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

July 30, 2004

South Carolina Electric & Gas Company
ATTN: Mr. Stephen A. Byrne
Senior Vice President, Nuclear Operations
Virgil C. Summer Nuclear Station
P. O. Box 88
Jenkinsville, SC 29065

SUBJECT: V. C. SUMMER NUCLEAR STATION - NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000395/2004007

Dear Mr. Byrne:

On June 25, 2004, 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 that date with you and other members of your staff. Following completion of additional review in the Region II office, a final exit was held by telephone with you and other members of your staff on July 30, 2004, to provide an update on changes to the preliminary inspection findings.

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.

This report documents one NRC-identified finding of very low safety significance (Green) involving a violation of NRC requirements. However, because of the very low safety significance and because it is entered into your corrective action program, the NRC is treating the finding as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. The report also documents two NRC-identified findings involving a violation of NRC requirements, however, the safety significance has not been determined. Additionally, licensee-identified violations which were determined to be of very low safety significance are listed in Section 4OA7 of this report. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator Region 2; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Virgil C. Summer Nuclear Station.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publically 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/

Charles R. Ogle, Chief
Engineering Branch 1
Division of Reactor Safety

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

Enclosure: NRC Triennial Fire Protection Inspection Report 05000395/2004007
w/Attachment: Supplemental Information

cc w/encl:
R. J. White
Nuclear Coordinator Mail Code 802
S.C. Public Service Authority
Virgil C. Summer Nuclear Station
Electronic Mail Distribution

Kathryn M. Sutton, Esq.
Winston & Strawn LLP
Electronic Mail Distribution

Henry J. Porter, Director
Div. of Radioactive Waste Mgmt.
Dept. of Health and Environmental Control
Electronic Mail Distribution

R. Mike Gandy
Division of Radioactive Waste Mgmt.
S. C. Department of Health and Environmental Control
Electronic Mail Distribution

(cc w/encl cont'd - See page 3)

(cc w/encl cont'd)
Jeffrey B. Archie, General Manager
Nuclear Plant Operations (Mail Code 303)
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
Electronic Mail Distribution

Ronald B. Clary, Manager
Nuclear Licensing & Operating
Experience (Mail Code 830)
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
Electronic Mail Distribution

Distribution w/encl:
K. Cotton, NRR
L. Slack, RII EICS
RIDSNRRDIPMLIPB
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	50-395
License No.:	NPF-12
Report No.:	05000395/2004007
Licensee:	South Carolina Electric & Gas Company
Facility:	Virgil C. Summer Nuclear Station
Location:	576 Stairway Road Jenkinsville, SC 29065
Dates:	June 7 - 11, 2004 (Week 1) June 21 - 25, 2004 (Week 2)
Inspectors:	C. Payne, Senior Reactor Inspector (Lead Inspector) G. Wiseman, Senior Reactor Inspector P. Fillion, Reactor Inspector
Accompanying Personnel:	N. Staples, Reactor Inspector K. O'Donohue, Fire Protection Team Leader G. Cameron, Fire Protection Co-op
Approved by:	Charles R. Ogle, Chief Engineering Branch 1 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000395/2004-007; 06/07 - 11/2004 and 06/21 - 25/2004; Virgil C. Summer Nuclear Station; Triennial Fire Protection.

The report covered an announced two-week period of inspection by three regional inspectors. One Green non-cited violation and two unresolved items pending a significance determination were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. A non-cited violation of V.C. Summer Facility Operating License NFP-12, Condition 2.C.(18), was identified for failure to provide the fire brigade with portable smoke ejectors capable of operation during a loss of offsite electrical power. The licensee acquired portable, gasoline-powered electrical generators to resolve the problem.

  The finding adversely affected the defense-in-depth element for fire brigade manual fire suppression capability. The finding is greater than minor because it is associated with the protection against external factors attribute and degraded the reactor safety mitigating systems cornerstone objective. Because this finding only impacted the effectiveness of the fire brigade while other fire protection features, such as passive fire barriers, physical separation, and safe shutdown capability remained available to mitigate a fire, the finding was determined to have very low safety significance. (Section R05.02)

- TBD. A finding was identified for failure to protect the control circuits for level control valves (LCV) LCV-115C and LCV-115E, charging pump suction valves from the volume control tank, to prevent spurious operation during a severe fire. The finding is unresolved pending completion of a significance determination. The licensee entered this issue into its corrective action program.

  The finding adversely impacted the reliability and capability of equipment required to achieve and maintain a safe shutdown condition following a severe fire. The finding is greater than minor because it is associated with the protection against external factors attribute and degraded the reactor safety mitigating systems cornerstone objective. The finding degraded the defense-in-depth for fire protection. This finding is applicable to FA IB-22, and other fire areas containing the control cables for either LCV-115C or LCV-115E and is unresolved pending completion of a significance determination. (Section 1R05.03)

- TBD. A finding was identified for failure to establish timely performance of key steps of the fire emergency procedures so that pressurizer level would be maintained in the indicating range during plant fires as required. The finding is unresolved pending completion of a significance determination. The licensee entered this issue into its corrective action program.

  The finding adversely impacted the reliability and capability of equipment required to achieve and maintain a safe shutdown condition following a severe fire. The finding is greater than minor because it is associated with the protection against external factors attribute and degraded the reactor safety mitigating systems cornerstone objective. The finding degraded the defense-in-depth for fire protection. This finding is applicable to all fire areas and is unresolved pending completion of a significance determination. (Section 1R05.05)

B. Licensee-Identified Violations

Violations of very low safety significance, which were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective actions are listed in Section 4OA7 of this report.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems and Barrier Integrity

1R05 Fire Protection

The purpose of this inspection was to review the Virgil C. Summer Nuclear Station fire protection program for selected risk-significant fire areas. Emphasis was placed on verification that the post-fire safe shutdown (SSD) capability [from both the Control Room (MCR) and the Control Room Evacuation Panel (CREP)] and the fire protection features provided for ensuring that at least one redundant train of SSD systems is maintained free of fire damage. The inspection was performed in accordance with the U.S. Nuclear Regulatory Commission's (NRC) Reactor Oversight Process using a risk-informed approach for selecting the fire areas and attributes to be inspected. The inspectors used the licensee's Individual Plant Examination for External Events and in-plant tours to choose three risk-significant fire areas for detailed inspection and review. The fire areas chosen for review during this inspection were:

- Fire Area (FA) DG-2, Diesel Generator (DG) "B" Room (400, 427, 436 and 477 foot (ft) levels). A severe fire in this area would require using DG "A" to power equipment required to achieve safe shutdown from the control room. Train "B" safety-related equipment would be de-energized.

- FA CB-15, Upper Cable Spreading Room (448 ft level). A severe fire in this area would require using DG "B" to power equipment required to perform an alternative safe shutdown from the control room evacuation panels. Train "A" safety-related equipment would be de-energized.

- FA IB-22.2, 1DB Switchgear Room (436 ft level). A severe fire in this area would require using DG "A" to power equipment required to achieve safe shutdown from the control room. Train "B" safety-related equipment would be de-energized.

The inspectors evaluated the licensee's fire protection program against applicable requirements, including Operating License Condition 3.D; Title 10 of the Code of Federal Regulations, Part 50 (10 CFR 50), Appendix R; 10 CFR 50.48; commitments to Appendix A of Branch Technical Position Auxiliary and Power Conversion Systems Branch 9.5-1; V.C. Summer Nuclear Station Final Safety Analysis Report (FSAR); related NRC safety evaluation reports (SERs); and plant Technical Specifications. The inspectors evaluated all areas of this inspection, as documented below, against these requirements.

Specific documents reviewed by the inspectors are listed in the attachment.

