UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

January 7, 2009

Mr. Jeffrey B. Archie
Vice President
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
P.O. Box 88
Jenkinsville, SC 29065

SUBJECT: V.C. SUMMER NUCLEAR STATION - NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000395/2008007

Dear Mr. Archie:

On September 12, 2008, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Virgil C. Summer Nuclear Station. The enclosed inspection report documents the inspection findings which were discussed on September 12, 2008, October 23, 2008, and on December 10, 2008, with you and other members of your staff.

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

Based on the results of this inspection, the inspectors identified four findings of very low safety significance (Green). Three of these findings were determined to involve violations of NRC requirements. However, because of their very low safety significance and because they are entered into your corrective action program, the NRC is treating the three findings determined to be violations of NRC requirements as Non-Cited Violations (NCVs) consistent with Section VI.A.1 of the NRC's Enforcement Policy. If you contest any of these NCVs you should provide a response within 30 days of the date of this inspection report, with the bases for your denial, 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, U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at VC Summer Nuclear 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 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/

Binoy B. Desai, Chief
Engineering Branch 1
Division of Reactor Safety

Docket No.: 50-395
License No.: NPF-12

(cc: w/encl - See Page 3)

Enclosure: Inspection Report 05000395/2008007 w/Attachment: Supplemental Information

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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,

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ADAMS: ☐ Yes ACCESSION NUMBER:_____ ☐ SUNSI REVIEW COMPLETE

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-395
License Nos.:	NPF-12
Report No.:	05000395/2008007
Licensee:	South Carolina Electric & Gas (SCE&G) Company
Facility:	Virgil C. Summer Nuclear Station Unit 1
Location:	P.O. Box 88 Jenkinsville, SC 29065
Dates:	August 11, 2008 – September 12, 2008
Inspectors:	S. Walker, Lead Inspector T. Tinkel, Contractor G. Skinner, Contractor D. Mas-Penaranda, Reactor Inspector J. Rivera, Reactor Inspector (Week 8/11-15) C. Peabody, Reactor Inspector (Week 8/25-29) E. Morris, Resident Inspector, Robinson (Week 9/8-12) C. Fletcher, Reactor Inspector-in-Training (Week 8/11-15) J. Eargle, Reactor Inspector-in-Training (Week 8/25-29)
Approved by:	Binoy B. Desai, Chief Engineering Branch 1 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000395/2008007; 08/11/08 - 08/15/08, 08/25/08 – 08/29/08, 09/08/08 – 09/12/08, Virgil C. Summer Nuclear Station, Unit 1; Component Design Bases Inspection.

This inspection was conducted by a team of nine NRC inspectors, which included two NRC contract inspectors and two NRC trainee inspector accompaniments. Four Green findings (three of which were classified as non-cited violations) were identified during this inspection. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using 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," (ROP) Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a NCV of 10 CFR 50, Appendix B, Criterion III, Design Control. Specifically, the licensee failed to verify the adequacy of the degraded voltage relay voltage setpoints by performing motor starting analyses based on voltage afforded by the relays. The failure resulted in several safety related motors having less margin than originally calculated. The licensee assessed the calculations to ensure the motors would start and entered the issue into their corrective action program to address this concern.

  This finding is more than minor because it affects the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and operability of the safety related motors to perform their intended safety function during a design basis event and the cornerstone attribute of Design Control, i.e. initial design. The inspectors determined that the finding was of very low safety significance because the deficiency did not result in any motor being inoperable, after additional licensee analysis showed that the motors would have adequate voltage to start based on actual field setpoints. This finding was reviewed for cross-cutting aspects and none were identified since the performance deficiency is not indicative of current licensee performance. (Section 1R21.2.2)

- Green. The inspectors identified a NCV of VCS TS 3.8.1.1.b.4 caused by the failure to conduct proper post modification testing after implementation of modification ECR-50555. This testing failed to identify that the voltage regulator settings and the reverse power relay portion of the modification were improperly implemented. Further, it impacted the reliability and availability of the Parr alternate AC supply to VCS's safety buses. The licensee initiated procedures for setting the voltage regulators and bypassed the reverse power relay. These issues were entered into the corrective action program. LER 05000395/2008004 was also submitted on October 10, 2008 by the licensee associated with the TS violation.

This finding is more than minor because exceeding a Technical Specification Limiting Condition of Operation affects the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and operability of the EDGs to perform their intended safety function during a design basis event, and the cornerstone attribute of Equipment Performance:, i.e. availability. Following a Phase 3 analysis under the Significance Determination Process (SDP) the finding was determined to be of very low safety significance. The cause of this finding was related to the cross-cutting area of problem identification and resolution, specifically with respect to corrective action, because the licensee did not thoroughly evaluate the anomalous operation of the Parr generator voltage regulators and the reverse power relay in November 2006, such that the resolution adequately addressed causes and extent of condition. (P.1.c) (Section 1R21.2.19)

- Green. The inspectors identified a NCV of TS 6.8.1, Procedures and Programs, for failure to follow procedure, ES-507, Review and Processing of Vendor Maintenance and Instruction Manuals, Revision 4, which requires performance of impact reviews of plant procedures due to vendor manual changes and technical updates. The failure resulted in 3 of 4 reactor trip breakers exceeding their service life. In addition, the inspectors identified several discrepancies between the vendor manual and the procedures that had not been properly evaluated. In response, the licensee initiated CR-08-03848 and properly evaluated the impact of the discrepancies noted by the inspectors.

  This finding is more than minor because it affects the Mitigating Systems Cornerstone objective to ensure the reliability, availability, and capability of systems that respond to initiating events and is associated with the attribute of procedure quality, in that inconsistencies were identified in Procedure EMP-135.004, Reactor Trip Breaker Testing, Revision 2, where the licensee routinely failed to evaluate differences between vendor recommendations and the procedure. The finding was determined to be of very low safety significance, because there was no loss of the reactor trip breaker safety function to open on a reactor trip signal. The cause of this finding was related to the cross-cutting area of operating experience, specifically with respect to including vendor recommendations in procedures to support plant safety. (P.2.b) (Section 1R21.4)

- Green. The inspectors identified a finding of very low safety significance involving a failure to comply with a commitment to maintain periodic vendor interface program in response to Generic Letter 90-03. This failure resulted in identifying at least two items in the vendor manual that were either out of date or obsolete, succeeded by a more recent technical bulletin from the vendor.

This finding is more than minor because it affects the Mitigating Systems Cornerstone objective to ensure the reliability, availability, and capability of systems that respond to initiating events and is associated with the attribute of equipment performance, in that the data in the vendor technical information files necessary to ensure reliable equipment operation was obsolete.
The finding was determined to be of very low safety significance because there was no loss of the reactor trip breaker safety function to open on a reactor trip signal. There was no cross-cutting aspect identified with this finding.

B. Licensee-Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Mitigating Systems and Barrier Integrity

1R21 Component Design Bases Inspection (71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components and operator actions for review using information contained in the licensee's Probabilistic Risk Assessment (PRA). In general, this included components and operator actions that had a risk achievement worth factor greater than two or Birnbaum value greater than 1 x10E-6. The components selected were located within the several plant systems including main steam, high head safety injection (HHSI), component cooling water (CCW), reactor make-up capability, instrument air (IA), and off-site power capability. In addition to design operation capability, the seismic capability of components was reviewed. The sample selection included 23 components, seven operator actions, and four operating experience items. Additionally, the team reviewed two modifications by performing activities identified in IP 71111.17, "Permanent Plant Modifications," Section 02.02.a. and IP 71111.02, "Evaluations of Changes, Tests, or Experiments."

The team performed a margin assessment and detailed review of the selected risk-significant components to verify that the design bases have been correctly implemented and maintained. This design margin assessment considered original design issues, margin reductions due to modification, or margin reductions identified as a result of material condition issues. Equipment reliability issues were also considered in the selection of components for detailed review. These included items such as failed performance test results, significant corrective action, repeated maintenance, maintenance rule (a)1 status, Regulatory Issue Summary 05-020 (formerly Generic Letter 91-18) conditions, NRC resident inspector input of problem equipment, system health reports, industry operating experience and licensee problem equipment lists. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense in depth margins. An overall summary of the reviews performed and the specific inspection findings identified are included in the following sections of the report.

.2 Results of Detailed Reviews

.2.1 High Energy Piping– Main Steam Piping (Loop A)

a. Inspection Scope

The team reviewed the design basis document (DBD), updated final safety analysis report (UFSAR), applicable plant drawings, and design specification documents to identify the design requirements for main steam piping from the steam generator to the main steam isolation valves. The team reviewed past examination history and scheduled examinations of the Main Steam piping as part of the In-service Inspection Program and Flow Accelerated Corrosion Control Program to verify that the scope and examination frequencies were consistent with the NRC regulatory requirements and industry standards.

Furthermore, the team reviewed stress analysis calculations to verify that design assumptions and safety margin were adequate for normal, upset, emergency, and faulted conditions. The team also reviewed the design calculations to verify that plant modifications were considered in the analyses and that the design basis was maintained. In addition, the team performed a system walk-down to verify the piping installed configuration and assess the observable material condition.

b. Findings

No findings of significance were identified.

.2.2 HHSI Pump & Pump Motor B

a. Inspection Scope

The team reviewed applicable portions of the UFSAR, DBD, drawings, and calculations to identify design basis requirements for the high head safety injection/charging pump. Surveillance procedures and tests were reviewed to determine whether design basis head/flow requirements were enveloped by test acceptance criteria. Pump flows encountered during mini-flow bypass operation, normal operation, and surveillance testing were evaluated to assess whether loads on the thrust bearing replicated design basis accident conditions. Maintenance Rule (MR) program and implementation documents were examined to determine whether the pump was scoped under the MR. The vendor manual was reviewed to identify recommendations for inspection and maintenance. The computerized maintenance management system (CMMS) was reviewed to identify preventive maintenance (PM) procedures and maintenance work orders. Surveillance test results for oil and vibration testing were reviewed to determine whether results were consistent with acceptance criteria. Condition report (CR) history for the past eight years was reviewed to identify thrust bearing and other failures and to determine whether failures were evaluated for MR.

The team reviewed pump power demand during runout conditions to determine whether the motors were operated within their ratings. The team reviewed AC load flow and voltage calculations to determine whether adequate motive power was available during worst case degraded voltage and service conditions. The team reviewed elementary wiring and logic diagrams to determine whether motor control logic was in conformance with the design bases. The team reviewed overcurrent protective device settings to determine whether the motors were adequately protected, and whether they were susceptible to spurious tripping during runout conditions.

b. Findings

Introduction: The inspectors identified a finding of very low safety significance (Green) involving a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, Design Control. Specifically, the licensee failed to verify the adequacy of the degraded voltage relay voltage setpoints by performing motor starting analyses based on voltage commensurate with the degraded voltage relay scheme.

