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

May 8, 2018

Mr. William F. Maguire, Site Vice President
Entergy Operations, Inc.
River Bend Station
5485 U.S. Highway 61N
St. Francisville, LA 70775

SUBJECT: RIVER BEND STATION – NRC INTEGRATED INSPECTION REPORT 05000458/2018001

Dear Mr. Maguire:

On March 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your River Bend Station, Unit 1. On April 25, 2018, 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 two findings of very low safety significance (Green) in this report. One of these findings involved a violation of NRC requirements. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the violation or significance of the NCV, 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 No. 50-458
License No. NPF-47

Enclosure:
Inspection Report 05000458/2018001
w/ Attachments:
1. Documents Reviewed
2. Occupational Radiation Safety Inspection Request for Information

**U.S. NUCLEAR REGULATORY COMMISSION**
**Inspection Report**

| | |
|---|---|
| Docket Number: | 05000458 |
| License Number: | NPF-47 |
| Report Number: | 05000458/2018001 |
| Enterprise Identifier: | I-2018-001-0009 |
| Licensee: | Entergy Operations, Inc. |
| Facility: | River Bend Station |
| Location: | Saint Francisville, Louisiana |
| Inspection Dates: | January 1, 2018 to March 31, 2018. |
| Inspectors: | J. Sowa, Senior Resident Inspector<br>B. Parks, Resident Inspector<br>M. O'Banion, Acting Resident Inspector<br>J. Drake, Senior Reactor Inspector<br>C. Young, Senior Project Engineer<br>L. Carson II, Senior Health Physicist |
| Approved By: | J. Kozal, Chief, Branch C<br>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 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. Findings and violations being considered in the NRC's assessment are summarized in the table below.

### List of Findings and Violations

| Failure to Implement Procedure for Storage of Material in the Pools | | | |
|---|---|---|---|
| Cornerstone | Significance | Cross-cutting Aspect | Report Section |
| Occupational Radiation Safety | Green<br>NCV 05000458/2018001-01<br>Closed | [H.4] – Human Performance, Teamwork | 71124.02 – Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls |
| The inspectors identified a non-cited violation of Technical Specification 5.4.1.a for the licensee's failure to implement written procedures for activities referenced in Appendix A of Regulatory Guide 1.33, Revision 2, dated February 1978. Specifically, the licensee failed to implement radioactive material control Procedure ADM-0071, "Fuel Pools Material Control," Revision 8, for the storage and movement of spent Tri-Nuke filters. | | | |

| Installation of an Incorrectly Specified Relay Causes Plant Transient and Reactor Scram | | | |
|---|---|---|---|
| Cornerstone | Significance | Cross-cutting Aspect | Report Section |
| Initiating Events | Green<br>FIN 05000458/2018001-02<br>Closed | [H.5] – Human Performance, Work Management | 71152 – Problem Identification and Resolution |
| The inspectors reviewed two examples of a self-revealed finding for the licensee's installation of an incorrectly specified relay in 1) the control circuitry for the feedwater level control system and 2) the turbine generator voltage regulator circuitry. In each instance, the incorrectly specified relay failed in service, causing a plant transient and automatic reactor scram. | | | |

**Additional Tracking Items**

| Type | Issue number | Title | Report Section | Status |
|---|---|---|---|---|
| LER | 05000458/2017-007-00 | Automatic Reactor Scram Due to Failure of Main Generator Voltage Regulator Mode Transfer Relay | 71153 | Closed |
| LER | 05000458/2017-008-00 | Automatic Reactor Scram Due to Failure of Main Feedwater Regulator Transfer Relay | 71153 | Closed |

## PLANT STATUS

River Bend Station began the inspection period at rated thermal power. On January 8, 2018, the unit was shut down for a planned maintenance outage. A reactor startup was performed on January 30, 2018. The unit was shut down to conduct a forced outage on February 1, 2018, due to an unexpected trip of the B reactor recirculation pump. A reactor startup was performed on February 9, 2018. The unit was shut down to conduct a forced outage on March 1, 2018, due to a pipe leak associated with the main condenser. A reactor startup was performed on March 6, 2018. The unit was returned to rated thermal power on March 20, 2018. The unit 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

### 71111.04—Equipment Alignment

Partial Walkdown (3 Samples)

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

(1) Division I residual heat removal system on January 25, 2018

(2) Division II residual heat removal system on January 25, 2018

(3) Control building heating, ventilation, and air conditioning (HVAC) system on March 15, 2018

Complete Walkdown (1 Sample)

The inspectors evaluated system configurations during a complete walkdown of the standby service water system on March 8, 2018.

71111.05AQ—Fire Protection Annual/Quarterly

Quarterly Inspection (4 Samples)

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

(1) Residual heat removal pump A room, fire area AB-5 on January 25, 2018

(2) Residual heat removal pump B room, fire area AB-3 on January 25, 2018

(3) Standby service water pump A room, fire area PH-1/Z-1on March 12, 2018

(4) Standby service water pump B room, fire area PH-2/Z-1 on March 12, 2018

71111.06—Flood Protection Measures

Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the standby service water pump rooms, SW-01 on January 12, 2018.

Cables (1 Sample)

The inspectors evaluated cable submergence protection in:

(1) Electrical manhole 1EMH607 on January 16, 2018

(2) Electrical manhole 1EMH613 on January 16, 2018

71111.11—Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated licensed operator requalification training on February 6, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated the operators' performance during a plant shutdown for a planned maintenance outage on January 7, 2018.

