



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

August 6, 2015

Mr. David A. Heacock  
President and Chief Nuclear Officer  
Virginia Electric and Power Company  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060-6711

SUBJECT: SURRY POWER STATION – NRC INTEGRATED INSPECTION REPORT  
05000280/2015002 AND 05000281/2015002

Dear Mr. Heacock:

On June 30, 2015, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Surry Power Station Units 1 and 2. On July 29, 2015, the NRC inspectors discussed the results of this inspection with Mr. R. Simmons and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

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

If you contest the violations or significance of these NCVs, 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 Regional Administrator, Region II, and the NRC Resident Inspector at the Surry Power Station.

In accordance with Title 10 of the Code of Federal Regulations (CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Steven D. Rose, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

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

Enclosure:  
IR 05000280/2015002, 05000281/2015002  
w/Attachment: Supplementary Information

cc: Distribution via ListServ

D. Heacock

2

In accordance with Title 10 of the Code of Federal Regulations (CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

Steven D. Rose, Chief  
Reactor Projects Branch 5

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

Enclosure:  
IR 05000280/2015002, 05000281/2015002  
w/Attachment: Supplementary Information

cc: Distribution via ListServ

☒ PUBLICLY AVAILABLE

☐ NON-PUBLICLY AVAILABLE

☐ SENSITIVE

☒ NON-SENSITIVE

ADAMS: ☐ Yes    ACCESSION NUMBER: \_\_\_\_\_

☒ SUNSI REVIEW COMPLETE ☒ FORM 665 ATTACHED

OFFICE	RII:DRP	RII:DRP	RII:DRS	RII:DRS	RII:DRS	RII:DRS	RII:DRP
SIGNATURE	PJM3 via e-mail	CDJ1	BCC2 via e-mail	RXK3 via e-mail	AXS2	RXK3 /RA for/	GJK2 via e-mail
NAME	PMcKenna	CJones	BCollins	RKellner	ASengupta	RHamilton	GKolcum
DATE	7/27/2015	8/5/2015	7/27/2015	8/4/2015	7/27/2015	8/4/2015	8/4/2015
E-MAIL COPY?	YES    NO	YES    NO	YES    NO	YES    NO	YES    NO	YES    NO	YES    NO
OFFICE	RII:DRP	RII:DRP	RII:DRP				
SIGNATURE	CMD4	SON	SDR2				
NAME	CDykes	SNinh	SRose				
DATE	8/5/2015	8/3/2015	8/6/2015				
E-MAIL COPY?	YES    NO	YES    NO	YES    NO				

OFFICIAL RECORD COPY DOCUMENT NAME: G:\DRP\IRPB5\SURRY\REPORTS\2015\2015-002\SURRYIR2015-002FINAL.DOCX

Letter to David A. Heacock from Steven D. Rose dated August 6, 2015.

SUBJECT: SURRY POWER STATION – NRC INTEGRATED INSPECTION REPORT  
05000280/2015002, 05000281/2015002

**DISTRIBUTION:**

D. Gamberoni, RII

L. Gibson, RII

OE Mail

RIDSNRRDIRS

PUBLIC

RidsNrrPMSurry Resource

**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 50-280, 50-281

License Nos.: DPR-32, DPR-37

Report No: 05000280/2015002, 05000281/2015002

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: Surry Power Station, Units 1 and 2

Location: 5850 Hog Island Road  
Surry, VA 23883

Dates: April 1, 2015 through June 30, 2015

Inspectors: P. McKenna, Senior Resident Inspector  
C. Jones, Resident Inspector  
B. Collins, Reactor Inspector (1R08)  
R. Hamilton, Senior Health Physicist (2RS6, 2RS7)  
R. Kellner, Senior Health Physicist (2RS6, 2RS7)  
G. Kolcum, Senior Resident Inspector North Anna (1R04, 1R05,  
4OA2)  
A. Sengupta, Reactor Inspector (1R08, 4OA5)

Approved by: Steven D. Rose, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Enclosure

## SUMMARY

IR 05000280/2015002, 05000281/2015002; 04/01/2015–06/30/2015; Surry Power Station, Units 1 and 2: Inservice Inspection Activities and Maintenance Effectiveness

The report covered a three-month period of inspection by resident inspectors and region-based inspectors. Inspectors identified two non-cited violations (NCVs) of very low safety significance. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP), dated April 29, 2015. The cross-cutting aspects were determined using IMC 0310, "Components Within The Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

### **Cornerstone: Mitigating Systems**

- **Green.** A self-revealing NCV of Surry Technical Specification (TS) 6.4.D was identified because the Unit 1 "A" motor driven auxiliary feedwater (MDAFW) pump motor outboard bearing thermocouple was improperly installed while installing a new motor on the MDAFW pump in November, 2013. The improper thermocouple installation in the bearing caused the bearing to fail while the pump was running on January 5, 2015. This issue was documented in the licensee's corrective action program (CAP) as condition report (CR) 568663.

The inspectors concluded that the failure of the licensee to use a procedure to remove and reinstall the "A" MDAFW pump motor thermocouples was a performance deficiency (PD). Using Manual Chapter 0612, Appendix B, Issue Screening, dated September 7, 2012, the inspectors determined that the PD was more than minor because it was associated with the human performance attribute of the Mitigating Systems Cornerstone, and it adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the incorrect installation of the motor outboard bearing thermocouple eventually damaged the bearing and caused the "A" MDAFW pump to become inoperable. Using Manual Chapter 0609.04, "Initial Characterization of Findings," dated June 19, 2012, the finding was determined to affect the Mitigating Systems Cornerstone. The inspectors screened the finding using IMC 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 affect the design or qualification of the AFW system and it did not represent a loss of system safety function. This finding has a cross-cutting aspect in the Challenge the Unknown aspect of the human performance area, H.11, because the individuals involved in removing and installing the thermocouples did not stop when faced with a work order that did not have the appropriate procedure reference for the action they were taking. (Section 1R12)

**Cornerstone: Barrier Integrity**

- Green. An NRC-identified NCV of 10 CFR 50.55a, "Codes and Standards," was identified for the licensee's failure to conduct a detailed visual examination of the concrete-liner interface for the Unit 1 containment, per the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC) Section XI, Subsection IWE 1241, Table IWE-2500-1, Category E-C, Item E 4.11. This issue was documented in the licensee's CAP as CR 578448.

The licensee's failure to conduct a detailed visual examination of the concrete-liner interface of the Units 1 and 2 containment in accordance with the ASME BPVC Section XI, Subsection IWE 1241, Table IWE-2500-1, Category E-C, Item E 4.11, was a PD that was within the licensee's ability to foresee and correct. Using Manual Chapter 0612, Appendix B, Issue Screening, dated September 7, 2012, the inspectors determined that the PD was more than minor because, if left uncorrected, it had the potential to lead to a more significant safety concern. Specifically, detailed visual inspections of the containment metallic liner provides assurance that the liner remains capable of performing its intended safety function, and in the absence of such inspections, corrosive conditions could progress to challenge that capability. Using Manual Chapter 0609.04, "Initial Characterization of Findings," dated June 19, 2012, the finding was determined to affect the Barrier Integrity Cornerstone. The inspectors screened the finding using IMC 0609, Appendix A, "Significance Determination Process (SDP) for Findings at-Power," dated June 19, 2012, and determined that the finding was of very low safety-significance (Green) because the finding did not represent an actual open pathway in the physical integrity of the reactor containment. The team determined that no cross cutting aspect was applicable to this performance deficiency because this finding was not indicative of current licensee performance. (Section 1R08)

## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at or near rated thermal power (RTP) from the beginning of the inspection period until April 19, 2015, when it was shutdown to begin a planned refueling outage (RFO). It remained offline until May 27, when the main turbine generator was synchronized to the grid. On June 1, the unit reached full RTP and operated there for the remainder of the inspection period.

Unit 2 operated at or near RTP throughout the inspection period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R01 Adverse Weather Protection

##### .1 Review of Offsite Power and Alternate AC Power Readiness

- a. The inspectors verified that plant features, and procedures for operation and continued availability of offsite and alternate alternating current (AC) power systems were appropriate. The inspectors reviewed the licensee's procedures affecting those areas, and the communications protocols between the transmission system operator and the nuclear power plant to verify that the appropriate information was exchanged when issues arose that could impact the offsite power system. The inspectors evaluated the readiness of the offsite and alternate AC power systems by reviewing the licensee's procedures that address measures to monitor and maintain the availability and reliability of the offsite and alternative AC power systems.

- b. Findings

No findings were identified.

##### .2 Seasonal Readiness Reviews for Hot Weather

- a. Inspection Scope

The inspectors reviewed the licensee's preparations for seasonal hot weather. Inspection focused on verification of design features and implementation of the licensee's procedure for hot weather conditions, 0-OSP-ZZ-003, "Hot Weather Preparation," Revision 6. The inspectors walked down key structures (i.e., the turbine and auxiliary buildings, safeguards buildings, the emergency switchgear rooms, and emergency battery rooms) and verified heating, ventilation and air-conditioning (HVAC) systems were operating properly and that area temperatures remained within design requirements specified in the Updated Final Safety Analysis Report (UFSAR). The mitigating systems reviewed during this inspection include: the auxiliary feedwater systems, the refueling water storage tanks, emergency diesel generators, and emergency switchgear.



b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial Walkdown

a. Inspection Scope

The inspectors conducted three equipment alignment partial walkdowns to evaluate the operability of selected redundant trains or backup systems, listed below, with the other train or system inoperable or out of service. The inspectors reviewed the functional systems descriptions, UFSAR, system operating procedures, and Technical Specifications (TS) to determine correct system lineups for the current plant conditions. The inspectors performed walkdowns of the systems to verify that critical components were properly aligned and to identify any discrepancies which could affect operability of the redundant train or backup system.

- Emergency Diesel Generator (EDG) 1 after completion of a planned maintenance outage.
- Unit 1 Turbine Driven Auxiliary Feedwater (TDAFW) Pump after completion of planned maintenance.
- Unit 1 Containment Instrument Air (IA) system while the “A” containment IA train was out of service for unplanned maintenance.

b. Findings

No findings were identified.

.2 Complete Walkdown

a. Inspection Scope

The inspectors performed a detailed walkdown and inspection of the Unit 1 recirculation spray (RS) system including the service water (SW) supporting lineup to verify the systems were properly aligned and capable of performing their safety function, and to assess their material condition. During the walkdown, the inspectors verified breaker positions were in the proper alignment, component labeling was accurate, hangers and supports were functional, and local indications were accurate. Recent testing history was also reviewed to verify that standby components were performing within their design. The plant health report, system drawings, condition reports, the UFSAR, and TS were reviewed and outstanding deficiencies were verified to be properly classified and not affect system operability and capability to perform its safety function. The inspectors reviewed the corrective action program (CAP) to verify equipment alignment issues were being identified and resolved.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Quarterly Fire Protection Reviews

a. Inspection Scope

The inspectors conducted tours of the five areas listed below that are important to reactor safety to verify the licensee's implementation of fire protection requirements as described in fleet procedures CM-AA-FPA-100, "Fire Protection/Appendix R (Fire Safe Shutdown) Program," Revision 10, CM-AA-FPA-101, "Control of Combustible and Flammable Materials," Revision 8, and CM-AA-FPA-102, "Fire Protection and Fire Safe Shutdown Review and Preparation Process and Design Change Process," Revision 5. The reviews were performed to evaluate the fire protection program operational status and material condition and the adequacy of: (1) control of transient combustibles and ignition sources; (2) fire detection and suppression capability; (3) passive fire protection features; (4) compensatory measures established for out-of-service, degraded or inoperable fire protection equipment, systems, or features; and (5) procedures, equipment, fire barriers, and systems so that post-fire capability to safely shutdown the plant is ensured. The inspectors reviewed the corrective action program to verify fire protection deficiencies were being identified and properly resolved.

- Unit 1 Safeguards and Valve Pit
- Unit 2 Safeguards and Valve Pit
- Technical Support Center
- Alternate AC Diesel Building
- Unit 1 Containment

b. Findings

No findings were identified.

.2 Drill Observation

1. Inspection Scope

The inspectors observed an unannounced fire drill on June 9, 2015, that took place in the Unit 2 normal switchgear room. The drill was observed to evaluate the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies, openly discussed them in a self-critical manner at the debrief, and took appropriate corrective actions as required. Specific attributes evaluated were: (1) proper wearing of turnout gear and self-contained breathing apparatus; (2) proper uses and layout of fire hoses; (3) employment of appropriate firefighting techniques; (4) sufficient firefighting equipment brought to the scene; (5) effectiveness of command and

control; (6) search for victims and propagation of the fire into other plant areas; (7) smoke removal operations; (8) utilization of pre-planned strategies; (9) adherence to the pre-planned drill scenario; and (10) drill objectives.

## 2. Findings

No findings were identified.

