



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 94 TO FACILITY OPERATING LICENSE NO. NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-395

1.0 INTRODUCTION

By letter dated May 16, 1990, as supplemented August 13, 1990, South Carolina Electric & Gas Company (SCE&G or the licensee), the licensee for the Virgil C. Summer Nuclear Station, Unit No. 1, (Summer Station) requested an amendment to the Technical Specifications (TS) appended to Facility Operating License No. NPF-12.

The proposed amendment would (1) increase the tolerance of the pressurizer safety valve (PSV) setpoint from $\pm 1\%$ to $\pm 3\%$ and (2) allow the Mode 3 operation with one or more PSVs inoperable so that the plant can be heated up to Mode 3 condition for the purposes of testing these valves. Specifically, the request would (1) modify Limiting Conditions for Operation (LCO) 3.4.2.1 and 3.4.2.2 by changing the PSV setpoint tolerance from ± 1 to $\pm 3\%$, (2) modify Surveillance Requirement 4.4.2.1 to indicate that the PSV shall have its lift set pressure verified under cold conditions, and (3) add a footnote under LCO 3.4.2.2 indicating that Mode 3 applicability is exempted if the following conditions are met: (i) there have been at least 5 days of operation in Mode 5 or 6 since the reactor was last critical, and (ii) all rod cluster control assemblies (RCCA) are fully inserted with all control rod drive mechanisms (CRDM) deenergized.

2.0 EVALUATION

The Summer Station PSVs were designed and manufactured to meet the 1971 Edition including the Winter 1972 Addenda of the ASME Code, Section III, which required the PSVs to be designed to open within $\pm 1\%$ of the set pressure. The current TS also impose a tolerance of $\pm 1\%$ on the set pressure in the LCO for the PSVs. However, the Surveillance Requirements of these TS require testing the PSVs under Section XI of the ASME Code. 10 CFR Part 50 requires that Section XI testing be in compliance with the 1977 Edition, including the Summer 1978 Addenda of the ASME Code. This Edition of

Section XI does not specify a tolerance to be applied to lift pressure verification; therefore, the tolerance prescribed in the LCO ($\pm 1\%$) is used as the acceptance criteria for Section XI testing. Section XI also requires that when any valve in a system fails the setpoint criteria, additional valves in the system shall be tested, and a valve failing to function during a test shall be repaired or replaced.

The 1989 Edition of the ASME Code, Section XI, requires that the PSVs be tested per the standard ASME/ANSI OM-1987, Part 1. This standard allows the tested lift pressure to exceed the stamped set pressure by up to 3% before declaring a test failure. It also provides a guideline for testing additional valves when a valve exceeds the $\pm 3\%$ tolerance. Therefore, increasing the PSV setpoint tolerance to $\pm 3\%$ for testing acceptance criteria is in compliance with the later Code requirements.

To support the proposed TS amendments for the increased PSV setpoint tolerance and testing in Mode 3, the licensee provided the sensitivity analyses and evaluation of the existing analyses of all the transients and accidents in the Reload Transition Safety Report (RTSR) performed to determine the impacts on each transient or accident.

In evaluating the impact of the increased setpoint tolerance on the pressurization events, the PSVs were assumed to have a setpoint at the maximum tolerance of 3% plus 3% accumulation, i.e., the PSVs open at the setpoint of 2575 psia and attain the full open relief capacity at 2653 psia. The results of the evaluation indicated that (1) the low probability event of a rupture of CRDM housing, which results in the ejection of a RCCA, has the peak reactor coolant system (RCS) pressure of 2900 psia, which is below the pressure limit which would cause stresses to exceed the "Service Limit C" (an emergency condition) as defined in the ASME Code and accepted by the Standard Review Plan (SRP), Section 5.2, and (2) all other events including turbine trip and a Condition IV locked rotor event have the peak RCS pressure of 110% of the design pressure. Though the staff does not agree with the licensee's acceptance criteria of (1) 120% of the RCS design pressure for Condition IV events, and (2) the faulted condition stress limits for a rod ejection event, it finds the licensee evaluation results to be acceptable because the increased PSV setpoint tolerance limit of 3% does not result in the peak RCS pressure exceeding the SRP acceptance limits for the transients and accidents of the RTSR.