71111.12—Maintenance Effectiveness

Routine Maintenance Effectiveness (3 Samples)

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

(1) Functional failure review of standby service water on January 16, 2018

(2) Functional failure review of the 120 VAC system on February 19, 2018

(3) Functional failure review of the reactor recirculation system associated with the failure of the B recirculation pump to upshift to fast speed on March 1, 2018

71111.13—Maintenance Risk Assessments and Emergent Work Control (4 Samples)

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

(1) Yellow shutdown risk condition with containment access hatch open on January 8, 2018

(2) Yellow risk condition due to fuel movement and Division III emergency diesel generator inoperability while in Mode 5 on January 24, 2018

(3) Yellow risk condition due to high pressure core spray pump inoperability during remote shutdown panel surveillance testing on February 23, 2018

(4) Yellow risk condition due to residual heat removal pump B discharge flow inoperability during maintenance and testing on March 15, 2018

71111.15—Operability Determinations and Functionality Assessments (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) E31-N604F main steam line tunnel temperature exceeded allowable values per surveillance test requirements on January 3, 2018

(2) Jacket water leaks associated with Division I emergency diesel generator on January 5, 2018

(3) Unexpected system response during Division II standby service water surveillance testing on January 15, 2018

(4) Residual heat removal shutdown cooling outboard isolation valve E12-MOVF008 over-torqued on February 19, 2018

(5) Division I inverter DNB-INV01A1 system output voltage exceeded max allowable voltage on March 20, 2018

71111.18—Plant Modifications (1 Sample)

The inspectors evaluated the following permanent modification:

(1) Division I standby diesel generator exhaust manifold piping to eliminate a vulnerability to flaw formation and leakage after Division I emergency diesel generator shroud replacement on January 19, 2018

71111.19—Post Maintenance Testing (7 Samples)

The inspectors evaluated the following post maintenance tests:

(1) STP-209-6310, Revision 39, "RCIC Pump and Valve Quarterly Operability and Flow Test," following maintenance on the reactor core isolation cooling governor valve on January 5, 2018

(2) STP-504-4504, Revision 18, "RPS/Control Rod Block – IRM D Channel Functional Test and LSFT," following replacement of intermediate range monitor D control relay H13-P672-Z2K18 on January 13, 2018

(3) STP-309-0206, Revision 29, "Division I Diesel Generator 184 Day Operability Test," following maintenance on Division I emergency diesel generator on January 22, 2018

(4) STP-309-0203, Revision 329, "Division III Diesel Generator Operability Test," following replacement of the Division III emergency diesel generator voltage regulator on January 24, 2018

(5) STP-504-4503, Revision 20, "RPS/Control Rod Block – IRM C Channel Functional Test and LSFT," following maintenance on intermediate range monitor C on January 30, 2018

(6) SOP-0030, Revision 33, "High Pressure Core Spray System (Sys 203)," following maintenance on high pressure core spray motor supply breaker on February 22, 2018

(7) STP-256-6603, Revision 21, "Division I Standby Service Water Quarterly Valve Operability Test," following maintenance and repairs to standby service water valve SWP-MOV96A on March 5, 2018

71111.20—Refueling and Other Outage Activities (3 Samples)

(1) The inspectors evaluated a planned maintenance outage implemented to remove damaged fuel assemblies. Inspection activities occurred from January 8, 2018, to January 31, 2018.

(2) The inspectors evaluated forced outage activities from February 1, 2018, to February 9, 2018. The forced outage occurred due to a failure of the B reactor recirculation pump to shift to fast speed. Station personnel conducted a forced outage and replaced the 13.8 kV transformer associated with the B reactor recirculation pump.

(3) The inspectors evaluated forced outage activities from March 1, 2018, to March 7, 2018. The forced outage occurred due to a leak from a crack on piping associated with the main condenser. Station personnel conducted a forced outage and repaired the leak.

71111.22—Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (3 Samples)

(1) STP-203-1302, Revision 25, "E22-S001BAT Quarterly Surveillance," on January 18, 2018

(2) STP-057-3801, Revision 012, "Containment Equipment Hatch Leak Rate Test," on January 27, 2018

(3) OSP-0604, Revision 2, "Remote Shutdown System Control Circuit Operability Test," on February 26, 2018

In-service (2 Samples)

(1) STP-204-1300, Revision 18, "LPCI Pump 'A' Start Time Delay Channel Calibration and Channel Functional Test," on January 2, 2018

(2) STP-256-6301, Revision 23, "Division I Standby Service Water Quarterly Valve Operability Test," on January 6, 2018

Reactor Coolant System Leak Detection (1 Sample)

(1) STP-000-0001, Revision 082, "Daily Operating Logs," on January 4, 2018

Containment Isolation Valve (1 Sample)

(1) STP-057-7705, Revision 012, "Primary Containment Airlocks Seal Leakage Rate Test," on January 28, 2018

71114.06—Drill Evaluation

Drill/Training Evolution (1 Sample)

The inspectors evaluated a simulator-based emergency preparedness drill on March 13, 2018.

**RADIATION SAFETY**

71124.02—Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls

Radiological Work Planning (1 Sample)

The inspectors evaluated the licensee's radiological work planning by reviewing the following activities:

(1) RWP 2017-1220, Pre/Post Outage Prep Including Support

(2) RWP 2017-1296, RWCU Pump Replacement and Support Activities

(3) RWP 2017-1426, Motor Operated Valve and In-Vessel Testing

(4) RWP 2017-1436, Installation/Removal of Temporary Installation Main Steam Tunnel

(5) RWP 2017-1753, RWCU Hx Room Flow Accelerated Corrosion (FAC) Piping Replacement

(6) RWP 2017-1800, RF-19 Refuel Floor Outage Activities

(7) RWP 2018-1327, Separator Repair Following SHZAM Bolt Disengagement

Verification of Dose Estimates and Exposure Tracking Systems (1 Sample)

The inspectors evaluated dose estimates and exposure tracking.

