensee's CAP to identify repetitive equipment failures or specific human performance issues for followup. The inspectors reviewed condition reports, attended screening meetings, or accessed the licensee's computerized corrective action database.

.2 Annual Followup of Selected Issues

a. Inspection Scope

1. The inspectors conducted a detailed review of NCR 02123373, Emergency Action Level Document Calculation Assumptions. The inspectors chose the sample because the EAL issue initially appeared to be potentially more significant than finally determined. The inspectors evaluated the following attributes of the licensee's actions:

- complete and accurate identification of the problem in a timely manner
- evaluation and disposition of operability and reportability issues
- consideration of extent of condition, generic implications, common cause, and previous occurrences
- classification and prioritization of the problem
- identification of root and contributing causes of the problem

- identification of any additional condition reports
  - completion of corrective actions in a timely manner
2. The inspectors conducted a detailed review of NCR 00520918, Loss of Offsite Power Impact on Technical Support Center (TSC). The inspectors chose the sample because it was discovered that on July 17, 2017, the licensee had removed a temporary diesel generator that was intended to provide a back-up reliable power source to the TSC until a permanent solution was implemented. The inspectors evaluated the following attributes of the licensee's actions:
- complete and accurate identification of the problem in a timely manner
  - evaluation and disposition of operability and reportability issues
  - consideration of extent of condition, generic implications, common cause, and previous occurrences
  - classification and prioritization of the problem
  - identification of root and contributing causes of the problem
  - identification of any additional condition reports
  - completion of corrective actions in a timely manner
- b. Findings
1. Incomplete and Inaccurate Emergency Action Level Submittals

Introduction: The NRC identified a Severity Level IV NCV of 10 CFR 50.9, "Completeness and accuracy of information," for failure to provide complete and accurate information for prior approval of a new EAL scheme. The documents submitted to the NRC were, "Shearon Harris Nuclear Power Plant, Unit 1 Changes to the Emergency Action Level Scheme," dated April 25, 2010, and "License Amendment Request to Adopt Emergency Action Level Scheme Pursuant to NEI 99-01, Revision 6," dated April 30, 2015. The first submittal to the NRC in 2010 was not complete and accurate in all material respects, and the submittal in 2015 was a missed opportunity to identify the errors made in the first submittal in 2010.

Description: On May 10, 2017, Shearon Harris identified the "hot operating mode" EAL thresholds were calculated incorrectly using a NUREG-0654 methodology vice the required NEI 99-01 Rev. 6 method, as specified in the current facility licensing basis. When employing the NUREG-0654 methodology to calculate the EAL threshold values, the reactor coolant system (RCS) inventory was assumed to be released at a 50 gallons per minute (gpm) RCS leak rate and activity of 300 micro-Curies per gram ( $\mu\text{Ci/gm}$ ) dose equivalent iodine (DEI), over a six-hour period of time. In comparison, when employing the NEI 99-01 Rev. 6 methodology, the assumption as part of calculating the EAL threshold values was that the entire RCS inventory was released instantaneously at an activity of  $300\mu\text{Ci/gm}$  DEI. Both of the licensee's submittals to the NRC, specified the licensee's EAL scheme for Category F – Fission Product Barrier EAL, contained declaration EAL threshold values for the containment high range radiation monitor for loss of fuel clad barrier and potential loss of containment, that were significantly lower than the correct values, due to use of the improper calculation methodology. The submittal dated April 30, 2015, was submitted to provide a complete change to the EAL scheme. This submittal was a missed opportunity by the licensee to identify that the wrong methodology to calculate the EAL threshold values had been used.

These submittals were not correct in material content and impacted the NRC's regulatory processes. The NRC evaluated the licensee's failure to provide complete and accurate information to determine if there were any unresolved issues. The inspectors concluded that the incomplete and inaccurate information in the license submittal was material to the NRC because, had the NRC staff known the actual methodology used was inaccurate, the staff would have required the licensee to modify the EAL threshold values. The licensee appropriately revised the EAL threshold values utilizing the correct calculation methodology.

