



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

November 26, 2007

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

SUBJECT: SURRY POWER STATION - NRC PROBLEM IDENTIFICATION AND
RESOLUTION INSPECTION REPORT 05000280/2007008 AND
05000281/2007008

Dear Mr. Christian:

On October 12, 2007, the United States Nuclear Regulatory Commission (NRC) completed a team inspection at your Surry Power Station Units 1 and 2. The enclosed inspection report documents the inspection findings, which were discussed on October 12, 2007, with Mr. Jernigan and other members of your staff during an exit meeting.

The inspection was an examination of activities conducted under your license as they relate to the identification and resolution of problems, and compliance with the Commission's rules, regulations and with the conditions of your operating licenses. Within these areas, the inspection involved examination of selected procedures and representative records, observations of activities, and interviews with personnel.

On the basis of the sample selected for review, the team concluded that in general, problems were properly identified, evaluated, and corrected. A few exceptions were noted in the enclosed report. Two of the systems reviewed had some long standing issues (auxiliary feedwater and service water). The team noted that performance in the corrective action area was improving as compared to the last assessment conducted in 2005. There were two green findings identified during this inspection. These findings were determined to be violations of NRC requirements. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs), in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you contest any NCV in this report, you should provide a response with the basis of your denial, within 30 days of the date of this inspection report, to the United States 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 NRC Resident Inspector at the Surry Power Station.

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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 document 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/

Eugene Guthrie, Chief
Reactor Projects Branch 5
Division of Reactor Projects

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

Enclosure: Inspection Report 05000280/2007008 and 05000281/2007008
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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Letter to David Christian from Eugene Guthrie dated November 26, 2007

SUBJECT: SURRY POWER STATION - NRC PROBLEM IDENTIFICATION AND
RESOLUTION INSPECTION REPORT 05000280/2007008 AND
05000281/2007008

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 05000280, 05000281

License Nos.: DPR-32, DPR-37

Report Nos.: 05000280/2007008 and 05000281/2007008

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: Surry Power Station, Units 1 and 2

Location: 5850 Hog Island Road
Surry, VA 23883

Dates: September 10 - October 12, 2007

Inspectors: J. Brady, Senior Resident Inspector (McGuire), Lead Inspector
G. McCoy, Senior Resident Inspector (Vogtle)
B. Monk, Senior Resident Inspector (Watts Bar)
K. Korth, Resident Inspector (Browns Ferry)

Approved by: Eugene Guthrie, Chief
Reactor Projects Branch 5
Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000280/2007008, 05000281/2007008; 09/10/2007 - 10/12/2007; Surry Power Station, Units 1 & 2; biennial inspection of the identification and resolution of problems.

The inspection was conducted by three senior resident inspectors and one resident inspector. Two findings of very low safety significance were identified during this inspection and were classified as non-cited violations. The findings were evaluated using the significance determination process (SDP). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). 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.

Identification and Resolution of Problems Summary

Based on review of greater than 150 corrective action documents, the licensee was generally effective in identifying problems and entering them into the corrective action program (CAP). Condition reports (CRs) normally provided complete and accurate characterization of the subject issues. In general, the threshold for initiating CRs was low as evidenced by the continued large number of CRs and the type of issues entered annually into the CAP. Employees were encouraged by management to initiate CRs. Site management was actively involved in the CAP and focused appropriate attention on significant plant issues. The inspectors did not identify any significant adverse conditions which were not in the CAP for resolution. During the reviews and walkdowns of accessible portions of the service water system (SW), alternate alternating current system (AAC), auxiliary feedwater system, and charging/safety injection system (CH/SI), the inspectors determined that system deficiencies were generally being identified, placed in the CAP, and the system engineers were generally appropriately tracking and trending these issues.

Evaluations (apparent and root cause) were generally adequate. Documentation of the methodology and facts used to support apparent cause evaluations was very limited. A couple of evaluations did not adequately address the issue described in the condition report. In a couple of cases, opportunities to adequately assess the effectiveness of previous corrective actions were missed. Also, a couple of instances were noted where the lack of an extent of condition review resulted in missed opportunities to prevent recurrence. These issues were discussed with the licensee.

In general, corrective actions were timely, effective, and commensurate with the safety significance of the issues. Effectiveness reviews for root and apparent cause evaluations were generally adequate. A couple of examples were noted where corrective actions were either incomplete or inadequate to address the causes. These examples were discussed with the licensee, and the licensee planned to re-evaluate these issues.

Two of the systems reviewed, auxiliary feedwater, and service water, had some long standing issues. Long standing issues are indicative of problems with corrective action effectiveness. These issues were discussed with the licensee.

Generally, the use of operating experience (OE) was found to be effective. However, a couple of instances were noted where OE generated by the Westinghouse Owner's Group (WOG) was not always utilized appropriately. This was discussed with the licensee.

Self-Assessments and audits were self-critical and generally effective in identifying problems.

On the basis of interviews, review of the licensee's safety conscious work environment (SCWE) surveys, and review of the licensee's employee concerns program, the inspectors determined that there was no evidence of SCWE problems.