.01 Systems Required to Achieve and Maintain Post-Fire Safe Shutdown

a. Inspection Scope

The licensee's Fire Protection Evaluation Report (FPER) was reviewed to determine the components and systems necessary to achieve and maintain SSD conditions from the MCR in the event of fire in FA DG-2 and FA IB-22.2. All safe shutdown functions were addressed to some extent with more emphasis placed on the decay heat removal, reactor coolant pump (RCP) seal protection and reactor coolant system (RCS) inventory control functions. This inspection activity included a review of the licensee's analysis as contained in the Appendix R Evaluation Phase II Composite Equipment List and the Success Path Diagrams for the "Compliance Review" and "Non-Compliance Review" for the selected SSD functions. The objectives of this inspection activity were to:

- Verify that the licensee's shutdown methodology had correctly identified the components and systems necessary to achieve and maintain an SSD condition.
- Confirm the adequacy of the systems selected for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring and support system functions.
- Verify that an SSD can be achieved and maintained without off-site power when it can be confirmed that a postulated fire in any of the selected fire areas could cause the loss of off-site power.
- Verify that manual operator actions are consistent with the plant's fire protection licensing basis.

Of the fire areas selected for review during this inspection, fire damage in FA CB-15 and FA IB-22.2 may result in at least one fire-induced failure that could lead to a loss of offsite power. The licensee's analysis for these areas concluded that one of the plant's two DGs would be available to power the SSD systems. (The licensee's fire mitigation strategy aligns equipment required to achieve and maintain safe shutdown to its associated DG, regardless of offsite power availability.) Accordingly, the inspectors addressed the validity of that conclusion by reviewing the DG output breaker control circuit, start circuit and shutdown circuit, as well as relevant operating procedures. The inspectors assessed the potential for fire-induced cable damage to inhibit the designated SSD DG from starting and re-energizing the distribution system following a loss of offsite power. The inspectors also evaluated the effects of inadvertent loading of the DG or unsynchronized paralleling to a bus already energized from normal power.

The team reviewed the licensee's strategy to safely shutdown given a fire in FA DG-2 or FA IB-22.2. Specifically, the team evaluated the viability of separating the SSD equipment from offsite power and aligning it to the designated DG while fully de-energizing the other train of safety-related equipment. The control circuit for DG "A" was reviewed in terms of the potential for permissives and interlocks being affected by a severe fire in either of these fire areas.

The MCR (remote) and in-plant manual operator actions (local) for controlling plant operation, fire response, and achieving a SSD condition in response to a severe fire in FA DG-2 or IB-22.2, were reviewed and walked down by the inspectors. To accomplish this task, the inspectors evaluated the following procedures:

- Fire Emergency Procedure (FEP) FEP-1.0, Fire Emergency Procedure Selection
- FEP 2.0, Train "A" Plant Shutdown To Hot Standby Due To Fire
- Annunciator Response Procedure (ARP) ARP-001, RCP A/B/C THERM BAR & BRG FLO LO
- Abnormal Operating Procedure (AOP) AOP-102.2, Loss of Charging
- AOP-118.1, Attachment 4, Starting a Charging Pump and Supplying RCP Seal Cooling

The procedure reviews focused on ensuring that all required functions for post-fire safe shutdown, and the corresponding equipment necessary to perform those functions, were included in the procedures. The team walked down applicable portions of the procedures listed above to verify that local manual operator actions were feasible and could be reliably performed in a timely manner.

b. Findings

Fire Emergency Procedure Implementation Not Timely To Ensure RCP Seal Integrity

An issue was identified in that operator actions to align RCP seal injection during some severe fires may not be performed in sufficient time to ensure that RCP seal integrity is maintained. In addition, existing procedural actions to reestablish seal injection after an extended loss (about 90 minutes for the procedures in effect during the inspection and currently about 50 minutes) may aggravate any degradation in RCP seal integrity that occurs.

Per the FPER, seal injection from the charging system is the assured method for protecting the RCP seals during a severe fire in any fire area. The RCP thermal barrier cooling system [which uses the component cooling water system] was not analyzed and is assumed by the licensee's analysis to be lost due to the effects of fire. In some cases, in lieu of analyzing and protecting required, control circuits and cables for the charging system seal injection flowpath, FEP guidance directs manual operator actions to locally control the SSD equipment in this system. This issue was previously identified as part of URI 05000395/2001010-01, Fire Emergency Procedure FEP-4.0 Potentially Not Adequate to Ensure RCP Seal Integrity and was opened pending additional NRC review.

While evaluating the feasibility of the manual actions using the guidance of Inspection Procedure 71111.05, the inspectors confirmed that procedures FEP-2.0, FEP-3.0 and FEP-4.0 allowed 90 minutes to complete the operator actions for aligning RCP seal injection. However, industry analyses [Westinghouse Direct Work No. DW-94-011; Westinghouse WCAP-10541, Revision 2; and Westinghouse WCAP-15603, Revision 1-A] have determined that seal package damage could occur within 13 minutes of loss of all seal package cooling. Thus, the operator guidance provided in procedures FEP-2.0, FEP-3.0 and FEP-4.0 does not appear to provide timely action and could possibly result in an RCP seal loss of coolant accident (LOCA). Loss of RCS inventory due to an RCP seal LOCA could be beyond the capacity of charging system equipment dedicated to achieve and maintain post-fire safe shutdown. Additionally, the inspectors confirmed that the FEPs do not provide guidance for evaluating the status of the RCP seal cooling prior to reestablishing seal injection after it has been lost for an extended period

consistent with Westinghouse technical guidance. The licensee entered the issue into its corrective action program (CAP) as Condition Evaluation Report (CER) 04-1527 and is applicable to all SSD fire areas. The issue is an unresolved item (URI) pending NRC review of RCP seal package performance during a complete loss of seal cooling and is identified as URI 05000395/2004007-001, Local Manual Operator Actions To Align RCP Seal Injection May Not Be Timely.

.02 Fire Protection of Safe Shutdown Capability

a. Inspection Scope

For the selected fire areas, the inspectors evaluated the potential for fires, the combustible fire load characteristics, the potential exposure fire severity, the separation of systems necessary to achieve SSD, and the separation of electrical components and circuits to ensure that at least one SSD path was free of fire damage. The inspectors reviewed selected portions of the V.C. Summer FSAR and FPER. This review was conducted to determine if the licensee's commitments, as established in the fire protection licensing basis documents, were satisfied.

The team evaluated the separation of electrical components and circuits located within the same fire area to verify that SSD equipment would be free of fire damage. Among the fire areas chosen, the Upper Cable Spreading Room (FA CB-15) was known to contain redundant trains of shutdown equipment in the same location. Consequently, this area uses an alternative shutdown strategy [from the CREP] to achieve a safe shutdown condition. The inspectors examined selected control and instrumentation circuit drawings to verify that SSD equipment would be independent from the effects of a fire in this area. Fire Areas DG-2 and IB-22.2, by the nature of the plant layout and overall cable routing strategy, were not expected to have cables of redundant trains routed within. The inspectors walked down these areas and reviewed cable routing diagrams to identify if any redundant SSD equipment trains were routed in the area. The inspectors also reviewed the success path diagrams to determine if one train of electrical power was sufficient to power the components and instrumentation required for achieving safe shutdown in FA DG-2 and FA IB-22.2.

The inspectors reviewed the licensee's documents which establish and implement controls and practices to prevent fires and to control the storage of permanent and transient combustible materials and ignition sources, to verify that the objectives established by the NRC-approved fire protection program were satisfied. The documents reviewed are listed in the attachment.

The inspectors toured the selected plant fire areas to observe: (1) the material condition of fire protection systems and equipment, (2) the storage of permanent and transient combustible materials, and (3) the implementation of administrative procedures for limiting fire hazards, combustible waste collection, housekeeping practices, and cleanliness conditions. These reviews were accomplished to ensure that the licensee was maintaining the fire protection systems, had properly evaluated in-situ combustible fire loads, controlled hot-work activities, and limited transient fire hazards in a manner consistent with the FPER, administrative procedures and other fire protection program procedures. In addition, the inspectors reviewed design control procedures to

determine if plant changes were adequately evaluated for the potential impact on the fire protection program, SSD equipment and plant procedures (as required by the fire protection program).

