



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

July 31, 2012

EA-12-139

Mr. Thomas D. Gatlin
Vice President - Nuclear Operations
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
P.O. Box 88
Jenkinsville, SC 29065

**SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION - NRC TRIENNIAL FIRE
PROTECTION INSPECTION REPORT 05000395/2012007 AND EXERCISE OF
ENFORCEMENT DISCRETION**

Dear Mr. Gatlin:

On May 25, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Virgil C. Summer Nuclear Station, Unit 1. The enclosed inspection report documents the inspection results, which were discussed with you and other members of your staff on May 25, 2012. Following completion of additional post-inspection analysis of the inspection findings by the NRC in the Region II office, a final exit meeting was held by telephone with Mr. Bruce Thompson, Manager, Nuclear Licensing and other members of your staff on July 3, 2012, to provide an update on changes to the preliminary inspection findings.

The inspection examined activities conducted under your license as they related 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.

The report documents two NRC-identified findings of very low safety significance (Green), which were also determined to involve violations of NRC requirements. However, because of the very low safety significance of these issues and because they were entered into your corrective action program, the NRC is treating these as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Virgil C. Summer Unit 1 Station.

In addition, if you disagree with the cross-cutting aspects assigned to the findings in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, RII, and the NRC Senior Resident Inspector at the Virgil C. Summer Unit 1 Nuclear Station.

The enclosed report also documents a noncompliance for which the NRC is exercising enforcement discretion in accordance with Section 9.1 of the NRC Enforcement Policy, "Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)." The noncompliance involved a failure to ensure that alternative shutdown equipment remained operable and available. To address this noncompliance, you implemented compensatory measures which included posting roving fire watches in the fire areas of concern, installing temporary jumpers, and revising fire emergency procedures. You also committed to restoring compliance by implementing design changes, as a part of your NFPA 805 transition process. The NRC is not taking enforcement action for this noncompliance because it meets the criteria of the NRC's interim enforcement policy regarding enforcement discretion for certain fire protection issues. In this case, the NRC concluded that: (1) South Carolina Electric & Gas entered the noncompliance into its corrective action program and implemented appropriate compensatory measures; (2) the noncompliance was not associated with a finding that the reactor oversight process significance determination process would evaluate as Red; (3) the noncompliance was not willful; and (4) South Carolina Electric & Gas had committed to transition to 10 CFR 50.48(c), which includes approaches in National Fire Protection Association Standard 805-2001 Edition (NFPA 805). Based on the results of the NRC's inspection and assessment, I have been authorized, after consultation with the Regional Administrator, to exercise enforcement discretion in accordance with Section 9.1 of the NRC Enforcement Policy, and refrain from issuing enforcement for this noncompliance. Furthermore, based on the corrective actions, and in accordance with NRC Inspection Manual Chapter 0305, Section 11.05, "Treatment of Items Associated with Enforcement Discretion," subsection 11.05.b, the NRC will refrain from including the noncompliance in the Agency Action Matrix.

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 Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Michael F. King, Chief
Engineering Branch 2
Division of Reactor Safety

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

Enclosure: Inspection Report 05000395/2012007
w/Attachment: Supplemental Information

cc w/encl.: (See page 3)

In addition, if you disagree with the cross-cutting aspects assigned to the findings in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, RII, and the NRC Senior Resident Inspector at the Virgil C. Summer Unit 1 Nuclear Station.

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cc w/encl.: (See page 3)

☐ PUBLICLY AVAILABLE

☐ NON-PUBLICLY AVAILABLE

☐ SENSITIVE

☐ NON-SENSITIVE

ADAMS: ☐ Yes

ACCESSION NUMBER: _____

☐ SUNSI REVIEW COMPLETE ☐ FORM 665 ATTACHED

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NAME	GWISEM AN	D. MAS	JMONTGOMERY	LSUGGS	MTHOMAS	MKING	GMCCOY	SSPARKS
DATE	7/ 2/2012	7/ 2/2012	7/27/2012	7/ /2012	7/ 2 /2012	7/31/2012	Q7/ /2012	7/ /2012
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Jenkinsville, SC 29065

Letter to Thomas D. Gatlin from Michael F. King dated July 31, 2012.

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION - NRC TRIENNIAL FIRE
PROTECTION INSPECTION REPORT 05000395/2012007 AND EXERCISE OF
ENFORCEMENT DISCRETION

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-395

License Nos.: NPF-12

Report Nos.: 05000395/2012007

Licensee: South Carolina Electric & Gas (SCE&G) Company

Facility: Virgil C. Summer Nuclear Station

Location: P.O. Box 88
Jenkinsville, SC 29065

Dates: May 7 – 11, 2012 (Week 1)
May 21 – 25, 2012 (Week 2)

Inspectors: G. Wiseman, Senior Reactor Inspector (Lead Inspector)
M. Thomas, Senior Reactor Inspector
L. Suggs, Reactor Inspector
J. Montgomery, Reactor Inspector

Accompanying
Personnel: D. Mas, Reactor Inspector (Training)

Approved by: Michael King, Chief
Engineering Branch 2
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000395/2012-007; 05/07-11/2012 and 05/21-25/2012; Virgil C. Summer Nuclear Station; Fire Protection.

This report covers an announced two-week triennial fire protection inspection composed of a team of five regional inspectors. Two Green non-cited violations were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after U.S. Nuclear Regulatory Commission (NRC) management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. An NRC identified non-cited violation of V.C. Summer Technical Specification 6.8.1.e., Procedures and Programs – Emergency Plan, was identified related to the emergency plan procedural duties of the Shift Engineer (SE)/Shift Technical Advisor (STA) during off-normal events. Specifically, fire emergency procedures (FEPs) 1.0, 2.0, 3.0, and 4.0 assigned actions that would be performed by the SE during fire events which conflicted with the V.C. Summer Emergency Plan Procedure EP-100 requirement that the SE perform the duties of the STA of assessing and advising the Shift Supervisor during off-normal events. The licensee entered this issue in their corrective action program as Condition Report 12-02035 and implemented fire watch compensatory measures in the fire areas/fire zones where the FEPs assigned actions to be performed by the SE that were outside the main control room.

The licensee's failure to comply with Technical Specification 6.8.1.e. was a performance deficiency. The finding was more than minor because it negatively impacted the Emergency Response Organization (ERO) Readiness Attribute of the Emergency Preparedness cornerstone objective to ensure that the licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. This finding was determined to be of very low safety significance (Green) using NRC Inspection Manual Chapter 0609, Appendix B, Emergency Preparedness Significance Determination Process (Section 5.2, Table 5.2.1), because there were no actual instances of entry into the FEPs in which shortages of the emergency plan minimum staffing occurred. The inspectors determined that there was no cross-cutting aspect associated with this finding because the licensee's decision to use the SE/STA to perform safe shutdown actions occurred before the 1985 revision of the Fire Protection Evaluation Report (FPER) and was not reflective of current licensee performance. (Section 1R05.05)

- Green. An NRC identified non-cited violation of License Condition 2.C (18), "Fire Protection System," was identified for the licensee's failure to provide readily available equipment to support the implementation of cold shutdown fire emergency procedures (FEPs). Specifically, the licensee failed to ensure that cold shutdown equipment will be readily available to implement Cold Shutdown Procedures FEP- 4.1 and EMP-100.002.

Enclosure

The licensee documented the deficiencies in Condition Reports 12-01975, 12-01948 and 12-01939. The licensee took immediate corrective action to replace all the missing equipment and performed an extent of condition to verify all other equipment identified in procedure FEP-4.1 was available and included on appropriate inventory lists.

The licensee's failure to ensure that cold shutdown equipment was readily available to implement cold shutdown Procedures FEP-4.1 and EMP-100.002 as written was a performance deficiency. The performance deficiency was more than minor because it was associated with the configuration control attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events (fire) to prevent undesirable consequences. The finding was evaluated for safety significance using NRC Inspection Manual Chapter 0609, Appendix F. Since the finding was related to the ability to achieve and maintain cold shutdown, the finding had very low safety significance (Green) from the Phase 1 evaluation. This performance deficiency had a cross-cutting aspect in the area of human performance associated with resources because the licensee did not have adequate and available facilities and equipment to ensure nuclear safety. Specifically, personnel did not have required equipment to implement the cold shut down procedures readily available in the designated areas [H.2 (d)]. (Section 1R05.09)

B. Licensee Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R05 Fire Protection

This report documents the results of a triennial fire protection inspection of the Virgil C. Summer Nuclear Station (VCSNS), Unit 1. The inspection was conducted in accordance with the guidance provided in NRC Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)," dated October 28, 2011. The objective of the inspection was to review a minimum sample of three risk-significant fire areas (FAs) to evaluate implementation of the fire protection program (FPP) as described in the VCSNS Updated Final Safety Analysis Report (UFSAR) and Fire Protection Evaluation Report (FPER); and to review site specific implementation of at least one mitigating strategy from Section B.5.b of NRC Order EA-02-026, "Order for Interim Safeguards and Security Compensatory Measures" (commonly referred to as B.5.b), as well as the storage, maintenance, and testing of B.5.b mitigating equipment. The sample FAs, and associated fire zones (FZs) were chosen based on a review of available risk information as analyzed by a senior reactor analyst from Region II, a review of previous inspection results, plant walk-downs of FA/FZs, consideration of relational characteristics of combustible material to targets, and location of equipment needed to achieve and maintain safe shutdown (SSD) of the reactor. In selecting a B.5.b mitigating strategy sample, the inspectors reviewed licensee submittal letters, safety evaluation reports (SER), licensee commitments, B.5.b implementing procedures, and previous NRC inspection reports (IR). Section 71111.05-02 of the IP specifies a minimum sample size of three FAs and one B.5.b implementing strategy for addressing large fires and explosions. This inspection fulfilled the requirements of the procedure by selecting a sample of three FAs and one B.5.b mitigating strategy. The FAs chosen were identified as follows:

1. Control Building (CB), 436 foot elevation, FA CB-6 (Room 36-11, Relay Room).
2. Auxiliary Building (AB), 463 foot elevation, FA AB-1/ FZs AB-1.21.1 and AB-1.21.2 (Rooms 63- 9, -14, -16, -19, Operating Floor).
3. Service Water Pump House (SWPH), 425 foot elevation, FA SWPH-2 (Room 25-04, Electrical Equipment Room C).