The team noted that performance in the corrective action area was improving as compared to the last assessment conducted in 2005.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation (NCV) of 10 CFR 50.65 (a)(2) after Surry Power Station (SPS) failed to categorize the failure of the Unit 2 Charging Pump Component Cooling System as a maintenance preventable functional failure and accordingly, failed to monitor the component as required by 10 CFR 50.65 (a)(1). The licensee entered this issue into the Corrective Action Program as Condition Report 021045.

The finding is greater than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and affects the cornerstone objective of ensuring the availability, reliability, and capability of the Charging System, which responds to initiating events to prevent undesirable consequences. In addition, Example 7.b provided in Manual Chapter 0612, Appendix E, states that violations of Paragraph 10 CFR 50.65 (a)(2), failure to demonstrate effective control of performance or condition and not putting the affected Systems, Structures, and Components (SSCs) in (a)(1), are not minor because they necessarily involve degraded SSC performance or condition. The inspectors determined this finding is of very low safety significance because the failure to place the system in (a)(1) status did not lead to any further instances of system unreliability or unavailability. The cause of this finding was directly related to the aspect of "Training of personnel" in the cross-cutting area of human performance (resources component) because the engineer conducting the maintenance rule evaluation, the Maintenance Rule Program Coordinator, and Engineering Supervisor reviewing the evaluation, did not fully understand when to apply the functional failure exemptions. (IMC 0305, H.2.b) [Section 4OA2 a(3)(I)]

- Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for the licensee's failure to revise procedure ECA 0.0, Loss of all AC Power, as corrective action for a condition identified by the licensee that could cause a loss of Net Positive Suction Head (NPSH) to the Turbine Driven Auxiliary Feedwater Pump (TDAFW), and potential damage to the only available feedwater pump during a loss of all AC power event. Other procedures where single AFW pump operation could cause inadequate NPSH had been revised.

The finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affects the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was determined to be of very low safety significance because no actual safety function was lost. The cause of the finding is related to the cross-cutting area of problem identification and resolution and the aspect of lack of thoroughness of evaluation such that the resolution addresses the causes and extent of conditions. (IMC 0305, P.1.c) [Section 4OA2.a(3)(ii)]

B. Licensee-Identified Violations

None

REPORT DETAILS

4 OTHER ACTIVITIES

40A2 Problem Identification and Resolution

The team based the following conclusions, in part, on issues identified / evaluated during the period, August 26, 2005, (the last biennial problem identification and resolution inspection) to the end of the inspection on October 12, 2007. In addition, for selected systems, the team reviewed problems which were identified outside this assessment period whose significance might be age dependent.

a. Assessment of the Corrective Action Program

(1) Inspection Scope

The inspectors reviewed the licensee's CAP procedures which described the administrative process for initiating and resolving problems through the use of work orders (WOs) and CRs. The inspectors attended meetings where WO and CRs were screened for significance, interviewed personnel, reviewed system health reports and maintenance rule reports, to determine whether the licensee was identifying, accurately characterizing, and entering problems into the corrective action program at an appropriate threshold. The inspectors also conducted plant walkdowns of safety-related equipment and equipment important to safety, to assess the material condition and to look for any deficiencies that had not been previously entered into the CAP. Control Room walkdowns were also performed to assess the main control room deficiency list and to ascertain if deficiencies were entered into the CAP.

The inspectors selected CRs for review covering the seven cornerstones of safety identified in the NRC's Reactor Oversight Process. The inspectors also conducted a review of CRs for four risk significant systems. These systems were selected based on equipment performance history, Maintenance Rule (MR) considerations, risk significance insights from the licensee's probabilistic safety assessment, and risk insights from the NRC Risk Informed Inspection Notebook for Surry. The systems selected were the SW system, the AAC System, the AFW system, and the Charging/High and Low Head Safety Injection System (CH/SI). The team reviewed the maintenance history and selected WO for the four systems as well as the associated system health reports. The inspectors also reviewed issues documented in NRC inspection reports and licensee event reports. In addition, a five-year review was performed for several issues in the SW system, the CH/ SI, and the AFW system which had existed for extended periods of time.

To verify that the licensee appropriately prioritized and evaluated problems in accordance with their risk significance, the inspectors reviewed CRs, including root and apparent cause evaluations, trend reports, and self-assessments. The review was to determine whether the licensee had adequately identified the cause of the problems, including root cause analysis where appropriate, and adequately addressed operability, reportability, common cause, generic concerns, extent of condition, and extent of cause. The review included the appropriateness of the assigned significance, the timeliness of resolutions, level of effort in the investigation, and the scope and depth of the causal

analysis. The review was also performed to verify that the licensee appropriately identified corrective actions to prevent recurrence and that these actions had been appropriately prioritized.

From the sample of CRs, the inspectors reviewed how the adverse conditions were resolved including completion of the designated tasks that were identified to correct the conditions and the timeliness of the completions. The inspectors evaluated whether the corrective actions were properly documented, assigned, and tracked to ensure completion. The review was also to verify the adequacy of corrective actions to address equipment deficiencies and MR functional failures of risk significant plant safety systems.

The inspectors also attended various plant meetings to observe management oversight and daily functions of the corrective action process. These included Plan Of The Day meetings, Condition Report Team meetings, Corrective Action Review Board meetings, and Plant Health Committee meetings. The inspectors also held discussions with various personnel to evaluate their threshold for identifying issues and entering them into the CAP.

