



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
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ATLANTA, GEORGIA 30303-1257

May 10, 2012

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
05000280/2012002, 05000281/2012002

Dear Mr. Heacock:

On March 31, 2012, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Surry Power Station Units 1 and 2. The enclosed inspection report documents the inspection findings which were discussed on May 7, 2012, with Mr. L. Lane and other members of your staff.

The inspection examined activities conducted under your licenses as they related to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

The enclosed inspection report discusses one self-revealing finding of low safety significance that involves a violation of NRC requirements. Additionally, one licensee-identified violation which was determined to be of very low safety significance is listed in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest 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 20555-001; 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.

In addition, if you disagree with the characterization of any finding 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 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Gerald J. McCoy, Chief
Reactor Projects Branch 5
Division of Reactor Projects

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

Enclosure: Inspection Report 05000280/2012002, 05000281/2012002
w/Attachment: Supplemental Information

cc w/encl. (See next page)

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Letter to David A. Heacock from Gerald J. McCoy dated May 10, 2012

SUBJECT: SURRY POWER STATION – NRC INTEGRATED INSPECTION REPORT
05000280/2012002, 05000281/2012002

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-280, 50-281

License Nos. DPR-32, DPR-37

Report Nos: 05000280/2012002, 05000281/2012002

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, 2012 through March 31, 2012

Inspectors: S. Sanchez, Senior Resident Inspector
J. Nadel, Resident Inspector
S. Ninh, Senior Project Engineer
A. Sengupta, Reactor Inspector (Section 4OA5.2)

Approved by: Gerald J. McCoy, Chief
Reactor Projects Branch 5
Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000280/2012002, 05000281/2012002,; 1/01/2012–3/31/2012; Surry Power Station, Units 1 and 2; Identification and Resolution of Problems.

The report covered a three month period of inspection by resident inspectors and region based inspectors. One self-revealing non-cited violation (NCV) was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspect was determined using IMC 0310, "Components Within The Cross-Cutting Areas." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process" Revision 4, dated December 2006.

A. NRC Identified and Self-Revealing Findings

Cornerstone: Emergency Preparedness

- Green. The inspectors identified a self-revealing non-cited violation (NCV) of 10 CFR 50.54(q) for the failure to maintain in effect, an emergency plan which meets the requirements of 10 CFR 50.47(b)(4). Specifically, a standard emergency classification and action level scheme which includes facility system parameters. The licensee's plan contained Alert and Notification of Unusual Event (NOUE) emergency action levels (EALs) which relied on indications from the station's Strong Motion Accelerograph (seismic monitoring equipment) while that instrument was incapable of functioning. The licensee entered the problem into their corrective action program as condition report, CR-469813.

The inspectors determined that the failure to properly maintain the seismic instrumentation was a performance deficiency and resulted in an emergency plan requirement which could not be met. The performance deficiency was determined to be more than minor because it is associated with the Emergency Preparedness Cornerstone attribute of Emergency Response Organization Performance. The finding impacted the cornerstone objective because it is associated with a program element not meeting 50.47(b) planning standards to protect the health and safety of the public in the event of a radiological emergency. Specifically, the licensee's ability to declare an Alert and NOUE based on Natural Phenomenon was degraded. The finding was assessed for significance in accordance with NRC Inspection Manual Chapter (IMC) 0609, using the Phase I SDP worksheets for emergency preparedness and was determined to be very low safety significance because there was a degraded risk-significant planning standard function. IMC 0609, Appendix B states, "FAILURE TO COMPLY means that a program is noncompliant with a REGULATORY REQUIREMENT." The inspectors determined the licensee was noncompliant with 10 CFR 50.54(q), 50.47(b)(4), and App. E, Section IV.B in that the Natural Phenomenon Emergency Action Level contained Alert and NOUE classification decision inputs requiring Strong Motion Accelerograph activation, which could not function due to inadequate maintenance. This would require use of other means to determine whether the classification thresholds had been

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exceeded. Using IMC 0609 App. B, Figure 5.4-1, Significance Determination for Ineffective EALs and Overclassification, the inspectors determined that an Alert (HA1.1) would not be declared, resulting in Green significance. The cause of this finding involved the cross cutting area of human performance, the component of resources, and the aspect of complete, accurate, and up-to-date procedures [H.2(c)] (Section 4OA2.3)

B. Licensee Identified Violations

One violation of very low safety significance, which was identified by the licensee, was reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and its respective corrective actions are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

