



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

January 29, 2019

Mr. Steven Vercelli, Site Vice President
Entergy Operations, Inc.
5485 U.S. Highway 61N
St. Francisville, LA 70775

**SUBJECT: RIVER BEND STATION – NRC INTEGRATED INSPECTION
REPORT 05000458/2018004 AND INDEPENDENT SPENT FUEL STORAGE
INSTALLATION INSPECTION REPORT 07200049/2018001**

Dear Mr. Vercelli:

On December 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your River Bend Station, Unit 1. On January 14, 2019, 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.

NRC inspectors documented five findings of very low safety significance (Green) in this report. Four of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the violations or significance of these non-cited violations, 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 IV; the Director, Office of Enforcement; and the NRC resident inspector at the River Bend Station.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC resident inspector at the River Bend Station.

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/

Jason W. Kozal, Chief
Project Branch C
Division of Reactor Projects

Docket Nos. 50-458 and 72-049
License No. NPF-47

Enclosures:

Inspection Report 05000458/2018004 and
07200049/2018001 w/Attachments:

1. Documents Reviewed
2. Occupational Radiation Safety Inspection
Request for Information

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers: 05000458 and 07200049

License Number: NPF-47

Report Numbers: 05000458/2018004 and 07200049/2018001

Enterprise Identifier: I-2018-004-0009 and I-2018-001-0109

Licensee: Entergy Operations, Inc.

Facility: River Bend Station and Independent Spent Fuel Storage Installation

Location: Saint Francisville, Louisiana

Inspection Dates: October 1, 2018 to December 31, 2018

Inspectors: C. Speer, Acting Senior Resident Inspector
B. Parks, Resident Inspector/Acting Senior Resident Inspector
T. DeBey, Acting Resident Inspector
L. Carson II, Senior Health Physicist
N. Greene, PhD, Senior Health Physicist
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Approved By: J. Kozal
Chief, Project Branch C
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at River Bend Station, Unit 1, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. NRC-identified and self-revealed findings, violations, and additional items are summarized in the table below. Licensee-identified non-cited violations are documented in the Inspection Results at the end of this report.

List of Findings and Violations

Failure to Disposition Adverse Conditions Associated with the Offgas System as Required by Procedures			
Cornerstone	Significance	Cross-cutting Aspect	Inspection Procedure
Public Radiation Safety	Green FIN 05000458/2018004-01 Closed	H.4 – Teamwork	71111.15 – Operability Determinations and Functionality Assessments
The inspectors identified a finding for the licensee's failure to disposition adverse conditions as required by Procedure EN-LI-102, "Corrective Action Program," Revision 35. Specifically, the licensee did not categorize conditions associated with the offgas system as adverse as required by the procedure.			

Failure to Control Entrance Into a High Radiation Area			
Cornerstone	Significance	Cross-cutting Aspect	Inspection Procedure
Occupational Radiation Safety	Green NCV 05000458/2018004-02 Closed	H.11 – Challenge the Unknown	71124.01 – Radiological Hazard Assessment and Exposure Controls
The inspectors reviewed a self-revealed, non-cited violation of Technical Specification 5.7.1, "High Radiation Area," for the licensee's failure to control activities in a high radiation area. Specifically, a worker entered into the lower area of the reactor building steam tunnel via a ladder, conservatively posted and controlled as a locked high radiation area (i.e., an area with dose rates greater than 100 millirem per hour and below 1,000 millirem per hour at 30 cm), without knowledge of current radiological conditions and without continuous Radiation Protection oversight, as required. The worker received an unexpected dose alarm.			

Inadequate Risk Mitigation Actions in Work Procedure Leads to Inadvertent High Pressure Core Spray Initiation			
Cornerstone	Significance	Cross-cutting Aspect	Inspection Procedure
Mitigating Systems	Green NCV 05000458/2018004-03 Closed	H.12 – Avoid Complacency	71153 – Follow-up of Events and Notices of Enforcement Discretion
The inspectors reviewed a self-revealed, non-cited violation of Technical Specification 5.4.1.a for the licensee's failure to implement a procedure required by Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Specifically, the licensee failed to pre-plan and perform maintenance on level transmitter B21-LTN081C in accordance with a procedure appropriate to the circumstances. The failure led to a perturbation in the "C" instrument reference leg that caused an invalid actuation of the high pressure core spray system at power.			

Control Room Fresh Air Surveillance Procedures Inappropriate to the Circumstances			
Cornerstone	Significance	Cross-cutting Aspect	Inspection Procedure
Barrier Integrity	Green NCV 05000458/2018004-04 Closed	H.14 – Conservative Bias	71153 – Follow-up of Events and Notices of Enforcement Discretion
The inspectors reviewed a self-revealed, non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," which occurred because the licensee did not prescribe procedures for performing surveillance tests on the main control room fresh air subsystem that were appropriate to the circumstances. Specifically, the licensee allowed up to 31 days to receive and review the results of charcoal filtration bed samples. As a result, the Division II control room fresh air subsystem was inoperable from April 17, 2018, to May 3, 2018, exceeding Technical Specification 3.7.2 allowed outage time of 7 days.			

Inappropriate Maintenance Procedure Leads to Water Intrusion into Division II Emergency Diesel Generator Lube Oil System			
Cornerstone	Significance	Cross-cutting Aspect	Inspection Procedure
Mitigating Systems	Green NCV 05000458/2018004-05 Closed	H.12 – Avoid Complacency	71153 – Follow-up of Events and Notices of Enforcement Discretion
The inspectors reviewed a self-revealed, non-cited violation of Technical Specification 5.4.1.a for the licensee's failure to implement a procedure required by Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Specifically, the licensee failed to pre-plan and perform maintenance on the Division II emergency diesel generator in accordance with a procedure appropriate to the circumstances. As a result, the emergency diesel generator was rendered incapable of performing its specified safety function.			

Additional Tracking Items

Type	Issue number	Title	Inspection Procedure	Status
LER	05000458/2018-002-00	Inadvertent High Pressure Core Spray Initiation and Loss of Safety Function Due to Inadequate Work Instruction Mitigation Actions	71153	Closed
LER	05000458/2018-003-00	Condition Prohibited by Technical Specifications Due to Untimely Recognition of Failed Laboratory Analysis of Ventilation Charcoal Sample	71153	Closed
LER	05000458/2018-006-00	Potential Loss of Safety Function and Condition Prohibited by Technical Specifications Due to Emergency Diesel Generator Lube Oil Chiller Leak Caused by Design Deficiency	71153	Closed

PLANT STATUS

River Bend Station began the inspection period at rated thermal power. On October 27, 2018, the unit was down powered to 63 percent for a control rod sequence exchange and to suppress a suspected nuclear fuel leak. The unit was returned to rated thermal power on November 5, 2018. On November 10, 2018, the unit experienced a scram due to a failure of the number three turbine control valve. The unit was returned to rated thermal power on November 23, 2018. On December 14, 2018, the unit was down powered to 72 percent for a control rod sequence exchange. The unit was returned to rated thermal power on December 16, 2018, and remained at or near rated thermal power for the remainder of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at

<http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>.

Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01—Adverse Weather Protection

Seasonal Extreme Weather (1 Sample)

The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal cold temperatures on October 19, 2018.

71111.04—Equipment Alignment

Partial Walkdown (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Division I standby diesel generator on October 15, 2018
- (2) High pressure core spray on October 25, 2018
- (3) Division II emergency diesel generator on November 23, 2018

71111.05AQ—Fire Protection Annual/Quarterly

Quarterly Inspection (4 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) Diesel generator B room, fire area DG-4/Z-1, on October 10, 2018
- (2) Standby switchgear 1C room, fire area C-22, on October 24, 2018
- (3) Diesel generator C room, fire area DG-5/Z-1, on October 24, 2018
- (4) Diesel generator A room, fire area DG-6/Z-1, on November 23, 2018

71111.11—Licensed Operator Regualification Program and Licensed Operator Performance

Operator Regualification (1 Sample)

The inspectors observed and evaluated licensed operator regualification training on October 25, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated the operators' performance as the plant was returning to steady state full power after a rod sequence adjustment on November 2, 2018.

