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March 23, 1989

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

> Subject: Virgil C. Summer Nuclear Station Docket No. 50/395 Operating License No. NPF-12 NRC Bulletin 88-08

Gentlemen:

During the recent refueling outage at the Virgil C. Summer Nuclear Station which ended December 29, 1988, a temperature monitoring system in accordance with NRC Bulletin 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems," was installed at the plant. Since installation, the system has been obtaining data and the monitoring program was considered functional, but not fully operational. Some equipment problems, such as failed temperature detectors, have also been experienced since the monitoring program has been installed; however, as plant conditions and schedule permitted, these problems have been corrected. On February 22, 1989, South Carolina Electric & Gas Company (SCE&G) determined the system was operating correctly and declared the monitoring program operational.

Attachment 1 is a summary of the data collected in December 1988, January and February 1989. While some data indicates the presence of isolated temperature fluctuation events, no significant cycling has been noted. Four lines have demonstrated a constant top to bottom pipe temperature delta of up to 36°F, but since this temperature difference is remaining constant for each line, does not exhibit cyclic tendencies, and is well within the 50°F temperature difference criteria, the condition is not presently considered significant. The actual temperature ranges being recorded and compared to the estimates contained in Table 1 of the December 19, 1988, SCE&G submittal are slightly higher than originally predicted; however, evaluations have indicated that since the readings are stable and because only minor temperature variations are observed, these temperatures are acceptable. In addition these predicted temperature ranges are only secondary screening criteria which were developed based on standard heat transfer calculations since the extent of fluid mixing was unknown. The 50°F temperature difference from top to bottom of the pipe is in the primary monitoring criteria. While no significant problems are expected based on the results to date, as noted in the December 19, 1988 SCE&G submittal, additional correspondence will be transmitted to the NRC Staff should significant monitoring results be obtained.

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Should you have any questions, please contact us at your convenience.

Very truly yours,

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O. S. Bradham

AMM/OSB:1cd Attachment

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NRCB 88-08 MONITORING PROGRAM

EVALUATION OF DATA

The following is a summary of the data gathered from December 20, 1988 through February 2, 1989 for the nine (9) lines monitored at the Virgil C. Summer Nuclear Station for NRCB 88-08.

LINE:

MAXIMUM ΔT: NORMAL ΔT: TEMPERATURE RANGE: POINTS OF INTEREST: NORMAL CHARGING

10.5°F $\approx 8^{\circ}F$ 460°F ± 10 Some unexpected cycling resulting from charging has been identified; it is not severe in nature.

LINE:

MAXIMUM ΔT : NORMAL ΔT : TEMPERATURE RANGE: POINTS OF INTEREST:

LINE:

MAXIMUM ΔT : NORMAL ΔT : TEMPERATURE RANGE: POINTS OF INTEREST:

LINE:

MAXIMUM ∆T: NORMAL ∆T: TEMPERATURE RANGE: POINTS OF INTEREST:

ALTERNATE CHARGING

48.7°F $\approx 30^{\circ}$ F 520°F ± 20 The 48.7°F Δ T was a one time event the cause of which cannot be identified. This line has a very stable Δ T of about 30°F.

AUXILIARY PRESSURIZER SPRAY

36.8°F $\approx 33^{\circ}F$ 490°F thru 545°F This line has a very stable ΔT of about 33°F.

SAFETY INJECTION, COLD LEG, LOOP A

5.4°F 4.5°F 535°F ±5 This line is very stable with no indication of stratification or cycling. Attachment 1 to Document Control Desk Letter March 23, 1989 Page 2 of 3

LINE:

MAXIMUM ΔT : NORMAL ΔT : TEMPERATURE RANGE: POINTS OF INTEREST:

LINE:

MAXIMUM ΔT: NORMAL ΔT: TEMPERATURE RANGE: POINTS OF INTEREST:

LINE:

MAXIMUM ΔT : NORMAL ΔT : TEMPERATURE RANGE: POINTS OF INTEREST:

LINE:

MAXIMUM ΔT : NORMAL ΔT : TEMPERATURE RANGE: POINTS OF INTEREST: SAFETY INJECTION, COLD LEG, LOOP B $88.9^{\circ}F \approx 36^{\circ}F$ $480^{\circ}F$ thru $545^{\circ}F$ Three high $\Delta T's$ were noted but were isolated events with no specific cause. This line has a ΔT of about $36^{\circ}F$.

SAFETY INJECTION, COLD LEG, LOOP C

 $22^{\circ}F \approx 2^{\circ}F$ 545°F ± 5 This line is very stable, with no indication of stratification or cycling.

SAFETY INJECTION, HOT LEG, LOOP A

3.7°F 3°F 610°F thru 625°F This line is very stable, with no indication of stratification or cycling. The temperature range is almost 100°F higher than originally expected; however, this does not represent a problem. The cause of the increased temperature is postulated to be the result of fluid mixing which was not accounted for in the original temperature range.

SAFETY INJECTION, HOT LEG, LOOP B

Unknown Unknown $610^{\circ}F \pm 5$ The top RTD indicated that this is a very stable line, and it does not present any evidence of stratification or cycling. The bottom RTD has been inoperable since program startup. This problem has recently been corrected. Attachment 1 to Document Control Desk Letter March 23, 1989 Page 3 of 3

LINE:

MAXIMUM ΔT : NORMAL ΔT : TEMPERATURE RANGE: POINTS OF INTEREST: SAFETY INJECTION, HOT LEG, LOOP C

282.7°F $\approx 32^{\circ}$ F 580°F thru 615°F The 282.7°F Δ T resembles what would be expected if a Safety Injection (SI) had occurred; however, the plant data gathered does not support an SI or provide any indication to what caused this condition. This was a one time event. This line has a normal Δ T of 32°F.