### 1R06 Flood Protection Measures

#### a. Inspection Scope

The inspectors reviewed the internal flood protection measures and procedural controls established to address potential flooding in the Unit 1 and 2 turbine buildings and the emergency switchgear rooms while design change SU-13-00012, "Component Cooling Heat Exchanger (CCHX) Service Water (SW) Outlet Jumper," was installed during the Unit 1 RFO. This design change installed a temporary pipe and isolation valves downstream of the "A" and "B" CCHXs SW outlets in the Unit 1 turbine building to the Unit 2 main condenser outlet waterbox "B" located in the Unit 2 turbine building. The inspectors conducted a walk down of the affected areas to observe and assess the condition of the installed flood dikes, floor drain backflow preventers, the sealing of holes and penetrations between flood areas, the adequacy of water tight doors, the operability of flooding alarms, and the installed sump pumps. Additionally, the inspectors verified that the required compensatory actions required as part of the design change were being accomplished by the licensee.

#### b. Findings

No findings were identified.

### 1R08 Inservice Inspection Activities

#### a. Inspection Scope

##### Non-Destructive Examination Activities and Welding Activities

From April 27, through May 1, 2015, the inspectors conducted an onsite review of the implementation of the licensee's in-service inspection (ISI) program for monitoring degradation of the reactor coolant system (RCS) boundary, risk-significant piping and component boundaries, and containment boundaries in Unit 1.

The inspectors either directly observed or reviewed the following non-destructive examinations (NDEs), mandated by the American Society of Mechanical Engineers (ASME) boiler and pressure vessel code (BPVC) (Code of Record: 2004 Edition) to evaluate compliance with the ASME Code, Section XI and Section V requirements, and if any indications or defects were detected, to evaluate if they were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement. The

code of record for the containment program is the 2001 Edition with 2003 Addenda. The inspectors also reviewed the qualifications of the NDE technicians performing the examinations to determine whether they were current, and in compliance with the ASME Code requirements.

- WO 38103517058, Ultrasonic Testing (UT), Safety Injection elbow-to-pipe weld 12-RC-22/1-08, 12-inch line from accumulator, Class 1 (observed)
- WO 38103423799, Visual Testing (VT), N-722-1 Bottom-Mounted Instrumentation Penetration Nozzle, Class 1 (reviewed)
- WO 38103423539, Penetrant Testing (PT), 01-CH-431-Valve, CVCS System, Class 1 (reviewed)
- WO 38103359485, PT, RCS Make Up Suction Connection on Containment Spray, Class 2 (reviewed)
- WO 38103359485, Radiography Testing (RT) RCS Make Up Suction Connection on Containment Spray, Class 2 (reviewed)
- WO 38103583329, UT, MRP-146 Thermal Fatigue B Cold Leg Drain Line, Class 1 (reviewed)

The inspectors either directly observed or reviewed the following welding activities, qualification records, and associated documents, in order to evaluate compliance with procedures, and the ASME Code, Section XI and Section IX requirements. Specifically, the inspectors reviewed the work order (WO), repair and replacement plan, weld data sheets, welding procedures, procedure qualification records, welder performance qualification records, and NDE reports.

- WO 38103533149, 01-RC-139 Pressurizer Spray Valve PCV-1455A Bypass, Class 1 (observed)
- WO 38103359485, RCS Make Up Suction Connection on Containment Spray, Class 2 (reviewed)
- WO 38103423539, 01-CH-431-Valve, chemical and volume control system (CVCS) , Class 1 (reviewed)

During non-destructive surface and volumetric examinations performed since the previous refueling outage, the licensee did not identify any relevant indications that were analytically evaluated and accepted for continued service; therefore, no NRC review was completed for this inspection procedure attribute.

#### Pressurized Water Reactor Vessel Upper Head Penetration Inspection Activities

The inspectors verified that for the Unit 1 vessel head, a bare metal visual examination and a volumetric examination were not required during this outage, in accordance with the requirements of ASME Code Case N-729-1 and 10 CFR 50.55a(g)(6)(ii)(D).

The licensee did not identify any relevant indications that were accepted for continued service. Additionally, the licensee did not perform any welding repairs to the vessel head penetrations since the beginning of the last Unit 1 refueling outage; therefore, no NRC review was completed for these inspection procedure (IP) attributes.

### Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the licensee's boric acid corrosion control (BACC) program activities to determine if the activities were implemented in accordance with the commitments made in response to NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," and applicable industry guidance documents. Specifically, the inspectors performed an onsite records review of procedures, and the results of the licensee's containment walkdown inspections performed during the current refueling outage. The inspectors also interviewed the BACC program owner, conducted an independent walkdown of containment to evaluate compliance with licensee BACC program requirements, and verified that degraded or non-conforming conditions such as boric acid leaks, were properly identified and corrected in accordance with the licensee's BACC, and the CAP.

The inspectors reviewed the following engineering evaluations completed for evidence of boric acid leakage, to determine if the licensee properly applied applicable corrosion rates to the affected components, and properly assessed the effects of corrosion-induced wastage on structural or pressure boundary integrity, in accordance with the licensee procedures.

- CR 530120, CA to Engineering to Initiate Required Actions of ASME XI IWA-5250
- CR 569758, Increase in 1-RC-PCV-1455 A Leakage
- CR 545699, Through-Wall Leak on 2-RC-MOV-2595 Packing Leak-Off Line
- CR 529746, Boric Acid on 1-RH-20 (Body to Bonnet)
- CR 530120, Boric Acid on 3/4 inch-CH-109-1502 (Flange) Piping between 1-RC-P-1C Seal & 1-CH-360
- CR 539354, RCS Leakby at 1-RC-ICV-3510 approximately 1 drop/10 sec
- CR 559138, 1-RC-PCV-1455A Boric Acid Buildup Not Being Contained by Spray Shield

The inspectors reviewed the following CRs and associated corrective actions (CAs) related to evidence of boric acid leakage, to evaluate if the corrective actions completed were consistent with the requirements of the ASME Code and 10 CFR Part 50, Appendix B, Criterion XVI.

- CR 578230, Excessive Dry, White Boric Acid Deposits on Containment Basement Floor
- CR 577242, 1-CH-433 Packing Leak
- CR 557322, Found Boric Acid Buildup on 1-RC-PCV-1455A PZR Spray Loop A

### Steam Generator Tube Inspection Activities

The inspectors verified that for the Unit 1 steam generator (SG) B tubes, no inspection activities were required for this refueling outage, in accordance with the requirements of the ASME Code, the licensee's TS, and Nuclear Energy Institute (NEI) 97-06, "Steam Generator Program Guidelines."

The inspectors reviewed the eddy current (EC) examination activities performed in Unit 1 SGs A and C during current refueling outage, to verify compliance with the licensee's TSs, ASME BPVC Section XI, and NEI 97-06, "Steam Generator Program Guidelines."

The inspectors reviewed the scope of the EC examinations, and the implementation of scope expansion criteria, to verify that these were consistent with the Electric Power Research Institute (EPRI) Pressurized Water Reactor Steam Generator Examination Guidelines, Revision 7. The inspectors reviewed documentation for a sample of EC data analysts, probes, and testers to verify that personnel and equipment were qualified to detect the applicable degradation mechanisms, in accordance with the EPRI Examination Guidelines. This review included a sample of site-specific Examination Technique Specification Sheets (ETSSs) to verify that their qualification, and site-specific implementation were consistent with Appendix H or I of the EPRI Examination Guidelines. The inspectors also reviewed a sample of EC data for SG tubes A-R29C77, A-R33C63, A-R12C47, B-R39C23, and B-R35C17 with a qualified data analyst to confirm that data analysis, and equipment configuration, were performed in accordance with the applicable ETSSs and site-specific analysis guidelines. The inspectors verified that recordable indications were detected and sized in accordance with vendor procedures.

The inspectors selected a sample of degradation mechanisms from the Unit 1 Degradation Assessment report (i.e., anti-vibration bar wear), and verified that their respective in-situ pressure testing criteria were determined in accordance with the EPRI Steam Generator Integrity Assessment Guidelines, Revision 3. Additionally, the inspectors reviewed EC indication reports to determine whether tubes with relevant indications were appropriately screened for in-situ pressure testing. The inspectors also compared the latest EC examination results with the last Condition Monitoring and Operational Assessment report for Unit 1, to assess the licensee's prediction capability for maximum tube degradation, and number of tubes with indications. The inspectors verified that the licensee's evaluation was conservative, and that current examination results were bound by the operational assessment projections.

The inspectors assessed the latest EC examination results to verify that new degradation mechanisms, if any, were identified and evaluated before plant startup. The review of EC examination results included the disposition of potential loose part indications on the SG secondary side, to verify that corrective actions for evaluating and retrieving loose parts were consistent with the EPRI Guidelines. The inspectors also reviewed a sample of primary-to-secondary leakage data for Unit 1, to confirm that operational leakage in each SG remained below the detection or action level threshold during the previous operating cycle.

The inspectors' review included the implementation of tube repair criteria and repair methods, to verify they were consistent with plant TS and industry guidelines. The inspectors verified that the licensee had selected the appropriate tubes for plugging based on the required plugging criteria. The inspectors reviewed the tube plugging procedure, and a sample of tube plugging results for tube A-R29C77, to determine if the licensee installed the tube plugs in accordance with the applicable procedures.

Furthermore, the inspectors interviewed licensee staff and reviewed a sample of inspection results for the inspection conducted in the secondary side internals of SGs A and C, to verify that potential areas of degradation based on site-specific operating experience (OE) were inspected, and appropriate corrective actions were taken to address degradation indications. This review included the results of foreign object search and retrieval activities in both SGs, and an evaluation for a potential loose part in the secondary side of SG A.

#### Identification and Resolution of Problems

The inspectors reviewed a sample of ISI-related issues entered into the CAP to determine if the licensee had appropriately described the scope of the problem, and had initiated corrective actions. The review also included the licensee's consideration and assessment of OE events applicable to the plant. The inspectors performed this review to ensure compliance with 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements.

#### b. Findings

Introduction: The NRC identified a Green NCV of 10 CFR 50.55a, "Codes and Standards," for the licensee's failure to conduct a detailed visual examination of the concrete-liner interface of the Unit 1 containment, per the ASME BPVC Section XI, Subsection IWE 1241, Table IWE-2500-1, Category E-C, Item E 4.11.

Description: During an inspection of the Unit 1 containment as a part of the boric acid walkdown, the inspectors noted that licensee personnel were not conducting a detailed visual examination of the concrete-liner interface of the Unit 1 containment per the ASME Section XI, Subsection IWE 1241, Table IWE-2500-1, Category E-C, Item E 4.11.

The initial configuration for Unit 1 containment was a concrete containment with a steel containment liner, and a concrete basemat poured such that it was flush to the steel liner. No moisture barrier existed in the interface between the containment liner and the concrete basemat. In September 1996, the NRC added IWE requirements to 10CFR10.55a, and in 1998, the licensee implemented a general visual inspection of the accessible surface areas in accordance with Category E-A, Item E 1.12 of Table IWE-2500-1.

In 2003, NRC inspectors found degraded coatings and rust at the interface of the containment liner and the basemat for Unit 2 (NRC Inspection Report 50-281/2003-05, Adams Accession No. ML040280056). The interface between the concrete basemat and the containment liner is an area likely to experience accelerated degradation and aging, particularly without any moisture barrier installed. During the current inspection, the inspectors identified that the licensee had not performed a detailed visual examination of the concrete-liner interface of the Unit 1 containment, per the ASME Section XI. Subsection IWE 1241 specifically states that surface areas subject to accelerated degradation and aging require the augmented (detailed visual) inspection identified in Table IWE-2500-1, Examination Category E-C. Subsection IWE 1241 also

states that such areas include the interior and exterior containment surface areas that are subject to accelerated corrosion with no or minimal corrosion allowance. These areas may also include the concrete to containment liner interfaces. The licensee initiated CR 578448 to address the issue through the CAP.

Analysis: The inspectors concluded that the licensee's failure to conduct a detailed visual examination of the concrete-liner interface of the Units 1 and 2 containment in accordance with the ASME, BPVC, Section XI, Subsection IWE 1241, Table IWE-2500-1, Category E-C, Item E 4.11, was a PD that was within the licensee's ability to foresee and correct. Using Manual Chapter 0612, Appendix B, Issue Screening, dated September 7, 2012, the inspectors determined that the PD was more than minor because, if left uncorrected, it had the potential to lead to a more significant safety concern. Specifically, visual inspections of the containment metallic liner provides assurance that the liner remains capable of performing its intended safety function, and in the absence of such inspections, corrosive conditions could progress to challenge that capability. Using Manual Chapter 0609.04, "Initial Characterization of Findings," dated June 19, 2012, the finding was determined to affect the Barrier Integrity Cornerstone. The inspectors screened the finding using IMC 0609, Appendix A, "Significance Determination Process (SDP) for Findings at-Power," dated June 19, 2012, and determined that the finding was of very low safety-significance (Green), because the finding did not represent an actual open pathway in the physical integrity of reactor containment. The team determined that no cross cutting aspect was applicable to this performance deficiency because this finding was not indicative of current licensee performance.

Enforcement: In September 1996, the NRC added IWE requirements to 10CFR10.55a, and in 1998, the licensee implemented a general visual inspection of the accessible surface areas in accordance with Category E-A, Item E 1.12 of Table IWE-2500-1.