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

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

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

.1 Seasonal Readiness Reviews for Cold Weather

a. Inspection Scope

The inspectors reviewed the licensee's preparation for extreme cold weather. The inspection focused on verification of design features and the licensee's implementation of their cold weather procedures to protect mitigating systems from adverse weather effects. The inspectors reviewed station procedures 0-OSP-ZZ-001, "Cold Weather Preparations" and OC-21, "Severe Weather Checklist." The inspectors also walked down areas vulnerable to cold weather. The inspectors, on a sampling basis, verified that action items from the cold weather procedures were complete; which included verifying the proper position of roll-up doors, ventilation louvers, thermostat settings, and that piping insulation and heat tracing was installed and operable in areas susceptible to a cold environment. The areas walked down included the auxiliary and safeguards buildings, the turbine building, and the auxiliary feedwater (AFW) pump areas. The inspectors verified weather related problems were being identified, entered into the corrective action program (CAP), and properly addressed.

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 (OOS). 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

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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.

- 1A and 1B Charging Pumps while the 1C Charging Pump was OOS for Planned Maintenance
- 1A and 1B Emergency Service Water (ESW) Pumps While the 1C was OOS for Pump Replacement
- Emergency Diesel Generator (EDG) #2 while EDG #1 was OOS for Planned Surveillance 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," CM-AA-FPA-101, "Control of Combustible and Flammable Materials," and CM-AA-FPA-102, "Fire Protection and Fire Safe Shutdown Review and Preparation Process and Design Change Process." 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 CAP to verify fire protection deficiencies were being identified and properly resolved.

- Mechanical Equipment Room (MER) #3
- Unit 2 Emergency Switchgear Room (ESGR)
- Unit 2 A Battery Room
- Unit 1 Reactor Protection System (RPS) Relay Room
- Common ESW Pump House

b. Findings

No findings were identified.

.2 Fire Protection – Drill Observation

a. Inspection Scope

The inspectors observed an unannounced fire drill on March 20, 2012, that took place in the Emergency 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 use and layout of fire hoses; (3) employment of appropriate fire fighting techniques; (4) sufficient fire fighting 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.

b. Findings

No findings were identified.

1R06 Flood Protection Measures

Annual Review of Electrical Manholes

a. Inspection Scope

The inspectors reviewed and observed licensee periodic inspection of safety-related manholes 1-EP-MH-1 and 1-EP-MH-2, which contain EDG #1 control cables, 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 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

Resident Inspector Quarterly Review

a. Inspection Scope

The inspectors observed and evaluated a licensed operator simulator exercise given on January 25, 2012. The scenario involved a nuclear instrumentation failure, a loss of the

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1G transformer and associated circulating water pumps, followed by a small break loss of coolant accident requiring a reactor trip and safety injection (SI), and then failure of the high head SI pumps. The 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. Additionally, the inspectors reviewed control room operator performance during periods of testing and heightened risk.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the three equipment issues described in the condition reports (CR) 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). The 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," and ER-AA-MRL-100, "Implementing the Maintenance Rule."

- CR 458191, AAC Building Air Dampers Not Functioning Properly
- CR 460016, EDG #2 Fuel Oil System #1 Right Fuel Oil Filter Fouled
- CR 462179, Red Unavailability Performance Indicator for EDGs

b. Findings

No findings were identified.

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 CAP to verify deficiencies in risk assessments were being identified and properly resolved.

- Green Risk with Unit 1's Charging Pump 1B, ESW Pump 1C, and Main Control Room (MCR) Chillers 4B and 4E OOS for Planned Maintenance
- Green Risk with Unit 2's Charging Pump 1B OOS and a Tornado Watch in Effect
- Green Risk with Unit 2's Circulating Water System Spray Shield 206B and Unit 1's Charging Pump 1C OOS for Planned Maintenance
- Green Risk with Unit 2's Charging Pump 1C, Waterbox 1D, Circulating Water Pump 1C, Instrument Air Compressor 4A, and Damper 200B OOS for Planned Maintenance

b. Findings

No findings were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the six 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 licensee procedure OP-AA-102, "Operability Determination." The inspectors reviewed the licensee's CAP to verify that deficiencies in operability determinations were being identified and corrected.