71111.12—Maintenance Effectiveness

Routine Maintenance Effectiveness (1 Sample)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety-significant functions:

- (1) Functional failure and maintenance review of the standby emergency diesel generators on October 15, 2018

71111.13—Maintenance Risk Assessments and Emergent Work Control (3 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

- (1) Yellow risk during surveillance testing on Division II containment unit cooler on October 17, 2018
- (2) Yellow risk during surveillance testing of Division I containment unit cooler with Division I emergency diesel generator in extended outage on November 1, 2018
- (3) Green risk during inoperability of Division III emergency diesel generator due to failure of turbocharger lube oil pumps on November 28, 2018

71111.15—Operability Determinations and Functionality Assessments (2 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Division I residual heat removal pump after flow through mechanical seal cooler was discovered to be below minimum specification on October 11, 2018
- (2) Repeated offgas system degraded conditions on November 7, 2018

71111.19—Post Maintenance Testing (3 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) WO 00510064, "HVC-ACU1B Failed to Auto Start During Divisional Swap/TBS Fin PMT," following replacement of a relay in the control circuitry for the Division II control room air handling unit on October 5, 2018
- (2) WO 52734869, "OPS Perform Operability Testing," following maintenance overhaul of Division I emergency diesel generator on November 7, 2018
- (3) WO 00513628, "Troubleshoot E22-S001DCP (HPCS Diesel DC Soakback Pump Motor)," and WO 00513629, "Troubleshoot E22-S001ACP (HPCS Diesel AC Soakback Pump Motor)," following repair of the soakback oil pumps (AC and DC) for the high pressure core spray (Division III) diesel engine on December 18, 2018

71111.20—Refueling and Other Outage Activities (1 Sample)

The inspectors evaluated forced outage activities from November 10, 2018, to November 23, 2018. The forced outage occurred as a result of inadvertent closure of the number three turbine control valve. Station personnel conducted a forced outage and replaced a failed component in the number three turbine control valve.

71111.22—Surveillance Testing

The inspectors evaluated the following surveillance test:

Routine (1 Sample)

- (1) STP-302-1605, Revision 26, "HPCS Degraded Voltage Channel Calibration and Logic System Functional Test," on October 25, 2018

RADIATION SAFETY

71124.01—Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (1 Sample)

The inspectors evaluated radiological hazards assessments and controls.

Instructions to Workers (1 Sample)

The inspectors evaluated worker instructions.

Contamination and Radioactive Material Control (1 Sample)

The inspectors evaluated contamination and radioactive material controls.

Radiological Hazards Control and Work Coverage (1 Sample)

The inspectors evaluated radiological hazards control and work coverage.

High Radiation Area and Very High Radiation Area Controls (1 Sample)

The inspectors evaluated risk-significant high radiation area and very high radiation area controls.

Radiation Worker Performance and Radiation Protection Technician Proficiency (1 Sample)

The inspectors evaluated radiation worker performance and radiation protection technician proficiency.

71124.03—In-Plant Airborne Radioactivity Control and Mitigation

Engineering Controls (1 Sample)

The inspectors evaluated airborne controls and monitoring.

Use of Respiratory Protection Devices (1 Sample)

The inspectors evaluated respiratory protection.

Self-Contained Breathing Apparatus for Emergency Use (1 Sample)

The inspectors evaluated the licensee's self-contained breathing apparatus program.

OTHER ACTIVITIES – BASELINE

71151—Performance Indicator Verification (4 Samples)

The inspectors verified licensee performance indicators submittals listed below:

- (1) BI01: Reactor Coolant System Specific Activity Sample (10/01/2017 – 09/30/2018)
- (2) BI02: Reactor Coolant System Leak Rate Sample (10/01/2017 – 09/30/2018)
- (3) OR01: Occupational Exposure Control Effectiveness Sample (01/01/2018–09/30/2018)
- (4) PR01: Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences Sample (01/01/2018–09/30/2018)

71152—Problem Identification and Resolution

Semiannual Trend Review (1 Sample)

The inspectors reviewed the licensee's corrective action program for trends that might be indicative of a more significant safety issue. The inspectors noted that the station continues to exhibit an adverse trend in the area of equipment reliability.

Observation

During the first half of the year, the licensee documented an adverse trend in the area of equipment reliability. This trend continued into the second half of the year, with the station experiencing three additional fuel failures, inoperability of the Division II emergency diesel generator after a failure of packing in the lube oil cooler, inoperability of the Division III emergency diesel generator after a failure of turbo charger lube oil pumps, and a reactor scram driven by a spontaneous failure of a turbine control valve. These failures have been documented in the corrective action program, and the adverse trend remains open in the licensee's trending and performance review process. The station is planning to implement plant modifications in the upcoming refueling outage to reduce the likelihood and frequency of subsequent fuel failures.

71153—Follow-up of Events and Notices of Enforcement Discretion

Licensee Event Reports (3 Samples)

The inspectors evaluated the following licensee event reports (LERs) which can be accessed at <https://lersearch.inl.gov/LERSearchCriteria.aspx>:

- (1) LER 05000458/2018-002-00, Inadvertent High Pressure Core Spray Initiation and Loss of Safety Function Due to Inadequate Work Instruction Mitigation Actions on April 26, 2018

On April 26, 2018, an invalid initiation of the high pressure core spray system occurred. The inspectors reviewed the LER associated with the event and determined that the report adequately documented the summary of the event, including the cause of the event and potential safety consequences. The inspectors issued a finding for the licensee's failure to properly pre-plan and perform maintenance on safety-related components in accordance with documented instructions appropriate to the circumstances. This LER is closed.

- (2) LER 05000458/2018-003-00, Condition Prohibited by Technical Specifications due to Untimely Recognition of Failed Laboratory Analysis of Ventilation Charcoal Sample on April 30, 2018

The inspectors reviewed the LER submittal and documented a self-revealed, Green non-cited violation. This LER is closed.

- (3) LER 05000458/2018-006-00, Potential Loss of Safety Function and Condition Prohibited by Technical Specifications due to Emergency Diesel Generator Lube Oil Chiller Leak Caused by Design Deficiency on July 5, 2018

On July 5, 2018, the licensee discovered water intrusion into the Division II emergency diesel generator lube oil system, rendering the system inoperable. The inspectors reviewed the LER associated with the event and determined that the report adequately documented the summary of the event, including the cause of the event and potential safety consequences. The inspectors issued a finding for the licensee's failure to properly pre-plan and perform maintenance on safety-related components in accordance with documented instructions appropriate to the circumstances. This LER is closed.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

60855—Operation of an Independent Spent Fuel Storage Installation and 60857—Review of 10 CFR 72.48 Evaluations

The inspectors evaluated the licensee's operation of the independent spent fuel storage installation (ISFSI) from November 5 through November 8, 2018, on-site at the River Bend Station.

The River Bend Station ISFSI is licensed as a general 10 CFR Part 72 license and utilizes the Holtec HI-STORM 100 System, approved under Certificate of Compliance 1014, License Amendments 2 and 5, and Final Safety Analysis Report (FSAR), Revisions 3 and 7. The River Bend Station had been loading HI-STORM 100S Version B overpacks containing the Multi-Purpose Canister, MPC-68. The River Bend Station's ISFSI contained a total of 29 HI-STORM overpacks at the time of the routine inspection. The licensee was in the middle of its loading 2018 campaign. An inspector was onsite to observe loading activities associated with cask Number 30. The River Bend Station planned to complete an additional canister by the end of the campaign, increasing the total number of casks to 31 at the ISFSI.