Documents reviewed are listed in the Attachment.

(2) Assessment

Identification of Issues: The inspectors determined that the licensee was generally effective in identifying problems and entering them into the CAP. CRs normally provided complete and accurate characterization of the subject issues. In general, the threshold for initiating CRs was low as evidenced by the continued large number of CRs entered annually into the CAP. Employees were encouraged by management to initiate CRs. Site management was actively involved in the CAP and focused appropriate attention on significant plant issues. The inspectors' independent review did not identify any significant adverse conditions which were not in the CAP for resolution.

During the system reviews and walkdowns of accessible portions of the SW, AAC, AFW and CH/SI systems, the inspectors determined that system deficiencies were being identified and placed in the CAP and that the system engineers were appropriately tracking and trending these issues.

Prioritization and Evaluation of Issues: The inspectors determined that apparent and root cause evaluations were generally adequate. However, documentation of the methodology and facts used to support some apparent cause evaluations was very limited. Inspectors also noted that three evaluations did not adequately address the issue described in the condition report. The following examples were discussed with the licensee:

- On 4/29/2005, Unit 2 "B" Charging Pump failed a comprehensive flow surveillance (S-2005-2064). The cause of the surveillance failure was establishment of an incorrect (conservative) acceptance criteria due to a flow calculation error (S-2005-2114). The apparent cause evaluation never determined why the wrong assumption was used or what barriers broke down

that could have detected the error (e.g., independent review or supervisory approval). Consequently, the only corrective action was to revise the calculation and associated procedure acceptance criteria.

- Apparent Cause Evaluation S-2006-0680 was performed to evaluate the timeliness of corrective actions associated with Plant Issue S-2005-0397, which was written to clarify the basis of the low flow limit of 175 gpm for the AFW system. The Cause Description section identified that flow induced vibration had been a system limitation dating back as far as 1987. It also identified that testing had been attempted a number of times between May of 2005 and late February of 2006. Various reasons for why testing was delayed were enumerated. Examples included, conflicts with Emergency Diesel Generator maintenance on one occasion, insufficient personnel available on another occasion, and the late addition of a recovery plan to the procedure on another occasion. The apparent cause concluded that corrective actions of the original Plant Issue S-2005-0397 were not untimely. In that it was a long standing issue covered by operating procedure limitations, it was self-evident that an additional period of eight months was not significant. However, for Plant Issue S-2006-0680, for which the apparent cause was performed, nothing was identified related to schedule coordination or procedure completeness. Hence, no corrective actions were specified for these delays.
- On 8/1/2007 the licensee identified an elevated vibration reading during the review of test 1-PT-18.8 for service water pump 1-SW-P-10B. This issue was documented in CR017086. A different technician retested the point and measured vibrations at the expected level. No action was taken to determine why the first technician obtained an erroneous reading.

In some cases, opportunities to adequately assess the effectiveness of previous corrective actions were missed. The following examples were discussed with the licensee:

- On 8/25/2005 an oil leak was discovered on the Unit 2 "A" Charging Pump which resulted in its inoperability (S-2005-4087). The investigation identified that the lube oil cooler was not coated internally as required and that two other coolers were installed without the coating (S-2005-4186). An operability determination was conducted for the remaining non-coated coolers (Unit 1 "A" and "B") which determined they were operable based on calculated life without the coating. However, no actual measurements were taken of remaining tube condition/thickness to validate the calculations for the Unit 1 coolers. On 9/26/2005 the Unit 1 "A" Charging Pump cooler developed a lube oil leak (S-2005-4464) and both the "A" and "B" Charging Pumps were declared inoperable (S-2005-4470). No evaluation was conducted to assess the appropriateness of the Operability Determination decision to continue to operate with redundant degraded components.
- On 5/24/07, CR013532 was issued to evaluate an external audit finding that, setpoints had not been adequately controlled because the evaluations and independent reviews performed by engineers had not been comprehensive. The

CR listed examples of failure to properly process Westinghouse Owners Group Direct Work Requests (DWs). The OE Review identified two previous instances where DWs were not appropriately processed (S-2003-1490 and S-2004-2485) but no evaluation was conducted on why the corrective action was ineffective.

- On 3/22/07, CR09110 was written for Engineering to evaluate the 100 pound per square inch (psi) guage pressure drop acceptance criteria for charging pump discharge check valve leakage during monthly testing. The CR found that the setpoint was non-conservative for the design basis flow requirement. The Repeat Event search identified that this condition could have been addressed if the action from a previous corrective action document had been completed (S-2005-1486). However, no evaluation was conducted on why the action was not completed as assigned and therefore no corrective actions were taken to prevent similar occurrences in the future.