- CR 458507, #2 EDG Ready Fuel Oil Pump Leak
- CR 463275, Service Water Pump 1-SW-P-1C Vibration Readings Have Increased
- CR 460166, EDG #2 Missed Preventative Maintenance and Subsequent High Fuel Oil Filter Pressure

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- CR 457801, 1A Charging Pump With Wear Particles in Oil Sample
- CR 460245, 460420, 1B Charging Pump Oil Sightglass Shows Signs of Oil Foaming
- CR 458404, Charging Pump 1B Discharge Check Valve Failed Leak Test

b. Findings:

Introduction: An unresolved item (URI) was identified when several operability determinations associated with the 1B charging pump were questioned by the inspectors. Specifically, the 1B charging pump speed increaser was observed with excessive foaming to the point where sight glass oil level was not visible and could not be determined.

Description: During the nightshift on January 25, 2012, operators noted a more than usual level of foam present in the main gearbox oil sight glass on the running Unit 1 charging pump (1-CH-P-1B). This charging pump had been in service for approximately four and a half days following maintenance to the discharge check valve. A Condition Report (CR) was submitted and the licensee's immediate operability determination (IOD) concluded that the pump remained operable because all pump parameters (e.g., bearing temperature, lube oil pressure, and pump flow rate) were normal.

Later on dayshift of that same day, operators discovered that the foaming had gotten worse and now covered the entire sight glass with no oil level visible. Operators added one gallon of oil, but the oil level was still not visible and could not be determined. The pump was immediately shutdown based on a recommendation from engineering personnel who were present at the time. Another CR was written for this event and the IOD also declared the pump operable.

The inspectors reviewed the issue and associated documentation on January 30 and found that the pump had remained secured and was considered operable since January 25. No actions had been taken or assigned from the previous CRs, no answers to the open questions were documented, and the CR had been closed to a work order that was still in a planning stage. The inspectors questioned the documented IOD, its lack of a technical basis for operability, and requested answers to the open questions. The next day, after further challenges from the inspectors, the licensee decided to run the pump again to see if foaming would occur immediately; an indication that air was intruding into the system.

The pump was started with engineering personnel present and after approximately 30 seconds the foaming appeared and the sight glass was again full of foam. The pump was stopped again and Engineering confirmed that air intrusion was occurring. The licensee still maintained the pump was operable in this condition; however their IOD lacked a justifiable technical basis for that conclusion.

On February 1, 2012, the inspectors challenged the conclusions of the operability determinations again and the licensee agreed that they did not have a proper technically justifiable basis to call the pump operable. They declared the pump inoperable and entered the applicable 72 hour Technical Specification (TS) Limiting Condition for Operation (LCO). The licensee subsequently replaced the oil with new oil and also sealed all piping connections in the charging pump lube oil system. The pump was returned to service on February 4 and the air intrusion and foaming did not recur.

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The inspectors require additional information, including the licensee's pending past operability justification, to determine an appropriate performance deficiency. This issue is identified as URI 05000280/2012002-01, Operability Determinations Questioned When the 1B Charging Pump Lube Oil Exhibited Foaming.

1R18 Plant Modifications

Permanent Modifications

a. Inspection Scope

The inspectors reviewed the completed permanent plant modification design change package (DCP) SU-10-00011, RCP Stator Cooler Outlet Trough Oil Collection Assemblies, to verify that the modification did not affect system operability or availability as described by the TS and UFSAR. Additionally, the inspectors 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," VPAP-0301, "Design Change Process," 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. In addition, the inspectors conducted interviews with licensee personnel.

b. Findings:

A licensee-identified violation (LIV) was identified and discussed in Section 4OA7 of this inspection report.

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."

- WO 38103169011, #3 EDG Auxiliary Lube Oil Pump Replacement
- WO 38103171621, 1-VS-E-4E MCR Chiller Maintenance Package
- WO 38103186281, 2-CH-P-1B Lube Oil Air Intrusion Troubleshooting

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- WO 38103176365, EDG #2 Missed PM Filter Replacements
- WO 38103002330, Inspection and Repair of 1B Charging Pump Discharge Check Valve CH-267

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the six 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-CH-002, Charging Pump 1B Quarterly Surveillance Test
- 0-OPT-SW-002, ESW Pump 1B Monthly Surveillance Test

Surveillance Testing:

- 2-IPT-FT-RP-SI-001A/B, Train A/B Safeguards Actuation Logic Functional Test
- 2-OPT-RX-005, Unit 2 Partial Rod Movement Surveillance Testing
- 2-OPT-EG-007, EDG #2 Starting Air System Refueling Interval Test
- 0-EPT-0104-01, Semi-Annual Station Battery Test

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

.1 First Quarter 2012

a. Inspection Scope

The inspectors observed an emergency response training drill conducted on March 27, 2012, to assess licensee performance in event classification per the emergency plan, protective action recommendations, and off-site notifications. The drill required

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emergency plan response actions be taken by personnel located in the technical support center (TSC). The inspectors observed conduct of the drill from the TSC, and the subsequent critique performance. This drill was included in the Emergency Response Performance Indicator Statistics.

b. Findings

No findings were identified.

