

SOUTH CAROLINA ELECTRIC & GAS COMPANY

POST OFFICE 764

COLUMBIA, SOUTH CAROLINA 29218

O. W. DIXON, JR.  
VICE PRESIDENT  
NUCLEAR OPERATIONS

May 3, 1985

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Dr. J. Nelson Grace  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region II, Suite 2900  
101 Marietta Street, N.W.  
Atlanta, Georgia 30323

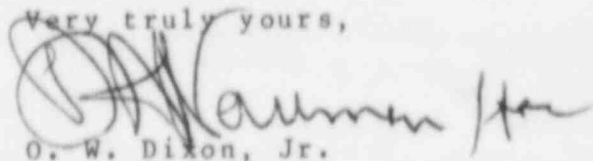
SUBJECT: Virgil C. Summer Nuclear Station  
Docket No. 50/395  
Operating License No. NPF-12  
Response to Notice of Violation  
NRC Inspection Report 85-12

Dear Dr. Grace:

Attached is South Carolina Electric and Gas Company's response for the Violations as addressed in Enclosure 1 of NRC Inspection Report 85-12.

If there are any questions, please call us at your convenience.

Very truly yours,



O. W. Dixon, Jr.

RMF:OWD/led  
Attachment

cc: V. C. Summer  
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ENCLOSURE 1  
RESPONSE TO NOTICE OF VIOLATIONS  
INSPECTION REPORT 85-12

I. ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

South Carolina Electric and Gas Company is in agreement with the alleged violations.

II. REASON FOR THE VIOLATION

On February 28, 1985 at 1330 hours during a reactor startup, a reactor trip occurred on the high flux positive rate trip. The Plant responded as expected to the Reactor Protection System (RPS) actuation. The violations were attributed to two causes. First, the licensed operator conducting the startup failed to adhere to applicable procedures in that criticality was not anticipated at all times during control rod withdrawal and an awareness of plant conditions was not maintained at all times. The second cause which contributed to the violations was a lack of adequate guidance in procedures used to calculate Estimated Critical Conditions (ECC) and Reference Critical Data (RCD). These two procedures, General Operating Procedure Appendices C and B, respectively, were determined to be adequate for the majority of the core conditions calculated for reactor startups. However, the procedures did not provide adequate guidance for conditions where non-equilibrium RCD is used to determine the ECC.

The reactor startup on February 28, 1985 at 1330 hours was preceded by a startup that same day at 0630 hours. The reactor was critical for approximately three hours prior to shutdown. The RCD was based on data taken for the brief period of criticality rather than data for equilibrium conditions from the previous power history. Therefore, when the ECC was calculated for the reactor startup at 1300 hours, the incorrect values of reactivity worth of poisons in the core were used. Additionally, the value used for control rod worth in the ECC calculation was based on middle of life (MOL) rod worth curves instead of beginning of life (BOL) rod worth curves. The station curve book provides rod worth curves for three times during core life; beginning, middle, and end of life. The reactor was between the BOL and MOL in Cycle 2, and the BOL curve more accurately reflects rod worth. These two factors contributed to the miscalculation of the estimated critical condition by 128 control rod steps. The ECC predicted criticality at 168 steps on Bank D while the actual critical rod height was determined to be at 40 steps on Bank D.

## II. REASON FOR THE VIOLATION continued

The ECC calculated prior to startup misinformed the licensed operator as to the actual core conditions. This was a contributing factor to the unanticipated reactor criticality which was terminated by the high flux positive rate trip.

The consequences of this event were well bounded by the safety analysis for an uncontrolled rod withdrawal accident. The power transient was terminated at approximately six percent power by the positive rate trip. The startup rate was estimated to be approximately 17 decades per minute. No adverse consequences were identified upon completion of the review of this event.

## III. CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

The following immediate corrective actions were taken prior to reactor startup:

- 1) A statistical reliability check of source range instrumentation was performed.
- 2) During startup,  $\frac{1}{M}$  plots using data from both source range instruments were used to monitor the approach to criticality.
- 3) Special care was taken to verify the correct Reactor Coolant System boron concentration used for the ECC calculation.
- 4) Additionally, the licensed operator who performed the startup was removed from the watch bill until the Licensee completed evaluation of the event, its causes, and the operator's capability to continue licensed duties. The operator resumed licensed operator duties on March 13, 1985 upon completion of the Licensee's evaluation.

The reactor startup was conducted without further problems and criticality was achieved as predicted by the 1/M calculations.

## IV. CORRECTIVE ACTION TAKEN TO AVOID FURTHER VIOLATION

Actions taken by the Licensee to avoid further violations include formal counseling of the licensed operator for failure to maintain an awareness of plant conditions during the reactor startup. Additionally, procedures used for the calculation of ECCs have been revised to provide improved guidance for data usage and limitations for determination of core conditions for reactor startups.

IV. CORRECTIVE ACTION TAKEN TO AVOID FURTHER VIOLATION continued

The station curve book has been revised to clearly label burnup dependent curves with the appropriate burnup windows. This will provide a more accurate means of selecting the appropriate curves for ECC calculations.

V. DATE OF FULL COMPLIANCE

South Carolina Electric and Gas Company is in full compliance with respect to the corrective action as stated.