Title 10 CFR 50.55a, "Codes and Standards," states, in part that, the examination of metallic liners in concrete containments shall satisfy the requirements of ASME Section XI, Subsection IWE of the 2001 Edition with the 2003 Addenda through the latest edition, and addenda incorporated by reference in paragraph 10 CFR 50.55a(b)(2). The code of record for the current containment ISI Program Interval at Surry Unit 1 is the 2004 Edition of ASME Section XI. Section XI, Subsection IWE 1241, Table IWE-2500-1, Category E-C, Item E 4.11 requires the licensee to do a detailed visual examination of 100 percent of the surface areas subject to accelerated degradation and aging, including the concrete to containment liner interface.

Contrary to the above, from 1998 to 2015, the licensee failed to perform a detailed visual examination of the concrete-liner interface of the Units 1 and 2 containment in accordance with ASME Section XI. The licensee provided the results of the general visual examination, and leak rate test for the Unit 1 containment to demonstrate that there is no immediate safety concern. This violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy, dated July 9, 2013. The violation was entered into the licensee's CAP as CR 578448. (NCV 05000280, 281/2015002-01, Failure to Perform Detailed Visual Examination of the Concrete-Liner Interface of the Unit 1 Containment).



## 1R11 Licensed Operator Requalification Program

### .1 Resident Inspector Quarterly Review

#### a. Inspection Scope

The inspectors observed and evaluated a licensed operator simulator exercise given on April 2, 2015. The scenario involved a SG tube rupture with a faulted SG and the loss of two auxiliary feedwater (AFW) pumps. This scenario was intended to exercise the entire operations crew and assess the ability of the operators to react correctly to multiple failures. The inspectors observed the crew's performance to determine whether the crew met the scenario objectives; accomplished the critical tasks; demonstrated the ability to take timely action in a safe direction and to prioritize, interpret, and verify alarms; demonstrated proper use of alarm response, abnormal, and emergency operating procedures; demonstrated proper command and control; communicated effectively; and appropriately classified events per the emergency plan. The inspectors observed the post training critique to determine that weaknesses or improvement areas revealed by the training were captured by the instructor and reviewed with the operators.

#### b. Findings

No findings were identified.

### .2 Resident Inspector Observation of Control Room Operations

#### a. Inspection Scope

During the inspection period, the inspectors conducted observations of licensed reactor operator activities to ensure consistency with licensee procedures and regulatory requirements. For the following activities, the inspectors observed the following elements of operator performance: 1) operator compliance and use of plant procedures including technical specifications; 2) control board component manipulations; 3) use and interpretation of plant instrumentation and alarms; 4) documentation of activities; 5) management and supervision of activities; and 6) control room communications.

- On April 20, Unit 1 reactor plant shutdown to begin a refueling outage.
- On May 26, Unit 1 dilute to criticality for reactor startup.

#### b. Findings

No findings were identified.

## 1R12 Maintenance Effectiveness

#### a. Inspection Scope

For the two equipment issues described in the condition reports listed below, the inspectors evaluated the effectiveness of the corresponding licensee's preventive and

corrective maintenance. The inspectors performed a detailed review of the problem history and associated circumstances, evaluated the extent of condition reviews, as required, and reviewed the generic implications of the equipment and/or work practice problem(s). Inspectors performed walkdowns of the accessible portions of the system, performed in-office reviews of procedures and evaluations, and held discussions with system engineers. The inspectors compared the licensee's actions with the requirements of the Maintenance Rule (10 CFR 50.65), station procedures ER-AA-MRL-10, "Maintenance Rule Program," Revision 6, and ER-AA-MRL-100, "Implementing the Maintenance Rule," Revision 8.

- CR 566825, Appendix "R" Lighting failures
- CR 568663, Unit 1 "B" Motor Driven Auxiliary Feedwater Pump Motor replacement

b. Findings

Introduction: A self-revealing Green NCV of Surry Technical Specification (TS) 6.4.D was identified because the Unit 1 "A" motor driven auxiliary feedwater pump (MDAFW) motor outboard bearing thermocouple was improperly installed while installing a new motor on the MDAFW pump in November 2013. The improper thermocouple installation in the bearing caused the bearing to fail while the pump was running on January 5, 2015.

Description: On January 5, 2015, the "A" MDAFW pump motor outboard bearing temperature sharply increased to a maximum indicated temperature of 202 degrees F, sixty-eight minutes into the performance of the quarterly periodic test of the pump. The licensee visually inspected the post-test run motor oil samples and the outboard motor bearing sample was cloudy and dark; whereas, the inboard motor bearing sample was clear and golden. Operations declared the "A" MDAFW pump inoperable and entered a 72 hour shutdown limiting condition for operation (LCO). Visual inspection of the motor outboard bearing was performed and witnessed by the NRC resident inspectors. When the upper-half outboard bearing housing was removed, babbitt material from the bearing lining was found to be clearly extruded from the upper-half bearing shell. The presence of babbitt material was indication that the bearing had wiped in conjunction with the increase in bearing temperature. This issue was documented in the licensee's CAP as CR 568663.

It was also observed during this inspection that the outboard bearing thermocouple had been incorrectly installed in the bearing. The sensing end of the thermocouple was not inserted into the recessed hole drilled in the lower-half bearing shell as designed. Instead, the end of the thermocouple was found to be in contact with the outside of the lower bearing shell at the point where it is supported by the bearing housing casting. Further on-site examination of the removed motor was performed by the licensee upon release from the radiological controlled area (RCA). It was found that the outboard motor bearing thermocouple's sensing end was imbedded between the polymer insulation material layer of the bearing and the bearing support.

The inboard bearing thermocouple was also found to be incorrectly installed, with the sensing end in the contact with the lower-half housing bearing support. Additionally, it was observed that the inboard/outboard thermocouple assemblies were found to be installed on the end of the motor which was opposite of the “as found” labeling on the underside of each thermocouple housing.

Extensive failure analysis of the “A” MDAFW pump motor was also conducted at the manufacturing facility. The third party contracted by the motor manufacture confirmed that the two bearing thermocouples were interchanged, with the bearing outboard sensor having been bent and forcibly pressing against the lower outboard side of the bearing shell, underneath the insulating Teflon sheet or directly onto the lower bearing shell. The third party analysis also concluded that the mechanical intrusion of the thermocouple resulted in a disturbance to the alignment of this bearing shell to sufficient extent to cause oil-film and ultimate bearing failure. Additionally, the third party contractor assessed the condition of the “A” MDAFW pump operating with the incorrectly installed thermocouples during a design base event and came to the conclusion that the “A” MDAFW pump would have met its mission time.

The licensee conducted an apparent cause evaluation (ACE) and determined that during the October 1, 2013 outage readiness review challenge review board (CRB) for the replacement of the “A” MDAFW pump motor, it was identified that there would be only two inches of clearance between the motor and the doorway into the Safeguards room doorway. The CRB desired extra margin for the motor movement through the doorway and the decision was made to remove all external attachments to the motor frame. Subsequently, the work order was not revised to include removing the thermocouples and therefore contained no specific steps for disassembly and assembly of the motor or related sub-components. The inboard and outboard thermocouples were re-installed incorrectly because procedure 0-ECM-1406-05, “AFW Pump Motor Maintenance,” section 6.4, “Motor Disassembly and Assembly,” was not referenced or utilized. This included failure to remove the upper half bearing housing to ensure that the thermocouple sensing end was properly inserted into the designed recessed hole drilled in the lower-half bearing shell. The MDAFW pump motor replacement was completed on November 11, 2013, and successfully passed a post maintenance test.

The inspectors agreed that the work order was not updated for the appropriate steps and procedure reference for removing and then reinstalling the motor bearing thermocouples. The inspectors also noted that the workers did not question why the procedure was not referenced in the work package when the actual work was being performed to remove and reinstall the thermocouples. Dominion procedure AD-AA-102, “Procedure Use and Adherence,” step 3.6.2 states, in part, “When the procedure cannot be performed as written then: stop work, contact cognizant supervision, and initiate a procedure change to correct the procedure.” This process was not accomplished in the “A” MDAFW pump motor replacement.

Analysis: The inspectors concluded that the failure of the licensee to use a procedure to remove and reinstall the “A” MDAFW pump motor thermocouples was a performance deficiency that was within the licensee’s ability to foresee and correct. Specifically, the workers who installed the pump motor proceeded to remove and reinstall the new motor

thermocouples based on the decision from the CRB even though the motor installation work order for the expanded work scope was not changed and no thermocouple installation instructions were included in the work order. Using Manual Chapter 0612, Appendix B, Issue Screening, dated September 7, 2012, the inspectors determined that the performance deficiency was more than minor because it was associated with the human performance attribute of the Mitigating Systems Cornerstone, and it adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the incorrect installation of the motor outboard bearing thermocouple eventually damaged the bearing and caused the "A" MDAFW pump to become inoperable.

Using Manual Chapter 0609.04, "Initial Characterization of Findings," dated June 19, 2012, the finding was determined to affect the Mitigating Systems Cornerstone. The inspectors screened the finding using Manual Chapter 0609, Appendix A, SDP for Findings at-Power," dated June 19, 2012, and determined that it screened as Green because the deficiency did not affect the design or qualification of the AFW system and it did not represent a loss of system safety function. This finding has a cross-cutting aspect in the Challenge the Unknown aspect of the human performance area, H.11, because the individuals involved in removing and installing the thermocouples did not stop when faced with a work order that did not have the appropriate procedure reference for the action they were taking.

Enforcement: 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: corrective maintenance operations which would have an effect on the safety of the reactor." These requirements are implemented, in part, by Dominion procedure 0-ECM-1406-05, "AFW Pump Motor Maintenance." Contrary to the above, on November 11, 2013, the licensee removed and reinstalled the thermocouples for the "A" MDAFW pump motor bearings under a work order that was not adequate for the task and did not reference, section 6.4, 0-ECM-1406-05, the applicable section for thermocouple removal and re-installation. Because the licensee entered the issue into their corrective action program as CR 568663 and the finding is of very low safety significance (Green), this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000280/2015002-02, "A" MDAFW Pump Motor Outboard Bearing Damaged.

## 1R13 Maintenance Risk Assessments and Emergent Work Control

### a. Inspection Scope

The inspectors evaluated, as appropriate, the six activities listed below for the following: (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of risk; (3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved. The inspectors verified that the

licensee was complying with the requirements of 10 CFR 50.65(a)(4) and the data output from the licensee's safety monitor associated with the risk profile of Units 1 and 2. The inspectors reviewed the corrective action program to verify deficiencies in risk assessments were being identified and properly resolved.

- On April 21, Unit 1 and Unit 2 risk during Unit 1 "H" Bus logic testing and RCS at reduced inventory.
- On May 4, Unit 2 risk while one of two main generator output breakers were open, #1 EDG out of service for planned maintenance, and component cooling SW outlet jumper in service.
- On May 12, Unit 1 risk during a reactor coolant pump (RCP) motor lift concurrent with core reload.
- On May 14, Unit 1 risk during lowered RCS inventory with SGs and RCS loops isolated, and "C" reserved station service transformer (RSST) out of service.
- On May 21, Unit 1 risk after Unit 1 safeguards basement flooding event.
- On June 6, Unit 2 risk while the refueling water storage tank "B" refrigeration unit was out of service for unplanned corrective maintenance and a "Hot Weather" alert was in effect.

b. Findings

No findings were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the five operability evaluations listed below, affecting risk-significant mitigating systems, to assess as appropriate: (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether other existing degraded conditions were considered; (4) if compensatory measures were involved, whether the compensatory measures were in place, would work as intended, and were appropriately controlled; and (5) where continued operability was considered unjustified, the impact on TS Limiting Conditions for Operation and the risk significance. The inspectors' review included verification that operability determinations were made as specified in OP-AA-102, "Operability Determination," Revision 13. The inspectors reviewed the licensee's corrective action program to verify deficiencies in operability determinations were being identified and corrected.

- CR 576194, Uninterruptible power supply (UPS) 1A2 not sharing load.
- CR 577479, Safety Injection failed to reset during Unit 1 "H" bus logic testing.
- CR 580226, U1 Safeguards Equipment after recirculation spray (RS) HX SW flooding in safeguards basement.
- CR 580707, U1 RCS loop flow after the replacement of the "B" and "C" RCPs.
- CR 577346, 1C SW header debris evaluation.

b. Findings:

No findings were identified.

1R18 Plant Modifications

.1 Temporary Modifications

a. Inspection Scope

The inspectors reviewed temporary modification design change (DC) SU-13-00012, "CCHX SW Outlet Jumper," to verify that the modification did not affect system operability or availability as described by the TS and UFSAR. In addition, the inspectors verified that the temporary modification was in accordance with CM-AA-DDC-201, "Design Changes," Revision 16, and for the related work package, that adequate controls were in place, procedures and drawings were updated, and post-installation tests verified the operability of the affected systems.

b. Findings:

No findings were identified.