.2 Fourth Quarter 2011

a. Inspection Scope

The following writeup is for an emergency response training drill that was observed on November 8, 2011, but was inadvertently omitted from Inspection Report 2011-005.

The inspectors observed an emergency response training drill to assess licensee performance in event classification per the emergency plan, protective action recommendations, and off-site notifications. The drill required emergency plan response actions be taken by personnel located in the simulator control room, the technical support center (TSC), and the local emergency operating facility (LEOF). The inspectors observed conduct of the drill from the simulator, the TSC, the LEOF, and the subsequent critique performance. This drill was included in the Emergency Response Performance Indicator Statistics.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors performed a periodic review of the following six 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." 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, 2011, through December 31, 2011. Documents reviewed included applicable NRC inspection reports, licensee event reports, operator logs, station performance indicators, and related CRs.

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

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

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems

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

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.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's correction action program documents to identify trends that could indicate the existence of a more significant safety issue. Specifically, the inspectors reviewed an identified degrading trend in Rod Control System Detector Interface Board (DIB) failures, which were documented in CR 457599. The inspectors' review was focused on repetitive equipment and corrective maintenance issues, but also considered the results of daily inspector corrective action program 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 June through December 2011, 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 were identified. In general, the licensee has identified trends and has addressed the trends with their corrective action program. No new adverse trends were identified this period that had not already been identified by the licensee.

.3 Annual Sample: Review of CR 440986, "Seismic Monitor Failure to Actuate"

a. Inspection Scope

The inspectors reviewed the licensee's assessments and corrective actions for CR 440986, "Seismic Monitor Failure to Actuate," to ensure that the full extent of the issue was identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspectors also evaluated the CR against the requirements of the licensee's CAP as specified in procedure, PI-AA-200, "Corrective Action Program," and 10 CFR 50, Appendix B.

b. Findings and Observations

Introduction: The inspectors identified a self-revealing non-cited violation (NCV) of 10 CFR 50.54(q) for the failure to maintain in effect, an emergency plan which meets the requirements of 10 CFR 50.47(b)(4). Specifically, a standard emergency classification and action level scheme which includes facility system parameters. The licensee's plan contained Alert and Notification of Unusual Event (NOUE) emergency action levels (EALs) which relied on indications from the station's Strong Motion Accelerograph (seismic monitoring equipment) while that instrument was incapable of functioning.

Description: Following an earthquake on August 23, 2011, which should have resulted in an indication of a seismic event from installed plant equipment, it was determined that the seismic monitoring equipment had not been properly maintained and therefore, was incapable of providing meaningful input to the EAL classification process. As a result, a seismic event declarations based on EAL HA1.1 could not be made and similarly, a declaration based on EAL HU1.1 would be delayed.

United States Geological Society data indicated that the Surry Plant area had experienced an earthquake of nominal 0.04 - 0.05 gravity (g) magnitude. The installed seismic monitoring equipment is to be calibrated to actuate at 0.01g magnitude. The Kinometrics Strong Motion Accelerograph SMA-3 System consists of three ground motion sensors (accelerometers), a recorder (data capture system and playback unit), and a trigger unit. The licensee, with vendor assistance, identified that the triggering unit sensor masses were not properly centered, thus rendering the triggering system incapable of performing its function.

The triggering unit's calibration is performed every refuel cycle. This maintenance is accomplished in the shop after the equipment is removed from its field location. Following maintenance, the equipment is moved back to its field location and reinstalled. The last calibration performed on the triggering unit was in the Fall of 2010. The licensee concluded the sensor masses became misaligned sometime between the shop calibration and unit reinstallation. The licensee determined that procedural inadequacy and a lack of understanding of the details for proper maintenance and calibration of the seismic monitor were the causes for the equipment's failure.