The inspectors evaluated the licensee's FPP against applicable requirements, including VCSNS Operating License Condition 2.C (18), "Fire Protection Program;" Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix A, General Design Criteria 3, "Fire Protection;" 10 CFR Part 50, Appendix R Subsections III.G, III.J, III.L, and III.O; 10 CFR 50.48, "Fire Protection;" Appendix A to NRC Auxiliary Power Conversion System Branch (APCSB) Branch Technical Position (BTP) 9.5-1, "Guidelines For Fire Protection For Nuclear Power Plants," August 1976; VCSNS Safety Evaluation Report, NUREG 0717 with Supplements 3 and 4; VCSNS UFSAR Section 9.5.1, "Fire Protection System;" other related NRC SERs; and, plant Technical Specifications. The review of

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the B.5.b mitigating strategies was based on the VCSNS Operating License Condition 2.C (34), "Mitigation Strategy License Condition;" licensee B.5.b submittals; and related NRC SERs. The inspectors evaluated all areas of this inspection, as documented below, against these requirements. Specific licensing basis documents reviewed are listed in the Attachment.

.01 Protection of Safe Shutdown Capabilities

a. Inspection Scope

For the selected FA/FZs, the inspectors performed physical walk-downs to observe: (1) the material condition of fire protection systems and equipment; (2) the storage of permanent and transient combustibles; (3) the proximity of fire hazards to cables relied upon for safe shutdown; and (4) the licensee's implementation of procedures and processes for limiting fire hazards, housekeeping practices, and compensatory measures for inoperable or degraded fire protection systems and credited fire barriers.

Methodology

Cable routing information by FA was reviewed for a selected sample of safe shutdown components to verify that the associated cables would not be damaged by a fire in the selected fire areas or the licensee's analysis determined that the fire damage would not prohibit safe shutdown. The inspectors reviewed conduit and cable-tray layout drawings, as well as field walk downs of the cable routing to confirm that at least one train of redundant cables routed in the FA/FZs were adequately protected from fire damage. The inspectors reviewed the FPER for the selected FAs/FZs and compared it to the fire emergency procedures (FEPs) to verify that equipment identified in the FPER and FEPs as being required for post-fire SSD was adequately protected from fire damage in accordance with the requirements of 10 CFR 50, Appendix R, Section III.G, "Fire Protection of Safe Shutdown Capability" and the FPP. In cases where local operator manual actions (OMAs) were credited in-lieu of cable protection of SSD equipment, the inspectors reviewed the OMAs to verify that the OMAs were feasible utilizing the guidance of NRC IP 71111.05T, paragraph 02.02.j.2. A list of SSD components examined for cable routing is included in the Attachment.

Operational Implementation

The inspectors reviewed applicable sections of FEP 1.0, "Fire Emergency Procedure Selection," FEP 2.0, "Train A Plant Shutdown to Hot Standby Due to Fire," and FEP 3.0, "Train B Plant Shutdown to Hot Standby Due to Fire," for FA AB-1/FZs AB-1.21.1 and AB-1.21.2; and FA SWPH-2 to verify that the shutdown methodology properly identified the systems and components necessary to achieve and maintain SSD conditions. The inspectors performed a walk-through of the FEP procedure steps to ensure the implementation and human factors adequacy of the procedures. The inspectors verified that licensee personnel credited for procedure implementation had procedures available, were trained on implementation, and were available in the event a fire occurred. The inspectors also reviewed selected operator actions to verify that the operators could reasonably be expected to perform the specific actions within the time required to maintain plant parameters within specified limits.

b. Findings

No findings were identified.

.02 Passive Fire Protection

a. Inspection Scope

For the selected FA/FZs, the inspectors evaluated the adequacy of fire barrier walls, ceilings, floors, electrical cable tray fire stops, fire doors, and fire dampers. The inspectors walked down accessible portions of the selected FA/FZs to observe material condition of the fire barriers to identify any potential degradation or non-conformances. The inspectors compared the installed configurations to the approved construction details, standard industry practices, and supporting fire endurance test data, which established the fire resistance ratings of the selected fire barriers to assure that the respective fire barriers met the requirements of 10 CFR 50, Appendix R, Section III.G, and Appendix A of BTP APCSB 9.5-1. A sample of completed surveillance and maintenance procedures for selected fire doors, fire dampers, and fire walls was reviewed to ensure that these passive fire barrier features were properly inspected and maintained.

In addition, the inspectors reviewed recent test results for the relay room (FA CB-6) fire damper functionality test; and inspection records of electrical cable tray fire stops and fire separation barriers for the selected areas; to verify whether the inspection and testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified. The fire protection features included in the review are listed in the Attachment.

b. Findings

No findings were identified

.03 Active Fire Protection

a. Inspection Scope

The inspectors performed in-plant observations of the material condition and operational line-up of fire detection, fire protection water supply, automatic pre-action sprinkler systems, carbon dioxide fire extinguishing systems, and manual fire hose and standpipe systems. The inspectors reviewed the fire protection water supply system, operational valve lineups associated with the electric motor-driven fire pump, the diesel engine-driven fire pump and, the fire main piping distribution system. Using operating and valve alignment procedures as well as engineering drawings, the inspectors examined selected fire pumps and accessible portions of the fire main piping system to evaluate material condition, consistency of as-built configurations with engineering drawings, and to verify correct system valve lineups. In addition, the inspectors reviewed completed periodic surveillance procedures for the fire pumps and fire main loop to assess whether the test program was sufficient to validate proper operation of the fire protection water supply system in accordance with its design requirements.

The inspectors evaluated the fire detection and suppression systems in the selected FA/FZs to determine whether they were installed, tested, maintained, and operated in accordance with NRC requirements and approved exemptions, National Fire Protection Association (NFPA) codes of record, and VCSNS's FPP, as approved by the NRC. The inspectors also assessed whether the suppression system's capabilities were adequate to control and/or extinguish fires associated with the hazards in the selected areas. With respect to FA CB-6, the inspectors compared detector layout drawings, calculations, ceiling beam location drawings, ceiling beam schedule drawings and actual field locations of detectors against the NFPA 72E code of record (1978 edition) for detector spacing and placement requirements.

The inspectors reviewed the adequacy of the design and installation of the gaseous low pressure automatic carbon dioxide (CO₂) fire suppression systems in FA CB-6 (relay room). This review included CO₂ fire suppression system controls to ensure accessibility and functionality of the system and associated ventilation system fire/CO₂ isolation dampers. The inspectors also examined licensee design calculations, vendor certifications, and pre-operational test data to verify the required quantity of CO₂ for the area was available. Review of recent surveillance testing of the suppression systems and associated detection systems was performed to verify that system functionality was being maintained.

For the selected FA/FZs the inspectors compared the pre-fire plan strategy of each area to existing plant layout and equipment configurations and the fire response procedures. The inspectors assessed the condition of firefighting and smoke removal equipment by inspecting the equipment located in the fire brigade equipment staging and storage areas. The inspectors reviewed fire brigade drill planning, offsite fire department communications and staging procedures, and fire drill critique records for drills performed in the control building, auxiliary building, and the SWPH conducted in 2011 and 2012. Specific fire brigade attributes evaluated were: (1) staffing, training, and response strategies; (2) utilization of pre-fire planning; (3) fitness for duty and qualification training; (4) equipment lockers, offsite fire department communications, and staging procedures; and (5) personal protective equipment and emergency lighting to assess the fire brigade readiness to respond to any and all fires that may occur. The documents included in the review are listed in the Attachment.

b. Findings

No findings were identified.

.04 Protection From Damage From Fire Suppression Activities

a. Inspection Scope

The inspectors performed plant walk-downs and document reviews to verify that redundant trains of systems required for hot shutdown, which are located in the same fire area, would not be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems. Specifically, the inspectors verified that:

- A fire in one of the selected areas would not directly, through production of smoke, heat, or hot gases, cause activation of suppression systems that could potentially damage all redundant safe shutdown trains.
- A fire in one of the selected areas or the inadvertent actuation or rupture of a fire suppression system would not directly cause damage to all redundant trains.
- Adequate drainage is provided in areas protected by water suppression systems.

The inspectors reviewed the separation of safe shutdown cables, equipment, and components within the same fire areas, and reviewed the methodology for meeting the requirements of 10 CFR 50.48, Appendix A to Branch Technical Position 9.5-1 and 10 CFR Part 50, Appendix R, Section III.G. Specifically, this was to determine whether at least one post-fire safe shutdown success path was free of fire damage in the event of a fire in the selected areas. Also, air flow paths out of the selected areas were reviewed to verify that inter-area migration of smoke, hot gases or CO₂ would not adversely affect SSD. Additionally, the inspectors measured curb heights above the floor for installed equipment and visually checked floor slope to determine if water could inadvertently pool in such a manner as to adversely affect SSD equipment.

b. Findings

No findings were identified.

