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September 19, 2003  
RC-03-0194

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

ATTN: K. R. Cotton

Dear Sir/Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION  
DOCKET NO. 50/395  
OPERATING LICENSE NO. NPF-12  
LICENSE AMENDMENT REQUEST - LAR 03-1901  
SURVEILLANCE REQUIREMENT 4.2.4.2 AND ASSOCIATED BASES

Pursuant to 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G), acting for itself and as agent for South Carolina Public Service Authority, hereby requests an amendment to the Virgil C. Summer Nuclear Station (VCSNS) Technical Specifications (TS).

The proposed change will revise Surveillance Requirement (SR) 4.2.4.2 to reflect the use of the Power Distribution Monitoring System (PDMS) for a core power distribution measurement. This change will also result in revising the Bases for 3/4.2.4 to reflect the use of the PDMS.

Amendment 142 added TS 3.3.3.11 for the PDMS (Reference 1). However, SR 4.2.4.2 was not revised to include the PDMS as a means of performing a core power distribution measurement. This apparent oversight requires revision to the surveillance requirement to include PDMS. This proposed amendment request specifies the use of the PDMS in this application.

The enclosure to this letter provides the details of the proposed change including the background and analytical information. Attachment I provides the TS pages marked up with the proposed changes. Attachment II provides the retyped TS pages. Attachment III provides the list of regulatory commitments.

The VCSNS Plant Safety Review Committee and the Nuclear Safety Review Committee have reviewed and approved the proposed change.

SCE&G requests approval of the proposed amendment by February 2, 2004. Once approved, the amendment shall be implemented within 30 days.

There are no other TS changes in process that will affect or be affected by this change request.

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If you have any questions or require additional information, please contact Mr. Ronald B. Clary at (803) 345-4757.

I certify under penalty of perjury that the information contained herein is true and correct.

9/19/03  
Executed on

  
Stephen A. Byrne

AJC/SAB/dr

Enclosure:

Evaluation of the proposed change

Attachment(s): 3

- I. Proposed Technical Specification Change - Mark-up
- II. Proposed Technical Specification Change - Retyped
- III. List of Regulatory Commitments

c: N. O. Lorick  
N. S. Carns  
T. G. Eppink (w/o Attachments)  
R. J. White  
L. A. Reyes  
NRC Resident Inspector  
P. Ledbetter  
K. M. Sutton  
T. P. O'Kelley  
RTS (LAR 03-1901)  
File (813.20)  
DMS (RC-03-0194)

**Subject: LICENSE AMENDMENT REQUEST - LAR 03-1901  
SURVEILLANCE REQUIREMENT 4.2.4.2 and Associated Bases**

## **1.0 DESCRIPTION**

South Carolina Electric & Gas Company (SCE&G) requests an amendment to revise the Virgil C. Summer Nuclear Station (VCSNS) Technical Specifications (TS) Surveillance Requirements (SR). The proposed change to SR 4.2.4.2 and the Bases for 3/4.2.4 are being requested to reflect the use of the Power Distribution Monitoring System (PDMS) for a core power distribution measurement.

## **2.0 PROPOSED CHANGE**

Specifically the proposed changes would revise the following:

### **2.1 TS 4.2.4.2**

The proposed change will revise SR 4.2.4.2 to specifically identify the use of the PDMS as a means for determining the Quadrant Power Tilt Ratio (QPTR) to be within the limit with one Power Range Channel inoperable.

### **2.2 Bases 3/4.2.4**

The proposed change will revise the Quadrant Power Tilt Ratio section to reflect the use of the PDMS as a means of monitoring QPTR when one excore detector is inoperable.

## **3.0 BACKGROUND**

Amendment 142 to the VCSNS TS added the PDMS as TS 3.3.3.11. There were various other sections revised at that time. However, when SR 4.2.4.2 was revised, the specific reference to the PDMS was not added as a means of performing a core power distribution measurement with one Power Range Channel inoperable. This apparent oversight requires revision to include the use of PDMS since TS 3.3.3.11 requires PDMS to be used when > 25% Rated Thermal Power (RTP) (Reference 1). Alternatives include the use of 2 sets of 4 symmetric thimble locations or a full incore flux map. The preferred method is the PDMS.

#### **4.0 TECHNICAL ANALYSIS**

Amendment 142 added TS 3.3.3.11 for the PDMS (Reference 1). However, SR 4.2.4.2 was not revised to include the PDMS as a means of performing a core power distribution measurement. This apparent oversight requires revision to the surveillance requirement to include PDMS. This proposed amendment request specifies the use of the PDMS in this application.

