UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200
ATLANTA, GEORGIA 30303-1200

February 12, 2019

Mr. Daniel G. 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 05000280/2018004 AND 05000281/2018004

Dear Mr. Stoddard:

On December 31, 2018, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Surry Power Station, Units 1 and 2. On January 15, 2019, 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 two findings of very low safety significance (Green) in this report. One 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 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 Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; and the NRC Resident Inspector at the Surry Power Station.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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.

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/

Lundy F. Pressley, Acting Chief
Reactor Projects Branch 4
Division of Reactor Projects

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

Enclosure:
IR 05000280/2018004, 05000281/2018004

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SUBJECT: SURRY POWER STATION – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 05000280/2018004 AND 05000281/2018004 February 12 , 2019

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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:	05000280/2018004 and 05000281/2018004
Enterprise Identifier:	I-2018-004-0051
Licensee:	Virginia Electric and Power Company (VEPCO)
Facility:	Surry Power Station, Units 1 and 2
Location:	Surry, VA 23883
Inspection Dates:	October 1, 2018 to December 31, 2018
Inspectors:	B. Lin, Acting Senior Resident Inspector C. Read, Resident Inspector R. Kellner, Senior Health Physicist (Sections 71124.02 and 71124.03) W. Loo, Senior Health Physicist (Sections 71124.05 and 71151 – OR01, PR01) W. Pursley, Health Physicist (Sections 71124.01 and 71124.04) S. Downey, Senior Reactor Inspector (Section 71111.08) A. Butcavage, Reactor Inspector (Section 71111.08) P. Capehart, Senior Operations Engineer (Section 71111.11 – Operator Exams)
Approved By:	Lundy F. Pressley, Acting 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 Assess and Manage Plant Risk During Testing of an Instrument Air Compressor			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000280/2018004-01 Opened/Closed	P.2 - Evaluation	71111.13
An NRC-identified Green non-cited violation (NCV) of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," section a(4), for the licensee's failure to assess and manage the increase in risk for routine surveillance testing of the Unit 1 instrument air compressor. As a result of the instrument air system alignment during testing and a known equipment issue, Unit 1 experienced a secondary transient and a forced rapid power reduction.			

Failure to Maintain Reactor Coolant System Pressure during Solid Plant Operation			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Barrier Integrity	Green FIN 05000280/2018004-02 Opened/Closed	H.12 – Avoid Complacency	71153
A self-revealed Green finding of OP-AA-100, "Conduct of Operations," was identified for the licensee's failure to adequately implement operator fundamentals. Specifically, operators did not appropriately execute clear communication, peer checks, and supervisory oversight during solid plant operations, leading to an adjustment of the incorrect component and actuation of the over pressurization mitigation system (OPMS).			

PLANT STATUS

Unit 1 operated at or near rated thermal power (RTP) from the beginning of the inspection period until October 5, 2018, when it was shut down for repairs on 'C' station service transformer (SST). It remained offline until October 11, 2018, when the main turbine was synchronized to the grid and returned to rated thermal power. On October 16, 2018, the unit lowered power to 75 percent RTP after the Unit 1 instrument air compressor tripped during planned scheduled surveillance testing resulting in a degraded condition of the running high pressure heater drain pump when the level control valves changed to their fail-safe positions as designed. After the instrument air header was restored, the unit returned to rated thermal power on October 17, 2018, and operated there for the remainder of the inspection period.

Unit 2 operated at or near rated thermal power from the beginning of the inspection period until October 27, 2018, when it was shut down to begin a planned refueling outage. It remained offline until December 6, 2018, when the main turbine was synchronized to the grid. On December 8, 2018, the unit reached rated thermal power and operated there for the remainder of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

External Flooding (1 Sample)

The inspectors evaluated readiness to cope with external flooding on December 12, 2018.

Seasonal Extreme Weather (1 Sample)

The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal cold temperatures on December 17, 2018.

71111.04 - Equipment Alignment

Partial Walkdown (4 Samples)

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

(1) Unit 1 and Unit 2 instrument air (IA) and service air systems while both Unit 1 and Unit 2 IA compressors were nonfunctional and severe weather was forecasted, on October 24, 2018
(2) Alternate AC (AAC) diesel generator prior to tagging out 'C' reserve station service transformer (RSST) for replacement on October 31, 2018
(3) Safety injection system on November 30, 2018
(4) #3 Emergency diesel generator (EDG) while #2 EDG was inoperable for a monthly performance test, on December 17, 2018

Complete Walkdown (1 Sample)

The inspectors evaluated system configurations during a complete walkdown of the emergency service water system full alignment on November 29, 2018.

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (5 Samples)

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

(1) Unit 2 upper cable vault penetration area (35 feet (ft) - 6 inches (in) and 15 ft – 0 in elevations) on October 25, 2018
(2) Emergency switchgear room halon system cylinder pressure and weight testing on November 9, 2018
(3) AAC diesel generator building on November 1, 2018
(4) Emergency service water (ESW) pump house - low level elevation 18 ft on November 29, 2018
(5) Unit 2 containment building on December 4, 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 on December 11 and December 13, 2018.

71111.08 - Inservice Inspection Activities (1 Sample)

The inspectors evaluated pressurized water reactor non-destructive testing by reviewing the following examinations from November 5, 2018, to November 9, 2018:

(1) Eddy Current Examination
   a) Steam Generator 2C - ET for tubes R43C64, R36C68, R40C59, R26C54, R34C55, R36C68, R11C94, R13C89, R11C89, R15C89, R15C88, R34C74, R38C62, American Society of Mechanical Engineers (ASME) Class 1

(2) Liquid Penetrant Examination
   a) Weld 1-09, pipe to elbow weld, ASME Class 1
   b) Weld 1-19A, pipe to elbow weld, ASME Class 1. This included a review of associated welding activities.
   c) Weld 1-20A, pipe to valve weld, ASME Class 1. This included a review of associated welding activities.
   d) Weld 1-21A, pipe to valve weld, ASME Class 1. This included a review of associated welding activities.
   e) Weld 2-13, pipe to elbow weld, ASME Class 2.