The licensee issued NCR 02123373, dated May 10, 2017, for EAL thresholds that were calculated without using the correct methodology described in the facility licensing basis. The licensee implemented compensatory corrective actions by issuing Standing Instruction 2017-017 to inform operators and emergency response organization decision-makers of the proper application of the EAL scheme and revised threshold values to be implemented until a permanent change is made to the license. Additionally, the licensee issued NCR 02155272, dated October 3, 2017, for the incomplete and inaccurate EAL submittal, specifically addressing and resolving the completeness and accuracy issues identified by the inspectors. The final significance determination of the underlying technical issue for the licensee's failure to maintain the effectiveness of its emergency plan was documented in NRC Inspection Report 05000400/2017003, Section 4OA7, as a Green LIV.

Analysis: The inspectors evaluated the underlying technical issue and determined that the licensee's failure to maintain the effectiveness of its emergency plan was a performance deficiency. The issue was documented as a Green LIV in Section 4OA7 of this report. The ROP's significance determination process does not specifically consider the regulatory process impact in its assessment of licensee performance. Therefore, it was necessary to address this violation which impeded the NRC's ability to regulate, using traditional enforcement to adequately deter non-compliance. Using the NRC Enforcement Policy, Section 2.3.11, "Inaccurate and Incomplete Information," and Section 6.9, "Inaccurate and Incomplete Information or Failure to Make a Required Report," this issue was determined to be a SL IV violation. Though the NRC would have questioned the issue with a request for additional information, it would not have resulted in substantial further inquiry. Additionally, the associated technical violation was determined to be of very low safety significance. Traditional enforcement violations are not assessed for cross-cutting aspects.

Enforcement: Section 50.9 of 10 CFR states, in part, that, information provided to the Commission by a licensee shall be complete and accurate in all material respects. Contrary to the above, on April 25, 2010, and on April 30, 2015, information was submitted by the licensee to the NRC that was not complete and accurate in all material respects. Specifically, the submitted documents specified the licensee's EAL scheme for Category F – Fission Product Barrier EAL, contained EAL declaration threshold values for the containment high range radiation monitor, that were lower than the actual correct values, due to use of an improper calculation methodology. This was not in accordance with the license. It was used to calculate the loss of fuel clad barrier and potential loss of containment thresholds values. The licensee implemented compensatory corrective actions by issuing Standing Instruction 2017-017 to inform operators and emergency response organization decision-makers of the proper application of the EAL scheme and appropriate threshold values to be implemented. Additionally, the licensee plans to submit a license amendment request to update the

EAL scheme. Because this violation was not repetitive or willful, and was entered into the licensee's CAP as NCR 02155272, it is being treated as a SL IV NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 05000400/2017003-01, "Incomplete and Inaccurate Emergency Action Level Submittals")

## 2. Adequacy of Process for Removal of the TSC Temporary Diesel Generator

Introduction: The inspectors opened an Unresolved Item (URI) to complete a review of the licensee's removal of a temporary diesel generator on July 17, 2017, that was previously installed to provide reliable backup power to the TSC in the event of a Loss of Offsite Power (LOOP) coincident with a Loss of Coolant Accident (LOCA) event. This temporary diesel generator was originally intended to be installed until a reliable backup power source could be implemented under a permanent modification.

Description: The licensee initiated NCR 00520918 on March 1, 2012, to address the consequences of a LOOP/LOCA event on the TSC functionality. Since the TSC is designed with two sources of electrical power, both from offsite power sources, it was recognized that a complete loss of offsite power to the TSC could result in long term TSC operational concerns. Specifically, with the loss of both offsite power sources, the TSC emergency ventilation system, which provides required radiation protection for event response personnel, would be non-functional, as well as other critical TSC equipment following the loss of short-term (~1-2 hours) back-up battery power supplies. The inspectors noted that the operability/functionality section of NCR 00520918 stated that "the TSC was functional based on the (current) availability of both of the offsite power sources; however, should a LOOP event occur, then the TSC would be considered non-functional since offsite power would be rendered non-functional." This statement demonstrated the licensee's understanding of the vulnerability of continued TSC functionality during a LOOP event. In recognition of this vulnerability, the NCR implemented a short-term solution for procuring and installing a temporary diesel generator in late 2012 under modification EC 85350. The inspectors noted that an emergency preparedness change review evaluation was conducted in accordance with 10 CFR 50.54(q) under action request 00568695. This change request stated that it was necessary to provide the infrastructure for an additional reliable power source for the TSC habitability systems. NCR 00520918 stated that the long-term solution was to provide a permanent backup power supply to the TSC, at which time the temporary diesel generator would be removed. While an action item was initiated to install this TSC permanent backup power source under modification EC 85145, the modification was later revised, removing the intended implementation of a permanent backup power source to the TSC.

