



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

May 7, 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
05000280/2015001 AND 05000281/2015001

Dear Mr. Heacock:

On March 31, 2015, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Surry Power Station, Units 1 and 2. On April 15, 2015, the NRC inspectors discussed the results of this inspection with Mr. L. Lane and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the violation or significance of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Surry Power Station.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the 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 05000280/2015001, 05000281/2015001
w/Attachment: Supplemental Information

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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).

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3

Letter to David A. Heacock from Steven D. Rose dated May 7, 2015.

SUBJECT: SURRY POWER STATION – NRC INTEGRATED INSPECTION REPORT
05000280/2015001, 05000281/2015001

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-280, 50-281

License Nos.: DPR-32, DPR-37

Report No: 05000280/2015001, 05000281/2015001

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: Surry Power Station, Units 1 and 2

Location: 5850 Hog Island Road
Surry, VA 23883

Dates: January 1, 2015 through March 31, 2015

Inspectors: P. McKenna, Senior Resident Inspector
C. Jones, Resident Inspector
P. Capehart, Senior Operations Engineer (1R11)
A. Toth, Operations Engineer (1R11)
M. Scheetz, Reactor Engineer (1R11)

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

Enclosure

SUMMARY

IR 05000280/2015001, 05000281/2015001; 01/01/2015–03/31/2015; Surry Power Station, Units 1 and 2: Maintenance Effectiveness

The report covered a three-month period of inspection by resident inspectors and region-based inspectors. Inspectors identified one non-cited violation (NCV) 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 June 2, 2011. The cross-cutting aspect was determined using IMC 0310, "Components Within The Cross-Cutting Areas," dated December 04, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 5, 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. An NRC-identified, non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," was identified because the licensee failed to promptly identify a condition adverse to quality associated with the material condition of the Unit 2 charging service water (CH/SW) piping. Specifically, the NRC resident inspectors identified a leak in the discharge piping of the Unit 2 "A" CH/SW pump on November 24, 2014. The licensee had previously identified a leak on the Unit 1 "B" CH/SW pump discharge piping on June 16, 2014. The issue was documented in the licensee's corrective action program (CAP) as condition report (CR) 563166.

The licensee's failure to identify a condition adverse to quality associated with the material condition of the Unit 2 "A" CH/SW piping was a performance deficiency (PD). The inspectors determined that the PD was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, not having compensatory actions in place for CH/SW "Green Thread" piping that has been prone to through-wall leaks, left the licensee susceptible to undetected leaks from the CH/SW piping systems. Using Manual Chapter 0609.04, "Initial Characterization of Findings," Table 2, dated June 19, 2012, the finding was determined to adversely affect the Mitigating Systems Cornerstone. The inspectors screened the finding using Manual Chapter 0609, Appendix A, "Significance Determination Process (SDP) for Findings at-Power," dated June 19, 2012, and determined that it screened as Green because the PD did not affect the design or qualification of the CH/SW system and the leak rate did not represent an actual loss of system safety function. This finding has a cross-cutting aspect in the evaluation component of the problem identification and resolution, P.2, because the organization did not thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, the license did not institute compensatory actions for a long-term corrective action on CH/SW piping that has had a recent history of developing through-wall leaks. (Section 1R12)

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near rated thermal power (RTP) throughout the inspection period.

Unit 2 operated at RTP until January 26 when reactor power was reduced to 60 percent to repair the “B” main feed pump. Unit 2 returned to RTP on January 28 and remained there for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

.1 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors performed a site-specific weather-related inspection due to anticipated adverse weather conditions; specifically, extreme cold temperature on January 7, 2015. The inspectors reviewed the licensee’s preparations for potential severe weather as well as severe weather procedure 0-OP-ZZ-021, “Severe Weather Preparation,” Revision 8. The inspectors walked down site areas which included the emergency diesel generators, emergency switchgear rooms, emergency service water pump house, and the turbine, safeguards, and auxiliary buildings.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial Walkdown

a. Inspection Scope

The inspectors conducted four 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, Updated Final Safety Analysis Report (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.

- Main Control Room (MCR) Chiller "A" and "B" and associated service water (SW) piping while "C" MCR Chiller was out of service for maintenance
- "A" and "C" Emergency Service Water (ESW) pumps while "B" ESW pump was out of service for maintenance
- Component Cooling (CC) water system while "D" CC heat exchanger was out of service for cleaning
- Emergency Diesel Generator (EDG) 1 and 3 while EDG 2 was out of service for monthly testing

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 "A" Battery Room
- Unit 1 "B" Battery Room
- Main Control Room
- #2 EDG Room
- Unit 1 and Unit 2 Relay Rooms

b. Findings

No findings were identified.