There were two instances where the lack of an extent of condition review resulted in missed opportunities to prevent recurrence. The following examples were discussed with the licensee:

- On 1/30/06, a Plant Issue was initiated in response to a NRC violation for having a non-conservative Emergency Operating Procedure (EOP) setpoint to stop safety injection and charging pumps on low Refueling Water Storage Tank Level (RWST) (S-2006-0334). The only corrective action taken was to change the RWST Level setpoint and associated procedure. No extent of condition evaluation was conducted to determine what other industry or vendor information may exist that could impact EOPs.
- On 4/29/2005, Unit 2 "B" Charging Pump failed a comprehensive flow surveillance (S-2005-2064). The cause of the surveillance failure was establishment of an incorrect acceptance criteria due to a flow calculation error (S-2005-2114). The only corrective action was to revise the calculation and associated procedure acceptance criteria. No evaluation was conducted to verify this condition did not exist in other calculations.

Effectiveness of Corrective Actions: Based on a review of numerous CR corrective actions and their implementation, the team found in general, that the licensee's corrective actions were timely, effective, and commensurate with the safety significance of the issues. Effectiveness reviews for root and apparent cause evaluations were generally of good depth and correctly identified issues. The team identified examples where corrective actions were either incomplete or inadequate. The following examples were discussed with the licensee:

- On 3/3/06, the Unit 2 "A" Charging Pump discharge pressure dropped during a monthly surveillance (S-2005-1394 and S-2005-1486). The pressure drop was due to idle charging pump check valve leakage. A corrective action (S-2005-1486-R3) was assigned to determine the applicability of the 100 psi header pressure change for acceptability of the check valves. The response was that the check valves were replaced and no further actions were required. The team concluded that this was a missed opportunity to identify non-conservative

acceptance criteria based on in-service testing requirements, instead of design basis requirements.

- On 9/15/04, a Plant Issue was initiated to address a NRC White finding on inadequate fire response procedures (S-2004-3295). The root cause was determined to be inadequate processing of industry information including WOG Documents. One corrective action was to revise any setpoints in the EOP setpoint database as necessary to incorporate the Emergency Response Guideline (ERG) feedback (R32). This corrective action was not effective in that it did not result in changing the RWST Low Level Emergency Contingency Action Setpoint as needed. Another corrective action was to ensure that the documents received under the WOG DW program were independently reviewed and/or receive supervisor review (R44). This corrective action was incomplete since its implementation did not encompass the corporate screening review, which was part of the screening process.

The inspectors observed that the licensee had long standing issues in AFW and SW systems. The following examples were discussed with the licensee, regarding the effectiveness of corrective actions:

- The team reviewed related Plant Issues S-2005-0397 and S-2006-1810. Plant Issue S-2005-0397 related to procedural guidance that required flow in the Auxiliary Feedwater System to remain greater than 175 gpm for the Turbine Driven Auxiliary Feedwater (TDAFW) Pump and 145 gpm for the Motor Driven Auxiliary Feedwater (MDAFW) Pumps. It was determined in 1987 that low flow in the system caused excessive pipe vibration. A number of corrective actions were taken over the years such as changing flow control valves and fine tuning of the TDAFW pump governor. Those actions did not resolve the vibration problem. The licensee has another corrective action planned to change out the discharge check valves with a different design during the next outages. Plant Issue S-2006-1810 was an issue that related to loss of NSPH_a during specific plant conditions. These conditions would occur when the Steam Generator pressures associated with Reactor Coolant System (RCS) temperatures are between 350°F and Hot Shutdown (547 F) and one AFW pump is feeding all three Steam Generators. The initial corrective action was to remove the automatic opening signal from each (2) of the B Steam Generator inlet flow control valves and manually maintain the valves closed during Startup and Shutdown of the plant. A pending corrective action was to replace the existing design with a Main Control Board switch which would allow the operator to selectively disable the flow control valve automatic open signal to any one of the three Steam Generator's AFW flow control valve pairs. Manual closure of a pair of normally open flow control valves would remain an operator requirement.

These system deficiencies were being managed by placing procedural limitations on the operators at both the high flow end of the pump curve for the NSPH_a condition and at the low flow end of the pump curve for the flow induced vibration condition.

- During the root cause evaluation for S-2006-1372 to address the fouling of the Component Cooling (CC) heat exchangers, the licensee's team identified the root cause for the fouling of the CC heat exchangers to be due to the low velocity of service water flow through the heat exchangers during the winter months which causes sedimentation of suspended solids and subsequent fouling with organisms. The recommended corrective action to prevent recurrence was to develop a design change to increase the velocity of service water flow through the heat exchanger. This design change was rejected in favor of better management of existing programs such as the cleaning of the heat exchangers. Yet the licensee continues to experience issues in controlling the chemicals in the heat exchangers and managing the cleaning process.

3) Findings

(I) Failure to Properly Categorize a Maintenance Preventable Functional Failure

Introduction: The inspectors identified a Green NCV of 10 CFR 50.65 (a)(2) after the licensee failed to categorize the failure of Unit 2 Charging Pump Component Cooling System (CPCC) as a maintenance preventable functional failure and accordingly, failed to monitor the component as required by 10 CFR 50.65 (a)(1).