The ISFSI activities specifically reviewed during the on-site inspection and the subsequent in-office review included:

- (1) Evaluated and observed fuel selection and fuel loading operations associated with the 7th canister of the campaign (the 30th cask placed at the ISFSI).
- (2) Evaluated and observed welding of the canister, non-destructive testing of the welds, bulk water removal, and forced helium drying.
- (3) Reviewed the licensee's loading, processing, and heavy load procedures associated with its current dry fuel storage campaign.
- (4) Reviewed licensee's corrective action program implementation for ISFSI operations since the last routine ISFSI inspection which was completed in May 2016.
- (5) Reviewed quality assurance program implementation, including recent quality assurance audits, surveillances, receipt inspection, and quality control activities.
- (6) Reviewed documentation related to technical specification required operational surveillance activities and FSAR-required annual maintenance activities.
- (7) Reviewed the licensee's radiological monitoring data for calendar years 2016 and 2017 to verify compliance with 10 CFR 72.104 requirements.
- (8) Reviewed spent fuel documentation for the canisters loaded since the last routine ISFSI inspection (Canisters 24-30) to confirm the fuel met all technical specification requirements for storage at the ISFSI.
- (9) Reviewed annual maintenance activities for heavy lifting components which included special lifting devices, the vertical cask transporter, and the site's single-failure proof cask handling crane.

- (10) Reviewed all 10 CFR 72.48 safety evaluations/screenings for changes made to the licensee's ISFSI operations in accordance with Inspection Procedure 60857, since the last routine ISFSI inspection.
- (11) Reviewed all changes made to the licensee's 10 CFR 72.212 Report from Revision 2 to Revision 3 under the licensee's 10 CFR 72.48 program in accordance with Inspection Procedure 60857.
- (12) The Region IV Fuel Cycle and Decommissioning Branch submitted a technical assistance request to the NRC Division of Spent Fuel Management to evaluate the adequacy of the licensee's revised seismic stability analysis for the stack-up operations associated with the use of the Holtec HI-STORM 100 system. The revised analysis showed acceptable seismic response characteristics during a safe shutdown earthquake event at River Bend Station. The site specific responses calculated in the seismic stack-up analysis were below the maximum criteria established using guidance from the NRC Regulatory Issue Summary 2015-13, "Seismic Stability Analysis Methodologies for Spent Fuel Dry Cask Loading Stack-up Configuration."

The inspectors did not identify any issues or concerns requiring documentation.

INSPECTION RESULTS

Failure to Disposition Adverse Conditions Associated with the Offgas System as Required by Procedures			
Cornerstone	Significance	Cross-cutting Aspect	Inspection Procedure
Public Radiation Safety	Green FIN 05000458/2018004-01 Closed	H.4 – Teamwork	71111.15 – Operability Determinations and Functionality Assessments
The inspectors identified a finding for the licensee's failure to disposition adverse conditions as required by Procedure EN-LI-102, "Corrective Action Program," Revision 35. Specifically, the licensee did not categorize conditions associated with the offgas system as adverse as required by the procedure.			
<p><u>Description:</u> In a review of a sample of condition reports (CRs) associated with the offgas system, the inspectors identified six conditions that were not categorized as adverse conditions as required by Procedure EN-LI-102, "Corrective Action Program," Revision 35, for conditions that resulted in a failure, malfunction, deficiency, deviation, or nonconformance of a structure, system, or component described in the current license basis. In each instance, the licensee generated a CR documenting the deficient condition associated with the system, but inappropriately concluded that the condition was non-adverse and so the requirements of EN-LI-102 to address adverse conditions within the corrective action program did not apply.</p> <ul style="list-style-type: none"> CR-RBS-2018-03866 documented alarms associated with high temperature in the adsorber vessel and abnormally high vault temperatures. 			

- CR-RBS-2018-03939 documented bubbles found in refrigeration machine A contrary to procedural guidance.
- CR-RBS-2018-04134 documented an unexpected alarm associated with the gas dryers.
- CR-RBS-2018-04625 documented the failure of a valve associated with dryer bed A to fully open.
- CR-RBS-2018-04864 documented unexpected alarms received in the main control room.
- CR-RBS-2018-05273 documented an abnormal condition for the refrigeration machine A oil receiver tank identified on operator rounds.

After questioning from the inspectors, the station determined that personnel responsible for categorizing CRs based their assessment on the functionality determination section of Procedure EN-OP-104, "Operability Determination Process," Revision 16. If plant equipment was determined not to be within the scope of the functionality assessment process, licensee personnel assumed that equipment was also outside of the scope of the corrective action program. Because most of the offgas system falls outside the scope of EN-OP-104, the licensee categorized most CRs associated with the offgas system as non-adverse.

Licensee personnel did not recognize that the scope of EN-OP-104 functionality assessment differs from the scope of EN-LI-102 adverse conditions for installed plant equipment. Step 6.3 of EN-OP-104 limits the scope of functionality assessments to particular license basis documents such as the Technical Requirements Manual. Most of the offgas system does not fall within the scope of EN-OP-104. However, EN-LI-102, Attachment 9.1 includes "any condition which results in a failure, malfunction, deficiency, deviation, or nonconformance" of structures, systems, or components "described in the current license basis." The updated safety analysis report is a current license basis document. Chapter 11 of the updated safety analysis report includes an extensive description of the offgas system, resulting in more conditions with the offgas system falling within the scope of EN-LI-102 adverse conditions and requiring resolution through the corrective action program than recognized by the licensee.

Corrective Actions: The licensee's corrective actions included reviewing CRs related to the offgas system to revise them as adverse as required by EN-LI-102. The licensee is also planning to review extent of condition to address other systems potentially inappropriately treated as falling outside the scope of the EN-LI-102 adverse conditions.

Corrective Action Reference: CR-RBS-2018-05816

Performance Assessment:

Performance Deficiency: The failure to consistently disposition adverse conditions as required by Procedure EN-LI-102, "Corrective Action Program," Revision 35, was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because, if left uncorrected, it would have the potential to lead to a more significant safety

concern. Specifically, programmatic failure to categorize conditions associated with the offgas system as adverse and address them in the corrective action program could affect the availability and reliability of the offgas system to maintain the doses associated with releases to the environment as low as reasonably achievable.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," and Appendix D, "Public Radiation Safety Significance Determination Process." The finding was determined to be of very low safety significance (Green) because it involved the Effluent Release Program and it did not impair the ability to assess dose and did not exceed the 10 CFR Part 50, Appendix 1, or 10 CFR 20.1301(d) limits.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the area of human performance, teamwork, because individuals and work groups did not communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety was maintained. Specifically, individuals and groups responsible for categorizing CRs did not communicate and coordinate their activities to ensure conditions were categorized correctly as required by procedures [H.4].

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

Failure to Control Entrance Into a High Radiation Area

Cornerstone	Significance	Cross-cutting Aspect	Inspection Procedure
Occupational Radiation Safety	Green NCV 05000458/2018004-02 Closed	H.11 – Challenge the Unknown	71124.01 Radiological Hazard Assessment and Exposure Controls

The inspectors reviewed a self-revealed, non-cited violation of Technical Specification 5.7.1, "High Radiation Area," for the licensee's failure to control activities in a high radiation area. Specifically, a worker entered into the lower area of the reactor building steam tunnel via a ladder, conservatively posted and controlled as a locked high radiation area (i.e., an area with dose rates greater than 100 millirem per hour and below 1,000 millirem per hour at 30 cm), without knowledge of current radiological conditions and without continuous radiation protection (RP) oversight, as required. The worker received an unexpected dose alarm.

Description: On February 15, 2017, the worker (a contract carpenter) was briefed on radiological conditions by a supplemental RP technician using historical radiation survey data. The two-year old survey showed a maximum dose rate of 20 to 30 millirem per hour for the work area. However, after the worker entered the work area, the maximum dose rate was found to be 560 millirem per hour. This was more than 18 times higher than what had been briefed by RP. As a result, the worker accumulated additional dose and received a dose alarm based on his radiological work permit (RWP) dose alarm setpoint of 52 millirem. Once the alarm was received, the worker stopped and left the area. The worker was logged onto RWP 20171709, Task 5, which only allowed entry into the area with knowledge of the work

area dose rates and continuous RP coverage. In addition, the RP technician failed to take timely, current, and thorough radiation surveys because the RP technician placed too much reliance on two-year old survey data. Overall, the RP technician did not have a full understanding of radiological changes within the work area.

Corrective Actions: The licensee took immediate corrective actions, including coaching the job coverage RP technician and appropriately surveying the work area. Survey RBS-1702-0953 was updated accordingly.