The requested changes to SR 4.2.4.2 and Bases 3/4.2.4 are necessary to clarify that the use of PDMS is a means of monitoring the core power distribution when one Power Range Channel is inoperable. TS 3.3.3.11 requires that the PDMS be operable when greater than 25% Rated Thermal Power to obtain a core power distribution measurement. If PDMS is not operable, TS 3.3.3.11 requires the incore movable detectors to be used. In addition, TS 3.3.3.2 requires the incore moveable detectors to be operable when monitoring QPTR by performing a full incore flux map.

Therefore, with the PDMS operable and one Power Range Channel inoperable it is reasonable that PDMS would be used as a core power distribution measurement to determine that QPTR is within the limit. If the PDMS is not operable, then the incore movable detectors would be used to determine if QPTR is within the limit by using 2 of 4 sets of symmetric thimble locations or performing a full incore flux map as a core power distribution measurement to determine if QPTR is within the limit.

In conclusion, the requested changes do not alter methods previously reviewed and approved and do not adversely impact the level of safety currently provided in SR 4.2.4.2.

#### **5.0 REGULATORY SAFETY ANALYSIS**

##### **5.1 No Significant Hazards Consideration**

South Carolina Electric & Gas Company (SCE&G) has evaluated the proposed changes to the VCSNS TS described above against the No Significant Hazards Criteria of 10CFR50.92 and has determined that the changes do not involve any significant hazard. The following is provided in support of this conclusion.

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed change to TS 4.2.4.2 clarifies the use of the PDMS as means of measuring core power distribution with one Power Range Channel inoperable to determine if QPTR is within the limit. The use of the PDMS was approved in Amendment 142 and added as TS 3.3.3.11. This clarification of its use in TS 4.2.4.2 specifies an additional method of performing the surveillance requirement and will not increase the probability of an accident previously evaluated.

The probability or consequences of accidents previously evaluated in the VCSNS FSAR are unaffected by this proposed change because there is no change to any equipment response or accident mitigation scenario. There are no additional challenges to fission product barrier integrity. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change to TS 4.2.4.2 clarifies the use of the PDMS as means of measuring core power distribution with one Power Range Channel inoperable to determine if QPTR is within the limit. The use of the PDMS was approved in Amendment 142 and added as TS 3.3.3.11. This clarification of its use in TS 4.2.4.2 specifies an additional method of performing the surveillance requirement and does not create the possibility of a new or different kind of accident or malfunction.

No new accident scenarios, failure mechanisms, or limiting single failures are introduced as a result of the proposed change. The proposed change does not challenge the performance or integrity of any safety-related system. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does this change involve a significant reduction in margin of safety?

Response: No.

The margin of safety associated with the acceptance criteria of any accident is unchanged. The proposed change will have no affect on the availability, operability, or performance of the safety-related systems and components. A change to the surveillance requirement is proposed; however, this clarification of the use of the PDMS in TS 4.2.4.2 specifies an additional method of performing the surveillance requirement.

Pursuant to 10 CFR 50.91, the preceding analyses provide a determination that the proposed Technical Specifications change poses no significant hazard as delineated by 10 CFR 50.92.

## 5.2 Applicable Regulatory Requirements/Criteria

### 5.2.1 Regulations

10 CFR 50.36(c)(3), "Surveillance Requirements," stipulates that surveillances be performed to assure the necessary quality of systems and components be maintained, the facility operation will be within safety limits, and that the limiting condition for operation will be met.

### 5.2.2 Approved Methodologies

1. NUREG 1431, Revision 2, "Standard Technical Specifications Westinghouse Plants"
2. Westinghouse Electric Corporation, WCAP-12472-P-A, "BEACON Core Monitoring and Operations Support System" Topical Report, August 1994.

### 5.2.3 Conclusion

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

## 6.0 ENVIRONMENTAL CONSIDERATION

SCE&G has determined that the proposed amendment would change a surveillance requirement. SCE&G has evaluated the proposed change and has determined that the change does not involve, (i) a significant hazards consideration, (ii) a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. As discussed above, the proposed changes do not involve a significant hazards consideration. Accordingly, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51, specifically 10 CFR 51.22(c)(9). Therefore, pursuant 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

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## **7.0 REFERENCES**

1. Nuclear Regulatory Commission Letter to Mr. Gary J. Taylor, "Issuance Of Amendment No. 142 to Facility Operating License No. NPF-12 Regarding Best Estimate Analyzer for Core Operations-Nuclear (BEACON), Virgil C. Summer Nuclear Station, Unit No. 1 (TAC NO. MA3997), dated April 9, 1999.