1R06 Flood Protection Measures

Annual Review of Electrical Manholes

a. Inspection Scope

The inspectors conducted an inspection of underground manholes subject to flooding that contain cables whose failure could affect risk-significant equipment. The inspectors performed walkdowns of risk-significant areas, including manholes 1-EP-MH-1, 1-EP-MH-2, and 1-EP-MH-3, to assess the condition of electrical cables located inside the underground manholes. The inspectors verified by direct observation and review of the associated inspection documents that the cables, splices, support structures, and sump pumps located within the manholes appeared intact, and that the cables were not being impacted by water. In addition, the inspectors reviewed several past periodic licensee inspection results and the licensee's CAP database for each of the above mentioned manholes to ensure that any degraded conditions identified were appropriately resolved.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program

.1 Resident Inspector Quarterly Review

a. Inspection Scope

The inspectors observed and evaluated a licensed operator simulator exercise given on March 12, 2015. The scenario involved a degraded reactor coolant pump seal, a pressurizer level channel failure, loss of the low level intake structure 2G bus transformer, a rapid loss of main condenser vacuum resulting in an automatic reactor trip and the eventually loss of all three auxiliary feedwater pumps and a declaration of a site area emergency. 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 January 16, 2-OPT-RX-005, Control Rod Assembly Partial Movement.
- On February 20, lowering vacuum in Unit 2 main condensor due to ice blockage at high level intake structure.
- On March 3, Unit 1 intake canal low level indication while "A" high level intake bay was out of service for maintenance.

b. Findings

No findings were identified.

.3 Biennial Review of Licensed Operator Requalification Program

a. Inspection Scope

The inspectors reviewed the facility operating history and associated documents in preparation for this inspection. During the week of January 19, 2015, the inspectors reviewed documentation and observed the administration of operating tests associated with the licensee's operator requalification program. Each of the activities performed by the inspectors was done to assess the effectiveness of the facility licensee in implementing requalification requirements identified in 10 CFR Part 55, "Operators' Licenses." Evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," and Inspection Procedure 71111.11, "Licensed Operator Requalification Program." The inspectors also evaluated the licensee's simulation facility for adequacy for use in operator licensing examinations using ANSI/ANS-3-5-2009, "American National Standard for Nuclear Power Plant Simulators for use in Operator Training and Examination." The inspectors observed two crews during the performance of the operating tests. Documentation reviewed included written examinations, Job Performance Measures (JPMs), simulator scenarios, licensee procedures, on-shift records, simulator modification request records, simulator performance test records, operator feedback records, licensed operator qualification records, remediation plans, watchstanding records, and medical records. The records were inspected using the criteria listed in Inspection Procedure 71111.11. Documents reviewed during the inspection are documented in the Attachment.

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 6.

- CR 566136, CH/SW piping leaks
- CR 570282, Unit 2 "B" Main Feed Pump seal replacement

b. Findings

Introduction: An NRC-identified Green NCV of 10 CFR 50, Appendix B, Criterion XVI, "Correction Action," was identified because the licensee failed to promptly identify a condition adverse to quality associated with the material condition of the Unit 2 CH/SW piping. Specifically, the NRC resident inspectors identified a leak in the discharge piping of the Unit 2 "A" CH/SW pump on November 24, 2014. The licensee had previously identified a leak on the Unit 1 "B" CH/SW pump discharge piping on June 16, 2014.

Description: On June 16, 2014 the licensee identified a leaking joint on the discharge of 1-SW-P-10B, the "B" CH/SW pump, located in mechanical equipment room (MER) 3. The leak was identified as a through-wall leak and the "B" CH/SW pump was declared inoperable. The licensee entered a 72 hour limiting condition for operation (LCO) for one train of high head safety injection not available. The licensee replaced the section of piping on June 17, and the "B" CH/SW pump was declared operable. This issue was documented in the licensee's CAP as CR 551846.

The section of CH/SW piping that developed the leak was made of "Green Thread" material. "Green Thread" is a trade-marked name for piping that is filament wound using amine-cured epoxy resins and fiberglass. The leak developed in the section of piping that is connected by glue to the flanged end of the piping. The licensee's CH/SW piping mainly consists of fiberglass reinforced thermosetting resin pipe (RTRP) that meets the requirements of American Society of Mechanical Engineers (ASME) code case N-155-2 and "Green Thread" piping.

The licensee has had previous cracks or leaks of the “Green Thread” sections of CH/SW piping. The two most recent were in 2004 on the discharge of the Unit 2 “A” CH/SW pump and in December, 2012 on the discharge of the Unit 2 “A” CH/SW pump. The root cause evaluation (RCE) conducted on the 2004 issue attributed the cause to an improperly made joint which caused a tension overload on the “Green Thread” pipe. The apparent cause evaluation (ACE) conducted on the 2012 issue attributed the cause to incomplete application of glue to the fiberglass joint.

