



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II**

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ATLANTA, GEORGIA 30303-1257

July 23, 2018

Mr. Daniel Stoddard  
Senior Vice President and  
Chief Nuclear Officer  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060-6711

**SUBJECT: SURRY POWER STATION – NUCLEAR REGULATORY COMMISSION  
INTEGRATED INSPECTION REPORT 05000280/2018002 AND  
05000281/2018002**

Dear Mr. Stoddard:

On June 30, 2018, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Surry Power Station, Units 1 and 2. On July 11, 2018, the NRC inspectors discussed the results of this inspection with Mr. F. Mladen and other members of your staff. The results of this inspection are documented in the enclosed inspection report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding 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 violations or significance of any of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Surry Power 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 II; and the NRC Resident Inspector at the Surry Power Station.

D. Stoddard

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

Sincerely,

*/RA/*

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

Docket Nos.: 50-280, 50-281  
License Nos.: DPR-32, DPR-37

Enclosure:  
IR 05000280/2018002, 05000281/2018002

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INTEGRATED INSPECTION REPORT 05000280/2018002 AND  
05000281/2018002 July 23, 2018

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

Docket Numbers: 50-280, 50-281

License Numbers: DPR-32, DPR-37

Report Numbers: 05000280/2018002 and 05000281/2018002

Enterprise Identifier: I-2018-002-0046

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: Surry Power Station, Units 1 and 2

Location: 5850 Hog Island Road  
Surry, VA 23883

Inspection Dates: April 1, 2018 – June 30, 2018

Inspectors: P. McKenna, Senior Resident Inspector  
C. Read, Resident Inspector  
A. Butcavage, Reactor Inspector (71111.08)  
R. Carrion, Senior Reactor Inspector (71111.08)  
C. Fontana, Emergency Preparedness Inspector (71114, 71151)  
S. Sanchez, Senior Emergency Preparedness Inspector (71114, 71151)  
J. Tornow, Physical Security Inspector (EP Trainee)  
J. Walker, Emergency Preparedness Inspector (Trainee)

Approved By: S. Rose, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee's performance by conducting a quarterly integrated inspection at Surry Power Station, Units 1 and 2, 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 and self-revealed findings, violations, and additional items are summarized in the table below.

### List of Findings and Violations

Failure to Follow Preventative Maintenance Procedure Results in Additional Failures of Emergency Bus Undervoltage and Degraded Voltage Relays			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000281/2018002-01 Opened/Closed	P.3 - Resolution	71152
An NRC-identified Green NCV of Surry Technical Specification (TS) 6.4.D was identified for the failure to follow procedure ER-AA-102, "Preventative Maintenance Program," which resulted in the Unit 2 "H" emergency bus degraded voltage (DV) relay failure on March 13, 2018, and the Unit 2 "J" emergency bus under voltage (UV) relay failure on May 21, 2018, while the unit was operating at rated thermal power (RTP).			

## PLANT STATUS

Unit 1 operated at or near rated thermal power from the beginning of the inspection period until April 21, 2018, when it was shut down to begin a planned refueling outage (RFO). It remained offline until May 31, 2018, when the main turbine was synchronized to the grid. On June 2, 2018, the unit reached rated thermal power and operated there for the remainder of the inspection period.

Unit 2 operated at or near rated thermal power for the entire 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 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

#### Summer Readiness (1 Sample)

The inspectors evaluated summer readiness of offsite and alternate alternating current (AC) power systems.

### 71111.04 - Equipment Alignment

#### Partial Walkdown (4 Samples)

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

- (1) Alternative alternating current (AAC) diesel prior to planned #2 emergency diesel generator (EDG) monthly performance test, on April 9, 2018
- (2) Unit 1 "A" train residual heat removal (RHR) system after pump and motor replacement, on May 17, 2018
- (3) Unit 1 "C" safety injection (SI) accumulator after check valve repairs, on May 22, 2018
- (4) Unit 1 auxiliary feedwater (AFW) system valves inside containment, on May 22, 2018

### 71111.05AQ - Fire Protection Annual/Quarterly

#### Quarterly Inspection (5 Samples)

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

- (1) AAC Diesel Building, on April 9, 2018
- (2) Carbon dioxide suppression system testing for Unit 1 Cable Vault and Cable Tunnel, on April 11, 2018
- (3) Unit 1 Containment Building, on May 9, 2018
- (4) Auxiliary Building 27 foot elevation, on June 21, 2018
- (5) Fuel Building, on June 21, 2018

#### 71111.06 - Flood Protection Measures

##### Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the Unit 1 and Unit 2 turbine buildings with the component cooling heat exchanger (CCHX) service water (SW) jumper modification in place between the two turbine buildings.

#### 71111.08 - Inservice Inspection Activities (1 Sample)

The inspectors evaluated pressurized water reactor non-destructive testing by reviewing the following examinations from April 23 – 27, 2018:

- (1) Liquid Penetrant Test (PT)
  - a) PT-18-020, Work Order 38103811311/NDER17-203, Weld Number 0-17, ASME Code Class 2, Pipe to Tee, Charging Crosstie 5/3/18 (Reviewed)
  - b) BOP-PT-18-046, Work Order 38103811311, Final Weld Number 017, ASME Code Class 2, 3-CH-251-1502, 4/26/18 (Observed)
  - c) BOP-PT-16-193, Work Order 38103611539, Final Welds 3&5, Valve 01-RC-139, 11/8/16 (Reviewed)
- (2) Ultrasonic (UT)
  - a) Summary No. 17-203, Work Order No. 3810311311, Weld 0-17 In Area Ground for ISI Prep, UT Thickness Examination, ASME Class 2, 4/25/18 (Observed)
  - b) Summary No. S1.LSS.0003, Work Order No. 38103811311/NDER17-203, Component ID 11448-WMKS-1105B5 / 3-CH-3 / 2-E, Tee to Pipe, Report No. UT-18-005, 4/24/18 (Observed)
  - c) Summary No. S1.LSS.0005, Work Order No. 38103811311/NDER17-203, Component ID 11448-WMKS-1105B13 / 3-CH-4 / 0-20, Tee to Pipe, Report No. UT-18-006, 4/24/18 (Observed)
  - d) Summary No. S1.LSS.0006, Work Order No. 38103811311/NDER17-203, Component ID 11448-WMKS-1105B13 / 3-CH-4 / 0-19, Pipe to Elbow, Report No. UT-18-007, 4/24/18 (Observed)
  - e) Summary No. S1.LSS.0020, Work Order No. 38203874699/NDER18-109, Component ID 11448-WMKS-1105B13 / 3-CH-4 / 0-18A, Elbow to Pipe, Report No. UT-18-008, 4/24/18 (Observed)
- (3) Visual (VT)
  - a) Summary No. S1.B15.80.001, Component ID, 11448-WMKS-RC-R-1.1/N/A/1-RC-R-1, Reactor Bottom Mounted Instrumentation Penetration Nozzles, 4/24/18 (Reviewed)

- b) Summary No. S1.F1.30.193, VT-3 Visual Inspection of Component Support ID111448-WMKS-0112E1/18-CC-19/1-CC-H018, 4/25/18 (Reviewed)
- c) Summary No. S1.F1.30.272, VT-3 Visual Inspection of Component Support ID 11448-WMKS-0112L1/6-CC-101/1-CC-H015 (Reviewed)

(4) Eddy Current Testing (ECT)

- a) Steam Generator A; Tubes R038/C027, R016/C068, R017/C068, R016/C069, and R017/C069 (Reviewed.)