Description: Calculation DC0820-001 was intended to determine the adequacy of the degraded voltage relay setpoints. The calculation analyzed starting of motors, other than MOVs, during load sequencing on the offsite power supply. The analysis used a switchyard voltage of 96% of nominal voltage rather than voltage afforded by the degraded voltage relay scheme. A voltage of 96% was within the expected normal range of switchyard voltage controlled by system operators. A voltage of 96% at the switchyard afforded voltage at the 7.2 kV Class 1E bus is considerably higher than that guaranteed by the degraded voltage relays. Rough calculations by the inspectors based on the degraded voltage relay setpoints specified in surveillance procedure STP0506.004 showed that the voltage on the 7.2 kV bus could be 2.6% lower during load sequencing than the value that was used for the motor starting analyses in Calculation DC0820-001, without separating the Class 1E bus from the offsite power supply. Similarly, voltage during steady state conditions could be approximately 3% lower than was used for the Calculation DC0820-001 motor starting analysis. The inspectors noted that the voltage margin documented in Calculation DC0820-001 for motor starting was less than 10% for several motors and was as low as 3% for one motor. Consequently, the licensee failed to assure that motors had adequate voltage to start based on voltage afforded by undervoltage protection scheme during load sequencing and steady state conditions. The inspectors reviewed recent calibration data for the degraded voltage relays and concluded that the actual field setpoints would likely afford adequate voltage during motor starting, so that no motors were determined to be inoperable. The licensee assessed the operability of the motors and initiated CR-08-03731 to further address this concern.

Analysis: The failure to assure the adequacy of degraded voltage relay setpoints by performing adequate motor starting analyses was a performance deficiency. This finding is more than minor because it affects the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and operability of the safety related motors to perform their intended safety function during a design basis event and the cornerstone attribute of Design Control, i.e. initial design. The inspectors assessed the finding using the Manual Chapter 0609 Significance Determination Process and determined that the finding was of very low safety significance (Green) because the deficiency did not result in any motor being inoperable, after additional analysis showed that the motors would have adequate voltage to start based on actual field setpoints. This finding was reviewed for cross-cutting aspects and none were identified since the performance deficiency is not indicative of current licensee performance.

Enforcement: 10 CFR 50, Appendix B, Criterion III, Design Control, states, in part, that measures shall be established to assure that applicable regulatory requirements and the design bases for structures, systems, and components are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, the licensee failed to assure that the degraded voltage relay setpoints provided in surveillance procedures were based on adequate motor starting analyses. Because this violation was of very low safety significance, was not repetitive or willful, and it was entered into the licensee's corrective action program as condition report CR-08-03731, this violation is being treated as an NCV, consistent with section VI.A.1 of the NRC Enforcement Policy. This finding is identified as NCV 05000395/20080007-01, Inadequate Motor Starting Analysis.

.2.3 HHSI Pump mini-flow MOV 8109B

a. Inspection Scope

The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify design basis requirements for this motor operated valve (MOV). Surveillance procedures and test results were reviewed to determine whether design basis stroke times were enveloped by test acceptance criteria. Calculations for valve stem thrust and motor operator actuator characteristics were reviewed to determine whether the actuator and valve were capable of operation under worst-case line pressure and differential pressure (DP). MR program and implementation documents were examined to determine whether the valve was scoped under the MR. The vendor manual was reviewed to identify recommendations for inspection and maintenance. The CMMS was reviewed to identify PM procedures and maintenance work orders. The CR history for the past eight years was reviewed to identify failures and determine whether they were loaded into the MR. PM procedures were reviewed to identify greasing frequency and greases specified for lubrication. Environmental test results were reviewed to verify whether specified greases were capable of withstanding effects of radiation and high temperature.

b. Findings

No findings of significance were identified.

.2.4 HHSI Pump mini-flow check valves 8480B and 8481B

a. Inspection Scope

The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify design basis requirements for these check valves. Surveillance procedures and test results were reviewed to determine whether design conditions for flow in the open position and DP and allowable leak rate in the closed position were enveloped by test acceptance criteria. MR program and implementation documents were examined to determine whether these valves were scoped under the MR. CMMS was reviewed to identify PM procedures and maintenance work orders. CR history for the past eight years was reviewed to identify failures and determine whether they were loaded into the MR. Information from surveillance test results and CMMS records was reviewed to determine whether the check valve flow direction was correct and whether proper materials were installed.

b. Findings

No findings of significance were identified.

2.5 HHSI Pump B Lube Oil and Gear Oil Coolers

a. Inspection Scope

The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify design basis requirements for these two oil coolers.

Calculations and information in the vendor manual and applicable drawings were reviewed to determine whether the coolers were capable of removing heat at design basis conditions. The procedure for making equipment rounds and recording equipment readings was reviewed to determine whether oil temperature exiting the coolers was consistent with maximum limits in the vendor manual and whether there was any indication of heat transfer fouling. MR program and implementation documents were examined to determine whether the coolers were scoped under the MR. The vendor manual was reviewed to identify recommendations for inspection and maintenance. CMMS was reviewed to identify PM procedures and maintenance work orders. CR history for the past eight years was reviewed to identify failures and whether failures were loaded into the MR.

b. Findings

No findings of significance were identified.

.2.6 HHSI Pump B Cooler CCW Inlet Valve 9684B

a. Inspection Scope

The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify design basis requirements for this air operated valve. Surveillance procedures and test results were reviewed to determine whether design basis stroke times were enveloped by test acceptance criteria. Calculations for valve stem thrust and air actuator characteristics were reviewed to determine whether the actuator and valve were capable of operation under worst-case line pressure and DP. MR program and implementation documents were examined to determine whether the valve was scoped under the MR. The vendor manual was reviewed to identify recommendations for inspection and maintenance. CMMS was reviewed to identify PM procedures and maintenance work orders. CR history for the past eight years was reviewed to identify failures and determine whether they were loaded into the MR. PM procedures were reviewed to identify greasing frequency and greases specified for lubrication. Environmental test results were reviewed to verify whether specified greases were capable of withstanding effects of radiation and high temperature.

b. Findings

No findings of significance were identified.

.2.7 HHSI Pump B Suction Valve from RWST LCV00115D

a. Inspection Scope

The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify design basis requirements for this MOV. Surveillance procedures and test results were reviewed to determine whether design basis stroke times were enveloped by test acceptance criteria. Calculations for valve stem thrust and motor operator actuator characteristics were reviewed to determine whether the actuator and valve were capable of operation under worst-case line pressure and DP.

MR program and implementation documents were examined to determine whether the valve was scoped under the MR. The vendor manual was reviewed to identify recommendations for inspection and maintenance. CMMS was reviewed to identify PM procedures and maintenance work orders. CR history for the past eight years was reviewed to identify failures and determine whether they were evaluated for MR. PM procedures were reviewed to identify greasing frequency and greases specified for lubrication. Environmental test results were reviewed to verify whether specified greases were capable of withstanding effects of radiation and high temperature.

b. Findings

No findings of significance were identified.

.2.8 CCW Pump & Pump Motor B

a. Inspection Scope

The team examined the machinery history of CCW Pumps to verify that design bases have been maintained. The team reviewed the CCW DBDs, UFSAR, and applicable plant drawings to verify that the established design bases are in accordance with regulatory requirements. The team examined records and test data for both corrective and preventive maintenance, vendor trip reports, and applicable corrective actions to verify that potential degradation was being monitored, prevented, and corrected. The team verified the PM history and schedule consistent with vendor recommendations. The team also reviewed vibration data and associated test results, and lube-oil test results for the CCW Pumps to verify the likelihood of pump damage or failure from these mechanisms. The team reviewed the NPSH calculation to verify that the CCW pumps would be available and unimpeded during accident conditions. The team also conducted a field walkdown of the CCW pumps with the CCW System Engineer to verify that the installed configuration is consistent with the design basis and plant drawings.

The team reviewed pump power demand during runout conditions to determine whether the motors were applied within their ratings. The team reviewed AC load flow and voltage calculations to determine whether adequate motive power was available during worst case degraded voltage and service conditions. The team reviewed elementary wiring and logic diagrams to determine whether motor control logic was in conformance with the design bases. The team reviewed overcurrent protective device settings to determine whether the motors were adequately protected, and whether they were susceptible to spurious tripping during runout conditions.

b. Findings

Reference inspection report finding NCV 05000395/20080007-01, Inadequate Motor Starting Analysis (Section 1R21.2.2 of this report)

.2.9 CCW Pump B Discharge Header Check Valve XVC09682B

a. Inspection Scope

The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify design basis requirements for this check valve. Surveillance procedures and test results were reviewed to determine whether design conditions for flow in the open position and DP and allowable leak rate in the closed position were enveloped by test acceptance criteria. MR program and implementation documents were examined to determine whether the valve was scoped under the MR. CMMS was reviewed to identify PM procedures and maintenance work orders. CR history for the past eight years was reviewed to identify failures and whether failures were loaded into the MR. Information from surveillance test results and CMMS records was used to determine whether the check valve flow direction was correct and whether proper materials were installed.

b. Findings

No findings of significance were identified.

.2.10 CCW Heat Exchanger (HX) B

a. Inspection Scope

The team reviewed portions of the UFSAR, DBD, and drawings to identify design basis requirements for this HX. Calculations and information in the UFSAR, vendor manual, and drawings were reviewed to determine whether the HX was capable of removing heat at design basis conditions. CMMS was reviewed to identify maintenance work orders, and the CR history for the past eight years was reviewed to identify failures. CRs detailing degraded thermal performance caused by bio-fouling were reviewed. Associated calculations for heat transfer capability and margin were reviewed to determine whether the required accident heat load could be transferred by the HX in the reported degraded conditions.

b. Findings

No findings of significance were identified.

.2.11 CCW Inlet to Residual Heat Removal (RHR) HX Valve XVB9503B

a. Inspection Scope

The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify design basis requirements for this MOV. Surveillance procedures and test results were reviewed to determine whether design basis stroke times and limit switch settings were enveloped by test acceptance criteria. A walk-down was performed to determine whether valve position could be independently verified by physical inspection. Calculations for valve stem thrust and motor operator actuator characteristics were reviewed to determine whether the actuator and valve were capable of operation under worst-case line pressure and DP. MR program and implementation documents were examined to determine whether the valve was scoped under the MR.