The licensee conducted an ACE that included failure analysis of the leaking section of pipe. The ACE determined the apparent cause to be a bending or stretching event that overloaded the pipe. The overload event could not exactly be determined and was attributed to a combination of torque application to the flanged connection, operational transient in the CH/SW system, and inadvertent contact of the piping which is located at foot level. The corrective action for the apparent cause was for the licensee engineering department to present to the plant health working group a case for replacing the piping downstream of the CH/SW pumps with copper-nickel piping. No compensatory actions were put into place for the permanent corrective action of evaluating replacing the piping with copper-nickel, despite the history of leaks on the “Green Thread” piping.

Based on the number of issues with leaks on CH/SW piping and the range of apparent cause failure methods of the June, 2014 leak, the resident inspectors began to conduct more frequent walkdowns of this piping. On November 24, 2014, the inspectors found water dripping from underneath the insulation of the discharge piping from the Unit 2 “A” CH/SW pump. The licensee removed the insulation and found a pipe leak of approximately 45 drops per minute from a section of “Green Thread” piping. The pump was declared inoperable and the licensee entered a 72hour LCO for one train of high head safety injection not available. The licensee replaced the section of piping that same day and the Unit 2 “A” CH/SW pump was declared operable. This issue was documented in the licensee’s CAP as CR 563166.

The licensee conducted an ACE on the Unit 2 “A” CH/SW discharge pipe leak and concluded that the apparent cause of the leak was stresses placed on the piping from the original torqueing of the bolting, minor pipe misalignment, minor vibrations from the CH/SW pump, and possible personnel contact. After the leak was found by the resident inspectors, the licensee instituted a monthly engineering walkdown of all CH/SW piping in MER-3 and 4 as a compensatory action.

Analysis: The inspectors determined that failure to identify a condition adverse to quality associated with the material condition of the Unit 2 “A” CH/SW piping was a PD that was within the licensee’s ability to foresee and correct. The inspectors determined that the PD was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, not having compensatory actions in place for CH/SW “Green Thread” piping that has been prone to through-wall leaks, left the licensee susceptible to undetected leaks from the CH/SW piping systems. Using Manual Chapter 0609.04, “Initial Characterization of Findings,” Table 2, dated June 19, 2012; the finding was determined to adversely affect the

Mitigating Systems Cornerstone. The inspectors screened the finding using Manual Chapter 0609, Appendix A, "Significance Determination Process (SDP) for Findings at-Power," dated June 19, 2012, and determined that it screened as Green because the PD did not affect the design or qualification of the CH/SW system and the leak rate did not represent an actual loss of system safety function. This finding has a cross-cutting aspect in the evaluation component of the problem identification and resolution, P.2, because the organization did not thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, the license did not institute compensatory actions for a long-term corrective action on CH/SW piping that has had a recent history of developing through-wall leaks.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified." Contrary to the above, on November 24, 2014, the licensee did not promptly identify a leak in the discharge piping of the Unit 2 "A" CH/SW pump. Specifically, the licensee had no compensatory actions in place to detect leaks on CH/SW piping that had been known to develop leaks in the past, the reason for the leaks could not always be determined, and the permanent corrective action was to evaluate replacing the piping with copper-nickel piping. Because the licensee entered the issue into their CAP as CR 563166 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 05000281/2015001-01, Failure to Identify Charging Service Water Pipe Leak.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors evaluated, as appropriate, the four 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 January 5, Unit 1 and Unit 2 risk while the Unit 1 "A" motor driven auxiliary feedwater (MDAFW) pump was out of service for unplanned corrective maintenance.
- On January 26, Unit 1 and Unit 2 risk while the Unit 2 "B" main feedwater (MFW) pump was out of service for unplanned corrective maintenance.
- On February 2, Unit 1 and Unit 2 risk while #3 EDG monthly test run occurred during a severe thunderstorm warning.
- On February 18, Unit 1 and Unit 2 risk during extreme cold weather and "C" ESW pump out of service for planned maintenance.

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 12. The inspectors reviewed the licensee's corrective action program to verify deficiencies in operability determinations were being identified and corrected.

