



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

July 25, 2017

Ernest J. Kapopoulos, Jr.  
Site Vice President  
H. B. Robinson Steam Electric Plant  
Duke Energy  
3581 West Entrance Road, RNPA01  
Hartsville, SC 29550

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT – NRC INTEGRATED INSPECTION  
REPORT 05000261/2017002

Dear Mr. Kapopoulos:

On June 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your H. B. Robinson Steam Electric Plant, Unit 2. On July 19, 2017, the NRC inspectors discussed the results of this inspection with you and members of your staff. On July 20, 2017, a re-exit meeting was conducted with Mr. Dave Huffman and other members of your staff, to discuss the final results of the inspection. Inspectors documented the results of this inspection in the enclosed inspection report.

The NRC inspectors did not identify any finding or violation of more than minor significance.

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.: 50-261  
License No.: DPR-23

Enclosure:  
Inspection Report 05000261/2017002  
w/Attachment: Supplemental Information

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SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT – NRC INTEGRATED INSPECTION  
 REPORT 05000261/2017002 July 25, 2017

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 50-261

License Nos.: DPR-23

Report No.: 05000261/2017002

Licensee: Duke Energy Progress, Inc.

Facility: H. B. Robinson Steam Electric Plant, Unit 2

Location: 3581 West Entrance Road  
Hartsville, SC 29550

Dates: April 1, 2017 through June 30, 2017

Inspectors: J. Zeiler, Acting Senior Resident Inspector  
G. Eatmon, Acting Senior Resident Inspector  
A. Beasten, Resident Inspector  
R. Kellner, Senior Health Physicist (Sections 2RS1, 2RS3, 2RS4)  
J. Panfel, Health Physicist (Section 2RS2)  
W. Pursley, Health Physicist (Sections 2RS5, 4OA1)

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

Enclosure

## **SUMMARY**

Integrated Inspection Report 05000261/2017002, April 1, 2017, through June 30, 2017; Duke Energy Progress, Inc., H. B. Robinson Steam Electric Plant, Unit 2, Operability Determinations and Functionality Assessments.

The report covered a 3-month period of inspection by resident inspectors and three regional inspectors. The NRC's program for overseeing the safe operations of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6. No findings or violations of greater than minor significance were identified.

## REPORT DETAILS

### Summary of Plant Status

The unit began the inspection period shut down in Mode 4 for a planned refueling outage. The unit reached essentially 100 percent power on April 10, 2017, and remained there for the duration of the quarter.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

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

##### a. Inspection Scope

##### .1 Summer Readiness of Offsite and Alternate AC Power System

The licensee did not implement equipment or procedure changes that potentially affect operation or reliability of offsite and alternate AC power systems since the last time the inspectors assessed grid reliability. The inspectors reviewed the material condition of offsite and onsite alternate AC power systems (including switchyard and transformers) by performing a walkdown of the switchyard. The inspectors reviewed outstanding work orders and assessed corrective actions for degraded conditions that impacted plant risk or required compensatory actions. Documents reviewed are listed in the attachment.

##### .2 Seasonal Extreme Weather Conditions

The inspectors conducted a detailed review of the station's adverse weather procedures written for extreme high temperatures. The inspectors verified that weather-related equipment deficiencies identified during the previous year had been placed into the work control process and/or corrected before the onset of seasonal extremes. The inspectors evaluated the licensee's implementation of adverse weather preparation procedures and compensatory measures before the onset of and during seasonal extreme weather conditions. Documents reviewed are listed in the attachment. The inspectors evaluated the following risk-significant systems:

- Containment air recirculation cooling system
- Service water booster pumps

##### b. Findings

No findings were identified.

#### 1R04 Equipment Alignment (71111.04 – 4 samples)

##### a. Inspection Scope

##### .1 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:

- Charging pumps 'A' and 'C' while charging pump 'B' was out of service for repair
- Motor driven auxiliary feedwater (MDAFW) pump 'A' while MDAFW 'B' was out of service for scheduled preventative maintenance
- Service water booster pump (SWBP) 'A' while SWBP 'B' was out of service for scheduled rotating assembly replacement
- 'B' emergency diesel generator (EDG) while 'A' EDG out of service for scheduled oil replacement

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05Q – 5 samples)

a. Inspection Scope

.1 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 corrective action program (CAP)

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

- MDAFW pump room, fire zone 6
- Turbine building – Building 350 – west end ground level
- North and South cable vaults, fire zones 9 and 10
- Emergency 4160 volt switchgear rooms E1/E2, fire zone 20
- 'B' EDG room, fire zone 1

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)a. Inspection Scope.1 Internal Flooding

The inspectors reviewed related flood analysis documents and walked down the areas listed below containing risk-significant structures, systems, and components susceptible to flooding. The inspectors verified that plant design features and plant procedures for flood mitigation were consistent with design requirements and internal flooding analysis assumptions. The inspectors also assessed the condition of flood protection barriers and drain systems. In addition, the inspectors verified the licensee was identifying and properly addressing issues using the CAP. Documents reviewed are listed in the attachment.

- Component cooling water pump room (internal flood zone FLC050)
- 'A' and 'B' EDG rooms (internal flood zones FLC020 and FLC010)

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 May 23, 2017, the inspectors observed an evaluated simulator scenario administered to an operating crew as part of the annual regualification operating test required by 10 CFR 55.59, "Regualification."

The scenario consisted of three events, starting with a pressurizer level transmitter failure, continuing with a loss of normal power to an emergency electrical bus, coupled with the 'A' EDG failure to start. The final event consisted of a large-break loss of coolant accident, with one train of safeguards available.

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

On April 5-6, 2017, the inspectors observed licensed operator performance in the main control room during reactor restart and reactor physics testing following the refueling outage.

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.

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. Documents reviewed are listed in the attachment.

- NCR 02121535, No output DC voltage on A-1 battery charger
- NCR 02115268, Significant steam leak and damage to steam dump valve PRV-1324B-1 during unit startup

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.



- April 17, 2017, Green risk for MDAFW pump 'B' out of service for planned maintenance
- May 12, 2017, Green risk for emergent RCS Loop 3 Low Flow bistable switch replacement
- April 27-29, 2017, emergent Yellow grid system reliability condition due to low generation capacity
- June 13-15, 2017, planned Yellow risk for maintenance on steam driven auxiliary feedwater pump, with multiple revisions of station risk profile
- May 25, 2017, emergent elevated Green risk for tornado watch

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 4 samples)

a. Inspection Scope

.1 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 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 technical specification and updated final safety analysis report 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 02118558, All turbine valves lost indication on the control room turbine control panel
- NCR 02012658, Main steam line break unanalyzed condition due to single failure vulnerability with bypass feedwater regulating valves
- NCR 02125988 and NCR02120069, Evaluate service water booster pump 'B' cloudy oil and suspended sediment
- NCR 02127683 and NCR 0212686, Failed infared detector in Reactor Coolant Pump bay 'B'

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 2 samples)a. Inspection Scope

The inspectors verified that the plant modifications listed below did not affect the safety functions of important safety systems. The inspectors confirmed the modifications 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. Documents reviewed are listed in the attachment.