The vendor manual was reviewed to identify recommendations for inspection and maintenance. CMMS was reviewed to identify PM procedures and maintenance work orders. CR history for the past eight years was reviewed to identify failures and whether failures were loaded into the MR. PM procedures were reviewed to identify greasing frequency and greases specified for lubrication. Environmental test results were reviewed to verify whether specified greases were capable of withstanding effects of radiation and high temperature.

b. Findings

No findings of significance were identified.

.2.12 Reactor Make-up Water Storage Tank (RMWST) to Boric Acid Blender for Refueling Water Storage Tank (RWST) Make-up Flow Control Valve 1-FCV-168 B:

a. Inspection Scope

The team reviewed the DBD, UFSAR, drawings, and procedures to identify the design basis requirements for this valve. The team reviewed testing procedures and valve specifications to verify that the design basis requirements were incorporated into the test acceptance criteria and equipment design. The team also reviewed maintenance history of the valve, as indicated by related maintenance work documentation, system health reports, and Corrective Action documents to verify that the valve was adequately maintained and that identified equipment problems were resolved. The team reviewed performance test documentation to assure that the equipment capability was monitored and maintained. The team also reviewed modification history of this valve to verify that design basis has been maintained through component changes. In addition, the team performed a plant walk-down to assess the observable material condition, to verify the valve was accessible for local manual operation, and to verify that the installed configuration was consistent with the design basis and plant drawings.

b. Findings

No findings of significance were identified.

.2.13 Check Valves XVC-8443-CS (upstream Boric Acid Blender for RWST Make-up) and XVC-8433-CS (downstream Boric Acid Blender for RWST Make-up)

a. Inspection Scope

The team reviewed the DBD, UFSAR, and applicable plant calculations, evaluations, and drawings to identify the design requirements for the check valves. Specifically, the team reviewed their reliability, availability, and capability to refill the RWST during a Steam Generator Tube Rupture accident. The team reviewed maintenance history, vendor manuals, and testing procedures to verify that the design basis has been adequately implemented and maintained. The team also reviewed Corrective Action documents to verify that functional problems and material degradation were identified and corrected.

b. Findings

No findings of significance were identified.

.2.14 Reactor Make-up Water Pump Suction Header Check Valve XVC1902

a. Inspection Scope

The team reviewed the DBDs, UFSAR, and applicable plant drawings to identify the design requirements for the Reactor Makeup Water pump suction header check valve. The team examined the machinery history of valves to verify that the design bases have been adequately implemented and maintained. The team also conducted a field walk down of the check valve to verify that the installed configuration is consistent with the design basis and plant drawings. The team reviewed maintenance rule data to verify that equipment unavailability and failures were being properly tracked and appropriate risk insights were being applied.

b. Findings

No findings of significance were identified.

.2.15 High Head Safety Injection System Cold Leg Check Valve XVC8997B

a. Inspection Scope

The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify design basis requirements for this check valve. Surveillance procedures and test results were reviewed to determine whether design conditions for flow in the open position and DP and allowable leak rate in the closed position were enveloped by test acceptance criteria. MR program and implementation documents were examined to determine whether the valve was scoped under the MR. CMMS was reviewed to identify PM procedures and maintenance work orders. CR history for the past eight years was reviewed to identify failures and whether failures were loaded into the MR. Information from surveillance test results and CMMS records was used to determine whether check valve flow direction was correct and whether proper materials were installed.

b. Findings

No findings of significance were identified.

.2.16 Safety Injection System Cold Leg Inlet Header Check Valve XVC8973B

a. Inspection Scope

The team reviewed applicable portions of the UFSAR, DBD, and drawings to identify design basis requirements for this check valve. Surveillance procedures and test results were reviewed to determine whether design conditions for flow in the open position and DP and allowable leak rate in the closed position were enveloped by test acceptance criteria. MR program and implementation documents were examined to determine whether the valve was scoped under the MR.

CMMS was reviewed to identify PM procedures and maintenance work orders. CR history for the past eight years was reviewed to identify failures and whether failures were loaded into the MR. Information from surveillance test results and CMMS records was used to determine whether check valve flow direction was correct and whether proper materials were installed.

b. Findings

No findings of significance were identified.

.2.17 Service Water Pump C Discharge MOV 3116C

a. Inspection Scope

The team reviewed the DBDs, UFSAR, and applicable plant drawings to identify the design requirements for the Service Water Pump C Discharge MOV 3116C. The team examined the machinery history to verify that design bases have been adequately implemented and maintained. The team reviewed plant test procedures, and test results to verify that established acceptance criteria were met. The team examined records and test data for both corrective and preventive maintenance, as well as reviewed applicable corrective actions to verify that potential degradation was being monitored and/or prevented. The team also conducted a field walkdown of these MOVs to verify that the installed configuration is consistent with the design basis and plant drawings. The team reviewed maintenance rule data to verify that equipment unavailability and failures were being properly tracked and appropriate risk insights were being applied.

b. Findings

No findings of significance were identified.

.2.18 Pressurizer Safety Valves XVS8010A, B, & C

a. Inspection Scope

The team reviewed the DBDs, UFSAR, and applicable plant drawings to identify the design requirements for the valves. The team examined the machinery history of Pressurizer Safety Valves XVS8010A, -B, -C to verify that design bases have been maintained. The team reviewed plant test procedures and results to verify that established acceptance criteria were met. The team examined records and test data for both corrective and preventative maintenance, IST trending, as well as reviewed applicable corrective actions to verify that potential degradation was being monitored and/or prevented. The team reviewed maintenance rule data to verify that equipment unavailability and failures were being properly tracked and appropriate risk insights were being applied.

b. Findings

No findings of significance were identified.

.2.19 Parr Hydro-Electric Line

a. Inspection Scope

The team reviewed Modification ECR-50555, implemented in 2006, which installed a new underground electric tie line from the Parr Hydro Generating Station (Parr) to VCS, and its associated distribution equipment. The Parr station is a non-safety system. The modification was intended to provide an alternate source of AC power to the VCS 7.2 kV safety buses, thus reducing plant risk, and enabling the extension of an EDG TS Action Statement from 72 hours to 14 days. The team reviewed design drawings, design calculations, specifications, and test procedures and results to determine whether the as-built design was in accordance with the intended design. The team reviewed corrective action documents and maintenance history to determine whether there were any adverse issues stemming from the modification. The team also performed a walkdown of the Parr station and associated distribution equipment to assess material condition and the presence of hazards.

b. Findings

Introduction: The inspectors identified a Green NCV of VCS TS 3.8.1.1.b.4 for the failure to conduct proper post modification testing after implementation of modification ECR-50555. Specifically, this testing failed to identify that the voltage regulator settings and the reverse power relay portion of the modification were improperly implemented. These deficiencies resulted in the EDG TS 3.8.1.1.b.4 not being met on three occasions. Further, it impacted the reliability and availability of the Parr alternate AC supply to VCS's safety buses, thus affecting licensee assumptions and actions related to plant risk. The licensee entered these issues into the corrective action program as CR-08-03862 and CR-08-03863. LER 05000395/2008004 was also submitted on October 10, 2008 by the licensee associated with the TS violation.

Description: Modification ECR-50555, implemented in 2006, was intended to provide an alternate source of AC power to the VCS 7.2 kV safety buses in the event of loss of the other sources of power, including power from the 115 kV and 230 kV switchyards, and the EDGs. The modification involved installation of an underground tie line from VCS to the Parr station, and associated distribution equipment and protective relaying. The Parr source was not credited as an Alternate AC source commensurate with the requirements of 10 CFR 50.63, Loss of all alternating current power. However, the Parr source was installed to extend the TS Allowable Outage Time for an EDG from 72 hours to 14 days in accordance with TS 3.8.1.1.b.4 as well as to reduce overall plant risk.

The team determined that the licensee extended the TS action statement, as allowed by TS 3.8.1.1.b.4 on three occasions based on the Parr source being available. The three occasions since 2006 when the EDG out-of-service time was extended beyond 72 hours occurred on 2/12/2007 to 2/18/07 (129.7 hours), 2/26/07 to 3/02/07 (83 hours), and 3/24/08 to 3/31/08 (135.1 hours).

Upon review of test records and corrective action documents generated during acceptance and post modification testing for ECR-50555 in 2006, and for periodic testing performed in 2008, the inspector noted several entries regarding malfunction of the Parr generator voltage regulators and the reverse power relay in the circuit. These malfunctions could have rendered the Parr AC source to VCS unreliable and potentially unavailable. In particular, during the November 2006 acceptance testing performed in accordance with STP 125.021, voltage on the VCS 7.2 kV safety bus during motor starting dipped much lower than predicted in the design calculation. Calculation DC0810-025 predicted 82.8 percentage voltage (approximately 5.961 kV) at the 7.2 kV bus during starting of the charging pump; however, voltage actually dipped to approximately 69% (approximately 4.968 kV). The team noted that procedure EC-3, Processing Engineering Change Package, Section 6.12.3 required testing to confirm that the assumptions made in the design process were valid and the design met the functional requirement of the design basis.

The team noted that the post modification testing requirements for ECR-50555 did not provide for direct measurement of bus voltage during motor starting and did not provide associated voltage acceptance criteria. Consequently, CR-06-04031 concluded that the test results showing approximately 69% voltage were acceptable without addressing the disparity with the design calculation which predicted 82.8%. CR-06-04031 incorrectly characterized the starting voltage specification (i.e., 80%) for motors as the pre-inrush voltage at the bus, not the minimum voltage at the motor terminals during inrush. During a May 2008 test, the starting of a charging pump motor caused 7.2 kV bus voltage to drop enough to cause the Parr generators to trip. After troubleshooting, the licensee concluded in CR-08-02381 that the cause of the Parr generator trip was incorrect field current settings on the three generators used for the tests.

The team concluded that the licensee had failed to establish adequate post modification testing criteria for adjusting the Parr generator voltage regulators. This resulted in the voltage regulators for the Parr generators being improperly set to support VCS 7.2 kV safety buses. On two occasions where Parr was attempted to be tied to the VCS 7.2 kV buses, the 7.2 kV bus voltage was not maintained as required, rendering the Parr generators an unreliable source of power from the installation of ECR-50555 in 2006 until May, 2008.