(3) Magnetic Particle Examination
   a) Repair weld on 02-SW-FNG-101-PIPE (through wall hole), ASME Class 3. This included a review of associated welding activities
   b) Weld 2-09, nozzle to vessel weld, ASME Class 2

(4) Ultrasonic Examination
   a) Weld 1-09, pipe to elbow weld, ASME Class 1
   b) Weld 1-11, pipe to elbow weld, ASME Class 1
   c) Weld 2-09, nozzle to vessel weld, ASME Class 2
   d) Weld 2-13, pipe to elbow weld, ASME Class 2

(5) Visual Examination
   a) Reactor Vessel Bottom Mounted Instrumentation nozzles, ASME Class 1
   b) Steam Generator-2C, Foreign Object Search and Retrieval (FOSAR) Secondary Side Tube-sheet Upper Surface, ASME Class 2

The Inspectors evaluated the licensee's boric acid control program performance.

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated a simulator scenario involving the operations crew briefing and entering procedures for a faster than normal ramp rate; responding to a loss of station IA; and responding to uncontrollable flooding in the turbine building December 6, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated licensed operator performance in the Unit 1 main control room during the shutdown from 100 percent power to hot shutdown for the mid-cycle outage on October 5-6, 2018, and start up activities following the mid-cycle outage on October 10, 2018.

Operator Exams (1 Sample)

The inspectors reviewed and evaluated requalification examination results on November 29, 2018.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (4 Samples)

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

(1) Low level intake structure site Maintenance Rule structures inspections
(2) ESW pumps preventative and corrective maintenance
(3) Splicing underground cables for ‘C’ RSST connections to the switchyard
(4) Concrete repairs of structural beams for the high-level intake structure

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) 1-OSP-IA-001, Instrument Air Testing, configuration risk evaluation on October 16, 2018
(2) Unit 1 and Unit 2 risk while both Unit 1 and Unit 2 instrument air compressors were non-functional, and the severe weather was forecasted, on October 24, 2018
(3) Unit 2 equipment hatch closure team not on station with fuel movements in process, on October 28, 2018
(4) Cabling splicing repair from failed restoration of the ‘C’ RSST on November 18, 2018
(5) Unit 2 risk while conducting consequence limiting safeguards logic testing on December 3, 2018

71111.15 - Operability Determinations and Functionality Assessments (7 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) CR 1110265, evaluation of the site exiting a technical specification (TS) 3.16, 6-hour shutdown action statement and functionality of the offsite power source to the ‘1H’ and ‘2J’ emergency buses following ‘C’ RSST pilot wire lockout on November 12, 2018
(2) Operability of the service water (SW) motor-operated isolation valves in the Unit 2 service water pit when residents identified standing water in the recirculation spray heat exchanger and bearing cooling SW pits on December 11, 2018
(3) CR 1110407, operability of the ‘B’ ESW pump after damage was discovered on the exhaust muffler before reinstallation of the engine component on November 14, 2018
(4) CR 1112396, operability of degraded voltage relay (1-EP-27AX-1HDUP-1H1) after unsatisfactory response during a scheduled performance test on December 13, 2018
(5) CR 1112752, operability of the pressurizer PORV (2RC-PCV-2456) due to an air leak on the valve stem from the 'B' air bottle on December 20, 2018

(6) CR 1111573, operability of the main steam piping component with wall thickness below the minimum code wall thickness on November 30, 2018
(7) CRs 1112789 and 1112811, voids detected during ultrasonic examination of Unit 1 safety injection piping on December 20, 2018

71111.18 Plant Modifications (4 Samples)

The inspectors evaluated the following permanent modifications:

(1) Coating modification on wetted parts of safety-related circulating water inlet piping
(2) Modification of 'B' ESW pump (1-SW-P-1B) foundation
(3) Modification of 'C' RSST cable splices following identification of damaged splices and obsolescence
(4) 'C' RSST replacement

71111.19 - Post Maintenance Testing (7 Samples)

The inspectors evaluated the following post maintenance tests:

(1) ETE-SU-2018-0047, Results and retests of the low side bushing on the Unit 1 'C' SST on October 10, 2018
(2) 2-PT-1.1, Nuclear instrumentation (NI) trip channel tests prior to start up following source range detector channel (N32) replacement on November 5, 2018
(3) DC-15-1083, replacement and retests of the 'B' ESW pump on November 20, 2018
(4) 2-OPT-EG-009, #2 EDG operability test following an 18-month preventative maintenance package on November 21, 2018
(5) 2-OPT-RH-003, Residual heat removal (RHR) system operability test following the Unit 2 'B' RHR pump motor replacement on November 25, 2018
(6) SU-18-00168, 'C' RSST restoration following transformer replacement on November 16, 2018
(7) 1-PT-2.33A, Emergency bus undervoltage and degraded protection test following the replacement of relay '1-EP-27AX-1HDUP-1H1' (degraded voltage relay) on December 13, 2018

71111.20 – Refueling and Other Outage Activities (2 Samples)

The inspectors evaluated the following activities:

(1) Unit 1 Mid-Cycle Outage for 'C' SST Repair from October 5 to October 11, 2018
(2) Unit 2 (2R28) Refueling Outage from October 27 to December 6, 2018

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (4 Samples)

(1) Unit 2 Train 'A' safeguards actuation logic functional testing on December 5, 2018
(2) Unit 2 test of the low head safety injection check valves to the hot legs on November 4, 2018

(3) Unit 2 'A' motor-driven auxiliary feedwater pump testing on December 3, 2018
(4) Consequence limiting safeguards testing on December 3, 2018

In-service Testing (2 Samples)

(1) 2-OPT-EG-001, Number 2 EDG monthly test, on October 22, 2018
(2) 1-OPT-EG-001, Number 1 EDG monthly run on December 10, 2018

Containment Isolation Valve (1 Sample)
(1) Containment valve testing on Unit 2 penetration #94 (Containment hogger) on November 21, 2018

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (1 Sample)

The inspectors evaluated radiological hazards assessments and controls.

Instructions to Workers (1 Sample)

The inspectors evaluated worker instructions.

Contamination and Radioactive Material Control (1 Sample)

The inspectors evaluated contamination and radioactive material controls.

Radiological Hazards Control and Work Coverage (1 Sample)

The inspectors evaluated radiological hazards control and work coverage.