The inspectors were concerned that the TSC could have equipment and habitability issues during design basis LOOP/LOCA events when the normal TSC offsite power would be non-functional. In addition, the inspectors determined that the TSC temporary diesel generator was removed from the site on July 17, 2017, without implementing the originally intended reliable permanent backup power to the TSC and without conducting a 10 CFR 50.54(q) evaluation specific to its removal to demonstrate that this action did not reduce the effectiveness of implementing the emergency plan. The inspectors requested additional information from the licensee related to the documentation, basis, and process used for the removal of the TSC temporary diesel generator, and evidence that the TSC facility would still be capable of performing all of its intended functions during a LOOP/LOCA event. This issue of concern requires more information to



determine if a performance deficiency exists, and if the performance deficiency potentially constitutes a violation of regulatory requirements. Pending review of additional information from the licensee, this issue is identified as URI 05000400/2017003-02, Review of Removal of the Technical Support Center (TSC) Temporary Diesel Generator.

#### 4OA5 Other Activities

##### .1 (Closed) URI 05000400/2017002-01, Evaluate Fire Protection Discrepancies in RHR/CS Pump Rooms:

###### a. Inspection Scope

During the second quarter of 2017, the inspectors opened a URI regarding two issues of concern with the licensee's implementation of their fire protection requirements in the 'A' and 'B' RHR/CS pump rooms. These concerns involved the following: 1) use of unapproved, non-fire retardant plastic sheeting used to wrap a 30-foot section of the 'A' RHR pump suction piping to contain potential piping contamination; and 2) the fire pre-plans for the 'A' and 'B' RHR/CS pump rooms on RAB 190' elevation failed to prescribe appropriate fire hose stations that contained adequate hose lengths for use in fighting a fire in either of the two rooms.

URI 05000400/2017002-01 was identified because additional NRC review and evaluation was needed to determine whether the issues of concern represented performance deficiencies and whether they were more than minor significance.

The licensee initiated NCRs 02132781 and 02134163 to address the two issues of concern. The inspectors reviewed the NCR evaluations, conducted further inspections of the fire protection features in the areas involved, and discussed the issues with licensee fire protection personnel.

Regarding the first issue, the licensee confirmed that the plastic sheeting identified by the inspectors was a type of plastic stretch wrap that was not fire retardant. Immediate actions were taken to remove the plastic and conduct an extent of condition to identify any other instances where unauthorized plastic was used for contamination control in the Power Block. Another nine instances were identified and corrected; however, none of these additional areas were as significant as the 'A' RHR pump room. The inspectors reviewed the licensee's fire protection procedures for controlling transient combustible materials. Procedure AD-EG-ALL-1520, "Transient Combustible Control," required plastic sheeting materials used in the Power Block to be fire retardant types that have passed the requirements of National Fire Protection Association (NFPA) 701, "Standard Methods of Fire Tests for Flame Propagation of Textiles and Films." Contrary to this, the plastic stretch wrap material was not NFPA 701 qualified. The inspectors determined that the licensee's failure to follow AD-EG-ALL-1520 constituted a violation of NRC requirements. The licensee weighed the amount of plastic material removed from the RHR pump room and it was found to be 4.8 pounds. This amount was still within the allowable fire hazard analysis "incidental" combustible limit for the fire area, i.e., the equivalent of 5 pounds of plastic. From a review of NRC Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," this issue was determined to be similar to example 4.k. Based on not exceeding the fire hazard analysis limit for the area and the lack of a reasonable fire ignition source in the vicinity, the inspectors determined the

safety significance of this violation to be minor. Consistent with the NRC Enforcement Policy, Section 2.2.2, minor violations generally do not warrant enforcement action but are required to be entered into the licensee's CAP and actions must be taken to restore compliance. The licensee entered this issue into their CAP as NCR 02132781 and took appropriate corrective actions to address the deficiency.