.05 Alternative Shutdown Capability

a. Inspection Scope

Methodology

For a postulated fire in FA CB-6, the licensee credited alternative shutdown capability (the capability to achieve SSD outside the main control room (MCR)) in areas where redundant trains of equipment required for hot shutdown were located in the same FA and may be subject to damage from a single fire, from fire suppression activities, or from the rupture or inadvertent operation of fire suppression systems. The inspectors reviewed UFSAR Section 9.5.1, the FPER, and corresponding procedures FEP 1.0 and FEP 4.0, "Control Room Evacuation Due to Fire," to ensure that appropriate controls provided reasonable assurance that alternative shutdown equipment remained operable, available, and accessible when required. In cases where local OMAs were credited in lieu of cable protection of SSD components, the inspectors performed a walk-through of the procedures to verify that the OMAs were feasible. The inspectors reviewed records of the most recently completed functional tests for a sample of the Appendix R transfer switches, relays and control room evacuation panel (CREP). The tests objectives were to demonstrate the capability to transfer plant controls from the MCR to the CREP or local control station. The inspectors reviewed the records to verify that testing was performed satisfactorily and in accordance with the surveillance test program required by Procedure FPP-027, "Safe Shutdown," Rev. 3, and that test deficiencies were properly entered and corrected by the corrective action program. The inspectors also reviewed electrical elementary diagrams outlining the control transfer capability to verify that the system would function to electrically isolate the CREP from the MCR, and that testing adequately demonstrated operability of the system. Reviews also included verification that alternative shutdown could be accomplished with or without offsite power.

Operational Implementation

The inspectors reviewed selected training materials for licensed and non-licensed operators and shift engineers to verify the training reinforced the shutdown methodology in the FPER and FEPs for FA CB-6. The inspectors also reviewed shift turnover logs and shift manning to verify that personnel required for SSD using alternative shutdown systems and procedures were available onsite, exclusive of those assigned as fire brigade members.

The inspectors performed a walk-through of procedure steps with operations personnel to assess the implementation and human factors adequacy of the procedures and shutdown strategy, evaluate the expected ambient conditions, relative difficulty and operator familiarization associated with each OMA. The inspectors reviewed the systems and components credited for use during this shutdown method to verify that they would remain free from fire damage. The inspectors reviewed selected operator actions to verify that the operators could reasonably be expected to perform the specific actions within the time required to maintain plant parameters within specified limits.

b. Findings

Introduction: An NRC identified Green non-cited violation of VCSNS Technical Specification (TS) 6.8.1.e., Procedures and Programs – Emergency Plan, was identified related to the emergency plan procedural duties of the Shift Engineer (SE)/Shift Technical Advisor (STA) during off-normal events. Specifically, fire emergency procedures (FEPs) 1.0, 2.0, 3.0, and 4.0 assigned actions that would be performed by the SE during fire events which conflicted with the V.C. Summer Emergency Plan Procedure EP-100 requirement that the SE perform the duties of the STA of assessing and advising the Shift Supervisor (SS) during off-normal events.

Description: During review of the licensee's safe shutdown (SSD) strategy for alternative shutdown, the inspectors noted that procedure FEP-4.0, "Control Room Evacuation Due to Fire," included operator manual actions (OMAs) outside the main control room (MCR) that were specified to be performed by the SE. The inspectors determined that FEP-4.0, Enclosure F, "Duties of the Shift Engineer," required the SE to manipulate equipment and controls outside the MCR at various local control stations for a period of time which could last up to 90 minutes. During that time, the SE would not be available to report to the SS and perform duties as the STA. The local OMAs specified in FEP-4.0, Enclosure F, included establishing and throttling turbine driven emergency feedwater (TDEFW) flow to the steam generators; preparing selected chillers for starting; and verifying service water booster pump suction pressure. The inspectors determined that the actions assigned to the SE in FEP-4.0 were in conflict with the V.C. Summer Emergency Plan (EP). Emergency Plan Procedure EP-100, "Radiation Emergency Plan," Section 5.1, stated that while on duty the SEs diagnose off-normal events and report to the SS. The SE was to report to the control room and be available to the SS within 10 minutes of being summoned and perform the functions of the STA. EP-100 further stated that the duties of the SE did not include the manipulation of controls. The inspectors also noted that the SE actions in FEP 4.0 were not consistent with the post Three Mile Island role of the STA which was described in V.C. Summer UFSAR Section 13.1.2.2.1.1 and approved in the NRC Safety Evaluation Report (NUREG-0717) Supplement 1, dated April 1981. Similar to EP-100, UFSAR Section

13.1.2.2.1.1 stated that the Shift Engineer is to support the diagnosis of off-normal events and to advise the SS on actions to terminate or mitigate the consequences of such events. The UFSAR further stated that the Shift Engineer will respond to the SS in the control room within 10 minutes of being notified of an off-normal reactor plant condition. The inspectors discussed this issue with licensee personnel who stated that the SE/STA duties during fire events requiring alternative shutdown outside the control room were described in the NRC approved V.C. Summer Fire Protection Evaluation Report (FPER). The inspectors reviewed V.C. Summer fire protection licensing bases documents and determined that the SE's actions were included in the V.C. Summer Appendix R reanalysis dated September 4, 1985, as referenced in NRC Safety Evaluation dated May 22, 1986, and V.C. Summer renewed Operating License Condition 2.C.18. The inspectors concluded that although the SE actions described in the FPER appeared to have been reviewed and accepted by the NRC in the May 1986 Safety Evaluation, the licensee was not in compliance with Technical Specification 6.8.1.e. with regard to Emergency Plan Procedure EP-100. During review of FEP-1.0, "Fire Emergency Procedure Selection," the inspectors noted that FEP-1.0 identified numerous other fire areas/fire zones where local actions outside the MCR were assigned to the SE in FEP-2.0 and FEP-3.0. The licensee entered this issue into their corrective action program as Condition Report 12-02035 and implemented additional fire watch compensatory measures in the fire areas/fire zones where the FEPs assigned actions to the SE that were outside the MCR. The licensee also initiated actions to train select plant personnel to perform the FEP actions currently assigned to the SE which would allow the SE to be available to perform duties as the STA during off-normal events.

Analysis: The licensee's failure to comply with Technical Specification 6.8.1.e. was a performance deficiency. The finding was more than minor because it negatively impacted the Emergency Response Organization (ERO) Readiness Attribute of the Emergency Preparedness cornerstone objective to ensure that the licensee was capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. This finding was determined to be of very low safety significance (Green) using NRC Inspection Manual Chapter 0609, Appendix B, Emergency Preparedness Significance Determination Process (Section 5.2, Table 5.2.1), because there were no actual instances of entry into the FEPs in which shortages of the emergency plan minimum staffing occurred. The inspectors determined that there was no cross-cutting aspect associated with this finding because the licensee's decision to use the SE/STA to perform safe shutdown actions occurred before the 1985 revision to the FPER and was not reflective of current licensee performance.

Enforcement: V.C. Summer Technical Specification 6.8.1.e. states, in part, that written procedures shall be established, implemented, and maintained covering activities associated with the Emergency Plan. Emergency Plan Procedure EP-100, "Radiation Emergency Plan," Section 5.1, stated that while on duty, the Shift Engineers perform accident assessment, evaluate operating conditions, diagnose off-normal events, and report to the Shift Supervisor. When on duty, they will be available to the Shift Supervisor in the control room within 10 minutes of being summoned. During emergency conditions the Shift Engineer was to report to the Control Room and perform as a Shift Technical Advisor. Procedure EP-100 further stated that the duties of the Shift Engineer did not include the manipulation of controls or the supervision of operators.

Contrary to the above, on May 25, 2012, the inspectors identified that the licensee failed to comply with the requirements of Technical Specification 6.8.1.e. regarding procedures for implementing the V.C. Summer Emergency Plan. Specifically, fire emergency procedures 1.0, 2.0, 3.0, and 4.0 assigned local actions to the SE during fire events which conflicted with the V.C. Summer Emergency Plan Procedure EP-100 requirement that the SE perform the duties of the STA to assess plant conditions and advise the Shift Supervisor during off-normal events. The inspectors determined that this issue regarding use of the SE to perform SSD actions during certain fire events has existed in the FPER since at least 1985. The licensee entered this issue into their corrective action program as Condition Report 12-02035 and implemented compensatory measures in the form of roving fire watches in the fire areas/fire zones where the FEPs specified actions for the SE that were outside the MCR. The licensee also initiated actions to train select plant personnel to perform the FEP actions currently assigned to the SE which would allow the SE to be available to the SS to perform duties as the STA during off-normal events. Subsequent to the onsite inspection, the licensee informed the inspectors that the corrective actions associated with Condition Report 12-02035 had been completed and the SE was no longer assigned SSD actions during certain fire events. Because this finding is of very low safety significance (Green) and was entered into the licensee's corrective action program, this finding is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy and is identified as NCV 05000395/2012007-01, Duties of the Shift Engineer During Off-Normal Fire Events.

.06 Circuit Analyses

a. Inspection Scope

During a walk down of Fire Area AB-1.21.1 and AB-1.21.2, inspectors identified circuits associated with the credited safe shutdown train traversing the fire area. Inspectors reviewed calculation TR-08620-004, Appendix R Compliance Review Resolution of Potential Deviations, which identified components and cables that deviated from Appendix R requirements, to independently verify that these circuits were captured in the licensee's analysis. Additionally, since these cables were associated with the credited shutdown train, inspectors reviewed the licensee's breaker coordination analysis to ensure that fire damage to these cables would not interrupt the safe shutdown capability.

Inspectors reviewed a select sample of SSD components to evaluate if the existing post fire safe shutdown procedures were adequate for a postulated fire in any of the selected FA/FZs. The cables examined were based upon a list of SSD components selected by the inspectors after a review of the licensee's separation, fire hazards analysis, FPER and the SSD Analysis flow diagrams. The results of this review were compared with the licensee's Elementary/Schematic/Circuit analysis, 10 CFR 50 Appendix R Compliance Review, and the operations post-fire safe shutdown procedures. The specific components reviewed are listed in the Attachment.

The inspectors reviewed the electrical control wiring diagrams and identified the cables associated with the SSD components and examined in detail the cable routing and potential for fire damage and the effects on the circuit. The inspectors also reviewed design drawings for a sample of components credited in the alternative shutdown procedures to verify that the transfer switches associated with these components would adequately transfer control and power from the main control room to the control room evacuation panel in accordance with FEP 4.0. Cable routing data was also reviewed for

these components to verify that the cables for the sampled transfer switches were not routed in the selected fire areas or were adequately protected. Additionally, the licensee credited several electrical disconnect switches in their FEPs and inspectors reviewed design drawing and cable routing data, on a sampling basis, to verify that credited disconnect switches were routed in armored cable and would appropriately isolate credited components that could be affected by the fire, in accordance with their FPER.