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

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

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

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

71124.02 - 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) ALARA Plan 18-036, Move Rx Head from Head Stand to Vessel, Includes all Support Tasks, radiation work permit (RWP) Number 18-0-3511
(2) ALARA Plan 18-044, 2-RH-P-1 B Pump Replacement, RWP Number 18-0-3134
(3) ALARA Plan 18-045, Perform Part 21 Valve Maintenance/Overhaul, RWP Number 18-0-3136
(4) ALARA Plan 18-046, Primary Seam Generator Eddy Current, RWP Number 18-0-3502
(5) ALARA Plan 18-049, 2-RC-HVC-2557B & 2557C Cutout and Replacement, RWP Number 18-0-3127 [Emergent Work]

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) Reactor Head Set, RWP Number 18-0-3511
(2) S/G Primary Eddy Current, RWP Number 18-0-3501
(3) 2-RH-P-1 B Pump Replacement, RWP Number 18-0-3134

Radiation Worker Performance (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician performance.

71124.03 - In-Plant Airborne Radioactivity Control and Mitigation

Engineering Controls (1 Sample)

The inspectors evaluated airborne controls and monitoring.

Use of Respiratory Protection Devices (1 Sample)

The inspectors evaluated respiratory protection.

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

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

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.

71124.05 - Radiation Monitoring Instrumentation

Walk Downs and Observations (1 Sample)

The inspectors evaluated radiation monitoring instrumentation during plant walkdowns.

Calibration and Testing Program (1 Sample)

The inspectors evaluated the licensee's calibration and testing program.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below for the period from October 2017 through September 2018. (8 Samples)

(1) Unit 1 High Pressure Injection systems
(2) Unit 2 High Pressure Injection systems
(3) Unit 1 Residual Heat Removal systems
(4) Unit 2 Residual Heat Removal systems
(5) Unit 1 Cooling Water systems
(6) Unit 2 Cooling Water systems
(7) Occupational Exposure Control Effectiveness
(8) Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences

71152 - Problem Identification and Resolution

Semiannual Trend Review (1 Sample)

The inspectors reviewed the licensee's corrective action program for trends that might be indicative of a more significant safety issue.

Annual Follow-up of Selected Issues (2 Samples)

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

(1) Containment spray and charging pump system condition reports (CRs 1098928 and 1112688)
(2) Foreign material in the reactor coolant system (RCS) leading to debris induced fuel failure (CR 1110248)

71153 - Follow-up of Events

Events (2 Samples)

(1) The inspectors evaluated a forced rapid downpower to less than 75 percent due to an automatic bypassing of condensate polishing, and the licensee's response, on October 16, 2018.

(2) The inspectors evaluated a rapid RCS pressure increase and an actuation of the overpressure mitigation system, and the licensee's response on October 24, 2018.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

60855.1 - Operation of an Independent Spent Fuel Storage Installation (1 Sample)

The inspectors evaluated the licensee's independent spent fuel storage installation (ISFSI) cask loadings and completed an ISFSI pad walk-down on October 1, 2018.

INSPECTION RESULTS

Observation	71152

The inspectors performed a detailed review of the corrective action from the following condition reports:

- CR1098928, Water in the Oil of 1-CS-P-1A
- CR1112688, Documenting Follow-up on Charging Pump Mechanical Seal Drain Line

The inspectors chose these samples because of potential common cause failure mechanisms on all trains of high head safety injection and containment spray, and to evaluate the timeliness of the associated corrective actions. The inspectors determined that although the evaluations and operability determinations were not completed in a timely manner, the pumps could have performed their design function.

The inspectors performed a detailed review of the corrective action from the following condition reports:

- CR1110163, Unit 2 FOSAR Discover Items
- CR1110248, Confirmation of One Leaking Rod in Fuel Assembly 817
- CR1111425, Request FOSAR Training Solution Analysis

The inspectors chose this sample since Unit 2 had its second consecutive operating cycle with damaged fuel caused by debris induced wear and to evaluate the effectiveness of the corrective actions from cycle 27. The inspectors determined that all corrective actions were implemented and extensive searches for additional foreign objects were conducted with consultation of the fuel vendor and a third-party organization. Despite the licensee's corrective actions, the effectiveness of its efforts cannot be determined until Unit 2 operates after a full 18-month cycle or indications of a failed fuel is discovered during RCS sampling analysis.

Failure to Assess and Manage Plant Risk During Testing of an Instrument Air Compressor			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000280/2018004-01 Opened/Closed	P.2 - Evaluation	71111.13

An NRC-identified Green NCV of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," section a(4), for the licensee's failure to assess and manage the increase in risk for routine surveillance testing of the Unit 1 instrument air compressor. As a result of the instrument air system alignment during testing and a known equipment issue, Unit 1 experienced a secondary transient and forced rapid power reduction.

Description: On October 16, 2018, during a routine surveillance test of the Unit 1 instrument air compressor, the compressor tripped, resulting in a pressure drop in the Unit 1 instrument air header. The rapid drop in pressure resulted in the closure of a high-pressure heater drain tank level control valve, a low level in the high-pressure heater drain tank, and automatic

bypass of condensate polishing. Operators entered abnormal operating procedures and performed a rapid load reduction to 75 percent power.

The approved surveillance testing procedure for the instrument air compressors required isolating all station air to the instrument air header. While isolated, each units' instrument air header was solely pressurized by its respective instrument air compressor. Although an operator was staged at the isolation valve during the test as a risk management action, the operator did not have enough time to open the valve before the transient occurred.

The licensee screened the routine instrument air surveillance as low risk. Licensee procedure WM-AA-301, "Operational Risk Assessment," stated, in part, that an activity is high risk if the activity, if performed incorrectly, would significantly increase the possibility of a plant transient and the use of peer checks is not practical. Evaluating the activity as high risk per WM-AA-100 and WM-AA-301 would have required additional management reviews, approvals, and risk management actions. NRC inspectors identified that the risk assessment was not appropriate for the procedure.

In addition to the normal testing configuration qualifying as high risk, the licensee was also aware of an equipment issue with both instrument air compressors. Sometime around September 28, 2018, following preventative maintenance testing, the licensee identified that the Unit 1 instrument air compressor's digital controller settings had reverted to factory default settings. This was identified on September 28, 2018, after a loss of power to the controller for longer than the power supply of the internal battery. Prior to September 28, 2018, the licensee was not aware that an extended loss of power to the digital controller would erase the custom settings that were required for the compressor to be functional. Although the compressor's controller remained in the factory default setting and as a result would fail the routine surveillance test, the licensee continued with the surveillance test on October 16, 2018. NRC inspectors identified that the licensee did not incorporate this additional information into the surveillance risk assessment when it was determined to be a low risk activity.

Corrective Actions: The licensee's immediate corrective action was to declare both instrument air compressors nonfunctional and to quarantine the instrument air testing procedures. The licensee performed a level of effort evaluation which identified weaknesses in corrective actions, communications, design flaws, and testing.