The Inspectors evaluated the licensee's boric acid control program performance, performed a walk-down inspection of the reactor containment building and completed a sample review of the latest inspection results for the lower reactor vessel head penetration area.

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated a simulator scenario involving a failed open pressurizer relief valve, tornado in the switchyard which caused a loss of offsite power, a large break loss of coolant accident (LOCA) with the failure of the low head safety injection (LHSI) pumps to auto start, and a loss of SW flow through the recirculation spray heat exchangers (RSHXs) due to the failure of all RSHX SW inlet isolation valves to open with an alert declaration, on June 6, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated licensed operator performance in the main control room during 1-GOP-2.7, "Unit Shutdown Power Decrease from Allowable Power to Unit Offline for Refueling Outage," on April 20, 2018; and 1-OP-RX-009, "Dilution to Critical Conditions Following Refueling," on May 30, 2018.

71111.12 - Maintenance Effectiveness

Quality Control (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the following equipment performance issues:

- (1) Machinery equipment room (MER) – 3 charging (CH) SW piping replacement

71111.13 - Maintenance Risk Assessments and Emergent Work Control (5 Samples)

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

- (1) Unit 1 and Unit 2 risk while the "A" main control room (MCR) and emergency switchgear room (ESGR) chilled water system was tagged out for an emergent modification and compensatory fire watches were in place in MER-3 for unprotected CHSW fiberglass piping, on April 18, 2018.



- (2) Unit 1 and Unit 2 risk with "A" reserve station service transformer (RSST) planned maintenance, unplanned maintenance on the "C" RSST tap changer motor, and Unit 1 in refueling outage (RFO), on April 23, 2018.
- (3) Unit 2 risk during #1 EDG 18 month maintenance outage during the Unit 1 RFO, on April 30, 2018.
- (4) Unit 2 risk while the Unit 1 "B" station battery was being replaced, the ESGR flood dike was not installed, and Unit 1 was in a RFO, on May 14, 2018.
- (5) Unit 1 and Unit 2 risk with one service air (SA) compressor out for planned maintenance and both of the remaining SA compressors tripped due to high temperatures, and the site in a hot weather alert, on June 19, 2018.

#### 71111.15 - Operability Determinations and Functionality Assessments (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) CRs 1094780 and 1091963, Unprotected Appendix "R" CHSW piping in MER-3
- (2) Unit 1 charging cross-connection modification performed in three phases during Unit 1 RFO
- (3) CR 1071016, Unit 1 Anchor Darling double disc gate valves after RFO testing and modifications
- (4) Low level intake structure fire protection
- (5) CR1097862, 1-SW-MOV-104B, RSHX SW inlet isolation valve degrading trend after valve seat and valve operator replacement

#### 71111.18 - Plant Modifications (2 Samples)

The inspectors evaluated the following permanent modifications:

- (1) Design Change Package (DCP) SU-16-00109, Surry Unit 1 AFW MOV Hot Short Resolution
- (2) DCP SU-17-00109, Surry Unit 1 Hot Short Resolution Charging Cross-tie Relocation

#### 71111.19 - Post Maintenance Testing (7 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) 0-OPT-ZZ-008, "ASME System Pressure Test," Revision 11, and radiography film review after the completion of the charging cross-tie modification, on April 29, May 14, and May 18, 2018
- (2) 1-OPT-EG-009, "Number 1 Emergency Diesel Generator Major Maintenance Operability Test," Revision 58, following the completion of the #1 EDG 18 month maintenance package, on May 3, 2018
- (3) DNES-AA-MOV-1001, "Motor-Operated Diagnostic Test Preparation and Evaluation," Revision 1, following stem and disc arm replacement on 1-SI-MOV-1863A, "Low Head SI to Alternative High Head SI isolation valve," on May 9, 2018
- (4) 1-EPT-0106-07, "Main Station Battery 1B Performance Test," Revision 21, following the Unit 1 "B" Main battery cell replacement, on May 16, 2018

- (5) 1-OPT-SI-002, "Refueling Test of the Low Head Safety Injection Check Valves to the Cold Legs," Revision 25, following maintenance on 1-SI-79, "Loop 'A' Cold Leg Injection Downstream Check Valve," on May 17, 2018
- (6) 1-OPT-FW-002, "Motor Driven Auxiliary Feedwater Pump 1-FW-P-3B Performance Test," Revision 36, following motor replacement, on May 21, 2018
- (7) 1-PT-8.2, "Reactor Protection Logic," Revision 25, following the replacement of reactor protection system relay 1-RLY-P10-XA, on May 29, 2018

#### 71111.20 - Refueling and Other Outage Activities (1 Sample)

The inspectors evaluated refueling outage 1R28 activities from April 21, 2018 to May 31, 2018.

#### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

##### Routine (4 Samples)

- (1) 1-OSP-SW-008, "SW Flow Test of RSHXs 1-RS-E-1B and 1-RS-E-1C," Revision 6 (OTO1), on April 21, 2018
- (2) 1-OPT-ZZ-001, "ESF Actuation with Undervoltage and Degraded Voltage 1H Bus," Revision 42, on April 23, 2018
- (3) 1-OPT-SI-009, "Refueling Test of the LHSI Check Valves to the Hot Legs," Revision 17, on April 27, 2018
- (4) 1-OPT-SI-026, "Safety Injection Train A Master Relay and Reset Timer Test," Revisions 3 and 4, on May 8, 2018

##### In-service (1 Sample)

- (1) 0-OPT-SW-002, "Emergency Service Water Pump 1-SW-P-1B Performance Test," Revision 65, on May 31, 2018

##### Containment Isolation Valve (1 Sample)

- (1) Type C leak rate testing on Penetration 112, "Containment Instrument Air Compressor Suction Piping," on May 11, 2018

#### 71114.02 - Alert and Notification System Testing (1 Sample)

The inspectors evaluated the maintenance and testing of the alert and notification system, on April 9, 2018 through April 13, 2018.

#### 71114.03 - Emergency Response Organization Staffing and Augmentation System (1 Sample)

The inspectors evaluated the readiness Emergency Response Organization, on April 9, 2018 through April 13, 2018.

71114.04 - Emergency Action Level and Emergency Plan Changes (1 Sample)

The inspectors evaluated submitted Emergency Action Level and Emergency Plan changes, on April 9, 2018 through April 13, 2018. This evaluation does not constitute NRC approval.

71114.05 - Maintenance of Emergency Preparedness (1 Sample)

The inspectors evaluated the maintenance of the emergency preparedness program, on April 9, 2018 through April 13, 2018.

71114.06 - Drill EvaluationEmergency Planning (EP) Drill (1 Sample)

The inspectors evaluated a licensee EP drill involving a dropped fuel assembly in the fuel building, a loss of all feedwater, and a steam generator tube rupture concurrent with failed fuel and a stuck open main steam safety valve resulting in a General Emergency declaration, on June 19, 2018.