Corrective Action Reference: CR-RBS-2017-01511

Performance Assessment:

Performance Deficiency: The failure to control work activities in a high radiation area, including providing incorrect information about radiological conditions to a worker, is a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the human performance attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process," and determined the violation was of very low safety significance (Green) because it: (1) was not related to as low as reasonably achievable planning, (2) did not involve an overexposure or substantial potential for overexposure, and (3) did not compromise the ability to assess dose.

Cross-cutting Aspect: This finding involved the cross-cutting aspect of human performance, challenge the unknown, because the event was a direct result of not stopping when faced with uncertain conditions. The RP technician providing oversight failed to question the need to survey all areas, ensure the correct work location within the work area, and provide continuous oversight to ensure the individuals working in the area were not entering spaces not briefed for entry [H.11].

Enforcement:

Violation: Technical Specification 5.7.1, "High Radiation Areas," requires, in part, that any individual who enters a high radiation area shall be provided with or accompanied by one or more of the following: (a) a radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received after the dose rate levels in the area have been established and personnel are aware of them and/or (b) an individual qualified in RP procedures with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area and shall perform periodic radiation surveillance at the frequency specified by the health physics supervision in the RWP.

Contrary to the above, on February 15, 2017, an individual entered a high radiation area with a radiation monitoring device that continuously integrates the radiation dose rate in the area

and alarms when a preset integrated dose is received, but the dose rate levels in the area had not been established and personnel were therefore not aware of them. Additionally, the individual qualified in RP procedures with a radiation dose rate monitoring device, who was responsible for providing positive control over the activities within the area, failed to perform periodic radiation surveillance at the frequency specified by the health physics supervision in the RWP.

Enforcement Action: This violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy.

Inadequate Risk Mitigation Actions in Work Procedure Leads to Inadvertent High Pressure Core Spray Initiation

Cornerstone	Significance	Cross-cutting Aspect	Inspection Procedure
Mitigating Systems	Green NCV 05000458/2018004-03 Closed	H.12 – Avoid Complacency	71153 – Follow-up of Events and Notices of Enforcement Discretion

The inspectors reviewed a self-revealed, non-cited violation of Technical Specification 5.4.1.a for the licensee's failure to implement a procedure required by Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Specifically, the licensee failed to pre-plan and perform maintenance on level transmitter B21-LTN081C in accordance with a procedure appropriate to the circumstances. The failure led to a perturbation in the "C" reactor water level instrument reference leg that caused an invalid actuation of the high pressure core spray (HPCS) system at power.

Description: On April 26, 2018, with the plant operating at 100 percent power, the licensee attempted to replace channel C level instrument B21-LTN081C, which was reading lower than the other channels. When the newly installed instrument was returned to service after the replacement, air was released into the line. The air release caused a perturbation in the readings of two instruments that share a reference leg with B21-LTN081C. These instruments, B21-LTN073G and B21-LTN073C, provide inputs into the level 2 HPCS actuation logic and are together sufficient to cause a HPCS actuation. Upon the air release, a spurious level 2 condition was detected by both instruments, causing an actual initiation of HPCS to occur.

The inadvertent initiation of HPCS directed cold water into the shroud, high above the core. The cold water condensed the steam in the area and led to a drop in pressure. The drop in pressure inserted negative reactivity, causing reactor power to fall from 100 percent to 94 percent. After verifying that a low level condition did not actually exist, operators secured HPCS. The securing of HPCS caused the system to be temporarily inoperable.

The cause of the inadvertent initiation was determined to be an inadequate procedure. Specifically, the licensee restored the instrument to service using Procedure STP-051-4203, which did not contain actions to mitigate the possibility of an inadvertent HPCS actuation, even though such an actuation was a known risk.

Corrective Actions: The licensee restored the HPCS system to operable status after the event and modified STP-051-4203 to mitigate the risk of an inadvertent HPCS actuation.

Corrective Action Reference: CR-RBS-2018-02524

Performance Assessment:

Performance Deficiency: The failure to pre-plan and perform maintenance that can affect the performance of safety-related equipment using written procedures and documented instructions appropriate to the circumstances was a performance deficiency.

Screening: The inspectors determined that the performance deficiency was more than minor, and therefore a finding, because it was associated with the equipment performance attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, by conducting maintenance using a procedure inappropriate to the circumstances, the licensee caused a malfunction that led to an inadvertent safety system actuation and an associated power transient.

Significance: The inspectors assessed the significance of the finding using NRC Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 1 – "Mitigating Systems Screening Questions." The inspectors determined that the finding was of very low safety significance (Green) because the finding did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the area of human performance, avoid complacency, because individuals did not recognize and plan for the possibility of mistakes, latent issues, and inherent risk even while expecting successful outcomes. Specifically, despite knowing that the maintenance had the potential to cause an inadvertent actuation of HPCS, the licensee failed to appropriately mitigate the risk [H.12].

Enforcement:

Violation: Technical Specification 5.4.1.a requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, Section 9.a specifies that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances.

Contrary to the above, on April 26, 2018, the licensee failed to pre-plan and perform maintenance that can affect the performance of safety-related equipment using written procedures and documented instructions appropriate to the circumstances. Specifically, the written procedures and documented instructions used to replace B21-LTN081C, a level instrument that can affect the performance of safety-related equipment, were not appropriate to mitigate the risk of an inadvertent actuation of the HPCS system.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy.

Control Room Fresh Air Surveillance Procedures Inappropriate to the Circumstances			
Cornerstone	Significance	Cross-cutting Aspect	Inspection Procedure
Barrier Integrity	Green NCV 05000458/2018004-04 Closed	H.14 – Conservative Bias	71153 – Follow-up of Events and Notices of Enforcement Discretion
<p>The inspectors reviewed a self-revealed, non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," which occurred because the licensee did not prescribe procedures for performing surveillance tests on the main control room fresh air (CRFA) subsystem that were appropriate to the circumstances. Specifically, the licensee allowed up to 31 days to receive and review the results of charcoal filtration bed samples. As a result, the Division II CRFA subsystem was inoperable from April 17, 2018, to May 3, 2018, exceeding Technical Specification 3.7.2 allowed outage time of 7 days.</p>			
<p><u>Description:</u> On April 17, 2018, the licensee removed a sample canister of a carbon filter from the Division II CRFA air filter for laboratory testing in accordance with STP-004-002, "Division II Main Control Room Fresh Air System Laboratory Carbon Filter," Revision 3, to fulfill technical specification surveillance requirements.</p> <p>On April 30, 2018, the licensee reviewed the laboratory testing results and determined that they did not meet the acceptance criteria of STP-004-002 and declared the Division II CRFA subsystem inoperable. The licensee replaced the carbon filter media and restored the Division II CRFA subsystem to an operable status on May 3, 2018, 16 days after the test sample was removed.</p> <p>Technical Specification 3.7.2 requires that two CRFA subsystems be operable during Modes 1, 2, and 3. It also requires that if one subsystem is inoperable, it be returned to service within 7 days or the unit be placed into Mode 3 within 12 hours. The licensee did not meet this technical specification requirement from April 17, 2018, until May 3, 2018.</p> <p>STP-004-002, Step 7.4.1, requires that the licensee obtain the results of laboratory testing of the CRFA carbon samples within 31 days of sample removal. This conflicts with Technical Specification 3.7.2 requirement. Because of this, the licensee's procedure did not ensure that the licensee would return any inoperable subsystem to an operable status within 7 days or the unit be placed into Mode 3 within 12 hours if laboratory testing results did not meet the acceptance criteria of STP-004-002.</p> <p>Corrective Actions: The licensee's immediate corrective action was to replace the Division II CRFA charcoal media to return the system to an operable status. Additional corrective actions included revising STP-402-8605 to obtain test results be reviewed within 3 days rather than 31 days or to take action to ensure the charcoal filters are in an operable status. The licensee also reviewed the testing requirements for other charcoal filters related to</p>			

technical specification requirements to ensure laboratory test results are reviewed within timeframes consistent with the technical specification requirements.