.2 Permanent Modifications

a. Inspection Scope

The inspectors reviewed the completed permanent plant modification (DC) SU-14-0116, "Unit 1 RCP Replacement." The inspectors conducted walkdowns of the installation at various stages of completion, reviewed the 10 CFR 50.59 Safety Review/Regulatory Screening, technical drawings, test plans and the modification package to assess the TS implications. The inspectors also verified that the permanent modification was in accordance with licensee procedure CM-AA-DDC-201, "Design Changes," Revision 16. In addition, the inspectors reviewed calculations and conducted interviews with licensee personnel.

b. Findings

No findings were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed nine post maintenance test procedures and/or test activities for selected risk-significant mitigating systems listed below, to assess whether: (1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance criteria were clear and adequately demonstrated operational readiness

consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy consistent with the application; (5) tests were performed as written with applicable prerequisites satisfied; (6) jumpers installed or leads lifted were properly controlled; (7) test equipment was removed following testing; and (8) equipment was returned to the status required to perform in accordance with VPAP-2003, "Post Maintenance Testing Program," Revision 14.

- 1-IPT-FT-RP-SI-001A, OTO 1, Train A Safeguards Action Logic Functional Test", Revision 0, to validate SI switch functionality following troubleshooting.
- 1-OPT-EG-009, "#1 EDG Major Maintenance Operability Test", Revision 53, following breaker 15H8 indicating lights control power cable replacement
- 0-ECM-1509-06, "Quiklook Testing for Quarter Turn Motor Operated Valves", Revision 28, and 0-EPM-1503-01, "Motor Operated Valve Operator Inspection", Revision 8, periodic MOV testing on 1-SW-MOV-105B, "B" RSHX SW outlet isolation valve.
- 1-OPT-EG-009, OTO 1," #1 EDG Major Maintenance Operability Test", Revision 53, following a major maintenance outage
- 0-MCM-0300-10, "Valve Repack," Revision 7, following the repack of 1-RH-MOV-1700, the Unit 1 residual heat removal inlet isolation valve
- 1-MOP-EP-007, "Removal and Return to Service of UPS 1B-1," Revision 3, following its 10 year preventative maintenance outage
- 0-OPT-ZZ-008, "ASME System Pressure Tests," Revision 11, following the repair and return to service of RS SW expansion joint, 1-SW-REJ-105B
- 1-OPT-FW-001, "Motor Driven Auxiliary Feedwater Pump 1-FW-P-3A Performance Test," Revision 36, following removal and reinstallation of the Unit 1 "A" MDAFW pump motor
- 0-OPT-ZZ-008, "ASME System Pressure Tests," Revision 11, following through wall leak repair on main control room chiller SW backwash piping.

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities

a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 1 refueling outage, which was conducted April 19 through May 27, 2015, to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. The inspectors used IP 71111.20, "Refueling and Outage Activities," to observe portions of the maintenance and startup activities to verify that the licensee maintained defense-in-depth commensurate with the outage risk plan and applicable TS. The inspectors monitored licensee controls over the outage activities listed below.

- Licensee configuration management, including daily outage reports, to evaluate maintenance of defense-in-depth commensurate with the outage risk plan for key safety functions and compliance with the applicable TS when taking equipment out of service.
- Implementation of clearance activities and confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing.
- Controls over the status and configuration of electrical systems to ensure that TS and outage safety plan requirements were met, and controls over switchyard activities.
- Controls over activities that could affect reactivity.
- Monitoring of decay heat removal operations.
- Spent fuel cooling operations to verify that outage work was not impacting the ability of the operations staff to operate the spent fuel cooling system during and after core offload.
- Reactor coolant inventory controls, including flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss.
- The control of containment penetrations and containment entries to verify that the licensee controlled those penetrations and activities in accordance with the appropriate TS and could achieve/maintain containment closure for required conditions.
- Refueling activities, including fuel handling and fuel receipt inspections.
- Startup and ascension to full power operation, tracking of startup prerequisites, and walkdown of the primary containment to verify that debris had not been left which could block emergency core cooling system strainers.
- Fatigue management.
- Licensee identification and resolution of problems related to forced outage activities.

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the seven surveillance tests listed below, the inspectors examined the test procedures, witnessed testing, or reviewed test records and data packages, to determine whether the scope of testing adequately demonstrated that the affected equipment was functional and operable, and that the surveillance requirements of TS were met. The inspectors also determined whether the testing effectively demonstrated that the systems or components were operationally ready and capable of performing their intended safety functions.

In-Service Testing:

- 1-OPT-RH-003, RHR System Operability Test, Revision 23



Surveillance Testing:

- 0-OSP-AAC-001, Alternate AC Diesel Quarterly Test, Revision 44
- 1-EPT-0106-06, Main Station Battery 1A Performance Test, Revision 19
- 1-OPT-ZZ-001, 1H Bus Logic Testing, Revision 39
- 1-OPT-SI-008, Refueling Test of the High Head SI Check Valve to the Hot legs, Revision 21
- CH-11.202, RCS Specific Activity Chemistry Sample, Revision 9

Appendix J Leak Rate Determination

- 1-OPT-CT-201, Containment Isolation Valve Local Leak Rate Testing (Type C): 1-RS-MEJ-2B, 1-RS-11 and 1-RS-MOV-156B, Revision 22

b. Findings

No findings were identified.

1EP6 Drill EvaluationEmergency Preparedness (EP) Drilla. Inspection Scope

On April 2, 2015, the inspectors reviewed and observed a licensee EP drill involving a failed open steam generator relief valve, a steam generator tube rupture, the loss of two AFW pumps, and an unisolable radioactive air release. The inspectors assessed the licensee emergency procedure usage, emergency plan classifications, notifications, and protective actions recommendation development. The inspectors evaluated the adequacy of the licensee's conduct of the drill and post-drill critique performance. The inspectors verified that the drill critique identified drill performance weaknesses and entered these items into the licensee's CAP.

b. Findings

No findings were identified.

## 2. RADIATION SAFETY

Cornerstones: Public Radiation Safety

2RS6 Radioactive Gaseous and Liquid Effluent Treatmenta. Inspection Scope:

Event and Effluent Program Reviews: The inspectors reviewed recent liquid and gaseous release permits including pre-release sampling results, effluent monitor setpoints, and public dose calculations. The inspectors reviewed the 2013 and 2014

annual effluent reports to evaluate reported doses to the public, review any anomalous events, evaluate groundwater sampling results, and to review Offsite Dose Calculation Manual (ODCM) changes. The inspectors also reviewed compensatory sampling data for time periods when selected radiation monitors were out of service.

Walk-Downs and Observations: The inspectors walked-down selected components of the gaseous and liquid radioactive waste processing and discharge systems, the protected area, and auxiliary building. To the extent practical, the inspectors observed and evaluated the material condition of in-place waste processing equipment for indications of degradation or leakage that could constitute a possible release pathway to the environment. Inspected components included waste monitor tanks, laundry waste tanks, evaporation equipment, waste gas decay tanks, ventilation filtration systems, vendor-supplied liquid waste processing equipment, and associated piping and valves. The inspectors interviewed licensee staff regarding radwaste equipment configuration and effluent monitor operation. The inspectors also reviewed surveillance testing records for auxiliary building ventilation filtration systems and for effluent flow rate measuring devices.

Sampling and Analyses: The inspectors observed sampling, analysis, and effluent release permit generation for the condensate air ejector and ventilation vent #1 release points. Quality control activities for count room equipment were discussed with health physics (HP) technicians and results of the 2013 and 2014 radiochemistry cross-check program were reviewed. The inspectors discussed effluent source term evaluation, changes to effluent release points with licensee staff and evaluated recent land use census results. Meteorological data used to calculate doses to the public was evaluated as part of IP 71124.07.

Ground Water Protection: The inspectors reviewed the licensee's continued implementation of the industry's Ground Water Protection Initiative (NEI 07-07) and discussed any changes to the program. The inspectors discussed program guidance for dealing with spills, leaks, and unexpected discharges with licensee staff and reviewed recent entries into the 10 CFR 50.75(g) decommissioning file. The inspectors reviewed and discussed the licensee's program for monitoring of structures, systems, and components (SSCs) with the potential to release radioactive material to the environment including the liquid radioactive waste system, spent fuel pool liner, boron recovery valve gallery, storm drains, and refueling water storage tanks. Potential effluent release points due to onsite surface water bodies were also evaluated. The inspectors discussed the status of site initiatives to rehabilitate site drainage and groundwater mitigation systems including, floor drains, curtain drain pumps, piezometer wells, and installation of wells in the sand layer above the engineered backfill with the capability to use the wells for stabilization and future remediation of site groundwater tritium concentrations.

Radioactive waste system operation, effluent processing activities, and groundwater protection efforts were evaluated against requirements and guidance documented in the following: 10 CFR 20; 10 CFR 50 Appendix I; Offsite Dose Calculation Manual (ODCM); UFSAR Section 11; Regulation Guide (RG) 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants"; RG 1.109,

“Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50 Appendix I”; and Surry TS Section 6. Procedures and records reviewed during the inspection are listed in the Attachment.

Problem Identification and Resolution: The inspectors reviewed selected CAP documents in the areas of gaseous and liquid effluent processing and release activities. The inspectors evaluated the licensee’s ability to identify and resolve the identified issues in accordance with procedure PI-AA-200, “Corrective Action,” Rev. 23. The inspectors also discussed the scope of the licensee’s internal audit program and reviewed recent assessment results. Documents reviewed are listed in the attachment.

The inspectors completed one (1) sample as required by Inspection Procedure (IP) 71124.06.

b. Findings

No findings were identified.

2RS7 Radiological Environmental Monitoring Program (REMP)

a. Inspection Scope

REMP Status and Results: The inspectors reviewed and discussed planned changes to the ODCM and results presented in the Annual Environmental Radiological Environmental Operating Report issued for 2013 and 2014. The REMF contract laboratory (Teledyne Brown Engineering) cross-check program results and current procedural guidance for offsite collection, processing and analysis of airborne particulate and iodine, broadleaf vegetation, and surface water samples were reviewed and discussed. The Annual Environmental Radiological Environmental Operating Report environmental measurement results were reviewed for consistency with licensee effluent data and evaluated for radionuclide concentration trends. The inspectors reviewed and discussed detection level sensitivity requirements and results for selected environmental media analyzed by the offsite environmental laboratory.

Site Inspection and Equipment Walk-down: The inspectors discussed implementation of selected REMF monitoring and sample collection activities for atmospheric, broadleaf vegetation samples, and water and milk samples as specified in the current ODCM and applicable procedures. The inspectors observed equipment material condition and verified operability, including verification of flow rates and total sample volume results for the weekly airborne particulate filter and iodine cartridge change-outs at eight atmospheric sampling stations. In addition, the inspectors discussed broadleaf vegetation sampling for selected stations. Thermo-luminescent dosimeter (TLD) material condition and placement were verified by direct verification at eight ODCM locations. Land use census results, actions for missed samples including compensatory measures, sediment sample collection/processing activities, and availability of replacement equipment were discussed with knowledgeable licensee staff. In addition, sample pump calibration and maintenance records for selected environmental air

samplers were reviewed. The current status and completeness of the licensee's 10 CFR 50.75(g) decommissioning files were reviewed and discussed, as well as the licensee's assessment of SSCs that could potentially leak material into the groundwater. Additional assessment of the ground water protection program, including sampling of wells and the curtain drain systems, was completed and is documented in Section 2RS6.

Meteorological Monitoring Program: The inspectors conducted a tour of the meteorological tower and observed the local data collection equipment computer used to provide local readout if required. The inspectors observed the physical condition of the tower and associated instruments and discussed equipment operability, maintenance history, and backup power supplies with responsible licensee staff. The inspectors evaluated transmission of locally generated meteorological data from the meteorological tower to the main control room operators. For the meteorological measurements of wind speed, wind direction, and temperature, the inspectors reviewed applicable tower instrumentation calibration records for 2013 and 2014 and evaluated meteorological measurement data recovery for 2013 and 2014.

Procedural guidance, program implementation, quantitative analysis sensitivities, and environmental monitoring results were reviewed against 10 CFR Part 20; Appendix I to 10 CFR Part 50; TS Sections 6.4, and 6.6; ODCM, Rev. 18; RG 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment"; and the Branch Technical Position, An Acceptable Radiological Environmental Monitoring Program - 1979. Licensee procedures and activities related to meteorological monitoring were evaluated against: ODCM; UFSAR Chapter 11; RG 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," and ANSI/ANS-2.5-1984, "Standard for Determining Meteorological Information at Nuclear Power Sites." Procedures and records reviewed during the inspection are listed in the Attachment.

Problem Identification and Resolution: The inspectors reviewed selected CAP documents in the areas of environmental and meteorological monitoring. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with PI-AA-200, "Corrective Action," Revision 23. Documents reviewed are listed in the attachment.

The inspectors completed 1 sample as required by IP 71124.07.

b. Findings

No findings were identified.

#### 4. OTHER ACTIVITIES

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, and Occupational Radiation Safety

##### 4OA1 Performance Indicator (PI) Verification

##### .1 Safety System Functional Failures

###### a. Inspection Scope

The inspectors sample the licensee's submittals for the Safety System Functional Failures performance indicator for both Unit 1 and Unit 2 (2 samples) for the period of April 1, 2014 through March 31, 2015, to assess the accuracy and completeness of the submitted data and whether the performance indicators were calculated in accordance with the guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspection was conducted in accordance with NRC Inspection Procedure 71151, "Performance Indicator Verification." The inspectors reviewed the applicable NRC inspection reports and the licensee's event reports, operator logs, station performance indicators, and related CRs.

###### b. Findings

No findings were identified.