**OTHER ACTIVITIES – BASELINE**71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below for the period from April 1, 2017 through March 31, 2018. (6 Samples)

- (1) Unit 1 and Unit 2 Safety System Functional Failures
- (2) Unit 1 and Unit 2 Reactor Coolant System (RCS) Specific Activity
- (3) Unit 1 and Unit 2 RCS Leak Rate

The inspectors verified licensee performance indicators submittals listed below for the period from April 1, 2017 through December 31, 2017. (3 Samples)

- (1) EP01: Drill & Exercise Performance
- (2) EP02: Emergency Response Organization Drill Participation
- (3) EP03: Alert & Notification System Reliability

71152 - Problem Identification and ResolutionAnnual Follow-up of Selected Issues (1 Sample)

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

- (1) Emergency Bus Degraded and Under Voltage Relays (CRs 1009999, 1030874, and 1084436)

## INSPECTION RESULTS

Observation	71152
<p>The inspectors performed a detailed review of the corrective action from the following condition reports:</p> <ul style="list-style-type: none"> <li>• CR 1009999, Unanticipated Starting of EDG #2 During Undervoltage (UV) Degraded Voltage (DV) Testing Procedure</li> <li>• CR 1030874, 1J Emergency Bus UV/DV Panel Light Out</li> <li>• CR 1084472, Evaluation Required of Emergency Bus UV/DV Relays</li> </ul> <p>The inspectors chose this sample because of two additional failures of emergency bus UV/DV relays. A Unit 2 “H” emergency bus DV relay failed during 2-PT-2.33A, “Emergency Bus Undervoltage and Degraded Voltage Test “H” Train” on March 13, 2018 (CR 1091928) and a Unit 2 “J” emergency bus UV relay failed during 2-PT-2.33B on May 21, 2018. The inspectors identified a Non-cited Violation (NCV) during this sample which is detailed in the next section of this report.</p>	

Failure to follow Preventative Maintenance Procedure Results in Additional Failures of Emergency Bus Undervoltage and Degraded Voltage Relays			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000281/2018002-01 Opened/Closed	P.3 - Resolution	71152
<p>An NRC-identified Green NCV of Surry Technical Specification (TS) 6.4.D was identified for the failure to follow procedure ER-AA-102, “Preventative Maintenance Program,” which resulted in the Unit 2 “H” emergency bus degraded voltage (DV) relay failure on March 13, 2018, and the Unit 2 “J” emergency bus under voltage (UV) relay failure on May 21, 2018, while the unit was operating at rated thermal power (RTP).</p>			
<p><u>Description:</u> On March 13, 2018, the licensee was testing DV relay, 2-EP-27BX-2HDUP-2H, “B” phase “H” emergency bus DV relay as part of procedure 2-PT-2.33A, “Emergency Bus Undervoltage and Degraded Protection Test ‘H’ Train.” When the relay was tested as part of the procedure, it failed to fully change state. The relay was declared inoperable and Unit 2 entered an unplanned TS limiting condition for operation (LCO) to place the affected reactor protection system (RPS) channel in trip within 72 hours. The relay was replaced with Unit 2 operating at RTP on March 14, 2018.</p> <p>Additionally, on May 21, 2018, the licensee tested UV relay, 2-EP-27BX-2JDUP-2J2, the “B” phase “J” emergency bus UV relay as part of procedure 2-PT-2.33B, “Emergency Bus Undervoltage and Degraded Protection Test ‘J’ Train.” This relay failed to re-energize as expected during the test. The relay was declared inoperable and Unit 2 entered an unplanned TS LCO to place the affected reactor protection system (RPS) channel in trip within 72 hours. The relay was replaced with Unit 2 operating at RTP on May 22, 2018.</p> <p>The DV and UV relays that failed were Westinghouse, Model ARD440UR relays which are normally energized. The licensee had a previous failure of this type of relay on September 16, 2015 when a Unit 2 “H” bus UV relay failed during 2-PT-2.33A testing (CR 1009999).</p>			

This failure caused a loss of the Unit 2 “H” bus and the auto start of the number 2 EDG. As part of the corrective action for this failure, the licensee conducted an apparent cause evaluation (ACE) and concluded that all emergency bus UV and DV relays had no preventative maintenance (PM) to periodically replace the relays. The installed relays were five years past their Electrical Power Research Institute (EPRI) Guide 3002000541 end of life of 20 years. Independent lab testing of the failed relay indicated prolonged thermal damage as the cause of the failure.

As part of the corrective actions to the ACE, the licensee created a corrective action (CA) to create a PM for the UV and DV relays on the Unit 1 and Unit 2 emergency buses. The PM was created as part of a request for technical evaluation (RTE) and determined that the initial relay replacement activities needed to be performed at the next scheduled opportunity and that the normally energized relays need to be replaced on a 20-year frequency. The PM approval date was November 25, 2015. A work order (WO) (38103660563) was written prior to completion of the ACE to replace all of the Unit 2 normally energized UV relays during the fall 2015 refueling outage (RFO). The work order status was listed as completed, but only the remaining two UV relays on the Unit 2 “H” bus were replaced. The “J” bus UV relays were not replaced and the “H” and “J” bus DV relays were not replaced. New work orders were created for the UV and DV relays that were not replaced, but no UV or DV relays were replaced during the Unit 1 fall 2016 RFO and no UV or DV relays were replaced during the Unit 2 spring 2017 RFO. There were no notes in the work orders discussing the delay in replacing the relays and there were no RTEs for PM evaluations to evaluate if the relays could operate for additional cycles without replacement.

Dominion procedure ER-AA-102, “Preventative Maintenance Program,” section 3.4 discusses the scheduling and reviewing of PM tasks. Section 3.4.11 states to “Annotate in the description field of first work order for new PM tasks ‘First Time PM (FTPM)’ or ‘FTPM-Past Initial Frequency (PIF)’ prior to PM task description.” All of the WOs to replace the UV and DV relays should have been annotated “FTPM-PIF,” but none were noted as such. Some of the WOs did have “FTPM” in the description field, but were missing “PIF.” Failure to annotate “PIF” on the WO failed to relay critical information for the work planning process. Additionally, the initial WOs that were created, were not updated with language that recommended replacement of the relays “at the next scheduled opportunity.”

Corrective Actions: The licensee’s immediate corrective action was to replace the Unit 2 “B” phase “H” emergency bus DV relay. Additionally, the licensee made a CA assignment for engineering to review previous corrective actions associated with emergency bus UV and DV relays to determine if actions taken were timely and if additional actions were required based on this issue.

Corrective Action Reference: CR 1091928

Performance Assessment:

Performance Deficiency: The inspectors determined that failure of the licensee to follow procedure ER-AA-102, “Preventative Maintenance Program,” and properly annotate a past initial frequency PM was a performance deficiency (PD) that was within the licensee’s ability to foresee and correct. Specifically, the licensee did not annotate the emergency bus UV and DV relay replacement WOs as “Past Initial Frequency” and as a result, these relays were not scheduled to be replaced at the next scheduled opportunity in accordance with the RTE that established the PM.

**Screening:** The inspectors determined that the PD was more than minor because it adversely affected the equipment performance attribute of the Initiating Events Cornerstone and 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, the failure of the Unit 2 “B” phase “H” and “J” emergency bus DV and UV relays while at RTP necessitated the high risk replacement to prevent a loss of an emergency bus and unnecessarily challenging safety systems.

**Significance:** The inspectors assessed the significance of the finding using IMC 0609.04, “Initial Characterization of Findings,” Table 2, dated October 7, 2016, and the finding was determined to adversely affect the Initiating Events Cornerstone. The inspectors screened the finding using Manual Chapter 0609, Appendix A, “Significance Determination Process (SDP) for Findings at-Power,” dated June 19, 2012, and determined that it screened as Green because the deficiency did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant to a stable shutdown condition.