Corrective Action Reference: CR-RBS-2018-02592

Performance Assessment:

Performance Deficiency: The failure to provide procedures appropriate to the circumstances to ensure failed CRFA subsystem testing would be identified and addressed within Technical Specification 3.7.2 requirements was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the procedure quality attribute of the Barrier Integrity Cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents. Specifically, the licensee's CRFA test procedures did not ensure that test failures would be identified and addressed within Technical Specification 3.7.2 requirements.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 3, "Barrier Integrity Screening Questions," dated June 19, 2012. The inspectors determined that the finding was of very low safety significance (Green) because it only represented a degradation of the radiological barrier function of the control room.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the area of human performance, conservative bias, because the individuals did not use decision-making practices that emphasized prudent choices over those that were simply allowable. Specifically, licensee personnel did not decide to take action to obtain test results within the 7-day technical specification allowed completion time rather than within the procedurally allowed 31 days [H.14].

Enforcement:

Violation: As required by Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances.

Contrary to the above, prior to April 30, 2018, surveillance testing activities on the Division II CRFA subsystem, which are activities affecting quality, were not prescribed by documented procedures appropriate to the circumstances. Specifically, the procedure for conducting surveillance testing on the Division II CRFA subsystem allowed up to 31 days to receive and review the results of charcoal filtration bed samples. As a result, the Division II CRFA subsystem was inoperable from April 17, 2018, to May 3, 2018, exceeding Technical Specification 3.7.2 allowed outage time of 7 days.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy.

Inappropriate Maintenance Procedure Leads to Water Intrusion into Division II Emergency Diesel Generator Lube Oil System			
Cornerstone	Significance	Cross-cutting Aspect	Inspection Procedure
Mitigating Systems	Green NCV 05000458/2018004-05 Closed	H.5 – Work Management	71153 – Follow-up of Events and Notices of Enforcement Discretion
<p>The inspectors reviewed a self-revealed, non-cited violation of Technical Specification 5.4.1.a for the licensee's failure to implement a procedure required by Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Specifically, the licensee failed to pre-plan and perform maintenance on the Division II emergency diesel generator in accordance with a procedure appropriate to the circumstances. As a result, the emergency diesel generator was rendered incapable of performing its specified safety function.</p>			
<p><u>Description:</u> On July 6, 2018, the Division II emergency diesel generator at River Bend Station was declared inoperable due to confirmed water intrusion into the lube oil system. The cause of the water intrusion was a failure of the packing material that separates the water side of the lube oil heat exchanger tube sheet from the oil side.</p> <p>The emergency diesel generator lube oil heat exchanger is designed with a floating tube sheet on one end to allow for thermal expansion and contraction during operation. The floating end contains two rings of rubber packing and an internal lantern ring, with weep holes that direct packing leakage outside of the heat exchanger onto the floor.</p> <p>When exposed to repeated thermal stresses over time, the packing material has the potential to deform over time. The system is designed so that water leakage caused by this deformation will pass through the weep holes in the lantern ring onto the floor, where the station will be detect and respond to it.</p> <p>The lantern ring that the licensee used in the seal was incorrectly sized relative to the tube sheet itself. The tube sheet was machined to a smaller, non-standard size by the original vendor, but the size of the installed lantern ring was never adjusted accordingly. The structure therefore exhibited excessive clearance that allowed the packing, as it deformed and degraded, to extrude and block the lantern ring drain holes when heated from ambient to standby temperatures. This condition had the potential to send water leakage into the lube oil side of the heat exchanger rather than onto the floor as designed.</p> <p>The licensee was aware of this non-conforming condition since the year 2000 and experienced several water leaks in the lube oil system as a result of it, with the most recent leak occurring in 2008. The leaks occurred in conjunction with extended maintenance outages in which the lube oil system was cooled down to ambient temperature and then heated up to standby conditions.</p> <p>On June 24, 2018, the licensee entered into an extended maintenance outage on the Division II emergency diesel generator. During this outage, the licensee allowed the emergency diesel generator lube oil system to cool down to ambient temperatures. On July 1, 2018, the licensee completed the outage and heated the lube oil system back up to</p>			

standby conditions. The licensee ran the emergency diesel generator for post maintenance tests, accumulating 187 minutes of run time with normal parameters. During the post maintenance testing, the licensee identified an issue associated with relays that control the emergency start circuit. To correct this issue, the licensee tagged out the engine and auxiliaries, allowing temperatures in the lube oil system to return back to ambient levels. On July 3, 2018, after resolving the relay issue, the licensee removed tags and heated the lube oil system back up to standby conditions. On July 4, 2018, the licensee completed post maintenance testing on the emergency diesel generator and declared it operable. On the evening of July 5, 2018, a watchstander noted a large increase in the differential pressure across the filter for the lube oil strainer. After sampling the lube oil system, the licensee found evidence of water intrusion and declared the emergency diesel generator inoperable.

After investigation, the licensee determined that the cooldown of the system on July 1, 2018, induced contractions in the packing that caused a leak. On July 3, 2018, when the packing subsequently expanded on startup of the system, it extruded and covered the lantern ring drain holes. Because the leaking water was unable to travel through the lantern ring, it intruded into the lube oil side of the heat exchanger where it spread throughout the system, causing the high differential pressure reading on the strainer and rendering the emergency diesel generator inoperable.

The improperly-sized lantern ring represented a non-conforming condition that made the lube oil system vulnerable to water intrusion in response to thermal cycling. Despite knowing about this non-conforming condition and having experienced water intrusion related to it in multiple prior maintenance outages, the licensee exposed the system to the failure mechanism associated with the condition without utilizing any precautions, steps, or references in any procedures or work instructions to verify that the system remained intact and functioning properly prior to returning it to service.

Corrective Action(s): The licensee replaced the deformed packing and the lantern ring in the Division II emergency diesel generator and declared the emergency diesel generator operable on July 9, 2018. The licensee installed a correctly-sized lantern ring on the Division I emergency diesel generator in the most recent outage and has issued a work order to install a correctly-sized lantern ring in the next Division II emergency diesel generator outage.

Corrective Action Reference: CR-RBS-2018-3804

Performance Assessment:

Performance Deficiency: The failure to pre-plan and perform maintenance that can affect the performance of safety-related equipment using written procedures and documented instructions appropriate to the circumstances was a performance deficiency.

Screening: The inspectors determined that the performance deficiency was more than minor, and therefore a finding, because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the procedures used in the maintenance outage failed to contain precautions, steps, or instructions to ensure that the lube oil system was intact and functioning properly after being repeatedly exposed to a known historical

failure mechanism. As a consequence, the licensee incorrectly designated the Division II emergency diesel generator as operable and placed the Division I emergency diesel generator in maintenance mode for a test run, creating a condition in which the Division I and Division II emergency diesel generators were simultaneously inoperable.

Significance: The inspectors assessed the significance of the finding using NRC Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2 – "Mitigating Systems Screening Questions." The inspectors determined that the finding was of very low safety significance (Green) because the water intrusion, which began on or after July 1, 2018, did not represent (1) an actual loss of function of at least a single train for greater than its technical specification allowed outage time, (2) two separate safety systems out-of-service for greater than its technical specification allowed outage time, or (3) an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hours.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the area of human performance, work management, because the station failed to implement a work process that included the identification and management of risk commensurate to the work. Specifically, the licensee failed to recognize and plan for the risk, confirmed in prior station operating experience, that the packing and lantern ring in the emergency diesel generator heat exchanger might fail in response to repeated cooldowns and heatups of the system during an outage [H.5].

Enforcement:

Violation: Technical Specification 5.4.1.a requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, Section 9.a specifies that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances.

Contrary to the above, from June 24, 2018, until July 9, 2018, the licensee failed to pre-plan and perform maintenance that can affect the performance of safety-related equipment using written procedures and documented instructions appropriate to the circumstances. Specifically, the written procedures and documented instructions used in the maintenance were not appropriate to the circumstances in that they repeatedly exposed the system to a known historical failure mechanism without directing operators to take appropriate action to verify that the system was intact and functioning properly prior to returning it to service.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

On November 8, 2018, the inspectors presented the baseline radiation safety inspection results to Mr. W. Maguire, Site Vice President, and other members of the licensee staff. The inspectors verified no proprietary information was retained or documented in this report.