- CR572976, Oil pressure gage not indicating on the "A" ESW pump
- CR567836, Seismic housekeeping issues in auxiliary building and Unit 1 safeguards
- CR571004, Radio Control (RC) filter for 1-MS-PC-1484-INTCPM, "Loop 2 Steam Break Protection Channel 2," found damaged
- CR573706, Canal level probe response time near administrative limit
- CR568663, Unit 1 "A" MDAFW Pump outboard motor bearing damaged

b. Findings:

No findings were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed five 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-OPT-FW-001, "A" MDAFW Pump Periodic Test, Revision 33, following motor outboard bearing replacement
- 0-ICM-RD-RPI-001, CERPI System Diagnostic Checks and Maintenance, Revision 14, following replacement of detector interface board for position indication of control rod L11
- 1-PT-18.8, CH/SW Pump Performance Test, Revision 36, following failure of initial CH/SW pump performance test
- 0-OPT-SW-001, Emergency Service Water Pump Performance Test, Revision 59, following oil pressure gage replacement
- 2-OPT-RS-007, Containment Outside Recirculation Spray Pumps Motor Operated Valve (MOV) Stroke Test, Revision 11, following MOV indicator replacement

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the five 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-FW-003, Turbine Driven Auxiliary Feedwater Pump Quarterly IST, Revision 47

Surveillance Testing:

- 1-OPT-SI-005, Low Head Safety Injection Pump Test, Revision 32
- 1-OPT-EG-001, #1 EDG Monthly Start Exercise Test, Revision 63
- 1-OPT-CH-002, Charging Pump Operability and Performance Test for 1-CH-P-1B, Revision 56
- 2-OPT-CS-002, Containment Spray System Test, Revision 17

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

a. Inspection Scope

The inspectors performed a periodic review of the six following Unit 1 and 2 PIs 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." Specifically, the inspectors reviewed the Unit 1 and Unit 2 data reported to the NRC for the period January 1, 2014 through December 31, 2014. Documents reviewed included applicable NRC inspection reports, licensee event reports, operator logs, station performance indicators, and related CRs.

- Unit 1 and 2 Unplanned Scrams
- Unit 1 and 2 Unplanned Scrams With Complications
- Unit 1 and 2 Unplanned Power Changes per 7000 Critical Hours

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 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment and corrective maintenance issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.1. The review included issues documented outside the normal correction action program in system health reports, corrective maintenance work orders, component

status reports, site monthly meeting reports, and maintenance rule assessments. The inspectors' review nominally considered the six month period of July through December, 2014, although some examples expanded beyond those dates when the scope of the trend warranted.

The inspectors compared and contrasted their results with the results contained in the licensee's latest integrated quarterly assessment report. Corrective actions associated with a sample of the issues identified in the licensee's trend report were reviewed for adequacy.

b. Assessment and Observations

No findings of significance were identified. In general, the licensee has identified trends and has addressed the trends with their CAP. No new adverse trends were identified this period that had not already been identified by the licensee.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On April 15, 2015, the inspection results were presented to Mr. L. Lane 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: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

L. Baker, Training Manager
D. Cobb, Manager, Nuclear Oversight
J. Eggart, Manager, Radiation Protection & Chemistry
J. Fisher, Supervisor, Nuclear Training
B. Garber, Supervisor, Station Licensing
M. Haduck, Manager, Outage and Planning
G. Hayes, Manager, Protection Services
R. Johnson, Manager, Operations
L. Lane, Site Vice President
D. Lawrence, Director, Station Safety and Licensing
R. Philpot, Supervisor, Nuclear Training
J. Rosenberger, Director, Station Engineering
R. Scanlan, Manager, Maintenance
R. Simmons, Plant Manager
M. Smith, Manager, Organizational Effectiveness
N. Turner, Supervisor, Emergency Preparedness
D. Wilson, Assistant Operations Manager

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000281/2015001-01	NCV	Failure to Identify Charging Service Water Pipe Leak (Section 1R12)
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LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

0-OP-ZZ-021, Severe Weather Preparation, Rev. 8

0-OSP-ZZ-001, Cold Weather Preparation, Rev. 16

Condition Reports

568630	568833	568837	568849	568963	569051
569107	569181				

Section 1R04: Equipment Alignment

Procedures

0-OP-EG-001A, EDG 3 System Alignment, Rev. 14

0-OP-SW-002A, Emergency Service Water System Alignment, Rev. 9

1-OP-EG-001A, EDG 1 System Alignment, Rev. 12

1-OP-51.1A, Component Cooling System Alignment, Rev. 23

2-OP-51.1A, Component Cooling System Alignment, Rev. 13

OP-49.1B, Service Water System – CR Chillers and Supply Strainers Valve Alignment, Rev. 28

Condition Reports (*NRC Identified)

*569697	*570113	*572876	*572878
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Drawings

11448-FM-071A SH 1, Flow/Valve Operating Numbers Diagram Circulating and Service Water System Unit 1, Rev. 80

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

11448-FM-071E SH 1, Flow/Valve Operating Numbers Diagram Service Water Fuel Oil System, Rev. 12