The inspectors reviewed protection device coordination calculations for MCCs XMC1EC1X, MXC1A3X, XMC1C3X and XMC1B3X to verify that a fault at load would not affect the MCC feeder breaker. The specific components reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.07 Communications

a. Inspection Scope

The inspectors reviewed fixed and portable plant communication capabilities to evaluate the availability of the communication systems to support plant personnel in fire event notification, fire brigade fire fighting activities, and performance of post fire safe shutdown procedures. The inspectors reviewed electrical power supplies and cable routing for plant radios and the plant page system to verify that a fire in the selected FA/FZs would not affect communication equipment. During walk-downs of the licensee's FEPs, the inspectors observed operators performing radio checks to verify that communications would be available at various locations throughout the plant. During this review, the inspectors considered the effects of ambient noise levels, clarity of reception, reliability, and coverage patterns. The inspectors reviewed preventative maintenance and surveillance test records to verify that the communication equipment was being properly maintained.

b. Findings

No findings were identified.

.08 Emergency Lighting

a. Inspection Scope

The inspectors performed plant walk down inspections with licensee staff of the post-fire safe shutdown procedures for the selected fire areas to observe if the placement and coverage area of fixed 8-hour battery pack emergency lights provided reasonable assurance of illuminating access and egress pathways and any equipment requiring local operation and/or instrumentation monitoring for post fire safe shutdown.

The inspectors reviewed maintenance and design aspects of the fixed emergency lighting units to verify that the battery power supplies were rated with at least an 8-hour capacity as required by the FPP. Surveillance testing records were reviewed to ensure

adequate surveillance testing and periodic battery replacements were in place to ensure continued reliable operation of the fixed emergency lights. The inspectors reviewed the completed 8-hour discharge test records for a random sample of fixed emergency lights to verify they met the minimum rating of at least an eight-hour capacity.

b. Findings

No findings were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The inspectors reviewed the licensee's alternative safe shutdown procedures to verify that the licensee identified repairs needed to reach and maintain cold shutdown and had dedicated repair procedures, equipment, and materials to accomplish these repairs after a fire event assuming no offsite power was available.

The inspectors verified that the fire damage repair procedures were current and adequate and repair parts and equipment were being stored and maintained onsite. The inspectors toured Warehouse B where Tool and Material Kit E0065 was stored to examine the material condition of the parts being stored in the kit. The inspectors verified that annual inventories of the kit were being performed in accordance with the applicable Emergency Tool Locker and Kit Inventory List in electrical maintenance procedure EMP-100.002, "Emergency Installation of Cable for RHR System." The inspectors reviewed the inventory inspection data sheet work order records and compared them to the parts list in EMP-100.002 to verify that all required replacement parts were being accounted for and were available for use. In addition, the inspectors reviewed procedures FEP-4.1, "Plant Shutdown from Hot Standby to Cold Shutdown due to a Fire in Control Room," in order to verify that all equipment called for in the procedure was available and included in the applicable inventory list. The inspectors also verified equipment in the instrumentation and control shop FEP Storage Area and the electrical kit located in the alternate shutdown facility.

b. Findings

Introduction. An NRC identified Green non-cited violation of License Condition 2.C (18), "Fire Protection Systems," was identified for the licensee's failure to provide readily available equipment to support the implementation of Cold Shutdown Procedures. Specifically, the licensee failed to ensure that cold shutdown equipment was readily available to implement Cold Shutdown Procedures FEP- 4.1 and EMP-100.002.

Description. On May 9, 2012, the inspectors reviewed a sample of repairs required for achieving and maintaining cold shutdown. Walkthroughs of Enclosure B of Procedure FEP-4.1, "Plant Shutdown from Hot Standby to Cold Shutdown due to Fire in the Control Building," Revision 2, with plant personnel identified the following deficiencies:

Enclosure B, Step 3, required air tank, regulator, valves, fittings and tubing to operate air operated valves (AOV) HCV00603B and FCV00605B. The procedure sends the operators to I/C Shop FEP Storage Area to collect the equipment. The inspectors verified equipment available at the I/C Shop FEP Storage Area and noticed that most of

the equipment required on procedure FEP-4.1 Enclosure B was missing. In addition, the inspectors reviewed Procedure OAP-100.6, "Control Room Conduct and Control Shift Activities," Revision 3, Attachment IVL, "I&C Technicians, FEP Equipment Storage Locker Inventory List," and noted that most of the equipment needed to operate AOVs was also missing from the list.

The inspectors determined that the equipment descriptions in Procedure FEP-4.1 and OAP-100.6 were different and the equipment needed to complete procedure FEP-4.1, Enclosure B, Step 3 was not readily available in the FEP equipment storage locker. Also, the inspectors identified two other inventory deficiencies during the inspection. On May 12, 2012, while performing inspection and inventory of emergency kit E0065, it was observed that three rolls of Scotch® 33+ electrical tape were missing. The emergency kit E0065 is required to complete procedure EMP-100.002, "Emergency Installation of Cable for RHR System", Rev. 6. The other deficiency that the inspectors identified was related to a missing 9-volt battery from the Electrician's Emergency Tool Kit 1. The licensee entered these issues into their corrective action program as Condition Reports 12-01975, 12-01948 and 12-01939. The licensee took immediate corrective action to replace all the missing equipment and performed an extent of condition to verify all other equipment identified in procedure FEP-4.1 was available and included on appropriate inventory lists.

Analysis: The failure to ensure that cold shutdown equipment will be readily available to implement cold shutdown procedures FEP-4.1 and EMP-100.002 was a performance deficiency. The performance deficiency was more than minor because it was associated with the configuration control attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events (fire) to prevent undesirable consequences. The finding was evaluated for safety significance using NRC Inspection Manual Chapter 0609, Appendix F. Since the finding was related to the ability to achieve and maintain cold shutdown, the finding had very low safety significance (Green) from the Phase 1 evaluation. This performance deficiency had a cross-cutting aspect in the area of human performance associated with resources because the licensee did not have adequate and available facilities and equipment to ensure nuclear safety. Specifically, personnel did not have required equipment to implement the cold shut down procedures readily available in the designated area [H.2 (d)].

Enforcement: VCSNS Operating License Condition 2.C (18) requires, in part, that the licensee implement and maintain in effect all provisions of the approved FPP as described in the FSAR for the facility, and as approved in the Safety Evaluation Report (SER) dated February 1981, and Supplements dated January 1982, and August 1982, and the safety evaluations dated May 22, 1986, November 26, 1986, and July 27, 1987. VCSNS FSAR Section 9.5.1 states in part, that the provisions of 10 CFR 50, Appendix R, Sections III.G, III.J, III.O, and III.L apply to the FPP, and that the FPER is considered a part of the FSAR. VCSNS FPER Section 3.4.3, "Control and Isolation of Safe Shutdown Equipment," states, in part, that procedures requiring the use of tools, and in some cases jumper wires, have been provided for the operation of some equipment needed after 8 hours and for some equipment needed only for cold shutdown. A repair procedure for power cabling has been developed, including providing dedicated replacement cabling and related materials. Section III.L.5 of 10 CFR 50, Appendix R, specifies that fire damage to equipment and systems necessary to achieve cold shutdown shall be limited so that the systems can be made operable and cold shutdown

can be achieved within 72 hours. Materials for such repairs shall be readily available on site and procedures shall be in effect to implement such repairs. Contrary to the above, since March 1, 2004, the licensee failed to implement and maintain in effect all provisions of the approved fire protection program. Specifically, the licensee failed to ensure that cold shutdown equipment was readily available to implement cold shutdown procedures FEP- 4.1 and EMP-100.002. Because this violation was of very low safety significance (Green) and it was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy and is identified as NCV 05000395/2012007-02, Missing Cold Shutdown Repair Equipment.

.10 Compensatory Measures

a. Inspection Scope

The inspectors reviewed the fire protection and fire watch training program documents as well as training records for personnel tasked with performing fire watch responsibilities to ensure that individuals were properly instructed and qualified to perform the task.

b. Findings

No findings were identified.

.11 Review and Documentation of Fire Protection Program Changes

a. Inspection Scope

The inspectors reviewed a sample of FPP changes made between July 2010 and May 2012 to assess the licensee's effectiveness to determine if the changes to the FPP were in accordance with the fire protection license condition and had no adverse effect on the ability to achieve SSD.

b. Findings

No findings were identified.

.12 Control of Transient Combustibles and Ignition Sources

a. Inspection Scope

The inspectors walked down numerous areas in the plant, including the selected FA/FZs, to verify that the licensee had properly evaluated in-situ combustible fire loads, limited transient fire hazards, controlled hot-work activities, and maintained general housekeeping consistent with plant administrative control procedures, and the VCSNS FPP. For the selected FA/FZs, the inspectors evaluated the fire event history, the potential for fires and explosions, and potential fire severity. There were no hot work activities ongoing within the selected FA/FZs during the inspection, so direct observations of hot work related activity could not be performed.

b. Findings

No findings were identified.

