SCE&G
A SCANA Company

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

Gary J. Taylor
Vice President
Nuclear Operations

April 17, 1996

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

Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
NRC BULLETIN 96-01
CONTROL ROD INSERTION PROBLEMS

This letter provides South Carolina Electric & Gas Company (SCE&G) amended response to requested actions as delineated in NRC Bulletin 96-01. This response is hereby amended per conference call discussions and agreements reached between SCE&G and the NRC on April 10 and 11, 1996.

I declare that these statements and matters set forth herein are true and correct to the best of my knowledge, information and belief.

Should you have any questions, please call at your convenience.

Very truly yours,

Gary J. Taylor

Gary J. Taylor

240007

CJM/GJT/ews
Attachment

c: J. L. Skolds
W. F. Conway
R. R. Mahan (w/o attachment)
R. J. White
S. D. Ebneter
J. I. Zimmerman
S. F. Fipps
NRC Resident Inspector
J. B. Knotts Jr.
Dave Campbell (WOG Project Office)
DMS (RC-96-0114)
RTS (IEB 960001)
File (815.02)

IE57
1/1

STATE OF SOUTH CAROLINA :

: TO WIT :

COUNTY OF FAIRFIELD :

I hereby certify that on the 17th day of April 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

[signature]
Notary Public

My Commission Expires

July 13, 2005
Date

South Carolina Electric & Gas Company
Response to NRC Bulletin 96-01

NRC Bulletin 96-01 is applicable to the Virgil C. Summer Nuclear Station (VCSNS) since the facility is a Westinghouse designed pressurized-water reactor (PWR) potentially impacted by recent industry events. The following response is provided to each of the requested actions contained in the bulletin:

- **Promptly inform operators of recent events (reactor trips and testing) in which control rods did not fully insert and subsequently provide necessary training, including simulator drills, utilizing the required procedures for responding to an event in which the control rods do not fully insert upon reactor trip (e.g., boration of a pre-specified amount).**

  Operators at the Virgil C. Summer Nuclear Station (VCSNS) have been informed of the recent events during shift meetings. Additionally, this NRC bulletin was added to the March required reading program to further ensure that all operators were aware of event details and actions to be taken by Westinghouse PWR licensees.

  Nuclear Operations Training currently addresses the issue raised in the NRC bulletin in both classroom and simulator training. Classroom training for Emergency Operating Procedure EOP-1.1, Reactor Trip Recovery, defines specific operator actions to emergency borate the Reactor Coolant System by 1500 gallons (approximately 7.5% Boric Acid Tank level) for each control rod not fully inserted into the core when two or more rods are not fully inserted.

  The actions required in response to two or more rods not fully inserted following a reactor trip were reinforced during simulator training while performing LOR-ST-063 in cycle 4 of LOR 95001. This training was completed in November and December of 1995.

  Additionally, the Nuclear Operations Training department will:

  1) Develop a specific lesson plan for NRC Bulletin 96-01 to be presented during the licensed operator requalification training currently scheduled for April 29 through May 2, 1996. This training will be completed during the refueling outage scheduled to commence on April 15.

  2) Incorporate two or more stuck control rods into a reactor trip simulator scenario for presentation during the licensed operator requalification program cycle 8 immediately following the upcoming refueling outage. This simulator scenario will include discussion to point out that any control rod position indication that is less than rod bottom bistable is to be interpreted as not fully inserted.

3) Include EOP-1.1 in the classroom portion of cycle 8 to reinforce the actions being taught in the simulator sessions.

- **Promptly determine the continued operability of control rods based on current information. As new information becomes available from plant rod drop tests and trips, licensees should consider this new information together with data already available from Wolf Creek, South Texas, North Anna, and other industry experience, and make a prompt determination of control rod operability.**

  Current rod drop data has been reviewed and it was confirmed that there is no indication of degradation. Rod drop times taken at the beginning of the current fuel cycle were all under the Technical Specification limit of 2.7 seconds from beginning of decay of stationary gripper coil voltage to dashpot entry. Additionally, there has been no observed problems (indicative of dragging) during the performance of the monthly RCCA stepping tests or manual insertion of rods during the May 1995 maintenance outage.

  As new information becomes available it will be evaluated to determine if there is an impact on the operability assumptions for the control rod system at VCSNS. The Westinghouse Owners Group (WOG) is currently performing root cause analyses on the noted industry failures and it is expected that all pertinent information from VCSNS testing and industry experience will be shared.

- **Measure and evaluate at each outage of sufficient duration during calendar year 1996 (end of cycle, maintenance, etc.), the control rod drop times and rod recoil data for all control rods. If appropriate plant conditions exist where the vessel head is removed, measure and evaluate drag forces for all rodded fuel assemblies.**

  a. **Rods failing to meet the rod drop time in the technical specifications shall be deemed inoperable.**

  b. **Rods failing to bottom or exhibiting high drag forces shall require prompt corrective action in accordance with Appendix B to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR 50).**

  As requested, rod drop tests will be performed at VCSNS for all outages of sufficient duration in 1996. SCE&G considers an outage of sufficient duration to be a maintenance outage of greater than 72 hours or a forced (reactor trip) outage where the plant is not actively trying to restart following shutdown. The only exception would be, as discussed between the NRC and WOG representatives on March 25, 1996, where rod drop tests would not provide meaningful data (e.g., tests within 2,500 MWD/MTU burnup of the last test).

