



South Carolina Electric & Gas Company
P.O. Box 88
Jenkinsville, SC 29065
(803) 345-4344

Gary J. Taylor
Vice President
Nuclear Operations

October 17, 1996
RC-96-0236

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

Gentlemen:

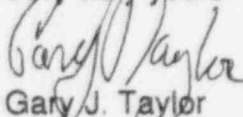
Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
REQUEST FOR DEVIATION TO SECTION III.G.2 OF APPENDIX R TO
10CFR PART 50

South Carolina Electric & Gas Company (SCE&G), is submitting the following information in response to a telephone conference call with Mr. A. Johnson and Mr. P. Madden of the NRC on September 16, 1996. The call was in reference to our follow-up response to the Request for Additional Information regarding Generic Letter 92-08 dated August 23, 1996 and supersedes that letter in its entirety. SCE&G is submitting the attached Requests for Deviation to the requirements of Section III.G.2 of Appendix R to 10CFR Part 50, in accordance with 10CFR50.12(a)(2)(ii) for V. C. Summer Nuclear Station. A deviation request is the appropriate regulatory mechanism to be used under V. C. Summer Nuclear Station's License Condition, instead of an exemption request as discussed in the September 16, 1996 telephone conference. This response is being submitted under oath of affirmation.

In accordance with the schedule submitted, the initial design for the installation of the Rockbestos Firezone R fire rated cable to replace portions of certain safe shutdown circuits at V. C. Summer Nuclear Station is complete. During the design development, several additional design considerations were identified and are currently under evaluation. Any necessary changes identified during evaluation of these design considerations will be incorporated into the final design prior to implementation. These remaining design considerations and associated evaluations will not affect SCE&G's Thermo-Lag resolution plans or the implementation completion schedule previously submitted on March 29, 1996.

Should you have any questions, please call Ms. Linda Martin at (803) 345-4217.

Very truly yours


Gary J. Taylor

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LJM/GJT/nkk
Attachment

c.	J. L. Skolds	NRC Resident Inspector
	W. F. Conway	J. B. Knotts, Jr.
	R. R. Mahan (w/o Att.)	RTS (GL 960008)
	R. J. White	DMS (RC-96-0236)
	S. D. Ebnetter	File (815.14)
	A. R. Johnson	

STATE OF SOUTH CAROLINA :
: **TO WIT :**
COUNTY OF FAIRFIELD :

I hereby certify that on the 17th day of October 1996, before me, the subscriber, a Notary Public of the State of South Carolina personally appeared Gary J. Taylor, being duly sworn, and states that he is Vice President, Nuclear Operations of the South Carolina Electric & Gas Company, a corporation of the State of South Carolina, that he provides the foregoing response for the purposes therein set forth, that the statements made are true and correct to the best of his knowledge, information, and belief, and that he was authorized to provide the response on behalf of said Corporation.

WITNESS my Hand and Notarial Seal

Michael J. Baccare
Notary Public

My Commission Expires

My Commission Expires July 13, 2005

Date

**SOUTH CAROLINA ELECTRIC & GAS
VIRGIL C. SUMMER NUCLEAR STATION**

**TWO REQUESTS FOR DEVIATION FROM THE CRITERIA
OF SECTION III.G.2 OF APPENDIX R TO 10CFR PART 50**

BACKGROUND

This document provides a detailed description of two separate deviation requests to the requirements of Section III.G.2 of Appendix R to 10CFR Part 50. These deviations are requested as a part of the South Carolina Electric & Gas (SCE&G) effort at Virgil C. Summer Nuclear Station to resolve concerns associated with Thermo-Lag 330-1 as expressed in IEB 92-01, GL 92-08, GL 92-08 R1, numerous IENs, and subsequent 50.54f Requests for Additional Information. These deviation requests are consistent with Virgil C. Summer Station's Thermo-Lag 330-1 resolution plans as described in SCE&G's responses to NRC communications on Thermo-Lag 330-1.