In addition, during troubleshooting tests to determine the cause of the Parr generator trip in May 2008, the 7.2 kV bus was spuriously separated from the Parr source by action of the reverse power relay opening the Parr Generator output breakers, installed as part of ECR-50555. This was unexpected since it occurred while forward current was flowing to the 7.2 kV bus, as would occur during use of the Parr source. The evaluation done as part of CR-08-02477 identified that the reverse relay had been connected incorrectly during installation in 2006.

The team noted that procedure EC-03, Processing Engineering Change Packages, Section 6.12.2 required testing to confirm that the modified system functioned dynamically as designed. ECR-50555D, Functional Requirement 4.7.2.9 stated that interlock relaying shall be set up only to allow full power flow out of the Parr Station to VCS but not the reverse. However, the modification package did not include specific testing requirements for the reverse power relay that demonstrated that this requirement was met.

The team also noted that the licensee had an opportunity to discover the incorrect wiring since anomalous relay performance had been observed during testing in November 2006. CR-06-04033 documented that a sustained reverse power condition existed without operation of the relay as expected.

The relay calibration was checked and found to be acceptable, but no further investigation was performed to determine the cause of the observed malfunction until May, 2008. The team concluded that the design error in the reverse power relay wiring further contributed to the Parr source to VCS being unreliable and unavailable since the installation of ECR-50555 in 2006 until May, 2008.

In summary, the team concluded that between 2006 to May 2008, modification ECR-50555 was not properly implemented due to the unreliability introduced by the improper setting of the voltage regulator as well as improper installation of the reverse power relay. This unreliability also affected overall plant risk assumptions made by the licensee. The licensee has entered these issues into the corrective action program as CR-08-03862 and CR-08-03863.

Analysis: The failure to conduct adequate post modification testing to verify proper implementation of modification ECR-50555 resulted in the unreliability and capability of the Parr Hydro AC source to meet its intended purpose and was a performance deficiency. Between 2006 to May 2008, the intent for modification ECR-50555 to provide alternate source of AC power to the VCS 7.2 kV safety buses as well as enable the extension of an EDG TS Action Statement from 72 hours to 14 days was not accomplished due to the unreliability introduced by the improper setting of the voltage regulator as well as improper installation of the reverse power relay. The team determined that the deficiencies were within the licensee's ability to foresee, prevent, and correct.

This finding involving inadequate post modification testing is more than minor because it resulted in TS 3.8.1.1.b.4 not being met on three occasions as well as overall plant risk reduction and consequent equipment out-of-service planning based on an unavailable and unreliable Parr alternate AC source. The finding affected Mitigating Systems Cornerstone objective of ensuring the availability and operability of the EDG units and the reliability and availability of Parr units which were intended to reduce overall plant risk. The EDG units' unavailability also affected the cornerstone attribute of Equipment Performance. A regional Senior Reactor Analyst performed a Significance Determination Process Phase 3 analysis of the performance deficiency resulting in a finding of very low safety significance (Green). The dominant accident sequence involved a non-grid related Loss of Offsite Power with both Emergency Diesel Generators failing to run, the Parr Hydro-electric Generator power source failed (performance deficiency) and was not recovered, operators operated the Turbine Driven Auxiliary Feedwater Train beyond battery life but, offsite power was not recovered within fourteen hours. This resulted in core damage. The key assumptions were:

- The alternate Alternating Current source, the Parr Hydro-electric Generator, would trip one time out of every nine demands due to the performance deficiency
- A Parr Hydro-electric Generator trip due to the performance deficiency could be reset and the generator restarted fifty percent of the time, if core damage would not happen for over four hours.

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- Prior to station battery depletion, operators would place the Turbine Driven Auxiliary Feedwater Train's flow control valves such that they would continue to provide secondary side heat removal after battery failure.

Both Emergency Diesel Generator maintenance and non-maintenance configurations were considered in the analysis. Therefore, a one year exposure time evaluated. Also, external events were considered but, were shown to have a minimal risk contribution.

The cause of this finding was related to the cross-cutting area of problem identification and resolution, specifically with respect to corrective action, because the licensee did not thoroughly evaluate the anomalous operation of the Parr generator voltage regulators and the reverse power relay in November 2006, such that the resolution adequately addressed causes and extent of condition (MC 0305, aspect P.1.c).

Enforcement: The performance deficiency involving inadequate post modification testing following implementation of modification ECR 50555 resulted in the requirements of TS 3.8.1.1.b.4 not being met on three occasions as well as overall plant risk reduction and consequent equipment out-of-service planning based on an unavailable and unreliable Parr alternate AC source. Technical Specification Limiting Condition for Operation (LCO) 3.8.1.1.b requires that two diesel generators be operable during Modes 1, 2, 3, and 4 of operation. Technical Specification Action 3.8.1.1.b.4 for one EDG of 3.8.1.1.b inoperable, states, in part:

> Restore the EDG to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, unless the following condition exists:
> a) The requirement for restoration of the EDG to OPERABLE status within 72 hours may be extended to 14 days if the Alternate AC (AAC) power source is or will be available within 1 hour, as specified in the Bases, and
> b) If at any time the AAC availability cannot be met, either restore the AAC to available status within the remainder of the 72 hours in 4.a (not to exceed 14 days from the time the EDG originally became inoperable), or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the next 30 hours.

SR 3.0.1 states, "Compliance with the Limiting Conditions for Operation contained in the succeeding specifications is required during the OPERATIONAL MODES or other conditions specified therein; except that upon failure to meet the Limiting Conditions for Operation, the associated ACTION requirements shall be met." Contrary to the above, from 2/12/2007 to 2/18/07, 2/26/07 to 3/02/07, and 3/24/08 to 3/31/08, one diesel generator was inoperable for greater than 72 hours without the availability of the Alternate AC power source, without taking actions required by LCO 3.8.1.1.b. Because this violation was of very low safety significance, was not repetitive or willful, and it was entered into the licensee's corrective action program as condition reports CR-08-03862 and CR-08-03863, this violation is being treated as an NCV, consistent with section VI.A.1 of the NRC Enforcement Policy. This finding is identified as NCV 05000395/20080007-02, EDG Exceeded Technical Specification Allowable Outage Time.

.2.20 Engineered Safety Features Loading Sequencer (ESFLS)

a. Inspection Scope

The team reviewed samples of surveillance test procedures for LOOP/LOCA logic functional testing to confirm that the logic paths were being tested in a manner to adequately demonstrate that the equipment would perform in accordance with design basis documents. In addition, the team also reviewed test records to verify periodic testing of permissives and interlocks of the ESF Sequencer system. Also, the team reviewed the instrumentation that is used for initiation and control of sequencer to verify that the system will be functional and provide desired control during a design basis accident. System health reports, maintenance records and CRs were reviewed to verify that design and performance problems were identified and entered into the corrective action program. The team performed field walk downs of the ESF Sequencer system to verify that the observable material condition was acceptable.

b. Findings

No findings of significance were identified.

.2.21 Backup Instrument Air Compressor XAC-12

a. Inspection Scope

The team reviewed the setpoints for the instrument loops related to the Backup Instrument Air Compressor XAC-12 swapover operation to verify that the existing setpoints for these instruments were in accordance with the operating limits of the instrument air system. Also, the team reviewed the last two completed surveillance procedures and calibration test record for these instruments to verify that the instruments are properly calibrated and maintained in accordance with design output documents and vendor specifications. In addition, the team reviewed maintenance documentation, performance trending, equipment history as identified by plant work orders and system health reports to assess the licensee's actions to verify and maintain the safety function, reliability, and availability. The review was performed in order to verify that specified acceptance criteria were met and that the equipment operation was consistent with the plant's licensing and design bases. The team reviewed a selected sample of CRs to verify that design and performance problems were identified and entered into the corrective action program. The team performed field walk downs of the Instrument Air system to verify that the observable material condition was acceptable.

b. Findings

No findings of significance were identified.

.2.22 MOV Instrumentation & Control Review

a. Inspection Scope

For the selected MOV inspection samples, the team reviewed AC load flow and valve voltage calculations to determine whether adequate motive power was available during worst case degraded voltage and service conditions.

The team reviewed MCC control circuit voltage drop calculations to determine whether MOV contactors had adequate voltage to pick up when required. The team reviewed elementary wiring diagrams to determine whether control logic was in conformance with the design bases.

b. Findings

No findings of significance were identified.

.3 Review of Low Margin Operator Actions

a. Inspection Scope

The team performed a margin assessment and detailed review of a sample of risk significant and time critical operator actions. Where possible, margins were determined by the review of the assumed design bases and safety analysis report response times and performance times documented by job performance measure results within operator time critical task verification tests. For the selected operator actions, the team performed a walk through of associated emergency procedures, abnormal procedures, annunciator response procedures, and other operations procedures with appropriate plant operators and engineers to assess operator knowledge level, adequacy of procedures, availability of special equipment when required, and the conditions under which the procedures would be performed. Detailed reviews were also conducted with risk assessment engineers, engineering safety analysts, training department leadership, and through observation and utilization of a simulator training period to further understand and assess the procedural rationale and approach to meeting the design bases and safety analysis report response and performance times. The following operator actions were reviewed:

- Placing Parr-Hydro Into Service In Response to a SBO (Failure to align in 1 hr)
- Refill RWST As Part of SGTR Mitigation (Failure to refill RWST)
- Time Required to Terminate Primary to Secondary Break Flow May Exceed 30 min Accident Analysis Assumption During SGTR
- Inadvertent SI- Pressurizer Fills Before Operator Terminates SI
- Operator Opens Switchgear Door in Response to High Temperature Alarms
- Operator Response to Use XAC-12, Backup IA Compressor
- Operator Initial Response to ATWS (Failure of Manual Rod Insertion)

b. Findings

No findings of significance were identified.