Corrective Action Reference: CR1107786

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to assess and manage the increase in plant risk during testing of an instrument air compressor was a performance deficiency (PD) that was within the licensee's ability to foresee and correct. Specifically, the licensee was aware that with the station air isolated and a single equipment failure, that the operator was the only compensatory measure to prevent a plant transient. Additionally, the licensee was aware that the instrument air compressor's digital controller had defaulted to factory settings, which did not meet the design basis of the compressor. Despite this knowledge, the licensee screened the surveillance as low risk.

Screening: The inspectors determined that the PD was more than minor because it was associated with the Configuration Control attribute of the Initiating Events Cornerstone and

adversely affected the cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the result of the air alignment and compressor trip during surveillance testing was a secondary transient that required a rapid power reduction to 75 percent power of Unit 1.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter (IMC) 0609.04, "Initial Characterization of Findings," Table 2, dated October 7, 2016; the finding was determined to adversely affect the Initiating Events Cornerstone. The inspectors screened the finding using IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process" dated May 19, 2005. An independent bounding quantitative risk assessment was performed by a regional senior reactor analyst for the conditions represented by the finding. The risk assessment determined that the performance deficiency represented a risk increase less than 1.0E-7/year in core damage frequency. The finding was modelled as a loss of instrument air initiator with a common-cause fail to start of both instrument air compressors. Per NRC IMC 0609, Appendix K, incremental core damage probabilities less than 1E-06 screen to Green, a finding of very low safety significance.

Cross-cutting Aspect: This finding has a cross-cutting aspect in the Evaluation component of the Problem Identification and Resolution area, P.2, because although the licensee had identified that the air compressor's controller settings had been modified, the impact of those settings on the compressor and the risk of the compressor tripping during the surveillance test were not properly evaluated.

Enforcement:

Violation: 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," section a(4), required, in part, that the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities.

Contrary to the above, on October 16, 2018, the licensee failed to assess and manage the increase in risk during routine testing of the Unit 1 instrument air compressor. Specifically, the licensee failed to characterize the activity as high-risk per their work management procedures based on the potential to cause a plant transient, and the licensee failed to consider the risk of testing a compressor that had a digital controller with incorrect setpoints.

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

Failure to Maintain Reactor Coolant System Pressure during Solid Plant Operation			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Barrier Integrity	Green FIN 05000280/2018004-02 Opened/Closed	H.12 – Avoid Complacency	71153
A self-revealed Green finding of OP-AA-100, "Conduct of Operations," was identified for the licensee's failure to adequately implement operator fundamentals. Specifically, operators did not appropriately execute clear communication, peer checks, and supervisory oversight			

during solid plant operations, leading to an adjustment of the incorrect component and actuation of the over pressurization mitigation system (OPMS).

Description: On October 28, 2018, at 0037 hours, with Unit 2 in cold shutdown and solid plant operations, operators were venting and purging the volume control tank (VCT) in support of chemistry controls for the refueling outage. A focus brief was held and critical plant parameters were identified to maintain VCT level and RCS pressure within established limits. During the evolution, the operator at the controls attempted to adjust VCT level and performed the adjustment on a nearby letdown pressure controller (2-CH-PCV-2145) that was similar in appearance and within six inches of the VCT level controller. However, without concurrent verification by the other licensed operator or informing the unit supervisor, the wrong controller was manipulated. This action resulted in a RCS pressure transient which rapidly raised primary pressure. With no pressurizer bubble to absorb the transient due to solid plant operations, primary pressure quickly rose above the PORV setpoint, lifting one valve for 0.5 second. At which point, the operators took appropriate action to restore primary pressure to previously established operating parameters. The pressure transient did not result in exceeding the maximum RCS pressure allowed in Figures 3.2-1 of TS 3.1-6.

OP-AA-100, Attachment 2 for "Shift Operations," required, in part, that operators use multiple indications to make operational decisions, peer check manipulations of components in the control room, and clearly communicate to the unit supervision when indications confirm adverse trends. The inspectors concluded that the licensee failed to meet the requirements of OP-AA-100 when operators did not appropriately utilize these fundamentals and concepts, which lead to the pressure transient and actuation of OPMS.

Corrective Actions: The licensee's immediate corrective actions were to immediately lower and return RCS pressure within its control band and verify plant conditions returned to the pre-event parameters. The licensee's TS required a 30-day report to be submitted to the NRC in the event that the reactor coolant OPMS was used to mitigate a pressure transient. The licensee completed an engineering evaluation and concluded that the RCS was acceptable for continued operations. The evaluation verified that the limits of 10 CFR Part 50, Appendix G and ASME Section XI, Appendix G were not exceeded. The licensee additionally performed a Level of Effort Evaluation identifying weaknesses with their conduct of operations procedure with regard to infrequent conducted and complex evolutions, and communications.

Corrective Action Reference: CR 1108816

Performance Assessment:

Performance Deficiency: The inspectors determined that failure to adequately implement operator fundamentals in accordance with OP-AA-100 was a performance deficiency that was within the capability of the licensee to foresee and correct and should have been prevented. Specifically, during solid plant operations, operators did not appropriately execute clear communication, peer checks, and supervisory oversight during solid plant operations, leading to an adjustment of the incorrect component and actuation of OPMS.

Screening: This performance deficiency was determined to be more than minor because it adversely affected the human performance attribute of the Barrier Integrity cornerstone objective to provide reasonable assurance that physical design barriers (RCS) protect the public from radionuclide releases caused by accidents or events. Specifically, during solid

plant operations, the licensee failed to maintain RCS pressure within the pre-established limits, which caused an actuation of OPMS. This performance deficiency was also consistent with example 4b from IMC 0612 Appendix E.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter (IMC) 0609.04, "Initial Characterization of Findings," Table 3, dated October 7, 2016; the finding was determined to adversely affect the Barrier Cornerstone. Because the finding pertains to an event while the plant was shut down, the inspectors screened the finding through IMC 0609, Appendix G, Attachment 1, "Shutdown Operations Significance Determination Process Phase 1 Initial Screening and Characterization of Findings," using Exhibit 4, "Barrier Integrity Screening Questions." The finding screened to be of very low safety significance (Green) because it was determined that the RCS pressure did not exceed the pressure limits of 10 CFR Part 50, Appendix G or ASME Section XI, Appendix G and all of the questions in Exhibit 4 were answered "No."