Analysis: The inspectors determined that the failure to properly maintain the seismic instrument was a performance deficiency and resulted in an emergency plan

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requirement which could not be met. The performance deficiency was determined to be more than minor because it is associated with the Emergency Preparedness Cornerstone attribute of Emergency Response Organization Performance. The finding impacted the cornerstone objective because it was associated with a program element not meeting 50.47(b) planning standards to protect the health and safety of the public in the event of a radiological emergency. Specifically, the licensee's ability to declare an Alert and NOUE based on Natural Phenomenon was degraded. The finding was assessed for significance in accordance with NRC Inspection Manual Chapter (IMC) 0609, using the Phase I SDP worksheets for emergency preparedness and was determined to be very low safety significance (Green) because there was a degraded risk-significant planning standard function. IMC 0609, Appendix B states, "FAILURE TO COMPLY means that a program is noncompliant with a REGULATORY REQUIREMENT." The inspectors determined the licensee was noncompliant with 10 CFR 50.54(q), 50.47(b)(4), and App. E, Section IV.B in that the Natural Phenomenon Emergency Action Level contained Alert and NOUE classification decision inputs requiring Strong Motion Accelerograph activation, which could not function due to inadequate maintenance. This would require use of other means to determine whether the classification thresholds had been exceeded. Using IMC 0609 App. B, Figure 5.4-1, Significance Determination for Ineffective EALs and Overclassification, the inspectors determined that an Alert (HA1.1) would not be declared, resulting in Green significance. The cause of this finding involved the cross cutting area of human performance, the component of resources, and the aspect of complete, accurate, and up-to-date procedures [H.2(c)].

Enforcement: 10 CFR Part 50.54(q), requires that a holder of a nuclear power reactor operating license shall follow and maintain in effect emergency plans which meet the standards in 10 CFR 50.47(b), and the requirements in Appendix E. 10 CFR 50.47(b)(4), requires a standard emergency classification and action level scheme, the bases of which include facility and system effluent parameters is in use by the nuclear facility licensee, and state and local response calls for reliance on information by facility licensees for determinations of minimum initial offsite response measures. Contrary to the above, since November 2010 the licensee failed to maintain in effect, a standard emergency classification scheme which included facility system parameters. Specifically, the Alert HA1.1 and NOUE HU1.1 specified Strong Motion Accelerograph indications which the instruments could not accurately measure due to improper maintenance, which the licensee was capable of implementing. This information was being relied upon to provide criteria for determining the need for notification of local and State agencies. Because this violation was of very low safety significance and was entered into the licensee's corrective action program as CR-469813, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000280, 281/2012002-02, Failure to Maintain a Standard Emergency Action Level Scheme for Earthquakes.

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4OA3 Event Follow-up.1 (Closed) Licensee Event Report (LER) 050000280, 281/2011-001-00, Reactor Trip on Both Units due to Loss of Offsite Power

On May 16, 2011, an automatic reactor trip occurred on both units due to the loss of offsite power resulting from damage inflicted in the switchyard from a tornado. A Notification of Unusual Event was declared due to loss of offsite power to both emergency buses on both units. Following the unit trips, Unit 1 and Unit 2 pressurizer spray temperature difference was in violation of TS 3.1.B.3 limit due to insufficient procedural guidance. Unit 1 pressurizer heatup rate also was in violation of TS 3.1.B.3 limit due to human error for failure to recognize the challenge of reinitiating letdown flow following the conclusion of the residual heat removal operability test. Delayed implementation of compensatory measures for the loss of power to one source of surveillance equipment was in violation of 10 CFR 73.71(a) due to conflicting prioritization of resources following the onsite tornado event.

Corrective actions included: debris from the switchyard in the intake canal was removed prior to startup; the procedure for RCS and pressurizer heatup/cooldown verification was revised to enhance monitoring of critical parameters necessary to prevent exceeding the pressurizer spray line differential temperature limit; operators involved with managing the thermal limits when Unit 1 pressurizer heatup rate exceeded the TS limit were removed from licensed duties for remediation; and interim actions were implemented to ensure timely implementation of compensatory measures.