On December 13, 2018, the lead inspector presented the results from the routine ISFSI inspection to Mr. Kent Scott, General Manager Plant Operations, and other members of the licensee staff. Licensee personnel acknowledged the information presented. The inspectors confirmed that proprietary information was controlled to protect from public disclosure.

On January 14, the inspector presented the quarterly resident inspector inspection results to Mr. S. Vercelli, Site Vice President, and other members of the licensee staff. The inspectors verified no proprietary information was retained or documented in this report.

DOCUMENTS REVIEWED

71111.01 – Adverse Weather Protection

Condition Reports (CR-RBS-)

2018-05172	2018-05174	2018-05449	2018-05473
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Miscellaneous Documents

WT-WTRBS-2018-00075

Procedures

Number	Title	Revision
EN-FAP-WM-016	Seasonal Reliability	1
OSP-0043	Freeze Protection and Temperature Maintenance	39

Work Orders

52714395	52717534	52768742	52833091
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71111.04 – Equipment Alignment

Condition Reports (CR-RBS-)

2018-00526	2018-01850	2018-02670	2018-03262	2018-03476
2018-03780	2018-04225	2018-04490	2018-04550	2018-04807
2018-04826	2018-05094	2018-05556	2018-05563	

Procedures

Number	Title	Revision
PEP-0026	Diesel Generator Operating Logs	015
SOP-0030	High Pressure Core Spray	33
SOP-0053	Standby Diesel Generator and Auxiliaries (SYS 309)	339
SOP-0061	Diesel Generator Building Ventilation	016

71111.05AQ – Fire Protection Annual/Quarterly

Calculation

Number	Title	Revision
G13.18.12.2-022	River Bend Station – Combustible Loading	5

Condition Reports (CR-RBS-)

2017-05946	2018-00331	2018-01736	2018-02863	2018-03079
2018-04613				

Procedures

Number	Title	Revision
CB-116-131-	Standby Switchgear 1C Room, Fire Area C-22	3
DG-98-050	Diesel Generator B Room Fire Area DG-4/Z-1	3
DG-98-051	Diesel Generator B Control Room Fire Area DG-4/Z-1	4
DG-98-052	Diesel Generator C Room Fire Area DG-5/Z-1	4
DG-98-053	Diesel Generator C Control Room Fire Area DG-5/Z-1	4
DG-98-054	Diesel Generator A Room Fire Area DG-6/Z-1	4
SEP-FPP-RBS-001	River Bend Station Fire Protection Program	4
SEP-FPP-RBS-004	Guidelines for Preparation of Pre-Fire Strategies and Pre-Fire Plans	2
SOP-0053	Standby Diesel Generator and Auxiliaries (SYS 309)	339

71111.11 – Licensed Operator Regualification Program and Licensed Operator Performance

Procedures

Number	Title	Revision
EN-OP-115	Conduct of Operations	025
GOP-0002	Power Decrease / Plant Shutdown	082

71111.12 – Maintenance Effectiveness

Condition Reports (CR-RBS-)

2007-03766	2017-03638	2017-07080	2017-07111	2017-07532
2018-00505				

Miscellaneous Document

Number	Title	Revision
SDC-309	System Design Criteria Standby Diesel Generator System	3

Procedures

Number	Title	Revision
EN-DC-203	Maintenance Rule Program	4
EN-DC-205	Maintenance Rule Monitoring	6
EN-DC-206	Maintenance Rule (A)(1) Process	3

71111.13 – Maintenance Risk Assessments and Emergent Work Control

Condition Reports (CR-RBS-)

2018-05603	2018-05824	2018-06363
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Procedures

Number	Title	Revision
ADM-0096	Risk Management Program Implementation and On-line Maintenance Risk Assessment	327
EN-WM-104	On Line Risk Assessment	018
STP-305-1604	ENGR-CHGR1B Load Test	302
STP-403-1200	HVR-UC1A System A Timer Channel Functional Test	012
STP-403-1201	HVR-UC1B System B Timer Channel Functional Test	006
STP-403-1300	HVR-UC1A System A Timer Channel Calibration	013

71111.15 – Operability Determinations and Functionality Assessments

Condition Reports (CR-RBS-)

2012-00160	2012-00178	2018-05468	2018-05479	2018-01190
2018-03866	2018-03939	2018-04134	2018-04531	2018-04625
2018-04864	2018-05264	2018-05273	2018-05816	

Miscellaneous Documents

Number	Title	Revision
	River Bend Station Emergency Plan	43
0221.435-000-006	GE Design Specification, Residual Heat Removal System	0
SDC-204	Residual Heat Removal System Design Criteria System Number 204	4

Procedures

Number	Title	Revision
EN-LI-102	Corrective Action Program	35
EN-OP-104	Operability Determination Process	16

71111.19 – Post Maintenance Testing

Condition Reports (CR-RBS-)

2018-05378	2018-05866	2018-05874	2018-05875	2018-05876
2018-05880	2018-05909	2018-05915	2018-05937	2018-05944
2018-05981	2018-06011	2018-06063	2018-06363	2018-06375

Procedures

Number	Title	Revision
CMP-1026	MCC Circuit Breakers, Starters, and Thermal Overloads (Testing Performed per Work Order Instructions)	21
EN-MA-157	Configuration Control	2

Procedures

Number	Title	Revision
EN-WM-107	Post Maintenance Testing	1
MCP-1130	Testing and Calibration of Agastat Relays	11
SOP-0053	Standby Diesel Generator and Auxiliaries (Sys 309)	339
STP-309-0206	Division I Diesel Generator 184 Day Operability Test	030

Work Orders

00510064	00513628	00513629	52734869
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71111.20 – Refueling and Other Outage Activities

Condition Reports (CR-RBS-)

2018-06018	2018-06256
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Procedures

Number	Title	Revision
GOP-0001	Plant Startup	103
GOP-0003	Scram Recovery	032

71111.22 – Surveillance Testing

Condition Reports (CR-RBS-)

2018-01283	2018-01894	2018-01982	2018-01987	2018-03496
2018-05662	2018-05709			

Work Order

05276254

71124.01 – Radiological Hazard Assessment and Exposure Controls

Air Sample Surveys

Number	Title	Date
RBS-AS-2018-0082	Reactor Building Cavity 186'	January 16, 2018
RBS-AS-2018-0085	Aux Platform 186'	January 16, 2018
RBS-AS-2018-0107	RFF South 186'	January 19, 2018
RBS-AS-2018-0285	Fuel Building 148'	April 17, 2018
RBS-AS-2018-0559	Fuel Building Cask Pool 113'	August 23, 2018

Audits and Self-Assessments

Number	Title	Date
LO-RLO-2017-00071	RP Pre-NRC Focused Self-Assessment Radiation Safety Inspection	August 28, 2018

Condition Reports (CR-RBS-)

2017-01233	2017-01262	2017-01323	2017-01343	2017-01372
2017-01410	2017-01511	2017-01534	2017-01648	2017-02099
2017-02910	2017-03011	2017-03424	2017-05519	2017-05787
2017-06922	2017-07100	2017-07664	2017-07929	2018-00523
2018-00596	2018-00725	2018-01764	2018-02221	2018-03241
2018-03534	2018-03845	2018-04681		

Miscellaneous Documents

Number	Title	Date
EN-RP-101, Att. 6	LHRA/VHRA Key Log	November 7, 2018
	Pool Material Inventory Report Post RF-19	May 31, 2017
	2018 Annual Inventory Reconciliation	January 3, 2018
443615001	10 CFR Part 61 Waste Stream Sample Screening and Evaluation	January 30, 2018
52783772	Radioactive Source Leak Test	April 11, 2018

Procedures

Number	Title	Revision
ADM-0071	Fuel Pools Material Control	008
ADM-0097	Hot spot/line Flushing Program	002
ADM-0103	Radiation Protection Standards and Expectations	006
EN-RP-100	Radiation Worker Expectations	011
EN-RP-101	Access Control for Radiologically Controlled Areas	012
EN-RP-102	Radiological Control	005
EN-RP-105	Radiological Work Permits	018
EN-RP-108	Radiation Protection Posting	018
EN-RP-109	Hot Spot Program	005
EN-RP-121	Radioactive Material Control	014
EN-RP-152	Conduct of Radiation Protection	001
EN-RP-201	Dosimetry Administration	005
EN-RP-202	Personnel Monitoring	012
EN-RP-311	Electronic Alarming Dosimeters	002
RSP-0229	Radiation Protection Response to Changing Radiological Conditions	019
SOP-0112	Solid Radwaste Processing (SYS #604)	019