- Engineering Change (EC) 259629, CS/SI Full Flow Test Line – Closeout of Acceptance Testing (Permanent Modification)
- EC 408455, Charging pump 'C' lubricating collection tank Belzona leak repair (Temporary Modification)

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 7 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) 20133334, 20121841, and 20045301, AFW (Auxiliary Feedwater) pump 'B' post maintenance testing following scheduled preventative maintenance in accordance with OST-201-2, MDAFW (Motor Driven Auxiliary Feedwater) System Component Test – Train B
- WO 20034740, Limitorque grease inspection of valve SI-880C-MO in accordance with PM-112, Limitorque Inspection No. 1
- WOs 20156906 and 20089787, Perform maintenance and testing of reactor trip "bypass" bkr (breaker)
- WO 20161947, FC-435, RCS Loop 3 bistable switch post maintenance testing following emergent troubleshooting and repair
- WO 13422523, SWBP 'B' post maintenance testing following scheduled rotating assembly replacement in accordance with OST-303-2, Service Water Booster Pump B test
- WO 20014772, Charging pump 'C' post maintenance testing following repair of leak in lubricating collection tank in accordance with OP-301C, Chemical and Volume Control System Charging Pump 'C' Operation

- WO 20031124, AFW pump 'A' discharge flow control valve FCV-1424 post maintenance testing following scheduled controller calibration in accordance with PIC-033, Auxiliary Feedwater Flow Indicating Controller FIC-1424 and OST-210-1, MDAFW System Component Test – Train A

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.

1R20 Refueling and Other Outage Activities (71111.20 – 1 sample)

a. Inspection Scope

For the refueling outage which was ongoing at the start of the inspection period and ended April 8, 2017, the inspectors evaluated the following outage activities:

- decay heat removal and spent fuel pool cooling system operation
- containment closure
- reactivity control
- heatup and startup

The inspectors verified that the licensee:

- controlled plant configuration in accordance with administrative risk reduction methodologies
- developed work schedules to manage fatigue
- developed mitigation strategies for loss of key safety functions
- adhered to operating license and TS requirements

Inspectors verified that safety-related and risk-significant structures, systems, and components not accessible during power operations were maintained in an operable condition. The inspectors also reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with outage activities. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 samples)a. Inspection Scope

The inspectors reviewed the surveillance tests listed below and either observed the test or reviewed test results to verify testing activities adequately demonstrated that the affected SSCs remained capable of performing the intended safety functions (under conditions as close as practical to design bases conditions or as required by technical specifications) and maintained their operational readiness.

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

- MST-020, Reactor Protection Logic Train “A” at Power
- EST-050, Refueling Startup Procedure
- OST-160, Pressure Isolation Check Valve Back Leakage Test

In-Service Tests

- OST-151-3, Safety Injection System Components Test – Pump C

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

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

The inspectors observed the emergency preparedness drill conducted on May 31, 2017. The inspectors observed licensee activities in the simulator and technical support center to evaluate implementation of the emergency plan, including event classification, notification, and protective action recommendations. 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 [RS]

Cornerstones: Occupational Radiation Safety and Public Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 1 sample)

a. Inspection Scope

Hazard Assessment and Instructions to Workers

The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys of the independent spent fuel storage installation (ISFSI) pad. The inspectors reviewed survey records of gamma and neutron surveys around the ISFSI.

b. Findings

No findings were identified.

2RS2 Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls (71124.02 – 5 samples)

a. Inspection Scope

Work Planning and Exposure Tracking

The inspectors reviewed work activities and their collective exposure estimates for Refueling Outages 29 and 30 (RO29 and RO30). The inspectors reviewed ALARA planning packages for activities related to the following RO30 high collective exposure tasks: Bottom Vessel Instrumentation Inspection, In-Service Inspections, Steam Generator Primary and Secondary Side Maintenance, and Refueling/Reactor Head Activities. 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 of exposure reduction initiatives and operating experience, including historical post-job reviews, into RWP requirements. Where applicable, the inspectors discussed changes to established estimates during the RO29 and RO30 outages with ALARA planners and evaluated them 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 2012 - 2015. The inspectors evaluated historical dose rate trends for reactor coolant system piping and compared them to levels during both RO29 and RO30. Source term reduction initiatives, including cobalt reduction and zinc injection, were reviewed and discussed with radiation protection (RP) staff. The inspectors also reviewed temporary shielding packages for the 2RO30.

Radiation Worker Performance

In conjunction with Inspection Procedure (IP) 71124.01, the inspectors observed pre-job ALARA briefings and radiation worker performance for higher risk jobs that were performed during the inspection. While observing job tasks, the inspectors evaluated the use of remote technologies to reduce dose including teledosimetry and remote visual monitoring.

### 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. The inspectors also reviewed recent self-assessment results.

### Inspection Criteria

ALARA program activities were evaluated against the requirements of UFSAR Chapters 11 and 12, TS Section 5.7, 10 CFR Part 20, and approved licensee procedures. Documents reviewed are listed in the attachment.

#### b. Findings

No findings were identified.

### 2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03 – 4 samples)

#### a. Inspection Scope

##### Engineering Controls

The inspectors reviewed the use of temporary and permanent engineering controls to mitigate airborne radioactivity during RO30. The inspectors reviewed the use of portable air filtration units for work in contaminated areas of the radiologically controlled area (RCA) and reviewed filtration unit testing certificates. The inspectors evaluated the effectiveness of continuous air monitors to provide indication of increasing airborne levels and the placement of air samplers in work area "breathing zones", and verified that the licensee is accounting for alpha emitting nuclides in setpoint determination.

##### 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. The inspectors reviewed selected ALARA evaluations for the use of respiratory protection performed since the last inspection. Selected Self-Contained Breathing Apparatus (SCBA) units and negative pressure respirators (NPR)s staged for routine and emergency use in the Main Control Room and other locations were inspected for material condition, SCBA bottle air pressure, number of units, and number of spare masks and availability of air bottles. The inspectors reviewed maintenance records for selected SCBA units for the past two years and 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 reviewed the number and types of respirators used for various jobs during RO30 and observed fit testing of SCBA and negative pressure respirator face pieces. The inspectors discussed training for various types of respiratory protection devices with licensee staff and interviewed radworkers and control room operators on use of the devices including SCBA bottle change-out and use of corrective lens inserts. The inspectors reviewed respirator qualification records (including medical qualifications)

for several Main Control Room operators and emergency responder personnel. In addition, inspectors evaluated qualifications for individuals responsible for testing and repairing SCBA vital components.