  Rod drop tests performed at VCSNS measure the time interval from the first reactor trip breaker opening to the rod bottom bistable indicating full

insertion of all rods. This test actually measures a more conservative time than the time from beginning of decay of stationary gripper coil voltage to dashpot entry required by Technical Specifications. The test does not provide recoil data; however, as an alternative to recoil data, VCSNS will provide rod drop test data from the beginning of the current cycle for comparison against the rod drop data gathered during any outage of sufficient duration. This data should provide insight into any fuel burnup related effects on rod drop times. It should be noted, however, that a review of all previous rod drop tests, including specific rod drop tests performed on the current generation of fuel assemblies (VANTAGE + and Performance +) with burnups up to approximately 25,000 MWD/MTU, has found no indication of insertion problems at VCSNS. The fuel design for VANTAGE + and Performance + fuel incorporates a number of different design characteristics from VANTAGE 5H and Standard XLR fuel types. These characteristic differences may preclude similar occurrences to those experienced at the utilities referenced in the subject bulletin.

During the refueling outage, drag tests will be performed on all presently rodded fuel assemblies with greater than 25,000 MWD/MTU assembly burnup along with those assemblies of burnups less than 25,000 MWD/MTU which will be reloaded into rodded locations in Cycle 10. In total, drag testing will be performed on 44 of the 48 rodded assemblies.

The results of the upcoming rod drop and drag tests will be evaluated by SCE&G to determine the condition of the control rods. Individual rod drop times will be obtained, as necessary, should there be any observed rod insertion problems during the rod drop test. Corrective actions will be initiated to correct any observed problems. The test results will be provided to the NRC within 30 days of completing the actions for each outage.

- **For each reactor trip during calendar year 1996, verify that all control rods have promptly fully inserted (bottomed) and obtain other available information to assess the operability and any performance trend of the rods. In the event that all rods do not fully insert promptly, conduct tests to measure and evaluate rod drop times and rod recoil.**

  VCSNS Emergency Operating Procedure EOP-1.0, Reactor Trip/Safety Injection Actuation, currently requires operators to verify that all rod bottom lights are lit following each reactor trip. This verification is made immediately following each event. Post trip reviews of the Sequence of Events (plant computer) printout would also note times for reactor trip breakers opening and "all rods on bottom."

  In the event that all rods do not fully insert promptly, SCE&G will perform rod drop tests, as necessary, to gather information to assess operability.

- **Within 30 days of the date of this bulletin, provide a core map of rodded fuel assemblies indicating fuel type (materials, grids, spacers, guide tube inner diameter) and current and projected end of cycle burnup of each rodded assembly for the current cycle; when available, provide the same information for the next cycle.**

  Attached is a current core map for cycle 9 and a projected core map for cycle 10 along with pertinent information on the fuel assemblies used at VCSNS.

FUEL ASSEMBLY DESCRIPTION

	REGION ID		
Assembly Type	10A/10B VANTAGE+	11 Performance+	12 Performance+
Fuel Rod Array	17x17	17x17	17x17
Clad Material	Zirlo™	Zirlo™	Zirlo™
Guide Tube Material(24)	Zirlo™	Zirlo™	Zirlo™
Guide Tube Dimensions			
Upper Part OD (in.)	.474	.474	.474
Upper Part ID (in.)	.442	.442	.442
Lower Part OD (in.)	.430	.430	.430
lower Part ID (in.)	.397	.397	.397
Instrument Tube Material(1)	Zirlo™	Zirlo™	Zirlo™
Instrument Tube Dimensions:			
OD (in.)	.474	.474	.474
ID (in.)	.442	.442	.442
Grid Material			
Inner Structural(6)	Zr-4	Zirlo™	Zirlo™
End Structural(2)	Inconel	Inconel	Inconel
IFM(3)	Zr-4	Zirlo™	Zirlo™
Protective(1)	N/A	N/A	Inconel
Nozzle Material			
Top		Stainless Steel	
Bottom		Stainless Steel	