**Cross-cutting Aspect:** This finding has a cross-cutting aspect in the resolution component of the problem identification and resolution area, P.3, because the organization did not take effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, the replacement of the Unit 1 and Unit 2 emergency bus UV and DV relays were not scheduled at the next scheduled opportunity in accordance with the RTE that established the PM frequency after the September 2015 failure of an UV relay.

**Enforcement:**

**Violation:** Surry Technical Specification 6.4.D requires, in part, that “procedures described in section 6.4.A shall be followed.” Surry Technical Specification 6.4.A.7 requires, in part, that “detailed written procedures with appropriate instructions shall be provided for conditions that include: preventative maintenance operations which would have an effect on the safety of the reactor.” These requirements are implemented, in part, by Dominion procedure, ER-AA-102, “Preventative Maintenance Program.”

Contrary to the above, on November 25, 2015, the licensee failed to follow their Preventative Maintenance Program procedure and did not properly annotate the work orders to replace the emergency bus UV and DV relays as “Past Initial Frequency.” As a result, the UV and DV relays were not replaced at their next scheduled opportunity and subsequently the Unit 2 “B” phase “H” emergency bus DV relay failed on March 13, 2018 and Unit 2 “B” phase “J” emergency bus UV relay failed on May 21, 2018.

**Disposition:** 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**

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

- On July 11, 2018, the inspector presented the quarterly resident inspector inspection results to Mr. F. Mladen, and other members of the licensee staff.

**DOCUMENTS REVIEWED****IP 71111.01: Adverse Weather Protection**Procedures

0-AP-10.18, Response to Grid Instability, Rev. 23  
 0-AP-37.01, Abnormal Environmental Conditions, Rev. 71  
 0-OP-ZZ-021, Severe Weather Preparation, Rev. 20  
 0-OSP-ZZ-003, Hot Weather Preparation, Rev. 8  
 1-OP-26.5, 230 KV Switchyard Voltage, Rev. 19  
 2-OP-26.5, 500 KV Switchyard Voltage, Rev. 23

Work Orders

38103849456

**IP 71111.04: Equipment Alignment**Procedures

0-OP-AAC-001A, AAC Diesel Generator Systems Alignment, Rev. 13  
 1-OP-RH-001A, RHR System Alignment, Rev. 6  
 1-OP-FW-001A, Auxiliary Feedwater System Valve Alignment, Rev. 7  
 1-OP-SI-001A, Safety Injection System Alignment, Rev. 19

Condition Reports (\*NRC Identified)

1094952*	1095732*	1096350*	1097151*	1097647	1097650
1098085*	1098224*	1099074*	1100035*		

Drawings

11448-FB-046D Sh. 2, Flow/Valve Operating Numbers Diagram Lube Oil System – Station Blackout, Rev. 3  
 11448-FB-046D Sh. 3, Flow/Valve Operating Numbers Diagram Cooling Water System – Station Blackout, Rev. 3  
 11448-FB-046D Sh. 4, Flow/Valve Operating Numbers Diagram Starting Air System – Station Blackout, Rev. 11

**IP 71111.05: Fire Protection**Procedures

0-LPT-FP-011, Fire Hose Hydrostatic Test, Rev. 4  
 1-LPT-FP-009, Inspection of Containment Hose Stations, Rev. 4  
 1-LPT-FP-013, Inspection of Containment Fire Hoses, Rev. 3  
 1-LPT-FP-023, Flow Test of containment Hose Station Valves, Rev. 8  
 0-FS-FP-161, Auxiliary Building Elevation 27 Feet – 6 Inches, Rev. 2  
 0-FS-FP-163, Fuel Building Elevation 6 Feet – 10 Inches and 15 Feet – 10 Inches, Rev. 1  
 0-FS-FP-164, Fuel Building Elevation 27 Feet – 6 Inches and 45 Feet – 10 Inches, Rev. 3  
 1-FS-FP-134, Containment Unit 1 Elevation 47 Feet – 4 Inches, Rev. 1  
 1-FS-FP-135, Containment Unit 1 Elevation 18 Feet – 4 Inches, Rev. 1  
 1-FS-FP-136, Containment Unit 1 Elevation (-)3 Feet – 6 Inches, Rev. 1  
 1-FS-FP-137, Containment Unit 1 Elevation (-)27 Feet – 7 Inches, Rev. 1  
 1-EPT-0902-01, Fire Protection Low Pressure CO2 System Puff Test, Rev. 31  
 0-FS-FP-225, Alternate AC Diesel Room – Construction Site Elevation 35 Ft, Rev. 1

**IP 71111.06: Flood Protection**Procedures

0-AP-13.00, Turbine Building or MER 3 Flooding, Rev. 30  
 0-MOP-SW-002, Operation of Unit 1 to Unit 2 Service Water Jumper, Rev. 7  
 0-MOP-SW-003, Preparation of Unit 1 to Unit 2 Service Water Jumper, Rev. 2  
 0-OP-ZZ-008, Assessment of Maintenance Activities for Potential Flooding of Turbine Building & Associated Areas, Rev. 13  
 GMP-C-107, Rigging and Lifting, Rev. 34  
 MA-AA-101, Fleet Lifting and Material Handling, Rev. 22

Other Documents

DC SU-13-00012, CCHX SW Outlet Jumper

**IP 71111.08: Inservice Inspection Activities**Procedures:

ER-AA-NDE 140, Nondestructive Examination (NDE) Procedure, Processing of Dominion NDE Data, Rev. 5  
 ER-AA-NDE-PT-300, SME Section XI Liquid Penetrant Examination Procedure, Rev. 7  
 ER-AA-NDE-PT-301, NDE Procedure, Balance of Plant, Liquid Penetrant Examination Procedure, Rev. 7  
 ER-AA-NDE-PT-301, NDE Procedure, Balance of Plant (BOP) Liquid Penetrant Examination Procedure, Rev. 7  
 ER-AA-NDE-UT-701, NDE Procedure, Ultrasonic Thickness Measurement Procedure, Rev. 6  
 ER-AA-NDE-UT-706, NDE Procedure, Ultrasonic Examination for the detection of Laminar Indications, Rev. 1  
 ER-AA-NDE-UT-802, NDE Procedure, Ultrasonic Examination of Austenitic Piping Welds in Accordance with ASME Section XI, Appendix VIII, Rev. 5  
 ER-AA-NDE-VT-603, NDE Procedure, VT-3 Visual Examination Procedure, Rev. 6  
 ER-AA-NDE-VT-604, NDE Procedure, Visual Examination for Leakage of PWR Reactor Head Penetrations, (Code Case N729-4), Rev. 3  
 ER-AA-NDE-VT-607, NDE Procedure, Visual Examination Procedure, Examination of Pressure Retaining Welds in Class 1 Components Fabricated with Alloy 600/82/182 Materials, Rev. 2  
 ER-AP-SGP-10, Steam Generator Program Description, Rev. 8  
 ER-AP-SGP-101, Steam Generator Program, Rev. 12  
 ER-AP-SGP-102, Steam Generator Degradation Assessment, Rev. 8  
 ER-AP-SGP-103, Steam Generator Condition Monitoring and Operational Assessments, Rev. 7  
 ER-SU-AUG-101, Administrative Procedure, Surry Augmented Inspection Program, Rev. 16  
 0-NSP-RC-003, Engineering Surveillance Procedure, Visual Examination of Reactor Pressure Vessel Bottom Mounted Instrumentation (BMI), Rev. 3

Drawings:

11448-CBM-087A-5, ISI Classification Boundary Drawing, Interval-5, Residual Heat Removal System, Surry Power Station Unit-1, Virginia Power, Rev. 0  
 11448-FM-087A, Sht. 1, Flow/Valve Operating Numbers Diagram, Residual Heat Removal System, Rev. 23  
 11448-FP-12B, Sht. 2, Residual Heat Removal System, Rev. 11  
 11448-WMKS-RC-R-1.1, Inservice Inspection Detail Drawing, Reactor Vessel Welds, Surry Power Station, Unit-1, Rev. 4  
 WM-4372, Work Order 38103811311 Weld Map, Charging System Line No. 3-CH-251-1502, Design Change No. SU-17-00109, 4/20/18  
 WM-4166, Work Order 38103611539 Weld Map, Line No. ¾ RC-67-1502, 9/26/16



Work Orders/Work Requests:

38103611539, Valve Replacement In Accordance with Design Change SU-15-01046, Replace Valve 01-RC-139, 11/5/16  
 38103775582, RHR Pump 01-RH-P-1A, Pump Swap Out, 4/24/18

Condition Reports:

1051211, 1-RH-P-1A Has Seal Leakage  
 1051336, Boric Acid on 1-RH-P-1A (Pump Seal)  
 1052226, Possible Foreign Material in the Secondary Side of the Steam Generator  
 1053709, U1 S/G Pressures Lower Than Expected after Refueling Outage  
 1062048, U-1 Steam Generator Elevated Sodium  
 1063848, Boric Acid Identified on 1-SI-61, Low Head Safety Injection Pump 1A Recirculation Check Valve  
 1069494, Unit 1 Steam Generator Sodium Concentration Increasing  
 1073523, PCS Primary to Secondary Leak Rate Program Requires Update  
 1076596, U-1 Steam Generator Sodium Spiked when Placing 1-CP-DM-1F in Service for 2-hr Run  
 1089827, 1-OP-RC-015 Data Incorrectly Entered  
 1095256, Surry Unit-1, R28, Cold Shutdown Walk-down, Boric Acid Inspection, Below Screening Threshold Leaks  
 1095383, Pipe Support 1-CC-H015, Unable to Determine Cold Load Setting on Spring Support  
 1095388, Pipe Support 1-CC-H018, Unacceptable Gaps Noted Condition, Improper Thread Engagement  
 1095485, ASME Section XI, IWE Inspection Procedure ER-AA-NDE-VT-605 Requires Update  
 1095636, Foreign Material (FM) Identified during As-Found Inspections in "C" Steam Generator Primary Side  
 1095775, UT Indication Found during MRP-146 Thermal Fatigue Examination  
 1095586, Boric Acid Leak at Pipe Cap Downstream of 1-CH-433  
 1095587, NRC Identified Boric Acid at 1-CH-344 at ASME Class 1 Tee Connection  
 1096048, Possible Loose Parts in U1 SG A

Miscellaneous Documents:

Certificate of Certification, Spotcheck Penetrant, SKL-SP-2, 5/14/17  
 Certificate of Calibration, Thermometer Certificate No. 180854030900376, 3/26/18  
 Certificate of, Thermometer Certificate No. 180854030900380, 3/26/18  
 CAL-18-004, UT Thickness Calibration Report, 4/25/18  
 Document Number 180-9264066-000, Surry S1R27 Bare Metal Visual Examination, 11/10/16  
 ETE-SU-2015-0011, Steam Generator Condition Monitoring and Operational Assessment - Surry Unit 1, Rev. 0  
 ETE-SU-2016-0031, Steam Generator Condition Monitoring and Operational Assessment - Surry Unit 1, Rev. 0  
 ETE-SU-2018-0009, Surry Unit 1, Spring 2018 Steam Generator Degradation Assessment, Rev. 0  
 Figure 15.5-1, Reactor Containment Waterproofing Elevation View, Surry UFSAR, Rev 49.01, 1/31/18  
 Framatome Inc. Engineering Information Record, 51-9282567-000, Surry Unit 1 – 1R28 ECT Inspection Plan  
 Framatome Inc. Engineering Information Record, 51- 9282741- 000 - Qualified Eddy Current Examination Techniques for Surry Unit 1, 1R28

NDE Personnel Qualification and Certification Records for 15 individuals  
 Personnel Certification Records for one Independent Data Analyst  
 RR 2016-093, ASME Section XI Repair /Replacement Plan for Work Order 38103611539,  
 11/8/16  
 Self-Assessment PIR1030006, Steam Generator Program Quality and Implementation  
 SRY-SGPMS-002, Surry Site Specific Eddy Current Analysis Guidelines, Surry 1R28, Rev. 26  
 Surry Power Station, Unit-1, Inservice Inspection Plan for Components and Component  
 Supports, Fifth 10-Year Inservice Inspection Interval, Dec.14, 2013 - October 13, 2023, Rev. 3  
 TB-07-2, Westinghouse Technical Bulletin, Reactor Vessel Head Adapter Thermal Sleeve Wear  
 Rev. 3  
 Weld Data Record, Work Order 38103611539, Weld No. 3, Valve 01-RC-139, 11/8/16  
 Weld Data Record, Work Order 38103611539, Weld No. 5, Valve 01-RC-139, 11/8/16  
 Welder Performance Qualification (WPQ), for Rev. 8 of Technique 801- one person

**IP 71111.11: Licensed Operator Regualification Program**

Procedures

1-GOP-1.8, Unit Startup, Hot Shutdown to Max Allowable Power, Rev. 40  
 1-GOP-2.7, Unit Shutdown, Power Decrease from Allowable Power to Unit Offline for Refueling  
 Outage, Rev. 38  
 1-OP-RX-009, Dilution to Critical Conditions Following Refueling, Rev. 26

**IP 71111.12: Maintenance Effectiveness**

Condition Reports

1091963      1098836

Work Orders

38203874980      38203875045

Other Documents

DC SU-18-00112, Charging SW Fire Protection Pipe Replacement, Rev. 0  
 GMP-035, Sealing of Fire Barriers with Mortar or Caulking Compound, Rev. 15

**IP 71111.13: Maintenance Risk Assessments and Emergent Work Control**

Procedures

NF-AA-PRA-370, Probabilistic Risk Assessment Procedures and Methods: MRule (a)(4) Risk  
 Monitor Guidance, Rev. 19  
 WM-AA-20, Risk Assessment of Maintenance Activities, Rev. 2  
 WM-AA-100, Work Management, Rev. 31  
 WM-AA-301, Operational Risk Assessment, Rev. 19

Other Documents

EOOS Schedulers Risk Evaluation for Surry Power Station, April 18, 2018  
 EOOS Schedulers Risk Evaluation for Surry Power Station, April 24, 2018  
 EOOS Schedulers Risk Evaluation for Surry Power Station, April 30, 2018  
 EOOS Schedulers Risk Evaluation for Surry Power Station, May 14, 2018  
 Surry Unit 2 2017 Outage Shutdown Risk Review Report, Dated 4/21/2018

**IP 71111.15: Operability Determinations and Functionality Assessments**

Procedures

0-FS-FP-211, Emergency Service Water Pump House – Low Level Elevation 18 Feet, Rev. 3

DNES-AA-MOV-1001, Motor Operated Valve Diagnostic Test Preparation and Evaluation, Rev. 1  
 OP-AA-102, Operability Determination, Rev. 15

Condition Reports

1091963      1094780      1097862

Drawings

11448-FM-071B, Flow/Valve Operating Numbers Diagram Circulating and Service water System, Rev. 61  
 11448-FM-088B, Flow/Valve Operating Numbers Diagram Chemical & Volume Control System, Rev. 53