Description: On September 25 during the review of CR000031, Loss of Charging CC System due to Air Binding, the inspector identified that the licensee had not categorized the event as a maintenance rule functional failure. In accordance with ER-AA-MRL-100, Maintenance Rule Implementation, personnel errors occurring in support of maintenance activities, which result in a failure and loss of function, are to be considered maintenance preventable functional failures. On July 27, 2006, the Unit 2 "A" Charging Pump Intermediate Seal Cooler was being restored following repair of a leak on the cooler. Air was introduced into the CC system when a cooler isolation valve was opened, causing the operable pump to become air-bound. This resulted in the system being unable to perform its monitored safety function of cooling the Charging Pumps (High Head Safety Injection Pumps). This failure resulted in exceeding the criteria used to demonstrate that the performance of the system was being adequately controlled through the performance of appropriate preventative maintenance and should have resulted in the system being placed in maintenance rule (a)(1) status. When the inspectors questioned the accuracy of the evaluation, the licensee entered the issue in their corrective action program and re-evaluated the failure. On October 4, 2007, the Maintenance Rule Working Group concluded that the failure was a maintenance

preventable functional failure and that the system should have been placed in 10 CFR 50.65 (a)(1) status.

The original Maintenance Rule Evaluation (MRE000001) concluded that the failure was not a maintenance rule functional failure since "loss of a component function due to the misalignment of SSCs by Operations in preparation for removal or return of SSCs to service for equipment rotation or normal line-up are NOT Maintenance Rule Functional Failures." These allowances did not apply in this case since the restoration of the cooler was part of the maintenance activity and not associated with equipment rotation or a normal valve lineup. The evaluation went on to state that "Failures that occur during

Return to Service testing that are directly related to the maintenance being performed are not Maintenance Rule Functional Failures.” The inspectors determined that this exemption did not apply since the activity caused components not under the maintenance to fail (i.e., the in-service CC Pump). The MR evaluation was approved on October 4, 2006 after receiving review and approval by both the Maintenance Rule Program Coordinator and the Engineering Supervisor.

Analysis: The inadequate maintenance rule evaluation of the failure of the Charging Pump Component Cooling System is a performance deficiency. The finding is greater than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and affects the cornerstone objective of ensuring the availability, reliability, and capability of the Charging System, which responds to initiating events to prevent undesirable consequences. In addition, Example 7.b provided in Manual Chapter 0612, Appendix E, states that violations of Paragraph 10 CFR 50.65 (a)(2), failure to demonstrate effective control of performance or condition and not putting the affected SSC(s) in (a)(1), are not minor because they necessarily involve degraded SSC performance or condition. The inspectors determined this finding is of very low safety significance because the failure to place the system in (a)(1) status did not result in any further instances of system unreliability or unavailability. The cause of this finding was directly related to the aspect of “Training of personnel” in the cross-cutting area of human performance (resources component) because the engineer conducting the maintenance rule evaluation, the Maintenance Rule Program Coordinator and Engineering Supervisor reviewing the evaluation, did not fully understand when to apply the functional failure exemptions. (H.2.b).

Enforcement: Paragraph (a)(1) of 10 CFR 50.65, requires, in part, that the holders of an operating license shall monitor the performance or condition of SSCs within the scope of the rule as defined by 10 CFR 50.65 (b), against licensee-established goals, in a manner sufficient to provide reasonable assurance that SSCs are capable of fulfilling their functions. Paragraph (a)(2) of 10 CFR 50.65 states, in part, that monitoring as specified in 10 CFR 50.65(a)(1) is not required where it has been demonstrated that the performance or condition of an SSC is being effectively controlled through the performance of appropriate preventive maintenance, such that the SSC remains capable of performing its intended function. Contrary to the above, the licensee failed to adequately demonstrate that the performance of preventative maintenance on the Unit 2 Charging Pump Component Cooling System was sufficient to ensure the system was capable of performing its intended function, and the system was not placed under the requirements of 10 CFR 50.65 (a)(1). Because this finding is of very low safety significance and has been entered into the licensee’s corrective action program as Condition Report 021045, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000281/2007008-01, Failure to Properly Categorize a Maintenance Preventable Functional Failure.

- (ii) Failure to take adequate corrective action for an auxiliary feedwater system issue

Introduction: A non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, was identified for failing to revise procedure ECA 0.0, Loss of all AC Power, as corrective action for a condition identified that could cause a loss of Net Positive Suction

Head to the TDAFW pump and potential damage to the only available feedwater pump during a loss of all AC event.

Description: During review of Plant Issue S-2006-1810 related to inadequate Net Positive Suction Head Available, $NPSH_a$, for both the Motor Driven and Turbine Driven Auxiliary Feedwater Pumps dated 05/04/2006, the inspectors noted that the licensee had identified that the only procedures affected by the condition were those related to Startup and Shutdown of the Units with only one AFW pump running while feeding all three Steam Generators. The plant conditions associated with the inadequate $NPSH_a$ concern occur when Steam Generator pressures are those that correspond with RCS temperatures between 350°F and Hot Shutdown (547°F). The inspectors identified that procedure ECA 0.0, Loss of all AC Power, also could lead to establishing the condition of having only one source of feedwater available (TDAFW Pump) to all three Steam Generators. This procedure had steps which involve cooldown of the RCS to temperatures in the range of $NPSH_a$ concerns. No guidance was provided to the operators as to the potential challenges to the pump due to loss of $NPSH$ and subsequent loss of the TDAFW Pump.