Cross-cutting Aspect: This finding has a cross-cutting aspect in the avoiding complacency component in the human performance area, H.12, because the operator did not assess the potential for undesired consequences before performing actions and appropriate error-reduction tools were not implemented. Specifically, the licensee failed to ensure its operators followed the standards and practices in the Conduct of Operations procedure while operating in solid plant operations.

Enforcement:

The 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 November 30, 2018, the inspectors presented the radiation protection inspection results to the site vice president, Mr. F. Mladen, and other members of the licensee staff.

- On January 15, 2019, the inspectors presented the quarterly resident inspector inspection results to Mr. F. Mladen, and other members of the licensee staff.

THIRD PARTY REVIEWS

Inspectors reviewed the Institute of Nuclear Power Operations plant assessment final report that was issued this inspection period.

DOCUMENTS REVIEWED

IP 71111.01: Adverse Weather Protection

Procedures

ETE-SU-2016-0037, Surry Power Station Beyond Design Basis Flooding Local Intense Precipitation Assessment Evaluations, Rev. 0
ETE-SU-2017-0010, Surry Power Station Units 1 and 2 Flooding Focus Evaluation, Rev. 0
SU-15-01083, 01-SW-P-1A/B/C Diesel Foundation Replacement Project, Rev. 13
Dominion Flooding Hazard Reevaluation Report for Surry Power Station Units 1 and 2, Rev. 1
ETE-CEP-2012-003, Design and Licensing Basis Review of the Surry Seismic and Flooding Requirements Related to the March 12, 2012, NRC 50.54(f) Request for Information, Rev. 2
0-OP-ZZ-021, Severe Weather Preparation, Rev. 21
0-EPM-1303-01, Freeze Protection Inspection, Rev. 27
0-OSP-ZZ-001, Cold Weather Preparation, Rev. 23
Calculation 14-221, Local Intense Precipitation Flooding Using Site Specific Precipitation Information – Surry Power Station, Rev. 0

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IP 71111.04: Equipment Alignment

Procedures

0-OP-SW-002A, Emergency Service Water System Alignment, Rev. 10
0-OP-EG-001A, EDG 3 System Alignment, Rev. 16
0-OP-AAC-001A, AAC Diesel Generator Systems Alignment, Rev. 13
1-OP-46.2C, Instrument Air System Alignment, Rev. 50
2-OPSI-001A, Safety Injection Alignment, Rev. 15

IP 71111.05: Fire Protection

Procedures

0-FS-FP-211, Emergency Service Water Pump House – Low Level Elevation 18 Feet, Rev. 3
0-FS-FP-225, Alternative AC Diesel Room 35 Feet, Rev. 1
1-LPT-FP-018, Emergency Switchgear Room Halon System Cylinder Pressure and Weight Test, Rev. 14
2-FS-FP-102, Unit 2 Cable Vault Tunnel Elevation 9 Feet – 6 Inches and 15 Feet – 0 Inches, Rev. 3
2-FS-FP-101, Unit 2 Cable Vault Penetration Area Elevation 15 Feet – 0 Inches, Rev. 4
2-FS-FP-103, Unit 2 Upper Cable Vault Elevation 35 FT – 6 In, Rev. 3

IP 71111.06: Flood Protection

Procedures

0-MPM-1900-01, Periodic Inspection of Flood and Spill Protection Dikes, Dams, and Expansion Joint Shields, Rev. 15
ME-0814, Surry ESGR Flooding Evaluation During Implementation of DCPs 07-007 & 06-007, Rev. 0
ETE-SU-2017-0010, Surry Power Station Units 1 and 2 Flooding Focus Evaluation, Rev. 0

IP 71111.08: Inservice Inspection Activities

Procedures

0-NSP-RC-003, Visual Examination of Reactor Pressure Vessel Bottom Mounted Instrumentation (BMI), Revision 3
03-9288957, Secondary Side Visual Inspection Plan and Procedure for Dominion Surry Unit 2R28, Level 2, 9/17/18
03-1274768, Secondary Side Visual Inspection and Loose Part Retrieval Procedure for Heat Exchangers, Rev. 0
54-ISI-400-022, Multi-Frequency Eddy Current Examination of Tubing, Rev. 0
ER-AA-NDE-MT-200, ASME Section XI Magnetic Particle Examination Procedure, Revision 5
ER-AA-NDE-MT-201, Balance of Plant (BOP) Magnetic Particle Examination Procedure, Revision 6
ER-AA-NDE-PT-300, ASME Section XI Liquid Penetrant Examination Procedure, Revision 7
ER-AA-NDE-PT-301, Balance of Plant (BOP) Liquid Penetrant Examination Procedure, Revision 7
ER-AA-NDE-UT-702, Ultrasonic Examination of Ferritic Vessel Welds Greater than 2.0” in Thickness, Revision 5
ER-AA-NDE-UT-706, Ultrasonic Examination for the Detection of Laminar Indications, Revision 1
ER-AA-NDE-UT-800, Appendix VIII Qualified Equipment Tables for PDI Generic Procedures, Revision 5
ER-AA-NDE-VT—607, VE Examination of Pressure Retaining Welds in Class 1 Components Fabricated with Alloy 600/82/182 Materials
ER-AP-BAC-10, Boric Acid Corrosion Control Program, Revision 12
ER-AP-BAC-101, Boric Acid Corrosion Control Program Inspections, Revision 12
ER-AP-BAC-102, Boric Acid Corrosion Control Program Evaluations, Revision 13
ER-AP-SGP-101, Dominion Administrative Procedure, Steam Generator Program, Revision 12
SRY-SGPMS-002, Surry Site Specific Eddy Current Analysis Guidelines - Surry 2R28, Revision 27

Calculations

51-9125055, EPRI Flaw Evaluation Calculator Software Validation, 1/24/13

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Weld Map WM-4539, dated 10/30/18

NDE Examiner Qualifications:

Curtiss-Wright Personnel Certification Statement (Coburn), dated 02/02/18
Curtiss-Wright Personnel Certification Statement (Davies), dated 07/18/18
Curtiss-Wright Personnel Certification Statement (Fuechtmann), dated 07/19/18
Curtiss-Wright Personnel Certification Statement (Johnson), dated 07/13/18
Curtiss-Wright Personnel Certification Statement (Popp), dated 07/10/18
Curtiss-Wright Personnel Certification Statement (Smith), dated 08/13/18
Curtiss-Wright Personnel Certification Statement (Thompson), dated 07/18/18
Curtiss-Wright Personnel Certification Statement (Zollner), dated 08/14/18
Dominion NDE Personnel Qualification and Certification Record (Valdivieso), dated 02/02/17
Industrial Testing Laboratory Services Certificate of Qualification (Humphrey), PT-Level II, dated 08/14/2016
Industrial Testing Laboratory Services Certificate of Qualification (Matowitz), MT-Level II,