**ATTACHMENT I**

**PROPOSED TECHNICAL SPECIFICATION CHANGES (MARK-UP)**

**Attachment to License Amendment No. XXX**  
**To Facility Operating License No. NPF-12**  
**Docket No. 50-395**

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

Insert Pages

3/4 2-14  
 B 3/4 2-5

3/4 2-14  
 B 3/4 2-5

**SCE&G – EXPLANATION OF CHANGES**

<u>Page</u>	<u>Affected Section</u>	<u>Bar #</u>	<u>Description of Change</u>	<u>Reason for Change</u>
3/4 2-14	4.2.4.2	1	Rewrite of 4.2.4.2 - Reworked to allow use of PDMS as a means of core power distribution measurement	To be consistent with other references to PDMS as a means of core power distribution measurement.
B 3/4.2.4	3/4 2.4	1	Remove period in the word "Figure".	Typo.
B 3/4.2.4	3/4 2.4	2	Rewrite of 3/4.2.4	To specify PDMS as a means of core power distribution measurement.



POWER DISTRIBUTION LIMITS

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 2 hours and reduce the Power Range Neutron Flux-High Trip Setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours.
  3. Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER; subsequent POWER OPERATION above 50% of RATED THERMAL POWER may proceed provided that the QUADRANT POWER TILT RATIO is verified within its limit at least once per hour for 12 hours or until verified at 95% or greater RATED THERMAL POWER.
- d. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.2.4.1 The QUADRANT POWER TILT RATIO shall be determined to be within the limit above 50% of RATED THERMAL POWER by:

- a. Calculating the ratio at least once per 7 days when the alarm is OPERABLE.
- b. Calculating the ratio at least once per 12 hours during steady state operation when the alarm is inoperable.

4.2.4.2 The QUADRANT POWER TILT RATIO shall be determined to be within the limit when above 75 percent of RATED THERMAL POWER with one Power Range Channel inoperable by using the movable incore detectors to confirm that the normalized symmetric power distribution, obtained from 2 sets of 4 symmetric thimble locations or a core power distribution measurement, is consistent with the indicated QUADRANT POWER TILT RATIO at least once per 12 hours.

4.2.4.2 The QUADRANT POWER TILT RATIO shall be determined to be within the limit when above 75 percent RATED THERMAL POWER with one Power Range Channel inoperable at least once per 12 hours by using the PDMS or movable incore detectors to confirm that the normalized symmetric power distribution is consistent with the indicated QUADRANT POWER TILT RATIO. The incore detector monitoring shall be done with 2 sets of 4 symmetric thimbles or a full incore flux map.

POWER DISTRIBUTION LIMIT

BASES

HEAT FLUX HOT CHANNEL FACTOR and RCS FLOWRATE and NUCLEAR ENTHALPY  
RISE HOT CHANNEL FACTOR (Continued)

contained in the COLR. The PDMS will automatically calculate and apply the correct measurement uncertainty to the measured  $F_{AH}^N$  value.

The 12-hour periodic surveillance of Indicated RCS flow is sufficient to detect only flow degradation which could lead to operation outside the acceptable region of operation specified on the RCS Total Flow Rate Versus  $F_{AH}^N$  figure in the COLR.

3/4.2.4 QUADRANT POWER TILT RATIO

The quadrant power tilt power ratio limit assures that the radial power distribution satisfies the design values used in the power capability analysis. Radial power distribution measurements are made during startup testing and periodically during power operation.

The limit of 1.02, at which corrective action is required, provides DNB and linear heat generation rate protection with x-y plane power tilts. A limiting tilt of 1.025 can be tolerated before the margin for uncertainty in  $F_0$  is depleted. The limit of 1.02 was selected to provide an allowance for the uncertainty associated with the indicated power tilt.

The two hour time allowance for operation with a tilt condition greater than 1.02 but less than 1.09 is provided to allow identification and correction of a dropped or misaligned control rod. In the event such action does not correct the tilt, the margin for uncertainty on  $F_0$  is reinstated by reducing the maximum allowed power by 3 percent for each percent of tilt in excess of 1.0.

For purposes of monitoring QUADRANT POWER TILT RATIO when one excore detector is inoperable, the movable incore detectors or ~~a core power distribution measurement~~ are used to confirm that the normalized symmetric power distribution is consistent with the QUADRANT POWER TILT RATIO. The incore detector monitoring is done with a full incore flux map or two sets of 4 symmetric thimbles. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, N-8.

the PDMS

3/4.2.5 DNB PARAMETERS

The limits on the DNB related parameters assure that each of the parameters are maintained within the normal steady state envelope of operation assumed in the transient and accident analyses. The limits are consistent with the initial FSAR assumptions and have been analytically demonstrated adequate to maintain a minimum of DNBR in the core at or above the design limit throughout each analyzed transient. The maximum indicated  $T_{avg}$  limit of 589.2°F and the minimum indicated pressure limit of 2206 psig correspond to analytical limits of 591.4°F and 2185 psig respectively, read from control board indications.