The inspectors reviewed operator and fire brigade staffing, fire brigade response, fire brigade qualification training and drill program procedures, and fire brigade drill critiques from January, 2002, to March, 2004. The reviews were performed to determine whether fire brigade drills had been conducted in high fire risk plant areas and whether fire brigade personnel training, qualifications, manning assignments, drill response, and performance met the requirements of the fire protection program.

The inspectors walked down the fire emergency equipment storage locker locations and dress-out areas in the turbine and control buildings to assess the operational readiness of fire fighting and smoke control equipment. The fire brigade self-contained breathing apparatuses were reviewed for adequacy as well as the availability of supplemental breathing air bottles and the capability to refill these bottles.

The inspectors reviewed fire fighting pre-fire plans for the selected fire areas to determine if appropriate information was provided to fire brigade members to identify SSD equipment and to facilitate suppression of an exposure fire that could adversely impact SSD capability. The inspectors walked down the selected fire areas to compare the associated pre-fire plans and drawings with as-built plant conditions. This was done to verify that fire fighting pre-fire plans and drawings were consistent with the fire protection features and potential fire conditions described in the FPER.

The inspectors examined the diesel generator building equipment and floor drain systems and fuel oil day tank oil-retention curbs to verify that redundant trains of SSD systems or operator actions required for hot shutdown would not be impacted by potential diesel generator combustible liquid spills or migration through the drain systems. In addition, the inspectors performed a review of drawings, flooding analysis calculations, and maintenance instructions for fire suppression-caused flooding associated with the floor drain systems and flood barriers for the 1DA Switchgear Room (FA IB-20) and the 1DB Switchgear Room (FA IB-22).

b. Findings

Failure to Provide Portable Smoke Ejectors Capable of Operation During a Loss of Offsite Electrical Power

Introduction: A non-cited violation (NCV) of V.C. Summer Facility Operating License NFP-12, Condition 2.C.(18), was identified for failure to provide the fire brigade with portable smoke ejectors capable of operation during a loss of offsite electrical power. This finding was applicable to all fire areas. The licensee acquired portable, gasoline-powered electrical generators to resolve the problem.

Description: On June 10, 2004, the inspectors walked down the fire emergency equipment storage lockers and dress-out areas located in the turbine and control buildings. These lockers contained the fire brigade emergency protective gear, and fire fighting and support equipment. The inspectors observed that the portable smoke

ejectors stored at the fire brigade lockers were electrically-powered units. However, Section 5.D.4(c) of the FPER states, in part, that the portable smoke ejectors are capable of operation during a loss of offsite electrical power.

When asked how the commitment was satisfied using electrically-powered smoke ejectors, the licensee generated CER 04-1935 to identify and track the issue. On June 22, 2004, the licensee determined that a change to Fire Protection Procedure (FPP) FPP-026, Fire / Hazmat Response, had been implemented in 1997 replacing the original gasoline-powered smoke ejectors with electrically-powered units (due to maintenance issues.) The licensee had performed a safety evaluation for the procedure change but the evaluation failed to identify and address the applicable section of the FPER. The licensee made a verbal report of this condition to the NRC upon discovery and immediately initiated corrective actions to bring the plant back into compliance with the FPER. On June 24, 2004, the inspectors confirmed that portable, gasoline-powered electrical generators had been acquired and placed at the fire brigade lockers to support smoke ejector operation.

The apparent cause of this finding was a human performance error that occurred in 1997 while developing the station modification package to replace the original gasoline-powered smoke ejector units. The evaluators who were screening the modification failed to identify and address the applicable section of the FPER containing the station commitment that the portable smoke ejectors would be capable of operation during the loss of offsite electrical power.

Analysis: The finding adversely affected the defense-in-depth element for fire brigade manual fire suppression capability. The finding is greater than minor because it is associated with the protection against external factors attribute and degraded the reactor safety mitigating systems cornerstone objective. Smoke ejectors may be used in all fire areas to remove smoke associated with a fire to assist the fire brigade in overall fire fighting activities. Ineffective smoke removal can hamper the fire brigade's ability to locate and control a severe fire, and possibly result in more significant plant damage. The finding was evaluated using the significance determination process (SDP) Phase 1 Screening Worksheet and found to be of very low safety significance because only the effectiveness of the fire brigade was affected and because other fire protection mitigating features, such as passive fire barriers, physical separation, and SSD capability from the MCR or the CREP, were not degraded.

Enforcement: V.C. Summer Facility Operating License No. NFP-12, Condition 2.C.(18) requires, in part, that the licensee implement and maintain the provisions of the approved fire protection program as described in the FSAR. Section 9.5.1.1 of the FSAR incorporates the FPER by reference. Section 5.D.4(c) of the FPER states that available portable smoke ejectors are capable of operation with the loss of offsite electrical power.

Contrary to the above, on June 10, 2004, the available portable smoke ejectors stored at the fire brigade lockers were electrically powered units not capable of operation during a loss of offsite electrical power. This condition has existed since 1997 when the licensee replaced the original gasoline-powered smoke ejector units with electrically-powered units. Because the finding is of very low safety significance and because it has

been entered into the CAP, this violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000395/2004007-002, Failure to Provide Portable Smoke Ejectors Capable of Operation During a Loss of Offsite Electrical Power.

.03 Post-Fire Safe Shutdown Circuit Analysis

a. Inspection Scope

Using the FPER, the inspectors reviewed how systems would be used to achieve and maintain reactivity control, over-pressure protection, inventory control with high or low pressure injection systems, and residual heat removal during and following a fire in the areas selected for inspection. The inspection specifically focused on the minimum required systems and equipment necessary to achieve and maintain hot shutdown conditions because damage to these systems could pose a significantly greater risk than damage to systems required to achieve cold shutdown conditions.

On a sample basis, the team evaluated the adequacy of separation provided for power, control and instrumentation required for shutdown systems. The inspectors reviewed the licensee's analysis of systems intended to show that fire damage to components and cables located within the chosen fire areas would not prevent safe shutdown. In FA DG-2, the inspectors analyzed all cables in cable trays 3126, 2087, and 4609 for impact on safe shutdown capability. From the cable and raceway schedule, drawings were obtained for all cables in these three trays. The inspectors studied the cable schedule data to ascertain the system function associated with the cable. Additional details of selected systems were inspected as necessary.

Relative to FA IB-22.2, the inspectors performed a detailed review of selected control circuits as listed in the attachment. The routing of important cables was reviewed to determine the areas of the plant through which the cables were routed and the types of fire barriers that were installed. The team inspected the relevant plant areas to verify the routing and barrier information contained in the design documents. In addition, the routing of cables for the following components was traced on drawings in relation to the requirement to have one train of shutdown equipment free of fire damage:

- XVG-8131A-CS, Charging suction "B" to "C" cross connect valve
- XVG-8131B-CS, Charging suction "B" to "C" cross connect valve
- ITE-420-RC, RCS loop "B" cold leg temperature
- ITE-423-RC, RCS loop "B" hot leg temperature
- IPT-484-MS, Steam generator "B" pressure
- IPT-2010-MS, Steam generator "B" outlet pressure

The inspectors reviewed coordination for ground faults on the 7.2 kilo-volt (kV) and 480 volt (V) systems to check whether fire-induced faults on distribution system cables or buses could degrade safe shutdown capability. The design set points for the following relays and circuit breakers were evaluated and verified by examination of the relay in the field, or in one case, review of the last calibration data:

- 480 V buses 1DB2 and 1DB2Y
- 50G, At a typical feeder breaker for 7.2 kV bus 1DB
- 51BN-1C, At the normal incoming breaker for 7.2 kV bus 1C
- 51BN-1DA, At the normal incoming breaker for 7.2 kV bus 1DA
- 51BN-1DB, At the normal incoming breaker for 7.2 kV bus 1DB
- 51DG, In the neutral of DG "B"
- 51NL31, At the secondary neutral connection of transformer XTF31
- 51NL4, At the secondary neutral connection of transformer XTF4
- 51NL5, At the secondary neutral connection of transformer XTF5

The potential for spurious valve operation or malfunction was considered in the period immediately following a fire and in the period after operator realignment to hot standby mode but before fire extinguishment. The inspectors also utilized this information to determine if the requirements of 10 CFR 50, Appendix R, Section III.G.2 (for protection of control and power cables) were met. In the case of a severe Upper Cable Spreading Room fire, alternative safe shutdown capability was considered. The applicable criterion was that a fire would not degrade the ability to safely shutdown from the CREP.

b. Findings

Failure to Prevent Spurious Operation of Charging Pump Suction From VCT Valves LCV-115C and LCV-115E

Introduction: A finding was identified for failure to protect the control circuits for level control valves (LCV) LCV-115C and LCV-115E, charging pump suction valves from the volume control tank (VCT), to prevent spurious operation during a severe fire. The finding is a URI pending completion of the SDP.