11448-FM-072B SH 1, Flow/Valve Operating Numbers Diagram Component Cooling Water System Unit 1, Rev. 30

11448-FM-072C SH 4, Flow/Valve Operating Numbers Diagram Component Cooling Water System Unit 1, Rev. 29

11448-FM-072D SH 2, Flow/Valve Operating Numbers Diagram Component Cooling Water System Unit 1, Rev. 36

11448-FM-072G SH 1, Flow/Valve Operating Numbers Diagram Component Cooling Water System Unit 1, Rev. 18

Section 1R05: Fire Protection

Procedures

0-FS-FP-116, Control Room Elevation 27 Feet – 6 Inches, Rev. 6

0-FS-FP-122, Diesel Generator Room Number 2 – Elevation 27 Feet – 6 Inches, Rev. 1

1-FS-FP-108, Unit 1 Relay Room Elevation 9 Feet – 6 Inches, Rev. 3

1-FS-FP-109, Battery Room 1A Elevation 9 Feet – 6 Inches, Rev. 2

1-FS-FP-110, Battery Room 1B Elevation 9 Feet – 6 Inches, Rev. 1

2-FS-FP-108, Unit 2 Relay Room Elevation 9 Feet – 6 Inches, Rev. 3

Drawings

11448-FAR-206 SH 7, Equipment Location – Appendix ‘R’ Service Building Plan – EL. 9’ – 6”, Rev. 17

11448-FAR-206 SH 8, Equipment Location – Appendix ‘R’ Service Building Plan – EL. 9’ – 6”, Rev. 21

Section 1R06: Flood ProtectionProcedures

0-MCM-1207-01, Pumping of Security and Electrical Cable Vaults, Rev. 11

0-MCM-1207-03, Inspection of Electrical Cable Vaults With Safety Related Cables, Rev. 1

Condition Reports

575180

Work Orders

38103392765

Section 1R11: Licensed Operator Regualification ProgramProcedures

0-AP-12.01, Loss of Intake Canal Level, Rev. 31

0-AP-53.00, Loss of Vital Instrumentation/Control, Rev. 21

1-AP-9.00, Reactor Coolant Pump Abnormal Conditions, Rev. 35

1-AP-14.00, Loss of Main Condenser Vacuum, Rev. 16

1-E-0, Reactor Trip or Safety Injection, Rev. 70

1-FR-H.1, Response to Loss of Secondat Heat Sink, Rev.37

2-OPT-RX-005, Control Rod Assembly Partial Movement, Rev. 33

ADM-OP-AA-103, Operator Qualifications, Rev. 6

ADM-SA-AA-122, Medical Evaluation, Rev. 4

ADM-TR-AA-100, Analysis, Rev. 12

ADM-TR-AA-101, Conduct of Training, Rev. 3

ADM-TR-AA-300, Development, Rev. 11

ADM-TR-AA-310, Just in Time Training, Rev. 2

ADM-TR-AA-400, Implementation, Rev. 11

ADM-TR-AA-410, OJT and TPE, Rev. 12

ADM-TR-AA-500, Training Evaluation, Rev. 18

ADM-TR-AA-710, NRC Exam Security Requirements, Rev. 3

ADM-TR-AA-730, LO Biennial and Annual Requal Exam, Rev. 4

EPIP-1.01, Emergency Manager Controlling Procedure, Rev. 57

TR-AA-0300-TPG Change 3, Training Program Guide, Rev. 1

TR-AA-SIM-100, Simulator Modification Process, Rev. 6

TR-AA-SIM-101, Simulator Configuration Control Committee, Rev. 1

TR-AA-SIM-200, Simulator Hardware Management, Rev. 3

TR-AA-SIM-300, Simulator Software Management, Rev. 2

TR-AA-SIM-400, Simulator Performance Testing, Rev. 4

Condition Reports (*NRC Identified)

CR 524203, “Possible Exam Security Issue with Sim Computers”

CR 528999 “LORP Exam Security”

CR 531113 “NRC Compromises Simulator Exam Material”

CR 534494 and associated CCA304 "NLOCT Exam Contains Answer Key"

CR 543530 and associated RCE1120, "1D SW Supply Header Flow Restriction"

*CR570110, Simulator setup for Biennial evaluation was insufficient

*CR570134, NRC inspection identified an administrative error on a licensed operator physical

Simulator Work Orders

201307080900 "Modify Yokogawa Recorder for 1-CC-LR-100 and 1-CC-TR-100"

201310010630 "Perform Simulator ANSI 3.5 Testing for Cycle 26"

201401020500 "Provide Coast Down Core Life with Minimal Boron Concentration"