The inspectors reviewed the LER, condition reports (CRs), and apparent cause evaluation documenting this event. With regard to the Unit 1 and Unit 2 pressurizer spray temperature difference issue, the inspectors determined that this issue had been inspected and dispositioned as a Licensee-Identified Violation (LIV) and documented in Section 4OA7 of NRC Inspection Report 05000280, 281/2011003. With regard to the Unit 1 pressurizer heatup rate issue, the inspectors determined that this issue had been inspected and dispositioned as a LIV and documented in Section 4OA7 of NRC Inspection Report 05000280, 281/2011003. With regard to the delayed implementation of compensatory measures issue, the inspectors determined that this issue had been inspected by the security baseline inspection in October 2011 and was dispositioned as a minor violation of NRC requirement and not required to be documented in the inspection report. No additional findings were identified. This LER is closed.

.2 (Closed) LER 05000281/2011-003-00, Isolation of Main Feedwater (MFW) Pump Results in Auxiliary Feedwater Actuation

On May 30, 2011, with Unit 2 at intermediate shutdown (ISD), control room operators' secured the Unit 2 A MFW pump to prevent bearing damage with the knowledge that AFW would automatically start. The Unit 2 B MFW pump was undergoing maintenance when the running Unit 2 A MFW pump outboard motor bearing experienced high temperature due to low oil flow. Plant equipment responded as designed and there was no challenge to normal plant operation. The unit was maintained stable at ISD. The licensee's evaluation determined that debris was present in the Unit 2 A MFW pump lube oil system due to lack of procedure

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guidance and caused the low oil flow to the A MFW pump outboard motor bearing. Corrective actions included the lube oil system for the Unit 2 A MFW pump was disassembled, cleaned, flushed, tested, and placed back into service. Also, maintenance procedures were revised to include guidance for flushing the lube oil system and for proper replacement of bearing housing sealant to prevent intrusion into the system. The inspectors reviewed the LER, CR, and apparent cause evaluation documenting this event. No findings were identified. This LER is closed.

.3 (Closed) LER 05000281/2011-002-00, Spurious Safety Injection Results in Exceeding Pressurizer Heatup Rate

On May 26, 2011, with Unit 2 at ISD, a spurious actuation of the Unit 2 B train safety injection (SI) occurred during performance of the consequence limiting safeguards (CLS) logic test when the test terminate push button was depressed. The cause of the spurious SI was a failed relay. The pressurizer liquid space temperature rapid increase exceeding the heatup rate specified by TS 3.1.B.3, was the result of the pressurizer heaters remaining energized during the event. Contributing to the temperature increase was the dynamic mixing caused by the surge, coupled with the warmer fluid already in the pressurizer when the SI initiated. The apparent cause identified that the movable contact 19/23 on relay 2 CLS-3-1BM was misaligned from the stationary contact during installation. This prevented the contact from making up when cycled during the surveillance test and caused the SI on the B train to occur. Corrective actions included the addition of inspection hold points to procedure O-ECM-1801-01, to ensure that the contact is properly aligned following relay installation. The inspectors reviewed the LER, CR, and apparent cause evaluation documenting this event. The inspectors determined that this issue had been inspected and dispositioned as a LIV and documented in Section 4OA7 of NRC Inspection Report 05000280, 281/2011003. No additional findings were identified. This LER is closed.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with the licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings were identified.

.2 Temporary Instruction (TI) 2515/182 - Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks, Phase 1

a. Inspection Scope

Leakage from buried and underground pipes has resulted in ground water contamination incidents with associated heightened NRC and public interest. The industry issued a guidance document, Nuclear Energy Institute (NEI) 09-14, "Guideline for the Management of Buried Piping Integrity," (ADAMS Accession No. ML1030901420), to describe the goals and required actions (commitments made by the licensee) resulting from this underground piping and tank initiative. On December 31, 2010, NEI issued Revision 1 to NEI 09-14, "Guidance for the Management of Underground Piping and Tank Integrity," (ADAMS Accession No. ML110700122), with an expanded scope of components which included underground piping that was not in direct contact with the soil and underground tanks. On November 17, 2011, the NRC issued TI-2515/182 "Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks," to gather information related to the industry's implementation of this initiative.

The inspectors reviewed the licensee's programs for buried pipe and underground piping, and tanks in accordance with TI-2515/182 to determine if the program attributes and completion dates identified in Sections 3.3 A and 3.3 B of NEI 09-14 Revision 1 were contained in the licensee's program and implementing procedures. For the buried pipe and underground piping program attributes, with completion dates that had passed, the inspectors reviewed records to determine if the attribute was in fact complete and to determine if the attribute was accomplished in a manner which reflected good or poor practices in program management.