#### Problem Identification and Resolution

The inspectors reviewed and discussed selected CAP documents associated with airborne controls and respiratory protection activities. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

#### Inspection Criteria

RP program activities associated with airborne radioactivity monitoring and controls were evaluated against details and requirements documented in the UFSAR Chapters 11 and 12; 10 CFR Part 20; Regulatory Guide (RG) 8.15, "Acceptable Programs for Respiratory Protection" and approved licensee procedures. Documents reviewed are listed in the attachment.

#### b. Findings

No findings were identified.

### 2RS4 Occupational Dose Assessment (71124.04 – 5 samples)

#### a. Inspection Scope

##### Source Term Characterization

The inspectors reviewed the plant radiation characterization (including gamma, beta, alpha, and neutron) being monitored and verified the use of scaling factors to account for hard-to-detect radionuclides in internal dose assessments.

##### External Dosimetry

The inspectors reviewed National Voluntary Laboratory Accreditation Program (NVLAP) certification data for the licensee's optically stimulated luminescence (OSL) processor for the current year for ionizing radiation dosimetry. The inspectors observed and evaluated onsite storage of thermoluminescent dosimeters (TLDs). Comparisons between electronic dosimeter (ED) and OSL results, including correction factors, were reviewed and discussed. The inspectors also evaluated licensee procedures for unusual dosimetry occurrences. ED alarm logs were reviewed as part of Inspection Procedure 71124.01. The inspectors reviewed contamination logs and evaluated events with the potential for external dose.

##### Internal Dosimetry

The inspectors reviewed and discussed the in vivo bioassay program with the licensee. Inspectors reviewed procedures that addressed methods for determining internal or external contamination, releasing contaminated individuals, and the assignment of dose. The inspectors evaluated the licensee's program for in vitro monitoring and reviewed in vivo bioassay results, and in vitro sample information, for personnel involved in recent

diving activities. The inspectors also reviewed contamination logs and evaluated events with the potential for internal dose.

#### Special Dosimetric Situations

The inspectors reviewed records for declared pregnant workers (DPW)s from March 2015 through June 2017 and discussed guidance for monitoring and instructing DPWs. Inspectors reviewed the licensee's program for monitoring external dose in areas of expected dose rate gradients, including the use of multi-badging and extremity dosimetry. The inspectors evaluated the licensee's neutron dosimetry program including instrumentation used to perform neutron surveys. In addition, the inspectors reviewed the licensee's program for evaluation of shallow dose equivalent (SDE). The inspectors also reviewed contamination logs and evaluated events with the potential for SDE.

#### Problem Identification and Resolution

The inspectors reviewed and discussed selected CAP documents associated with occupational dose assessment including self-assessments. The inspectors evaluated the licensee's ability to identify and resolve issues.

#### Inspection Criteria

The licensee's occupational dose assessment activities were evaluated against the requirements of U-2 UFSAR Chapter 12; TS Section 5.4 and 5.7; 10 CFR Parts 19 and 20; and approved licensee procedures. Documents reviewed are listed in the attachment.

#### b. Findings

No findings were identified.

#### 2RS5 Radiation Monitoring Instrumentation (71124.05 – 3 samples)

#### a. Inspection Scope

The inspectors reviewed the licensee's radiation monitoring instrumentation programs to verify the accuracy and operability of radiation monitoring instruments used to monitor areas, materials, and workers to ensure a radiologically safe work environment during normal operations and under postulated accident conditions.

#### Walkdowns and Observations

During tours of the site areas, the inspectors observed installed radiation detection equipment including the following instrument types: area radiation monitors (ARMs), continuous air monitors (CAMs), personnel contamination monitors (PCMs), small article monitors (SAMs), and portal monitors (PMs). The inspectors observed the calibration status, physical location, material condition and compared technical specifications for this equipment with UFSAR requirements. In addition, the inspectors observed the calibration status and functional checks of selected in-service portable instruments and discussed the bases for established frequencies and source ranges with RP staff personnel. The inspectors reviewed periodic source check records for compliance with



plant procedures and manufacturer's recommendation for selected instruments and observed the material condition of sources used.

#### Calibration and Testing Program

The inspectors reviewed calibration data for selected ARMs, PCMs, PMs, SAMs, and laboratory instruments as well as the last calibration and methodology for the whole body counter. The inspectors reviewed calibration data, methodology used and the source certification for the Containment High Range Radiation Monitors R-32A and R-32B. In addition, the inspectors observed a functional test of all ARMs outside containment in accordance with plant procedures. The current output values for the portable instrument calibrator and the instrument certifications used to develop them were reviewed by the inspectors. The inspectors reviewed the licensee's process for investigating instruments that are removed from service for calibration or response check failures and discussed specific instrument failures with plant staff. In addition, the inspectors reviewed 10 CFR Part 61 data to determine if sources used in the maintenance of the licensee's radiation detection instrumentation were representative of radiation hazards in the plant and scaled appropriately for "hard to detect" nuclides.

#### Problem Identification and Resolution

The inspectors reviewed and discussed selected CAP documents associated with radiological instrumentation including licensee sponsored assessments. The inspectors evaluated the licensee's ability to identify and resolve issues. The inspectors also reviewed recent self-assessment results.

#### Inspection Criteria

Operability 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 and 5; UFSAR Chapter 12 and applicable licensee procedures. Documents reviewed are listed in the attachment.

#### b. Findings

No findings were identified.

#### 4. OTHER ACTIVITIES

##### 40A1 Performance Indicator Verification (71151 – 3 samples)

#### a. Inspection Scope

The inspectors reviewed a sample of the performance indicator (PI) data, submitted by the licensee, for the Unit 1 and Unit 2 PIs listed below. The inspectors reviewed plant records compiled between April 1, 2016, and March 31, 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 Nuclear Energy Institute 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: Initiating Events

- unplanned scrams with complications

Cornerstone: Mitigating Systems

- safety system functional failures

Public Radiation Safety Cornerstone

The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results for the Public Radiation Safety Cornerstone and reviewed PI records generated between January 2016 and May 2017. 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/Off-site Dose Calculation Manual issues. Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 3 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 Semi-Annual Trend Review

a. Inspection Scope

The inspectors reviewed issues entered in the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors focused their review on the human performance trend associated with procedure use and adherence that lead to repetitive equipment issues but also considered the results of inspector daily condition report screenings, licensee trending efforts, and licensee human performance results. The review nominally considered the 6-month period of January 2017 through June 2017, although some examples extended beyond those dates when the scope of the trend warranted. The inspectors compared their results with the licensee's analysis of trends. Additionally, the inspectors reviewed the adequacy of corrective actions associated with a sample of the issues identified in the licensee's trend reports. The inspectors also reviewed corrective action documents that were processed by the licensee to identify potential adverse trends in the condition of structures, systems, and/or components as evidenced by acceptance of long-standing

non-conforming or degraded conditions. Documents reviewed are listed in the attachment.

b. Findings and Observations

No findings were identified. However, the inspectors noted there were five NCRs generated during the first half of 2017 relating to human performance issues, specifically procedure use and adherence with the potential to impact plant health. Most events were significant enough to warrant a Human Performance Review Board. One of these events resulted in an inadvertent actuation of the AFW system, discussed in 4OA3 of this report. Several other events involved missed procedural steps which had the potential to impact or did impact equipment important to safety. The licensee is aware of the trend in human performance as it relates to procedure use and adherence, and took immediate corrective actions in each instance, however human performance continues to be an item of interest. The inspectors also observed the procedure use and adherence trends extended into log keeping as it related to entering and exiting procedures, severe weather alerts, and changes in risk. The logkeeping observations have been captured by the licensee in NCR 02132554.