Implementation of ALARA and Radiological Work Controls (1 Sample)

The inspectors reviewed ALARA practices and radiological work controls by reviewing the following activities:

(1) RWP 2017-1220, Pre/Post Outage Prep Including Support

(2) RWP 2017-1296, RWCU Pump Replacement and Support Activities

(3) RWP 2017-1426, Motor Operated Valve and In-Vessel Testing

(4) RWP 2017-1436, Installation/Removal of Temporary Installation Main Steam Tunnel

(5) RWP 2017-1753, RWCU HX Room FAC Piping Replacement

(6) RWP 2017-1800, RF-19 Refuel Floor Outage Activities

(7) RWP 2018-1327, Separator Repair Following SHZAM Bolt Disengagement

Radiation Worker Performance (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician performance.

71124.04 - Occupational Dose Assessment

Source Term Characterization (1 Sample)

The inspectors evaluated the licensee's source term characterization.

External Dosimetry (1 Sample)

The inspectors evaluated the licensee's external dosimetry program.

Internal Dosimetry (1 Sample)

The inspectors evaluated the licensee's internal dosimetry program.

Special Dosimetric Situations (1 Sample)

The inspectors evaluated the licensee's performance for special dosimetric situations.

**OTHER ACTIVITIES – BASELINE**

71151—Performance Indicator Verification (3 Samples)

The inspectors verified licensee performance indicators submittals listed below:

(1) IE01: Unplanned Scrams per 7000 Critical Hours Sample (01/01/2017 – 12/31/2017)

(2) IE03: Unplanned Power Changes per 7000 Critical Hours Sample (01/01/2017 – 12/31/2017)

(3) IE04: Unplanned Scrams with Complications (USwC) Sample (01/01/2017 – 12/31/2017)

71152—Problem Identification and Resolution

Annual Follow-up of Selected Issues (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issue:

(1) Relay failures in the feedwater level control system and the turbine generator voltage regulator control system resulted in reactor scrams

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

Licensee Event Reports (2 Samples)

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

(1) Licensee Event Report 05000458/2017-007-00, Automatic Reactor Scram Due to Failure of Main Generator Voltage Regulator Mode Transfer Relay on August 21, 2017

(2) Licensee Event Report 05000458/2017-008-00, Automatic Reactor Scram Due to Failure of Main Feedwater Regulator Transfer Relay on October 12, 2017

**INSPECTION RESULTS**

| Failure to Implement Procedure for Storage of Material in the Pools | | | |
|---|---|---|---|
| Cornerstone | Significance | Cross-cutting Aspect | Report Section |
| Occupational Radiation Safety | Green<br>NCV 05000458/2018001-01<br>Closed | [H.4] – Human Performance, Teamwork | 71124.02 – Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls |

The inspector identified a non-cited violation of Technical Specification 5.4.1.a, for the licensee's failure to implement written procedures for activities referenced in Appendix A of Regulatory Guide 1.33, Revision 2, dated February 1978. Specifically, the licensee failed to implement radioactive material control Procedure ADM-0071, "Fuel Pools Material Control," Revision 8, for the storage and movement of spent Tri-Nuke filters.

Description:

The inspector reviewed condition reports (CRs) that documented incidents associated with the movement and storage of highly radioactive materials in the various pools at River Bend Station (RBS) in 2017. Four radiological occurrences involved unplanned and unanticipated movements of spent Tri-Nuke filters around the separator and upper inclined fuel transfer storage (IFTS) pools.

- January 5, 2017, CR-RBS-2017-0100: Radiation Protection (RP) was notified that a spent Tri-Nuke filter was found floating on the surface of the separator pool. Surveys of the filter and surrounding area were performed by RP technicians. Dose rates on the filter measured 2.2 Roentgen/hour (R/hr) on contact and 0.85 R/hr at 30 centimeters (cm).

- April 3, 2017, CR-RBS-2017-03011: A used Tri-Nuke filter measuring 1.3 R/hr and 0.350 R/hr at 30 cm was discovered floating in the reactor building (RB)-186 separator pool.

- April 24, 2017, CR-RBS-2017-03424: While performing video surveillance of the refueling pool on RB-186, a Tri-Nuke filter was discovered floating on the surface of the separator pool. The filter had a dose rate of 11 R/hr on contact and 6 R/hr at 30 cm.

- During the week of April 27, 2017, the licensee transferred the 30 Tri-Nuke filters from the separator pool to the IFTS. However, one of the Tri-Nuke filters (0.300 R/hr) had been damaged when falling into the bottom of the IFTS pool. It was eventually recovered and stored.

The inspector examined the circumstances that caused the Tri-Nuke filters to become buoyant and float around the separator pool resulting in unintended radiological hazards. Two CRs from 2015 (CR-RBS-2015-07893 and CR-RBS-2015-08050) identified concerns with air

intrusion from a leaky spent fuel cooling system valve. Also, two CRs from 2017 (CR-RBS-2017-01881 and CR-RBS-2017-03424) identified that the leaky valve caused spent Tri-Nuke filters to float. The licensee eventually determined the solution to the problem was to transfer the spent Tri-Nuke filters to the upper IFTS pool. However, the inspector determined that the licensee was not supposed to leave the spent Tri-Nukes in the separator and upper IFTS pools unless designed storage racks were in place or an engineering change request (ECR) evaluation allowed the practice.

The movement and storage of radioactive material in and around the pools at RBS are implemented through the following procedures:

- EN-RP-121, Revision 13, "Radioactive Material Control"
- EN-RP-123, Revision 1, "Radiological Controls of Highly Radioactive Objects"
- ADM-0071, Revision 8, "Fuel Pools Material Control"

The inspector determined that the purpose of Entergy Corporate Procedures EN-RP-121 and EN-RP-123 was to prevent the unauthorized movement and removal of radioactive materials around the site and from pools. These procedures required that licensee personnel receive proper authorization from reactor engineering and radiation protection management for movement and storage of radioactive materials in pools and the around pools. Based on the documents and procedures reviewed by the inspector, the licensee did not specify storage requirements or equipment for these filters to prevent them from floating to the top of the pools and becoming radiological hazards.