.4 Review of Industry Operating Experience

a. Inspection Scope

The team reviewed selected OE issues from domestic and foreign nuclear facilities for applicability at VCS to determine the need for a detailed review. The issues that received a detailed review by the team included:

- NRC Bulletin 87-01, Thinning of Pipe Walls in Nuclear Power Plants
- NRC Generic Letter (GL) 89-08, Erosion/Corrosion-Induced Pipe Wall Thinning
- Information Notice (IN) 91-18, High-Energy Piping Failures Caused by Wall Thinning
- IN 97-84, Rupture in Extraction Steam Piping as a Result of Flow-Accelerated Corrosion
- IN 00-20, Potential Loss of Redundant Safety-Related Equipment Because of the Lack of High-Energy Line Break Barriers
- IN 01-09, Main Feedwater System Degradation in Safety-Related ASME Code Class 2 Piping Inside the Containment of a Pressurized Water Reactor
- Licensee Actions to Implement Commitments of Salem ATWS (GL 83-28, Supplement 1, GL 90-03)
- Licensee Actions in Response to North Anna Spurious SI (July 2007) GL 88-14, Instrument Air Supply System Problems Affecting Safety-Related Equipment
- IN 89-26, Instrument Air Supply to Safety-Related Equipment
- IN 85-35, Failure of Air Check Valves to Seat

b. Findings

.1 Failure to Translate Vendor Recommendations Into Procedures for Reactor Trip Breakers

Introduction: The inspectors identified a finding of very low safety significance (Green) involving a non-cited violation of TS 6.8.1, Procedures and Programs, for failure to follow procedure, ES-507, Review and Processing of Vendor Maintenance and Instruction Manuals, Revision 4, which requires performance of impact reviews of plant procedures due to vendor manual changes and technical updates.

Description: The inspectors identified inconsistencies between the licensee's reactor trip breaker testing procedure, EMP-135.004, Reactor Trip Breaker Testing, Revision 2, and the applicable vendor information. Westinghouse Maintenance Program Manual for Safety Related Type DS Low Voltage Metal Enclosed Switchgear, dated March, 1999, was incorporated into VCS Vendor Manual 1-MS-94B-1066, Revision 10. The inspectors noted that there were several differences between the licensee's maintenance procedure and the vendor manual and inquired whether a procedure impact review had been performed when the vendor manual had been received. The licensee was not able to locate any record of an impact review.

In May 2008, Westinghouse advised the licensee that 3 out of the 4 reactor trip breakers sent in for refurbishment could not be refurbished because they had exceeded their service life of 4000 cycles. The 4000 cycle service life was clearly stated in the vendor manual but had not been captured in the maintenance procedure or otherwise evaluated as not applicable.

The licensee initiated CR-08-01710 at the time, but failed to investigate whether there were other vendor maintenance requirements that were also not being met. Consequently, this represents missed opportunity to identify and correct the discrepancies.

The differences between the vendor manual and the licensee procedure were substantive and included omissions of required tasks, as well as differences in test methods, test sequence, acceptance criteria, and maintenance methods. Although the circuit breakers installed during RFO-17 had been refurbished, the Westinghouse Maintenance Program Manual also required testing prior to installation. The inspectors reviewed work orders related to the pre-installation testing and noted that, in addition to the discrepancies with vendor recommendations previously identified, at least one required test specified by the vendor had not been performed. In response to the inspectors concerns, the licensee initiated CR-08-03848 and evaluated the impact of the discrepancies noted by the inspectors.

The licensee concluded that based on discussions with Westinghouse and the successful completion of Surveillance Test STP-345.037, there was reasonable assurance that the reactor trip breakers would operate properly in response to a reactor trip signal.

Analysis: The inspectors concluded that the failure to perform technical impact reviews of reactor trip breaker manual changes and technical updates was a performance deficiency. This finding is more than minor in a accordance with MC 0612. It affects the Mitigating Systems Cornerstone objective to ensure the reliability, availability, and capability of systems that respond to initiating events and is associated with the attribute of procedure quality, in that inconsistencies were identified in Procedure EMP-135.004, Reactor Trip Breaker Testing, Revision 2, and the licensee routinely failed to evaluate differences between vendor recommendations and the procedure. The finding was determined to be of very low safety significance (Green), using the safety significance determination process (SDP) phase 1 worksheet, because there was no loss of the reactor trip breaker safety function to open on a reactor trip signal.

The cause of this finding was related to the cross-cutting area of operating experience, specifically with respect to including vendor recommendations in procedures to support plant safety. (MC 0305, P.2.b).

Enforcement: TS 6.8.1 requires that procedures shall be established, implemented and maintained covering the applicable procedures recommended in Regulatory Guide 1.33. Regulatory Guide 1.33, Appendix A, Section 3, requires procedures for operation and maintenance of safety-related systems. ES-507, Review and Processing of Vendor Maintenance and Instruction Manuals, Revision 4, requires that vendor manuals receive a technical impact review to address revising maintenance, surveillance or test procedures. Contrary to the above, activities affecting quality were not accomplished in accordance with prescribed procedures, in that a technical impact review was not performed for reactor trip breaker manual changes. Specifically, changes to the Westinghouse Maintenance Program Manual for Safety Related Type DS Low Voltage Metal Enclosed Switchgear, dated March 1999 received no technical impact review. Consequently, there was no justification for identified deviations between the vendor manual and the maintenance procedure. This issue was identified in the licensee's corrective action program as CR-08-03848.

Because this failure to comply with TS 6.8.1 is of very low safety significance and has been entered into the licensee's corrective action program, it is being identified as a non-cited violation consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000395/20080007-03, Failure to Follow Procedure for Analyzing the Impact of Updated Vendor Technical Manual.

.2 Failure to Maintain a Vendor Interface Program

Introduction: The inspectors identified a finding of very low safety significance (Green) involving a failure to comply with a commitment to maintain a vendor interface program assuring receipt of all technical information in response to Generic Letter 90-03.

Description: Generic Letter 83-28, Item 2.2.2 required licensees to establish, implement and maintain a continuing program to ensure that vendor information for safety-related components is complete, current and controlled throughout the life of their plants. Item 2.2.2 required periodic communication with vendors and system of positive feedback with vendors for mailings containing technical information. Generic Letter 90-03 modified the original requirements of Generic Letter 83-28 by endorsing Vendor Equipment Technical Information Program (VETIP) described in the Nuclear Utility Task Action Committee (NUTAC) Report issued in March 1984. Generic Letter 90-03 stated that there should be a program with the NSSS vendor as described in the VETIP, which covered all the safety-related components within the NSSS scope of supply. This program was expected to include provisions for assuring receipt by the licensee of all technical information provided by the NSSS vendor. In addition, a program was also expected to be in place to periodically contact the vendors of key safety-related components (such as auxiliary feedwater pumps, batteries, inverters, battery chargers, cooling water pumps, and valve operators), to obtain any applicable technical information. In letters dated September 28, 1984, and September 25, 1990, VCS committed to periodic contact with the NSSS supplier and other vendors of safety related equipment. The letters also described processes for review of technical information and incorporation into vendor manuals and maintenance procedures. Specifically, the September 25, 1990 letter stated, "In addition, based on the recommendations of the Generic Letter, SCE&G, as part of the periodic evaluation of vendors, will request information on any changes to vendor technical information for key equipment." This commitment was incorporated into SAP-1280, Control of Vendor Manuals, Revision 2, which required in Section 5.2.2 that the Manager of Materials and Procurement "Ensure that changes to vendor technical information for key equipment are requested as part of the ongoing interface with and periodic evaluation of vendors." SAP-1280 Revision 2 Change A eliminated this requirement as a result of a commitment reduction effort in 1999. Consequently, since 1999 it appears that there has not been a formal vendor interface program meeting the intent of the Generic Letter 83-28 Item 2.2.2 and Generic Letter 90-03. In particular, the licensee was not able to provide evidence of periodic vendor contact for the purpose of ensuring that the technical files for the Reactor Trip Breakers were up to date. A limited review of VCS vendor manual files for the Reactor Trip Breakers by the inspectors showed that at least two items were out of date. First, Vendor Manual 1MS-94B-468 contained I.B. 32-690-A, Instructions for Type DS Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear Assemblies, dated July, 1976 while the current revision is I.B. 32-690-D, dated January 1985.

Second, Vendor Manual 1-MS-94B-1066 had not been updated to incorporate Westinghouse Technical Bulletin W-TB-00-01-R0, Westinghouse DS Circuit Breaker, Issued, April 24, 2000. Westinghouse Technical Bulletin W-TB-00-01-R0 affected activities performed by Maintenance Procedure EMP-135.004, Reactor Trip Breaker Testing, Revision 2, which was found to have obsolete information affected by the bulletin. The licensee concluded that based on discussions with Westinghouse and the successful completion of Surveillance Test STP-345.037, that there was reasonable assurance that the reactor trip breakers would operate properly in response to a reactor trip signal. This issue has been entered into the licensee's corrective action program as CR-08-03931.

Analysis: The inspectors concluded that the failure to comply with a commitment to maintain a vendor interface program assuring receipt of all technical information was a performance deficiency. This finding is more than minor in accordance with MC 0612. It affects the Mitigating Systems Cornerstone objective to ensure the reliability, availability, and capability of systems that respond to initiating events and is associated with the attribute of equipment performance, in that data in vendor technical information files necessary to ensure reliable equipment operation was obsolete.

The finding was determined to be of very low safety significance (Green), using the safety significance determination process (SDP) phase 1 worksheet, because there was no loss of the reactor trip breaker safety function to open on a reactor trip signal. There was no cross-cutting aspect identified with this finding.

Enforcement: Enforcement action does not apply because the performance deficiency did not involve a violation of a regulatory requirement. Because this finding does not involve a violation of regulatory requirements and has very low safety significance, it is identified as FIN 05000395/20080007-04, Failure to Maintain a Vendor Interface Program.