The deviation requests detailed on the attached pages will demonstrate that adequate protection can be provided to assure Virgil C. Summer Nuclear Station's safe shutdown capability while eliminating the need for reliance on Thermo-Lag 330-1 fire barriers. For Cable Tray 3088 and Conduit XX7177A, Rockbestos Firezone R Cable will be used to replace portions of the safe shutdown circuits requiring protection to meet the requirements of Appendix R to 10 CFR Part 50.

SCE&G previously identified that an exemption to requirements of Appendix R to 10 CFR Part 50 would be submitted for the Nuclear Instrumentation (NI) Circuits in Fire Area CB-12. During the detailed analysis performed to support development of this exemption, design considerations were identified which prevent application of the alternative method. Instead, SCE&G will modify the existing NI circuits to meet the requirements of Appendix R to 10 CFR Part 50 without reliance on Thermo-Lag 330-1. This modification will be implemented within the schedule previously submitted in our letter of March 29, 1996.

DEVIATION SUMMARIES

Deviation Request No. 1 for four required safe shutdown circuits in Cable Tray 3088 is detailed on pages 2 through 5 of this document. Table 1, on pages 9 and 10 identifies six circuits and their function. Four of these circuits are required to support Appendix R functions. Two of the circuits can facilitate shutdown, but are not required for Appendix R. SCE&G proposes to eliminate the Thermo-Lag 330-1 barrier by installing fire rated cable in place of the four required circuits in Cable Tray 3088. A deviation request is submitted since fire rated cable is not recognized in the context of Appendix R requirements.

Deviation Request No. 2 for three required safe shutdown circuits in Conduit XX7177A is detailed on pages 6 through 8 of this document. Table 2, on page 11, identifies the four circuits in conduit XX7177A and their functions. Three of these circuits are required to support Appendix R functions. One of the circuits can facilitate shutdown, but is not required for Appendix R. SCE&G proposes to eliminate the Thermo-Lag 330-1 barrier by installing fire rated cable in place of the three required circuits in Conduit XX7177A. A deviation request is submitted since fire rated cable is not recognized in the context of Appendix R requirements.

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DEVIATION REQUEST NO. 1 - CABLE TRAY 3088

INTERMEDIATE BUILDING FIRE SUB-ZONES IB-25.1.2 AND IB-25.6.2 :

Cable Tray 3088 contains 14 active 'A' Train cables as follows:

- Four required for safe shutdown (Itemized on Table 1)
- Two cables can facilitate safe shutdown if available but are not required for Appendix R purposes (Itemized on Table 1)
- Eight are not required for safe shutdown

A deviation is requested from the separation requirements of Section III.G.2 of Appendix R to 10CFR Part 50 for the four required safe shutdown cables in Cable Tray 3088.

in lieu of separation, through the provision of a one hour rated fire barrier and automatic suppression, SCE&G proposes to provide an equivalent level of protection by removing the Thermo-Lag 330-1 fire barrier from Cable Tray 3088 and installing Rockbestos Firezone R fire rated cable (in open cable tray) for the four Appendix R required circuits. The existing automatic suppression will be maintained.

Rockbestos Firezone R is Class 1E qualified in accordance with IEEE 383 and IEEE-323 and has been shown to meet a minimum one hour fire rating at 1700°F as defined by the ASTM Standard E-119. This deviation request is necessary since Rockbestos Firezone R cable does not literally meet the criteria of Section III.G.2 of Appendix R to 10CFR50 - it is not a *"one hour rated fire barrier"*.