The licensee's review of the second issue of concern confirmed that the fire pre-plan procedure (i.e., FPP-012-02-RAB190-216) for the 'A' and 'B' RHR/CS pump rooms prescribed the wrong hose stations to be used by the fire brigade for combating a fire in either of the rooms. Instead of prescribing the opposite RHR pump room hose stations for the fire brigade backup team (which was over 300 feet away and across multiple floors and stairways), the procedure should have utilized hose stations that were directly above the stairway leading to each of the rooms. The licensee revised the fire pre-plan procedure with the correct hose stations. Based on the errant hose stations prescribed by the fire pre-plan, the inspectors determined that the procedure was inadequate and constituted a violation of NRC requirements. As part of the licensee's extent of condition evaluation, all other fire pre-plans were reviewed to ensure no other similar errors existed. The results of this review did not identify any other discrepancies. To provide added assurance that the hose station error would not have caused confusion and inefficiency in fire brigade response actions, the inspectors interviewed several fire brigade team leaders about the procedural error. There was clear recognition that it would not have been practical to attempt to pull a backup hose from the opposite RHR pump rooms in lieu of utilizing the hose station that was directly above the stairway leading to each of the rooms. Based on this, the inspectors determined that most likely the inadequate procedure would not have resulted in any actual adverse fire brigade response consequences had an actual fire occurred in the RHR pump rooms. As such, the inspectors determined the safety significance of this violation to be minor. Consistent with the NRC Enforcement Policy, Section 2.2.2, minor violations generally do not warrant enforcement action but are required to be entered into the licensee's CAP and actions must be taken to restore compliance. The licensee entered this issue into their CAP as NCR 02134163 and took appropriate corrective actions to address the deficiency.

b. Findings

No findings were identified. URI 05000400/2017002-01 is closed.

.2 (Closed) URI 05000400/2017002-02, 'B' ESCW Chiller Failure to Start:

a. Inspection Scope

During the second quarter of 2017, the inspectors opened a URI regarding the unexpected start failure of the 'B' ESCW chiller. Initial investigation identified that the chiller motor breaker had tripped on an instantaneous overcurrent relay actuation. The licensee entered the issue into their CAP as NCR 02124014 and initiated a Failure Investigation Process (FIP) of the failure. This FIP was completed on June 29, 2017, and additional NRC inspection was required to determine if the licensee's evaluations and corrective actions properly addressed the chiller start failure and whether the failure was reasonably within the licensee's ability to predict or prevent.

The inspectors reviewed the results of the licensee's causal evaluations, discussed the results with engineering personnel, and performed walkdowns of the 'A' and 'B' ESCW chillers at various times during chiller operation and startup to identify any other anomalous operating conditions. The licensee's investigation revealed that the chiller motor instantaneous overcurrent relay actuation occurred on the 'C' phase; however, a relay calibration setpoint check of all three phases did not identify any anomaly in their as-found setpoints. The overcurrent relays for the 'B' ESCW chiller were only recently replaced in September 2014 and had no history of spurious operation. A review of the relay calibration setpoint values used in the procedure confirmed that the correct trip setpoint value was used based on the chiller motor size and applicable industry electrical guidelines. A laboratory forensic analysis of the installed 'C' phase relay was performed and it was determined to be operating as designed. In order to ensure that actual chiller motor inrush currents were not increasing due to motor degradation, motor inrush data and relay actuation time constraints were measured and reviewed against expected values. Motor inrush currents were found to be within the expected range and no motor degradation was identified. Since there were initial reports of previous instances where the mechanical indication flags associated with the instantaneous overcurrent relays had "flagged" without the actual relay actuating, a historical review of the chiller motors (as well as other safety related large motors) was performed to identify any adverse trends of this occurring in the recent past. No adverse trends were identified from this review.

Based on these evaluations, the licensee concluded that the cause of the 'B' chiller trip was an intermittent actuation of the instantaneous overcurrent relay. As a precaution, an engineering change was implemented to increase the instantaneous overcurrent relay trip setpoint on all three phases of the 'A' and 'B' chillers to higher in the allowable range in order to reduce the potential for future spurious motor trips.

The inspectors determined that the licensee had performed an adequate evaluation of the 'B' chiller start failure and had taken reasonable corrective actions to address the issue. Based on the additional reviews, the inspectors did not identify any performance deficiencies.

b. Findings

No findings were identified. URI 05000400/2017002-02 is closed.

4OA6 Meetings, Including Exit

On October 12, 2017, the resident inspectors presented the inspection results to Ms. Tanya Hamilton, Site Vice President, and other members of the licensee's staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

On October 4, 2017, the emergency preparedness inspectors presented their inspection results to Ms. Tanya Hamilton, Site Vice President, and other members of the licensee's staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

#### 4OA7 Licensee-Identified Violation

The following licensee-identified violation of NRC requirements was determined to be of very low safety significance and met the NRC Enforcement Policy criteria for being dispositioned as a Non-Cited Violation.