V. C. SUMMER NUCLEAR STATION CYCLE 9

	R	P	N	M	L	K	J	H	G	F	E	D	C	B	A
1							------	------	------						
2					------	K06-10A A 23287 36101	------	L17-11 D 0 24125	------	K09-10A A 23056 36053	------				
3				------	------	------	L43-11 SA 0 26701	------	L48-11 SA 0 26757	------	------	------			
4			------	L37-11 C 0 22298	------	K45-10B B 24611 45565	------	------	------	K33-10B B 24574 45594	------	L38-11 C 0 22298	------		
5		------	------	------	K18-10A SB 24026 44056	------	------	------	------	------	K15-10A SB 24156 44056	------	------	------	
6		K08-10A A 23122 36093	------	K42-10B 7 24340 45594	------	K31-10A D 19001 39056	------	L60-11 C 0 27131	------	K24-10B D 18884 39056	------	K43-10B B 24565 45565	------	K03-10A A 23512 36101	
7	------	------	L42-11 SA 0 26757	------	------	------	L44-11 SB 0 26482	------	L54-11 SB 0 26482	------	------	------	L51-11 SA 0 26701	------	------
8	------	L18-11 D 0 24125	------	------	------	L52-11 C 0 27131	------	------	------	L47-11 C 0 27131	------	------	------	L19-11 D 0 24125	------
9	------	------	L49-11 SA 0 26701	------	------	------	L58-11 SB 0 26482	------	L46-11 SB 0 26482	------	------	------	L62-11 SA 0 26757	------	------
10		K11-10A A 23031 36101	------	K36-10B B 24323 45565	------	K26-10A D 19006 39056	------	L61-11 C 0 27131	------	K23-10A D 18960 39056	------	K47-10B B 24557 45594	------	K10-10A A 23142 36093	
11		------	------	------	K14-10A SB 24197 44056	------	------	------	------	------	K19-10A SB 24207 44056	------	------	------	
12			------	L39-11 C 0 22258	------	K38-10B B 24195 45594	------	------	------	K35-10B B 24283 45565	------	L40-11 C 0 22298	------		
13				------	------	------	L56-11 SA 0 26757	------	L53-11 SA 0 26701	------	------	------			
14					------	K05-10A A 23166 36093	------	L20-11 D 0 24125	------	K04-10A A 23463 36101	------				
15							------	------	------						

ASSEMBLY ID - REGION ID
RCCA BANK ID
BOC BURNUP (MWD/MTU) - ACTUAL
EOC BURNUP (MWD/MTU) - PROJECTED

V. C. SUMMER NUCLEAR STATION CYCLE 10

	R	P	N	M	L	K	J	H	G	F	E	D	C	B	A
1							------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------						
2					------ ------ ------ ------	L44-11 A 26701 40594	------ ------ ------ ------	M62-12 D 0 22825	------ ------ ------ ------	L62-11 A 26757 40639	------ ------ ------ ------				
3				------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	M31-12 SA 0 27830	------ ------ ------ ------	M38-12 SA 0 27830	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------			
4			------ ------ ------ ------	M17-12 C 0 24812	------ ------ ------ ------	L31-11 B 25821 49022	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	L32-11 B 25832 49033	------ ------ ------ ------	M18-12 C 0 24812	------ ------ ------ ------		
5		------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	L37-11 SB 22298 46405	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	L38-11 SB 22298 46405	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	
6		L48-11 A 26757 40639	------ ------ ------ ------	L26-11 B 25832 49033	------ ------ ------ ------	L41-11 D 26062 49323	------ ------ ------ ------	K20-10A C 33838 52442	------ ------ ------ ------	L50-11 D 26062 49323	------ ------ ------ ------	L23-11 B 25821 49022	------ ------ ------ ------	L43-11 A 26701 40594	
7	------ ------ ------ ------	------ ------ ------ ------	M43-12 SA 0 27830	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	L60-11 SB 27132 49273	------ ------ ------ ------	L47-11 SB 27132 49273	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	M50-12 SA 0 27830	------ ------ ------ ------	------ ------ ------ ------
8	------ ------ ------ ------	M65-12 D 0 22825	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	K13-10A C 33838 52442	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	K17-10A C 33838 52442	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	M61-12 D 0 22825	------ ------ ------ ------
9	------ ------ ------ ------	------ ------ ------ ------	M36-12 SA 0 27830	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	L52-11 SB 27132 49273	------ ------ ------ ------	L61-11 SB 27132 49273	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	M60-12 SA 0 27830	------ ------ ------ ------	------ ------ ------ ------
10		L53-11 A 26701 40594	------ ------ ------ ------	L33-11 B 25821 49022	------ ------ ------ ------	L64-11 D 26062 49323	------ ------ ------ ------	K16-10A C 33838 52442	------ ------ ------ ------	L55-11 D 26062 49323	------ ------ ------ ------	L21-11 B 25832 49033	------ ------ ------ ------	L56-11 A 26757 40639	
11		------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	L39-11 SB 22298 46405	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	L40-11 SB 22298 46405	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	
12			------ ------ ------ ------	M19-12 C 0 24812	------ ------ ------ ------	L36-11 B 25832 49033	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	L24-11 B 25821 49022	------ ------ ------ ------	M20-12 C 0 24812	------ ------ ------ ------		
13				------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------	M42-12 SA 0 27830	------ ------ ------ ------	M56-12 SA 0 27830	------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------			
14					------ ------ ------ ------	L42-11 A 26757 40639	------ ------ ------ ------	M63-12 D 0 22825	------ ------ ------ ------	L51-11 A 26701 40594	------ ------ ------ ------				
15							------ ------ ------ ------	------ ------ ------ ------	------ ------ ------ ------						

------ ASSEMBLY ID - REGION ID
------ RCCA BANK ID
------ BOC BURNUP (MWD/MTU) - PROJECTED
------ EOC BURNUP (MWD/MTU) - PROJECTED