



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 176 TO FACILITY OPERATING LICENSE NO. DPR-46

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

DOCKET NO. 50-298

1.0 INTRODUCTION

By letter dated May 2, 1997, as superseded by letter dated May 5, 1997, the Nebraska Public Power District (NPPD, the licensee) submitted a request for changes to the Technical Specifications (TSs) for the Cooper Nuclear Station (CNS). The requested changes would relocate the surveillance requirements of TS 4.4.A.2.a regarding the setpoint for the Standby Liquid Control (SLC) system relief valves to the Updated Safety Analysis Report (USAR) and the Augmented Testing Program, which is part of the Inservice Testing (IST) Program. Also, TS Bases Section 3.4.A would be revised to delete the related discussion of SLC relief valve testing. On March 27, 1997, the licensee submitted an amendment request to convert the CNS TS to the Improved Standard Technical Specifications format of NUREG-1433, Revision 1, "Standard Technical Specifications for General Electric Plants, BWR/4." That request also included the relocation of the SLC relief valve setpoint requirements to the USAR and IST program.

2.0 BACKGROUND

The CNS USAR states, "The safety objective of the standby liquid control (SLC) system is to provide a backup method, independent of the control rods, to maintain the reactor subcritical as the nuclear system cools." The system is designed to allow a control room operator to manually initiate one or both SLC pumps to inject a sufficient quantity of boron neutron absorber solution into the reactor vessel, to shut down the reactor at a steady rate and maintain subcriticality, within the capacity of the shutdown cooling systems. Relief valves are provided on each pump discharge leg to prevent overpressurization.

The CNS TSs currently specify a minimum and a maximum SLC relief valve opening pressure setpoint and a minimum reset pressure setpoint. The maximum opening pressure setpoint is based on system overpressure protection requirements. The minimum operating pressure and reset pressure setpoints for the SLC are established to preclude recirculation flow through the relief valves. Such recirculation would divert a portion of the borated solution back to the pump suction, thereby reducing the rate of boron injection into the reactor vessel.

Prior to 1983, the CNS TS limits for the SLC relief valves were from 1400 psig to 1680 psig; the valves were set at a nominal value of 1460 psig. In 1983, the relief valve setpoint was raised to a nominal setpoint of 1540 psig, which was selected so that it was in the middle of the allowable range of 1400 to 1680 psig.

In April of 1986, General Electric (GE) performed a calculation as a part of an assessment in response to 10 CFR 50.62, the Commission's rule regarding Anticipated Transients Without Scram (ATWS). That calculation determined the discharge pressure for simultaneous operation of both SLC pumps to be approximately 1380 psig. Consequently, GE recommended the addition of a margin of 70 psi to the calculated pressure to allow for  $\pm 3\%$  relief valve setpoint drift, and for pressure fluctuations characteristic of positive displacement pumps. Based on this analytical result, GE recommended raising the SLC relief valve minimum setpoint in the TSs from 1400 to 1450 psig, to provide sufficient margin to preclude intermittent opening of the relief valves, which could result in diverting a portion of the injected boron solution away from the reactor vessel.

In a letter dated April 8, 1987, NPPD notified the Nuclear Regulatory Commission (NRC) of proposed changes to the SLC system to meet the requirements of the ATWS rule (10 CFR 50.62). In that letter, NPPD indicated that the SLC pump discharge pressure would increase to 1378.5 psig during dual-pump operation; therefore, the licensee committed to raise the SLC system relief valve lower setpoint pressure to provide approximately 70 psi setpoint margin to minimize the potential for relief valve leakage and the corresponding decrease in the boron injection rate to the vessel.

On December 23, 1987, the NRC safety evaluation (SE) relating to the ATWS rule for CNS concluded that the proposed changes to the SLC system, including the dual-pump operating configuration, were acceptable to meet the requirements of the rule. The staff's SE also indicated that NPPD should submit a TS change request as soon as possible to revise the TS lower limit for the relief valve setpoint. On April 29, 1988, the licensee applied for a license amendment which proposed to raise the SLC relief valve TS minimum setpoint to 1450 psig (nominal). In May of 1988, a SLC pump injection test was performed, which noted higher pump discharge pressures (approximately 1419 psig) than those previously calculated (approximately 1380 psig).