Based upon the scope of the review described above, Phase I of TI-2515/182 was completed.

b. Observations

The licensee's buried piping and underground piping and tanks program was inspected in accordance with paragraphs 03.01.a through 03.01.c of TI-2515/182 and was found to meet all applicable aspects of NEI 09-14 Revision 1, as set forth in Table 1 of the TI.

c. Findings

No findings were identified.

4OA6 Meetings, Including ExitExit Meeting Summaries.1 Resident Inspection

On May 7, 2011, 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.

.2 TI-2515-182 Inspection

Exit meetings were conducted on March 06, 2012, with licensee management. The inspectors returned all proprietary information back to the licensee or their respective vendors.

4OA7 Licensee-Identified Violation

The following finding of very low significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section 2.3.2 of the NRC Enforcement Policy, NUREG-1600, for characterization as an NCV.

- 10 CFR Part 50.48 states, in part, that each operating nuclear power plant “. . . must have a fire protection plan that satisfies Criterion 3 of Appendix A to this part.” The Surry Unit 1 Updated Facility Operating License DPR-32, and Unit 2 Updated Facility Operating License DPR-37, Condition 3.I, specify, in part, that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the UFSAR and as approved in the Safety Evaluation Report (SER) and subsequent supplements. The UFSAR requires, in part, that the fire protection program (FPP) meet Appendix A to Branch Technical Position (BTP) APCS 9.5-1, “Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976,” dated August 23, 1976.” Section D.2.a of Appendix A to BTP APCS 9.5-1 requires, in part, that safety related systems should be isolated or separated from combustible materials. When this is not possible because of the nature of the safety system or the combustible material, special protection should be provided to prevent a fire from defeating the safety system function. Examples of such combustible materials that may not be separable from the remainder of its system are: (3) Reactor coolant pump lube oil system. Additionally, 10 CFR 50, Appendix R, Section III.O requires, in part, that “The oil collection system shall be so designed, engineered, and installed that failure will not lead to fire during normal or design basis accident conditions. Leakage shall be collected and drained to a vented closed container that can hold the entire lube oil system inventory.”

Contrary to the above, on November 23, 2011, the licensee identified that the reactor coolant pump (RCP) oil collection tanks for all the RCPs on both units were full of water and would not be able to contain the entire lube oil system

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inventory. The tanks were full of water due to a design change oversight that resulted in pre-existing RCP stator condensation being directed into the oil collection tanks. The inspectors determined the finding was more than minor because it was associated with the initiating events cornerstone attribute of protection against external factors and it adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operations. Specifically, the failure to meet Appendix R resulted in the non-functionality of the oil collection systems on all Unit 1 and Unit 2 RCPs, increasing the risk of fire from an RCP oil leak. The inspectors reviewed IMC 0609, Appendix F, and determined the finding was of very low safety significance (Green), because the finding was assigned a low fire degradation rating. Specifically, the RCP oil inventory would be expected to rise to the top of the collection tank and spill out the tank vent on to the loop room floor, causing it to spread out and be directed to the containment sump through the floor drains. The loop room floor and components in the vicinity do not reach oil ignition temperatures and safe shutdown capability would not be affected. The licensee has entered this issue in their CAP as CR 453867.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

J. Ashley, Licensing Engineer
P. Blasioli, Director, Nuclear Protection Services and Emergency Preparedness
E. Collins, Manager, Emergency Preparedness
J. Eggart, Manager, Radiation Protection and Chemistry
B. Garber, Supervisor, Station Licensing
L. Hilbert, Manager, Outage and Planning
B. Hoffner, Manager, Nuclear Fleet Emergency Preparedness
L. Lane, Site Vice President
R. Johnson, Manager, Operations
C. Olsen, Director, Site Engineering
K. Sloane, Plant Manager (Nuclear)
M. Smith, Manager, Nuclear Oversight
B. Stanley, Director, Station Safety and Licensing
E. Turko, Buried Piping Program Supervisor
N. Turner, Supervisor, Emergency Preparedness
M. Wilda, Supervisor, Auxiliary Systems

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000280/2012002-01	URI	Operability Determinations Questioned When the 1B Charging Pump Lube Oil Exhibited Foaming (Section 1R15)
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Opened and Closed

05000280, 281/2012002-02	NCV	Failure to Maintain a Standard Emergency Action Level Scheme for Earthquakes (Section 4OA2)
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Closed