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Miscellaneous Documents

51-9289524, Surry Unit-2, 2R28 ECT Inspection Plan, Rev. 0
51-9125055-001, Areva NP Inc, EPRI Flaw Handbook Calculator Software Validation, 1/24/13
Areva Certificate of Calibration No. 55000, Eddy Current Tester MIZ -80, SN 086, 9/17/18
Areva Certificate of Calibration No. 55003, Eddy Current Tester MIZ -80, SN 040, 9/17/18
Array Probe, Cal 14 Summary Data, 10/27/18
ASME 2007 (with 2008 addendum) Section XI Division 1, IWB-2413, Inspection Program for Steam Generator Tubing
ASME 2007 Section XI Division 1, Table IWB-2500-2, Examination Category B-Q, for Steam Generator Tubing
Bobbin Coil Probe, Cal 19 Summary Data, 10/27/18
CA7432365, Corrective Action, Start-Up related, Document Retrieval of Loose Parts IAW ISI Inspection Plan Document, 11/9/18
Dominion Personnel Certifications, EC Technology, C. Black III, 10/9/18
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Eddy Current Examination, Captured C-Scan Screen Display for SG-2C, Cal 35, Tube Row 038, Column 062, 11/7/18
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EPRI Report 3002007571, “Steam Generator Management Program: Steam Generator Integrity Assessment Guidelines - Revision 4,” June 2016
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ER-AP-SGP-101, Steam Generator Program, Rev/ 12
ETE-SU-2018-0042, Attachment 1, Steam Generator Degradation Assessment, Surry Unit 2 Refuel Outage 2R28, Fall 2018, 10/4/18
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NDE Technology, Personnel Vision Certification, C. Black, 7/10/18
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IP 71111.11: Licensed Operator Requalification Program

Procedures

2-GOP-1.8, Unit Startup, Hot Shutdown to Max Allowable Power, Rev. 49
2-GOP-2.7, Unit Shutdown, Power Decrease from Allowable Power to Unit Offline for Refueling Outage, Rev. 36
2-OP-RX-009, Dilution to Critical Conditions Following Refueling, Rev. 24

IP 71111.12: Maintenance Effectiveness

Procedures

CM-AA-DDC-201, Design Changes, Rev. 15
MS-AA-IEE-301, Item Equivalency Evaluation, Rev. 10
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CM-AA-ETE-101, Engineering Technical Evaluation, Rev. 10
0-NSP-BS-005, Monitoring of Structures, Rev. 9
0-NSP-BS-005, Monitoring of Structures, Rev. 10
0-MCM-0114-01, Emergency Service water Pump Maintenance, Rev. 28

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IP 71111.13: Maintenance Risk Assessments and Emergent Work Control

Procedures

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WM-AA-20, Risk Assessment of Maintenance Activities, Rev. 2
WM-AA-100, Work Management, Rev. 31
WM-AA-301, Operational Risk Assessment, Rev. 20

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IP 711111.15: Operability Determinations and Functionality Assessments

Procedures

1-NPT-SI-013, Ultrasonic Examination of Safety Injection Piping, Rev. 3
CM-AA-12, Configuration Management Change Process, Rev 0
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IP 71111.18: Plant Modifications

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ETE-SU-2018-1009, Repair Disposition (Implementing Document) of CW Inlet Line Spool Pieces with Chesterton SD4i, Rev. 0
CM-AA-CTG-102, Coating Service Level III and Immersion Service Application, Rev. 5
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DC-SU-14-00136, Reserve Service Station Transformer Replacement, Rev. 19
2-ECM-2403-03, RSS Transformer C Outage with Backfeed of Transfer Bus F, Rev. 9
SU-15-01083, 1-SW-P-1B Diesel Foundation Replacement, Rev. 30

IP 71111.19: Post Maintenance Testing

Procedures

ETE-SU-2018-0047, Documentation of Results of 01-EP-SST-1C Low Side Bushing Investigation, Rev. 0
0-OPT-SW-008, Emergency Service Water Pump (1-SW-P-1B) Comprehensive Test, Rev. 26
1-PT-2.33A, Emergency Bus Undervoltage and Degraded Protection Test “H” Train, Rev. 8
2-OPT-RH-003, RHR System Operability Test, Rev. 20

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IP 71111.20: Refueling and Other Outage Activities

Procedures

2-OP-FH-001, Controlling Procedure for Refueling, Rev. 40
2-OP-FH-002, Dewatering the Reactor Cavity with Fuel Loaded, Rev. 22
2-GOP-1.7, Unit Starteup, RCS Heatup from Ambient to HSD, Rev. 32
2-GOP-1.8, Unit Startup, Hot Shutdown to Max Allowable Power, Rev. 49
2-GOP-2.7, Unit Shutdown, Power Decrease from Allowable Power to Unit Offline for Refueling Outage, Rev. 36
2-OP-FH-001, Controlling Procedure for Refueling, Rev. 40
2-OP-RC-004, Draining the RCS to Reactor Flange Level, Rev. 42
2-OP-RX-005, Rod Control System Withdrawal of the Shutdown Banks, Rev. 31
2-OP-RX-006, Withdrawal of the Control Banks to Critical Conditions, Rev. 37
2-OP-RX-009, Dilution to Critical Conditions Following Refueling, Rev. 24
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IP 71111.22: Surveillance Testing

Procedures

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2-IPT-FT-RP-SI-001A, Train A Safeguards Actuation Logic Functional Test, Rev. 18

2-OPT-CT-201, Containment Isolation Valve Local Leak Rate Testing (Type C Containment Testing), Rev. 22
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C-HP-1071.010, Control of Radioactive Sources, Revision 8
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IP 71124.02: Occupational ALARA Planning and Controls