On July 5, 1988, the NRC issued License Amendment No. 123, which approved raising the minimum TS pressure setpoint for the SLC relief valves from 1400 to 1450 psig. The NRC's safety evaluation stated that the purpose of the minimum pressure setpoint was to preclude recirculation flow through the relief valves. Although the actual pump testing in May 1988 revealed a higher discharge pressure of 1419 psig; on September 29, 1988, GE reevaluated the previous calculation and stated that there was still sufficient relief valve pressure margin at the system design flow rate of 106 gpm (both pumps operating) to assure full flow rate to the reactor vessel. The GE report also stated that while the SLC system test results were higher than predicted, there was no evidence that the SLC system would not meet the ATWS rule.

requirements as intended. In reaching this conclusion, GE recognized that CNS normally set the SLC relief valves at a nominal setpoint of 1540 psig and considered that the minimum TS setpoint limit of 1450 psig was still valid; because the remaining 31 psi margin would still account for pump ripple effects, and there was no need to include the 3% allowance for setpoint drift at 1450 psig because CNS did not set the SLC relief valves at that pressure.

In November of 1996, the NRC identified this as a potential reduction in the margin of safety, and consequently, a potential unreviewed safety question (USQ), as defined in 10 CFR 50.59. The staff's approval of Amendment No. 123 was based on the licensee maintaining a 70 psi margin between the calculated system pressure of 1380 psig during an ATWS event and the minimum Technical Specification pressure setting for the relief valves of 1450 psig. However, the testing data and revised calculation performed in May 1988 indicated that a difference of only 31 psi would exist, as the test data indicated a peak system pressure of 1419 psig would be reached. Although the ATWS requirements were being met, as the licensee had been administratively controlling the actual relief valve setpoint at 1540 psig, the NRC still viewed this issue as a reduction in the margin of safety (a reduction from 70 psi to 31 psi) and a potential USQ. The existing CNS TS would allow the SLC relief valve setpoint to be set at the lower limit of 1450 psig, where the valves (and the system) would still be considered operable. However, at this point, the combined effects of 3% setpoint drift and pump ripple, when added to the revised peak calculated system pressure of 1419 psig, could have exceeded the relief valve setpoint and caused the valves to open. This scenario could have reduced the rate of boron injection into the reactor vessel below the rate assumed by the staff in its safety evaluations related to the ATWS rule and Amendment No. 123.

### 3.0 EVALUATION

The specific changes proposed in the licensee's May 5, 1997, letter are as follows:

#### Section 4.4.A.2.a

This paragraph delineating the operability requirements for the SLC relief valves has been removed from the TS, based on the fact that the control of the relief valve setpoint has been relocated to the Augmented Testing Program, which is a part of the Inservice Testing Program. In addition, the nominal setpoint of 1540 psig  $\pm$  1% and the basis for that setpoint are now described in the USAR.

#### Section 3.4.A Bases

The paragraph describing the significance of the SLC relief valve setpoint limits has been deleted, since the SLC relief valve setpoint requirements have been relocated from the TSs to the USAR and the IST program.

The licensee provided the following discussion in support of the requested amendment:

(1) The original calculated nominal SLC system pressure of 1380 psig, which was used in establishing the Technical Specifications SLC relief valve minimum opening pressure of 1450 psig by adding 70 psi margin, has been recalculated to be 1419 psig based on test data; this increase in nominal SLC system pressure from 1380 psig to 1419 psig has brought into question the adequacy of the Technical Specification minimum pressure for the SLC relief valves.

(2) The SLC relief valves are set and administratively controlled at a nominal setpoint of 1540 psig  $\pm$  1% per the IST Augmented Testing Program, which is much higher than the Technical Specification minimum opening pressure of 1450 psig and therefore, yields a margin of 121 psi above the recalculated SLC system pressure of 1419 psig. This margin of 121 psi is greater and more conservative than the 70 psi margin which the current Technical Specification minimum opening pressure is based on.

(3) The relocation of the SLC relief valve setpoint control from the Technical Specifications has also been proposed in the CNS Improved Technical Specification (ITS) submittal dated March 27, 1997. It is based on the adequacy of the administrative control established on the changes to SLC testing and relief valve setpoint requirements in the IST program.

(4) The SLC relief valve nominal setpoint of 1540  $\pm$  1% and its associated bases have been included in the USAR, a copy of which is being enclosed with this proposed change request. It confirms that any changes to the SLC relief valve nominal setpoint would fall under the purview of 10 CFR 50.59 regulation.