The inspector reviewed RBS site-specific Procedure ADM-0071, Revision 8, which described the requirements established for the control of miscellaneous material stored in fuel pools. At RBS, radioactive materials are stored in the following seven pools: spent fuel pool, cask pool, lower IFTS, upper IFTS, upper containment pool, dryer storage pool, and separator pool.

ECR RBS-ER-97-504, "Fuel Pool Inventory Identification, Justification, and Evaluation," dated September 30, 1997, stated that the purpose of ADM-0071 was to provide a means to adequately control, regulate, and inventory non-special nuclear material stored in the spent fuel pool and upper containment pools. Items may not be stored in the spent fuel storage upper containment pools, which includes the separator pool, without design engineering approval. Additionally, items that are not stainless steel or in a stainless steel container are not to be stored without being verified radiation resistant and not detrimental to the fuel pool water quality.

Section 7.3 of Procedure ADM-0071 provided instructions for storing or moving material within the same pool or to another pool location. Section 7.3.7 required that the pool material inventory 'POOL MATERIAL CONTROL FORM' be completed and updated after approval of the material storage/move by the reactor engineering manager and radiation protection superintendent. The form required specific information about proposed items to be stored, such as the radiation surveys taken, work order used, storage container location, special requirements, radiation exposure duration, and applicable ECR evaluations. At the time of this inspection, the licensee did not have any pool material control forms completed for the 30 Tri-Nuke filters that were placed into the separator pool and subsequently transferred to the IFTS in 2017. In particular, there was no pool material control forms signed by the reactor engineering manager and radiation protection superintendent approving the proper storage and movement of these Tri-Nuke filters for either location.

Procedure ADM-0071 allowed miscellaneous items such as Tri-Nuke filters to be stored in the separator and IFTS pools if an ECR evaluation and engineering approval on the storage method were done. The inspector queried whether any ECRs had been performed for storage of the Tri-Nuke filters. Only two were available for the inspector's review. The two ECRs (ECR RBS-ER-97-504 and ECR 33163) revealed that the licensee had not made specific provisions or performed evaluations for the storage of Tri-Nuke filters in the separator or upper IFTS pools.

The inspector determined that licensee's procedures did not adequately address securing highly radioactive material in pools such as Tri-Nuke filters to prevent radioactive material from floating to the pool surface and thereby becoming radiation hazards to personnel, as had occurred three times in early 2017. Further, the failure to follow the requirements of Procedure ADM-0071 resulted in bypassing the performance of an evaluation to ensure proper movement and storage of the filters.

Corrective Actions: Immediate safety concerns with filters becoming buoyant due to the air intrusion in the separator pool were addressed when the licensee transferred the 30 Tri-Nuke filters to the IFTS pool in late April 2017. Procedure compliance issues are being addressed through an action item in CR-RBS-2018-00523.

Corrective Action References: CR-RBS-2018-00523

Performance Assessment:

Performance Deficiency: The licensee's failure to implement written procedures for activities referenced in Appendix A of Regulatory Guide 1.33, Revision 2, dated February 1978, as required by Technical Specification 5.4.1.a, was a performance deficiency. Specifically, the licensee failed to implement radioactive material control Procedure ADM-0071, "Fuel Pools Material Control," Revision 8, for the storage and movement of spent Tri-Nuke filters.

Screening: The performance deficiency was more than minor because it adversely affected the programs and process (exposure control) attribute of the Occupational Radiation Safety Cornerstone and its objective to ensure the adequate protection of the worker health and safety from exposure to radiation from radioactive material. Specifically, allowing highly radioactive material (Tri-Nuke filters) to be moved and stored in an unsafe, unevaluated, unapproved manner resulted in unanticipated dose rates and unplanned worker exposures to radiation.

Significance: The inspectors assessed the significance of the finding using NRC Inspection Manual Chapter 0609, Appendix, C, "Occupational Radiation Safety Significance Determination Process," and determined that the finding was of very low safety significance (Green) because it did not: (1) involve ALARA planning or work controls, (2) did not involve an overexposure, (3) did not have a substantial potential to be an overexposure, and (4) the ability to assess dose was not compromised.

Cross-cutting Aspect: The finding has a cross-cutting aspect in the area of human performance, associated with teamwork, because individuals and work groups failed to communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety was maintained. Specifically, the communication and coordination of

activities between construction projects, health physics, and nuclear engineering failed to prevent radiological issues associated with the storage and movement of Tri-Nuke filters.

Enforcement:

Violation: Technical Specification 5.4.1.a requires, in part, that procedures be written, implemented, and established for those areas recommended in Regulatory Guide 1.33, Appendix A, Revision 2, 1978. Section 7(b) of Regulatory Guide 1.33, Appendix A, requires procedures for control of radioactive materials to minimize potential releases to the environment and control personnel exposure associated with solid radioactive waste.

Licensee Procedure ADM-0071, "Fuel Pools Material Control," Revision 8, Section 7.1, requires that if material must be stored in a pool or previously stored material must be moved from one pool to a different pool or to a different area in the same pool, Section 7.3 must be completed. Section 7.3.7 requires that the pool material inventory 'POOL MATERIAL CONTROL FORM' be updated after approval of the material storage/move by the reactor engineering manager and radiation protection superintendent.

Contrary to the above, beginning in 2017 and to present, the licensee stored material in a pool and moved previously stored material from one pool to a separate pool without completing Section 7.3 of Procedure ADM-0071. Specifically, the licensee stored 30 Tri-Nuke filters in the separator pool without completing the pool material Inventory form and, in April 2017, moved the filters to the incline fuel transfer storage pool without completing/ updating a pool material Inventory 'POOL MATERIAL CONTROL FORM' and obtaining the required approvals.