Analysis: The finding is more than minor because it is 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. The inspectors evaluated this finding using MC 0609, Appendix A and determined the finding to be of very low safety significance because no actual safety function was lost. The cause of the finding is related to the cross cutting area of problem identification and resolution and the aspect of lack of thoroughness of evaluation such that resolutions addressed causes and extent of conditions. (P.1.c).

Enforcement: 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, states, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, defective material and equipment and non-conformances are promptly identified and corrected. Contrary to the above, both the Motor Driven Auxiliary Feedwater pumps and the Turbine Driven pump were identified by the licensee to have inadequate Net Positive Suction Head available under certain plant conditions. The licensee failed to identify and promptly correct procedure ECA 0.0, Loss of all AC Power, to account for this condition. Because this finding is of very low safety significance and because it was entered into the licensee's corrective action program as CR CR021047, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000280,281/2007008-02, Failure to Promptly Identify and Correct Procedures Related to the Operation of the Auxiliary Feedwater System.

b. Assessment of the Use of Operating Experience (OE)

(1) Inspection Scope

The inspectors conducted a sample review of the licensee's OE program for the selected systems to determine whether actions were completed in accordance with licensee procedure DNAP-3002, Dominion Nuclear OE Program. The inspectors focused on NRC generic communications and OE items associated with recent industry

operating experience for a detailed review to verify issues were appropriately evaluated and entered into the CAP. The inspectors also reviewed a sampling of the items the licensee had submitted for OE to verify the information accurately reflected the event(s).

(2) Assessment

Generally, use of OE was found to be effective. However, OE generated by the Westinghouse Owner's Group was not always utilized appropriately as noted above.

(3) Findings

No findings of significance were identified.

c. Assessment of Self-Assessments and Audits

(1) Inspection Scope

The inspectors conducted a review of the licensee's Self-Assessment and Audit programs to verify that actions were completed in accordance with licensee procedures: PI-AA-100-1004, Formal Self Assessments; PI-AA-100-1005, Informal Self Assessments; DNAP-1801, Internal Auditing and Oversight; and D-NOCP-0212, Internal Audit Program. The inspectors reviewed a sampling of self-assessments and audits to verify that identified deficiencies and areas needing improvement were entered into the CAP tracking system.

(2) Assessment

Self-Assessments and audits were self-critical and generally effective in identifying problems.

(3) Findings

No findings of significance were identified.

d. Assessment of Safety-Conscious Work Environment

(1) Inspection Scope

The inspectors randomly interviewed approximately 30 on-site workers, focusing on their knowledge of the problem identification process at Surry. Interviewees were questioned on their understanding and their willingness to initiate condition reports or raise safety concerns through the employee concerns program. Discussions with plant staff were conducted to develop a general sense of the safety-conscious work environment at the site. The inspectors looked for indications of conditions that would cause employees to be reluctant to raise safety concerns. The inspectors reviewed the licensee's training slides associated with safety-conscious work environment used for general employee training, leadership training, continuing training, employee update meeting (2/21/2007), and management retreat (1/29/2007). The inspectors reviewed the Surry July 2006 Nuclear Safety Culture Survey.

The inspectors discussed the concerns in the employee concern program with the employee concern representative and reviewed one file (CR 14909 associated with this file) which had the potential to have regulatory implications, to determine the completeness, adequacy of the investigation, file documentation, responsiveness to the concerned individuals, responses to "recommended corrective actions" by station management, and to verify that employee concerns remain anonymous. The inspection included verification that concerns were being properly reviewed; identified deficiencies were being resolved; and issues were entered into the CAP when appropriate.

(2) Assessment and Observations

On the basis of interviews conducted during the inspection, and the results of the licensee's safety conscious work environment (SCWE) surveys, the inspectors determined that there is no evidence of SCWE problems.

(3) Findings

No findings of significance were identified.

4OA6 Management Meetings

On October 12, the inspectors presented the inspection results to Mr. Jernigan, and other members of his staff, who acknowledged the findings. The inspectors informed the licensee that proprietary information that was examined during the inspection was returned and will not be included in the report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

M. Adams, Director, Nuclear Station Safety and Licensing
K. Grover, Manager, Operations
B. Garber, Supervisor, Licensing
J. Grau, Manager, Nuclear Oversight
E. Hendrixson, Director, Site Engineering
D. Herring, Shift Technical Advisor
L. Hilbert-Semmes, Manager, Organizational Effectiveness
D. Jernigan, Site Vice President
L. Jones, Manager, Radiation Protection and Chemistry
P. Kirshner, Station Licensing
C. Luffman, Manager, Protection Services
R. Manrique, Supervisor, Engineering
R. Simmons, Manager, Outage and Planning
K. Sloane, Director, Nuclear Station Operations and Maintenance
T. Steed, Manager, Station Nuclear Safety
B. Stanley, Manager, Maintenance
M. Wilson, Manager, Training

NRC personnel

E. Guthrie, Chief, Branch 5, Division of Reactor Projects
E. Riggs, Acting Senior Resident Inspector, Surry
R. Reyes, Acting Senior Resident Inspector, Surry
C. Welch, Senior Resident Inspector, Surry