.3 Annual Followup of Selected Issues

a. Inspection Scope

The inspectors conducted a detailed review of the following condition reports:

- NCR 02117314, ENG identified trend in charging pump discharge relief valve
- NCR 02118679, Small oil leak at upper crank case bolts on EDG B

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

Documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

4OA3 Follow-up of Events and Notices of Enforcement Discretion (71153 - 1 sample)

.1 (Closed) License Event Report (LER) 05000261/2017-001-00, Auxiliary Feedwater System Actuation During Surveillance Testing

a. Inspection Scope

On April 3, 2017, with the plant in Mode 3 at 0 percent power, Unit 2 experienced an actuation of the AFW system during turbine trip logic surveillance testing. The licensee determined that the direct cause of the AFW system actuation was inadequate procedure adherence during the surveillance procedure. In accordance with the test procedure, the single running main feedwater pump was tripped, however the AFW system actuated because the AFW defeat switches were not in the defeat position, as required by the test procedure. MDAFW pumps 'A' and 'B' started as designed in response to the trip of the main feedwater pump. The licensee took immediate corrective actions to re-emphasize the need to verify all steps in the procedure are completed. The inspectors reviewed the licensee event report, appropriateness of corrective actions, violations of requirements, and generic issues.

b. Findings

The inspectors concluded that the failure to follow licensee procedure MST-551, Turbine Trip Logic Channel Testing, was a violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," which required that activities affecting quality be accomplished in accordance with instructions and procedures. Due to the fact that no actual loss of auxiliary feedwater occurred during the incident and because the Unit was in Mode 3, there was no adverse impact on plant operation, the failure to comply with this requirement constituted a violation of minor safety significance that was not subject to enforcement action in accordance with the NRC's Enforcement Policy. The licensee entered this issue into their CAP as NCR 02113929. This LER is closed.

40A6 Meetings, Including Exit

On July 19, 2017, the resident inspectors presented the inspection results to Mr. Kapopoulos and other members of the licensee's staff. On July 20, 2017, a re-exit meeting was conducted with Mr. Dave Huffman and other members of your staff, to discuss the final results of the inspection. The inspectors confirmed that no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

J. Barber, Radiation Protection Supervisor  
C. Caudell, Regulatory Affairs  
F. Giannone, Training Manager  
T. Giese, Manager, Operations Training  
D. Hall, Nuclear Oversight Manager  
S. Hall, Radiation Protection Superintendent / Manager  
G. Hartzler, Chemistry Manager  
D. Hoffman, Manager, Operations  
J. Kammer, General Manager, Engineering  
E. Kapopoulos, Site Vice President  
T. Kirwin, Manager, Maintenance  
J. Krakuszeski, Plant General Manager  
A. Maysam, Regulatory Affairs  
C. Orr, Manager, Nuclear Work Management  
T. Pilo, Regulatory Affairs Manager  
D. Pitsley, Manager, Emergency Preparedness  
C. Sherman, Organizational Effectiveness Director  
J. Wild, Regulatory Affairs

#### **NRC personnel**

J. Zeiler, Senior Resident Inspector  
G. Eatmon, Senior Resident Inspector  
A. Beaten, Resident Inspector  
P. Niebaum, Acting Chief, Reactor Projects Branch 4

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Closed**

05000261/2017-001-00	LER	Auxiliary Feedwater System Actuation During Surveillance Testing (Section 4OA3)
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## LIST OF DOCUMENTS REVIEWED

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

#### Summer Readiness of Offsite and Alternate AC Power System

AOP-026, Grid Instability  
AOP-031, Operation with High Switchyard Voltage  
OMM-021, Operation During Adverse Weather Conditions  
NCR 02079029, OMM-021 R051  
PRR 02072508, OMM-021  
PRR 02085520, OMM-021  
NCR 02088314, RNP Eng. Review of a New EPRI Document

#### Seasonal Extreme Weather Conditions

AD-WC-ALL-0230, Seasonal Readiness  
PLP-118, Hot Weather Operations  
AP-058, Seasonal Readiness  
SPP-038, Installation, Operation, and Removal of Supplemental Cooling for HVH-1, 2, 3, and 4  
OP-921, Containment Air Handling  
Work Orders 20061782, 20068317, and 20090187  
NCR 02040730, Circulating water pump 'B' motor bearing temperature increase  
NCR 02036821, EDG 'A' room high temperature alarm received  
NCR 02033995, Install fan for cooling oil sump for SDAFW pump  
NCR 02053680, SWBP 'A' oil visibly degraded and seal casing hot

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

#### Partial Walkdown

Drawing 5379-685, Chemical and Volume Control System Purification and Make-up Flow Diagram, Sheet 2 of 4  
Drawing G-190197, Feedwater, Condensate, and Air Evacuation System Flow Diagram, Sheet 4 of 5  
OP-903, Service Water System  
Drawing G-190204-A, Emergency Diesel Generator System Flow Diagram, Sheets 1, 2 and 3

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

AD-EG-ALL-1520, Transient Combustible Control  
OMM-002, Fire Protection Manual  
OMM-003, Fire Protection Pre-Plans/Unit No. 2  
AOP-041, Response to the Fire Event  
HBR2-11937, Fire Pre-Plan Emergency Switchgear (E-1/E-2) Room  
HBR2-11937, Fire Pre-Plan B Diesel Generator Room  
HBR2-11937, Fire Pre-Plan Turbine Building, Building 350 – West End, Ground Level  
HBR2-11937, Fire Pre-Plan Auxiliary Feedwater Pump Room  
HBR2-11937, Fire Pre-Plan South Cable Vault Room  
HBR2-11937, Fire Pre-Plan North Cable Vault Room