Description: Per the FPER, charging pump flow with suction from the refueling water storage tank (RWST) is the assured method for providing makeup water to the RCS during a severe fire. However, until this flow path is manually aligned by the operators, suction to the charging pumps is provided from the VCT through LCV-115C and LCV-115E. Each is a motor-operated valve arranged in series between the VCT and the suction of the charging pumps. These valves are normally controlled from the MCR. The licensee had not evaluated the control circuits of these two valves for potential adverse effects caused by fire-induced damage nor were these circuits protected to ensure operability during a fire. Because the control cable for LCV-115E is not protected in switchgear room 1DB (FA IB-22), thermal insult to the control circuit for this valve could cause it to spuriously close during a severe fire in this area. Spurious closure of LCV-115E would cause a loss of the water supply to the suction of the operating charging pump. (The suction valves from the RWST to the charging pumps do not automatically open on spurious closure of either LCV-115C or LCV-115E.) The licensee indicated pump damage could occur in about 30 seconds.

For a severe fire in FA IB-22, the FPER indicates that safe shutdown is achieved by aligning the "A" train of SSD equipment. If charging pump "A" is operating at the time of the fire, it could be damaged and unable to fulfill its SSD function should LCV-115E spuriously close due to fire-induced damage. The licensee's SSD strategy in this scenario involves aligning the "A" train equipment to DG "A" and then de-energizing all

"B" train equipment, including charging pump "B". If charging pump "A" is lost, no means of providing RCS make-up and RCP seal injection flow would be immediately available. Likewise for fire areas relying on "B" train equipment, similar thermal insult to an unprotected cable to LCV-115C could render charging pump "B" unavailable. [Charging pump "C" could be available for use, but operator actions may be required to align it to the DG being used for safe shutdown. These actions had not been analyzed, were not addressed in the FEP, and may take up to 30 minutes to perform.]

The inspectors noted that procedures FEP-1.0 and FEP-2.0 do not contain steps to protect charging pump "A" (or charging pump "B" for "B" train SSD fire areas) or to ensure a protected supply of water is quickly provided to prevent pump damage. FEP-2.0, Enclosure C, Step 4, directs the nuclear reactor operator to open both LCV-115B and LCV-115D. However, this step is not required to be accomplished for 30 minutes which the inspectors determined to be untimely. The licensee entered this finding into its CAP as CER 04-1756.

Analysis: The finding adversely impacted the reliability and capability of equipment required to achieve and maintain a safe shutdown condition following a severe fire. The finding is greater than minor because it is associated with the protection against external factors attribute and degraded the reactor safety mitigating systems cornerstone objective. The finding degraded the defense-in-depth for fire protection. This finding is applicable to FA IB-22, and other fire areas containing the control cables for either LCV-115C or LCV-115E, and is unresolved pending completion of a significance determination.

Enforcement: V.C. Summer Facility Operating License No. NFP-12, Condition 2.C.(18) requires, in part, that the licensee implement and maintain in effect the provisions of the approved fire protection program as described in the FSAR. Section 9.5.1.1 of the FSAR incorporates the FPER by reference. Section 1.2 of the FPER commits to maintain the fire protection program in accordance with Appendix R of 10 CFR 50. Appendix R, Section III.G.2 states, in part, that where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of three specific means of ensuring that one of the redundant trains is free of fire damage shall be provided.

Contrary to the above, on June 25, 2004, the inspectors identified that the licensee failed to protect control circuits and cables that could cause maloperation of valves LCV-115C and LCV-115E. This condition has existed since initial plant licensing in 1982. The finding and related violation are unresolved pending completion of a significance determination. This finding is identified as URI 05000395/2004007-003, Failure to Prevent Spurious Operation of Charging Pump Suction From VCT Valves LCV-115C and LCV-115E.

.04 Alternative Shutdown Capability

a. Inspection Scope

The licensee's FPER and plant configuration were reviewed to determine the components and systems necessary to achieve and maintain SSD conditions from the CREP in the event of fire in the MCR. The objectives of this evaluation were to:

- Verify that the licensee's alternative shutdown methodology had correctly identified the components and systems necessary to achieve and maintain an SSD condition.
- Confirm the adequacy of the systems selected for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring and support system functions.
- Verify that hot and cold shutdown from outside the MCR can be achieved and maintained with offsite power available or not available.

The team evaluated the problems and resolutions listed in FPER, Section 4.5.15.2 for FA CB-15 in relation to requirements for 10 CFR 50, Appendix R, Section III.G.3. The inspectors focused on the capacity and capability of the CREP to fulfill the decay heat removal function. This inspection activity included a detailed review of the success path diagram for decay heat removal as well as procedures, CREP instrumentation control devices and control circuits as necessary to form a conclusion.

A sample of control circuits were reviewed to check they incorporated isolation / transfer switches as necessary to ensure that the CREP was independent of fire area CB-15. [For example, the DG "B" output breaker control circuit and the RCS loop C pressure instrumentation.] Coordination of overcurrent protective devices in the isolation / transfer circuits was also reviewed.

b. Findings

No findings of significance were identified.

.05 Operational Implementation of Alternative Shutdown Capability

a. Inspection Scope

The team reviewed the operational implementation of the alternative SSD capability that would be used during a severe fire in the Upper Cable Spreading Room (FA CB-15). This review was performed to determine if: (1) the training program for licensed personnel included alternative SSD capability; (2) personnel required to achieve and maintain the plant in hot standby following a fire using the CREP could be provided from normal onsite staff, exclusive of the fire brigade; (3) the licensee had incorporated the operability of alternative shutdown transfer and control functions into plant administrative procedures; and (4) the licensee periodically performed operability testing of the alternative shutdown instrumentation, and transfer and control functions.

The team reviewed and walked down the following procedures that implemented the licensee's alternative SSD strategy:

- FEP-1.0, Fire Emergency Procedure Selection
- FEP-4.0, Control Room Evacuation Due to Fire
  - Enclosure A, Duties of the Control Room Supervisor
  - Enclosure B, Duties of the Nuclear Reactor Operator at the Controls
  - Enclosure C, Duties of the Nuclear Reactor Operator
  - Enclosure D, Duties of the Intermediate Building Operator
  - Enclosure E, Duties of the Auxiliary Building Operator (Upper)
  - Enclosure F, Duties of the Shift Engineer
  - Enclosure G, Duties of Electrical Maintenance Personnel

The procedure reviews focused on ensuring that all required functions for post-fire safe shutdown, and the corresponding equipment necessary to perform those functions, were included in the procedures. The team walked down each enclosure listed above to verify that local manual operator actions were feasible and could be reliably performed in a timely manner.

b. Findings

Fire Emergency Procedure Implementation Not Timely To Maintain Pressurizer Level In Indicating Range

Introduction: A finding was identified for the licensee's failure to establish timely performance of key steps of the fire emergency procedures to ensure that pressurizer level would be maintained in the indicating range during plant fires as required. The finding is a URI pending completion of the SDP.

