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July 1, 2011

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
LICENSEE EVENT REPORT (LER 2011-002-00)
UNANALYZED CONDITION DUE TO FAILURE TO MAINTAIN ONE TRAIN OF SYSTEMS FOR SAFE SHUTDOWN IN ACCORDANCE WITH APPENDIX R SECTION III.G.a/III.G.3

Attached is Licensee Event Report (LER) No. 2011-002-00 for the Virgil C. Summer Nuclear Station Unit 1. This report describes an Appendix R violation for postulated fires in the Main Control Room or the Cable Spreading Room, which could affect the ability to start the "B" Emergency Diesel Generator (EDG) using local controls. This report is submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B).

Should you have any questions, please call Bruce Thompson at (803) 931-5042.

Very truly yours,

Thomas D. Gatlin

JMW/TDG/gr
Attachment

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RTS (CR-11-02298)
File (818.07)
PRSF (RC-11-0082)

IE22
NRR

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE

Failure to Maintain One Train of Safe Shutdown Systems in Accordance with Appendix R Section III. G. a/III.G.3.

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
05	03	2011	2011	- 2 -	0	07	01	2011	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

DE-FUELED

10. POWER LEVEL

000

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☑ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Bruce Thompson, Manager Licensing, Virgil C. Summer Nuclear Station Unit 1	(803) 931-5042

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☑ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On May 3, 2011 at 0514 hours, V.C. Summer Nuclear Station (VCSNS) determined the following:

During circuit analysis review for transitioning the Fire Protection Program to NFPA 805, VCSNS identified a violation of the Appendix R requirement to maintain one train of systems free of fire damage , which are necessary to achieve and maintain Hot Shutdown conditions. This violation applies to postulated fires in the Main Control Room (MCR) or Cable Spreading Room (CSR). Circuits were identified in the MCR and the CSR that impact a control power circuit that could result in the loss of ability to start the B Emergency Diesel Generator (EDG) using local controls.

A root cause analysis was conducted and determined that the root cause was a less than adequate design change/configuration management process. Specifically, a design modification caused the subject vulnerability and the associated Appendix R review (both performed by a vendor for VCSNS) did not ensure the issue was corrected.

Immediate corrective actions consisted of establishing roving fire watches and installing jumpers to defeat the subject control power start permissive contacts.

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NARRATIVE

PLANT IDENTIFICATION
Westinghouse - Pressurized Water Reactor

EQUIPMENT IDENTIFICATION:
XEG0001B-E, 'B' Emergency Diesel Generator

IDENTIFICATION OF EVENT
On May 3, 2011 at 0514 hours, VCSNS personnel identified a violation of 10 CFR 50 Appendix R, Fire Protection Program for Nuclear Power Facilities, Sections III.G.a and III.G.3 during circuit analysis review for transitioning the Fire Protection Program to NFPA 805. Specifically, VCSNS failed to maintain one train of systems free of fire damage, which are necessary to achieve and maintain Hot Shutdown conditions for postulated fires in the MCR or CSR.

EVENT DATE
May 03, 2011

Condition Report CR-11-02298 was generated to address this violation.

REPORT DATE
July 01, 2011

CONDITIONS PRIOR TO EVENT
De-Fueled, 0% Power

DESCRIPTION OF EVENT
On May 3, 2011 at 0514 hours, VCSNS personnel identified a violation of 10 CFR 50 Appendix R during circuit analysis review for transitioning the Fire Protection Program to NFPA 805. Circuits were identified in the Main Control Room (MCR) and Cable Spreading Room (CSR) that impact a control power circuit which could result in the loss of ability to start the 'B' Emergency Diesel Generator (EDG) using local controls.

Design Change (MRF-20788) was initiated and designed by Gilbert/Commonwealth in August 1985 to provide electrical isolation of the control circuits from the Control Building when the REMOTE/LOCAL/MAINT control transfer switch (located in the 'B' EDG Room) was placed in the LOCAL position in response to an evacuation of the MCR due to fire. This modification was implemented to provide an automatic start of the EDG using "de-energize to actuate" logic in the event that control circuit DGJ96B is damaged by fire (creating a hot short) in fire zones through which it is routed. The design allowed the EDG to start regardless of any type of fire-induced fault to this circuit. This modification created no adverse conditions in the plant.