##### .2 Reactor Coolant System (RCS) Specific Activity and RCS Leak Rate

###### a. Inspection Scope

The inspectors reviewed the licensee's submittals for the RCS specific activity and RCS leak rate performance indicators for both Unit 1 and Unit 2 for the period of April 1, 2014 through March 31, 2015 (4 samples) to assess the accuracy and completeness of the submitted data and whether the performance indicators were calculated in accordance with the guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspection was conducted in accordance with NRC Inspection Procedure 71151, "Performance Indicator Verification." The inspectors observed a chemistry technician obtain and analyze an RCS sample. The inspectors also reviewed RCS sample analysis and control room logs of daily RCS leakage, and compared that information to the data reported by the performance indicator.

###### b. Findings

No findings were identified

### .3 Occupational Radiation Safety Cornerstone

#### a. Inspection Scope

The inspectors reviewed the Occupational Exposure Control Effectiveness PI results for the Occupational Radiation Safety Cornerstone from June, 2013, through March, 2015. For the assessment period, the inspectors reviewed ED alarm logs and selected CRs related to controls for exposure significant areas. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in of the report Attachment.

#### b. Findings

No findings were identified.

### .4 Public Radiation Safety Cornerstone

- a. The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results for the Public Radiation Safety Cornerstone from June, 2013, through March, 2015. For the assessment period, the inspectors reviewed cumulative and projected doses to the public and CRs related to Radiological Effluent TS/ODCM issues. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in the Attachment.

#### b. Findings

No findings were identified.

## 4OA2 Identification and Resolution of Problems

### .1 Daily Reviews of items Entered into the Corrective Action Program:

#### a. Inspection Scope

As required by NRC Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by reviewing daily CR report summaries and periodically attending daily CR Review Team meetings.

#### b. Findings

No findings were identified.

.2 Annual Sample: Review of CRs 533401 and 534883, RCS Make-Up Connection to LHSI Piping not Missile Protected

a. Inspection Scope

The inspectors performed an in-depth review regarding the licensee's evaluation and corrective actions associated with CRs 533401 and 534883, RCS Make-Up Connection to Low Head Safety Injection (LHSI) Piping not Missile Protected. Specifically, on November 21, 2013, while answering a NRC inspector's questions about the seismic supports for the diverse and flexible coping strategies (FLEX) modification connection to LHSI piping, the licensee concluded that the newly installed FLEX modification make-up connection was not protected against external missiles. The inspectors assessed the licensee's problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of the licensee's corrective actions to determine whether the licensee was appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of the licensee's CAP as specified in procedure, PI-AA-200, "Corrective Action Program," Revision 23, and 10 CFR 50, Appendix B. In addition, the inspectors reviewed the corrective action program for similar issues, and interviewed engineering personnel to assess the effectiveness of the implemented corrective actions.

b. Findings

No findings were identified.

The licensee determined that the apparent cause was that the Beyond Design Basis (BDB) project team had an incorrect mindset in that the only the FLEX portion of piping was not fully missile protected. The project team failed to evaluate the design change with regards to protecting the FLEX connection to the LHSI piping. The licensee's correction actions included changing procedure CM-AA-DDC-201, "Design Changes," to include a requirement to review missile protection analysis during pre-job briefs as well as a requirement that interfaces between new and existing equipment be specifically identified and verified. The inspectors verified that the licensee had identified problems with this issue at an appropriate threshold and entered them into the CAP; and had proposed or implemented appropriate corrective actions. The inspectors determined that the corrective actions developed as a result of the apparent cause analysis were reasonable commensurate with the safety significance of the LHSI system.

4OA5 OTHER ACTIVITIES

(Closed) Unresolved Item 05000280/2013005-01: Application of American Society of Mechanical Engineers, Section XI, Table IWB 2500-1, Item B10.10, Inspection Requirements and Note 1 Exemptions (ML14041A449)

a. Inspection Scope

The inspectors followed up on an unresolved item (URI) concerning lack of surface examinations by the licensee for the reactor pressure vessel (RPV) supports attachment welds. ASME Section XI Code includes inspection requirements for the RPV supports attachment welds (Subsection IWB). Subsection IWB, Table IWB-2500-1, Item number B10.10, Note 1, describes the examination requirements for welded attachments for vessels, piping, pumps, and valves. Note 1 of Table IWB-2500-1 states that attachment welds (weld buildup) on nozzles that are in compression under normal load conditions, and provide only component support, are excluded from the surface examination requirements. During the inservice inspection in 2013 for Surry Unit 1 documented in inspection report 05000280/2013005, the inspectors identified that the licensee excluded the surface examination requirements based on the exemptions provided by Note 1. The licensee's position was that the surface examinations were not required based on the exclusion criteria provided in Note 1, for attachment welds under compressive loads during normal conditions. At the time of the inspection, the inspectors identified that in addition to compressive loads, shear type loadings appeared to exist for the normal load case based on calculations provided to the inspectors. This configuration did not appear to meet the intent of the exclusion criteria provided by Note 1 of the Table IWB 2500-1. The inspectors also identified that the support was relied upon in the RCS model analysis to restrain substantial multi-directional seismic and loss of coolant accident (LOCA) type loading cases. The inspectors initiated a URI pending resolution of apparent differences in the loading cases described in the licensee calculations, and the Note 1 criteria for compressive loadings. Subsequently, the Region II staff, after consulting the Office of Nuclear Reactor Regulation (NRR) and reviewing several regulatory as well as licensee-specific documents, developed a Task Interface Agreement (TIA) 2014-02 (ML14296A336). In a final response to the TIA (ML15139A283), the NRR staff concluded that there is no need for the licensee to perform a surface examination, as shear stresses for the normal load case were calculated to be negligible. This URI is closed.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On July 29, 2015, the inspection results were presented to Mr. R. Simmons and other members of his staff, who acknowledged the findings. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTARY INFORMATION



## **SUPPLEMENTARY INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

J. Abbott, Health Physicist  
J. Ashley, Licensing Engineer  
L. Baker, Training Manager  
P. Blount, Health Physicist  
D. Cobb, Manager, Nuclear Oversight  
J. Eggart, Manager, Radiation Protection & Chemistry  
A. Fletcher, Surry PM-Ground Water Protection Project  
M. Gabriel, Supervisor, Instrumentation and Controls  
B. Garber, Supervisor, Station Licensing  
M. Haduck, Manager, Outage and Planning  
P. Harris, Supervisor, Radiological Analysis and Instrumentation  
R. Johnson, Manager, Operations  
P. Jurewicz, Boric Acid Corrosion Control Program Owner  
L. Lane, Site Vice President  
D. Lawrence, Director, Station Safety and Licensing  
T. Mayer, Surry SG ISI Program Owner  
L. Ragland, Health Physics Operations Supervisor  
M. Ringler, Site Welding Engineer  
J. Rosenberger, Director, Station Engineering  
R. Scanlan, Manager, Maintenance  
B. Shelton, Station Engineering, Radiation Monitoring  
R. Simmons, Plant Manager  
M. Smith, Manager, Nuclear Organizational Effectiveness  
W. Terry, Supervisor, Health Physics Technical Services  
E. Turko, ISI Supervisor  
N. Turner, Supervisor, Emergency Preparedness

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

### Opened and Closed

05000280, 281/2015002-01	NCV	Failure to conduct a detailed visual examination of the concrete-liner interface for the Unit 1 containment (Section 1R08)
05000280/2015002-02	NCV	"A" MDAFW Pump Motor Outboard Bearing Damaged (Section 1R12)

### Closed

05000280/2013005-01	URI	Application of ASME Section XI, Table IWB 2500-1, Item B10.10, Inspection Requirements and Note 1 Exemptions (Section 1R08)
---------------------	-----	---

## LIST OF DOCUMENTS REVIEWED

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

#### Procedures

0-AP-10.18, Response to Grid Instability, Rev. 21  
0-OP-ZZ-021, Severe Weather Preparation, Rev. 10  
0-OSP-ZZ-003, Hot Weather Preparation, Rev. 6  
1-OP-26.5, 230 KV Switchyard Voltage, Rev. 18  
2-OP-26.5, 500 KV Switchyard Voltage, Rev. 20

#### Condition Reports

418810          520365          578431          582377

#### Work Orders

38103560458

#### Other Documents

CA195844, Hot Weather Readiness, 03/22/11

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

#### Procedures

1-OP-EG-001A, EDG 1 System Alignment, Rev. 13  
1-OP-RS-001A, Outside Recirc Spray System Alignment, Rev. 9  
1-OP-RS-002A, Inside Recirc Spray System Alignment, Rev. 4  
1-OP-46.2, Instrument Air System Alignment, Rev. 49  
1-OP-49.1A, Service Water System Alignment, Rev. 25

#### Condition Reports (\*NRC Identified)

\*576897          \*578935          \*582008          \*582504          \*583121          \*583122

#### Drawings

11448-FB-046A SH 1, Flow/Valve Operating Numbers Diagram Emergency Diesel Generator #1, Rev. 22  
11448-FB-046A SH 2, Flow/Valve Operating Numbers Diagram Emergency Diesel Generator #1, Rev. 16  
11448-FM-075C SH 3, Flow/Valve Operating Numbers Diagram Compressed Air System Unit 1, Rev. 34  
11448-FM-075J, Flow/Valve Operating Numbers Diagram Containment Air System Unit 1, Rev. 45  
11448-FM-084B SH 1, Flow/Valve Operating Numbers Diagram Recirculating Spray System Unit 1, Rev. 24  
11448-FM-084B SH 2, Flow/Valve Operating Numbers Diagram Recirculating Spray System Unit 1, Rev. 33

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

#### Procedures

0-FS-FP-225, Alternate AC Diesel Room – Construction Site Elevation 35 FT, Rev. 1  
0-FS-FP-133, Technical Support Center – Elevation 27 Feet – 6 Inches, Rev. 3  
0-LSP-FP-004, Fire Drills, Rev. 7

1-FS-FP-134, Containment Unit 1 Elevation 47 Feet – 4 Inches (Subatmospheric), Rev. 1  
 1-FS-FP-135, Containment Unit 1 Elevation 18 Feet – 4 Inches (Subatmospheric), Rev. 1  
 1-FS-FP-136, Containment Unit 1 Elevation (-)3 Feet – 6 Inches (Subatmospheric), Rev. 1  
 1-FS-FP-137, Containment Unit 1 Elevation (-)27 Feet – 7 Inches (Subatmospheric), Rev. 1  
 1-FS-FP-139, Safeguards Valve Pit - Unit 1 Elevation 28 Feet – 6 Inches, 19 Feet – 6 Inches, and 12 Feet, Rev. 2  
 1-FS-FP-140, Safeguards Basement - Unit 1 Elevation 11 Feet – 6 Inches, Rev. 2  
 1-FS-FP-141, Safeguards Spray Side - Unit 1 Elevation 27 Feet – 6 Inches, Rev. 2  
 2-FS-FP-139, Safeguards Valve Pit - Unit 2 Elevation 28 Feet – 6 Inches, 19 Feet – 6 Inches, and 12 Feet, Rev. 1  
 2-FS-FP-140, Safeguards Basement - Unit 2 Elevation 11 Feet – 6 Inches, Rev. 3  
 2-FS-FP-141, Safeguards Spray Side - Unit 2 Elevation 27 Feet – 6 Inches, Rev. 2  
 2-FS-FP-124, Unit 2 Switchgear Room Elevation 58 Feet – 6 Inches, Rev. 3  
 CM-AA-FPA-100, Fire Protection/Appendix R (Fire Safe Shutdown) Program, Rev. 10

#### Condition Reports (\*NRC Identified)

*576760	*576758	*576610	*580951	*580956	581469
581606	582163	582335	*582344		

#### Drawings

11448-FAR-200, Site Fire Boundaries – Appendix 'R' Plot Plan, Rev. 15  
 11448-FAR-201 SH 2, Equipment Location – Appendix 'R' Reac Cont, MSVH, SG Area & Quench Spray Pump House Plan – EL. 18' – 4", Rev. 15  
 11448-FAR-206 SH 3, Equipment Location – Appendix 'R' Service Building Part Plan – EL. 27' – 0", Rev. 15  
 11448-FAR-206 SH 4, Equipment Location – Appendix 'R' Service Building Part Plan – EL. 27' – 0", Rev. 19

#### Other Documents

Audit 14-05, Fire Protection Implementation, 8/5/2014  
 DC 07-046, Replacement of 1-FP-02 Diesel Fire Pump/Surry/Units 1&2, Rev. 0  
 DNES-VA-EEN-0305, Fire Protection Systems, Rev. 1  
 EWR 89-146, Evaluate FP Valves (1-FP-RV-102,103)/Surry/Units 1&2, Rev. 0  
 Fire Drill Scenario, 2nd Quarter 2015  
 SU-Report-000-EP-0012, Combustible Loading Analysis, Rev. 16

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

#### Procedures

0-AP-13.00, Turbine Building or MER 3 Flooding, Rev. 29  
 0-MOP-SW-002, Operation of Unit 1 to Unit 2 Service Water Jumper, Rev. 5  
 0-MOP-SW-003, Preparation of Unit 1 to Unit 2 Service Water Jumper, Rev. 1  
 0-OP-ZZ-108, Assessment of Maintenance Activities for Potential Flooding of Turbine Building and Associated Areas, Rev. 12  
 GMP-C-107, Rigging and Lifting, Rev. 31