Description: Fire response procedure FEP-4.0, Control Room Evacuation Due to Fire, specifies that operator actions to restore RCP seal injection flow [and thus makeup flow to the RCS] may be completed up to 90 minutes after procedure implementation. Assuming Technical Specification rates for allowable RCS leakage and 25 GPM per RCP seal leakage, licensee analysis determined that pressurizer level would decrease to the bottom of the pressurizer after 90 minutes. However, the performance requirements of Appendix R, Section III.L, specify that pressurizer level be maintained in the indicating range. Thus, the inspectors concluded the licensee's procedures did not ensure that operator actions would be taken in time to ensure pressurizer level was maintained in the indicating range as required. [Aspects of this finding were originally identified during a previous site visit and documented as part of URI 05000395/ 2001010-01, Fire Emergency Procedure FEP-4.0 Potentially Not Adequate to Ensure RCP Seal Integrity pending additional NRC review.] The inspectors confirmed during this inspection that a finding existed which applied to all SSD fire areas in the plant and because of its wide scope will track it separate from the RCP seal integrity issue discussed in Section 1R05.01.b of this report. The issue was entered into the licensee's CAP as CER 04-0472. On June 16, 2004, the licensee revised FEP-2.0, FEP-3.0, and FEP-4.0 to require alignment of RCP seal injection flow within 50 minutes. Based on the above assumptions, this performance time frame would maintain pressurizer level within the indicating range. The inspectors walked down the FEP-4.0 operator actions

and determined that the actions could feasiblely be completed in the 50 minute time frame.

Analysis: The finding adversely impacted the reliability and capability of equipment required to achieve and maintain a safe shutdown condition following a severe fire. The finding is greater than minor because it is associated with the protection against external factors attribute and degraded the reactor safety mitigating systems cornerstone objective. The finding degraded the defense-in-depth for fire protection. This finding is applicable to all SSD fire areas and is unresolved pending completion of a significance determination.

Enforcement: V.C. Summer Facility Operating License No. NFP-12, Condition 2.C.(18) requires, in part, that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the FSAR. Section 9.5.1.1 of the FSAR incorporates the FPER by reference. The FPER states that V.C. Summer complies with the applicable requirements of Appendix R, Section III.G. Section III.L.2.b states, in part, that one of the performance goals for the shutdown function is maintaining reactor coolant level within the level indication of the pressurizer for pressurized water reactors.

Contrary to the above, on June 25, 2004, the inspectors identified that the licensee failed to effectively implement the fire protection program in that FEP-4.0 would fail to maintain reactor coolant level within the level indication of the pressurizer. This condition has existed since at least January 21, 2004, when it was first identified by the NRC. This finding is identified as URI 05000395/2004007-004, Fire Emergency Procedure Implementation Not Timely To Maintain Pressurizer Level In Indicating Range, and is unresolved pending completion of a significance determination.

.06 Communications

a. Inspection Scope

The inspectors reviewed plant communication capabilities to evaluate the availability of the communication systems to support fire event notification, fire brigade fire fighting activities, and plant personnel in the performance of manual operator actions for SSD. This included verifying that the station redundant paging and portable radio communication systems were consistent with the licensing basis (as credited in the Safe Shutdown Analysis) and would be available during fire emergency response activities for fires in the selected fire areas. In addition, the inspectors reviewed completed fire brigade drill critique reports for brigade shifts from January, 2002, to March, 2004, to assess the proper operation and effectiveness of the fire brigade command post portable radio communications during fire drills as well as to identify any history of operational or performance problems with radio communications during fire drills.

b. Findings

A licensee-identified violation is documented and dispositioned in Section 4OA7 of this report regarding the availability of the portable radio communication systems during and following a fire event. No other findings of significance were identified.

.07 Emergency Lighting

a. Inspection Scope

The inspectors reviewed the design, placement, operation, and periodic testing procedures for direct current (DC) self-contained battery powered emergency lighting units (ELU) and dedicated, battery powered portable ELUs. The inspectors evaluated the capability of the ELUs to support plant personnel in the performance of SSD functions, including local manual operator actions, and for illuminating access and egress routes to the areas where those manual actions would be performed. The inspectors checked that these battery power supplies were rated with at least an 8-hour capacity, as required by Section III.J of 10 CFR 50, Appendix R. During inspector walk downs of the plant areas where operators performed local manual actions, the inspectors inspected area ELUs for proper operation and checked the aiming of lamp heads to determine if sufficient illumination would be available to adequately illuminate the SSD equipment, the equipment identification tags, and the access and egress routes thereto, so that operators would be able to perform the actions without needing to use flashlights. The inspectors also reviewed completed surveillance and maintenance procedures and test records to ensure that the licensee properly maintained the lighting equipment.

The inspectors observed whether emergency exit lighting was provided for personnel evacuation pathways to the outside exits as identified in the National Fire Protection Association (NFPA) 101, Life Safety Code, and the Occupational Safety and Health Administration (OSHA) Part 1910, Occupational Safety and Health Standards. This review also included examination of whether backup emergency lighting was provided for the fire emergency storage lockers and fire brigade dress-out areas in support of fire brigade operations should power fail during a fire emergency.

b. Findings

No findings of significance were identified.

.08 Cold Shutdown Repairs

a. Inspection Scope

The inspectors reviewed and inspected the licensee's repair procedure that may be needed to transition from hot standby to cold shutdown. The procedure was contained in Electrical Maintenance Procedure EMP-100.002, Emergency Installation of Cable For RHR System, Revision 5. The procedure involved routing and installing temporary cables from appropriate switchgear compartments to residual heat removal pump "B" and the RHR header isolation valves. A field inspection was made to verify the presence and condition of pre-staged tools and equipment to support procedure implementation.

b. Findings

No findings of significance were identified.

.09 Fire Barriers and Fire Area/Zone/Room Penetration Seals

a. Inspection Scope

The inspectors reviewed the selected fire areas to evaluate the adequacy of the fire resistance of fire area barrier enclosure walls, ceilings, floors, fire barrier mechanical and electrical penetration seals, fire doors, and fire dampers to ensure that at least one train of SSD equipment would be maintained free of fire damage. The inspectors selected several fire barrier features for detailed evaluation and inspection to verify proper installation and qualification. The inspectors walked down the selected fire areas to observe the material condition and configuration of the installed fire barrier features. The inspectors also reviewed construction details and supporting fire endurance tests for the installed fire barrier features to verify the as-built configurations were qualified by appropriate fire endurance tests. In addition, the inspectors reviewed the fire hazards analysis to verify the fire loading used by the licensee to determine the fire resistance rating of the fire barrier enclosures.

The inspectors conducted a detailed inspection of two 3-hour fire-rated drywall-on-steel stud walls separating the Upper Cable Spreading Room (FA CB-15) from FA CB-10 and FA CB-12 to confirm proper qualification and installation. The inspectors also reviewed engineering evaluations and a summary of completed inspection and maintenance procedures for six fire doors in the selected fire areas. These reviews were performed to ensure that the passive fire barriers were properly inspected, maintained, and met the licensing and design bases as described in the licensee submittals, NRC SERs, and the FPER.

The inspectors selected eight penetration fire seals in the 1DB Switchgear (FA IB-22) and the Upper Cable Spreading Room (FA CB-15) for review. The inspectors conducted a detailed examination of the seals to confirm proper installation and qualification. For the selected mechanical and electrical fire barrier penetration seals, the inspectors reviewed installation details, penetration seal detail drawings, fire resistance and water tightness qualification tests, and the penetration seal deviation engineering analysis to verify that the fire barrier installations met design requirements, license commitments, and standard industry practices. The inspectors compared the penetration seal ratings with the ratings of the barrier enclosures in which they were installed. Additionally, the inspectors reviewed a summary of completed surveillance and maintenance procedures for the selected fire barrier walls to verify the fire seals were being adequately inspected and maintained.

The inspectors reviewed FEP-4.0, selected fire fighting pre-plans, fire damper location and detail drawings, and heating, ventilation, and air conditioning system drawings to verify that access to alternate shutdown equipment and performance of SSD manual operator actions would not be inhibited by smoke migration from the area of the fire to adjacent plant areas. The inspectors reviewed the design, installation details, and qualification testing for three mechanical fire dampers in the Upper Cable Spreading

Room (FA CB-15) and Diesel Generator Room B (FA DG-2) to verify that the damper installations met design requirements and license commitments.

b. Findings

No findings of significance were identified.