201312170500 "B Train CERPI Failure"

201312170530 "Fire Protection IMS Computer Failing – Continuous Reboot"

201401211300 "The Logic Model for the PRZR HTR Green Lights on the AUX Shutdown Panel Needs to be Corrected"

201404010820 "Change Power Supply to 1-FW-LR-1477 (SG WR Level) and 1-RC-TR-1433 (Hot and Cold Leg Temperature Loop 3) to Vital Bus 1-III"

201403191000 "Adjust Normal Containment Sump Level from 23% to 35% to Reflect Current Reference Plant Conditions per Management Feedback"

201405010515 "Unit 2 'B' SI Accumulator Discharge MOV Modification"

201408110745 "Change CERPI Rod Resistance Number of Steps from 80 to 40"

201501120800 (OPEN) "Evaluate SG PORV Controller Operation based on Engineering Calculation Following Unit 2 Reactor Trip 10/14/2014"

201408050500 (OPEN) "Fuel Building Sump Pump Level Switch Setpoint Changes"

201210260740 (OPEN) "Enhance Simulator Scope of Simulation to Provide Better Representation of Incore Detector Recorder Traces during Flux Map Evolution"

Records

License Reactivation Packages (1 RO, 1 SRO Records Reviewed)

LORP Training Attendance records (5 Records Reviewed)

Medical Files (12 Files Reviewed)

Remedial Training Records (2 Records Reviewed)

Remedial Training Examinations (3 Records Reviewed)

Feedback Summaries (3 Records Reviewed)

Written Examinations

RQ-14.2-XB-1, Rev. 0

RQ-14.2-XB-2, Rev. 0

Simulator Testing, as required by ANSI/ANS 3.5-2009

Steady State (0-SPS-ANSI-09) for Cycle 26: "100% - Plant data 11/24/13 03:06"

Steady State (0-SPS-ANSI-09) for Cycle 26: "73% - Plant data 11/23/13 01:06"

Steady State (0-SPS-ANSI-09) for Cycle 26: "28% - Plant data 11/21/13 19:26"

Real Time and Repeatability (0-SPS-ANSI-20) for Cycle 26: Steady State (100%)

Limits of Simulation (0-SPS-ANSI-22) for Cycle 26

Normal Evolution Testing (0-SPS-ANSI-01) for Cycle 26: "Cold Shutdown to Intermediate Shutdown"

Transient Performance Testing (0-SPS-ANSI-13) for Cycle 26: "Simultaneous Trip of all Reactor Coolant Pumps"

Transient Performance Testing (0-SPS-ANSI-18) for Cycle 26: "Maximum Size Unisolable Main Steam Line Rupture"

Transient Performance Testing (0-SPS-ANSI-19) for Cycle 26: "Slow Primary System Depressurization to Saturated Condition with Pressurizer Relief or Safety Valve Stuck Open (Inhibit Activation of High Pressure Emergency Core Cooling System)"

Post-Event Simulator Testing per SWO 201305060910: "Performed Simulator Model Comparison to Unit 1 Ramp to 94.5% for Turbine Valve Freedom Test."

Simulator Scenario Based Tests: RQ-15.1-SE-3, Rev 0, "Surry Simulator Scenario Based Testing Checklist"

Simulator Scenario Based Test: RQ-15.1-SE-4, Rev 0, "Surry Simulator Scenario Based Testing Checklist"

Simulator Scenario Based Test: NRC 2014 ILT Scenario, Surry OP Test No. 2014-001

Scenario Packages

RQ-15.1-SE-1, Rev. 0

RQ-15.1-SE-2, Rev. 0

RQ-15.1-SE-3, Rev. 0

RQ-15.1-SE-4, Rev. 0

RQ-15.2-ST-3, Rev.0

JPM Packages:

LO13-04B, Rev. 13

LO26-01, Rev. 19

LO38-10, Rev. 5

LO52-10, Rev. 21

LO62-02, Rev. 11

LO88-63, Rev. 0

LO26-05B, Rev. 15

LO35-12, Rev. 0

LO52-03B, Rev. 8

LO65-02, Rev. 13

LO88-40, Rev. 5

LO99-06B, Rev. 0

Program Evaluation:

SPS Operations Training Programs 2014

Other Documents

List of Operations Department Clock Human Performance Reset Corrective Actions

Section 1R12: Maintenance Effectiveness

Procedures

PI-AA-300-3002, Apparent Cause Evaluation, Rev. 6

Condition Reports

566136	569624	570282	571021	571579
572638	573219			

Work Orders

38102867518	38102707756	38103581892	381003519492
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Other Documents