As of January 26, 2018, the licensee had not fully implemented Section 7.3 of Procedure ADM-0071 by updating the form and obtaining written approval from the radiation protection superintendent and reactor engineering manager for the movement and safe storage of the 30 Tri-Nuke filters in the incline fuel transfer storage pool.

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

| Installation of an Incorrectly Specified Relay Causes Plant Transient and Reactor Scram | | | |
|---|---|---|---|
| Cornerstone | Significance | Cross-cutting Aspect | Report Section |
| Initiating Events | Green<br>FIN 05000458/2018001-02<br>Closed | [H.5] – Human Performance, Work Management | 71152 – Problem Identification and Resolution |

The inspectors reviewed two examples of a self-revealed finding for the licensee's installation of an incorrectly specified relay in 1) the control circuitry for the feedwater level control system and 2) the turbine generator voltage regulator circuitry. In each instance, the incorrectly specified relay failed in service, causing a plant transient and automatic reactor scram.

Description:

Example 1: On August 18, 2017, with the plant operating at 100 percent power, an automatic scram occurred. At the time of the scram, operators were performing a scheduled

surveillance test that called for a planned shift of the controlling channel of the feedwater level control system from channel B to channel A. Immediately after the shift, feedwater regulating valves went full open and recirculation pumps downshifted to slow speed. The combination of these events caused an automatic scram to occur on high flow-biased thermal power.

The cause of the scram was a failure of the feedwater level select relay, C33A-K12. The failure of this relay caused the interpreted level in the feedwater level control system to go to zero, which in turn caused a full open demand on the feedwater regulating valves and a downshift of recirculation pumps from fast to slow speed on a perceived low level condition in the reactor vessel.

A subsequent investigation determined that the feedwater level select relay failed due to a degradation in the electrical contacts on the relay. The degradation caused a sharp increase in resistance across the contacts, which in turn led to a substantial reduction in the current passing through these contacts to the rest of the feedwater level control circuit. With the current substantially reduced, the circuit incorrectly perceived a low vessel level condition.

The failed relay was a General Electric Agastat GPI type relay. Operating experience at River Bend Station and at other sites in the industry has established that this type of relay is prone to intermittent failure. When used in low current applications such as those associated with the feedwater level control circuit, there is a potential for oxidation to build up on the contacts of the relay, which will create resistance across the relay and impair its ability to pass current. In light of this operating experience, the licensee issued part interchangeability evaluation (PIE) 411 in March 1993. PIE 411 called for a GPIA type relay with gold-plated contacts to be used for C33A-K12 in lieu of the silver-plated GPI type relay that had traditionally been used.

The inspectors determined that PIE-411 was a self-imposed licensee standard. The licensee complied with this standard until February 2017, when the gold-plated relay installed in the system was incorrectly replaced with a silver-plated relay. Given that the silver-plated relay was being used in a low current application, it built up resistance over time and eventually failed, causing the scram.

Example 2: On June 23, 2017, with the plant operating at 100 percent power, an automatic scram occurred. At the time of the scram, operators were performing a scheduled surveillance test that called for a planned shift of the turbine generator voltage regulator control from automatic to manual. Immediately after the shift, the main generator tripped which caused a subsequent reactor scram.

The cause of the scram was a failure of the voltage regulator transfer circuit relay, EXS-PNL1-43A. The failure of this relay caused an open circuit in both the manual and automatic voltage regulators and complete loss of control of the Alterrex Excitation System. When neither the manual nor the automatic voltage regulator is connected to the Alterrex Excitation System, there is no excitation field applied. The result is a turbine trip on loss of excitation.

A subsequent investigation determined that the main generator voltage regulator mode transfer relay failed due to a degradation in the electrical contacts on the relay. The degradation caused a sharp increase in resistance across the contacts, which in turn led to a substantial reduction in the current passing through these contacts to the rest of the voltage

regulator control circuit. With the current substantially reduced, the circuit could not be completed for either the manual or automatic control system of the turbine voltage regulator.

The failed relay was a General Electric DC operated 4-pole double throw miniature 43A relay provided as part of the turbine generator package and is part of the Alterrex exciter transfer panel assembly. Operating experience at River Bend Station and at other sites in the industry has established that this type of relay is prone to intermittent failure. The station generated engineering change 40442 in 2012 to replace the 43A relay with a different model documenting obsolescence of this relay as well as operating experience related to intermittent failures of this type of relay. In light of this operating experience, the licensee cancelled engineering change 40442 for unknown reasons and did not replace the 43A relay with a different style.

Corrective Actions: The licensee installed the correctly specified relay in the feedwater level control system and an upgraded vendor recommended relay in the turbine voltage regulator control system. The licensee also completed an extent of condition review on similar relays.

Corrective Action References: Condition Reports CR-RBS-2017-06118 and CR-RBS-2017-04961

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's installation of an incorrectly specified relay in 1) the control circuitry for the feedwater level control system and 2) the control circuitry for the main generator voltage regulator were two examples of a performance deficiency.

Screening: 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.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process for Findings At-Power." The finding was determined to be of very low safety significance (Green) because the finding did not contribute to both the likelihood of a reactor trip and the likelihood that mitigating equipment would not be available.

Cross-cutting Aspect: The finding has a cross-cutting aspect in the area of human performance associated with work management because the licensee failed to implement a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority.

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

## EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

On January 26, 2018, the inspectors presented the radiation safety inspection results to Mr. W. Maguire, Site Vice President, and other members of the licensee staff.

On April 25, 2018, the inspectors presented the quarterly resident inspector inspection results to Mr. W. Maguire, Site Vice President, and other members of the licensee staff.