.5 Review of Permanent Plant Modifications

a. Inspection Scope

The team reviewed two modifications related to the selected risk significant components in detail to verify that the design bases, licensing bases, and performance capability of the components have not been degraded through modifications. The adequacy of design and post modification testing of these modifications was reviewed by performing activities identified in IP 71111.17, Permanent Plant Modifications," Section 02.02.a. Additionally, the team reviewed the modifications in accordance IP 71111.02, "Evaluations of Changes, Tests, or Experiments," to verify the licensee had appropriately evaluated them for 10 CFR 50.59 applicability. The following modifications were reviewed:

- Parr-Hydro Alternate AC Power Supply
- Repair component support to provide additional clearance for pressurizer safety valve discharge piping.

b. Findings

See Section 1R21.2.19

4. OTHER ACTIVITIES

4AO6 Meetings, Including Exit

Exit Meeting Summary

On September 12, 2008, the team presented the inspection results to Mr. Archie, and other members of the licensee staff. The team returned all proprietary information examined to the licensee. No proprietary information is documented in the report. On October 23, 2008 and December 10, 2008, follow-up exit meetings were held with the licensee to present changes and updates of the inspection results, and if necessary, request additional information.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

J. Archie, Site Vice President
E. Baker, Plant Support Engineering Supervisor - Components
A. Cribb, Nuclear Licensing Supervisor
M. Fowlkes, Plant Engineering Manager
D. Gatlin, Plant Manager
G. Lippard, Operations Manager
W. Martin, Licensing Engineer
W. Stuart, Design Engineering Manager
B. Thompson, Nuclear Licensing Manager
G. Williams, Design Engineering Supervisor - Mechanical

NRC

J. Zeiler, Senior Resident Inspector
J. Policoski, Acting Senior Resident Inspector

ITEMS OPENED, CLOSED, AND DISCUSSED

Open and Closed

05000395/2008007-01	NCV	Inadequate Motor Starting Analysis (Section 1R21.2.2)
05000395/2008007-02	NCV	EDG Exceeded Technical Specification Allowable Outage Time (Section 1R21.2.19)
05000395/2008007-03	NCV	Failure to Follow Procedure for Analyzing the Impact of Updated Vendor Technical Manual (Section 1R21.4)
05000395/2008007-04	FIN	Failure to Maintain a Vendor Interface Program (Section 1R21.4)

DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

Licensing Basis Documents

Updated Final Safety Analysis Report (various sections), May 2007
Technical Specifications & Bases
NUREG-0717 Supplement 4, Safety Evaluation Report Related to the Operation of Virgil C. Summer Nuclear Station Unit No. 1, August 1982
NUREG-0717, Safety Evaluation Report Related to the Operation of Virgil C. Summer Nuclear Station Unit No. 1, February 1981

Calculations

DC04370-013, HHSI/Charging Pump NPSH from RWST, Revision 2
DC04410-019, TBD M-2A ECCS Flow Balance, Revision 4
DC01520-067, Design Review Capability for Rising Stem MOVs, Revision 15
DC04310-020, CCW Evaluation of SI Pump Coolers, Revision 2
DC0152A-001, Limiting Line and Differential Pressure for AOVs, Revision 0
DC01520-039, Max DP for CCWS Quarter-Turn MOV (XVB09503B), Revision 1
DC01520-090, Design Review Capability for Pratt Butterfly MOVs, Revision 4
DC04310-037, CCW Heat Exchanger Model, Revision 3
DC04310-045, CCW HX Design Basis Limiting, Revision 0
DC05010-035, Main Steam Safety Valve Reactions and Forces, Revision 1
DC06510-002, Instrument Air System Air Compressor Sizing, Revision 1
DC0360-008, Diesel Generator Voltage Limits, Revision 5
DC-08010-018, Verification of System Voltage Model Using Dapper, Revision 0
DC08010-025, Parr Hydro Alternate Power Source, Revision 0
DC080360-012, Restart of Large Motors on Diesel Generator, Revision 1
DC08200-003, Class 1E 460 MOV Starting Voltages at Degraded Voltage Conditions, Revision 6
DC08200-006, Restart of Large Motors on Offsite System, Revision 1
DC08220-007, 7.2 kV System Relay Settings (1E), Revision 4
DC08220-010, 1E Fault Current Study, Revision 3
DC08320-005, ESF Battery 1A & 1B Capacity, Revision 11
DC08320-010, Class 1E 125 Volt DC System Voltages & Voltage Drop, Revision 12
FAC Evaluation-Follow on for component MS-15-L-01-03-P, Refueling Outage 17
FAC Evaluation-Follow on for component MS-15-L-01-02-P, Refueling Outage 17
FAC Evaluation-Follow on for component MS-15-M02, Refueling Outage 16
FAC Evaluation-Follow on for component MS-15-M01, Refueling Outage 16
1MS-22-648, Main Steam Drain MS-15-SN-10050, Revision 3
1-MS-22-647, Main Steam Drain MS-14, Revision 4
MS-01, Design Calculation for Main Steam Piping Inside Containment – Loop A, Revision 5
MS-04, Design Calculation for Main Steam Piping Outside Containment – Loop A, Revision 6

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AOP-220.1, Loss of Instrument Air, Revision 2
EOP-6.0, Loss of all ESF AC Power, Revision 22
SOP-220, Station and Backup Instrument Air Systems, Section C. Operating the Diesel Driven Air Compressor Unloaded, Revision 16
SOP-220, Station and Backup Instrument Air Systems, Section A. Supplying Reactor Building Instrument Air from Station Instrument Air, Revision 16
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EMP-445.007, Baseline Testing of MOVs (Limit Switches) Revision 11
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ES-343, Supplier Qualification, Revision 1
ES-507, Review and Processing of Vendor Maintenance and Instruction Manuals, Revision 4
EMP-135.004, Reactor Trip Breaker Testing, Revision 2
ES-425, Cumulative Effects Program, Revision 3
ES-509, Disposition of Site Nonconformance, Revision 10
ES-514, Maintenance Rule Program Implementation, Revision 3 and Revision 4
ES-523, Functional Equipment Group and Functional Importance Determination Process, Revision 0
ES-560.211, CCW Heat Exchanger Performance, Revision 8
GTP-301, In-service Testing of Pumps Third Ten Year Interval, Revision 10
GTP-302, In-service Testing of Valves Third Ten Year Interval, Revision 15
ICP – 130.007, Total Make-up Flow IFT 00168 Calibration, Revision 7
ICP-240.119, Cleaning and Inspection of Instrumentation Cabinets, Revision 5
MMP-320.012, Charging/Safety Injection Pump Overhaul and Preventive Maintenance, Revision 14
MMP-445.026, Conversion of Copes Vulcan Valve Actuators From D-100 to D-1000, Revision 8
VC SUMMER SOP-106, Reactor Makeup Water System, Revision 11
VC SUMMER EOP-2.2, Transfer to Cold Leg Recirculation, Revision 14
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SAP-207A, Attachment II, Loss of Emergency Coolant Recirculation, EOP Step Deviation, Revision 4
SAP-1289, Check Valve Condition Monitoring Program, Revision 0
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STP-345.037, Solid State Protection System Actuation Logic and Master Relay Test Train A, Revision 17
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STP-123.003B, Train B Service Water System Valve Operability Test, STTS# - date: 0207991 – 8/9/2002; 0211250 – 11/9/2003; 0211908 – 10/18/2002; 0218462 – 1/26/200; 0301871 – 4/20/2003; 0304968 – 7/31/2003, 0310374 – 10/5/2003; 0314710 – 12/28/2003; 0400244 – 2/29/2004; 0406220 – 6/13/2004; 0411352 – 9/5/2004; 0416774 – 12/2/2004; 0419965 – 2/24/2005; 0502285 – 5/19/2005; 0505950 - 7/23/2005; 0510448 – 10/15/2005

STP-401.001, Pressurizer Safety Valve, ASME CODE SECTION XI TEST, STTS# - date: 0406037 – 5/5/2005; 0522608 – 10/26/2006; 712074001 - 5/1/2008; 0524388 – 1/8/2006; 0600317 – 4/20/2006; 0603900 – 4/28/2006; 0604069 – 7/13/2006;

PMTS 0216724, MOVATS Test for XVB09503B) 9/1/03
PMTS 0170638, MOVATS Test for XVB09503B 1/1/95
ES-560.211, CCW Heat Exchanger Performance Test 11/26/08
ES-560.211, CCW Heat Exchanger Performance Test 2/22/08
0525684, 7.2 kV Emerg Bus “A” U/V Trip Calb, performed 10/25/06
0525685, 7.2 kV Emerg Bus “B” U/V Trip Calb, performed 10/30/06
0613561, STP0125.021, performed 11/09/06
0703006-001, STP125.021, performed 05/27/08
0703006-001, STP125.021, performed 06/02/08
0808212-001, STP0345.037-XPN7010, performed 8/29/08
0707036-001, STP0506.004B-ES, performed 05/10/09
0707037-001, STP0506.004-ES, performed 05/17/09

OE Items

Letter from D.A. Nauman to NRC Document Control Desk, Response to NRC Bulletin 87-01, dated 09/01/1987
Letter from O.S. Bradham to NRC Document Control Desk, Response to NRC Bulletin 87-01, dated 12/02/1988
Letter from O.S. Bradham to NRC Document Control Desk, Response to Generic Letter 89-08, dated 06/26/1989
RTS# 910018, Industry Operating Experience Evaluation, NRC Information Notice 91-18
RTS# 970084, Industry Operating Experience Evaluation, NRC Information Notice 97-84
PIP 0-L-01-0001, IN 2000-20, Potential Loss of Redundant Safety-Related Equipment Because of the Lack of High-Energy Line Break Barriers
PIP 0-L-01-0099, IN 2001-09, Main Feedwater System Degradation in Safety-Related ASME Code Class 2 Piping Inside the Containment of a Pressurized Water Reactor
OE19938-Preliminary-(Summer) New Check Valve Would Not Pass Required Flow
NRC Information Notice 2001-06
Generic Letter 83-28, Required Actions Based on Generic Implications of Salem

ATWS Events, July 8, 1983
Generic Letter 90-03, Relaxation of Staff Position in Generic Letter 83-28, Item 2.2 Part 2 "Vendor Interface for Safety-Related Components" , March 20, 1990

Licensee Event Reports
50-285/1992-023, Reactor Trip Due to Inverter Malfunction and Subsequent Pressurizer Safety Valve Leak, Ft. Calhoun
50-285/1992-028, Partial Loss of Load Resulting in Pressurizer Safety Valve Lift and Subsequent Reactor Trip, Ft. Calhoun
50-317/1994-007, Reactor Trip Caused by Closure of Turbine Stop Valves, Calvert Cliffs 1