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

RNP-F/PSA-0009, Assessment of Internally Initiated Flood Events, Rev. 2  
RNP-F/PSA-0104, RNP Internal Flooding PRA Plant Partitioning and Walkdown Data, Rev. 0  
RNP-F/PSA-0105, Robinson Nuclear Plant Internal Flooding Analysis, Rev. 1  
RNP-F/PSA-0113, Robinson Nuclear Plant Internal Flooding PRA Quantification and Results Analysis, Rev. 0  
RNP-M/MECH-1881, Internal Flooding Pipe Breaks for Reactor Auxiliary Building, Rev. 0  
RNP-M/MECH-1882, Internal Flooding Displacement Evaluation for Reactor Auxiliary Building, Rev. 0

RNP-M/MECH-1883, Internal Flooding Analysis Reactor Auxiliary Building, Rev. 0  
 AOP-032-BD, Basis Document, Response to Flooding From the Fire Protection System  
 AOP-032, Response to Flooding From the Fire Protection System

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

Resident Inspector Quarterly Review of Licensed Operator Requalification  
 2017 Exam 07, Licensed Operator Continuing Training, Rev. 1

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

AD-OP-ALL-1000, Conduct of Operations  
 AD-OP-ALL-0203, Reactivity Management  
 GP-003, Normal Plant Startup From Hot Shutdown to Critical  
 GP-005, Power Operation

**Section 1R12: Maintenance Effectiveness**

AD-EG-ALL-1210, Maintenance Rule Program  
 WR 20067681, Troubleshoot/Repair PRV-1324B-1  
 ODM for malfunction of PRV-1324B-1  
 NCR 02115285, Malfunction of PRV-1324A-1 during unit startup  
 NCR 02121535, No output DC voltage on A-1 battery charger  
 WO 20040152, Calibrate battery charger A1 voltage and current meters  
 WO 20040149, Inspect/clean "A-1" battery charger  
 WO 20164069, No output DC voltage on A-1 battery charger

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

AD-WC-ALL-0200, On-Line Work Management  
 AD-OP-ALL-0201, Protected Equipment  
 OMA-NGGC-0203, Shutdown Risk Management  
 OMM-48, Work Coordination and Risk Assessment  
 OMP-003, Shutdown Safety Function Guidelines  
 AD-WC-ALL-0260, Nuclear Generation Response to High or Low Grid System Load  
 AD-OP-ALL-1000, Conduct of Operations  
 AP-053, Severe Weather Response  
 OMM-021, Operation During Adverse Weather Conditions  
 OMM-021, Attachment 2, Tornado Watch Check-Off Sheet dated May 25, 2016  
 17W24-02, RNP Risk Profile, Rev.1  
 17W24-02, RNP Risk Profile, Rev. 2  
 17W24-02, RNP Risk Profile, Rev. 3

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

AD-OP-ALL-0102, Operational Decision Making  
 AD-OP-ALL-0105, Operability Determination and Functionality Assessments  
 Standing Instruction 17-007, EH Turbine Control Valves Lost Indication on the RTGB at EH Turbine Control Panel, dated April 22, 2017  
 WR 20069351, Investigate loss of control room board indication of turbine control valves  
 Calculation RNP-M/MECH-1651, Containment Analysis Inputs  
 LER 2016-002, Unanalyzed Condition Related to Main Steam Line Break Inside Containment  
 NCR 02018710, Incorrect Response to NRC Bulletin 80-04  
 NCR 02012658, MSLB Unanalyzed Condition  
 Standing Instruction 16-003, NCR 2012658 CV Potentially Unanalyzed with FRV Bypass Open dated 4/29/2016

PNSC Review Presentation of NCR 0212658 MSLB Break Unanalyzed Condition  
 NCR 02037218, 50.59 Evaluation for PDO 2012658 Compensatory Actions  
 NCR 02018712, Inadequate review for applicability of NRC IN 91-69  
 NCR 02017505, Administrative Error in Technical Specification Bases  
 NCR 02017550, Administrative Error in UFSAR Section 6.2.1.4.2 EC404540, Evaluation of  
 Compensatory Actions for Containment Response to a Steam Line Break with Failed-Open  
 Feedwater Reg Bypass Valve  
 EC 404293, Maximum Flow Rate Through Feed Reg Bypass valve with Controlled SDAFW  
 Flow  
 TMM-004, Inservice Testing Program  
 AOP-041, Response to Fire Event  
 FP-012, Fire Protection Systems Minimum Equipment and Compensatory Actions  
 NCR 02127683, Fire Detector in "B" RCP Bay Failed  
 NCR 02127686, Single Train Fire Alarm in CV  
 OMM-007, Attachment 10.2, EIR – Fire Detection and Actuation System for RCP Bay "B" IR  
 Non-Functional, dated May 28, 2017  
 FP-002, Attachment 10.2, Fire Incident Report Number 17-006  
 NCR 02125988, Degraded Oil in Oil Reservoir Cup on SWBP-B  
 NCR 02120069, Clouded oil 'B' Service Water Booster Pump  
 PM-201, Equipment Lubrication List  
 PMD-001, Equipment Lube Oil Sampling  
 CM-M-SW-PMP-002, Service Water Booster Pump Maintenance  
 728-800-16, Worthington Instructions for Installation and Operation, Centrifugal Pump  
 Type 8CNG-104  
 Sample Oil Trend for SWBP-A, Service Wtr Booster Pmp "A" from 11/3/2015 to 5/2/2017  
 Sample Oil Trend for SWBP-B, Service Wtr Booster Pmp "B" from 4/27/2016 to 4/25/2017  
 Work Order 1347749301, Inspect SWBP-A Internal Assembly  
 Work Order 1354271801, 'A' SWBP Grease Leak  
 Chevron Regal R&O 68, Typical Test Data Sheet

### **Section 1R18: Plant Modifications**

AD-EG-ALL-1103, Procurement Engineering Products  
 AD-EG-ALL-1110, Design Review Requirements  
 AD-EG-ALL-1130, Activation of Engineering Changes  
 AD-EG-ALL-1132, Preparation and Control of Design Change Engineering Changes  
 AD-EG-ALL-1133, Preparation and Control of Equivalent Change Engineering Changes  
 AD-LS-ALL-0008, 10CFR50.59 Review Process  
 NCR 00471119, Carbon steel valves installed in borated system  
 NCR 00537208, Inappropriate valve material in SI system (SI-944)  
 WO 12087044, Implement EC 59629, Rev. 6 on SI-944 and associated valves  
 WO 20014772, Charging pump 'C' lubricating collection tank leak repair  
 Belzona 1311 Product Specification Sheet

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

PLP-033, Post Maintenance Testing Program  
 CM-M-GNRL-VLV-OPR-003, Limitorque SMC-04 Motor Operator  
 CM-114, SB-3 and SMB-0 through SMB-4 Motor Operator Overhaul  
 NCR 02123602, 52/BYA did not close in test position  
 MST-E-RCD-260V-RTBB-001, Maintenance and Testing of Reactor Trip Bypass Breakers  
 MST-I-RCS-FLW-CH II, RCS Flow 415, 425, and 435 Channel Operational Test Protection  
 Channel II (White)  
 CM-M-SW-PMP-002, Service Water Booster Pump Maintenance