Section 50.54(q)(2) of 10 CFR requires, in part, that a licensee shall follow and maintain the effectiveness of an emergency plan which meets the planning standards of 10 CFR 50.47(b) and the requirements of 10 CFR Part 50, Appendix E. Section 50.47(b)(4) of 10 CFR requires that a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures. Contrary to the above, from April 2010 to May 2017, the licensee failed to maintain the effectiveness of its emergency plan. Specifically, the licensee's emergency classification scheme action levels for Category F – Fission Product Barrier EAL, contained declaration threshold values for the containment high range radiation monitor, which were lower than the correct values due to an improper methodology used in calculating the loss of fuel clad barrier and potential loss of containment barrier threshold values and rendered the EALs ineffective. The licensee implemented compensatory actions by issuing Standing Instruction 2017-017 to inform operators and emergency response organization decision-makers of the proper application of the EAL scheme and appropriate threshold values to be implemented until a permanent change can be made to the license. The issue was entered into the licensee's CAP as NCR 02123373. The inspectors evaluated this issue as an ineffective EAL per IMC 0609, Appendix B, Emergency Preparedness Significance Determination Process, Figure 5.4-1. The inspectors concluded that the violation was of very low safety significance (Green). Although the incorrect EAL would alone render an early EAL classification of a General Emergency (GE) based upon the specific radiation monitor, other EALs would provide a GE classification in an accurate and timely manner aligned with the incorrect threshold values of the containment high range radiation monitor.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee personnel**

L. Faulk, Director, Plant Security  
P. Fisk, Plant Manager  
D. Griffith, Manager, Training  
T. Hamilton, Site Vice President  
B. Jones, Director, Organizational Effectiveness  
J. Keltner, Manager, Chemistry  
B. McCabe, Manager, Nuclear Oversight  
T. Mitchell, Manager, Maintenance  
S. O'Connor, General Manager, Engineering  
J. O'Keefe, Assistant Operations Manager - Shift  
M. Parker, Manager, Radiation Protection  
J. Robertson, Manager, Regulatory Affairs  
J. Scott, Operations Manager  
G. Simmons, Manager, Emergency Planning  
T. Stephens, Senior Nuclear Engineering Tech  
R. Vandenberg, Assistant Operations Manager – Support  
F. Womack, Senior Project Director, Major Projects  
C. Yarley, Licensing Engineer

#### **NRC personnel**

S. Rose, Chief, Reactor Projects Branch 4, Division of Reactor Projects, Region II

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000400/2017003-02	URI	Review of Removal of the Technical Support Center (TSC) Temporary Diesel Generator (Section 4OA2.2)
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### Closed

05000400/2017002-01	URI	Evaluate Fire Protection Discrepancies in RHR/CS Pump Rooms (Section 4OA5.1)
05000400/2017002-02	URI	'B' ESCW Chiller Failure to Start (Section 4OA5.2)

### Opened and Closed

05000400/2017003-01	NCV	Incomplete and Inaccurate Emergency Action Level Submittals (Section 4OA2.2)
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## LIST OF DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather Protection**

#### **Impending Adverse Weather Conditions**

AP-300, Severe Weather

AP-301, Seasonal Weather Preparations and Monitoring

#### **Readiness to Cope with External Flooding**

UFSAR Section 2.4, Hydrologic Engineering

UFSAR Section 3.4, Water Level (Flood) Design

Calculation PMS-0001, Probable Maximum Storm Ponding on all Buildings

Drawing 7-G-3170, DFOST Building - Plan & Details

Drawing 7-G-3171, DFOST Building - Sections & Details

Drawing 7-G-1310, RAB El. 305' Plan

Drawing 7-G-1322, RAB MS Penthouse

Drawing 5-G-0019, General Arrangement RAB Plan El. 306'