DEVIATION BASIS:

Raceway Description:

Cable Tray 3088, currently wrapped with Thermo-Lag 330-1, is approximately 80 feet long and runs horizontally from the east wall of Room IB 12-02S to the north wall of Room IB 12-01, the south IB stair tower, and vertically up the exterior of the stair tower wall through the 436 elevation floor (Room IB 36-02) to the underside of Room IB 63-02 at the 463 elevation. In it's route, Cable Tray 3088, passes through Fire Sub-Zones IB-25.1.2 and IB-25.6.2. Fire Sub-Zones IB-25.1.2 and IB-25.6.2 are described below:

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Fire Sub-Zone IB-25.1.2:

Fire Sub-Zone IB-25.1.2 is in the western portion of the Intermediate Building and extends from the floor at elevation 412 to the underside of the floor at elevation 436. This Fire Sub-Zone is one of five Sub-Zones which when combined are Fire Zone IB-25.1. This sub-zone contains mainly 'B' Train equipment and cabling. Thus for a fire in this sub-zone, shutdown will be achieved from the control room using 'A' Train equipment.

The four cables in Cable Tray 3088 required for 'A' Train safe shutdown (within sub-zone IB-25.1.2) need to be protected to ensure that they remain functional.

Fire Sub-Zone IB-25.6.2

Fire Sub-Zone IB-25.6.2 is also in the western portion of the Intermediate Building and extends from the floor at elevation 436 to the underside of the floor at elevation 463. This sub-zone contains mainly 'A' Train equipment and cabling. Thus for a major fire within this zone, 'B' Train will be used to achieve safe shutdown.

The four safe shutdown 'A' Train cables in Cable Tray 3088 within Fire Sub-Zone IB-25.6.2 need to be protected to ensure that they remain functional during a fire in Fire Sub-Zone IB-25.1.2 due to the existence of an open hatch between the two fire sub-zones.

FIRE HAZARD ANALYSIS

As described in the Virgil C. Summer Nuclear Station Fire Protection Evaluation Report (FPER), the floor/ceiling at elevation 436' would satisfy the requirements for a three hour rated fire barrier except for an open equipment hatch, unprotected pipe penetrations, and a personnel access hatch.

The pipe penetrations are located to the north of the nearest 'A' Train conduits by approximately 20 feet. These openings are of a size and location which would not present a significant pathway for propagation of a fire (originating in zone IB-25.1.2) to the 'A' Train cables in zone IB-25.6.2.

The personnel access hatch cover is constructed of steel and is located approximately 10 feet from the nearest 'A' Train cables; the hatch cover is sufficient to prevent fire propagation. The open equipment hatch is located against the East wall of the two zones and is approximately 15 feet from the nearest 'A' Train conduits. In addition to the 15 foot distance, these conduits are shielded from direct fire exposure from the hatch by the northeast corner of the switchgear room adjacent to zone IB-25.6.2.

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Cable Tray 3088 is located near the open equipment hatch. Therefore, there is a concern for potential damage to the four 'A' Train safe shutdown cables in this tray (within zone IB-25.6.2) as the result of a substantial fire within Fire Sub-Zone IB-25.1.2. A substantial fire within Fire Sub-Zone IB-25.1.2 will not damage the 'A' Train cables needed for safe shutdown that are located within Fire Sub-Zone IB-25.6.2, provided the four required safe shutdown cables in Cable Tray 3088 are adequately protected.

Conversely, there are no 'B' Train cables within Fire Sub-Zone IB-25.1.2 that are sufficiently close to the unprotected openings to be of concern. Thus a major fire within Fire Sub-Zone IB-25.6.2 will not damage the 'B' Train cables needed for safe shutdown that are located within Fire Sub-Zone IB-25.1.2.

The principal combustibles associated with permanent plant equipment and cabling for the overall floor areas that include the two fire sub-zones of interest are as follows:

	Fire Zone IB-25.6	Fire Zone IB-25.1
Cable Insulation	309,391,262 BTUs	165,305,149 BTUs
Mechanical Equipment	4,900,912 BTUs	435,318 BTUs
Transient Margin (Class A & B)	331,327,351 BTUs	323,731,045 BTUs
Permanent Storage	87,878,122 BTUs	10,730,635 BTUs

The total combustible content (including transient margin) of fire zone IB-25.1, which includes Fire Sub-Zone IB-25.1.2, is 633,560,625 BTUs, which results in a fire loading of 56,062 BTUs/FT². The total combustible content (with transient margin included) of fire zone IB-25.6, which includes fire sub-zone IB-26.6.2, is 501,533,412 BTUs, which results in a fire loading of 69,764 BTUs/FT². Since the storage combustible loading is substantially less than the transient margin, the storage combustible loading is not included in the combustible loading totals provided. These fire loadings are less than the loading considered equivalent to a one hour fire (80,000 BTUs).