.10 Fire Protection Systems, Features and Equipment

a. Inspection Scope

The inspectors reviewed SSD calculations, vendor documentation, flow diagrams, cable routing information, system operating instructions, operational valve lineup procedures, and system availability studies associated with the fire pumps and fire protection water supply system. Using operating and test procedures, the inspectors toured selected fire pumps and portions of the fire main piping system to evaluate material condition, consistency of as-built configurations with engineering drawings, and to verify correct system breaker and valve lineups. The inspectors evaluated the common fire protection water delivery and supply components to assess if they could be damaged or inhibited by fire-induced failures of electrical power supplies or control circuits. In addition, the inspectors reviewed periodic surveillance and operability flow test data 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 those design requirements and acceptance criteria specified in Section III of the Fire Protection Technical Requirements Package (TRP-2).

For the selected fire areas, the inspectors reviewed the adequacy of the design, installation, and operation of the automatic detection and alarm system to actuate in the early stage of a fire. This included walk downs of the systems and an examination of the types of detectors, detector spacing, the licensee's technical evaluation of the detector locations, and the ceiling, steel beam reinforcing plans as shown on location drawings. The inspectors also reviewed licensee documentation such as deviations from NRC regulations and the NFPA codes, and the NRC SERs associated with the selected fire areas. These reviews were performed to ensure that the fire detection systems for the selected fire areas were installed in accordance with the design and licensing bases of the plant. Additionally, the team reviewed fire detection surveillance procedures and the detection system technical requirements specified in TRP-2 to determine the adequacy of fire detection component testing to ensure that the detection systems could function when needed.

The inspectors reviewed engineering drawings for the automatic fire suppression systems to assess the adequacy of the design and installation in the Upper Cable Spreading Room (FA CB-15). The inspectors walked down the area to observe the placement and spacing of sprinkler heads and to confirm they were not obstructed. Design calculations were reviewed to verify that the required fire hose water flow and sprinkler system density for this area was available. The inspectors reviewed a sample of electrical schematics and cable routing information for automatic fire suppression equipment to assess the potential effects of fire-induced spurious system operation or malfunction on SSD manual operator actions in adjacent plant areas.

The inspectors reviewed the manual suppression standpipe and fire hose system to verify adequate design, installation, and operation in the selected fire areas. The inspectors examined flow measurement/pressure test data to verify that sufficient pressure and flow volume was available to produce electrically safe and effective fire hose operation within the nozzle manufacturer's specified flow range. During plant tours, the inspectors observed placement of the fire hoses and extinguishers to confirm consistency with the fire fighting pre-plan drawings and fire protection program documents. Additionally, the inspectors checked a sample of fire hose lengths to confirm they could reach the affected fire areas in support of manual fire fighting efforts.

b. Findings

No findings of significance were identified.

.11 Compensatory Measures

a. Inspection Scope

The inspectors reviewed the administrative controls for out-of-service, degraded, and/or inoperable fire protection features. The review was performed to verify that the risk associated with removing fire protection and/or post-fire SSD systems or components from service was properly assessed and adequate compensatory measures were implemented in accordance with the approved fire protection program. The inspectors reviewed the active items on the fire protection program log and compared them with the fire areas selected for inspection. The compensatory measures that had been established in these areas were compared to those specified in TRP-2, FPP-020, Fire Protection Program Administration, and FPP-022, Fire Prevention, and evaluated for adequacy. The inspectors also assessed the effectiveness of short-term measures used to compensate for degraded functions or features until corrective actions could be implemented.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

1. Triennial Fire Protection Review

a. Inspection Scope

During the inspection, the inspectors verified that licensee personnel were documenting fire protection problems in the corrective action program in accordance with 10 CFR Part 50, Appendix B, Criterion XVI, and licensee procedure SAP-1131, Corrective Action Program. The inspectors verified that the apparent cause evaluation and corrective actions were appropriate and timely, commensurate with the safety significance of the

problem. Condition Evaluation Reports resulting from fire, smoke, sparks, arcing, and equipment overheating incidents for the period of January, 2002, to April, 2004 as well as selected fire brigade response, emergency / incidents, and fire safety inspection reports were reviewed. This review was conducted to assess the frequency of fire incidents and effectiveness of the fire prevention program and any maintenance-related or material condition problems related to fire incidents. The inspectors also reviewed other CAP documents, including completed corrective actions documented in selected CERs, and operating experience program (OEP) documents to verify that industry-identified fire protection problems potentially or actually affecting V.C. Summer were appropriately entered into, and resolved by, the CAP process. Items included in the OEP effectiveness review were NRC Information Notices, industry or vendor-generated reports of defects and noncompliance under 10 CFR Part 21, and vendor information letters. In addition, the inspectors reviewed a sample of the fire protection program self-assessments which the licensee performed in the previous two-year period. The inspectors evaluated the effectiveness of the corrective actions for the identified issues. The documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

2. Cross-References to PI&R Findings Documented Elsewhere

Section 4OA7 of the report describes a licensee-identified violation regarding untimely corrective action of previously identified [NRC Inspection Report 50-395/01-09] emergency lighting deficiencies related to fire brigade operations and SSD manual operator actions.

4OA4 Cross Cutting Aspects of Findings

Sections 1R05.02 and 4OA7 describe human performance errors where the licensee failed to properly implement their procedures for design control during development of plant modification packages. As a result of these errors, the licensee failed to have available 1) portable smoke ejectors capable of operation during a loss of offsite electrical power and 2) a radio communication repeater system analyzed to support fire fighting activities and fire emergency procedure implementation. In both cases, the licensee's screening evaluation failed to identify and address specific fire protection program commitments related to this equipment as contained in the applicable sections of the FSAR and FPER.

4OA5 Other

(Closed) URI 05000395/2001010-01: Fire Emergency Procedure FEP-4.0 Potentially Not Adequate to Ensure RCP Seal Integrity

In NRC Inspection Report 05000395/2001010, dated February 5, 2004, the inspectors identified a URI related to untimely procedure guidance in FEP-4.0 to reestablish RCP seal injection cooling (up to 90 minutes after it has been isolated) as well as the lack of

guidance for evaluating the status of potential RCP seal damage prior to reestablishing seal injection for an extended period of time.

Subsequently, the inspectors reviewed this URI during this inspection and identified that a finding (see Section 1R05.04 above), and another related issue (see Section 1R05.01), exists for all SSD fire areas. The inspectors also found these issues concern procedural guidance in FEP-2.0 and FEP-3.0, in addition to FEP-4.0 (vice only FEP-4.0). Consequently, this URI has been clarified and expanded into two new URIs in this report to better reflect the issues of concern. This URI is closed.

4OA6 Meetings, Including Exit

On June 25, 2004, the lead inspector presented the inspection results to Mr. S. Byrne and other members of his staff who acknowledged the findings. Proprietary information was provided and examined during the inspection, however, proprietary information is not contained in this report. Following completion of additional review in the Region II office, a final exit was held by telephone with Mr. Byrne and other members of his staff on July 30, 2004, to provide an update on changes to the preliminary inspection findings. The licensee acknowledged the findings.

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCVs.