However, in September 1992, Impel Engineering developed a design change (MRF-21584) in response to an event in which a blown control power fuse in the 'B' EDG start circuit went undetected for a period of time. The intent of this design change was to improve the indication and alarms of control power availability for the various engine and generator control schemes. The modification added a control power monitoring relay to the portion of the control scheme that used "de-energize to actuate" logic, and added contacts from this relay as a start permissive in the EDG start circuit. This change inadvertently defeated the "de-energize to actuate" design of the emergency start circuit put in place by the earlier modification, and created the possibility of a fire-induced fault to this circuit resulting in autostart failure of the 'B' EDG.

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NARRATIVE

CAUSE OF EVENT

A root cause analysis (RCA-11-02298) was conducted to identify the reason MRF-21584 was implemented despite its impact on the ability of the 'B' EDG to automatically start upon loss of control power. The result of this analysis determined that the root cause was a less than adequate (LTA) design change/configuration management process. Specifically, a design change caused the subject vulnerability and the associated Appendix R review (both performed by a vendor for VCSNS) did not ensure the issue was corrected.

ES-416, "Design Modification Change Process and Control," Revision 6, was the VCS design change/configuration management process in place at the time the aforementioned modifications were implemented. ES-416, Revision 6, provided guidance for design considerations, including consideration of impact to Appendix R protected circuits. The issue of hot-shorting of cables and impacts on EDG start capability was identified by the Architectural and Engineering firm (A&E) responsible for the Appendix R review. However, the issue was not resolved by the responsible design organization for the design package. ES-416, Revision 6, at this time did not 1) require detailed reviews and verification of vendor modifications by VCSNS personnel, and 2) provide adequate guidance for post-modification testing of circuits, including verification of functionality of impacted plant equipment. Control of the design modification process has since been significantly improved with the issuance of Design Guide EC-03, "Processing Engineering Change Packages," in 1995. The purpose of the Design Guide is to consolidate guidance related to modification packages in one place. It contains detailed guidelines and checklists to help ensure that plant modifications are properly designed, implemented, tested, and documented. ES-110, "Review and Verification of Controlled Documents," also introduced in 1995, added the requirement for verification of vendor modifications by VCS personnel in 2009. The combination of an enhanced modification process and the relatively recent focus on improving human performance will help ensure that future modification process problems are minimized. Therefore, no new corrective actions were developed for this legacy design modification issue.

ANALYSIS OF EVENT

A number of circuits routed through fire zones in the Control Building were identified as susceptible to fire damage. If any of these circuits experienced a fire-induced hot short, a fuse in the EDG start circuit could blow, de-energizing control power relay CP4. This relay provides a start permissive for the 'B' EDG start circuit, and if de-energized, prevents the 'B' EDG from being started locally. Because a fire in the Control Building can result in the need to evacuate the MCR, the inability to start the diesel using these local controls, as identified in Station Procedures, could have an adverse effect on the ability to safely shut down the plant.

VCSNS has enforcement discretion for fire issues identified during the transition to NFPA 805 as long as the risk impact of these issues is not 'RED' (Change in Core Damage Frequency (CDF)>1.0E-04/yr) per the guidance in NRC Inspection Manual Chapter 0609, "Significance Determination Process." A PRA Evaluation was conducted to assess the risk significance of both this Appendix R violation and that associated with LER-2011-001-00 to determine if enforcement discretion remains applicable to VCSNS. The results of this evaluation determined that the total CDF increase for both events is below the 'RED' threshold of 1.0E-04/yr. Therefore, enforcement discretion should be maintained.

In anticipation of a situation in which the EDG must be started manually, operators are routinely trained on how to start the EDGs ('A' and 'B') using the Main Air Start Valves. The operator engages a spanner wrench and depresses air start valve XVM010997A or XVM010997B for 5 seconds, and observes that the EDG starts and accelerates to 514 rpm.

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NARRATIVE

CORRECTIVE ACTIONS

Corrective actions included: 1) roving fire watch patrols were established in the fire zones through which impacted circuits are routed until the jumpers were installed, and 2) CR-11-02298, Action 009 (W.O. 1105822-002) installed jumpers to defeat the CP4 relay start permissive contacts. Adding jumpers across the normally open contacts of CP4 removes any impact of a failure on CP4 including open coil or contact failure or any other failure that would result in not successfully energizing CP4. VCSNS will develop a permanent hardware change as part of NFPA 805 implementation.

PRIOR OCCURRENCES

LER-2010-002, "Unanalyzed Condition Due to Wiring Discrepancy in the "B" Emergency Diesel Generator (EDG) Appendix R Isolation Circuitry," identified a conductor that was not removed during the implementation of a design change in 1983. The cause of this deficiency was a design modification implemented in 1983 that did not contain sufficient information to remove the conductor. The circumstances surrounding this deficiency are not similar to the condition described in this LER.