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HP-1061.510, Primary Side Steam Generator Ventilation, Revision 4
RP-AA-103, ALARA Program, Revision 2
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C-HP-1042.122, Quantitative Fit Testing: Portacount Pro Fit Testing System, Revision 12
C-HP-1042.210, Respiratory Hazards Evaluation and Respiratory Protection Selection, Revision 4
HP-1061.052, Leak Testing Portable Ventilation Units and Vacuum Cleaners Using the Ati Aerosol Photometer Model 2i, Revision 0
RP-AA-110, Radiological Respiratory Protection Program, Revision 3
RP-AA-163, Inspection and Inventory of Respiratory Protection Equipment, Revision 6
RP-AA-243, Portable HEPA Ventilation Units, Revision 4
RP-AA-244, Vacuum Cleaner Use and Control, Revision 3
VPAP-0106, Subatmospheric Containment Entry, Revision 14

Records and Data
C-HP-1045.510, Attachment 3, Breathing Air Quality Verification Record, SRF's "A" Instrument Air/Del Monox System, 03/06/2018 and 10/04/2018
C-HP-1045.510, Attachment 3, Breathing Air Quality Verification Record, SRF's "B" Instrument Air/Del Monox System, 04/26/2018 and 08/30/2018
C-HP-1045.510, Attachment 3, Breathing Air Quality Verification Record, Station Service Air, 03/26/2018 and 10/08/2018
RP-AA-163, Attachment 2, Radiological Use Respiratory Inspection Records, 08/15/2018 and 09/13/2018
Work Order (W/O) 38103558800 and 38103727884, OMP-620-10, TSC Filter Test Results for 1-VS-FL-100, 05/10/2016, 02/12/2018 and 06/12/2018
W/O 38103562155 and 3810373108, OMP-620-11, Attachment 8, LEOF (F1) Filter Test Results, 05-20-16 and 02/17/2018
W/O 38203873082, Fire Protection Lockers Inspection, 08-22-2018

Corrective Action Program (CAP) Documents
CR1058242, CR1063543, CR1094878, CR1095782, and CR1095970
PA3130494, RP-AA-111-1010, Attachment 1, Radiological Respiratory Program Review, 07/30/2018
PI-AA-100, Performance Monitoring, Revision 11
PI-AA-200, Corrective Action, Revision 34

IP 71124.04: Occupational Dose Assessment

Procedures, Guidance Documents, and Manuals
0-HSP-RCAD-001, Restricted and Controlled Area Dose Surveillance Revision 0
C-HP-1031.011, Exposure Control Records and Reports, Revision 10
C-HP-1031.024, Administrative Dose Control, Revision 5
C-HP-1031.025, Dosimetry Requirements for Site Restricted Ares, Revision 10
C-HP-1031.060, SRD Control and Performance Checks, Revision 2
HP-1031.043, Periodic TLD Preparation, Exchange, and Processing, Revision 1
HP-1031.124, Performing Effective Dose Equivalent Exposure (EDEX) Calculations, Revision 5
RP-AA-104, Internal Radiation Exposure Control Program, Revision 2
RP-AA-105, External Radiation Exposure Control Program, Revision 2
RP-AA-123, Effective Dose Equivalent from External Exposure (EDEX), Revision 6
RP-AA-124, Dosimetry Investigation and Processing, Revision 7
RP-AA-133, Internal Dose Calculation Based on Radionuclide Intake, Revision 0
RP-AA-230, Personnel Contamination Monitoring and Decontamination, Revision 11

Records and Data
Part 61 Analysis, Surry Power Station 2018 Dry Active Waste, 10/02/2018

Declared Pregnant Worker Dose Records for two (2) individuals monitored at Surry Power Station from November 2016 through November 2018
Dosimetry Investigations # 17-038 and # 17-039,
Personnel Contamination Event Trending Log, March 2016 through May 2018
NVLAP Certificate and Scope of Accreditation, Mirion Technologies (GDS), Inc, 07/01/2016 through 06/30/2019
Whole Body Count Records/Results for six (6) workers with facial contamination, 04/22/2018 through 05/19/2018

Corrective Action Program (CAP) Documents
PI-AA-100, Performance Monitoring, Revision 11
PI-AA-200, Corrective Action, Revision 34
CR1053742, CR1054712, CR1070088, CR1075196, CR1075657, CR1076833, CR1097816
CA3064982

IP 71124.05: Radiation Monitoring Instrumentation

Procedures, Guidance Documents, and Manuals
0-HSP-INST-001, Maintenance of Instruments Calibrators, Revision 2
2-IPT-CC-RM-RMS-227, Containment High Range Area Radiation Monitor 2-RM-RMS-227 Channel Calibration, Revision 3
2-IPT-CC-RM-RMS-228, Containment High Range Area Radiation Monitor 2-RM-RMS-228 Channel Calibration, Revision 3
C-HP-1031.302, Calibration of Electronic Dosimeters, Revision 19
C-HP-1033.011, Check Source Reference Readings and Geotropism Checks for Portable Instruments, Revision 6
C-HP-1033.012, Portable Radiation Protection Instrumentation Control, Revision 7
C-HP-1033.021, Reference Sources for Radiation Protection Instrumentation, Revision 0
C-HP-1033.122, Tennelec Series 5: Performance Checks, Revision 3
C-HP-1033.533, MGP Telepole: Calibration and Operation, Revision 4
C-HP-1033.540, Eberline RO-2, RO-2A, RO-20, and Thermo Scientific RO-20AA: Calibration and Operation, Revision 6
C-HP-1033.545, Thermo Scientific Radeye GX: Calibration and Operation, Revision 4
C-HP-1033.546, Thermo Scientific Radeye G: Calibration and Operation, Revision 0
C-HP-1033.610, Eberline Air Monitor AMS-4 Calibration and Operation, Revision 7
C-HP-1033.620, Portable Air Samplers Calibration and Operation, Revision 9
HP-1033.020, Radiation Protection Instrument Calibration Facility Use, Revision 3
HP-1033.742, Calibration of Canberra Argos 5PAB Personnel Contamination Monitor, Revision 1
HP-1033.744, Canberra Cronos Contamination Monitor: Calibration and Operation, Revision 1
HP-1033.745, Calibration of Canberra GEM-5 Portal Monitor, Revision 1
HP-1041.045, Whole Body Counter: Performance Checks, Revision 6
HP-1041.046, APEX-InVivo Whole Body Counter: Operation and Performance Checks, Revision 3
HP-1041.065, Whole Body Counter: Calibration, Revision 1
HP-1041.066, APEX-InVivo Whole Body Counter: Calibration, Revision 3

Records and Data

0-HSP-INST-001, Maintenance of Instrument Calibrators, Revision 2, JL Shepherd Model 89-400, ID No. 8283, 10/25/17 and 02/06/18