- V.C. Summer Operating License Condition 2.C.(18) requires the licensee to implement and maintain all provisions of the approved fire protection program as described in the FSAR. Section 9.5.2, Communication Systems, commits to providing reliable communications between all essential areas of the station during normal operations or under emergency conditions. Contrary to this, in May, 2004, it was found that the original radio communication repeater equipment, associated power source and primary circuitry (analyzed and credited in the safe shutdown analysis) was no longer being used having been replaced by a plant modification in 1991. The currently installed radio communication repeater system had not been analyzed, nor protected, to ensure its availability during and following a fire emergency. The licensee's screening evaluation failed to identify and address specific fire protection program commitments related to this equipment as contained in the applicable sections of the FSAR and FPER. In addition, manual operator actions, specified in the FEPs for aligning the radio repeater's power source to the SSD train, were not applicable for the new equipment. This was identified in the licensee's CAP as CERs 04-1442 and 04-1974, respectively. This finding is of very low safety significance because the radios used by the operators and fire brigade members are capable of direct radio-to-radio communications that is independent of the radio communication repeater system. Also, extra radio batteries and chargers are stored at the fire brigade lockers and a standing order directs the fire brigade members and FEP operators to periodically change their radio batteries.

- In November, 2001, the NRC identified a finding for failure to install battery pack emergency lighting units (in accordance with the approved fire protection program) in thirteen areas where SSD manual operator actions would be performed [NRC Inspection Report 50-395/01-09-02]. 10 CFR Part 50, Appendix B, Criterion XVI requires, in part, that conditions adverse to quality shall be identified and corrected in a timely manner. Contrary to the above, on February 26, 2004, the licensee identified during a self assessment that a condition adverse to quality had not been corrected, in that, required battery pack emergency lighting units had not been installed. This was identified in the licensee's CAP as CER 04-0481. This finding is of very low significance because the operators carry tool kits with flashlights during fire emergency response, and it did not affect fire ignition frequency, fire detection, fire suppression, or fire barriers.

Attachment: Supplemental Information

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

F. Bacon, Manager, Chemistry Services
M. Browne, Manager, Quality Systems
S. Byrne, Senior Vice President
L. Cartin, Senior Engineer, Design Engineering
R. Clary, Manager, Nuclear Licensing and Operating Experience
S. Crumbo, Senior Engineer, Design Engineering
M. Findlay, Manager, Nuclear Protection Services
M. Fowlkes, General Manager, Engineering Services
D. Gatlin, Manager, Operations
T. Keckeisen, Supervisor, Operations Fire Protection
A. Monroe, Nuclear Licensing and Operating Experience
K. Nettles, General Manager, Nuclear Support Services
J. Parler, Supervisor, Design Engineering
A. Robosky, Senior Engineer - Fire Protection, Design Engineering
S. Shealy, Senior Principal Engineer - Electrical, Design Engineering
B. Stokes, Manager, Design Engineering
R. Sweet, Nuclear Licensing and Operating Experience
A. Torres, Manager, Planning / Scheduling and Project Management
R. White, Nuclear Coordinator, South Carolina Public Service Authority
S. Zarandi, Manager, Maintenance Services

NRC personnel:

J. Reece, Senior Resident Inspector (Acting)
S. Sanchez, Senior Resident Inspector (Acting)

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000395/2004007-001	URI	Local Manual Operator Actions To Align RCP Seal Injection May Not Be Timely (Section 1R05.01)
05000395/2004007-003	URI	Failure to Prevent Spurious Operation of Charging Pump Suction From VCT Valves LCV-115C and LCV-115E (Section 1R05.03)
05000395/2004007-004	URI	Fire Emergency Procedure Implementation Not Timely To Maintain Pressurizer Level In Indicating Range (Section 1R05.05)

Opened and Closed

05000395/2004007-002	NCV	Failure to Provide Portable Smoke Ejectors Capable of Operation During a Loss of Offsite Electrical Power (Section 1R05.02)

Closed

05000395/2004010-01	URI	Fire Emergency Procedure FEP-4.0 Potentially Not Adequate to Ensure RCP Seal Integrity (Section 40A5)

Discussed

None

LIST OF POWER AND CONTROL CIRCUITS INSPECTED IN RELATION TO SAFE SHUTDOWN REQUIREMENTS

Section 1R05.03: Post-Fire Safe Shutdown Capability

Drawing	Description
B-208-021, Sheet CS08, Revision 10	Charging pump C
B-208-021, Sheet CS22, Revision 12	Charging suction cross connect valve ZVG-8130A
B-208-021, Sheet CS23, Revision 12	Charging suction cross connect valve ZVG-8130B
B-208-021, Sheet CS33, Revision 10	Refueling water supply line stop valve LCV-115B
B-208-021, Sheet CS34, Revision 12	Refueling water supply line stop valve LCV-115D
B-208-021, Sheet CS35, Revision 10	VCT outlet valve LCV-115C
B-208-021, Sheet CS36, Revision 11	VCT outlet valve LCV-115E
B-208-024, Sheet DG02, Revision 13	Diesel generator B breaker control scheme
B-208-024, Sheet DG19, Revision 0	Diesel generator B start solenoid
B-208-024, Sheet DG23, Revision 1	Diesel generator B emergency/test start
B-208-024, Sheet DG25, Revision 1	Diesel generator B shutdown
B-208-037, Sheet ES07, Revision 11	7.2 kV bus 1DB normal incoming breaker
B-208-064, Sheet MD24, Revision 0	Diesel generator building sump pump B

LIST OF DOCUMENTS REVIEWED

Procedures

AOP-102.2, Loss of Charging, Revision 0
AOP-118.1, Attachment 4, Starting a Charging Pump and Supplying RCP Seal Cooling, Revision 2
ARP-001, Panel XCP-602, Annunciator Point 2-3, RCP A/B/C THERM BAR & BRG FLO LO, Revision 5
ARP-001, Panel XCP-617, Annunciator Point 2-2, RCP A #1 SL INJ FLO LO, Revision 7
CMP-100.008, Rework or Replacement of Plant Doors, Revision 5
EMP-100.002, Emergency Installation of Cable for RHR System, Revision 5
EMP-230.001, Emergency Light Battery Service Test, Revision 10
EPP-013, Fire Emergency, Revision 12
ES-427, Program / Issue Screening, Revision 1
FEP-1.0, Fire Emergency Procedure Selection, Revision 10
FEP-2.0, Train A Plant Shutdown to Hot Standby Due to Fire, Revision 3
FEP-4.0, Control Room Evacuation Due to Fire, Revision 3
FPP-020, Fire Protection Program Administration, Revision 4
FPP-022, Fire Prevention, Revision 2
FPP-022, Fire Detection, Revision 2
FPP-024, Fire Protection, Revision 2
FPP-025, Fire Containment, Revision 3
FPP-026, Fire / Hazmat Response, Revision 2
FPP-027, Safe Shutdown, Revision 1

FPP-031, Development and Control of Fire Protection Program Plans, Revision 2
MPP-460-008, General Maintenance of Fire Dampers, Revision 8
OAP-100.6, Control Room Conduct and Control of Shift Activities, Page 27 and Attachments IVA - IVD, Revision 0
PTP-114.005, Battery Powered and 125 Volt DC Emergency Lights, Revision 11
PTP-114.045, Sprinkler System Strainer Flush, Revision 1
PTP-114.091, Flammable Liquid Locker Inspection, Revision 3
QSP-208, Housekeeping Inspections, Revision 11
SAP-131, Fire Protection Program, Revision 6
SAP-133, Design Control / Implementation and Interface, Revision 11
SAP-142, Station Housekeeping Program, Revision 12
SAP-300, Conduct of Maintenance, Revision 10
SAP-1131, Corrective Action Program, Revision 5
SOP-304, Section C, Placing ESF Bus 1DA and 1DB on Alternate Feed, Revision 10
SOP-509, Attachment 1A, Water Suppression System Valve Lineup, Revision 16
STP-128.002, Attachment 1, FPER FS Valve Lineup Verification, Revision 17
STP-128.009, Fire Hose Station Inspection, Revision 10
STP-128.019, Semi-Annual Fire Door Inspection, Revision 6
STP-128.021, Fire Service Water Flow Test, Revision 10
STP-128.027, Fire Barrier Inspection, Diesel Generator Building, Revision 4
STP-128.043, Fire Barrier Inspection, Control Building, Revision 4
STP-128.047, Fire Barrier Inspection, Intermediate Building, Revision 3
TRP-2, Technical Requirements Package, Fire Protection, Revision 8