**DOCUMENTS REVIEWED**

**71111.04 – Equipment Alignment**

Condition Reports (CR-RBS-)

| | | | |
|---|---|---|---|
| 2017-05292 | 2017-07460 | 2017-07880 | 2018-00615 |
| 2018-00992 | | | |

Drawings

| Number | Title | Revision |
|---|---|---|
| PID-09-10E | Engineering P&I Diagram, System 256, Service Water – Standby | 24 |
| PID-22-09A | Engineering P&I Diagram, System 402, HVAC – Control Building | 21 |

Procedures

| Number | Title | Revision |
|---|---|---|
| R-STM-0118 | Service Water Systems | 26 |
| R-STM-0402 | HVAC – Control Building and Diesel Generator Building | 9 |
| SOP-0031 | Residual Heat Removal | 338 |
| SOP-0042 | Standby Service Water System (Sys #256) | 46 |
| SOP-0058 | Control Building HVAC System (Sys #402) | 24 |

**71111.05 – Fire Protection**

Procedures

| Number | Title | Revision |
|---|---|---|
| AB-070-502 | RHR Pump A Room, Fire Area AB-5 | 4 |
| AB-070-505 | RHR Pump B Room, Fire Area AB-3 | 3 |
| EN-DC-161 | Control of Combustibles | 17 |
| SP-118-450 | Standby Cooling Pump A Room, Fire Area PH-1/Z-1 | 3 |
| SP-118-451 | Standby Cooling Pump B Room, Fire Area PH-2/Z-1 | 3 |
| STP-250-4533 | FPM-PNL6 Fire Detection Channel Functional and Operational Tests for Zone SD72, SD73, and SD89 (A&B) | 1 |

**71111.06 – Flood Protection Measures**

Condition Reports (CR-RBS-)

| | | |
|---|---|---|
| 2018-00200 | 2018-00367 | 2018-00369 |

Procedure

| Number | Title | Revision |
|---|---|---|
| PN-317 | Max Flood Elevations for Moderate Energy Line Cracks in Cat I Structures | 01 |

Work Orders

| | |
|---|---|
| 0052802383 | 0052802384 |

**71111.11 – Licensed Operator Requalification Program and Licensed Operator Performance**

Procedures

| Number | Title | Revision |
|---|---|---|
| GOP-0002 | Power Decrease/Plant Shutdown | 078 |
| RSMS-OPS-HIT1 | Licensed Operator Requalification | 0 |

**71111.12 – Maintenance Effectiveness**

Condition Reports (CR-RBS-)

| | | | |
|---|---|---|---|
| 2017-00629 | 2017-01579 | 2017-01668 | 2017-01703 |
| 2017-01739 | 2017-01748 | 2017-01749 | 2017-03871 |
| 2017-04048 | 2017-04514 | 2017-05273 | 2017-05939 |
| 2017-06767 | 2017-06977 | 2017-06998 | 2017-07017 |
| 2017-07200 | 2017-07410 | 2017-07454 | 2017-07820 |
| 2017-07880 | 2017-07950 | 2018-00825 | 2018-01363 |

Procedures

| Number | Title | Revision |
|---|---|---|
| EN-DC-203 | Maintenance Rule Program | 3 |
| EN-DC-204 | Maintenance Rule Scope and Basis | 4 |
| EN-DC-205 | Maintenance Rule Monitoring | 6 |
| EN-DC-206 | Maintenance Rule (A)(1) Process | 3 |

Procedures

| Number | Title | Revision |
|---|---|---|
| SOP-0042 | Standby Service Water System (Sys #256) | 45 |

**71111.13 – Maintenance Risk Assessments and Emergent Work Control**

Condition Report (CR-RBS-)

2018-00505

Procedures

| Number | Title | Revision |
|---|---|---|
| ADM-0096 | Risk Management Program Implementation and On-Line Maintenance Risk Assessment | 326 |
| EN-WM-104 | On Line Risk Assessment | 16 |
| OSP-0037 | Shutdown Operations Protection Plan (SOPP) | 036 |

**71111.15 – Operability Determinations and Functionality Assessments**

Condition Reports (CR-RBS-)

| | | | |
|---|---|---|---|
| 2016-05866 | 2017-04048 | 2017-04097 | 2017-04302 |
| 2017-05033 | 2017-07111 | 2017-07162 | 2017-07199 |
| 2017-07219 | 2017-07532 | 2017-08048 | 2018-00194 |
| 2018-00402 | | | |

Miscellaneous

| Number | Title | Revision |
|---|---|---|
| EC 66261 | SWP-SOV523B Reasonable Expectation of Operability Input for CR-RBS-2016-05866 | 0 |

Procedures

| Number | Title | Revision |
|---|---|---|
| OSP-0028 | Log Report – Normal Switchgear, Control, and Diesel Generator Buildings | 108 |
| STP-000-0001 | Daily Operating Logs | 82 |
| STP-256-6608 | Division II Standby Service Water 2 Year Position Indication Verification Test | 4 |
| STP-309-0201 | Division I Diesel Generator Operability Test | 59 |

Work Orders

| | | |
|---|---|---|
| 00469400 | 00476322 | 00479296 |

**71111.18 – Plant Modifications**

Calculation

| Number | Title | Revision |
|---|---|---|
| G13.18.2.4-108 | LPI, Inc. Evaluation of Standby Diesel Generator Exhaust Manifold Stiffeners | 1 |

Condition Reports (CR-RBS-)

| | | | |
|---|---|---|---|
| 2015-04817 | 2016-06841 | 2016-07753 | 2017-07111 |
| 2017-07532 | 2017-08048 | | |

Drawing

| Number | Title | Revision |
|---|---|---|
| PID-08-09B | Engineering P&I Diagram System 309 Diesel Generator | 23 |