Work Orders

38102221431      38203874699      38203874700      38203874701

Other Documents

Calculation ME-0166, Appendix R Fire SWSOPA, Rev. 2  
 ETE-CME-2017-0014, Surry Power Station Anchor-Darling Double Disk Gate Valve Part 21 Applicable Valve Prioritizations, 06/11/18  
 Prompt Operability Determination for Unit 1 and Unit 2 Anchor-Darling Double Disk Gate Valves, 05/22/18  
 Static Test Evaluation Review Checklist for 1-SW-MOV-104B, 05/19/18  
 SU-17-00137, Unit 1 Stem and Pin Replacements on Anchor-Darling Double Disk Gate Valves, Rev. 0

**IP 71111.18: Plant Modifications**

Procedures

1-OSP-ZZ-001, Auxiliary Shutdown Panel Functional Surveillance, Rev. 15  
 1-OSP-ZZ-006, Operational Check of the Auxiliary Shutdown Panel and Transfer Relay Cabinets, Rev. 1  
 0-NAT-E-003, Control Circuitry Checkout/Initial Energization of Electrical Equipment, Rev. 2  
 0-NAT-FC-001, Functional Loop Checkout, Rev. 2  
 0-FCA-1.00, Limiting MCR Fire, Rev. 54  
 1-OSP-ZZ-006, Operational Check of the Auxiliary Shutdown Panel and Transfer Relay Cabinets, Rev. 0

Condition Reports

1097528      1097542      1098226      1098566

Drawings

11448-ESK-6BY, Elementary Diagram 480V Circuits Motor Operated Valves 01-FW-MOV-151C&D, Revs. 23 and 24  
 11448-FM-088B, Sheet 2, Flow/Valve Operating Numbers Diagram, Chemical & Volume Control System, Rev. 55  
 1700109-1-M-800, Sheet 001, Charging Cross Connection Piping, Surry Power Station – Unit 1, Rev. 0

Work Orders

38103835060      38103786256      38103862320      38203874701  
 38203874745

Other Documents

DCP 79-067, Charging Pump Cross-Connect #1 and #2, 02/06/81  
 DCP SU-16-00109, Surry Unit 1 AFW MOV Hot Short Resolution, Rev. 0  
 DCP, SU-17-00109, Surry Power Station Unit 1 Hot Short Resolution Charging Cross-tie Relocation, Rev. 0

**IP 71111.19: Post Maintenance Testing**

Procedures

0-OPT-ZZ-008, ASME System Pressure Test, Rev. 11  
 1-PT-2.33A, Emergency Bus Undervoltage and Degraded Protection Test "H" Train, Rev. 8  
 1-PT-8.2, Reactor Protection Logic, Rev. 25  
 1-OPT-SI-002, Refueling Test of the Low Head Safety Injection Check Valves to the Cold Legs, Rev. 25  
 1-OPT-FW-002, Motor Driven Auxiliary Feedwater Pump 1-FW-P-3B, Rev. 36  
 VPAP-0812, Station Lubrication Program, Rev. 17  
 1-EPT-0106-07, Main Station 1B Performance Test, Rev. 21  
 1-EPT-1801-01, Bus 1H Protective Relay Testing, Rev. 16  
 1-OPT-EG-009, Number 1 Emergency Diesel Generator Major Maintenance Operability Test, Rev. 58  
 1-OPT-ZZ-001, ESF Actuation with Undervoltage and Degraded Voltage 1H Bus, Rev. 42  
 DNES-AA-MOV-1001, Motor Operated Valve Diagnostic Test Preparation and Evaluation, Rev. 1

Condition Reports

1095507	1096445	1096973	1097129	1097208	1098022
1098650					

Work Orders

38203874699	38203874700	38203874701	38203877019
38103753291	38103753299	38103753307	38103753315
38103753323	38103753331	38103775433	38103771661
38103788540	38103867760	38103863466	38103629393

Drawings

11448-FM-088B, Flow/Valve Operating Numbers Diagram Chemical & Volume Control System, Rev. 53

Other Documents

DCP SU-17-00109, SPS U1 Hot Short Resolution Charging Cross-tie Relocation, Rev. 0  
 DCP SU-18-00116, Stem and Disc Arm Replacement for 1-SI-MOV-1863A, Rev. 0  
 ME-3330, JOG Calculation of Required Thrust Settings for MOV 1-SI-MOV-1863A, Rev. 4  
 Radiographic Film for RR-2018-084 Weld 3A, dated 4/29/18  
 Static Test Evaluation Review Checklist for 1-SI-MOV-1863A, 05/09/18  
 SU-CALC-MEC-2044498-C-033, Seismic/Weak Link Thrust Calculation for MOVs: 1-CH-MOV-1115B, 1-CH-MOV-1115D, 1-SI-MOV-1863A, & 1-SI-MOV-1863B at Surry Unit 1, Rev. 2  
 VT-2 Visual Examination Report for ASME Pressure Test RR-2018-084, dated 5/14/18 and 5/18/18

**IP 71111.20: Refueling and Other Outage Activities**

Procedures

1-GOP-1.8, Unit Startup, Hot Shutdown to Max Allowable Power, Rev. 40

- 1-GOP-2.7, Unit Shutdown, Power Decrease from Allowable Power to Unit Offline for Refueling Outage, Rev. 38
- 1-OP-FH-001, Controlling Procedure for Refueling, Rev. 41
- 1-OP-RC-004, Draining the RCS to Reactor Flange Level, Rev. 38
- 1-OP-RX-009, Dilution to Critical Conditions Following Refueling, Rev. 26
- LI-AA-700, Fatigue Management and Work Hour Limits for Covered Workers, Rev. 13
- MA-AA-102, Foreign Material Exclusion, Rev. 22

Condition Reports

1095133	1095607	1095784	1096592	1096323	1096319
1097151	1096349	1096386	1096874	1096989	1097149
1096810	1096339	1096350	1097304	1098578	1098605
1098650	1098758	1098933			

**IP 71111.22: Surveillance Testing**

Procedures

- 0-OPT-SW-002, Emergency Service Water Pump 1-SW-P-1B, Rev. 65
- 0-MCM-0802-01, Recirculation Spray Heat Exchanger Inspection and Cleaning, Rev. 11
- 1-OPT-SI-026, Safety Injection Train A Master Relay and Reset Timer Test, Revs. 3 and 4
- 1-OPT-CT-201, Containment Isolation Valve Local Leak Rate Testing (Type C Containment Testing), Rev. 25
- 1-OPT-SI-009, Refueling Test of the LHSI Check Valves to the Hot Legs, Rev. 17
- 1-OPT-ZZ-001, ESF Actuation with Undervoltage and Degraded Voltage 1H Bus, Rev. 42
- 1-OSP-SW-008, SW Flow Test of RSHXs 1-RS-E-1B and 1-RS-E-1C, Rev. 6 (OTO1)

Condition Reports

1096874

Work Orders

38103629393

**71114.02: Alert and Notification System Evaluation**

Procedures

- Surry Power Station Emergency Plan, Rev. 64
- 0-LSP-EW-001, Early Warning System Polling Functional Test, Rev. 17
- 0-LSP-EW-002, Early Warning System Siren Activation Monitoring, Rev. 13
- 0-LSP-EW-003, Early Warning System Siren Quarterly Inspection, Rev. 2
- 0-LSP-EW-004, Early Warning System Siren Quarterly Remote Activation Panel Inspection, Rev. 1
- 0-LSP-EW-007, Early Warning System Polling Functional Test (Innsbrook), Rev. 1
- 0-LSP-EW-008, Early Warning System Siren Annual Inspection, Rev. 2