Radiation Surveys

Number	Title	Date
RBS-1702-0953	141' Reactor Building Follow Up Survey	February 15, 2017
RBS-1804-0213	4300 Radwaste 136'	April 23, 2018

Radiation Surveys

Number	Title	Date
RBS-1806-0149	4114 Special Nuclear Material Storage Room	June 12, 2018
RBS-1808-0351	4024 Radwaste 90 Pipe Chase	August 27, 2018
RBS-1809-0181	7500 Reactor Building 186'	September 6, 2018

Radiation Work Permits

Number	Title	Revision
20171800	RF-19 Refuel Floor Outage Activities	06
20171953	RF-19 Bio-Shield Activities	00
20181001	Radiation Protection Activities	00
20181006	Decon, Radwaste & Radioactive Material Activities	00
20181071	Floor Drain Cleaning Project	00
20181214	Emergent Work Including All Support Activities	00
20181273	Reverse Osmosis (RO) Filter Move, Setup, & Changeout	00
20181296	RWCU Pump A Seal Replacement	02

71124.03 – In-Plant Airborne Radioactivity Control and Mitigation

Air Sample Surveys

Number	Title	Date
RBS-AS-2018-0321	Air Lapel Alpha Sample	May 2, 2018
RBS-AS-2018-0327	Air Lapel Alpha Sample	May 2, 2018
RBS-AS-2018-0328	Airborne Calculation Tri-Nuke Hose Cutup	May 2, 2018
RBS-AS-2018-0336	Air Lapel Alpha Sample	May 7, 2018
RBS-AS-2018-0341	Airborne Calculation Tri-Nuke Hose Cutup'	May 9, 2018

Audits and Self-Assessments

Number	Title	Date
LO-RLO-2017-00071	RP Pre-NRC Focused Self-Assessment Radiation Safety Inspection	August 28, 2018

Condition Reports (CR-RBS-)

2017-01217	2017-01422	2017-03366	2017-03880	2017-04151
2017-04156	2017-04941	2017-11262	2018-00177	2018-03534

HEPA and Charcoal Filter Test Records

Number	Title	Date
V-049	DOP HEPA Test Portable Ventilation	September 20, 2017
VW-035	DOP HEPA Test Portable Ventilation	May 24, 2017
35101639026068	DOP HEPA Test Portable Ventilation	May 24, 2017

HEPA and Charcoal Filter Test Records

Number	Title	Date
35101639026069	DOP HEPA Test Portable Ventilation	May 24, 2017

Miscellaneous Documents

Number	Title	Date
	ODMI Failed Fuel Action Plan	September 7, 2018
	ODMI Failed Fuel Action Plan	October 2, 2018

Procedures

Number	Title	Revision
EN-RP-402	DOP Challenge Testing of HEPA Vacuums and Portable Ventilation Units	004
EN-RP-404	Operation and Maintenance of HEPA Vacuum Cleaners and HEPA Ventilation Units	008
EN-RP-501	Respiratory Protection Program	005
EN-RP-502-01	FireHawk M7 SCBA	002
EN-RP-502-01	Inspection And Maintenance Of Respiratory Protection Equipment	005
EN-RP-502-02	Flow Testing MSA Breathing Apparatus	000
EN-RP-502-03	AirHawk II SCBA	000
EN-RP-503	Selection, Issue and Use of Respiratory Protection Equipment	007
EN-RP-504	Breathing Air	004
EN-RP-505	PortaCount Respirator Fit Testing	007

Respirator Testing, Inspection, and Inventory Records

Number	Title	Date
AMAG204076	SCBA	October 3, 2017
AMAG203061	SCBA	October 3, 2017
AMAG204076	SCBA	February 14, 2018
AMAG199928	SCBA	February 14, 2018

71151 – Performance Indicator Verification

Condition Reports (CR-RBS-)

2017-07277	2017-07777	2018-01613	2018-01756
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Miscellaneous Documents

Number	Title	Date
RBG-47820	NRC Performance Indicator Submittal for 4 th Quarter 2017	January 18, 2018

Miscellaneous Documents

Number	Title	Date
RBG-47856	NRC Performance Indicator Submittal for 1 st Quarter 2018	April 18, 2018
RBG-47887	NRC Performance Indicator Submittal for 2 nd Quarter 2018	July 23, 2018
RBS-47908	NRC Performance Indicator Submittal for 3 rd Quarter 2018	October 29, 2018

Procedures

Number	Title	Revision
EN-LI-114	Regulatory Performance Indicator Process	11 & 12
NEI 99-02	Regulatory Assessment Performance Indicator Guideline	7

71152 – Problem Identification and Resolution

Condition Reports (CR-RBS-)

2018-01277	2018-02656	2018-03001	2018-03182	2018-03804
2018-04253	2018-04921	2018-05564	2018-06018	2018-06363

Procedure

Number	Title	Revision
EN-LI-121	Trending and Performance Review Process	25

71153 – Follow-up of Events and Notices of Enforcement Discretion

Condition Report (CR-RBS-)

2018-02592

Procedure

Number	Title	Revision
STP-402-8605	Division II Main Control Room Fresh Air System Laboratory Carbon Filter Analysis	3 & 4

40A5.1 Other Activities (IP 60855) and (IP 60857)

10 CFR 72.48 Applicability Determinations and 10 CFR 72.48 Screens

Numerous, dated June 1, 2016, through October 21, 2018.

Condition Reports (CR-RBS-)

Numerous, dated June 1, 2016, through October 21, 2018.

Design Basis Documents

Number	Title	Revision
RBS-CS-17-0003	Methods and Criteria for Finite Element Analysis of the Dry Cask Stack-Up Configuration	0
RBS-CS-17-0004	Report for the Seismic Stability Analysis of the DFS Stack-up in the Cask Handling Area	0
N/A	10 CFR 72.212 Report; River Bend Station	3

Miscellaneous Documents

Number	Title	Revision or Date
RQA-20-2016	2016 ISFSI Audit	1
RQA-20-2018	2018 ISFSI Audi	1
N/A	RBS Cask 24-30 Fuel Selection Characteristic Matrix	0
N/A	2017 Annual Radioactive Effluent Release Report	May 1, 2018
1805-0323	Dry Fuel Cask Storage Area Radiological Survey	May 29, 2018
STP-000-0001	Daily Operating Logs (numerous)	Various

Procedures

Number	Title	Revision
DFS-0002	Dry Fuel Cask Loading	307
DFS-0003	MPC Transfer Operations and HI-STORM Transport	4
DFS-0140	MPC Forced Helium Dehydration Operation	5
EN-DC-215	Fuel Selection for Holtec Dry Cask Storage	9
EN-LI-102	Corrective Action Program	35

Work Orders

00182838	00497642	52696446	52715421	52767513
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**The following items are requested for the
Occupational Radiation Safety Inspection
at River Bend Station
November 5-9, 2018
Integrated Report 2018004**

Inspection areas are listed in the attachments below.

Please provide the requested information on or before **October 26, 2018**

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.01 should be in a file/folder titled "1- A," applicable organization charts in file/folder "1- B," etc.

If information is placed on *ims.certrec.com*, please ensure the inspection exit date entered is at least 30 days later than the onsite inspection dates, so the inspectors will have access to the information while writing the report.

In addition to the corrective action document lists provided for each inspection procedure listed below, please provide updated lists of corrective action documents at the entrance meeting. The dates for these lists should range from the end dates of the original lists to the day of the entrance meeting.

If more than one inspection procedure is to be conducted and the information requests appear to be redundant, there is no need to provide duplicate copies. Enter a note explaining in which file the information can be found.

If you have any questions or comments, please contact Louis Carson at (817)200-1221, Louis.Carson@nrc.gov or Natasha Greene at (817)200-1154, Natasha.Greene@nrc.gov

PAPERWORK REDUCTION ACT STATEMENT

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, control number 3150-0011.