.13 B.5.b Inspection Activities

a. Inspection Scope

The inspectors reviewed, on a sample basis, the licensee's spent fuel pool external makeup mitigation measures for large fires and explosions to verify that the measures were feasible, personnel were trained to implement the strategy, and equipment was properly staged and maintained. The inspectors requested and reviewed inventory and maintenance records of required equipment. Through discussions with plant staff, review of documentation, and plant walk-downs, the inspectors verified the engineering basis to establish reasonable assurance that the makeup capacity could be provided using the specified equipment and water sources. The inspectors reviewed the licensee's capability to provide a reliable and available water source and the ability to provide the minimum fuel supply to the portable pumping equipment. The inspectors performed a walk-down of the storage and staging areas for the B.5.b equipment to verify that equipment identified for use in the current procedures were available, calibrated and maintained. In the presence of licensee staff, the inspectors conducted an independent audit and inventory of required equipment and a visual inspection of the dedicated credited power and water source. The inspectors reviewed training records of the licensee's staff to verify that operator training/familiarity with the strategy objectives and implementing guidelines were accomplished according to the established training procedures. The inspectors verified, by review of records and physical inspection, that B.5.b equipment was currently being properly stored, maintained, and tested in accordance with the licensee's B.5.b program procedures.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed recent independent licensee audits for thoroughness, completeness and conformance to requirements. The inspectors reviewed other corrective action program (CAP) documents, including completed corrective actions documented in selected CRs to verify that industry-identified fire protection problems potentially or actually affecting the plant were appropriately entered into, and resolved by, the CAP process. The CRs were reviewed with regard to the attributes of timeliness and apparent cause determination to ensure that proposed corrective actions addressed the apparent cause, reportability and operability determination.

b. Findings

No findings were identified.

4OA3 Follow-Up of Events

.01 (Closed) Licensee Event Report (LER) 05000395/2011-001-00: Failure to Maintain One Train of Safe Shutdown Systems in Accordance with Appendix R Section III.G.a/III.G.3

(Closed) Licensee Event Report (LER) 05000395/2011-002-00: Failure to Maintain One Train of Safe Shutdown Systems in Accordance with Appendix R Section III.G.a/III.G.3

a. Inspection Scope

On July 1, 2011, the licensee submitted two LERs documenting the identification of circuits that, if impacted by fire, could result in the loss of the 'B' essential electrical bus (XSW1DB), or the inability to locally start the B emergency diesel generator (EDG). These inadequacies could prevent operators from achieving and maintaining safe shutdown (SSD) of the plant in the case of a postulated fire. The inspectors performed a detailed review of the information related to the LERs. The inspectors reviewed documents, performed walk-downs, and discussed the event with plant personnel to gain an understanding of the event. The inspectors assessed the licensee's compensatory measures and corrective actions to determine if they were adequate.

The following finding that affected 10 CFR 50.48 was identified by the licensee and is a violation of NRC requirements. This finding has been screened and determined to warrant enforcement discretion per the Interim Enforcement Policy Regarding Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48).

b. Findings

Introduction: The licensee identified a noncompliance with VCSNS Operating License Condition 2.C(18), "Fire Protection System," for the failure to provide alternative shutdown capability for fires in certain areas where protection of SSCs did not satisfy the requirements of the FPP. Specifically, the licensee discovered that they did not meet the FPP requirement to ensure that alternative shutdown equipment remained operable and available.

Description: During circuit analysis review in support of the NFPA 805 transition from the 10 CFR 50.48(b) licensing basis, the licensee discovered that a fire in the Control Building 412 North Chase (FA CB-4), Cable Spreading Room (FA CB-15), or Main Control Room (FA CB-17) could cause a hot short that could actuate a relay and result in the isolation of the B-train essential electrical bus (XSW1DB). Additionally, the licensee also discovered that a fire in FA CB-15 or FA CB-17 could cause a hot short that could result in the inability to start the B EDG using local controls. Per the licensee's analyses, SSD for fires in these areas would be achieved by alternative shutdown methods.

The licensee's original circuit analysis and re-analysis considered the possibility of a fire induced open circuit in a current transformer (CT) circuit that connects a set of sensing CTs in XSW1DB to an ammeter in the MCR. However, the licensee's circuit analyses

failed to consider hot shorts to ground. As a part of the NFPA 805 transition review, this failure mode was considered. The licensee discovered that hot shorts to ground in this circuit could result in spurious actuation of Relay 51BN-1DB. This relay actuates another relay, which trips and locks out all incoming breakers to the 1DB switchgear, and the incoming main breakers for the 480V busses. The lockout relay also prevents the B EDG breaker from closing and powering XSW1DB. This ultimately results in a complete loss of power on XSW1DB. This condition has existed since initial plant startup.

Additionally, the licensee discovered that a hot short in an EDG emergency start circuit could result in the unavailability of the B EDG. In 1985, a modification was performed to provide a “de-energize to actuate” feature in the B EDG start circuit. This feature would allow the diesel generator to start in the case of a fire-induced circuit fault to an EDG control circuit. A subsequent modification performed in 1992 inadvertently defeated the “de-energize to actuate” feature in the starting circuit, and created the possibility of a fire-induced hot short to this circuit that could result in the failure of the B EDG to automatically start. This hot short could also result in a blown fuse in the EDG start circuit, which would prevent the B EDG from being started locally. This condition has existed since September 1992, when the modification was implemented which inadvertently defeated the “de-energize to actuate” feature.

Both of these scenarios could result in a loss of power on the B ESF bus. For alternative shutdown, the licensee’s FEPs utilize a self-induced station blackout (SISBO) methodology, where the A ESF bus is disabled, the B ESF bus is credited with being available to provide power to safely shutdown the plant. Therefore, hot shorts described in these scenarios would render the credited power source unavailable to provide power to multiple components credited for alternative SSD. The licensee determined that these conditions were caused by human error during the original circuit analyses, and a less than adequate design change/configuration management process. Upon discovery, the licensee implemented compensatory measures, including posting roving fire watches in FAs of concern, installing temporary jumpers, and revising FEPs. The licensee also committed to restoring compliance by implementing design changes, as a part of the NFPA 805 transition process.

Analysis: Failure to provide alternative shutdown capability in accordance with the NRC approved FPP is a performance deficiency. This finding is more than minor because it is associated with the reactor safety mitigating system cornerstone attribute of protection against external events (i.e., fire). Failure to provide alternative shutdown capability affects the reactor safety mitigating systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Because this issue relates to fire protection, and this non-compliance was identified during the licensee’s transition to NFPA 805, this issue is being dispositioned in accordance with Section 9.1, “Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)” of the NRC Enforcement Policy.

In order to verify that this non-compliance was not associated with a finding of high safety significance (i.e., Red), inspectors reviewed quantitative risk analyses performed by the licensee. These risk evaluations took ignition source and target information from the ongoing VCSNS fire PRA to demonstrate that the significance of the non-compliances were less-than-Red (i.e. ΔCDF less than $1E-4/yr.$). The inspectors also performed walk-downs to verify the applicability of key assumptions.

Based on the ignition frequency of fire sources in the affected areas, combined with the probability of non-suppression for those fire scenarios, the inspectors determined that the significance of this non-compliance was less-than-Red. The inspectors also noted that the licensee's risk evaluation was conservative, in that it assumed that fires in the affected areas would cause both hot-short scenarios simultaneously. This provided additional confidence that this non-compliance was not associated with a finding of high safety significance (Red).

The inspectors determined that a cross-cutting aspect was not applicable to this non-compliance and it met the criteria for enforcement discretion in accordance with Section 9.1 of the NRC Enforcement Policy.

Enforcement: V.C. Summer License Condition 2.C (18), "Fire Protection System" states, in part, that VCSNS shall implement and maintain in effect all provisions of the approved FPP as described in the Final Safety Analysis Report for the facility and as approved in the Safety Evaluation Report (SER) dated February 1981 (and Supplements dated January 1982 and August 1982) and Safety Evaluations dated May 22, 1986, November 26, 1986, and July 27, 1987. Section 9.5.1, "Fire Protection System," of the FSAR states, in part, that the provisions of 10 CFR 50, Appendix R, Section III.G apply to the FPP for VCSNS. The NRC SER Supplement 3, dated January 1982, concluded that the VCSNS alternative shutdown capability was acceptable.

Contrary to the above, the licensee failed to implement all provisions of the VCSNS approved FPP in that alternative shutdown capability for fires in FAs CB-4, CB-15, and CB-17 was not acceptable. Specifically, on May 3, 2011, the licensee discovered that, for fires in these FAs, circuits for the B EDG and the B ESF bus were not adequately isolated to ensure that alternative shutdown equipment remained operable and available. This condition has existed since September 1992. The licensee entered this finding into the corrective action program (CRs 11-2298 & 11-2299) and the licensee has taken appropriate compensatory measures.

Because the licensee committed to adopt NFPA 805 and change their fire protection licensing bases to comply with 10 CFR 50.48(c), the NRC is exercising enforcement and reactor oversight process (ROP) discretion for this issue in accordance with the NRC Enforcement Policy, Section 9.1, "Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)" and Inspection Manual Chapter 0305. Specifically, this issue was identified and will be addressed during the licensee's transition to NFPA 805, was entered into the licensee's corrective action program, immediate corrective action and compensatory measures were taken, was not likely to have been previously identified by routine licensee efforts, was not willful, and it was not associated with a finding of high safety significance (i.e., Red).

LER 05000395/2011-001-00: Failure to Maintain One Train of Safe Shutdown Systems in Accordance with Appendix R Section III.G.a/III.G.3 and LER 05000395/2011-002-00: Failure to Maintain One Train of Safe Shutdown Systems in Accordance with Appendix R Section III.G.a/III.G.3, are closed. No new findings were identified.