The physical characteristics of the Fire Zones and Sub-Zones involved will not support the development of a hot gas layer at the ceiling during a fire scenario (i.e., the Fire Zones are relatively large with high ceilings and an open equipment hatch between floors). In addition, the primary combustibles available for ignition (predominantly IEEE 383 qualified cable) are not easily ignitable and will not readily support combustion.

In the unlikely event a fire should occur, an automatic fire detection system which alarms in the Main Control Room is provided in these fire zones/sub-zones. The fire detection system will also actuate the automatic preaction suppression system which provides full coverage in Fire Zone IB-25.1, including Sub-Zone IB-25.1.2 and partial coverage Sub-Zone IB-25.6.2, including the Cable Tray location(s) near the equipment

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hatch. In addition, Hose Stations and Portable Fire Extinguishers are provided for manual fire fighting activities in both sub-zones.

The automatic fire detection system in conjunction with the automatic suppression system assures rapid detection and control of a fire in its early stages. Should the automatic suppression system fail to fully extinguish the fire, the detection system assures early response by the plant fire brigade to extinguish the fire manually prior to significant propagation. The relationship of Fire Sub-Zones IB-25.1.2 and IB-25.6.2 to other fire zones or sub-zones within fire area IB-25 are described in the Fire Protection Evaluation Report and do not impact the evaluation provided in this deviation request.

The use of Rockbestos Firezone R Cable assures operability of the required 'A' Train safe shutdown cables located in Cable Tray 3088 during and after exposure to the fire. The maximum credible fire in these zones is less severe than the ASTM E-119 test fire conditions which were used in testing the Rockbestos cables as described in the Underwriters Laboratories, Inc., Report File R10925-1, "Report on Fire Resistant Cables" dated April 10, 1984.

The Rockbestos Firezone R cable will be routed in, and supported by, Cable Tray 3088 which will become an open cable tray. An evaluation will be performed to demonstrate the structural supports for Cable Tray 3088 will maintain the tray's integrity in the event a fire occurs. Should the evaluation conclude support protection is necessary, the necessary protection will be provided.

CONCLUSION:

The use of Rockbestos Firezone R Cable for the four required safe shutdown cables in Cable Tray 3088 (in both Fire Sub-Zone IB-25.1.2 and IB-25.6.2) in conjunction with the existing fire protection features described, is considered an equivalent level of protection to that required by Section III.G.2 of Appendix R to 10CFR Part 50.

A deviation is requested from the separation requirements of Section III.G.2 of Appendix R to 10CFR Part 50 for the four cables in Cable Tray 3088 required for safe shutdown, since Rockbestos Firezone R cable does not meet the literal definition of a "*one hour rated fire barrier*".

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DEVIATION REQUEST NO. 2 - CONDUIT XX7177A

CONTROL BUILDING FIRE AREA CB-2

Conduit XX-7177A contains 4 active cables as follows (Itemized on Table 2):

- Three required for safe shutdown
- One cable can facilitate safe shutdown if available, but is not required for Appendix R purposes

A deviation is requested from the separation requirements of Section III.G.2 of Appendix R to 10CFR Part 50 for the three required safe shutdown cables in Conduit XX7177A.

In lieu of separation, through the provision of a one hour rated fire barrier and automatic suppression, SCE&G proposes to provide an equivalent level of protection by removing the Thermo-Lag 330-1 fire barrier from Conduit XX7177A and installing Rockbestos Firezone R cable for the three Appendix R required circuits. The existing automatic suppression system will be maintained.

