

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 11 TO FACILITY OPERATING LICENSE NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY
SOUTH CAROLINA PUBLIC SERVICE AUTHORITY
VIRGIL C. SUMMER NUCLEAR STATION

DOCKET NO. 50-395

INTRODUCTION

The technical basis for initial operation of the Virgil C. Summer Station at power levels up to 50% for 2000 hours was provided in the licensee submittal of September 1982. By letter dated January 31, 1983, South Carolina Electric & Gas Company (SCE&G) submitted a basis for extending this initial 2000 hour period by 1000 hours at 50% power and with limited operation at 60, 75, 90 and 100% for plant startup testing. Details of the proposed power operation program are as follows:

<u>Time Period</u>	<u>% Full Power</u>
2000 hours	50%
1000 hours consisting of:	
592 hours	50%
24 hours	60%
336 hours	75%
24 hours	90%
24 hours	100%

Additionally, the duration specified for each power level may be exceeded as long as the additional power operation is deducted from the next higher power levels.

BACKGROUND

The September 1982 report provided an assessment of V. C. Summer's power operating program (2000 hours at no greater than 50% of full power) by comparing this program with the operating experience at other plants with split flow steam generators. Plant operating experience, as presented in the September 1982 report, is summarized below:

Plant A

Plant A started up in the fall of 1980 and, up to shutdown in October 1981, had operated at power levels at or greater than 50% for more than 3000 hours. Plant A was shut down in October 1981 with primary-to-secondary leakage. Subsequent inspection revealed that one tube was leaking on the

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cold leg side in the pre-heat section of one steam generator. Eddy Current Test (ECT) inspection of all three steam generators revealed wear indications in general on tubes in the first three rows of each steam generator.

Plant A returned to power in April 1982 and the unit was operated at 40% of main feed flow (with short intervals at higher power levels to obtain instrumentation data) for an approximate 1500 hour operating period. This period ended in June 1982.

An Eddy Current inspection was performed in June 1982 and those results compared with the March 1982 inspection. The June 1982 data resulted in a decrease in the total number of indications but a slight increase in the size of the larger indications.

Plant A returned to power in August 1982 and operated at 40% of main feed flow for approximately 2000 hours before shutdown in November 1982.

Plant B

Plant B started up in the spring of 1981 and, up to shutdown in November 1981, had operated at power levels at or greater than 50% for more than 2000 hours. Plant B was shut down in early November 1981 to perform ECT inspections of steam generator tubes. A pattern of indications similar to, but less pronounced than that at Plant A, was found.

Plant B returned to power in December 1981 for an approximate 1500 hour operating period at 50% of main feed flow (with short intervals at higher power levels to obtain instrumentation data). This period ended in March 1982. ECT inspection of the steam generators was performed, and it was concluded that little, if any, wear had occurred.

Plant B returned to power in April 1982 for an approximate 2000 hour operating period (which ended in July 1982) at 50% main feed flow. A photographic evaluation of the ECT data from the March and July inspections was performed by Westinghouse, with the conclusion that there has been no significant change in tube wear due to this operating period.

Plant B returned to power in September 1982 and has subsequently operated at 50% main feed flow for over 2000 hours.

Plant C

Plant C performed startup testing in late 1981 and operated at various power levels up to 100% through February 1982, accumulating 1500 hours of operation at and above 50% power, including 324 hours at and above 75% power. ECT inspection following shutdown in February 1982 revealed only minor degradation (20% throughwall penetration by differential ECT) on four tubes after this first period of operation.

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From March to June 1982, Plant C operated for 1500 hours at 50% main feed flow, followed by 710 hours at 75%. An Eddy Current inspection was performed and it was concluded that some wear had occurred but was difficult to quantify due to the varying inspection techniques.

Plant C returned to power in July 1982 and operated for approximately 1800 hours at 50% and 700 hours at 75% main feed flow before shutdown in November 1982.

In summary, there has been no significant tube wear observed in plants under operating conditions proposed herein for V. C. Summer. In particular, the experience of Plant B at 50% for over 3500 hours without significant tube wear and the experience of Plant C at 50% for 1500 hours and at 75% for 324 hours with minor degradation is relevant. (Plants which have significant tube wear indications have operated extensively at power levels of 75% and above prior to the inspection which indicated the significant levels of wear.) Consequently, the proposed power operation program for V. C. Summer should not result in more than minor levels of wear.

TUBE VIBRATION MEASUREMENTS

Tube vibration measurements taken at V. C. Summer in December 1982 provide for an additional comparison between V. C. Summer and other operating plants with split flow steam generators. For these measurements, accelerometers were installed in R49C51 and R49C67, (window and non-window tubes, respectively, in Steam Generator A); and data were obtained at power levels ranging from hot shutdown to 48% power. It was concluded from these tests that the tube motion was either absent or had low amplitude tube vibration levels which are within the amplitude ranges experienced at the operating power levels of other power plants.

EVALUATION

The September 1982 Report indicated that the V. C. Summer Station should be operated at 50% power (not exceeding 50% of full power feedwater flow to the main feedwater nozzle) for a period of up to 2000 hours. Further studies have been performed to evaluate the feasibility of extending the operational cycle.

Tube wear estimates, as quoted in the September 1982 Report, were extended to show the effect of increasing the operational period from 2000 to 3000 hours at 50%. In addition, tube wear estimates were extended to include the power history being proposed for V. C. Summer. Extending the operating period from 2000 to 3000 hours at 50% power increases the best estimate tube wear calculation by about 1.5% and the upper bound by about 2.5%. Furthermore, for the proposed operating history, the best estimate and upper bound tube wear are calculated to be less than 12% and 24%, respectively.

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An interim operating program has been evaluated for operation of the V. C. Summer Station on the basis of precluding significant steam generator tube wear. The tube wear for this proposed program has been evaluated by a quantitative assessment of wear using existing Westinghouse correlations, a comparison of the proposed V. C. Summer operating program with operational experience at other plants with split flow steam generators and a comparison of V. C. Summer tube vibration measurements with equivalent measurements in other split flow steam generators. The result of this evaluation is that significant tube wear should be precluded by adhering to the proposal. The staff, therefore, finds the V. C. Summer proposed operating program acceptable.

ENVIRONMENTAL CONSIDERATION

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered, does not create the possibility of an accident of a type different from any evaluated previously, and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: February 22, 1983

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