4OA6 Meetings, Including Exit

On May 25, 2012, the lead inspector presented the preliminary inspection results to Mr. D. Gatlin, VCSNS Unit 1 Vice President and other members of his staff. The licensee acknowledged the results. The lead inspector informed the licensee that proprietary information would not be included in this inspection report, although none was identified. Following completion of additional reviews in the Region II office, another exit meeting was held by telephone with Mr. B. Thompson, Manager, VCSNS Nuclear Licensing, and other members of the licensee's staff on July 3, 2012, to provide an update on changes to the preliminary inspection findings. The licensee acknowledged the findings.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

M. Browne, Manager, Quality Systems
G. Douglass, Manager, Nuclear Protection Services
D. Edwards, Operations Shift Supervisor
D. Gatlin, Site Vice President – Nuclear Operations Unit 1
R. Haselden, General Manager, Organizational/Development Effectiveness
R. Justice, Manager, Nuclear Operations
M. Kammer, Design Engineering Supervisor, NFPA 805
T. Keckeisen, Operations Fire Protection Specialist
G. Lippard, General Manager, Nuclear Plant Operations
G. Loignon, Supervisor, Probability Risk Assessment
R. Perrill, Operations
R. Ray, Manager, Planning and Outage
G. Robertson, Nuclear Licensing
R. Ruff, Supervisor, Maintenance
E. Rumfelt, Supervisor, Nuclear Licensing
S. Shealy, Electrical/I&C Design Engineering
W. Stuart, General Manager, Engineering Services
B. Thompson, Manager, Nuclear Licensing
G. Williams, Supervisor, Design Engineering Programs
B. Williamson, Manager, Emergency Planning
S. Zarandi, General Manager, Nuclear Support Services

NRC personnel

E. Coffman, Resident Inspector, VCSNS, Unit 1
M. King, Chief, Engineering Branch 2, Division of Reactor Safety, Region II
J. Reece, Senior Resident Inspector, VCSNS, Unit 1

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

05000395/2012007-01	NCV	Duties of the Shift Engineer During Off-Normal Fire Events (Section 1R05.05)
05000395/2012007-02	NCV	Missing Cold Shutdown Repair Equipment (Section 1R05.09)

Closed

05000395/2011-001-00	LER	Failure to Maintain One Train of Safe Shutdown Systems in Accordance with Appendix R Section III.G.a/III.G.3 (Section 4OA3.01)
05000395/2011-002-00	LER	Failure to Maintain One Train of Safe Shutdown Systems in Accordance with Appendix R Section III.G.a/III.G.3 (Section 4OA3.01)

Discussed

None

LIST OF FIRE BARRIER FEATURES INSPECTED
(Refer to Report Section 1RO5.02- Passive Fire Barriers)

<u>Barrier Identification</u>	<u>Description</u>
<u>Fire Wall</u>	
Gypsum Drywall Wall Construction	Separating FA/FZ SWPH-2 and FA/FZ SWPH-6
Gypsum Drywall Duct Enclosure	FA/FZ SWPH-2, Ventilation Duct Enclosure
<u>Fire Door</u>	
AB 505	Separating FA/FZ AB-1.21.2 and Room 83-03
CB 311	Separating FA/FZ CB-6 and FA/FZ CB-7
PA 301	Separating FA/FZ AB-1.21.1 and Room 63-01
SW-104	Separating FA/FZ SWPH-2 and SWPH-6
<u>Fire Damper</u>	
XFD-15- AH	Separating FA/FZ CB-6 and FA/FZ CB-7
XFD-18-AH	Separating FA/FZ CB-6 and FA/FZ CB-7
XFD-298-AH	Separating FA/FZ SWPH-2 and FA/FZ SWPH-6
XFD-122-AH	Separating FA/FZ SWPH-2 and FA/FZ SWPH-1
<u>Cable Tray Fire Stops</u>	
TR 2830	FA/FZ AB-1.21.2, Room 63-14
TR 2834	FA/FZ AB-1.21.2, Room 63-19

LIST OF COMPONENTS REVIEWED
(Refer to Report Section 1R05.01 / 1R05.05 / 1R05.06 – Circuit Analyses)

<u>Component Identification</u>	<u>Description</u>
<u>Valves</u>	
XVG-503A	Sinspectors Generator A Blowdown Isolation Valve
IPV-2000	Power Relief Valve
IPV-2020	Power Relief Valve-SG "C"
PVC-445B	Pressurizer Power Relief Valve
IPV-2010,	Power Relief Valve-SG "B"
FCV-3541	Motor-Driven Emergency Feedwater Pump "B"
PVG-2030	Turbine-Driven Emergency Feedwater Sinspectors Valve
XVB-3107B-SW	Service Water Valve
XVG-503A-BD	Blowdown Valve
MVT-8102A	"A" Seal Water Injection Isolation
<u>Transfer Switches</u>	
XSW1DB1-ES	Feeder Breaker XFER
XSWDB2-ES	Feeder Breaker XFER
XPP0039B	Service Water Pump B XFER
XPP0043B	Charging/Safety Injection Pump B XFER
XET-4003ED	Swing Charger Transfer Switch
XFER-FCV-122	Charging Flow Controller
XFER-XPP-0039A	Service Water Pump "A"
XFER-XPP-0039C	Service Water Pump "C"
XFER-LCV-459	Letdown Line Isolation
<u>Local Control Switches</u>	
XFN-46B-VL	Charging/SI Pump "C" Room Fan
XHX-1B-VU	"B" Chiller
XHX-1C-VC	"C" Chiller
XSW-1DB-ES-U4	XSW-1EB-ES Feeder Breaker
XSW-1DB1-U7B	Feeder Breaker RB Fan 96B
XBC-1A-ED	Swing Charger
<u>Pump Motors</u>	
XPP-1B-CC	Component Cooling Pump "B"
XPP-43B-CS	Charging Pump "B"
<u>Ventilation Fan</u>	
XFN-80B	Service Water Pump Room Fan

Emergency Diesel Generators

XEG-1B-DG

"B" Diesel Generator

Instruments

IPT-402

Reactor Coolant Loop 3 Hot Leg Pressure
Transmitter

IPT 403

Reactor Coolant Loop 1 Hot Leg Pressure
Transmitter

ILT-459A

Pressurizer Level Transmitter

ILT-484

Sinspector's Generator "B" Narrow Range Level
Transmitter

ILT-497B

Sinspector's Generator "C" Wide Range Level
Transmitter

IPT-2010

Sinspector's Generator "B" Outlet Pressure
Transmitter

IPT-2000

Sinspector's Generator "A" Outlet Pressure
Transmitter

XIT-5901-EV

XIT-5902-EV

LIST OF DOCUMENTS REVIEWED

Procedures

BDMG-1.0, Spent Fuel Pool Makeup and Spray Strategies, Rev. 1
EEP-013, Fire Emergency, Rev. 15
EPP-001, Activation and Implementation of Emergency Plan, Rev. 30
EPP-001.2, Alert, Rev. 8
EPP-020, Emergency Personnel Exposure Control, Rev. 12
EPP-027, Hostile Action, Rev. 4
EMP-100.002, Emergency Installation of Cable for RHR System, Rev. 5
FEP 1.0, Fire Emergency Procedure Selection, Rev. 11
FEP 2.0, Train A Plant Shutdown to Hot Standby Due to Fire, Rev. 4
FEP 3.0, Train B Plant Shutdown to Hot Standby Due to Fire, Rev. 4
FEP 3.1, Train B Plant Shutdown from Hot Standby to Cold Shutdown Due to Fire, Rev. 3
FEP 4.0, Control Room Evacuation Due to Fire, Rev. 4
FEP 4.1, Plant Shutdown from Hot Standby to Cold Shutdown Due to Fire in Control Building, Rev. 2
PTP-114.005, Battery Powered and 125 Volt DC Emergency Lights, Rev. 14
EMP-100.002, Emergency Installation of cable for RHR System, Rev.6
FPP-015, Shift Inspection, Rev. 6
FPP-020, Fire Protection Program Administration, Rev.5
FPP-022, Fire Prevention, Rev. 3
FPP-023, Fire Detection, Rev. 3
FPP-024, Fire Suppression, Rev. 3
FPP-025, Fire Containment, Rev. 4
FPP-027, Safe Shutdown, Rev. 3
FPP-031, Development and Control of Fire Protection Program Plans, Rev. 3
SAP-102, Statement of Responsibilities, Operations, Rev. 6
SAP-131, Fire Protection Program, Rev. 6
SAP-133, Design Control/Implementation and Interface, Rev. 14
SAP-142, Station Housekeeping Program, Rev. 15
SAP-421, Shift Engineer Conduct of Operations, Rev. 7
SOP-509, Fire Suppression System, Rev. 19
SPP-114, Security Force Responsibilities During Emergencies, Rev 16
STP-128.002, Fire Protection FPER Valve Lineup Verification, Rev. 18
STP-128.009, FPER Fire Hose Station Inspection, Rev. 10
STP-128.019, Semi-Annual Fire Door Inspection, Rev. 7
STP-128.031, Service Water Pump House Fire Barrier Inspections, Rev 5
STP-170-002, Diesel Fire Pump Monthly Test, Rev. 6
STP-728.037, Fire Barrier Inspections, Rev 4
TQP-606, Fire Protection Training, Rev 1
OAP-100.4, Communication, Rev. 2
OAP-100.2, Operations Personnel Expectations and Responsibilities, Rev. 1

Calculations, Analyses and Evaluations

Calculation DC 08040-012, Protective Device Coordination, Rev. 1
Calculation DC 07810-033, Fire Systems Flooding Affects Outside the Reactor Building, Rev. 0
Calculation DC 07810-036, Nozzle Pressures at Hose Reels, Rev. 0
Calculation DC 07850-006, Smoke Detectors in SWPH-2, Rev. 1
Calculation Chemetron Fire Services FL-22425-3, Carbon Dioxide Flow Calculation for Computer and Relay Rooms, Rev 1

Evaluation TR-0780E-006, Fire Protection Equivalency Evaluation, Attachment FEAT-04, Fire Barrier Penetrations-Special Doors, Rev. 0
 Evaluation TR-08620-004, Appendix R Compliance Review Resolution of Potential Deviations, Rev. 14
 Evaluation TR-0780E-006, Fire Protection Equivalency Evaluation, Attachment FEAT-01, Fire Barrier Construction, Rev. 0
 Evaluation TR08620-013, "Appendix R Emergency Lighting," Revision 0
 Evaluation TR07800-004, NFPA Code Review Report, Rev. 0
 RCA 11-02298, "Appendix R Issues Related to Emergency Start of 'B' Emergency Diesel Generator and XSW1DB
 CR-11-02298, 02299, "Appendix R Circuits"