Drawings

B-208-060, Sheet 05, Miscellaneous Alarms Leak Detection System, Revision 12
D-023-001 to 019, Special Plant Layout, Fire Protection Evaluation, Revision 16
D-108-012 and 013, Architectural Door Schedule, Revision 34
D-912-134, Diesel Generator area Vent System, Revision 11
D-912-140, Flow Diagram, Control Building Normal and Emergency Air Handling System, Revision 29
D-302-231, Flow Diagram, Fire Service Pumps, Revision 36
D-302-351, Flow Diagram, Diesel Generator-Fuel Oil System, Revision 14
E-206-005, Simplified Plant Electrical Distribution, Revision 19
E-206-011, One Line and Relay Diagram - Balance of Plant Power System, Revision 18
E-206-012, One Line and Relay Diagram - Engineered and Safety Features Power, Revision 27
E-207-041, Three Line Diagram - B Train Diesel Generator, Revision 1
E-214-043, Electrical Arrangement of Cable Trays, Revision 25
E-214-174, Electrical Arrangement of Cable Trays, Revision 16
E-214-049, Electrical Arrangement of Cable Trays, Revision 21
E-214-043, Arrangement of Cable Trays, Revision 25
E-214-049, Arrangement of Cable Trays, Revision 21
E-214-174, Arrangement of Cable Trays, Revision 16
E-221-612, Control Building Electrical Conduit Layout - Fire Detection, Revision 1
E-221-621, Diesel Generator Building Electrical Conduit Layout - Fire Detection, Revision 3
E-221-622, Intermediate Building Electrical Conduit Layout - Fire Detection, Revision 2

E-302-675, Sheet 3, Chemical and Volume Control FSAR Figure 9.3-16, Revision 22
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SS-211-021, Sheet C17, Electrical Block Diagram, Revision H
SS-211-021, Sheet C18, Electrical Block Diagram, Revision H
SS-211-021, Sheet C28, Electrical Block Diagram, Revision J
SS-211-021, Sheet C29, Electrical Block Diagram, Revision M
SS-211-021, Sheet C30, Electrical Block Diagram, Revision M
SS-211-021, Sheet C31, Electrical Block Diagram, Revision R
SS-211-021, Sheet M3, Electrical Block Diagram, Revision K
SS-211-021, Sheet M5, Electrical Block Diagram, Revision H
SS-211-021, Sheet W40, Electrical Block Diagram, Revision C
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SS-211-060, Electrical Block Diagram, Revision B
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DC08620-044, Appendix R Evaluation “Selected” Success Path Diagrams - CR, Revision 12
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NFPA 13, Installation of Sprinkler Systems, 1973 Edition
NFPA 14, Installation of Standpipe and Hose System, 1973 Edition

NFPA 15, Water Spray Fixed systems for Fire Protection, 1973 Edition
NFPA 20, Installation of Centrifugal Fire Pumps, 1974 Edition
NFPA 24, Outside Protection, 1973 Edition
NFPA 72D, Proprietary Protective Signaling Systems, 1973 Edition
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CER 02-0826, Arcing on the Insulators of 155 kV Lines From Clamps that Secure the Insulators
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CER 04-0689, Evaluate Changing FEP-4.0 to Shut the MSIV's If Possible. A Low Steam Line SI Will Otherwise Occur
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CER 04-1300, Issue Revision to ECR 50481 to Relocate Sprinklers
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CER 04-1525, The Fire Protection Evaluation Report (FPER) and Supporting Analyses Do Not Address the Time Available to Prevent an EF SG Overfill Condition
CER 04-1526, The Potential For the RCP Seal Bypass Lines to Open, Due to Spurious Operation of XVT-8142, Has Not Been Considered in the Station's Safe Shutdown Analysis For a Fire
CER 04-1527, RC Pump Seal Leakage In Accordance With WCAP-10541 May No Longer Be Acceptable to the NRC For Use in the FPER and Its Supporting Safe Shutdown (SSD) Analysis
CER 04-1528, In the FEP's, the RC Pump Seal Injection Flow Paths Are Used For RCS Makeup. Flow Through These Paths May Not Be Adequate to Offset RC Pumps' Seal Leakage and Other RCS Leakages That Might Exist During a Serious Station Fire
CER 04-1529, The Potential For the RC Pump #1 Seal Leakoff Lines to Close, Due to Spurious Operation of XVT-8141A, B, or C Has Not Been Considered in the Station's Safe Shutdown Analysis For a Serious Fire
All CER's Resulting from Fire, Smoke, Sparks, Arcing, and Equipment Overheating Incidents for the Calendar Year Period 01/01/02 to 03/31/04

<u>CERs, Station Orders and Procedure Feedbacks Generated During this Inspection</u>

CER 04-1736, Procedural Discrepancy Between FPP-020 and FPP-022 and GET FP-01 Regarding Fire Watch Duties for Identification of Potential Fire Hazards in Assigned Areas
CER 04-1756, The "Time Critical" Nature of Operator Action to Preclude the Loss of the Operating Charging Pump, Due to Early Spurious Operation of a VCT Outlet Isolation Valve During a Fire, Is Not Explicitly Addressed in Fire Protection Program
CER 04-1757, The "Time Critical" Nature of Operator Action to Preclude the Loss of the Operating Charging Pump, Due to Early Spurious Operation of the Pump's Mini-flow Isolation Valve During a Fire, Is Not Addressed in Fire Protection Program Documents
CER 04-1836, FEP Training Key Set #11 Would Not Open XET-4006
CER 04-1851, CER Written to Track FEP Procedure Feedback Enhancements to Their Completion and Any Other Feedback Associated With the FEP's That Improve Overall Implementation
CER 04-1892, This CER Is to Document Required Training for Operators on Changes to FEP-1.0, FEP-2.0, FEP-3.0 and FEP-4.0

CER 04-1935, Smoke Ejectors Provided for Fire Brigade Are Electric and Do Not Have a Dedicated Electric Generator for Use During Loss of Offsite Power As Specified In FPER
CER 04-1974, Portable Hand Held Radio's Have an 8-hour Full Charge Capacity. The Operating Shift Is a 12-hour Shift and Radio Communication May Be Lost During Emergency Near End of Shift
CER 04-2009, Diesel Generator "A" Engine Overspeed Microswitch Is Not Labeled
CER 04-2010, Dosimetry Not Available For Emergency Entries into IB-22 During FEP Enclosures
CER 04-2013, NRC Fire Protection Inspection Team Identified an Inconsistency Between the Fire Protection Evaluation Report and FEP-2.0
CER 04-2434, FEP-4.0 Requires Two Actions to Be Taken Within 8 Hours After a Fire That Have Been Classified as Repairs By The NRC
Procedure Feedback 04-193, Additional Clarification in FPP-022 to Define Fire Retardant Materials and Plastics and Their Use and Treatment as Transient Combustibles
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Station Order SO-04-07, FEP/Fire Brigade Radios

LIST OF ACRONYMS

ADAMS	Agency-Wide Documents Access and Management System
AOP	Abnormal Operating Procedure
ARP	Annunciator Response Procedure
CAP	corrective action program
CER	condition evaluation report
CFR	Code of Federal Regulations
CREP	Control Room Evacuation Panel
DC	direct current
DG	diesel generator
ELU	emergency lighting unit
FA	fire area
FEP	Fire Emergency Procedure
FPER	Fire Protection Evaluation Report
FPP	Fire Protection Procedure
FSAR	Final Safety Analysis Report
ft	foot
kV	kilo-volt
LCV	level control valve
MCR	main control room
NCV	non-cited violation
NFPA	National Fire Protection Association
NRC	U.S. Nuclear Regulatory Commission
OEP	operating experience program
OSHA	Occupational Safety and Health Administration
PARS	Publicly Available Records Systems
RCP	reactor coolant pump
RCS	reactor coolant system
RWST	refueling water storage tank
SDP	Significance Determination Process
SER	safety evaluation report
SSD	safe shutdown
URI	unresolved item
V	volt
VCT	volume control tank