NCRs 02043878, 0244553, 02088614, 02110320, and 02119214

### **Section 1R04: Equipment Alignment**

Operating Procedure (OP)-111, Residual Heat Removal System

OP-155, Diesel Generator Emergency Power System

OP-137, Auxiliary Feedwater System

Drawing 2165-S-0544, Simplified Flow Diagram Feedwater System

OP-156.02, AC Electrical Distribution

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

FPP-001, Fire Protection Program Manual

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

CSD-HNP-PFP-DGB, Diesel Generator Building Pre-Fire Plan

CSD-HNP-PFP-RAB-236, Reactor Auxiliary Building Elevation 236 Pre-Fire Plan

CSD-HNP-PFP-DFOSB, Diesel Fuel Oil Storage Building Pre-Fire Plan

CSD-HNP-PFP-SEC, Out Building Pre-Fire Plan

### **Section 1R06: Flood Protection Measures**

AD-EG-ALL-1615, Cable Aging Management Program – Implementation

WO 20119879, Inspect Listed 'A' Train Manholes and Associated Cables

PM-M0129, Cable Vault Sump Pump Skid Maintenance

Flow Diagram 5-G-0185, Yard Ductbank Sumps Drainage System (S02-S04)

NCRs 02048900, 02070097, 02118121, and 02137079

### **Section 1R11: Licensed Operator Requalification Program and Licensed Operator Performance**

**Resident Inspector Quarterly Review of Operator Requalification**

AD-TQ-ALL-0420, Conduct of Simulator Training and Evaluation

OMM-001, Operations Administrative Requirements

AOP-039, Startup and Unit Auxiliary Transformer Trouble

AOP-019, Malfunction of RCS Pressure Control

AOP-010, Feedwater Malfunctions

AOP-402, Secondary Steam Leak/Efficiency Loss

EOP-E-0, Reactor Trip or Safety Injection

EOP-ES-1.1, SI Termination  
 EOP-E-2, Faulted Steam Generator Isolation  
 EOP-E-3, Steam Generator Tube Rupture  
 EOP-ECA-3.1, SGTR with Loss of Reactor Coolant Subcooled Recovery

Resident Inspector Quarterly Review of Licensed Operator Performance in the Actual Plant/Main Control Room

AD-OP-ALL-1000, Conduct of Operations  
 OMM-001, Operations Administrative Requirements  
 AP-002, Plant Conduct of Operations  
 AOP-017, Loss of Instrument Air  
 GP-006, Normal Plant Shutdown from Power Operation to Hot Standby (Mode 1 to Mode 3)  
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Licensed Operator Regualification – Biennial

Records

License Reactivation Packages (6)  
 LORP Training Attendance records (6)  
 Medical Files (7)  
 Remedial Training Records (5)  
 Remedial Training Examinations (5)  
 Simulator Service Requests (two years of records reviewed)  
 Condition Reports Resulting in Clock Resets (5 records reviewed)  
 Simulator Modification Request Report from 01/09/2015 to 06/13/2017 (76 Closed Requests)  
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 TAP- 405, Rev. 1, License Applications, Renewals, and Operator Physicals.  
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Simulator Test Guide, Integrated Systems Test, Test No. SST-001, Steady-State Accuracy and Stability Test

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Simulator Scenario DSS-014

Simulator Scenario DSS-015

Simulator Scenario DSS-036

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JPM-IP-058 (Locally Isolate RCP Seals)

JPM-CR-225 (Failure CSIP Mini-Flow)

JPM-CR-048(a) (S/U Rod Withdrawal)

JPM-CR-023 (Startup RHR Train A)

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AOP-015, Secondary Load Rejection

EC 284243, Turbine control system upgrade – integration

NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants

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AD-OP-ALL-1000, Conduct of Operations

OP-107, Chemical and Volume Control System

OP-131.01, Main Turbine

OP-137, Auxiliary Feedwater System

MST-I0148, Steam Generator B Narrow Range Level Loop (L-0486) Operational Test

OST-1080 Auxiliary Feedwater Pump 1X-SAB Full Flow Test

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**Section 1R15: Operability Determinations and Functionality Assessments**

OPS-NGGC-1305, Operability Determinations

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**Section 1R19: Post Maintenance Testing**

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**Section 1R22: Surveillance Testing**

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 PEP-110, Emergency Classification and Protective Action Recommendations  
 PEP-230, Control Room Operations  
 PEP-310, Notifications and Communications  
 EP-EAL Matrix, Harris Nuclear Plant Classification of Emergency

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 AD-RP-ALL-2000, Sentinel Radiation Work Permit (RWP) Management, Rev. 3  
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#### **Section 2RS8: Radioactive Material Processing and Transportation**

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