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

GP-002, Cold Shutdown to Hot Subcritical at No Load Tavg  
 GP-003, Normal Plant Startup from Hot Shutdown to Critical  
 GP-005, Power Operation  
 Reactivity Manipulation Plan, Cycle 31 Initial Startup and Power Ascension

**Section 1R22: Surveillance Testing**

OMM-015, Operations Surveillance Testing  
 WO 1356913, Reactor startup and reactor physics testing  
 EST-050-1, Installation and Removal of Low Power Physics Testing (LPPT) Equipment  
 MST-020, Reactor Protection Logic Train "A" at Power  
 WO 20170516, OST-151-3 QL safety injection system components test

**Section 2RS1: Radiological Hazard Assessment and Exposure Controls**

AD-RP-ALL-2001, Taking, Counting, and Recording Surveys, Rev 2  
 RST-030, Surveillance of the 24P Independent Spent Fuel Storage Installation, Rev 9, 6/5/2017

**Section 2RS2: ALARA**

AD-CP-ALL-0012, Radiation Source Term, Rev. 1  
 AD-RP-ALL-9001, ALARA Planning, Rev. 4  
 AD-RP-ALL-9000, ALARA Program, Rev. 7  
 CSD-CP-RNP-001, Robinson Primary Chemistry Strategic Plan, Rev. 2  
 HB Robinson Nuclear Plant Long Range ALARA Plan 2017-2021, 12/30/16  
 ALARA Committee Meeting Minutes, 05/22/17, 02/13/17, 03/03/17, 03/12/17, 12/12/17,  
 11/28/17  
 ALARA Work Plan 2017RNP2RP3005, Under Vessel BMI Inspection, Rev. 0  
 ALARA Work Plan 2017RNP2RP3000, Steam Generator Eddy Current Inspections, Rev. 0  
 ALARA Work Plan 2017RNP2RP3000, Steam Generator Secondary Side Maintenance, Rev. 0  
 ALARA Work Plan 2017RNP2RP3006, RO-30 In Service Inspection, Rev. 1  
 ALARA Work Plan 2017RNP2RP3001, RO-30 Refueling/Rx Head, Rev. 0  
 ALARA Critique, 2015RNP2RO2917, 06/01/15  
 ALARA Critique, 2017RNP2RP3005, 05/23/17  
 ALARA Critique, 2017RNP2RP3006, 05/24/17  
 ALARA Critique, 2017RNP2RP3001, 05/24/17  
 ALARA Critique, 2017RNP2RP3000, 05/09/17  
 Radiological Survey RNP-M-20170225-1, RO-30 CV Downpost Survey, CV – Second Level  
 Radiological Survey RNP-M-20170225-2, RO-30 CV Downpost Survey, CV – Third Level  
 Radiological Survey RNP-M-20170225-3, RO-30 CV Downpost Survey, CV – First Level  
 Refueling Outage 29 ALARA Report, 12/31/15  
 RWP #12, Resin Operations, Rev.18  
 RWP #2648, RCS Filter Change Activities, Rev. 00  
 AD-PI-ALL-0100, Corrective Action Program, Rev. 7  
 Quick Cause Evaluation 02114311-02, Expected Dose Reduction Not Achieved During RO-30,  
 04/27/17  
 Quick Hitter Self-Assessment 00737842-07, Emergent Dose to Site, 08/20/15  
 NCRs 00751046, 00750261, 00742921, 01938556, 01953341, 01965097, 01983096,  
 01978756, 02003525, 02054427, 02058619, 02096840, 02101987, 02105112, 02096840,  
 02106872, 02106528, 02114311, and 02127692

**Section 2RS3: In-Plant Airborne Radioactivity Control and Mitigation**

AD-RP-ALL-2015, Alpha Radiation Characterization, Rev. 1  
 AD-RP-ALL-2019, TEDE ALARA Evaluations and DAC Hour Tracking, Rev. 2  
 AD-RP-ALL-6000, Respiratory Protective Equipment Approval and Issue, Rev. 2

AD-RP-ALL-6001, Quantitative Fit Testing, Rev. 0  
 AD-RP-ALL-6002, Inspections of Self-Contained Breathing Apparatus (SCBA) and Associated Equipment, Rev. 0  
 EST-017, Auxiliary Building Ventilation System Fans HVS-1, HVE-2A AND HVE-2B, Rev. 15  
 EST-023, Control Room Emergency Ventilation System, Rev. 24  
 EST-104, Radwaste Building Exhaust System Fan HVE-50, Rev. 7  
 HPP-RESP-002, Cleaning and Maintenance of Respiratory Equipment, Rev. 0  
 HPP-RESP-005, Sampling of Breathing Air Supplies, Rev. 1  
 HPP-RWT-002, Use of HEPA Filtration Units and Vacuum Cleaners, Rev. 4  
 HPP-SUR-003, Airborne Radioactivity Surveys, Rev. 4  
 HPP-001, Radiologically Controlled Area Surveillance Program, Rev. 131  
 HPS-NGGC-0015, Managing Respirators, Rev. 6  
 PLP-066, Respiratory Protection Program, Rev. 11  
 RST-003, Emergency Kit Inventory, Rev. 60  
 RST-023, Respirator Inspection and Inventory, Rev. 32  
 Annual Radionuclide Analysis of "D" Instrument Air Compressor, 11/30/2016  
 Calibration Record, PORTACOUNT PRO, SN 8030114821, 1/19/2016  
 Control Room Operator SCBA Glasses Verification, RP# 446918, and 328360, 6/20/2017  
 Daily PORTACOUNT PRO QC Check Records, SN 8030114821, 6/5/2017-6/20/2017  
 EST-017, Auxiliary Building Ventilation System Fans HVS-1, HVE-2A and HVE-213 [Test results], 11/30/2014 and Fusion Record ID Number: 018133077, 6/30/2016  
 EST-023, Control Room Emergency Ventilation System, [Test results], 6/15/2015 and 3/25/2015  
 EST-104, Radwaste Building Exhaust System Fan HVE-50, [Test results], 9/28/2013 and 2/14/2015  
 Medical Respirator Qualification Verification, RP#'s 446847, 357712, 332344, 279726, and 328360, 6/20/2017  
 Quarterly Compressed Air/Gas Quality Testing, Fire Protection Compressor [2<sup>nd</sup> quarter 2015 thru 1<sup>st</sup> quarter 2017], Various Dates  
 Quarterly Compressed Air/Gas Quality Testing, Fire Protection Cascade Cylinder [2<sup>nd</sup> quarter 2015 thru 1<sup>st</sup> quarter 2017], Various Dates  
 Radiation Control Air Sample Analysis Form, Air Sample # AS-20170321-004, Gamma Spec # 295878\_1, Install Blind Flange, 3/21/2017  
 RC-15-001, RNP Alpha Characterization, 3/2/2015  
 Respirator Fit Test Observation, RP ID# 446847, 6/20/2017  
 RNP Respirator Issue Log Detail Report, 2/25/2017 to 4/5/2017, 6/22/2017  
 RNP Respiratory Qualifications Report – Sorted by Name, 5/1/2017  
 Robinson Respirator Maintenance Inspection History Report, 5/1/2017  
 RST-023, Respirator Inspection and Inventory, Attachments 4 and 8 [Monthly mask and spare tank inventory], 2/14/2017  
 Scott Air Supplied Products Technician Maintenance and Overhaul Qualification Certifications [Vendor], 2015 thru 2019, Various  
 SCBA Cylinder Hydro Test Records; Cylinder SN249646, 04/2013; Cylinder 370043, 04/2016  
 SCBA PosiChek3 Visual/Functional Test Results, Regulator NL0022066EZVQ, 10/4/2016  
 SCBA PosiChek3 Visual/Functional Test Results, Regulator 115S0716002949, 1/18/2016  
 SCBA PosiChek3 Visual/Functional Test Results, Regulator 115S0818005931, 9/26/2016  
 SCBA PosiChek3 Visual/Functional Test Results, Regulator 11550818005938, 9/26/2016  
 Semi-Annual Compressed Air/Gas Quality Testing, EDP30 Bullard Air Pump, 6/18/2015, 12/9/2015, 5/24/2016, and 12/29/2016  
 Semi-Annual Compressed Air/Gas Quality Testing, "D" Instrument Air Compressor, 12/21/2015, and 11/21/2016  
 Setup and Radionuclide Analysis of "D" Instrument Air Compressor, 6/22/2016

