NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Virgil C. Summer Nuclear Station	0 5 0 0 0 3 9 5	1 OF 0 3

TITLE (4)
Reactor Trip

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 2	2 8	8 5	8 5	0 0 3	0 0	0 3	2 7	8 5		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9): 2
POWER LEVEL (10): 0 0 6

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

20.402(b)	20.405(c)	XX 50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
A. R. Koon, Jr., Associate Manager, Regulatory Compliance	AREA CODE 8 0 3 3 4 5 - 5 2 0 9

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
A	J C			N							

SUPPLEMENTAL REPORT EXPECTED (14)

	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)				
XX NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

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 event was 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 event was a lack of adequate guidance in procedures used to calculate Estimated Critical Conditions (ECC) and Reference Critical Data (RCD).

The consequences of this event are 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. No adverse consequences were identified upon completion of the review of this event.

Actions taken by the Licensee to prevent recurrence 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 will be revised to provide improved guidance for data usage and limitations for determination of core conditions for reactor startups.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

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 event was 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 event 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 do 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 is presently 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.

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 are 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.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

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.

Actions taken by the Licensee to prevent recurrence 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 will be revised to provide improved guidance for data usage and limitations for determination of core conditions for reactor startups.

The station curve book will also be 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.

The expected completion date for the actions outlined above is April 15, 1985.

SOUTH CAROLINA ELECTRIC & GAS COMPANY
POST OFFICE 764
COLUMBIA, SOUTH CAROLINA 29218

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

March 27, 1985

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

SUBJECT: Virgil C. Summer Nuclear Station
Docket No. 50/395
Operating License No. NPF-12
LER 85-003

Dear Sir:

Attached is Licensee Event Report #85-003 for the Virgil C. Summer Nuclear Station. This Report is submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

Should there be any questions, please call us at your convenience.

Very truly yours,

O. W. Dixon, Jr.

RMF:OSB/dwf
Attachment

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