Records and Data

- Alert & Notification System Updated Design Report for Surry Power Station, Rev. 2, dated 3/12/18
- Dominion's Surry Siren Upgrade Propagation Study, Rev. 1, dated 10/24/14
- FEMA Analysis of the Prompt Alert & Notification System for Surry Power Station, dated 12/8/87
- Notification System Quality Assurance Verification Final Report, dated 9/30/87
- Sample of 2017 & 2018 siren testing results

Condition Reports

CR 1035025, Potential trend for SPS EWS #51  
 CR 1044956, 00-EW-ESIR-49 Failed to Poll  
 CR 1055371, Siren 41 did not respond as expected during conduct of 0-LSP-EW-007  
 CR 1070454, SPS EWS Siren Polling (Corporate) 29 & 51 failed to Poll  
 CR 1071840, SPS scheduled EWS siren activation test  
 CR 1085925, Failed James County backup activation panel  
 CR 1088227, SPS Back-up EWS failed to Poll  
 CR 1094430, SPS EWS siren polling test 21A failed to respond to battery AC test (NRC-observed)

**71114.03: Emergency Response Organization Staffing and Augmentation System**Procedures

0-LSP-CO-005, EP Surveillance Procedure, Augmentation Capabilities, Rev. 0  
 CPIP-3.1, CERC and EOF Activation, Rev. 30  
 CPIP-3.3, Surry LEOF Activation, Rev. 21  
 CPIP-6.0, LEOF Recovery Manager Guidance, Rev. 14  
 EPIP-2.02, Notification of NRC, Rev. 24  
 EPIP-3.02, Activation of the Technical Support Center, Rev. 35  
 EPIP-3.03, Activation of the Operations Support Center, Rev. 22  
 EPIP-3.05, Augmentation of Emergency Response Organization, Rev. 12  
 EPIP-4.03, Dose Assessment Team Controlling Procedure, Rev. 21  
 EAL Technical Basis Document, Rev. 4  
 Corporate Emergency Plan, Rev. 16

Records and Data

Assessment of On-Shift Emergency Response Organization Staffing Capabilities, NEI 10-05, dated 12/20/12  
 Augmentation Capability Assessment – Emergency Response Organization: dated 1/30/17, 2/01/17, 7/17/17, 9/28/17, 12/06/17  
 Emergency Response Organization Team Roster Assignments  
 Selected ERO Training Records  
 Surry Units 1&2 On-shift Analysis Record of Revision, Rev. 0

Condition Reports

CR 1047822, Adverse Trend in Corp ERO Availability  
 CR 1055786, Drill confidential material distributed to key ERO members prior to 12/13/16 EP drill  
 CR 1055790, During SDEC16FS EP Drill, Accountability Reader Activation Took 8 Minutes  
 CR 1056052, EP drill conducted on 12/13/16, SDEC16FS objective 20 MET with Problems for CRS  
 CR 1056054, EP Drill conducted on 12/13/16, SDEC16 FS overall 20 graded as MET with Problems  
 CR 1061848, Surry ERO LMS roles do not align with the ERO Training Program Guide  
 CR 1062280, Communications Failures  
 CR 1072620, Unsuccessful Drill and Exercise Performance (DEP) opportunity  
 CR 1090846, CR not submitted when ERO staff positions dropped below five  
 CR 1094415, Discrepancies identified with ERO response times (NRC-identified)

**71114.04: Emergency Action Level and Emergency Plan Changes**Procedures

EP-AA-101, 10 CFR 50.54(q) Change Evaluation, Rev. 7  
 EP-AA-102, Revision & Control of Emergency Plan, Emergency Action Levels (Technical Basis and Matrix) & Reference Manual, Rev. 8  
 EP-AA-105, Emergency Preparedness Department Staff Training, Rev. 0  
 EPIP-4.03, Dose Assessment Team Controlling Procedure, Revs. 20 & 21  
 Surry Power Station Emergency Action Level Matrix, Rev. 4  
 Surry Power Station Emergency Action Level Technical Basis Document, Rev. 4  
 Surry Power Station Emergency Plan, Revs. 63 & 64

Change Packages

SU-17-06, 50.54(q)(3) Screening/Evaluation for Emergency Plan, Section 7.2.2.4, dated 2/27/18  
 SU-17-09A, 50.54(q)(2) Analysis for EPIP-4.03, Dose Assessment Team Controlling Procedure, Rev. 20  
 SU-17-10A, 50.54(q)(2) Analysis for EPIP-2.02, Notification of NRC, Rev. 24  
 SU-18-025, 50.54(q)(3) Screening/Evaluation for Surry Emergency Plan, Rev. 64

Condition Reports (\*NRC Identified)

CR 1061820, EPIP implementation has resulted in differences in current use revisions  
 CR 1062839, New calculations will affect future NEI 99.01 Rev. 6 EAL thresholds  
 CR 1071334, EPIP-2.01 enhancements required as discovered during training exercise  
 CR 1072420, Procedural deficiency in EPIP-4.03  
 CR 1072667, Question exists regarding most appropriate method of determining noble gas to particulate ratio (NG/Part)  
 CR 1074400, Wrong revision numbers referenced in procedure package  
 CR 1074537, SJUL17BE – Additional 50.72 reporting when in continuous NRC communications  
 CR 1094413\*, Benchmark the 10 CFR 50.54q process

**71114.05: Maintenance of Emergency Preparedness**Procedures

0-HSP-EP-001, Health Physics Surveillance Procedure, Rev. 26  
 1-1PM-ER-REC-001, Seismic Instrumentation Status Check Recording, Rev. 6  
 EP-AA-100, Maintaining Emergency Preparedness, Rev. 8  
 EP-AA-303, Equipment Important to Emergency Response, Rev. 17  
 EP-AA-400, Drill & Exercise Program, Rev. 12  
 EPIP-303, Activation of the OSC, Rev. 22  
 EPIP-4.03, Dose Assessment Team Controlling Procedure, Revs. 19, 20, and 21  
 EPIP-8.02, Activation of the TSC, Rev. 35  
 OP-ZZ-026, Compensatory Measures for Category "A" Equipment Important to Emergency Response, Rev. 1  
 PI-AA-100-1003, Self-Evaluation & Trending, Rev. 24  
 PI-AA-100-1004, Self-Assessments, Rev. 14  
 PI-AA-200, Corrective Action, Rev. 33  
 PI-AA-300, Cause Evaluation, Rev. 15  
 Surry Power Station Emergency Plan, Revs. 63 and 64

Records and Data

Surry Power Station, ACE #: CA 3060983, CR 1072620, Unsuccessful Drill and Exercise Performance (DEP) opportunity, dated 6/29/17