TEDE-ALARA Evaluation Worksheets: Lower Cavity Decon, 3/6/2017; CVC-200D Valve Replacement, 3/6/2017; SI-875N Cutout/Replace, 3/4/2017; S/G ECT Equipment Set-Up and Removal, 3/6/2017  
 Training Module RA311R-N, Radiation Protection Initial Training Presentation, Maintenance of Respiratory Protection Equipment, Rev. 11  
 AD-PI-ALL-0100, Corrective Action Program, Rev. 7  
 Self-Assessment 02033786-05, RP NON-RAD Respiratory, 10/11/2016  
 NCRs 01967086 and 02030502  
 PRRs 02030646 and 02126174  
 TRF 02064909

#### **Section 2RS4: Occupational Dose Assessment**

AD-RP-ALL-4010, Internal Dose Assessment, Rev. 0  
 AD-RP-ALL-2009, Personnel Contamination Monitoring and Reporting, Rev. 2  
 AD-RP-ALL-2015, Alpha Radiation Characterization, Rev. 1  
 AD-RP-ALL-4011, In-Vitro Bioassay, Rev. 0  
 AD-RP-ALL-7007, APEX INVIVO Whole Body Counter Calibration, Rev. 1  
 AD-RP-ALL-7008, APEX INVIVO Whole Body Counter Operation, Quality Checks and Data Review, Rev. 1  
 AD-RP-ALL-9004, Standard Radiation Field Monitoring and Characterization Program, Rev. 0  
 AD-RP-ALL-9007, Radiation Protection Source Term Review, Rev. 0  
 HPP-001, Radiologically Controlled Area Surveillance Program, Rev. 131  
 TE-RP-ALL-2007, Neutron Dose Tracking, Rev. 2  
 TE-RP-ALL-4005, Investigation of Unusual Dosimetry Occurrence or Possible Overexposure, Rev. 0  
 TE-RP-ALL-4001, Declared Pregnant Worker, Rev. 2  
 TE-RP-ALL-4004, Multiple Dosimetry, Rev. 4  
 Area TLD Monitoring Reports [including ISFSI], 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> quarter 2015; 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> quarter 2016; and 1<sup>st</sup>, and 2<sup>nd</sup> quarter 2017  
 Declared Pregnant Worker Dosimetry Records [7 individuals], 3/1/2015 – 6/1/2017  
 Dose Extension History Report, 05/01/2015 to 05/23/2017  
 Dosimetry Technical Report 14-04, RNP DCS/ISFSI Neutron TLD Correction Factor Validation, 12/11/2014  
 Electronic Dosimeter (ED) Dose and Dose Rate Alarm Reports 1/1/2016 thru 5/24/2017, 5/24/2017  
 Investigative Whole Body Count, RO30 PCE # 2 (facial contamination RP# 461527), 3/7/2017  
 Map, RNP Site TLD Locations, undated  
 NVLAP Accreditation Certificate, Duke Energy Dosimetry Laboratory, 4/1/2015 – 3/31/2016, 4/1/2016 – 3/31/2017, and 4/1/2017 – 3/31/2018  
 PCE 15-009, Level 3 PCE, 5/26/2015  
 PCE 15-011, Level 3 PCE, 5/31/2015  
 Personnel Contamination Event (PCE) Logs 3/1/2015 – 6/19/2017  
 Position Paper, Position on Accidental X-Ray of TLDs at Duke Energy Nuclear Sites, 3/19/2015  
 RC-15-001, RNP Alpha Characterization, 3/2/15  
 Skin Dose Calculation, PCE 15-009, 7/20/2015  
 Skin Dose Calculation, PCE 15-011, 7/20/2015  
 Whole Body Counter Inter-Comparison Cross Check, 6/27/2016  
 WBC Nuclide Libraries, RNP Inhalation, RNP Medical, and RNP Eu-152 CAL Check, 6/22/2017  
 10 CFR 61 Station Report for HB Robinson Nuclear Plant, Change 81, 5/16/2017  
 AD-PI-ALL-0100, Corrective Action Program, Rev. 7  
 Focused Self-Assessment 1993203, Robinson Internal Dosimetry Program Assessment, April 2016

Self-Assessment AR 02092129, 2016 Robinson Nuclear Plant Radiation Protection Source Term Review,  
 NCRs 00747680, 00760105, 01966366, 01989334, 02019774, 02020153, 02031091, 02045939, 02089366, and 02108188