2-IPT-CC-RM-RMS-227, Containment High Range Area Radiation Monitor 2-RM-RMS-227 Channel Calibration, Revision 3, 04/06/17 and 4, 11/01/18

2-IPT-CC-RM-RMS-228, Containment High Range Area Radiation Monitor 2-RM-RMS-227 Channel Calibration, Revision 3, 05/08/17 and 4, 11/01/18

ARGOS-5PAB Personnel Contamination Monitor Calibration Certificates: S/N 1112-247, 02/22/17 and 04/26/18

APEX-InVivo Daily Background and QC/QC Analysis Reports, Chair and Fastscan, 11/26/18

APEX-InVivo Whole Body Counter Calibration Records: Chair, 02/02/17 and 03/22/18; and Fastscan, 01/31/17 and 10/17/18

Canberra Genie/Apex, Detector No. 2, S/N 22-P-959C, 08/23/17 and 10/11/18

C-HP-1031.302, Revision 19, Attachment 7, DMC 3000 Calibration Records, Surry Power Station, ED S/Ns: 920415, 08/09/17 and 10/11/18; and 981993, 08/09/17 and 10/11/18

CRONOS Contamination Monitor Calibration Certificates: S/N 1303-068, 06/03/17 and 06/26/18

GEM-5 Portal Monitor Calibration Certificates: S/N 1604-049, 12/06/16 and 12/03/17

Laboratory Instrumentation Calibration Certificates for the following:

Tennelec Series 5, S/N 41324, 11/28/17 and 1/08/18

Tri-Carb 3100TR/3110TR Liquid Scintillation Counter, S/Ns: 433977, 05/24/17 and 10/07/18; and SGTC09150556, 04/21/17 and 03/05/18

Nuclide Distribution Report, 10/10/18

Portable Survey Instrument Calibration Certificates for the following:

Eberline AMS-4, S/N 919, 04/03/17 and 01/26/18

Ludlum 12-4, S/N 268388, 05/20/17 and 05/11/18

MGP Telepole, S/N 6607-001, 10/21/16 and 02/19/18

Radeco HD-29A Portable Air Sampler, S/N SQC-1702B, 08/30/17 and 10/11/18

Thermo Scientific Radeye G, S/N 30263, 10/16/17 and 10/24/18

Thermo Scientific Radeye GX Frisker/Low Range Gamma Detector, S/N 11078, 10/11/16 and 03/01/18

Thermo Scientific RO-20AA, S/N 12094, 04/27/17 and 04/17/18

Radiochemistry Cross Check Program Results, 1st Quarter 2017, 3rd Quarter 2017, 1st Quarter 2018, and 3rd Quarter 2018

Source Certificates of Calibration: Source No. 149821-UH 341, 04/16/12; Source No. 149821-UH 342, 04/16/12; Source No. 878-10, S/N 105, 07/02/84; Source No. 79295-44, 03/25/09; Source No. CS2132, 01/05/16; and Source S/N S-4070, 07/17/85

CAP Documents

CR1081487, CR1084036, CR1084433, and CR1095923

PI-AA-100, Performance Monitoring, Revision 11

PI-AA-200, Corrective Action, Revision 34

RP-AA-111-1014, Rev 0, Attachment 1, Radiological Instrumentation Control Program Review, Surry Power Station, CRS No. 3130538, 07/30/18

IP 71151: Performance Indicator Verification

Procedures

NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 7

SU-2014-0082, MSPI Basis Document, Rev. 0
Monthly PI Reports with Associated Data, October 2017 to September 2018
SU-2014-0082, MSPI Basis Document, Rev. 0
RP-AA-112, Radiation Safety Performance Indicator Reporting, Revision 4
PI-AA-100, Performance Monitoring, Revision 11
PI-AA-200, Corrective Action, Revision 34

Records and Data
2017 Annual Radioactive Effluent Release Report, Surry Power Station,
2017 Annual Radiological Environmental Operating Report, Surry Power Station,
Electronic Dosimeter (DAD) Alarm Log [Excel spreadsheet], December 2017 thru October 2018
Gaseous Radioactive Release Permit G-20181118-370-B, 11/20/2018
Liquid Radioactive Release Permit L-20181125-287-B, 11/26/2018

Condition Reports

1101811	1101699	1101539	1065745	1073161	1084128
1085465	1095572				

IP 71152: Identification and Resolution of Problems

Procedures
ER-AA-SPI-101, Implementation of the Consolidated Data Entry (CDE) Reporting for Mitigating System Performance Index (MSPI), Rev. 0
MA-AA-102, Foreign Material Exclusion, Rev. 22
NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 7

Condition Reports

1110248	1094344	1070319	1109777	1094344	1109653
1070319	1110163	1111425			

Other Documents
Root Cause Evaluation for Leaking Fuel Rod in Fuel Assembly 817, Rev. 0
Root Cause Evaluation for Leaking Fuel Rod in Fuel Assembly 622, Rev. 1

IP 71153: Follow-up of Events

Procedures
OP-AA-100, Conduct of Operations, Rev. 37
OP-AA-106, Infrequently Conducted or Complex Evolutions, Rev. 10
2-OP-CH-001, CVCS Operations, Rev. 26
2-OP-RC-002, Reactor Coolant System Fill, Rev. 32

Condition Reports
1108816

Other Documents
Virginia Electric and Power Company Surry Power Station Unit 2 30-Day Special Report for an RCS Pressure Transient, Rev. 1
Level of Effort Evaluation for CR 1108816

IP 60855: Operation of an Independent Spent Fuel Storage Installation

Procedures

0-HSP-ISFSI-002, NUHOMS Dry Spent Fuel Storage System Surveillance, Rev. 4
0-HSP-ISFSI-002, NUHOMS Dry Spent Fuel Storage System Surveillance, Rev. 5
0-NPT-ISFSI-001, ISFSI – Cask Visual Inspection, Rev. 2
0-OP-FH-072, NUHOMS 32 PTH Dry Shielded Canister Loading and Handling, Rev. 28
HP-1061.500, NUHOMS Spent Fuel Cask Preparation / Loading and Transport to ISFSI, Rev. 5
HP-1061.500, NUHOMS Spent Fuel Cask Preparation / Loading and Transport to ISFSI, Rev. 6
MA-AA-101, Fleet Lifting and Material Handling, Rev. 23
VPAP-0809, NUREG-0612 Heavy Load Program, Rev. 10

Condition Reports

1104697 1104694 1112424*