#### Other Documents

SU-13-00012, CCHX SW Outlet Jumper, 7/24/14

## **Section 1R08: Inservice Inspection Activities**

### **Procedures**

1-NPT-CT-102, Inspection of Containment Structure, Rev. 2  
 1-NPT-PR-002, Snubber Visual Inspection, Rev. 16  
 8-QPP-761, Multi-frequency Eddy Current Examination of Steam Generator Tubing, Rev. 3  
 CM-AA-NWP-101, Control of Welding, Rev. 1  
 CM-AA-PGM-1001, Program Health Report, Rev. 2  
 CM-AA-NWP-102, Control of Welding Materials, Rev. 2  
 ER-AP-BAC-10, Boric Acid Corrosion Control Program, Rev. 11  
 ER-AP-BAC-101, Boric Acid Corrosion Control Program Inspections, Rev. 10  
 ER-AP-BAC-102, Boric Acid Corrosion Control Program Evaluations, Rev. 11  
 ER-AA-CII-102, ASME Section XI Containment Inservice Inspection (Metal/IWE) Program Fleet Implementation Requirements, Rev. 2  
 ER-AA-ISI-100, Dominion Inservice Inspection Program, Rev. 6  
 ER-AA-ISI-RI-100, Dominion Risk Informed Program, Rev. 2  
 ER-AA-RRM-100, ASME Section XI Repair/Replacement Program Fleet Implementation Requirements, Rev. 6  
 ER-AA-SPT-100, ASME Section XI System Pressure Test Program Fleet Implementation Requirements, Rev. 6  
 ER-AA-TFM-101, Thermal Fatigue Management Program, Rev. 1  
 ER-AA-FAC-1002, Flow-Accelerated Corrosion (FAC) Inspection and Evaluation Activities, Rev. 9  
 ER-AA-NDE-RT-400, Radiographic Examination Procedure, Rev. 0  
 ER-AA-NDE-PT-300, ASME Section XI Liquid Penetrant Examination Procedure, Rev. 7  
 ER-AA-NDE-UT-701, Ultrasonic Thickness Measurement Procedure, Rev. 6  
 ER-AA-NDE-UT-802, Ultrasonic Examination of Austenitic Piping Welds in accordance with ASME Section XI, Appendix VIII, Rev. 3  
 ER-AA-NDE-VT-602, VT-2 Visual Examination Procedure, Rev. 4  
 ER-AA-NDE-VT-603, VT-3 Visual Examination Procedure, Rev. 4  
 ER-AA-NDE-VT-605, IWE Visual Examination Procedure, Rev. 0  
 ER-AA-5000, Nuclear Non-destructive Examination Request, Rev. 0  
 ER-AA-NDE-PT-300, ASME Section XI Liquid Penetrant Examination Procedure, Rev. 7  
 ER-AA-NDE-PT-301, BOP Liquid Penetrant Examination Procedure, Rev. 6  
 ER-AA-NDE-VT-605-NPQR, IWE Visual Examination Procedure, Rev. 0  
 ER-SU-AUG-101, Surry Augmented Inspection Program Procedure, Rev. 9  
 NS-WKI-000006-004, Mechanical Tube Plug & Stabilization Procedure, Rev. 0  
 P-101, General Piping and Pressure Vessel Welding Procedure, Rev. 18  
 PI-AA-200, Corrective Action Procedure, Rev. 23  
 PI-AA-100-1004, Self-Assessments Procedure, Rev. 11  
 PI-AA-100-1007, Operating Experience Program Procedure, Rev. 12  
 SRY-SGPMS-002, Surry Site Specific Eddy Current Analysis Guidelines Procedure, April 2015

### **Drawings**

D-2831-604, UT Calibration Block, 2-inch, Rev. 1  
 H448-WMKS-0118G1, Inservice Inspection of Feedwater Outside Containment, Rev. 7  
 10-47E865-4, Flow Diagram Ventilation and Air Conditioning Air Flow, Rev. 67

11448-CBM-082B-5, ISI Classification Boundary Dwg Interval-5 for Sampling System,  
 Sh 2 of 2, Rev. 0  
 11448-CBM-083B-5, ISI Classification Boundary Dwg Interval 5 for Vent and Drain System,  
 Sh 3 of 3, Rev. 0  
 11448-CBM-086A-5, ISI Classification Boundary Dwg Interval 5 for Reactor Coolant System,  
 Loop-A, Sh 1 of 3, Rev. 0  
 11448-CBM-086A-5, ISI Classification Boundary Dwg Interval 5 for Reactor Coolant System,  
 Loop-B, Sh 2 of 3, Rev. 0  
 11448-CBM-086A-5, ISI Classification Boundary Dwg Interval 5 for Reactor Coolant System,  
 Loop-C, Sh 3 of 3, Rev. 0  
 11448-CBM-086B-5, ISI Classification Boundary Dwg Interval 5 for Reactor Coolant System,  
 Sh 1 of 3, Rev. 0  
 11448-CBM-086C-5, ISI Classification Boundary Dwg Interval 5 for Reactor Coolant System,  
 Sh 1 of 2, Rev. 0  
 11448-CBM-086C-5, ISI Classification Boundary Dwg Interval 5 for Reactor Coolant System,  
 Sh 2 of 2, Rev. 0  
 11448-CBM-088C-5, ISI Classification Boundary Dwg Interval 5 for Chemical and Volume  
 Control System, Sh 1 of 2, Rev. 0  
 11448-FC-15B, Reactor Containment Unit 1, Sh 1 of 1, Rev. 8  
 11448-IWE-W01-A, ISI Containment Liner, Sh 1 of 1, Rev. 0  
 11448-IWE-W01-B, ISI Containment Liner, Sh 1 of 1, Rev. 0  
 11448-IWE-W01-C, ISI Containment Liner, Sh 1 of 1, Rev. 0  
 11448-IWE-W01-D, ISI Containment Liner, Sh 1 of 1, Rev. 0  
 11448-IWE-W01-E, ISI Containment Liner, Sh 1 of 1, Rev. 0  
 11448-IWE-W01-F, ISI Containment Liner, Sh 1 of 1, Rev. 0  
 11448-IWE-W01-G, ISI Containment Liner, Sh 1 of 1, Rev. 0  
 11448-IWE-W01-H, ISI Containment Liner, Sh 1 of 1, Rev. 0  
 11448-IWE-W01-I, ISI Containment Liner, Sh 1 of 1, Rev. 0

#### Work Orders

38102380440, Bare Metal Visual and Ultrasonic Examination of Reactor Vessel Head  
 (N-729-1)  
 38102534252, 38103517511, Replace 01-RC-PCV-1455A-Valve  
 38103217087, System Pressure Test of 1-NPT-CH-004  
 38103235910, 547-Day Frequency PT: Inspection of Containment Structure  
 38103235910, VT-3 Inspection of IWE Category E-A/E1.11  
 38103242105, 547-Day Frequency ISI of HHSI Flow Path – Cold Leg Injection  
 38103359485, Welding, RT and PT of RCS Make-Up Suction Connection on Containment  
 Spray, Class 2  
 38103423539, Welding and PT of 01-CH-431-Valve, CVCS System, Class 1  
 38103423799, 01-CH-PP-0.75-CH-PIPE-109-1502, BACC Flange Gasket and Fastener  
 Replacement  
 38103423799, Visual Testing, N-722-1 Bottom-Mounted Instrumentation Penetration Nozzle  
 38103489249, 02-DG-PP-0.75-Pipe-207-152 Piping Replacement  
 38103515670, Flow-Accelerated Corrosion Examination of Component 1-AS-PPS-17,  
 line 12-SA-1-301  
 38103516659, Snubber Visual of 11448-WMKS-0127C2

38103517058, Ultrasonic Testing, Safety Injection Elbow-to-pipe 12-RC-22/1-08, 12-Inch Line from Accumulator, Class 1  
 38103533149, Welding of 01-RC-139 Pressurizer Spray Valve PCV 1455A Bypass, Class 1  
 38103583329, Ultrasonic Testing, MRP-146 Thermal Fatigue B Cold Leg Drain Line  
 38103608808, Piping Replacement 01-RC-HCV-1557B Replacement  
 38103608808, Piping Replacement of 2 inch B Loop CL Drain Piping 2-RC-56-1502  
 38103611951, Indications Remove/Repair

#### Condition Reports

CR 523667, Welder Qualification  
 CR 529746, Boric Acid on 1-RH-20 (Body to Bonnet)  
 CR 530120, Boric Acid on 3/4 inch-CH-109-1502 Piping between 1-RC-P-1C seal & 1-CH-360  
 CR 539354, RCS Leakby at 1-RC-ICV-3510 Approx 1 drop/10 sec  
 CR 545699, Through-wall leak on 2-RC-MOV-2595 Packing Leak-Off Line  
 CR 548520, IN 14-07, Degradation of Leak-Chase Channel System for Floor Welds of Metal Containment  
 CR 550784, Weld Repair Sheet Missing From Package  
 CR 557322, Found Boric Acid Buildup on 1-RC-PCV-1455A PZR Spray Loop A  
 CR 559138, 1-RC-PCV-1455A Boric Acid Buildup Not Being Contained By Spray Shield  
 CR 569758, Increase in 1-RC-PCV-1455 A Leakage  
 CR 577242, 1-CH-433 Packing Leak  
 CR 577754, Indication on "B" Cold Leg Drain Line  
 CR 577976, Arc Strike Identified on Reactor Vessel Closure Stud Nut  
 CR 578059, White Discoloration on Nuts and Bolts of 1-RH-E-1B  
 CR 578095, Relevant Indication Identified During an ISI Liquid Penetrant NDE Examination  
 CR 578172, One SG C Tube Plugged due to Foreign Object Wear  
 CR 578230, Excessive Dry, White Boric Acid deposits on Containment Basement Floor  
 CR 578276, Four SG C Tubes Plugged due to Electronic Permeability Concerns  
 CR 578448, NRC Violation for Failure to Conduct Visual Examination

#### Welder Quals

Record of Welder Performance Qualification Test – C. Bressie; R. Dunn; J. Hunter; L. Martin; J. Rowe; B. Scruggs; K. Simm; and N. Sadler

#### Visual Acuity Exam Record

C. Bressie; B. Baker; R. Collins; R. Dunn; G. Fuechtmann; S. Flood; J. Hunter; T. Kupfer; B. Knott; L. Martin; C. Morgan; J. Odegard; J. Rowe; N. Sadler; B. Scruggs; K. Simm; K. Simon; R. Stack; W. Thomas; D. Valdivieso; R. Wray; and B. Zollner

#### Certificate of Qualification for NDE Examiner

B. Baker; R. Collins; G. Fuechtmann; S. Flood; T. Kupfer; B. Knott; C. Morgan; J. Odegard; K. Simon; R. Stack; W. Thomas; D. Valdivieso; R. Wray; and B. Zollner

#### Miscellaneous Documents

1-NPT-CT-102: Inspection of Containment Structure, dated 7/29/03  
 B&W Certificate of NDE Personnel Qualification: Eddy Current (Frazier), dated 9/4/14  
 B&W Certificate of Vision Examination (Frazier), dated 1/8/15  
 CA 283112, CA to Engineering to Review NRC IN 14-07

CA 301664, CA to Engineering to Complete a Metallurgical Exam of the Removed Pipe  
 CA 301928, CA to Engineering to Evaluate Indications following Controlled Metal Removal  
 Curtiss-Wright/Anatec Personnel Certification Summary Record: Eddy Current (Roberts),  
 dated 2/19/13  
 Curtiss-Wright/Anatec Vision Examination Certification (Roberts), dated 3/5/15  
 ET 00-0286, Containment Liner to Floor Joint Interface Inspection Report and Evaluation,  
 Rev. 0  
 ET-ISI-07-0001, Surry Power Station Unit 1 Risk Informed Inservice Inspection Periodic Update,  
 Fourth Interval, Second Period, Rev. 0  
 ETE-SU-22013-0053, Steam Generator Condition Monitoring and Operational Assessment  
 (2013), Rev. 0  
 NDE Technology, Inc. Personnel Certification Summary: Eddy Current (Causby)  
 NDE Technology, Inc. Personnel Vision Certification (Causby), dated 7/24/14  
 Plant Issue Resolution S-2003-5350-R7, Containment Liner, dated 4/19/14  
 Procedure Qualification Record (PQR) for Welding, 801, 830, and 831  
 Program Health Report, Boric Acid Corrosion Control, Q4-2014  
 Program Health Report, In-service Inspection, Q4-2014  
 Program Health Report, NDE, Q4-2014  
 Program Health Report, Welding, Q4-2014  
 SAR000486, Welding Program Fleet Self-Assessment, dated January 2014  
 SAR001227, Reactor Coolant System Materials Degradation Process Fleetwide Self  
 Assessment, dated 12/14/11  
 SAR001750, Steam Generator Program Formal Self-Assessment, dated 2/5/13  
 SAR002257, Inservice Inspection/Risk Informed Inservice Inspection Program Formal Self  
 Assessment, dated 1/30/14  
 SAR002813, Boric Acid Corrosion Control Program Self-Assessment, dated November 2014  
 VT-3 Examination of IWE Category E-A Containment Incore Sump, dated 2008  
 Welding Technique Sheet for Welding Technique Number 801, GTAW Manual Welding  
 WCAP-15988-NP, Generic Guidance for an Effective Boric Acid Inspection Program for  
 Pressurized Water Reactors, Rev. 2  
 Zetec Certificate of Personnel Qualification: Eddy Current (P. Anderson), dated 2/20/13  
 Zetec Designation of RevospECT Dashboard Operator/Configurator (P. Anderson),  
 dated 2/22/11  
 Zetec Eye Examination Certification (P. Anderson), dated 8/5/14