**Section 2RS5: Radiation Monitoring Instrumentation**

AD-RP-ALL-7001, Radiation Protection Support Equipment Issue and Return, Rev. 0  
 AD-RP-ALL-7002, Operation of Radiation Protection Portable Survey Instruments; Rev. 0  
 AD-RP-ALL-7005, Radiation Protection Portable Instrument Source Check, Rev. 0  
 AD-RP-ALL-7007, APEX Invivo Whole Body Counter Calibration, Rev. 1  
 HPP-CAL-017, Operation of the Hopewell BX-3 Box Calibrator, Rev. 0  
 RCP-105, Radioactive Source Certification, Rev. 15  
 RCP-115, Calibration and Operation of The iSOLO ALPHA/BETA Counter, Rev. 13  
 RST-001, Radiation Monitor Source Checks, Rev. 82  
 RST-008, Calibration of Radiation Monitor System Monitors R-1 through R-8, Rev. 38  
 RST-009, Calibration of Radiation Monitor System Monitors R-9, R-30, R-31a, B, C and R-33, Rev. 38  
 RST-020, Verification of Electronic Calibration of Radiation Monitoring System Monitors R-32A&B, Rev. 21  
 SIC-034, Calibration of Portable Air Sampling Equipment, Rev. 14  
 SIC-041, Calibration and Operation of Canberra Personnel Monitors, Rev. 20  
 Annual Verification of the Calibration of the Hopewell BX3 Calibrator (EnRad 10039), 11/16/2016  
 Annual Verification of the Calibration of the Shepherd Model 89 Calibrator (EnRad 10043), 06/16/2015 and 06/27/2016  
 Calibration GEM-5 Turbine Bldg. RCA Exit (EnRad ID:10342), 08/17/2016  
 Calibration GEM-5 PAP West Exit (EnRad ID:10307), 08/17/2016  
 Calibration ARGOS-5AB Aux. Bldg. exit, (EnRad ID:10138), 01/10/2017  
 Calibration CRONOS-1 DOSIMETRY, EnRad ID:12535), 01/10/2017  
 Calibration of iSOLO Alpha/Beta Counter, 04/08/2009  
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 Certificate of Calibration Analytics SN 35307B-63, Am-241, 07/03/1990  
 Counting Laboratory Certificates of Calibration, Eckert & Ziegler Analytics Serial Number (SN) 103963, Face Loaded F&J Cartridge, SN 103956, 47 mm Filter Paper in Petri Dish, SN 103961, Hot Particle  
 Daily Performance Test Graphs (Apex), Gamma Spectroscopy Detector No. 1, 05/16 – 06/16/2017  
 Daily Response Chart, 3110TR PE-8176 (LSC), 05/16/13 – 06/16/2017  
 EC 0000405688, Evaluation of Thermally Induced Current for R-32A and R-32B, Rev. 000  
 HPGe Calibration Record for Detector #1, 12/16/14  
 PCHG-DESG 0000093567R6, Engineering Change (Area Radiation Monitors), 5/4/15  
 Portable Instruments Calibration Records: EnRad ID 12632, Mirion RDS-31 Probe, 01/31/2017, EnRad ID 02706, Telepole, 02/06/2017, EnRad ID 01649, AMP-100, 01/25/2017, EnRad ID 10212, Goose Neck Air Sampler, 01/11/2017, EnRad ID:00507, Electra 1B, 03/27/2017, EnRad ID:10157, Ludlum-177, 02/17/2017, EnRad ID:00505, DCA 3090, 01/05/2017, EnRad ID: 02269, AMS-4 / Continuous Air Monitor, 07/21/2016.  
 RNPFS1 WBC Calibration, 03/01/2016 and 04/19/2017  
 RNPFS2 WBC Calibration, 04/19/2017  
 RNP-16-0101, Plan to Replace Cables for R-32A & R-32B Rad Monitors, RNP Operations Shift Turnover Report, 06/16/2017  
 RST-001, Radiation Monitor Source Checks, completed 06/14/2017  
 RST-20, Calibration R-32A&B, 06/05/2015  
 Source Certification for SN 128, R-32 A&B Calibration Source, 10/11/1995

System Health Report – Rad Monitors, 4th Qtr 2016 and 1st Qtr 2017  
 Work Order Package 13515897/01, Calibration R-32A, 03/04/2017  
 Work Order Package 13515897/01, Calibration R-32B, 03/05/2017  
 Work Order Package 13495388/02, Electronic Calibration of R-32B, 03/05/2017  
 Work Order Package 13515897/02, Electronic Calibration of R-32A, 03/04/2017  
 WBC Certificates of Calibration, Eckert & Ziegler Analytics SN 105119, 105120 and 102213A  
 WBC Daily Source Check Result, 06/15/2017  
 WBC Source Check Trend Charts, 05/01/17 – 06/15/2017  
 AD-PI-ALL-0100, Corrective Action Program, Rev. 7  
 Radiation Protection Instruments Assessment # 01993210-03, Radiation Protection  
 Instruments, 08/17/2016  
 NCRs 00749254, 00750938, 02038937, 02086958, 02094367, and 02122406

#### **Section 4OA1: Performance Indicator (PI) Verification**

AD-LS-ALL-0004, NRC Performance Indicators and Monthly Operating Report  
 AD-BO-ALL-0002, Performance Measures Program  
 AD-EG-ALL-1217, Mitigating System Performance Index (MSPI)  
 RNP-M/MECH-1904, RNP NRC Mitigating System Performance Index (MSPI) Basis Document  
 LERs 2016-005-01, 2016-005-00, 2016-004-00, 2016-003-00, and 2016-002-00  
 NCR 02068392, Reactor Trip LOOP event  
 NCR 02092932, Omission of Unavailability hours for RHR for December 2016  
 NCR 02093991, MSPI failure not identified and reported  
 NCR 02094907, MSPI monitored components missing from CDE  
 Gas Permit # G-2015-0137, 06/15/2017  
 Liquid Permit #L-2017-0153, 06/19/2017  
 H. B. Robinson Steam Electric Plant 2016 Annual Radioactive and Effluent Release Report,  
 4/25/2017  
 Gaseous and Liquid Plant Performance Indicator Report, April 2016 – March 2017

#### **Section 4OA2: Problem Identification and Resolution**

AD-PI-ALL-0100, Corrective Action Program  
 AD-PI-ALL-0101, Root Cause Evaluation  
 AD-PI-ALL-0102, Apparent Cause Evaluation  
 AD-PI-ALL-0103, Quick Cause Evaluation  
 AD-PI-ALL-0104, Prompt Investigation Response Team  
 AD-LS-ALL-0006, Notification/Reportability Evaluation  
 NCR 02124086, Plant status control event  
 NCR 2095259, Inadequate procedure use and adherence practices  
 NCR 02132554, Inaccurate narrative log entries  
 NCR 02088484, CVC-283A "C" suspected to be leaking by  
 NCR 02116569, Investigate/repair CVC-283B leak by (Chg Pp B Relief VLV)  
 NCR 02120270, CVC-283V charging pump discharge relief leaking by  
 NCR 02120271, Evaluation of charging pump discharge relief valves  
 NCR 02122414, CVC-283B  
 NCR 02088349, RCS leakage exceeds Tier Three Action Level  
 NCR 02115816, RCS Lithium CEI Impact

#### **Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion**

LER 2017-001, Auxiliary Feedwater Ststem Actuation During Surveillance Testing  
 MST-551, Turbine Trip Logic Channel Testing  
 NCR 02113929, Unplanned start of AFW pumps during MST-551