Rockbestos Firezone R is Class 1E qualified in accordance with IEEE 383 and IEEE-323 and has been shown to meet a minimum one hour fire rating at 1700°F as defined by the ASTM Standard E-119. This deviation request is necessary since Rockbestos Firezone R cable does not literally meet the criteria of Section III.G.2 - it is not a "one hour rated fire barrier".

DEVIATION BASIS:

Raceway Description:

Conduit XX-7177A is a single 3" horizontal galvanized rigid steel conduit approximately 5 feet' long and is located in the south end of Room CB 12-04 approximately 9 feet above floor level. It is routed from the west wall of the Intermediate Building (east wall of the Control Building) to the west wall of Room CB 12-04 through fire rated penetrations. Fire Area CB-2 is described below:

Fire Area CB-2:

Fire Area CB-2 is the 'B' Train east basement chase of the Control Building located at elevations 412' and 425'. It also includes the east portion of the electrical pit at elevation 400'. Fire Area CB-2 mainly contains 'B' Train cabling

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and no equipment. Thus for a major fire in this area, shutdown will be controlled from the control room using 'A' Train equipment.

The three safe shutdown 'A' Train cables in Conduit XX7177A and within Fire Area CB-2 need to be protected so that they remain functional during a fire.

FIRE HAZARD ANALYSIS:

As described in the Virgil C. Summer Nuclear Station Fire Protection Evaluation Report (FPER), Fire Area CB-2 at elevation 412, is bounded on the north by the controlled access hallway, on the east by the Intermediate Building, on the south by the stair tower, and on the west by the laundry and laboratory area and the 'A' Train east basement cable chase. At elevation 425, it is bounded on the north by a pipe and cable chase, on the east by the Intermediate Building, on the south by the stair tower, and on the west by the 'A' Train cable chase and the relay room cable spreading area.

The walls and ceiling which form the boundary of this fire area have three hour ratings except for the stair tower wall which is rated at two hours. The floors are of reinforced concrete but are non-rated since they are in contact with earth.

The primary combustibles associated with permanent plant equipment and cabling in Fire Area CB-2 are:

Cable Insulation	87,322,638 BTUs
Transient Margin (Class A & B)	1,122,594 BTUs
Storage	12,340,000 BTUs

The total combustible content (including transient margin and storage) of Fire Area CB-2 is 101,785,232 BTUs, which results in a fire loading of 204,799 BTUs/ft². No plant equipment is located in Fire Area CB-2. This fire loading is less than the loading considered equivalent to a three hour fire (240,000 BTUs/FT²).

The physical characteristics of Fire Area CB-2 does not support development of a hot gas layer at the elevation of Conduit XX7177A until substantial fire growth has occurred. While the Fire Area has a relatively small floor area, the ceiling height is approximately 24 feet. In addition, the primary combustibles available for ignition, (predominantly IEEE 383 qualified cable) are not easily ignitable and will not readily support combustion.

In the unlikely event a fire should occur, an automatic fire detection system which alarms in the Main Control Room is provided in the Fire Area. The fire detection system will also actuate an automatic preaction suppression system which provides full

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coverage in the area. In addition, Hose Stations and Portable Fire Extinguishers are provided for manual fire fighting activities.

The automatic fire detection system in conjunction with the automatic suppression system assures rapid detection and control of a fire in its early stages. Should the automatic suppression system fail to fully extinguish the fire, the detection system assures early response by the plant fire brigade to extinguish the fire manually prior to significant propagation.

The use of Rockbestos Firezone R Cable assures operability of the required 'A' Train safe shutdown cables located in Conduit XX7177A during and after exposure to the fire. The maximum credible fire in this area is less severe than the ASTM E-119 test fire conditions which were used in testing the Rockbestos cables as described in the Underwriters Laboratories, Inc., Report File R10925-1, "Report on Fire Resistant Cables" dated April 10, 1984.