### **Section 1R11: Licensed Operator Regualification Program**

#### **Procedures**

1-AP-24.01, Large SG Tube Leak, Rev. 37  
 1-E-0, Reactor Trip or Safety Injection, Rev. 71  
 1-E-1, Loss of Reactor or Secondary Coolant, Rev. 43  
 1-E-2, Faulted Steam Generator Isolation, Rev. 20  
 1-E-3, Steam Generator Tube Rupture, Rev. 51  
 1-GOP-2.7, Unit Shutdown, Power Decrease from Allowable Power to Unit Offline for Refueling  
 Outage, Rev. 29  
 1-OP-RC-004, Draining the RCS to Reactor Flange Level, Rev. 35  
 1-OP-RX-005, Rod Control System Withdrawal of the Shutdown Banks, Rev. 28  
 1-OP-RX-009, Dilution to Critical Conditions Following Refueling, Rev. 23  
 OP-AA-100, Conduct of Operations, Rev. 29



**Section 1R12: Maintenance Effectiveness****Procedures**

0-ECM-0105-01, Appendix R ELT Inspection and Rework, Rev. 33

1-OPT-FW-001, Motor Driven Auxiliary Feedwater Pump 1-FW-P-3A Periodic Test, Rev. 34

ER-AA-MRL-10, Maintenance Rule Program, Rev. 6

ER-AA-MRL-100, Implementing Maintenance Rule, Rev. 7

**Condition Reports (\*NRC Identified)**

523773	554144	554771	566825	566834	568663
568723	568832	573995	575111	575254	575257
575349	*575936	581300	581353	581362	581426
581427	581496	*581896			

**Work Orders**

38103487182

**Other Documents**

ACE 019856, 1-FW-P-3A Motor High Outboard Temperature, 4/28/15

As Found Investigation Photographs Homewood Energy Services 400HP Motor Outboard Bearing Failure, 01/06/15

CA300126, Corrective Action to Determine the Health of the Appendix R Lighting within the Station, 3/30/2015

CA298136, Engineering for Review 1-FW-P-3A for Prior Operability, 3/19/15

EA 96-322, NRC Inspection Report Nos. 50-338/96-10, 50-339/96-10, 12/2/96

MRE018213, Maintenance Rule Evaluation to Engineering (2-ELT-LF-005), 12/5/14

MRE018216, Maintenance Rule Evaluation to Engineering (1-ELT-LF-005), 12/5/14

McQuin Electrical Power Consulting, Inc. examination of 1-FW-P-3A Motor, 2/14/15

Pioneer Motor Bearing Company Operability Review of Damaged 1-FW-P-3A Outboard Motor Bearing, 03/13/15

SM-1602, Cooldown Analyses for Surry Safety Analyses, Rev. 0

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control****Procedures**

0-OP-ZZ-021, Severe Weather Preparation, Rev. 10

0-OSP-ZZ-003, Hot Weather Preparation, Rev. 6

GMP-001, Heavy Load Rigging and Movement, Rev. 34

**Condition Reports**

576208	5777302	577392	579938	582100	582399
582407					

**Other Documents**

EOOS Schedulers Risk Evaluation for Surry Power Station, April 21, 2015

EOOS Schedulers Risk Evaluation for Surry Power Station, May 4, 2015

EOOS Schedulers Risk Evaluation for Surry Power Station, May 12, 2015

EOOS Schedulers Risk Evaluation for Surry Power Station, May 14, 2015

EOOS Schedulers Risk Evaluation for Surry Power Station, May 21, 2015

EOOS Schedulers Risk Evaluation for Surry Power Station, June 6, 2015

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

1-NPT-RX-009, Calculating RCS Flow, Rev. 9

1-OSP-SW-007, SW Flow Test of RSHX 1-RS-E-1A and 1-RS-E-1D, Rev. 6

PI-AA-200, Corrective Action, Rev. 27

**Condition Reports (\*NRC Identified)**

577346	577474	577479	577275	577346	577516
577609	577875	580226	580248	580251	580252
580255	580259	580260	580337	580345	580361
580458	*580470	*580487	580532	580566	580568
580737	580742				

**Work Orders**

38102182541

**Other Documents**

CA303659, CA to Engineering to evaluate penetrations for potential degradation or damage, 6/4/15

CALC-000-SM-1515, RCS Power and Flow Uncertainty Qualification for Surry Statistical and DNB Limit Development, Rev. 0

ETE-CME-2015-1005, Surry Power Station Unit 1 Spring 2015 Reactor Coolant System Volumetric Flow Acceptance Criteria, Rev. 0

ETE-NAF-2015-0071, Results from Test Plan of DC SU-14-01164 – RCS Loop Flows, Rev. 0

ETE-NAF-2010-0079, Reload Transition Safety Report (RTSR): Westinghouse 15X15 Upgrade Fuel Design Transition at Surry Units 1 and 2, Rev. 2

ETE-SU-2015-0029, 1C SW Header Debris Evaluation, Rev. 0

Eval-ENG-RSE-S1C27, Reload Safety Evaluation Surry Unit 1 Cycle 27 Pattern TRX, Rev. 0

Event Review Team Report, Unexpected Water Intrusion into Unit 1 Safeguards Basement, 5/20/15

MRE018559, M-rule evaluation to Engineering (01-SI-RLY-2SIA-RELAY failure to reset), 4/30/15

**Section 1R18: Plant Modifications****Procedures**

0-MOP-SW-002, Operation of Unit 1 to Unit 2 Service Water Jumper, Rev. 5

0-MOP-SW-003, Preparation of Unit 1 to Unit 2 Service Water Jumper, Rev. 1

0-NSP-CC-005, CCHX Tests Using the Temporary Monitoring System, Rev. 5

0-OP-ZZ-108, Assessment of Maintenance Activities for Potential Flooding of Turbine Building and Associated Areas, Rev. 12

**Condition Reports**

574983      582025

Drawings

11448-FP-4C, Service Water Lines Surry Power Station – Unit 1, Rev. 12  
 11448-FP-4D, Service Water Lines Surry Power Station – Unit 1, Rev. 17  
 1100017-11448-FP-4A, Service Water Lines Surry Power Station – Unit 1, Rev. 0  
 1200013-11448-FP-4B, Service Water Lines Surry Power Station – Unit 1, Rev. 0

Work Orders

381003368153      381003368154

Other Documents

CE-1499, Pipe Stress Analysis of Temporary SW Jumper Line, Rev. 0  
 ETE-CME-2014-1029, Reconciliation between the Kewaunee and Surry Reactor Coolant Pump Specifications, Rev. 0  
 ETE-CME-2015-1005, Surry Power Station Unit 1 Spring 2015 Reactor Coolant System Volumetric Flow Acceptance Criteria, Rev. 0  
 ETE-SU-2014-006, RCP Turning Vane Bolt Design, Rev. 0  
 SU-13-00012, CCHX SW Outlet Jumper, 7/24/14  
 SU-14-01164, Unit 1 RCP Replacement, Rev. 13  
 SU-CALC-MEC-ME-0612, Service Water Discharge Jumper Flow, Rev. 2  
 SU-CALC-MEC-ME-0819, Residual Heat Removal Cooldown Capabilities with Maximum SW Temperature, Rev. 1  
 Westinghouse Technical Bulletins and Product Update, NSD-TB-94-06-RO, Model 93A RCP Turning Vane Bolts, Rev. 0

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

0-ECM-1406-05, Auxiliary Feedwater Pump Motor Maintenance, Rev. 22  
 0-ECM-1509-06, Quiklook Testing for Quarter Turn Motor Operated Valves, Rev. 28  
 0-EPM-1503-01, Motor Operated Valve (MOV) Operator Inspection, Rev. 8  
 0-MCM-0300-10, Repacking and Adjusting Packing on Motor-Operated Valves, Rev. 7  
 0-MCM-1003-01, Expansion Joint Removal, Inspection, and Installation, Rev. 34  
 0-ECM-1509-05, Rising Stem Motor Operated Valve Quiklook Testing, Rev. 29  
 1-MOP-EP-007, Removal from Service and Return to Service of UPS 1B-1, Rev. 3  
 1-OPT-EG-0090, Number 1 Emergency Diesel Generator Major Maintenance Operability Test, Rev. 53{OTO1}  
 DNES-AA-MOV-1001, Motor-Operated Valve Diagnostic Test Preparation and Evaluation, Rev. 1  
 GMP-M-154, Fabrication and Installation of A.O. Smith Fiberglass Reinforced Piping: Class 136, Rev. 5

Condition Reports (\*NRC Identified)

576390	576486	577329	577357	578213	578247
578383	578835	578847	579191	579216	579278
*582844					

Drawings

11448-FM-071D, Flow/Valve Operating Numbers Diagram Circulating & Service Water System Unit 1, Rev.67

Work Orders

38102905493	38103262543	38103402903	38103470228
38103584161	38103592057	38103600134	38103606025
38103630119			

Other Documents

ETE-SU-2014-0003, Attachment 1, Combustible Loading, 1/28/14  
 ETE-SU-2015-0021, Restoration of 15H8 Control Circuit, Rev. 0  
 ETE-SU-2015-1010, Repair of X304 Current Share Board for 1-EP-UPS-1A-1 and  
 1-EP-UPS-1A-2, Rev. 0  
 Rising Stem MOV Test Plan – As Left after Repack, 1-RH-MOV-1700

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

1-GOP-2.7, Unit Shutdown, Power Decrease from Allowable Power to Unit Offline for Refueling Outage, Rev. 29  
 1-OP-RC-004, Draining the RCS to Reactor Flange Level, Rev. 35  
 1-OP-RX-009, Dilution to Critical Conditions Following Refueling, Rev. 23  
 1-OPT-FW-001, Motor Driven Auxiliary Feedwater Pump 1-FW-P-3A, Rev. 35  
 1-OPT-FW-002, Motor Driven Auxiliary Feedwater Pump 1-FW-P-3B, Rev. 35  
 1-OPT-FW-020, Turbine Driven AFW Pump Performance Less Than 350°F/450 PSIG, Rev. 7  
 1-OSP-FW-006, Motor Driven Auxiliary Feedwater Pump Full Flow Test, Rev. 0  
 1-NPT-FW-004, Inservice Inspection System Pressure Test for Auxiliary Feedwater System Flow Path to Steam Generators, Rev. 4

Condition Reports (\*NRC Identified)

577027	577033	577035	*577701	577269	577708
577754	578093	578321	578362	578563	578570
578592	578619	578665	578666	578836	578850
578874	578892	578947	579052	579058	579071
579123	579150	579167	579198	579234	579294
579338	579398	579344	579624	579716	579830
579851	580003	580019	580149	580151	580358
580412	580475	*580479	580681		

Work Orders

38103476066	38103447185	38103248657	38103628278
38103448239			

**Section 1R22: Surveillance Testing**Procedures

CH-11.202, Primary Demineralizer Influent: Dissolved Hydrogen Analysis Using Orbisphere Hydrogen Analyzer and Model 31250 Sensor, Rev. 9  
 CH-21.202, Primary Demineralizer Influent: Dissolved Hydrogen Analysis Using Orbisphere Hydrogen Analyzer and Model 31250 Sensor, Rev. 9  
 0-OSP-AAC-001, Quarterly Test of 0-AAC-DG-0M, Alternate AC Diesel Generator, Rev. 44  
 1-EPT-0106-06, Main Station Battery Performance Test, Rev. 19 OTO-1  
 1-OPT-RH-003, RHR System Operability Test, Rev. 23

- 1-OPT-SI-007, Refueling Test of the High Head Safety Injection Check Valves to the Cold Legs, Rev. 22  
 1-OPT-SI-008, Refueling Test of the High Head Safety Injection Check Valves to the Hot Legs, Rev. 21  
 1-OPT-ZZ-001, ESF Actuation with Undervoltage and Degraded Voltage – 1H Bus, Rev. 39  
 OTO-5

#### Work Orders

38102897401	38103432063	38103432435	38103423643
38103447618	38103548493		

### **Section 1EP6: Drill Evaluation**

#### Procedures

- Emergency Plan, Rev. 61  
 EPIP-1.02, Response to Notification of Unusual Event, Rev. 16  
 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. 11  
 EPIP-2.01, Notification of State and Local Governments, Rev. 44  
 1-AP-24.01, Large SG Tube Leak, Rev. 37  
 1-E-0, Reactor Trip or Safety Injection, Rev. 71  
 1-E-1, Loss of Reactor or Secondary Coolant, Rev. 43  
 1-E-2, Faulted Steam Generator Isolation, Rev. 20  
 1-E-3, Steam Generator Tube Rupture, Rev. 51