Radiological Status Form, CERC run based on MIDAS projection for Surry Drill, run #4 ('K' run)  
 date/time: 6/27/17 at 10:38  
 Radiological Status Form, LEOF run based on MIDAS projection for Surry Drill, run # 3,  
 date/time: 6/27/17 at 10:05  
 Radiological Status Form, TSC run based on MIDAS projection for Surry Drill, run # 4,  
 date/time: 6/27/17 at 10:27  
 Self-Assessment, PIR 1039123, Emergency Response Facility Support Equipment, dated  
 12/21/16  
 Self-Assessment, PIR 1034876, Drill Development, dated 5/5/17  
 Self-Assessment, PIR 1058655, NRC Biennial Exercise Readiness, dated 6/26/17  
 Self-Assessment, PIR 1079700, Inspection Readiness, dated 3/15/18  
 Nuclear qualifications for selected ERO staff for respiratory protection, dated 4/9/18  
 Nuclear Oversight Audit report 17-02, Emergency Preparedness, dated 3/29/17  
 SDEC16FS, Full Scale Training Drill, Management Critique, dated 12/13/16  
 SFEB16FS, Full Scale Training Drill, Management Critique, dated 2/29/16  
 SJUN16FS, Full Scale Training Drill, Management Critique, dated 6/21/16  
 Surry Evacuation Time Estimates Report, dated December 2012  
 Surry 2017 Evacuation Time Estimate/Population Update Analysis, dated 12/7/17  
 0-LSP-CO-004, Emergency Response Data System (ERDS) Test, Rev. 8, dated 1/4/17

#### Work Orders

38103847993, Location 01-ER-REC-100-Panel, U1, PM: Perform Seismic Channel Check,  
 dated 2/22/18  
 38103854141, Location 01-ER-REC-100-Panel, U1, PM: Perform Seismic Channel Check,  
 dated 3/26/18  
 38103619942, Location 01-ER-REC-100-Panel, U1, PM: Perform Seismic Channel Check,  
 dated 10/23/16  
 38103444550, Location 01-ER-REC-100-Panel, U1, PM: Perform Seismic Channel Check,  
 dated 5/11/15

#### Corrective Action Documents

CR 1028317, Approver was not qualified to approve 10 CFR 50.54 (q) evaluations  
 CR 1035040, EP Baseline Inspection NRC observations  
 CR 1037165, Objective 4 offsite Notifications NOT MET  
 CR 1041302, NRC ENS line will not work for incoming or outgoing calls  
 CR 1041840, TSC AC unit not working  
 CR 1059998, 1-PT-26-2C completed UNSAT due to annunciator A3 will not illuminate  
 CR 1060458, Discrepancy in the minimum staffing requirements between the E-Plan and OP-  
 AA-100  
 CR 1061291, B.5b self-assessments have not been performed  
 CR 1063530, During drill SMAR 17 FS unable to complete EPIP-2.01 notification to all locations  
 within 145 minutes  
 CR 1064585, TSC Ping 38 communication error  
 CR 1068020, Main steam line Radiation Monitor cable damaged  
 CR 1068672, Surry backup EOF location different from NRC-approved location  
 CR 1069966, MIDAS not working properly  
 CR 1072399, Potential for ERO PAR vulnerability based on EPIP 4.03, NE-GL-0035  
 CR 1072405, SJUN17DR – Not Met objective 15 timely and accurate information to the public  
 CR 1072416, SJUN17DR DEP potentially incorrect IAW EP-AA-103 related to PAR  
 CR 1074327, TSC communication equipment issues  
 CR 1074436, SJUL17BE ERDS data from simulator not visible to NRC



CR 1074531, SJUL17BE Objective 20 was upgraded as NOT MET overall for the exercise  
 CR 1074753, SJUL17BE – Exercise Scenario package did not contain demonstration criteria  
 CR 1074790, Observations from NRC Biennial EP Inspection  
 CR 1077061, TSC Ping 3-B computer not functioning, the computer locked out  
 CR 1078651, Surry County ARD not working as designed  
 CR 1079349, MIDAS not automatically down-loading meteorological or radiation data  
 CR 1080249, Vent Stack 2 RM pump tripped  
 CR 1083260, TSC PCS components high temperature  
 CR 1084539, 1-VG-RI-131 B Vent-gas #2 failed  
 CR 1090066, Numerous outlets in the CP Control Room, including security card readers have lost power  
 CR 1090297, Charles City Instaphone is not functional  
 CR 1090846, CR not submitted when ERO staff positions dropped below five  
 CR 1093227, 1-GW-R1-130B indicates a flow fault  
 CR 1094428, LEOF tripping hazard resulted in near-miss (NRC-identified)  
 CR 1094431, LEOF walk down (NRC-identified)  
 CR 1094499, Respirator inspection date not documented in EP go-kits

#### **IP 71114.06: Emergency Preparedness Drills**

##### Procedures

1-E-0, Reactor Trip or Safety Injection, Rev. 72  
 EPIP-1.03, Response to Alert, Rev. 23  
 EPIP-1.04, Response to Site Area Emergency, Rev. 23  
 EPIP-1.05, Response to General Emergency, Rev. 25  
 EPIP-1.06, Protective Action Recommendations, Rev. 12  
 EPIP-2.01, Notification of State and Local Governments, Rev. 44

##### Condition Reports

1099973      1100214      1100460      1101008

#### **IP 71151: Performance Indicator Verification**

##### Procedures

EP-AA-103, Emergency Preparedness Performance Indicators, Rev. 5  
 ER-AA-SPI-101, Implementation of the Consolidated Data Entry (CDE) Reporting for Mitigating System Performance Index (MSPI), Rev. 0  
 NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 7  
 PI-AA-200, Corrective Action, Rev. 33  
 SU-2014-0082, MSPI Basis Document, Rev. 0

##### Records and Data

DEP opportunities documentation for 2<sup>nd</sup>, 3<sup>rd</sup>, & 4<sup>th</sup> quarters 2017  
 Siren test data for 2<sup>nd</sup>, 3<sup>rd</sup>, & 4<sup>th</sup> quarters 2017  
 Drill & exercise participation records of ERO personnel for 2<sup>nd</sup>, 3<sup>rd</sup>, & 4<sup>th</sup> quarters 2017

##### Corrective Action Documents

CR 1046155, Incorrect value for EP KPI  
 CR 1047961, Loss of power to EAS system  
 CR 1051157, ARCOS wed-based callout unavailable due to internet outage  
 CR 1058590, Operations personnel NRC Communicator qualifications delayed  
 CR 1074339, ARCOS activation notifications received 12 minutes after declaration of Alert

Other Documents

1Q/2018 Performance Indicators - Surry 1 and 2 – Reactor Coolant System Activity, dated 05/01/18

1Q/2018 Performance Indicators – Surry 1 and 2 – Reactor Coolant System Leakage, dated 05/01/18

1Q/2018 Performance Indicators – Surry 1 and 2 – Safety System Functional Failures, dated 05/01/18

Unit 1 Control Room Narrative Log, 04/01/2017 – 03/31/2018

Unit 2 Control Room Narrative Log, 04/01/2017 – 03/31/2018

**IP 71152: Identification and Resolution of Problems**Procedures

ER-AA-102, Preventative Maintenance Procedure, Rev. 11

WM-AA-10, Work Management, Rev. 1

WM-AA-101, Work Order Planning, Rev. 14

Condition Reports

1000999	1030874	1084436	1084472	1091928	1097966
1098297					

Work Orders

3810359162	38103658614	38103660563	38103843782
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Other Documents

ACE CA3009200, Unanticipated Starting of EDG #2 during Undervoltage/Degraded Voltage Testing Procedure, 12/06/2015

EACE, CA3027045, The 1-EP-27-1JDUS-1J1A Relay was found to be Chattering, 07/30/2016

RTE P-SURR-343477, Create Preventative Maintenance for Unit 2 “H” Bus UV/DV Two out of Three Relays, 01/29/2016