Drawings

B-208-009, Sinspectors Generator A Blowdown Isolation XVG-503A, Sheet 7, Rev. 8
 B-208-037, Transformer 1DB1 & 1DB2 Feeder Breaker, Sheet ES19, Rev. 3
 B-208-066, Safety Injection ESF Monitor Lights, Sheet 15, Rev. 8
 B-208-067, Power Relief Valve IPV-2000, Sheet 20B, Rev. 6
 B-208-067, Power Relief Valve IPV-2000, Sheet 20A, Rev. 8
 B-206-067, Power Relief Valve IPV-2020, Sheet 22A, Rev. 8
 B-208-067, Power Relief Valve IPV-2020, Sheet 22B, Rev. 7
 B-208-082, Pressurizer Power Relief Valve PVC-445B, Sheet 15, Rev. 13
 B-208-101, Service Water Pump C Speed Switch XES2003C, Sheet 14B, Rev. 6
 B-208-101, XMC1EC1X Transfer Scheme Channel A, Sheet 11, Rev. 3
 B-208-101, Service Water Pump B, Sheet 2, Rev. 8
 B-208-101, Service Water Pump B, Sheet 2, Rev. 9
 B-208-101, Service Water Pump B, Sheet 2, Rev. 11
 B-208-021, Charging/Safety Injection Pump B, Sheet 6, Rev. 9
 B-211-021, Electrical Block Diagram, Chemical and Volume Control, Rev. H
 B-318-010, Ionization Smoke Detector Locations, Auxiliary Building, sheet 5, Rev. 9
 B-318-010, Ionization Smoke Detector Locations, Control Building, sheet 7, Rev. 12
 B-318-010, Ionization Smoke Detector Locations, Service Water Pump House, sheet 9, Rev. 8
 D-108-012, Fire Door Schedule, Rev. 38
 D-108-017, Architectural Door Details, Rev. 18
 D-126-002, Architectural Service Water Pump House Plans and Details, Rev. 17
 D-126-014, Architectural Service Water Pump House Tray Rooms, Rev. 0
 D-302-231, Flow Diagram for Fire Service Hydrants and Loop, Rev. 11
 D-307-011, Main Steam Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 12
 D-307-083, Feedwater Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 8
 D-307-085, Emergency Feedwater Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 13
 D-307-221, Service Water Cooling Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 8
 D-307-222, Service Water Cooling Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 16
 D-307-611, Component Cooling Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 8
 D-307-614, Component Cooling System to NSSS Pumps Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 6
 D-912-130, HVAC System Flow Diagram, Auxiliary Building, Rev 23
 D-912-136, HVAC System Flow Diagram, Relay Room Cooling System, Rev 22
 E-023-011, Fire Protection Auxiliary Building, Rev. 11
 E-023-018, Fire Protection Control Building, Rev. 33

E-023-023, Fire Protection Service Water Pump House, Rev. 11
 E-206-080, Electrical One-Line Diagram, 120VDC Disconnect Switches for Appendix R Valves, Sheet 1, Rev. 1
 E-207-018, Three Line Diagram, 7200V Switchgear – Busses IEA and IEB, Rev. 9
 E-307-601, Reactor Coolant Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 9
 E-307-641, Residual Heat Removal Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 8
 E-307-671, Chemical and Volume Control Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 5
 E-307-672, Chemical and Volume Control Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 5
 E-307-673, Chemical and Volume Control Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 9
 E-307-674, Chemical and Volume Control Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 3
 E-307-675, Chemical and Volume Control Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 16
 D-307-781, Steam Generator Blowdown Safe Shutdown and Accident Mitigating Flow Diagram, Rev. 6
 E-911-102, Auxiliary Building Floor and Equipment Drain Flow Diagram, Rev. 6
 E-921-222, Auxiliary Building Floor and Equipment Drains, Rev. 7
 E-992-612, Control Complex HVAC, Rev 23
 E-934-101, Service Water Pump House HVAC, Rev 17
 MS-55-040, Chemetron Fire Services, Carbon Dioxide Fire Extinguishing System Schematic Arrangement, Rev. 6
 MS-55-137, Piping Diagram Auxiliary Building Pre-action Sprinkler System, Rev. 7
 SS-211-066, "Electrical Block Diagram-System MI," Revision F
 SS-211-066, Electrical Block Diagram, Misc. Inst., Sheet J1, Rev. K
 SS-211-066, Electrical Block Diagram, Misc. Inst., Sheet W9, Rev. G
 SS-211-066, Electrical Block Diagram, Misc. Inst., Sheet W61, Rev. C
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet J1, Rev. F
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet U1, Rev. D
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet U5, Rev. G
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet U12, Rev. C
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet W1, Rev. F
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet W1, Rev. F
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet J2, Rev. A
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet W31, Rev. B
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet W32, Rev. A
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet J4, Rev. F
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet J5, Rev. A
 SS-211-067, Electrical Block Diagram, Main Sinspectors, Sheet W3, Rev. G
 SS-211-081, "Electrical Block Diagram-System PS," Revision D
 SS-211-082, Electrical Block Diagram, Reactor Coolant, Sheet W17, Rev. B
 SS-211-082, Electrical Block Diagram, Reactor Coolant, Sheet W18, Rev. A
 SS-211-082, Electrical Block Diagram, Reactor Coolant, Sheet U37, Rev. A
 SS-211-082, Electrical Block Diagram, Reactor Coolant, Sheet R7, Rev. A
 SS-211-082, Electrical Block Diagram, Reactor Coolant, Sheet U37, Rev. A
 SS-211-093, "Electrical Block Diagram-System SF," Revision E
 SS-211-094, "Electrical Block Diagram-System SG," Revision G
 SS-211-128, Electrical Block Diagram, Reactor Coolant, Sheet W8, Rev. A

VCS-IPT0043-RC, Instrument Loop Diagram, Reactor Coolant Loop 1 Hot Leg Pressure, Sheet 1, Rev. 10
 VCS-IPT2010-MS, Instrument Loop Diagram, Sinspectors Generator B Outlet Pressure, Sheet 1, Rev. 7
 VCS-IPT2000-MS, Instrument Loop Diagram, Sinspectors Generator A Outlet Pressure, Sheet 1, Rev. 7
 VCS-IPT00402-RC, Instrument Loop Diagram, Reactor Coolant Loop 3 Hot Leg Pressure, Sheet 1, Rev. 10
 VCS-ILT00484-MS, Instrument Loop Diagram, Sinspectors Generator B Narrow Range Level Prot. I, Sheet 1, Rev. 5
 VCS-IPT00403, Instrument Loop Diagram, Reactor Coolant Loop 1 Hot Let Pressure, Sheet 1, Rev. 10
 VCS-IPT0043-RC, Instrument Loop Diagram, Reactor Coolant Loop 1 Hot Leg Pressure, Sheet 1, Rev. 10
 VCS-IPT2010-MS, Instrument Loop Diagram, Sinspectors Generator B Outlet Pressure, Sheet 1, Rev. 7
 VCS-IPT2000-MS, Instrument Loop Diagram, Sinspectors Generator A Outlet Pressure, Sheet 1, Rev. 7
 VCS-ILT00990-SF, "Instrument Loop Diagram-Refueling Water Storage Tank Level," Revision 7

Completed Surveillance Procedures, Test Records, & Work Orders

Chemetron Fire Services Calculation FL-22425-3, Carbon Dioxide Field Test Report for Computer and Relay Rooms, dated February 29, 1982
 WO 1114331, SWPH Fire Barrier Inspection, completed 11/29/2011
 WO 1115214, Semi-Annual Fire Door Inspection, completed 01/25/2012
 WO 1113626, HVAC Fire Damper Inspection, completed 01/18/2012
 WO 1200198, SWPH HVAC Fire Damper Inspection, completed 05/07/2012
 WO 1201148, Quarterly Valve Lineup Verification, completed 04/17/2012
 WO 1113952, Fire Barrier Inspection, Cable Tray Fire Stops, completed 12/06/2011
 WO 1118115, CO₂ Valve Lineup Verification, completed 03/02/2012
 WO 1109826, CO₂ System Functional Test, completed 04/11/2012
 WO 1103395, Smoke Detection Functional Tests, Zone I, completed 04/30/2011
 WO 1115224, Smoke Detection Functional Tests, Zone HH, completed 02/27/2012
 WO 1105030, Smoke Detection Functional Tests, Zone NN, completed 10/25/2011
 WO 1103491, Preaction Sprinkler System Flow Test, completed 08/24/2011
 WO 1109813, FPER 8 Hours Light Emergency Battery Light Inspection, completed 01/05/2012
 WO 1113765, FPER 8 Hours Light Emergency Battery Light Inspection, completed 02/02/2012
 WO 1115388, FPER 8 Hours Light Emergency Battery Light Inspection, completed 03/03/2012
 WO 1116522, FPER 8 Hours Light Emergency Battery Light Inspection, completed 03/28/2011
 WO 1117512, FPER 8 Hours Light Emergency Battery Light Inspection, completed 11/30/2011
 WO 1108537, FPER 8 Hours Light Emergency Battery Light Inspection, completed 12/21/2011

Applicable Codes, Specifications, and Standards

Fire Protection Handbook, 17th Edition
 NFPA 13, Installation of Sprinkler Systems, 1973 Edition
 NFPA 14, Installation of Standpipe and Hose System, 1974 Edition
 NFPA 30, Flammable and Combustible Liquids Code, 1993 Edition
 NFPA 72, National Fire Alarm Code, 2000 Edition
 NFPA 80, Fire Doors and Windows, 1973 Edition
 NFPA 90A, Installation Air Conditioning and Ventilating Systems, 1973 Edition

NFPA 805, Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition
 NUREG-1552, Supplement 1, Fire Barrier Penetration Seals in Nuclear Power Plants, dated 01/99
 Occupational Safety and Health Administration Standard 29 CFR 1910, Occupational Safety and Health Standards
 Underwriters Laboratory Standard 401, Standard for Portable Spray Hose Nozzles for Fire Protection Service, Third Edition, dated 08/27/93
 Underwriters Laboratory Standard 555, Standard for Fire Dampers and Ceiling Dampers, dated 05/14/79