6748-00-WS-471, Pipe Stress Analysis of Charging Pump Service Water Piping, Problem WS-471 Incorporating Problem WS-10, Rev. 1
 ACE 000840, 1-FW-P-1B Inboard Pump Seal Leak, 01/24/08
 ACE 19367, 1-SW-269 Piping Joint Leak, 04/02/2013
 ACE 19759, Discharge Pipe Leak on 1-SW-P-10B, 10/09/14
 ACE 19841, Leakage at 2-SW-P-10A Discharge, 03/13/15
 CE-1205, Pipe Support Calculations: Charging Pump Service Water Pipe Replacement – Auxiliary Building, Rev. 0
 DC 80-S42, Service Water RTRP #3 Mechanical Equipment Room, Rev. 6
 DC 81-S41, Charging Pump Service Water Supply Pump Relocation Modification, 07/19/83
 DC 95-006, Charging Pump Service Water Pipe Replacement/Surry/Units 1 and 2, 06/29/95
 Green Thread Piping System General Specifications, 02/01/09
 ETE-SU-2010-0017, ETE to Support IEER for Replacing Existing Main Feedwater Pump Mechanical Seals with a Burgmann Seal, Rev. 0
 ME-0621, Service Water Charging Pump Subsystem Pipe 200 Evaluation, Rev. 0
 N-155-2, ASME Bolier and Pressure Vessel Code Case, Fiberglass Reinforced Thermosetting Resin Pipe Section III, Division 1, 01/21/82
 NUS-9107, Specification for Fiberglass Plastic Piping (RTRP), Rev. 1
 PHSC Minutes, 02/03/15
 REA-SU-2015-0003, CH SW Fiberglass Piping Replacement PHSC Presentation, 02/03/15
 RCE S-2004-0528, Cracked Green Thread Reducer at Discharge of 2-SW-P-10A, 03/11/04
 STD-MEN-0004, Piping Specification for Class 136 Fiber Glass Reinforced Plastic, Rev. 13
 Stone & Webster Letter, DC 80-S42 Reinforced Fiberglass Plastic Piping Control and Relay Room Condenser Service Water Surry Power Station – Units 1&2, 01/28/81
 Stone & Webster Letter, STD-MEN-0004 Pipe Class Standard Surry Power Station – Units 1 and 2, 09/07/88

Section 1R13: Maintenance Risk Assessments and Emergent Work ControlOther Documents

EOOS Schedulers Risk Evaluation for Surry Power Station, January 5, 2015
 EOOS Schedulers Risk Evaluation for Surry Power Station, January 26, 2015
 EOOS Schedulers Risk Evaluation for Surry Power Station, February 2, 2015
 EOOS Schedulers Risk Evaluation for Surry Power Station, February 18, 2015

Section 1R15: Operability Determinations and Functionality AssessmentsProcedures

0-ICM-CW-L-001, Canal Level Probe Pre-Installation Testing and Replacement, Rev. 4
 0-ICM-ZZ-001, Placing Technical Specifications Channel in Trip, Rev. 1
 0-OP-SW-002 OTO1, Emergency Service Water Pump Operation, Rev. 45, 03/02/15
 1-OPT-FW-001, Motor Driven Auxiliary Feedwater Pump 1-FW-P-3A PT, Rev. 34
 2-IPT-CC-CW-L-203, Intake Canal Level Probe 2-CW-LS-203 Time Response Test and Channel Calibration, Rev. 12
 2-IPT-FT-CW-L-202-203, Low Intake Canal Level Trip Switches Quarterly Functional Test, Rev. 9
 CM-AA-SHK-101, Seismic Housekeeping, Rev. 0

Condition Reports (*NRC Identified)

387369	507172	*567730	567830	567832	*567836
568830	568832	568663	568723	570937	570954
571004	571021	571030	571033	571046	572905
572935	572960	572976	573706	573816	573995

Drawings

5965D31, Interconnecting Wiring Diagram Process Control System SPS - Unit 1, Rev. 15
 11448-FE-4AG, Wiring Diagram Nuclear Instrumentation Process Racks 13 & 14 SPS – Unit 1, Rev. 17

Work Orders

38102420082	38102498674	38103294407	38103413513
38103487182	38103575188	3810375203	38103575306

Other Documents

McQuin Electrical Power Consulting, Inc Report on the Examination of the Failed MDAFW Pump at Surry Nuclear Power Plant, Rev. 1
 Pioneer Motor Bearing Co. Engineering Report Operability Review of Damaged #1-FW-P-3A Outboard Motor Bearing, 03/13/15
 ACE019880, 1-MS-PC-1484 RC Filter Found Damaged, 02/04/15
 AD-AA-100 Att 2, Technical Procedure Approval, 03/02/15
 CA175253, CA to Maintenance to Replace the RC Network Surge Suppressors in Unit 1, 11/13/10
 CM-AA-400 Att 3, 50.59/72.48 Screen, 03/02/15
 EE-0724, Canal Level Probe Channel Statistical Accuracy Calculation, Rev. 1, 09/17/14
 ME-0318, Canal Level Probe Response Time, Rev. 1
 SM-1602, Cooldown Analysis for Surry Safety Analyses, Rev. 0
 SU-08-0004, HLIS Canal Level Probe Mounting Modification, 01/29/09