050000280, 281/2011-001-00	LER	Reactor Trip on Both Units due to Loss of Offsite Power (Section 4OA3.1)
05000281/2011-003-00	LER	Isolation of Main Feedwater Pump Results in Auxiliary Feedwater Actuation (Section 4OA3.2)
5000281/2011-002-00	LER	Spurious Safety Injection Results in Exceeding Pressurizer Heatup Rate (Section 4OA3.3)

05000280,281/2515-182	TI	Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks, Phase 1(Section 4OA5.2)
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Discussed

None

LIST OF ITEMS REVIEWED**Section 4OA5(2): Other Activities**Procedures

Inspection of Emergency Diesel Generator Fuel Oil Piping Cathodic Protection, O-EPM-2308-01, Rev. 2

Procedures for the Application of Ultrasonic Guided Wave Examination Techniques for Piping Systems, ER-AA-NDE-UT-715, Rev. 0

Root Cause Evaluation, P1-AA-300-3001, Rev. 2

Root Cause Evaluation, P1-AA-300-3001, Rev. 3

Cause Evaluation Program, DNAP-1604, Rev. 1

Underground Piping and Tank Integrity Program Description, ER-AA-BPM-10, Rev. 2

Underground Piping and Tank Integrity Program Description, ER-AA-BPM-101, Rev. 3

Corrective Actions

465172 Circulation Water Pipe Data Mis-located in Buried Piping Program Life Cycle Management Plan

LA001763, Risk Ranking

176106, Inspection Plan

176107, Revise Procedure and Oversight

CA189111, Prioritize Additional In-scope Underground Piping and Tanks

LA001762, Procedure and Oversight

SAR001873, NRC Observations from Buried Piping TI-182 Inspection

Others

Drawing#BPM-PP-0001, Rev. 0, Buried Piping Diagram

Drawing#11448-FP-26B, Rev. 7, Circulation Water Lines

Drawing#11448-FY-10, Rev. 34, Plot Plan

Engineering Transmittal#ET-S-10-0056, Buried Pipe Monitoring Program Inspections for 2010

RCA#S-2004-1932, AFW Pump Mini-flow Recirculation Line Leakage

CCA#00214, Common Cause Analysis to Engineering for Buried Piping Failures

ACE#108801, ACE to Engineering for Firemain Leakage at SRF

Engineering Evaluation and Remediation Options of Phase 1 High Risk Piping, Rev. 1, Feb 2012

Long-range Guided Wave Inspection Report, FBS, LC0901

Underground Piping and Tank Integrity (UPTI) Program Fleet Call Minutes and Actions, January 17, 2012

License Renewal Commitments, LA 000417

Life Cycle Management Plan, Underground Piping and Tank Integrity Program, Dec. 2010

Life Cycle Management Plan, Underground Piping and Tank Integrity Program, January 2012

System Health Report, Q3-2011

Attachment

System Health Report, Q4-2011
NACE Certificate for Michael Tarlton for Cathodic Protection
Groundwater Protection and Underground Piping/Tanks, CM-61, Rev. 0
2012 Buried Pipe Inspection Activities, February 2012

LIST OF ACRONYMS

AAC	Alternate Alternating Current
ADAMS	Agencywide Document Access and Management System
ALARA	As Low As Reasonably Achievable
ANS	Alert and Notification System Testing
CA	Corrective Action
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
DEP	Emergency Response Organization Drill/Exercise Performance
EAL	Emergency Action Level
EDG	Emergency Diesel Generator
ERO	Emergency Response Organization
HP	Health Physics
HPT	Health Physics Technician
HPAP	Health Physics Administrative Procedure
HRA	High Radiation Area
IMC	Inspection Manual Chapter
ISFSI	Independent Spent Fuel Storage Installation
JPM	Job Performance Measures
NCV	Non-cited Violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OD	Operability Determination
PAR	Protective Action Recommendation
PARS	Publicly Available Records
PI	Performance Indicator
PS	Planning Standard
RAB	Reactor Auxiliary Building
RCE	Root Cause Evaluation
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RFO	Refueling Outage
RP	Radiation Protection
RTP	Rated Thermal Power
RWP	Radiation Work Permit
SDP	Significance Determination Process
SR	Surveillance Requirements
TDAFWP	Turbine Driven Auxiliary Feedwater Pump
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VEPCO	Virginia Electric and Power Company
VHRA	Very High Radiation Area
VPAP	Virginia Power Administrative Procedure
WO	Work Order