Technical Manuals & Vendor Information

Specification Data Sheet for Simplex True-Alarm Fire Alarm Systems 4098 Series Ionization Sensors, dated July 1998
 Specification Data Sheet for FireQuip™ Single Jacket Industrial Fire Hose
 Specification Data Sheet 1-20 for Elkhart Brass L-205EB™ Electrical Fog Nozzle
 Specification Bill of Material VCS-SD1, Hollow Metal Doors, Rev 07/18/1977
 Light Guard LEC-361, Light Guard Exclusive Industrial Duty Sealed Lead Calcium Battery, dated 3/1/2006
 Specification Data Sheet for 3M Scotch® 33+ Vinyl Electrical Tape, dated 2003

Audits & Self-Assessments

Fire Service System Health Report, S2-2010
 Fire Service System Health Report, S1-2011
 Fire Service System Health Report, S2-2011
 QA-AUD-201104, Fire Protection Annual and Biennial Audit Report, conducted 03/26-04/19/ 2011
 QA-AUD-201207, Fire Protection Annual Audit Report, conducted 03/26-04/19/2012

License Basis Documents

VCSNS Technical Specifications 6.2.2, 6.2.4, 6.8.1.e
 Letter, South Carolina Electric & Gas Company to NRC, Fire Protection Evaluation-Fire Hazards Analysis Report, dated 09/18/1978
 Letter, South Carolina Electric & Gas Company to NRC, Fire Protection SER Open Item 1.6.10, dated 08/21/1981
 Letter, South Carolina Electric & Gas Company to NRC, Virgil C. Summer Nuclear Station, Docket No. 50-395, Operating License No. NPF-12, Fire Detection System, dated 4/20/1982
 10 CFR 50.48, "Fire Protection"
 10 CFR Part 50, Appendix A, Criterion 3, "Fire Protection"
 10 CFR 50, Appendix R, Section III.G, "Fire Protection of Safe Shutdown Capability"
 10 CFR 50, Appendix R, Section III.J, "Emergency Lighting"
 10 CFR 50, Appendix R, Section III.L, "Alternative and Dedicated Shutdown Capability"
 VCSNS Updated Final Safety Analysis Report, Section 9.5.1, Fire Protection System
 VCSNS Fire Protection Evaluation Report
 VCSNS Updated Final Safety Analysis Report, Section 13.1.2.2, Personnel Functions, Responsibilities, and Authorities
 VCSNS Safety Evaluation Report (SER), NUREG-0717, February 1981
 VCSNS Safety Evaluation Report (SER), NUREG-0717, Supplement No. 1, April 1981
 VCSNS Safety Evaluation Report (SER), NUREG-0717, Supplement No. 3, January 1982
 VCSNS Safety Evaluation Report (SER), NUREG-0717, Supplement No. 4, August 1984

Auxiliary Power Conversion System Branch (APCSB) Branch Technical Position (BTP) 9.5-1, "Guidelines for Fire Protection of Nuclear Power Plants"

Appendix A to BTP 9.5-1, "Guidelines for Fire Protection of Nuclear Power Plants Docketed Prior to July 1, 1976"

VCSNS Operating License Condition 2.C(18), "Fire Protection Program"

VCSNS Operating License Condition 2.C(34), "Mitigation Strategy License Condition"

VCSNS, Operating License, Amendment Number 167, Updated Fire Protection Evaluation Report, dated 11/2011

Letter, South Carolina Electric and Gas to NRC, Appendix R Reanalysis, dated 09/04/1985

NRC Safety Evaluation, VCSNS – Appendix R Reanalysis, dated 05/22/1986

NUREG-0737, Clarification of TMI Action Plan Requirements, dated 11/1980

EP-100, VCSNS Radiation Emergency Plan, Rev. 59

Letter, South Carolina Electric and Gas to NRC, Virgil C. Summer Nuclear Station Shift Technical Advisor and Independent Safety Engineering Group, dated 01/02/1981

Letter, South Carolina Electric & Gas Company to NRC, V. C. Summer Nuclear Station Letter of Intent to Adopt NFPA 805, Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition, dated 10/19/2006

Letter, NRC to South Carolina Electric & Gas Company, NRC Response to Letter of Intent to Adopt Title 10 of the Code of Federal Regulations, Part 50, Section 50.48(c) for V. C. Summer Nuclear Station, dated 01/19/2007

Letter, South Carolina Electric & Gas Company to NRC, V. C. Summer Nuclear Station Unit 1, Request for Continuance of Enforcement Discretion Related to License Amendment Request for Transitioning the Fire Protection Program to NFPA 805, dated 11/21/2011

Letter, NRC to South Carolina Electric & Gas Company, NRC Response to the Request to Re-Instate Enforcement Discretion, dated 02/27/2012

Other Documents

NUREG-0660, NRC Action Plan Developed as a Result of the TMI-2 Accident, Volume 1, dated 08/1980

Federal Register Notice 50 FR 43621, Commission Policy Statement on Engineering Expertise on Shift, dated 10/28/1985

NRC Information Notice 93-81, Implementation of Engineering Expertise on Shift, dated 10/12/1993

TQP-805, Shift Technical Advisor (STA) Training and Qualification Program, Rev. 0, Change B

TQP-806, Shift Technical Advisor Requalification Program, Rev. 0

Fire Protection Pre-Fire Plan, CB-Control Building 436, dated 08/01/2005

Fire Protection Pre-Fire Plan, AB-Auxiliary Building 463, dated 09/14/2009

Fire Protection Pre-Fire Plan, SWPH-Service Water Pump House 425, dated 08/01/2005

Fire Protection Program Log for Systems/Equipment Out of Service for Period 7/30/2008 to 6/22/2010

United States Gypsum Association and Gilbert Associates Letter, Fire Resistance Calculations, dated 04/17/1981

Gilbert Associates, EI-21087-SE, Engineering Instructions for Fire Damper Assemblies, dated 10/1984

LIST OF CONDITION REPORTS REVIEWED DURING INSPECTION

CR 07-00590, The power supplies for the normal (XR0008) and back-up (XR0009) radio repeaters may be affected by a fire

CR 07-00937, CER to document the "Fire Emergency Procedure Manual Actions Self-Assessment" SA07-OP-03

CR-07-02034, Emergency battery light was not placed in stand-by prior to hanging tag out

CR-10-00987, No FPER light located in the ASB south stairwell.
 CR-10-04 794, Review of NRC IN 2010-26
 CR-10-03 301, Review of NRC IN 2010-13
 CR-10-03265, 8 hour emergency light failed to illuminate while performing PTP 114.005, PMTS 1003661-001
 CR-10-03845, Two issues found on emergency lights during monthly walk down
 CR-10-04664, Review of NRC IN 2010-25
 CR-10-04123, Pass with Remediation Announced Fire Brigade Drill
 CR-11-00579, Pass with Remediation Announced Fire Brigade Drill
 CR-11-01505, Pass with Remediation Announced Fire Brigade Drill
 CR-11-03630, Review of NRC IN 2011-12
 CR-11-01818, XBA5135 8 hour emergency light stays illuminated W.O. 1105057.
 CR-11-02998, Breakers in APN panels are not identified as feeding Appendix R lighting.
 CR-11-04729, Possible battery failure battery XBA 5090
 CR-11-06101, XBA 5002 failed to illuminate.
 CR-11-01521, FEP equipment list (Attachment IVM) of OAP100.6 has an inventory deficiency.
 CR-11-03561, Appendix R Control Room Disconnect Switches
 CR 11-02298, Concern identified that could potentially result in inability to start B EDG
 CR 11-02299, Concern identified that could potentially result in trip and lockout of B emergency switchgear
 CR-12-00278, Pass with Remediation Unannounced Backshift Fire Brigade Drill

LIST OF CRS GENERATED AS A RESULT OF THIS INSPECTION

CR-12-01930, Alignment of XET4003 to Supply "B" Train Power
 CR-12-01933, FPER ELU is Not Working Correctly
 CR-12-01936, Breaker Coordination Discrepancy on XMC183X Related to NFPA 805
 CR-12-01939, 9-Volt Battery Missing in Electricians Fire Emergency Toolkit
 CR-12-01946, Emergency Battery Lighting Unit Charging Circuit Lamp Indication
 CR-12-01948, Tape Missing from Electrical Emergency Toolkit E))65 and Incorrect Step Listed in Procedure
 CR-12-01949, Monitoring of ELU Batteries
 CR-12-01959, Timely Access to Station by Offsite Emergency Vehicles
 CR-12-01975, FEP-4.1 List Equipment for Valve Operation Not Included in the Inventory
 CR-12-02035, Dual Role for the Shift Technical Advisor
 CR-12-02158, Availability of Communications Systems for Fire in AB-1.21.2

LIST OF ACRONYMS AND ABBREVIATIONS

AB	Auxiliary Building
AOV	Air Operated Valves
APCSB	Auxiliary and Power Conversion Systems Branch
BTP	Branch Technical Position
CFR	Code of Federal Regulations
CB	Control Building
CR	Condition Report
CREP	Control Room Evacuation Panel
FA	Fire Area
FEP	Fire Emergency Procedure
FHA	Fire Hazard Analysis
FPER	Fire Protection Evaluation Report
FPP	Fire Protection Program
FZ	Fire Zone
GDC	General Design Criteria
IP	Inspection Procedure
IR	Inspection Report
NCV	Non-cited Violation
NFPA	National Fire Protection Association
NRC	United States Nuclear Regulatory Commission
NUREG	An explanatory document published by the NRC
OMA	Operator Manual Action
Rev	Revision
Rm	Room
ROP	Reactor Oversight Process
SER	Safety Evaluation Report
SSD	Safe Shutdown
UFSAR	Updated Final Safety Analysis Report
VCSNS	Virgil C. Summer Nuclear Station
WO	Work Order