Section 1R19: Post Maintenance TestingProcedures

0-ICM-RD-RPI-001, CERPI System Diagnostic Checks and Maintenance, Rev. 14
 0-OPT-SW-001, Emergency Service Water Pump 1-SW-P-1A, Rev. 59
 1-OPT-FW-001, Motor Driven Auxiliary Feedwater Pump 1-FW-P-3A PT, Rev. 34
 1-PT-18.8, Charging Pump Service Water Performance, Rev. 36

Condition Reports

568663	568723	568832	571624	571712	572443
572715	572905	572935	572960	572976	

Work Orders

38103488091
 38103538166

Section 1R22: Surveillance TestingProcedures

1-OPT-CH-002, Charging Pump Operability and Performance Test for 1-CH-P-1B, Rev. 56
 1-OPT-EG-001, Number 1 Emergency Diesel Generator Monthly Start Exercise Test, Rev. 63

1-OPT-FW-003, Turbine Driven Auxiliary Feedwater Pump 1-FW-P-2, Rev. 47
 1-OPT-FW-007, Turbine Driven AFW Pump Steam Supply Line Check Valve Test, Rev. 7
 1-OPT-SI-005, LHSI Pump Test, Rev. 32
 2-OPT-CS-002, Containment Spray System Test, Rev. 17
 2-OPT-RS-007, Containment Outside Recirculation Spray Pumps MOV Stroke Test, Rev. 11

Condition Reports

574009

Work Orders

38103509125	38103529178	38103538964	38103538971
38103539039	38103543581	38103544169	

Other Documents

ET-S-09-0013, Fabrication and Installation of Indication Plates on 1/2-RS-MOV-x55A/B, Rev. 0

Section 40A1: Performance Indicator Verification

Other Documents

4Q/2014 Performance Indicators – Surry 1 and 2 - Unplanned Scrams per 7000 Critical Hours, dated 03/01/15
 4Q/2014 Performance Indicators - Surry 1 and 2 - Unplanned Power Changes per 7000 Critical Hours, dated 03/01/15
 4Q/2014 Performance Indicators – Surry 1 and 2 - Unplanned Scrams with Complications, dated 03/01/15
 Unit 1 Control Room Narrative Log, 01/01/2014 – 12/31/2014
 Unit 2 Control Room Narrative Log, 01/01/2014 – 12/31/2014

Section 40A2: Identification and Resolution of Problems

Procedures

PI-AA-100-1003, Self Evaluation, Rev. 13
 PI-AA-100-1004, Self-Assessments, Rev. 11
 PI-AA-200, Corrective Action, Rev. 23
 PI-AA-200-2001, Trending, Rev. 5

Condition Reports

563093	563094	570073	570074	570075	570076
570078	570079	570082	570085		

Other Documents

Nuclear Oversight Department Quarterly Report for Third Quarter 2014, 11/21/14
 Nuclear Oversight Department Quarterly Report for Fourth Quarter 2014, 02/05/15
 Surry Power Station Intergrated Trend Report Third Quarter 2014
 Surry Power Station Intergrated Trend Report Fourth Quarter 2014

LIST OF ACRONYMS

ACE	Apparent Cause Evaluation
ADAMS	Agencywide Document Access and Management System
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CC	Component Cooling
CFR	Code of Federal Regulations
CH/SW	Charging Service Water
CR	Condition Report
EDG	Emergency Diesel Generator
ESW	Emergency Service Water
IMC	Inspection Manual Chapter
IST	In-Service Test
JPM	Job Performance Measure
LCO	Limiting Condition for Operation
LORP	Licensed Operator Requalification Program
MFW	Main Feedwater
MCR	Main Control Room
MDAFW	Motor Driven Auxiliary Feedwater
MER	Mechanical Equipment Room
MOV	Motor Operated Valve
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PD	Performance Deficiency
PI	Performance Indicator
RC	Radio Control
RCE	Root Cause Evaluation
RTP	Rated Thermal Power
RTRP	Reinforced Thermosetting Resin Pipe
SDP	Significance Determination Process
SG	Steam Generator
SW	Service Water
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
VEPCO	Virginia Electric and Power Company
WO	Work Order