With the proposed relocation of TS 4.4.A.2.a, the licensee will continue to maintain the control of the SLC relief valve nominal setpoint at 1540 psig  $\pm$  1% under the current IST Augmented Testing Program. When a setpoint drift of  $\pm$  3% is applied to the relief valve nominal setpoint, under the worst case conditions, the actual setpoint could go as low as 1478 psig or as high as 1602 psig; therefore, the nominal setpoint will be controlled within stricter limits than currently allowed by TS (1450 to 1680 psig). The maximum expected SLC system pressure for two-pump operation is 1433 psig, which is based on an estimated 14 psig for pump ripple effects added to the calculated system pressure of 1419 psig. Consequently, under the worst case setpoint drift condition, control of the SLC relief valve nominal setpoint at 1540 psig  $\pm$  1% would still result in maintaining significant margin to ensure that the relief valves will not lift and cause recirculation flow if the SLC system is called upon during the operating interval between setpoint verification tests. The 70 psi margin relied upon by the staff in its safety evaluation related to License Amendment No. 123 to account for setpoint drift and pump ripple effects will be preserved by the proposed controls, and an additional margin of approximately 45 psi will be available (1478 - 1433 psig, after accounting

for said effects) to preclude relief valve lifting. Furthermore, with the inclusion of the SLC relief valve setpoint at 1540 psig  $\pm$  1% in the USAR, the licensee is required to evaluate any future changes to the setpoint in accordance with 10 CFR 50.59.

Section 50.36 of Title 10 of the Code of Federal Regulations established the regulatory requirements related to the content of technical specifications. The rule requires that technical specifications include items in specific categories, including safety limits, limiting conditions for operation, and surveillance requirements; however, the rule does not specify the particular requirements to be included in a plant's TS. The NRC developed criteria to determine which of the design conditions and associated surveillances needed to be located in the TS. These criteria were incorporated into 10 CFR 50.36(c)(2)(ii), which states that:

"A technical specification limiting condition for operation of a nuclear reactor must be established for each item meeting one or more of the following criteria:

(A) *Criterion 1.* Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

(B) *Criterion 2.* A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

(C) *Criterion 3.* A structure, system or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

(D) *Criterion 4.* A structure, system or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

The Commission acknowledged, in the "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors," (58 FR 39132), that its implementation may result in the relocation of existing technical specification requirements to licensee controlled documents and programs. However, in issuing the revisions to 10 CFR 50.36 (60 FR 36953), the Commission also indicated that the standby liquid control system was one of the systems to be included in TS under Criterion 4.

The staff has determined that the licensee's proposed change to relocate the requirements for the SLC relief valve setpoint does not eliminate the requirements for the licensee to ensure that the SLC system is capable of performing its safety function. Although the SLC relief valve setpoint is

relocated from the TSs to the USAR and the IST program, the licensee must continue to evaluate any changes to this setpoint in accordance with 10 CFR 50.59. Should the licensee's determination conclude that an unreviewed safety question is involved, due to either (1) an increase in the probability or consequences of accidents or malfunctions of equipment important to safety, (2) the creation of a possibility for an accident or malfunction of a different type than any evaluated previously, or (3) a reduction in the margin of safety, NRC approval and a license amendment would be required prior to implementation of the change. NRC inspection and enforcement programs also enable the staff to monitor facility changes and licensee adherence to USAR commitments and to take any remedial action that may be appropriate.

The staff's review concluded that 10 CFR 50.36 does not require the SLC relief valve setpoint to be retained in TSs. Requirements related to the operability, applicability, and surveillance requirements, including performance of testing to ensure operability of the SLC system are retained due to the system's importance in mitigating the consequences of an accident. However, the staff has determined that the inclusion of the relief valve setpoint is an operational detail related to the licensee's safety analyses, which are adequately controlled by the requirements of 10 CFR 50.59. The staff has concluded, therefore, that relocation of the SLC relief valve setpoint is acceptable because (1) its inclusion in TSs is not specifically required by 10 CFR 50.36 or other regulations, (2) the setpoint has been relocated to the Updated Safety Analysis Report and IST program, is adequately controlled by 10 CFR 50.59 and 10 CFR 50.55a, and its inclusion in the TS is not required to avert an immediate threat to the public health and safety, and (3) changes that are deemed to involve an unreviewed safety question, will require prior NRC approval in accordance with 10 CFR 50.59(c).

#### 4.0 EMERGENCY CIRCUMSTANCES

In its May 5, 1997, application, the licensee requested that this amendment be treated as an emergency amendment. In accordance with 10 CFR 50.91(a)(5), the licensee provided the following information regarding why this emergency situation occurred and how it could not have been avoided.