Condition Reports Reviewed During This Inspection (CRs)
PIP 0-L-01-0077, Evaluation of NRC Information Notice 2001-06
CR-05-02834, Charging pump oil level at 60% with no oil fill pipe
0-C-03-1484, ST lower than expected pump discharge pressure
0-C-06-0983, Extended PM frequency for pump motor lubrication
0-C-01-0136, Aux oil pump exhibiting abnormal noise and increased vibration
0-C-02-0508 3/4/02, Aux oil pump exhibiting high vibration
0-C-07-1067 3/25/07, Elevated noise from charging pump aux oil pump
CR-05-03218, Leaking Actuator Diaphragm for XVG09684B-CC
CR-03-02690, Degraded Thermal Performance of B CCW Heat Exchanger B
CR-03-02367, Degraded Thermal Performance of B CCW Heat Exchanger A
CR-07-03233, Adverse Trend in Heat Transfer CCW Heat Exchanger A and B
CR-07-03415, CCW Heat Exchanger B Thermal Performance at Action 1 Admin Limit
CR-03-00532, OPCRIT alarm for U1074
CR-03-01251, OPCRIT alarm for point U1074
CR-03-01344, Received several OPCRITS due to U1074 being close to warning setpoint
CR-03-01577, PZR SFTY/PORV DIFF TAILPIPE TEMP
CR-03-01125, B CCW Pump developed an outboard seal leak
CR-03-01670, B CCW pump had a seal leak on the outboard seal
CR-03-03216, B CCW Pump outboard seal is leaking less than 5 cc/min
CR-03-03375, During the STP250.001B inspection boron was identified
CR-03-04175, at 1217 the A Pressurizer Safety Tailpipe temperature alarmed
CR-04-00573, at 1322 on 03/01/04, annunciator “PRZ SAFETY VLV OPEN”
CR-04-00772, Received XCP-615 3-4 “PZR SAFETY VLV OPEN” alarm
CR-04-00888, Received XCP-615 3-4 “PZR SAFETY VLV OPEN” alarm
CR-04-01284, Ops building operator noted a small leak on both inboard and outboard seals
CR-04-01821, Received XCP-615 3-4 “PZR SAFETY VLV OPEN” alarm
CR-04-01832, Received XCP-615 3-4 “PZR SAFETY VLV OPEN” alarm
CR-04-01837, Spurious alarms received on XPN7298
CR-04-02972, Received alarm with no indication of actual safety valve actuation or leakage
CR-04-02979, Received several “PZR SAFETY VLV OPEN” alarms
CR-05-01438, While performing STP-250.001 found Boric Acid Leak (minor)
CR-05-01446, Boron leak found on body to bonnet mating surface
CR-06-01570, XVB03116C-SW did not stroke due to blown light bulb
CR-05-01645, The valve at location has wrong Champs ID tag
CR-06-02574, During shift rounds the aux building lower containment operator noted abnormal noise
CR-06-03106, Small CCW Leak on Inboard Seal Cooling Line

CR-06-03200, Puddle of Chromated Water Under B CCW Pump
CR-06-03420, Minor boron on the gasket connection of the body to bonnet
CR-06-03498, DISCOVERED SCRATCHES ACROSS THE MATING SURFACE
CR-06-03569, Pipe restraint (spacer plate) making contact with discharge pipe
CR-06-04077, Minor dried boron was found on the gasket area
CR-07-00325, Outboard Seal Leak on B CCW Pump
CR-05-01912, Stem Lock Plate on FCV-168B is Interfering with Actuator Frame in Open Position
CR-06-03569, Pipe restraint (spacer plate) making contact with discharge pipe on XVS08010B-RC
CR-99-00155, ASCO Cover Torque Value nit Updated to Recent Vendor Info
CR-02-00372, EMP-405.001 Vendor Manual Update not Approved
CR-05-0141, Loose wires on ESF Sequencer
CR-05-01419, Loose electrical terminations on ESF Sequencer B
CR-05-01820, Loose electrical terminations on ESF Sequencer A
CR-06 -04033, Parr reverse power relay did not work as expected
CR-07-00505, Close in fault at Parr
CR-08-01710, Service life for Reactor Trip Breakers exceeded
CR-08-02381, Failure of STP-125.021
CR-08-02477, Spurious operations of reverse power relay
NCN 05-1419, Part 21 Evaluation for loose wires on ESF Sequencer
06-01359, OOT founded while calibrating pressure switches, 04/24/06
04-03386, Operator inadvertently actuated the undervoltage test switch, 10/27/04
05-02108, Unsated test STP 125.015, 05/20/05
00-00632, “B” train ESF loading sequencer failed its auto test, 05/20/00
08-02316,During performance of STP125.015 XPP0001C Started, 05/25/08
CER-04-0067
CER-04-3920
CER/NCN-06-0345

Work Orders
WO 0515076, Valve and I/P Calibration of FCV-168B, 10/26/2006
WO 0603023, IFT00168 Calibration per ICP-130.007, 8/8/2006
WO 0515250, IFT00168 Calibration per ICP-130.007, 10/25/2006
WO 0405058, Perform Diagnostic Test on Valve FCV00168B-CS, 3/8/2004
WO 0108882, Adjust Package or Repack Valve FCV00168B-CS, 5/4/2002
WO-0508041, “B” Pressurizer Safety Valve testing. Remove safety valve from system and install spare, dated 05/30/05
WO 0612837, Resolve interference contact per NCN 06-3569, dated 11/05/06
WO 0706847-001, STP0215.008 RH Test 6/6/08
WO 0802974-001, STP0222.002 CC Test 4/6/08
WO 0712083-001, STP0222.002 CC Test 5/9/08
WO 0804827-001, STP0222.002 CC Test 7/13/08
WO 0808391-001, STP0222.002 CC Test 8/10/08
WO 0525454, condition monitoring inspection for XVC08481B
WO 9807860, B charging pump threaded connection oil leak
WO 9708100, B charging pump modification lube oil cooler piping
WO 0309020, B charging pump lube oil cooler chromate deposit
WO 0701451, diaphragm replacement for XVG09684B-CC
WO 0511749, replace leaking diaphragm for XVG09684B
WO 0612441, AOV diagnostic for XVG09684B-CC
WO 0705095, oil sump level at 50%

WO 0601503, oil sump level at 50%
WO 0609494, add oil
WO 0509729, oil sump level at 60%, add oil
WO 0104204, oil sump level at 50%, add oil
WO 0527706, Calibration IA standby compressor low lube oil pressure switch, 12/18/05
WO 0002322, Calibration IA standby compressor hi discharge air pressure switch, 2/8/00
WO 0302169, Calibration IA standby compressor hi discharge air pressure switch, 2/12/03
WO 0527705, Calibration IA standby compressor hi discharge air pressure switch, 2/18/05
WO 0604382, Calibration breathing air monoxide monitor, 4/23/06
WO 0418551, Calibration breathing air monoxide monitor, 10/3/04
WO 0614320, Inspection and cleaning of supplemental instrument air compressor XAC0012-IA breaker, 12/10/06
WO 0419408, Test refurbished spare breaker per EMP0405.002, 10/21/04
WO 0527697, Calibration of pressure control switch IPS08300A, 12/18/05
WO 0302164, Calibration of pressure control switch IPS08300A, 2/12/03
WO 0002318, Calibration of pressure control switch IPS08300A, 2/08/00
WO 9705039, Calibration of pressure control switch IPS08300A, 3/12/97
WO 0803211, Run compressor aligned to header 15 minutes, 7/5/08
WO 0402017, Replacement of air supply solenoid for XVA02659-IA, 6/30/05
WO 0402018, Functional test of IA back-up supply isolation valve, 2/6/04
WO 0527808, Calibration of pressure switch IPS08388, 1/28/07
WO 0209893, Calibration of pressure switch IPS08388, 2/8/98
WO 0706747, Train A integrated safeguards test STP 125.010, 6/3/08
WO 0706749, STP 125.011 Train B integrated safeguards test, 4/2/08
WO 0513513, STP 125.017 D/G “A” loss of offsite power, 11/30/06
WO 0802839, STP 125.017 D/G “A” loss of offsite power, 5/25/08
WO 0706756, STP 125.018 D/G “B” loss of offsite power, 6/3/08
WO 0513522, STP 125.018 D/G “B” loss of offsite power, 11/30/06
WO 0806851, STP 125.002A D/G “A” operability test, 7/2/08
WO 0808080, STP 125.002A D/G “A” operability test, 7/30/08
WO 0805558, STP 125.002B D/G “B” operability test, 6/19/08
WO 0806786, STP 125.002B D/G “B” operability test, 7/16/08
WO 0706750, STP 125.015 ESF load sequencer output 5 test, 5/25/08
WO 0513433, STP 125.015 ESF load sequencer output 5 test, 11/30/06
WO 0407453, STP 125.008 D/G “A” refueling operability test perform “A” DG 24 hour run, 8/19/05
WO 0606506, STP 125.008 D/G “A” refueling operability test perform “A” DG 24 hour run, 10/3/06
WO 0800282, STP 125.009 D/G “B” refueling operability test perform “B” DG 24 hour run, 2/28/08
WO 0605397, STP 125.009 D/G “B” refueling operability test perform “B” DG 24 hour run, 9/28/06
WO 9313120, Inspect contacts 7 & 8 on relay K17 for signs of deterioration, 4/27/93
WO 0001292-001, Circuit Switcher 1826 for Trans XTF0004
WO 0004276-001, Remove pin to defeat mech interlock
WO 0403547, Clean and Inspect XPN6025, 04/27/05
WO 0524160, RX Trip Breaker Test, 03/29/06
WO 0524281, RX Trip Breaker Test, 04/11/06
WO 0524282, RX Trip Breaker Test, 04/18/06

WO 0524280, RX Trip Breaker Test, 05/18/06
WO 0519265, Clean and Inspect XPN6025, 10/29/06
WO 0710612-001, Reactor Trip Breaker Test, 04/26/08
WO 0710611-001, Reactor Trip Breaker Test, 04/26/08
WO 0710607-002, Reactor Trip Breaker Test, 05/19/08
WO 0710610-002, Reactor Trip Breaker Test, 05/19/08
WO 0710613-002, Reactor Trip Breaker Test, 05/26/08
WO 0707036-001, WO 0405024, WO 0414706, WO 0501813