1. Radiological Hazard Assessment and Exposure Controls (71124.01) and Performance Indicator Verification (71151)

Date of Last Inspection: **February 10, 2017**

- A. List of contacts and telephone numbers for the Radiation Protection Organization Staff and Technicians, as well as the Licensing/Regulatory Affairs staff. Please include area code and prefix. If work cell numbers are appropriate, then please include them as well.
- B. Applicable organization charts including position or job titles. Please include as appropriate for your site, Site Management, RP, Chemistry, Maintenance (I&C), Engineering, and Emergency Protection. (Recent pictures are appreciated.)
- C. Copies of audits, self-assessments, LARs, and LERs written since the last inspection date, related to this inspection area
- D. Procedure indexes for the radiation protection procedures and other related disciplines.
- E. Please provide procedures related to the following areas noted below. Additional procedures may be requested by number after the inspector reviews the procedure indexes.
 - 1. Radiation Protection Program
 - 2. Radiation Protection Conduct of Operations, if not included in #1.
 - 3. Personnel Dosimetry
 - 4. Posting of Radiological Areas
 - 5. High Radiation Area Controls
 - 6. RCA Access Controls and Radiation Worker Instructions
 - 7. Conduct of Radiological Surveys
 - 8. Radioactive Source Inventory and Control
 - 9. Fuel Pool Inventory Access and Control
- F. Please provide a list of NRC Regulatory Guides and NUREGs that you are currently committed to relative to this program. Please include the revision and/or date for the commitment and where this may be located in your current licensing basis documents.
- G. Please provide a summary list of corrective action documents (including corporate and sub-tiered systems) since the last inspection date.
 - 1. Initiated by the radiation protection organization
 - 2. Assigned to the radiation protection organization

NOTE: These lists should include a description of the condition that provides sufficient detail that the inspectors can ascertain the regulatory impact, the significance level assigned to the condition, the status of the action (e.g., open, working, closed, etc.) and the search criteria used. Please provide in document formats which are "sortable" and "searchable" so that inspectors can quickly and efficiently determine appropriate sampling and perform word searches, as needed. (Excel spreadsheets are the preferred format.) If codes are used, please provide a legend for each column where a code is used.

- H. List of radiologically significant work activities scheduled to be conducted during the inspection period. (If the inspection is scheduled during an outage, please also include a list of work activities greater than 1 rem, scheduled during the outage with the dose estimate for the work activity.) Please include the radiological risk assigned to each activity.
- I. Provide a summary of any changes to plant operation that have resulted or could result in a significant new radiological hazard. For each change, please provide the assessment conducted on the potential impact and any monitoring done to evaluate it.
- J. List of active radiation work permits and those specifically planned for the on-site inspection week.
- K. Please provide a list of air samples taken to verify engineering controls and a separate list for breathing air samples in airborne radiation areas or high contamination work areas. Please include the RWP the breathing air sampling supports.
- L. Please provide the current radioactive source inventory, listing all radioactive sources that are required to be leak tested. Indicate which sources are deemed 10 CFR Part 20, Appendix E, Category 1 or Category 2. Please indicate the radioisotope, initial and current activity (w/assay date), and storage location for each applicable source.
- M. The last two leak test results for all required/applicable radioactive sources that have failed its leak test within the last two years. Provide any applicable condition reports.
- N. A list of all non-fuel items stored in the spent fuel pools, and if available, their appropriate dose rates (Contact / @ 30cm)
- O. A list of radiological controlled area entries greater than 100 millirem, since the last inspection date. The list should include the date of entry, some form of worker identification, the radiation work permit used by the worker, dose accrued by the worker, and the electronic dosimeter dose alarm set-point used during the entry (for Occupational Radiation Safety Performance Indicator verification in accordance with IP 71151).
- P. A list describing VHRAs and TS HRAs (> 1 rem/hour) that are current and historical. Include their current status, locations, and control measures.
- Q. Temporary effluent monitor locations and calibrations (AMS-4) used to monitor normally closed doors or off-normal release points (e.g., equipment hatch or turbine heater bay doors). Include any CRs associated with this monitoring or instrumentation.

3. In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

Date of Last Inspection June 16, 2016

- A. List of contacts and telephone numbers for the following areas. Please include area code and prefix. If work cell numbers are appropriate, then please include them as well.
1. Respiratory Protection Program
 2. Self-contained breathing apparatus
 3. Ventilation Systems for breathing air (not effluents)
 4. Licensing/Regulatory Affairs
- B. Applicable organization charts including position or job titles. Please include as appropriate for your site, Site Management, RP, Chemistry, Maintenance (I&C), Engineering, and Emergency Protection. (Recent pictures are appreciated.)
- C. Copies of audits, self-assessments, vendor or NUPIC audits for contractor support (SCBA), LARs, and LERs, written since the date of last inspection related to:
1. Installed air filtration systems
 2. Self-contained breathing apparatuses
- D. Procedure index for Radiation Protection, Maintenance, I&C, and other related disciplines.
1. Use, operation, and maintenance of installed and portable continuous air monitors
 2. Use operation, and maintenance of installed air filtration units for breathing air (e.g., for airline respirators, emergency ventilation systems).
 3. Use, operation, and maintenance of temporary air filtration units and vacuums
 4. Respiratory protection and other related disciplines.
- E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures may be requested by number after the inspector reviews the procedure indexes.
1. Respiratory protection program
 2. Use and maintenance of self-contained breathing apparatuses
 3. Air quality testing for SCBAs or other compressed or supplied air systems
 4. Use and testing of installed plant air cleaning systems used for breathing air, such as control room emergency ventilation, technical support center, operations support center, and emergency operations facility (When containment purge is not used as an effluent system, then it can be considered as a breathing air system used prior to outages during RCS breach and flood up.)
- F. Please provide a list of NRC Regulatory Guides and NUREGs that you are currently committed to relative to this program. Please include the revision and/or date for the commitment and where this may be located in your current licensing basis documents.
- G. Please provide a summary list of corrective action documents (including corporate and sub-tiered systems) written since the date of last inspection, related to the Airborne Monitoring program including:

1. In-plant continuous air monitors (installed or portable), not effluent monitors
2. Self-contained breathing apparatus
3. Air Cleaning systems (not effluent)
4. Respiratory protection program

NOTE: These lists should include a description of the condition that provides sufficient detail that the inspectors can ascertain the regulatory impact, the significance level assigned to the condition, the status of the action (e.g., open, working, closed, etc.) and the search criteria used. Please provide in document formats which are “sortable” and “searchable” so that inspectors can quickly and efficiently determine appropriate sampling and perform word searches, as needed. (Excel spreadsheets are the preferred format.) If codes are used, please provide a legend for each column where a code is used.

- H. List of SCBA qualified personnel - reactor operators and emergency response personnel. For the control room individuals, please indicate their normally scheduled shift and specific mask size, as well as note if they are permitted/fitted for eyewear.
- I. Inspection records for self-contained breathing apparatuses (SCBAs) staged in the plant for use since the date of last inspection.
- J. SCBA training and qualification records for control room operators, shift supervisors, STAs, and OSC personnel for the last year.
A selection of personnel may be asked to demonstrate proficiency in donning, doffing, and performance of functionality check for respiratory devices
- K. List of respirators (available for use) by type (APR, SCBA, PAPR, etc.), manufacturer, model, quantity by size, and location. Be prepared to demonstrate that these respirators are NIOSH certified.
Include in the list the specific quantities and sizes staged for emergency use.
- L. Provide one-line drawings of the supplied air and air cleaning systems identified in E.3 and E.4 above.
- M. List work activities requiring respiratory protection and the type of respirator used (include PAPRs)
- N. Please have available, on-site, the records demonstrating the compressed air for SCBAs or supplied air for a breathing air system is at least Grade D.

RIVER BEND STATION – NRC INTEGRATED INSPECTION REPORT 05000458/2018004
AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION INSPECTION
REPORT 07200049/2018001 – January 29, 2019

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 By: JKozal ☒ Yes ☐ No ☒ Publicly Available ☐ Sensitive NRC-002

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