The licensee states that the request for an emergency license amendment has resulted from the fact that the NRC notified the licensee on May 1, 1997, of the SLC relief valve setpoint concern as a CNS startup issue. Although an NRC inspection in November of 1996 first raised the issue as a potential reduction in the margin of safety and a potential unreviewed safety question, the licensee disagreed. Several subsequent discussions between the staff and the licensee still failed to result in agreement and the licensee continues to maintain that its actions have been conservative and that the issue does not involve an USQ. On May 1, 1997, the NRC staff verbally informed the licensee that the existing TS regarding the lower limit for the SLC relief valve setpoint was inadequate to ensure the proper function of the system under all postulated conditions, and that the TS needed to be revised prior to the resumption of plant operation.

The staff concludes that an emergency condition exists in that failure to act in a timely way would result in prevention of resumption of operation of the Cooper Nuclear Station. In addition, the staff has assessed the licensee's reasons for failing to file an application sufficiently in advance to preclude an emergency, and concluded that the licensee has acted expeditiously, by virtue of its March 27, 1997, request to convert the CNS TS to the Improved Standard Technical Specifications. Due to the period of time required for the staff to review the extensive TS conversion application, the licensee promptly proposed this amendment to remedy the immediate situation. Thus, the staff concludes that the licensee has not abused the emergency provisions by failing to make timely application for the amendment. Thus, conditions needed to satisfy 10 CFR 50.91(a)(5) exist, and the amendment is being processed on an emergency basis.

#### 5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92(c) state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility in accordance with the amendment would not: (1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or, (2) Create the possibility of a new or different kind of accident from any previously evaluated; or, (3) Involve a significant reduction in a margin of safety.

The following evaluation by the licensee demonstrates that the proposed amendment does not involve a significant hazards consideration:

(1) The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated. Standby Liquid Control (SLC) system is designed to meet two functions: a) bring the Reactor to a cold shutdown condition without use of control rods, and b) meet the requirements of the ATWS Rule per 10 CFR 50.62. Neither of these functions are impacted by the relocation of the SLC relief valve setpoint control from the Technical Specifications to the IST Augmented Testing Program and to the USAR. Furthermore, the removal does not alter any input parameters or precursors for any accident analyses described in the USAR. The function of the SLC relief valves during an ATWS event is to remain closed during two-pump SLC operation, thereby preventing recirculation flow. Also, the relief valve testing requirements per the IST Augmented Testing Program preserves the requirements to test the valves. Consequently, the ability of the relief valves to perform their credited function is not challenged by this proposed change. Therefore, relocation of the SLC relief valve setpoint control from the CNS Technical Specifications does not involve a significant increase in the probability or consequences of an accident previously evaluated.

(2) The proposed change will not create the possibility of a new or different kind of accident than evaluated in the USAR. The proposed change does not result in any physical change to CNS Structures, Systems,

or Component, nor does it change the fit, form, or function of any equipment/component taken credit for in the accident analyses described in the USAR. Therefore, the relocation of the SLC relief valve setpoint control from the Technical Specifications does not create the possibility of a new or different kind of accident.

(3) The proposed relocation of SLC relief valve testing from the CNS Technical Specifications to the IST Augmented Testing Program and to the USAR will not reduce the margin of safety. The SLC relief valve setpoint are being tested at the same frequency under the IST Augmented Testing Program. Under this program, the valves are set at a nominal setpoint of 1540 psig  $\pm$  1%. Since the maximum nominal SLC system pressure based on test data is determined to be 1419 psig, a margin of 121 psi is available between this calculated pressure and the relief valve nominal setpoint. This 121 psi margin allows for pump ripple and setpoint drift as opposed to only 70 psi which in the past has been added as a margin to obtain the current Technical Specification minimum limit of 1450 psig from the original calculated maximum SLC system pressure of 1380 psig to account for the same reasons. Although the SLC calculated maximum system pressure has increased from 1380 psig to 1419 psig based on test data by setting the SLC relief valve at a nominal setpoint of 1540 psig  $\pm$  1%, an increase in the margin will be achieved since consistent methodology has been applied in both cases.

Based on the above, the staff has made a final determination that the amendment involves no significant hazards consideration.

#### 6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Nebraska State official was notified of the proposed issuance of the amendment. The State official had no comments.

#### 7.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC 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 offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final no significant hazards finding with respect to this amendment. Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.



8.0 CONCLUSION

The Commission 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 the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: James R. Hall

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