Drawings
21-304-238-462 Sh. 1, Siemens Control Diagram, Revision 03
21-304-238-462 Sh. 2, Siemens Control Diagram, Revision 03
B-208-011 Sh. 2, Electrical Maintenance Diagram Component Cooling 'B' Pump (XPP1B), Revision 19
B-208-011 Sh. 4, Electrical Elementary Diagram Component Cooling 'C' Pump (XPP1C) (Channel B), Revision 19
B-208-021 Sh. 13, Electrical Elementary Diagram Charging Pump 1A Miniflow Valve 8109A (XVT8109A), Revision 11
B-208-021 Sh. 14, Electrical Elementary Diagram Charging Pump 1B Miniflow Valve 8109B (XVT8109B), Revision 11
B-208-021 Sh. 15, Electrical Elementary Diagram Charging Pump 1C Miniflow Valve 8109C (XVT8109C), Revision 11
B-208-021 Sh. 35, Electrical Elementary Diagram Refueling Water Supply Line Stop Valve LCV-115D (XVG0115D), Revision 12
B-208-037 Sh. 67A, 7.2kV Bus 1DB Undervoltage Relaying, Revision 11
B-208-037 Sh. 67B, 7.2kV Bus 1DB Undervoltage Relaying, Revision 11
B-208-037 Sh. 96, Circuit Switcher XES4, Revision 1
B-208-037 Sh. 97, Circuit Switcher XES5, Revision 1
B-208-084 Sh. 2, Electrical Elementary Diagram Residual Heat Removal Pump B, Revision 7
B-208-101 Sh 22, Electrical Elementary Diagram Service Water Pump C Discharge Valve (XVB3116C), Revision 9
B-208-057, Supplemental Instrument Air Compressor XAC-012-IA, Sheet IA07, Revision6
B-208-057, Reactor Building Instrument Air Compressor XAC0004A, Sheet IA05, Revision2
B-208-057, Reactor Building Instrument Air Compressor XAC0004B, Sheet IA06, Revision1
B-208-057, Instrument Air Compressor XAC0003A, Sheet IA01, Revision 9
B-208-057, Instrument Air Compressor XAC0003B, Sheet IA02, Revision 9
B-208-057, R.B Backup Air Supply XVA-2659, Revision 3
B-208-032, Motor driven EFW Pump B, Sheet EF02, Revision 6
B-208-084, Residual Heat Removal Pump B, Sheet RH02, Revision 7
B-208-011, Component Cooling "B" Pump, Sheet CC02, Revision 19
B-208-101, Service Water Pump C, Sheet SW04, Revision 9
CGE-2-2100, ISI Isometric Drawing: Main Stream "A" Loop, Revision 4
CGE-2-2101, ISI Isometric Drawing: Main Stream "A" Loop, Revision 4
CGE-2-2200, ISI Isometric Drawing: Main Stream "B" Loop, Revision 4
CGE-2-2201, ISI Isometric Drawing: Main Stream "B" Loop, Revision 3
CGE-2-2300, ISI Isometric Drawing: Main Stream "C" Loop, Revision 2
CGE-2-2301, ISI Isometric Drawing: Main Stream "C" Loop, Revision 1

C-314-011, Piping Analysis Diagram: Main Steam From Penetration 428 to Manifold, Revision 6
C-314-011, Piping Analysis Diagram: Main Steam From Steam Generator “A” to Penetration 428, Revision 6
C-314-601 Sheet 3, Piping Analysis Diagram Reactor Coolant – Pressurizer Safety, Revision 5
C-314-601 Sheet 2, Piping Analysis Diagram Reactor Coolant – Pressurizer Safety, Revision 8
D-302-011, Piping System Flow Diagram: Main Steam (Nuclear), Revision 39
D-302-012, Piping System Flow Diagram: Main Steam (Non-Nuclear), Revision 29
D-302-221, Piping System Flow Diagram – Service Water Cooling, Revision 26
D-302-611, Piping System Flow Diagram – Component Cooling, Revision 38
D-302-791, Reactor Make-Up Water System, Revision 24
D-302-611, Component Cooling System Flow Diagram, Revision 38
D-302-614, Component Cooling System to NSSS Pumps Flow Diagram, Revision 14
D-302-651, Spent Fuel Cooling System Flow Diagram, Revision 42
D-302-273, Reactor Building Instrument Air Service, Revision 18
D-302-271, System Flow Diagram Instrument Air, Revision 38
D-302-274, System Flow Diagram Instrument Air Backup, Revision 13
D-203-203, ESF Loading Sequence System, Revision 1
D-208-108, Elementary Diagram Cooling Unit Fan, Revision 7
E-206-005, Simplified Plant Electrical Distribution, Revision 22
E-206-011, One Line and Relay Diagram Balance of Plant Power System, Revision 19
E-206-012, One Line and Relay Diagram Engineered Safety Features Power System, Revision 28
E-206-034, One Line and Relay Diagram, Revision 19
E-302-641, Residual Heat Removal System Flow Diagram, Revision 19E-302-601,
E-302-601, Reactor System Flow Diagram, Revision 18
E-302-602, Reactor Coolant System, Revision 28
E-302-675, Chemical and Volume Control System Flow Diagram, Revision 25
E-302-677, Chemical and Volume Control System, Revision 11
E-302-791, Chemical and Volume Control System, Revision 25
E-302-691, Safety Injection System Flow Diagram, Revision 13
E-302-692, Safety Injection System Flow Diagram, Revision 12
E-302-693, Safety Injection System Flow Diagram, Revision 21
E-49179, Assembly for Type IJ pump (Charging), Revision 2
1MS-25-172-3, 2” Globe Valve, Revision D
1MS-12-018, Charging Pump Oil Cooler, Revision 1
1MS-25-940, 2”-150 Double Disc Gate Valve, Revision 0
1-MS-25-069-7, 8” Wedge Disc Gate Valve, Revision 8
1-MS-25-572, 20” Butterfly Valve, Revision 2
1-MS-50-036, Model D-1000-60 Operator 2”-150 lb ANSI Standard Valve Assembly, Revision 5
S-321-601 Sheet 093A, Pipe Support MK-RCH-093, Revision 11
S-321-601 Sheet 093B, Pipe Support MK-RCH-093, Revision 10
S-321-601 Sheet 093C, Pipe Support MK-RCH-093, Revision 10
S-321-601 Sheet 093D, Pipe Support MK-RCH-093, Revision 10
S-321-601 Sheet 093E, Pipe Support MK-RCH-093, Revision 10
S-321-601 Sheet 093F, Pipe Support MK-RCH-093, Revision 10
S-321-601 Sheet 093G, Pipe Support MK-RCH-093, Revision 10
S-321-601 Sheet 093H, Pipe Support MK-RCH-093, Revision 10
S-321-601 Sheet 093J, Pipe Support MK-RCH-093, Revision 10

S-321-601 Sheet 094E, Pipe Support MK-RCH-094, Revision 10
S-321-601 Sheet 095E, Pipe Support MK-RCH-095, Revision 9

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MS-94B-003, Installation Operation and Maintenance Instructions for Copes-Vulcan Type D-100 Air Operated Control Valves
MS-94B-405, Henry Pratt Co., 1100 Nuclear Class Valves
MS-94B-025-7, Charging/Safety Injection Pump, Revision (None)
MS-94B-0346, Charging Pump Mini-Flow Valve XVT08109B-CS, Revision 5
MS-94B-0236, Charging Pump Suction Valve to RWST LCV0115D, Revision 0
MS-94B-1405, Double Disc Gate Valves with AOV Operator XVG09684B-CC, Revision (None)
MS-94B-073, Westinghouse Auxiliary (RH) Heat Exchangers, Revision 1
MS-94B-405, 20" Butterfly Valve XVB09503B-CC, Revision 1
MS-94B-722, CCW Heat Exchanger, Revision None
Rockwell Edward Univalves Service Manual V375-R1 (XVC08443-CS)
Rockwell Edward Forged Steel Valves for Nuclear Applications V-321 (XVC08433-CS)
MS-076-022, Distribution Transformer Instruction Manual, Revision 0
MS-94B-1066, Westinghouse Maintenance Program Manual for Safety Related Type DS Low Voltage Metal Enclosed Switchgear, Revision 10
I.B. 32-690-A, Instructions for Type DS Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear Assemblies, July, 1976
IMS-94B-468, Low Voltage Metal Enclosed Switchgear – Reactor Trip Switchgear, Revision 2
W-TB-00-01-R0, Westinghouse DS Circuit Breaker Issues, April 24, 2000

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Chemical and Volume Control System Design Basis Document, Revision 10
Component Cooling Water System Design Basis Document, Revision 10
Reactor Cooling System, Revision 7
Residual Heat Removal System Design Basis Document, Revision 10
Service Water System, Revision 10
Safety Injection System Design Basis Document, Revision 10
MOV Scoping and Grouping, Vol. 1 (MV1), Revision 6
MOV Design Review, Capability, and Setup, Vol. 2, Revision 4

Miscellaneous Documents
VCS Manual ISE-5, Third Interval Inservice Inspection Program Plan for VC Summer Nuclear Station, Revision 1
VCSU-003-C01, Risk Informed Inservice Inspection Periodic Evaluation for VC Summer Nuclear Station Unit 1, Revision 0
Design Basis Document – Main Steam System, Revision 6
DSP-544B, Main Steam (Nuclear) System Piping and Pipe Supports, Revision 11
MRF 90102, Uprate Evaluations, Section 7.0, Main Steam System
Ultrasonic Examination Reports VCSU-1392, VCSU-1359, 99UT-007, 99UT-008
Magnetic Particle Examination Reports 99MT-006, 99MT-007
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CRs Initiated as a Result of Inspection

CR-08-03469, No evaluation of effect of loose connections on ESF Sequencer during seismic event in CR-05-01419
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CR-08-03512, 8429-CS, Boric Acid Blender Inlet Header Check Valve not modeled in PRA
CR-08-03531, FAC report indicates excessive wear on component and should be re-inspected
CR-08-03731, NRC Inspectors review of design calculation DC08200-001 expressed concerns with the degraded voltage relay setting and analysis
CR-08-03689, Incorporate Justification for 145.5F Charging Pump Oil Temperature
CR-08-03841, Procedural guidance for checking for tightness of terminations
CR-08-03843, Evaluate Procedure Note Allowing 10% Water in Charging Pump Lube Oil
CR-08-03848, CR-08-07710 did not evaluate maintenance requirements for RTBs
CR-08-03855, No guidance for Parr Hydro Operators in Plant Procedures
CR-08-03857, Update FSAR to Reflect CCW HX Design Basis with 92F Service Water
CR-08-03862, Voltage Drops Observed in 2006 STP-125.021
CR-08-03863, Performance of Reverse Power Relay during 2006 STP-125.021
CR-08-03890, Tech Manual for IPS08300A,B does not cover the existing pressure switches installed for these equipment numbers.
CR-08-03894, The setpoint database specifies different tolerance value for IPS08300A than the manufacturer
CR-08-03905, Incomplete Evaluation NRC IN 2001-06 for Thrust Bearing Loading
CR-08-03918, From NRC walkdown of IA, copper tubing downstream of XTP5013A/B on XAC0003B is banged up and needs replacement
CR-08-03926, Temperature in IB-436 near 7.3 kV switchgear appears higher than conditions in Westinghouse Calc CN-CDBT-92-374
CR-08-03931, Commitment to G.L. 90-03 for periodic vendor contact
CR-08-03948, Documents walkdown items of XTF5052 and procedures during CDBI
CR-08-03949, Documents walkdown items of ESF 7.2kV switchgear rooms during CDBI
CR-08-03989, No PM on 1A Standby Air Compressor discharge air temperature instrument switch