The impact of the PSV setpoint at the lower end of 3% tolerance limit was also evaluated. With a -3% tolerance, the lowest setpoint of 2425 psia remains higher than the setpoint of 2350 psia of the power operated relief valves (PORV). For the events where the departure from nucleate boiling (DNB) is of the primary concern, the analyses conservatively assumed the operation of the PORVs and the lowest set PSV since lower RCS pressure is detrimental to DNB. However, since the minimum PSV setpoint is still higher than the PORV setpoint, there is no impact on the analysis results of minimum DNB ratios.

Based on the evaluations and analyses performed, the licensee concluded that operation with PSV setpoints within $\pm 3\%$ tolerance about the nominal values will have no adverse impact upon the licensing basis analyses. All licensing basis criteria continue to be met and the conclusions in the RTSR remain valid. In addition, the probability of premature lifting of PSVs is not increased because of the lower PORV setpoint.

The licensee also proposed to set the PSVs under cold conditions, then heat up to Mode 3 and perform the PSV testing during Mode 3 operation using the Crosby Gage & Valve Set Point Verification Device (SPVD). This would render the PSVs inoperable during testing. The licensee, therefore, performed an examination of the impact of the Mode 3 PSV testing on all the transients and accidents assuming all PSVs inoperable. The PSV testing in Mode 3 will be allowed only after (1) at least 5 days of operation in cold shutdown (Mode 5) or a lower mode, and (2) all the RCCAs inserted with CRDMs deenergized. In addition, LCO 3.4.5 requires that the pressurizer be operable with a water volume of less than or equal to 1288 cubic feet during the operation of Modes 1, 2 and 3. This requirement ensures the presence of a steam bubble in the pressurizer. Therefore, at the time of the PSV testing, the decay heat level would be very low, no reactivity may be added to the primary side through rod motion, and there is sufficient bubble space to accommodate the reactor coolant surge into the pressurizer. The licensee examined all the transients and accidents of the RTSR, and concluded that there was no adverse effect of the inoperable PSVs on the previously analyzed results. Therefore, the licensee's proposal to set the PSVs in the cold condition and then test them in Mode 3 is acceptable. In addition, they indicated that the use of the SPVD does not restrict the vertical movement of the spindle before, during or after testing, and that since the internal mechanism of the SPVD triggers a solenoid and releases the spindle allowing the valve to reseat, it is highly unlikely that the valve with the SPVD installed will fail in an open position, thus initiating a transient. The staff agrees with the licensee's assessment. However, as recommended by the evaluation provided with the licensee's submittal, the licensee should verify that the test procedures will assure that the probability of initiating a transient is not increased.

The staff agrees with the licensee's assessment of the proposed setpoint tolerance criteria. The staff finds that the licensee's proposed tolerance of $\pm 3\%$ of nominal setpoint is consistent with current versions of ASME Code requirements and is acceptable for the purpose of determining the as-found setpoint acceptability and the necessity for testing additional valves. However, because the licensee proposed to leave the setpoint of the PSVs in the $\pm 3\%$ range, the staff was concerned that the valves would drift beyond the $\pm 3\%$ value when returned to service. In response to this concern, the licensee has evaluated an additional $\pm 3\%$ of setpoint drift beyond the $\pm 3\%$ range and has determined that the limits of the accident analyses are not exceeded (Reference 3). This is a

reasonable amount of additional drift which may be expected; therefore, the staff agrees that the PSVs may be left within the $\pm 3\%$ range following testing without resetting the valves.

The staff has reviewed the licensee's evaluation on the impacts of the proposed TS changes to allow an increased PSV set point tolerance to $\pm 3\%$ and to perform the PSV testing during Mode 3 operation with the conditions stated. We find that these proposed changes do not have adverse impact on the existing RTSR safety analysis results and are acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment changes requirements in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes the surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration, and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Section 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The Commission made a proposed determination that this amendment involves no significant hazards consideration, which was published in the FEDERAL REGISTER on (55 FR 40474) on October 3, 1990, and consulted with the State of South Carolina. No public comments or requests for hearing were received, and the State of South Carolina did not have comments.

The staff has concluded, based on the considerations discussed above, that (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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 REFERENCES

1. Letter from O. S. Bradham (SCE&G) to USNRC, "Technical Specifications Change Request - Pressurizer Safety Valve Setpoint and Mode 3 Exception," May 16, 1990.
2. Letter from O. S. Bradham (SCE&G) to USNRC, "Modification to Technical Specification Change Request - Pressurizer Safety Valve," August 13, 1990.
3. South Carolina Electric & Gas Company Technical Work Record, "PSV Set Point Tolerance Increase," Serial No. 239-02-7834, October 15, 1990.

Dated: January 10, 1991

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