The Rockbestos Firezone R cable will be routed and supported in rigid steel conduit. An evaluation will be performed to demonstrate the conduit supports will maintain raceway integrity in the event a fire occurs. Should the evaluation conclude support protection is necessary, the necessary protection will be provided.

CONCLUSION:

The use of Rockbestos Firezone R Cable for the three required safe shutdown cables in Conduit XX7177A in conjunction with the existing fire protection features described, is considered an equivalent level of protection to that required by Section III.G.2 of Appendix R to 10CFR Part 50.

A deviation is requested from the separation requirements of Section III.G.2 of Appendix R to 10CFR Part 50 for the three cables in Conduit XX-7177A within Fire Area CB-2 and required for safe shutdown, since Rockbestos Firezone R cable does not meet the literal definition of a "*one hour rated fire barrier*."

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TABLE 1

Cable Number	Size	From	Room From	To	Room To	Safe Shutdown Function of Cable
AHC561A		XMC1DA2X	IB 63-01 (IB 463 NW)	XFN38A	IB 23-02	Provides power from ESF MCC Unit 2CD to Batt Rm Supply Fan A (This cable is presently listed as required, but testing during the original Appendix R safe shutdown evaluation has shown that this fan is not required for the first eight hours after a fire. Therefore this cable would facilitate shutdown, but is not required)
EMC83A	1-3-3/0	XMC1DA2X	IB 63-01 (IB 463 NW)	XBC1A	IB 12-05	Provides power from ESF MCC Unit 8KM to Batt Chgr 1A. The power from the battery charger ensures the availability of dc power beyond the rated duty cycle of the battery.
EMC86A	1-3-1/0	XMC1DA2Y (AB-412 SE)	AB 12-28	XET4003 for XBC1A1B	IB 12-07	This cable is not required but can facilitate safe shutdown by providing power from ESF MCC Unit 8KM to Batt Chgr 1A/1B Xfer Sw. This transfer switch supplies power to the swing spare battery charger which can be used to provide 'B' Train dc power from the 'A' Train ac system. By making 'B' Train dc power available the additional instrumentation will remain functional. However, this 'B' Train instrumentation is not required to achieve safe shutdown.

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TABLE 1

Cable Number	Size	From	Room From	To	Room To	Safe Shutdown Function of Cable
ESE31A	1-2-1/0	DPN1HA1 (IB-412)	IB 12-05	XSW1DA (IB-463 SW)	IB 63-01	Provides power from 125VDC distribution panel to 7200V Swgr for control of the switchgear circuit breakers.
ESE32A	1-2-1/0	DPN1HA1 (IB-412)	IB 12-05	XSW1DA1 (IB-463 W)	IB 63-01	Provides power from 125VDC distribution panel to 480/277V Swgr for control of switchgear circuit breakers.
ESE33A	1-2-2	DPN1HA1 (IB-412)	IB 12-05	XSW1DA2 (IB-463 W)	IB 63-01	Provides power from 125VDC distribution panel to 480/277V Swgr for control of switchgear circuit breakers.

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TABLE 2

Cable Number	Size	From	Room From	To	Room To	Safe Shutdown Function of Cable
DGE4A	1-2-6	DPN1HA1	IB 12-04	XCX5201	CB 12-4A	Provides power from 125 VDC distribution panel to diesel generator control panel for engine starting and running controls.
DGE14A	1-4-4	DPN1HA1	IB 12-04	XPN5503	DG36-04	Provides power from 125 VDC distribution panel to diesel generator control relay panel for starting and running controls.
DGE32A	1-2-10	DPN1HA1	IB 12-04	XEX4201	DG27-04	Provides power from 125 VDC distribution panel to diesel generator exciter for generator controls.
MCE4A	1-2-2/0	DPN1HA1	IB 12-04	Main Control Board via splice box SB-MC10	DG36-01A	This cable is not required but can facilitate safe shutdown by providing 125 VDC power to various valves and instruments.