Procedure

| Number | Title | Revision |
|---|---|---|
| SOP-0053 | Standby Diesel Generator and Auxiliaries (Sys #309) | 057 |

Work Order

00228397

**71111.19 – Post-Maintenance Testing**

Condition Reports (CR-RBS-)

| | |
|---|---|
| 2017-07237 | 2017-07728 |

Miscellaneous

| Number | Title | Revision/Date |
|---|---|---|
| E22-S004 ACB2 | Vendor Overhaul Breaker | 0 |

Procedures

| Number | Title | Revision |
|---|---|---|
| CMP-EM-203-1001 | Inspection and Maintenance of 4.16 KV Magne-Blast Circuit Breakers | 1 |
| STP-209-0201 | RCIC Discharge Piping Fill and Valve Lineup Verification | 13 |

Work Orders

| | | | | |
|---|---|---|---|---|
| 00228397 | 00478865 | 00492550 | 00493155 | 00493741 |
| 52650988 | 52769345 | 52779858 | | |

**71111.20 – Refueling and Other Outage Activities**

Procedures

| Number | Title | Revision |
|---|---|---|
| GOP-0001 | Plant Startup | 099 |
| GOP-0002 | Power Decrease/Plant Shutdown | 078 |

**71111.22 – Surveillance Testing**

Condition Reports (CR-RBS-)

2015-02736 2018-00290

Drawing

| Number | Title | Revision |
|---|---|---|
| GE-828E534AA | Elementary Diagram Residual Heat Removal Sheet 8 | 28 |

Procedures

| Number | Title | Revision |
|---|---|---|
| SOP-0018 | Normal Service Water System | 67 |
| SOP-0042 | Standby Service Water System | 45 |

Work Orders

| | | |
|---|---|---|
| 00492725 | 52785880 | 52787021 |

**71114.06 – Drill Evaluation**

Miscellaneous

| Number | Title | Revision |
|---|---|---|
| RDRL-EP-1201 | Site Drill Scenario | 01 |

**71124.02 – Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls**

Audits and Self-Assessments

| Number | Title | Date |
|---|---|---|
| LO-RLO-2017-0055 | Pre-NRC Self-Assessment Radiation Safety – IP 71124.02 | December 4, 2017 |
| LO-RLO-2016-0145 | Pre-NRC Self-Assessment Radiation Safety – IP 71124.02 | January 17, 2017 |

Condition Reports (CR-RBS-)

| | | | |
|---|---|---|---|
| 2015-07893 | 2015-08050 | 2017-00100 | 2017-00707 |
| 2017-00868 | 2017-01250 | 2017-01355 | 2017-01731 |
| 2017-01881 | 2017-01927 | 2017-03011 | 2017-03237 |
| 2017-03266 | 2017-03424 | 2017-03598 | 2017-03788 |
| 2017-04856 | 2017-04941 | 2017-05499 | 2017-01372 |
| 2017-01422 | | | |

Miscellaneous

| Number | Title | Date |
|---|---|---|
| | RF-19 Water Movement Plan | January 2017 |
| | 10 CFR Part 20.1101(c) Report for 2016 | June 2017 |
| ADM-0071 | Post Material Inventory Report Post RF-19 | May 31, 2017 |
| WO 473593 | Relocate Tri-Nuke filters from the Separator Pool the IFTS | April 11, 2017 |

Procedures

| Number | Title | Revision |
|---|---|---|
| ADM-0071 | Fuel Pools Material Control | 08 |
| EN-RP-100 | Radiation Worker Expectations | 12 |
| EN-RP-101 | Access Control for Radiologically Controlled Areas | 13 |

Procedures

| Number | Title | Revision |
|---|---|---|
| EN-RP-102 | Radiological Control | 05 |
| EN-RP-105 | Radiological Work Permits | 18 |
| EN-RP-106 | Radiological Survey Documentation | 07 |
| EN-RP-108 | Radiation Protection Posting | 19 |
| EN-RP-109 | Hot Spot Program | 05 |
| EN-RP-110 | ALARA Program | 14 |
| EN-RP-110-03 | Collective Radiation Exposure (CRE) Guidelines | 04 |
| EN-RP-110-04 | Radiation Protection Risk Assessment Process | 07 |
| EN-RP-110-06 | Outage Dose Estimating and Tracking | 01 |
| EN-RP-115-01 | BRAC Survey Instructions | 00 |
| EN-RP-121 | Radioactive Material Control | 13 |
| EN-RP-123 | Radiological Controls for Highly Radioactive Objects | 01 |
| EN-RP-143 | Source Control | 13 |
| EN-RP-151 | Radiological Diving | 03 |
| GMP-0111 | Tri-Nuclear Filter Operations | 01 |

Radiation Surveys

| Number | Title | Date |
|---|---|---|
| RBS-1701-0042 | RB +186 Upper Pool HCA Handrail | January 5, 2017 |
| RBS-1703-0124 | RB +186 Upper Pool and Carousel Area | March 5, 2017 |
| RBS-1704-0059 | RB +186 Upper Pool 354 R/hr. Tri-Nuke Filter | April 5, 2017 |
| RBS-1704-0248 | RB +186 Upper Pool 11 R/hr. Tri-Nuke Filter | April 21, 2017 |
| RBS-1704-0303 | RB +186 Upper Pool 24 Tri-Nuke Filters | April 21, 2017 |

Radiation Work Permits/ALARA Reviews

| Number | Title | Revision |
|---|---|---|
| 2017-1220 | Pre/Post Outage Prep Including Support | 01 |
| 2017-1296 | RWCU Pump Replacement and Support Activities | 01 |
| 2017-1426 | Motor Operated Valve and In-Vessel Testing | 01 |