The 12-hour periodic surveillance of these parameters through instrument readout is sufficient to ensure that the parameters are restored within their limits following load changes and other expected transient operation.

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**ATTACHMENT II**

**PROPOSED TECHNICAL SPECIFICATION CHANGES (RETYPED)**

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## POWER DISTRIBUTION LIMITS

### LIMITING CONDITION FOR OPERATION

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#### ACTION: (Continued)

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 2 hours and reduce the Power Range Neutron Flux-High Trip Setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours.
  3. Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER; subsequent POWER OPERATION above 50% of RATED THERMAL POWER may proceed provided that the QUADRANT POWER TILT RATIO is verified within its limit at least once per hour for 12 hours or until verified at 95% or greater RATED THERMAL POWER.
- d. The provisions of Specification 3.0.4 are not applicable.

### SURVEILLANCE REQUIREMENTS

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4.2.4.1 The QUADRANT POWER TILT RATIO shall be determined to be within the limit above 50% of RATED THERMAL POWER by:

- a. Calculating the ratio at least once per 7 days when the alarm is OPERABLE.
- b. Calculating the ratio at least once per 12 hours during steady state operation when the alarm is inoperable.

4.2.4.2 The QUADRANT POWER TILT RATIO shall be determined to be within the limit when above 75 percent RATED THERMAL POWER with one Power Range Channel inoperable at least once per 12 hours by using the PDMS or movable incore detectors to confirm that the normalized symmetric power distribution is consistent with the indicated QUADRANT POWER TILT RATIO. The incore detector monitoring shall be done with 2 sets of 4 symmetric thimbles or a full incore flux map.

## POWER DISTRIBUTION LIMIT

### BASES

#### HEAT FLUX HOT CHANNEL FACTOR and RCS FLOWRATE and NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR (Continued)

contained in the COLR. The PDMS will automatically calculate and apply the correct measurement uncertainty to the measured  $F_{\Delta H}^N$  value.

The 12-hour periodic surveillance of indicated RCS flow is sufficient to detect only flow degradation which could lead to operation outside the acceptable region of operation specified on the RCS Total Flow Rate Versus R Figure in the COLR.

#### 3/4.2.4 QUADRANT POWER TILT RATIO

The quadrant power tilt power ratio limit assures that the radial power distribution satisfies the design values used in the power capability analysis. Radial power distribution measurements are made during startup testing and periodically during power operation.

The limit of 1.02, at which corrective action is required, provides DNB and linear heat generation rate protection with x-y plane power tilts. A limiting tilt of 1.025 can be tolerated before the margin for uncertainty in  $F_Q$  is depleted. The limit of 1.02 was selected to provide an allowance for the uncertainty associated with the indicated power tilt.

The two hour time allowance for operation with a tilt condition greater than 1.02 but less than 1.09 is provided to allow identification and correction of a dropped or misaligned control rod. In the event such action does not correct the tilt, the margin for uncertainty on  $F_Q$  is reinstated by reducing the maximum allowed power by 3 percent for each percent of tilt in excess of 1.0.

For purposes of monitoring QUADRANT POWER TILT RATIO when one excore detector is inoperable, the movable incore detectors or the PDMS are used to confirm that the normalized symmetric power distribution is consistent with the QUADRANT POWER TILT RATIO. The incore detector monitoring is done with a full incore flux map or two sets of 4 symmetric thimbles. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, N-8.

#### 3/4.2.5 DNB PARAMETERS

The limits on the DNB related parameters assure that each of the parameters are maintained within the normal steady state envelope of operation assumed in the transient and accident analyses. The limits are consistent with the initial FSAR assumptions and have been analytically demonstrated adequate to maintain a minimum of DNBR in the core at or above the design limit throughout each analyzed transient. The maximum indicated  $T_{avg}$  limit of 589.2°F and the minimum indicated pressure limit of 2206 psig correspond to analytical limits of 591.4°F and 2185 psig respectively, read from control board indications.

The 12-hour periodic surveillance of these parameters through instrument readout is sufficient to ensure that the parameters are restored within their limits following load changes and other expected transient operation.

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**ATTACHMENT III**

**LIST OF REGULATORY COMMITMENTS**

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There are no regulatory commitments created due to this License Amendment Request. The proposed change specifies the use of the Power Distribution Monitoring System (PDMS) as a means of core power distribution measurement.