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000281/2007008-01	NCV	Failure to Properly Categorize a Maintenance Preventable Functional Failure [Section 40A2 a(3)(I)]
05000280,281/2007008-02	NCV	Failure to Promptly Identify and Correct Procedures Related to the Operation of the Auxiliary Feedwater System. [Section 40A2 a(3)(ii)]

LIST OF DOCUMENTS REVIEWED

Procedures

DNAP-0110, Identifying and Addressing Nuclear Safety and Quality Concerns
DNAP-1801, Internal Auditing and Oversight
DNAP-2000, Dominion Work Management Process
DNAP-3002, Dominion Nuclear Operating Experience (OE) Program
D-NOCP-0212, Internal Audit Program
ECP-GL-1, Nuclear Employee Concerns Program
EE-AA-MRL-100, Maintenance Rule Implementation
PI-AA-100-1002, Focus on Four
PI-AA-100-1004, Formal Self Assessments
PI-AA-100-1005, Informal Self Assessments
PI-AA-200-2002, Effectiveness Reviews
PI-AA-200, Corrective Action
PI-AA-300, Cause Evaluation Program
VPAP-0502, Procedure Process Control
VPAP-1501, Deviations
VPAP-1601, Corrective Action
1 / 2 - ECA-0.0, Loss of all AC power
1 / 2 - GOP-1.3, UNIT STARTUP, RCS HEATUP FROM 345°F TO HSD
1 / 2 - GOP-2.4, UNIT COOLDOWN, HSD TO 351°F
1 / 2 - OP-FW-001, MOTOR DRIVEN AFW PUMPS STARTUP AND SHUTDOWN
1 / 2 - OP-FW-002, TURBINE DRIVEN AFW PUMPS STARTUP AND SHUTDOWN
LI-AA-110, Commitment Management

Condition Reports (includes associated evaluations, corrective actions, and work orders)

AAC: 3612, 6393, 6997, 7233, 7414, 7435, 7457, 7529, 7543, 7561, 11657, 12681, 17093
AFW: 21047
CH/SI: 31, 9110, 9518, 13709, 18194, 19150, 13532, 13996,
SW: 135, 185, 635, 772, 1128, 1141, 1326, 2078, 3006, 4456, 5092, 5239, 5343, 5502,
5508, 5536, 5538, 7764, 8169, 9115, 9761, 10999, 13449, 13831, 14251, 16841,
17985, 19387
Other: 2219, 2276, 2183, 3034, 3321, 3409, 5887, 11241

Problem Identifications (includes associated evaluations, corrective actions, and work orders)

AAC: S-2005-4251, S-2005-4254, S-2005-4274, S-2006-2249, S-2006-2360, S-2005-3078,
S-2006-3132
AFW: S-2005-0397, S-2006-0680, S-2003-5829, S-2003-5901, S-2006-1810
CH: S-1998-3997, S-2005-1394, S-2005-1486, S-2005-2064, S-2005-2114, S-2005-2096, S-
2006-0459, S-2006-0668, S-2005-4087, S-2005-4186, S-2005-4464, S-2005-4470, S-
2005-4517, S-2005-4553, S-2006-1946, S-2006-208, S-2006-2233
SI: S-2004-3601, S-2005-2294, S-2005-3194, S-2005-2352, S-2006-0334, S-2003-1490, S-
2004-3295, S-2004-2485, S-2006-0572, N-2006-0938,
SW: S-2005-3730, S-2005-3911, S-2005-4184, S-2005-4188, S-2005-4226, S-2005-4297, S-
2005-4381, S-2005-4402, S-2005-4692, S-2005-5315, S-2005-5343, S-2005-5350, S-
2005-5366, S-2005-5500, S-2006-0427, S-2006-0670, S-2006-1367, S-2006-1368, S-
2006-1372, S-2006-1472, S-2006-1912, S-2006-1947, S-2006-1011

Other: S-2006-2851, S-2006-1849, S-2005-2051, S-2005-4641, S-2006-1128, S-2006-1576, S-2006-1981, S-2006-2806, S-2006-2818, S-2006-3118

Self Assessments and Audits

07-05, SPS-SA-06-19, SAR000194, SAR000247

Work Orders:

0072739001, 0072739002, 0073547101, 0075124801, 0075124901, 0075125001, 0075168101, 0075200301, 0075200302, 0075313601, 0076103301, 0076103302, 0076672901, 0076672901, 0076893501, 0077001401, 0077001501, 0077392901, 0078466501, 0078536001, 0078536003, 0078545201

OE Response:

OE21991, OE22611, OEPX000348, OPEX000011, OPEX000022, OPEX000152, OPEX000349, OPEX000540,

System Health Reports:

Service Water
Alternate AC Station Blackout Diesel Generator
Auxiliary Feedwater
Charging and High Head Safety Injection
Low Head Safety Injection

Licensee Event Reports

05000280/2006001-00
05000280,281/2006002-00
05000280/2003006

NRC Violations/Findings

NCV 05000281/2005003-01
NCV 05000280,281/2005004-01
NCV 05000280,281/2005006-01
NCV 05000280,281/2005006-02
NCV 05000280,281/2006006-01
NCV 05000280,281/2006008-01
NCV 05000280,281/2006011-04
NCV 05000281/2007002-04
NCV 05000280,281/2007002-05
NCV 05000280,281/2007002-06