Radiation Work Permits/ALARA Reviews

| Number | Title | Revision |
|---|---|---|
| 2017-1436 | Installation/Removal of Temporary Installation Main Steam Tunnel | 01 |
| 2017-1753 | RWCU HX Room FAC Piping Replacement | 01 |
| 2017-1800 | RF-19 Refuel Floor Outage Activities | 01 |
| 2018-1327 | Separator Repair Following SHZAM Bolt Disengagement | 00 |

**71124.04 – Occupational Dose Assessment**

Audits and Self-Assessments

| Number | Title | Date |
|---|---|---|
| LO-RBS-2017-00055 | Pre-NRC Assessment IP71124.04 Occupational Dose | October 27, 2017 |

Condition Reports (CR-RBS-)

| | | | |
|---|---|---|---|
| 2016-05858 | 2017-08105 | 2017-00707 | 2017-00868 |
| 2017-00910 | 2017-03788 | 2017-05176 | 2017-05489 |

Miscellaneous

| Number | Title | Date |
|---|---|---|
| 2017 | Multi-Pack TLD Results | 2017 |
| 2018 | NVLAP Accreditation Report | 2018 |

Procedures

| Number | Title | Revision |
|---|---|---|
| EN-RP-131 | Air Sampling | 15 |
| EN-RP-201 | Dosimetry Administration | 05 |
| EN-RP-202 | Personnel Monitoring | 13 |
| EN-RP-203 | Dose Assessment | 10 |
| EN-RP-204 | Special Monitoring Requirements | 11 |
| EN-RP-205 | Prenatal Monitoring | 04 |
| EN-RP-206 | Dosimeter of Legal Record QA | 07 |
| EN-RP-208 | Whole Body Counting / In-Vitro Bioassay | 07 |

Procedures

| Number | Title | Revision |
|---|---|---|
| EN-RP-311 | Electronic Alarming Dosimeter | 02 |
| EN-RP-317-09 | Electronic Alarming Dosimeter Calibration | 02 |

Self-Reading Dosimeter Calibration Records

| Number | Title | Date |
|---|---|---|
| 2017-B2-28-CALDAT-05667 | Self-Reading Dosimeter | September 18, 2017 |
| 2017-B2-28-CALDAT-05713 | Self-Reading Dosimeter | September 30, 2017 |
| 2017-B2-28-CALDAT-05736 | Self-Reading Dosimeter | September 30, 2017 |
| 2017-B2-28-CALDAT-05836 | Self-Reading Dosimeter | September 26, 2017 |
| 2017-B2-28-CALDAT-06692 | Self-Reading Dosimeter | December 15, 2017 |

**71151 – Performance Indicator Verification**

Procedures

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

**71152 – Problem Identification and Resolution**

Condition Reports (CR-RBS-)

2017-06118 2017-04961

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

Condition Report (CR-RBS-)

2017-06118

Miscellaneous

| Number | Title | Revision |
|---|---|---|
| PIE-411 | Part Interchangeability Evaluation 411 | 0 |

Procedure

| Number | Title | Revision |
|---|---|---|
| EN-MA-101 | Conduct of Maintenance | 22 |

Work Order

00441196

**The following items are requested for the**
**Occupational Radiation Safety Inspection**
**at River Bend Station**
**January 22–25, 2018**
**Integrated Report 2018001**

Inspection areas are listed in the attachments below.

Please provide the requested information on or before January 12, 2018.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.0**1** 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 or Louis.Carson@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.

**2. Occupational ALARA Planning and Controls (71124.02)**
Date of last inspection: January 21, 2016

A. List of contacts and telephone numbers for ALARA program personnel

B. Applicable organization charts

C. Copies of audits, self-assessments, and LERs, written since date of last inspection, focusing on ALARA

D. Procedure index for ALARA Program

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. ALARA Program
2. ALARA Committee
3. Radiation Work Permit (RWP) Preparation

F. A summary list of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection, related to the ALARA program. In addition to ALARA, the summary should also address RWP violations, electronic dosimeter alarms, and RWP dose estimates

NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are "searchable" so that the inspector can perform word searches.

G. List of work activities greater than 1 rem, since date of last inspection, Include original dose estimate and actual dose.

H. Site dose totals and 3-year rolling averages for the past 3 years (based on dose of record)

I. Outline of source term reduction strategy

J. If available, provide a copy of the ALARA outage report for the most recently completed outages for each unit

K. Please provide your most recent Annual ALARA Report.

**4. Occupational Dose Assessment (Inspection Procedure 71124.04)**

Date of Last Inspection: January 21, 2016

A. List of contacts and telephone numbers for the following areas:

1. Dose Assessment personnel

B. Applicable organization charts

C. Audits, self-assessments, vendor or NUPIC audits of contractor support, and LERs written since date of last inspection, related to:

1. Occupational Dose Assessment

D. Procedure indexes for the following areas:

1. Occupational Dose Assessment

E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.

1. Radiation Protection Program
2. Radiation Protection Conduct of Operations
3. Personnel Dosimetry Program
4. Radiological Posting and Warning Devices
5. Air Sample Analysis
6. Performance of High Exposure Work
7. Declared Pregnant Worker
8. Bioassay Program

F. List of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection, associated with:

1. National Voluntary Laboratory Accreditation Program (NVLAP)
2. Dosimetry (TLD/OSL, etc.) problems
3. Electronic alarming dosimeters
4. Bioassays or internally deposited radionuclides or internal dose
5. Neutron dose

NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are "searchable" so that the inspector can perform word searches.

G. List of positive whole body counts since date of last inspection, names redacted if desired

H. Part 61 analyses/scaling factors

I. The most recent National Voluntary Laboratory Accreditation Program (NVLAP) accreditation report or, if dosimetry is provided by a vendor, the vendor's most recent results

RIVER BEND STATION – NRC INTEGRATED INSPECTION REPORT 05000458/2018001 – DATED MAY 8, 2018

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Electronic Distribution for River Bend Station

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