#### Condition Reports

575934	575942	575950	576074
--------	--------	--------	--------

### **Section 2RS6: Radioactive Gaseous and Liquid Effluent Treatment**

#### Procedures

- HP-3010.010, Radioactive Effluents Records and Reports, Rev. 7  
 HP-3010.020, Radioactive Liquid Waste Release Permits, Rev. 3  
 HP-3010.021, Radioactive Liquid Waste Sampling and Analysis, Rev. 4  
 HP-3010.030, Radioactive Gaseous Waste Release Permits, Rev. 9  
 HP-3010.031, Radioactive Gaseous Waste Sampling and Analysis, Rev. 37  
 HP-3010.040, Radiation Monitoring System Setpoint Determination, Rev. 34  
 HP-3051.020, Groundwater Protection Program, Rev. 5 and 6  
 RP-AA-502, Groundwater Protection Program, Rev. 4 and 5  
 RP-AA-504, Remediation Process for the Groundwater Protection Program, Rev. 3  
 VPAP-2103S, Offsite Dose Calculation Manual, Rev. 18  
 0-HSP-GW-001, 31 Day Effluent Dose Projections, Rev. 8  
 0-HSP-SS-002, Storm Drain Sampling Using the ISCO 6712 Portable Sampler and the ISCO 750 Area Velocity Module, Rev. 4  
 0-HSP-SS-003, Sub Surface Drain Sampling, Rev. 6  
 1-PT-50.3, Health Physics Sampling - Ventilation Vent #2, Rev. 4  
 1-PT-50.17, Health Physics Sampling – Condenser Air Ejector, Rev. 4

Condition Reports

515026	516339	518830	532885	535396	535440
536914	555437	559492	576342		

Work Orders

Work Order (W/O) 38102440842, HEPA DOP/Halogenated Hydrocarbon Test, Filter 01-VS-FL 3B [Aux Building Ventilation], 8/25/10

W/O 38102766319, Sample Charcoal and Send for Testing, Filter 01-VS-FL-3B [Aux Building Ventilation], 8/25/10

W/O 38102847141, Replace Charcoal Trays, 01-VS-FL-3A Filter [Aux Building Ventilation], 11/10/2011

W/O 38103136589, HEPA DOP/Halogenated Hydrocarbon Test, Filter 01-VS-FL 3B [Aux Building Ventilation], 5/07/13

W/O 38103168460, RCA Exhaust Fan 58A Discharge Flow Transmitter (01-VS-Loop-F-117A Loop Cal), 8/28/13

W/O 38103169453, RCA Exhaust Fan 58B Discharge Flow Transmitter (01-VS-Loop-F-117B Loop Cal), 8/29/13

W/O 3810319710, HEPA DOP/Halogenated Hydrocarbon Test, Filter 01-VS-FL-3A [Aux Building Ventilation], 5/8/13

W/O 38103330058, 0-HSP-REMP-001, Land Use Census [2013], 12/17/13

W/O 38103455965, 0-HSP-REMP-001, Land Use Census [2014], 12/15/14

10 CFR 50.75(g) Decommissioning Records

10 CFR 61, Vendor Laboratory Analysis Data from 2014 (7 record sets) LIMS Sample #'s: L58472-1, L59802-1, L59577-1, L59618-1, L59618-3, L61005-1, and L61005-2

Other Documents

Annual Radioactive Effluent Release Reports, 2013 and 2014

Gaseous Radioactive Waste Discharge Permit Package, Permit # G-20150513-167-C, Unit 2 Air Ejector, 5/20/15

Gaseous Radioactive Waste Discharge Permit Package, Permit # G-20150514-169-C, Ventilation Vent #2, 5/21/15

Ground Water Protection Project (GPP) Strategic Plan, 6/18/14

Groundwater Protection Initiative Monitoring Well Sample Results, January 2013-December 2014

HP-3010.031, Attachment 14, Loss of Radioactive Gaseous Effluent Monitoring Instrumentation Sampling Schedule [with compensatory sample results] for 1-GW-RM-130B (Process Vent Gas), 2/19-2/22/14

HP-3010.031, Attachment 14, Loss of Radioactive Gaseous Effluent Monitoring Instrumentation Sampling Schedule [with compensatory sample results] for 1-VG-RM-131B (Vent Vent #2 NG), 5/4-5/6/14

HP-3010.031, Attachment 8, Loss of Radioactive Liquid Effluent Monitoring Instrumentation Sampling Schedule [with compensatory sample results] for 1-SW-RM-120, 3/20-3/23/15

Independent Review of Tritium Leak Assessment Efforts, Groundwater Strategic Plan, Conestoga-Rovers & Associates, 7/14/14

Interlaboratory Cross Check Results - Surry 1<sup>st</sup> Quarter 2013

Interlaboratory Cross Check Results - Surry 3<sup>rd</sup> Quarter 2013

Interlaboratory Cross Check Results - Surry 1<sup>st</sup> Quarter 2014

Interlaboratory Cross Check Results - Surry 3<sup>rd</sup> Quarter 2014

Interlaboratory Cross Check Results - Surry/Teledyne 1st Quarter 2013  
 Interlaboratory Cross Check Results - Surry/Teledyne 3rd Quarter 2013  
 Interlaboratory Cross Check Results - Surry/Teledyne 1st Quarter 2014  
 Interlaboratory Cross Check Results - Surry/Teledyne 3rd Quarter 2014  
 Liquid Radioactive Waste Discharge Permit Package, Permit # L-20150519-130-B, Waste Monitoring Tank A, 5/19/15  
 Open EMS Effluent Release Summary Report of Liquid and Gaseous Batch and Continuous Releases, Including Quarterly and Annual Doses to the Public, 1/1/13-12/31/13  
 Open EMS Effluent Release Summary Report of Liquid and Gaseous Batch and Continuous Releases, Including Quarterly and Annual Doses to the Public, 1/1/14-12/31/14  
 Operations Log Entries Related to Effluent Radiation Monitor Ventilation Vent #1 being Inoperable, 11/10/14 and 2/16/15  
 Particulate Filter In-Place Leak Test Report, Surry Radwaste Facility Exhaust Filters A and B, 5/23/13  
 Surry Groundwater Protection Program Risk Assessment 2014  
 Site Subsurface Drain Tritium Monitoring Results, 10/1/13-5/11/15

### **Section 2RS7: Radiological Environmental Monitoring Program (REMP)**

#### Procedures

VPAP-2103S, Offsite Dose Calculation Manual, Rev. 18  
 HP-3051.020, Groundwater Protection Program, Rev. 6  
 0-HSP-ELLD-001, Environmental LLD Verification, Rev. 0  
 0-HSP-REMP-002, Environmental Radiation Monitors, Rev. 2  
 0-HSP-RM-002, Monitoring Normally Non-Radioactive Systems for Radioactive Contamination, Rev. 10  
 HP-3051.010, Radiological Environmental Monitoring Program, Rev. 22  
 0-IPM-MM-PRO-002, Backup Meteorological Tower Instrumentation Calibration, Rev. 6  
 0-IPM-MM-PRO-001, Primary Meteorological Tower Instrumentation Calibration, Rev. 9  
 0-HSP-GPP-001, Groundwater Protection Program Reviews and Assessments, Rev. 2  
 RP-AA-504, Remediation Process for the Groundwater Protection Program, Rev. 3

#### Condition Reports

516902	517263	531237	532704	535440	538091
570202	575281	576531			

#### Work Orders

38103168460, Surveillance 01-VS-LOOP-F-117A, 8/28/13  
 38103169453, Surveillance 01-VS-LOOP-F-117B, 8/29/13  
 38103181062, Surveillance Backup Met Tower Recorder, 8/20/12  
 38103354998, Primary Met Tower Replace Wind Direction and Speed Sensors, 2/27/14  
 38103404054, Backup Met Tower Recorder, 2/25/14  
 38103472476, Primary Met Tower Instruments to Include Recorder, 2/28/14  
 38103472481, Primary Met Tower Instruments to Include Recorder, 8/20/14

#### Other Documents

Calibration Certificate Portable Air Sampler SN23354, 23355 and 23357, 6/11/2014 and 6/12/13

Calibration Certificate Portable Air Sampler SN22123 and 22126, 1/6/14 and 7/9/12  
 Calibration Certificate Portable Air Sampler SN 12331, 22124, and 22125, 1/7-9/14 and 1/7/13  
 Records from 50.75(g) file describing a minor (<1 gallon) chilled water leak from RWST cooler 2B, 4/18/15  
 2013 Meteorological Data Joint Frequency Distribution and Data Recovery, 1/15/14  
 2014 Meteorological Data Joint Frequency Distribution and Data Recovery, 1/15/15

#### **Section 40A1: Performance Indicator Verification**

##### Procedures

RP-AA-111, Monitoring and Improving Radiological Performance, Rev. 2  
 RP-AA-112, Radiation Safety Performance Indicator Reporting, Rev. 4  
 PI-AA-100-1000, Performance Indicators, Rev. 4

##### Condition Reports

545792          574693          577119          582579

##### Other Documents

1Q/2015 Performance Indicators – Surry 1 and 2 – Safety System Functional Failures, dated 06/01/15  
 1Q/2015 Performance Indicators – Surry 1 and 2 – Reactor Coolant System Activity, dated 06/01/15  
 1Q/2015 Performance Indicators – Surry 1 and 2 – Reactor Coolant System Leakage, dated 06/01/15  
 LI-AA-500, NRC/INPO/WANO Performance Indicator and MOR Reporting, Rev. 1  
 Monthly PI Reports with Associated Data, June 2013 through March 2015  
 Spreadsheet of Electronic Dosimeter Dose and Dose Rate Alarms, 3/10/14 thru 4/14/15  
 Unit 1 Control Room Narrative Log, 04/01/14 – 03/31/15  
 Unit 2 Control Room Narrative Log, 04/01/14 – 03/31/15  
 Unit 1 and Unit 2 RCS Specific Activity Results, 04/01/14 – 03/31/15

#### **Section 40A2: Identification and Resolution of Problems**

##### Procedures

CM-AA-DDC-201, Design Change Process, Revision 16

##### Condition Reports

534883

##### Other Documents

ACE19643, ACE to Corporate Engineering (NRC Violation for RCS Make-up Piping that was not Missile Protected), 2/10/14  
 CA274166, CA to Engineering to perform prior operability review for BDB SI connection  
 CALC-SM-589, Emergency Condensate Storage Tank Sizings Calculations  
 ET-S-10-0079, PVC Equipment Drain Line for AFW and CS Pumps  
 TR001632, Potential Problem Report No. 90-014, North Anna Power Station Over Pressurization Potential of the Turbine Driven Auxiliary Feed Pumps with attachments describing Surry AFW basis



## LIST OF ACRONYMS

AC	Alternating Current
ACE	Apparent Cause Evaluation
ADAMS	Agencywide Document Access and Management System
AFW	Auxiliary Feedwater
ASME	American Society of Mechanical Engineers
BACC	Boric Acid Corrosion Control
BDB	Beyond Design Basis
BPVC	Boiler and Pressure Vessel Code
CA	Corrective Action
CAP	Corrective Action Program
CCHX	Component Cooling Heat Exchanger
CFR	Code of Federal Regulations
CR	Condition Report
CRB	Challenge Review Board
CVCS	Chemical and Volume Control System
DC	Design Change
EC	Eddy Current
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
EPRI	Electrical Power Research Institute
ETSS	Examination Technique Specification Sheets
FLEX	Diverse and Flexible Coping Strategies
HP	Health Physics
HVAC	Heating, Ventilation and Air-Conditioning
IA	Instrument Air
IMC	Inspection Manual Chapter
IP	Inspection Procedure
ISI	In-Service Inspection
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LHSI	Low Head Safety Injection
LOCA	Loss of Coolant Accident
MDAFW	Motor Driven Auxiliary Feedwater Pump
MSVH	Main Steam Valve House
MOV	Motor Operated Valve
MRP	Material Reliability Program
NCV	Non-cited Violation
NDE	Non-Destructive Examination
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
ODCM	Offsite Dose Calculation Manual
OE	Operating Experience
PARS	Publicly Available Records
PCV	Pressure Control Valve
PD	Performance Deficiency
PI	Performance Indicator

PT	Penetrant Testing
PZR	Pressurizer
RCA	Radiologically Controlled Area
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
REJ	Rubber Expansion Joint
REMP	Radiological Environmental Monitoring Program
RFO	Refueling Outage
RG	Regulation Guide
RHR	Residual Heat Removal
RPV	Reactor Pressure Vessel
RS	Recirculation Spray
RSHX	Recirculation Spray Heat Exchanger
RSST	Reserve Station Service Transformer
RT	Radiography Testing
RTP	Rated Thermal Power
SDP	Significance Determination Process
SG	Steam Generator
SSC	System, Structure or Component
SW	Service Water
TDAFW	Turbine Driven Auxiliary Feedwater
TIA	Task Interface Agreement
TLD	Thermo Luminescent Dosimeter
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
UPS	Uninterruptible Power Supply
URI	Unresolved Item
UT	Ultrasonic Testing
VEPCO	Virginia Electric and Power Company
VT	Visual Testing
WO	Work Order