Miscellaneous Documents

Maintenance Rule Working Group meeting minutes from 9/2005 through 7/2007
EWR-85-476, CH Pump LO Cooler Protective Coating
ET-MAT-05-0002, Interior Coating of Lube Oil Cooler Tubes for Corrosion Protection
ET-NAF-05-0023, Safety Analysis of Surry Unit 2 Flow Shortfall
ET-CME-07-0012, Evaluation of CH Pump Discharge Check Valve Back Leakage
ET-S-05-0086, Evaluate CH Pump Lube Oil Coolers

ET-S-05-0090, Evaluate Service Life of 1-CH-E-5A
Design Change 05-060, Replace Stainless Steel Service Water Piping
Design Change 02-075, Emergency Service Water Pump Diesel and Start Circuit Upgrade
Temporary Modification S1-07-104, Injection of Fresh Groundwater into the Casing of One
Emergency Service Water Pump
(GL 79-40) Follow-up Actions Resulting from the NRC Staff Reviews Regarding the TMI-
2 Accident
(GL 79-56) Discussion of Lessons Learned Short Term Requirements
NRC letter to VEPCO dated Dec 12, 1979
NRC letter to VEPCO dated Jan 2, 1980
NRC letter to VEPCO dated April 24, 1980
NRC letter to VEPCO dated Nov 17, 1980
NRC letter to VEPCO dated April 27, 1981
NRC letter to VEPCO dated July 10, 1981
NRC letter to VEPCO dated Aug 7, 1981
NRC letter to VEPCO dated April 27, 1982
NRC letter to VEPCO dated March 15, 1983
VEPCO letter to NRC dated Oct 24, 1979
VEPCO letter to NRC dated Nov 9, 1979
VEPCO letter to NRC dated Nov 26, 1979
VEPCO letter to NRC dated Dec 17, 1979
VEPCO letter to NRC dated Dec 28, 1979
VEPCO letter to NRC dated Jan 10, 1980
VEPCO letter to NRC dated Jan 15, 1980
VEPCO letter to NRC dated Feb 1, 1980
VEPCO letter to NRC dated Sept 30, 1980
VEPCO letter to NRC dated Dec 12, 1980
VEPCO letter to NRC dated Dec 15, 1980
Operator Work Arounds (2006-ODA-001 and 2006-ODA-002)
Calc ME-0597 related to AFW capacity
ET-NAF-06-0045 Rev. 0 (5/12/2006) – Evaluation of the Proposed Change to Surry FW-MOV-
151/251 Operation and Alignment
DCP 06-47 Defeat Auto-Open Function for Auxiliary Feedwater Flow Isolation Motor Operated
Valves/Surry/Units 1&2 (11/02/2006)
FSAR Section 10.3.5.2 Condensate and Feedwater
Technical Evaluation Report Auxiliary Feedwater System Automatic Initiation and Flow
Indication by Franklin Research Center for the NRC dated April 27, 1981.
Calc ME-0807
Calc ME-0813: Maximum AFW Pump Flow and NPSH_r Analysis for One Pump Delivering Flow
to Two Low Pressure Steam Generators.
License Amendments 245 and 246
Surry Power Station, Unit Nos. 1 and 2 – Issuance of Amendments on Revision of Auxiliary
Feedwater Requirements and Surveillances
Technical Specifications 3.6-Turbine Cycle
Technical Specifications 4.8-Turbine Cycle (Surveillance Requirements)
Drawing 11448-FM-068A
Drawing 11548-FM-068A

JCO SC-03-002, Control of Auxiliary Feedwater to Steam Generators with One Emergency Bus De-energized.
 Temporary Modification S1-03-046, implemented closing 4 of the 6 AFW MOV's to support the JCO

Surry Margin Issues List items:

- AFW01-Low AFW flow due to high assumed SG pressure and a lack of Blowdown Throttle Valve leakage testing (affects both units)
- AFW07-MDAFW and TDAFW challenge NPSH_a when any one pump is feeding all 3 S/G's at RCS temperatures between 350°F and 485°F for MDAFW pumps and between 485°F and 535°F.
- AFW09- Flow Restrictions on the TDAFW Pump – Vibration issues have required procedural restriction on TDAFW during certain plant transients. When the TDAFW pump is running, and total flow is less than 150 gpm, and flow is directed to less than all S/G's

LIST OF ACRONYMS

AAC	-	Alternate Alternating Current System
AFW	-	Auxiliary Feedwater
CAP	-	Corrective Action Program
CC	-	Component Cooling
CR	-	Condition Report
DW	-	Westinghouse Owners Group Direct Work Request
ECA	-	Emergency Contingency Action
EOP	-	Emergency Operating Procedure
gpm	-	Gallon Per Minute
MDAFW	-	Motor Driven Auxiliary Feedwater Pump
MR	-	Maintenance Rule
NCV	-	Non-Cited Violation
NPSH _a	-	Net Positive Suction Head available
OE	-	Operating Experience
RCS	-	Reactor Coolant System
SCWE	-	Safety Conscious Work Environment
SPS	-	Surry Power Station
SSC	-	Systems, Structures and Components
TDAFW	-	Turbine Driven Auxiliary Feedwater Pump