



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20665

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 10 TO FACILITY OPERATING LICENSE NO. NPF-87  
TEXAS UTILITIES ELECTRIC COMPANY, ET AL.  
COMANCHE PEAK STEAM ELECTRIC STATION, UNIT 1  
DOCKET NO. 50-445

1.0 INTRODUCTION

By letter dated February 28, 1992, Texas Utilities Electric Company (the licensee) requested an amendment to the Technical Specifications (Appendix A to Facility Operating License No. NPF-87) for the Comanche Peak Steam Electric Station (CPSES), Unit No. 1. The proposed changes would remove the Boron Dilution Mitigation System (BDMS) setpoints from the Technical Specifications (TS). The BDMS was developed to detect and mitigate a boron dilution event in Modes 3, 4 and 5 prior to a complete loss of shutdown margin. The system detects a boron dilution event by monitoring the output of the source range neutron flux detectors to determine if the neutron flux has increased by a specified multiplication factor over a prescribed time period. When a dilution event is detected, the BDMS isolates known dilution points to the reactor coolant system and realigns the reactor makeup water system to the refueling water storage tank so that any additional makeup will result in boration of the reactor coolant.

Technical Specification 3.3.1, Table 3.3-1, Functional Unit 6.b, "Boron Dilution Flux Doubling," requires that this function be operable in Modes 3, 4, and 5. If not operable when required, Action 5 applies. This action requires, in part, that the reactor trip breakers be open, that all operations involving positive reactivity changes be suspended, and that the sources of possible dilution be isolated. Since changing the plant temperature is an operation which could add positive reactivity, this action statement could require that plant cooldown or heatup be suspended.

As a result of a recent review of the analyses for the licensing basis boron dilution event for CPSES Unit 1, the licensee identified certain nonconservatisms related to the input assumptions and boundary conditions used by Westinghouse in the original design of the system. Specifically, the inverse count rate ratio (ICRR) and flux multiplication setpoint used in the analyses are not bounding. As a result, the licensing basis boron dilution event analysis, which shows that the BDMS response will prevent a return to critical, may not be applicable to CPSES Unit 1. Because of this, TU Electric has declared the boron dilution flux doubling channels inoperable. With the current TS and action statement described above, this could prevent a plant

restart following entry into Mode 3, 4, or 5. Therefore, the licensee proposed the aforementioned revised TS which would remove the boron dilution flux doubling requirements.

On March 23, 1992, a meeting was held at NRC Headquarters and was attended by representatives from the NRC, TU Electric, and Westinghouse. According to TU Electric, the most plausible long-term solution would be to relocate the source assemblies in the core during the second refueling outage, currently scheduled for the Fall of 1992. The NRC did not feel that it was appropriate to approve the proposed amendment as a permanent change because of the contradiction with the staff position that requires positive actions to prevent an unplanned criticality due to boron dilution events. The potential generic implication to certain other Westinghouse plants is also being reviewed. However, the NRC did recognize that temporary relief was necessary for CPSES Unit 1 until the issue could be researched further and an acceptable long-term solution could be identified with more certainty. Therefore, the licensee was requested to provide a supplemental letter which proposed a time limitation for the revised TS and a discussion of the compensatory actions that TU Electric would take during this time period. The licensee submitted these proposed TS revisions in a letter dated April 6, 1992. The licensee subsequently submitted additional changes to the proposed TS revisions to delete reference to Unit 2 in a letter dated May 26, 1992.

The additional information contained in the supplemental letters dated April 6, 1992 and May 26, 1992, was clarifying in nature and, thus, within the scope of the initial Federal Register notice and did not affect the staff's proposed no significant hazards consideration determination.

## 2.0 EVALUATION

TU Electric has requested that the TS revisions proposed by their May 26, 1992, letter remain in effect for Unit 1 until six months after criticality following the second refueling outage. After this time interval, the boron dilution flux doubling requirements would again become effective. These durations are expected to allow sufficient time to research the issues involved, verify the conclusion during testing following core (re)load, propose a permanent resolution, and for the NRC to review and approve the permanent resolution. The proposed modifications to the TS adequately address these time limits. The staff concurs with these proposed time limits and concurrently is preparing an Information Notice to alert all pressurized water reactor licensees of the CPSES problem since the same inadequacies may exist in similar systems.

The following compensatory action is proposed for the duration of this temporary revision of the Technical Specification:

- 1) Within 4 hours of entry into MODES 3, 4, or 5 from MODES 1, 2, or 6, (and once per every 14 days thereafter while in MODES 3, 4, or 5), TU Electric will verify (unless startup is in progress) that either valve CS-8455 or valves CS-8560, FCV-111B, CS-8439, CS-8441, and CS-8453 are closed and secured in position; or

- 2) Following entry into MODES 3, 4, or 5 from MODES 1, 2, or 6, each crew of the Control Room Staff will receive a briefing to discuss the type of reactivity changes that could occur during a dilution event; the indication of a dilution event; and the actions required to stop dilution, commence immediate boration and establish the required shutdown margin. For extended shutdowns, this briefing will be repeated for each crew prior to resumption of control room duties following an off duty period which exceeds 7 days. During time periods when this option is used, the source range will be monitored for indication of unexplained increasing counts and inadvertent boron dilution every fifteen (15) minutes. In addition, within 4 hours of entering MODE 5, TU Electric will ensure that only one Reactor Makeup Water Pump (dilution source) is aligned to the supply header.

These administrative actions will serve to isolate dilution flow paths by locking out valves from dilution sources or will restrict the maximum dilution flow rate by ensuring that no more than one reactor makeup water pump can supply water to the reactor coolant system (RCS) during Mode 5 operation. The NRC concurs that these administrative controls will reduce the probability of an inadvertent boron dilution event during the proposed temporary time interval for the revised TS.

In addition, the NRC believes that the proposed interim actions will provide appropriate operator vigilance to reduce the probability of an inadvertent boron dilution in all three shutdown modes during the proposed time interval for the revised TS.

New analyses have been performed by Westinghouse for CPSES Unit 1 with no credit for the BDMS that show at least 15 minutes exist from the initiation of an inadvertent boron dilution while operating in Modes 3, 4, or 5 before shutdown margin is lost. These analyses, documented in a letter from J. L. Vota (Westinghouse) to W. J. Cahill, Jr. (TU Electric) WPT-14386, dated February 25, 1992, provide reasonable confidence that the reactor operators have sufficient time during performance of their routine duties to identify and mitigate an inadvertent boron dilution event. The licensee has committed to perform similar analyses for CPSES Unit 2 prior to licensing.

Even though credit is not taken for the BDMS, its use during CPSES Unit 1 operation provides additional assurance that an inadvertent dilution event will be detected and mitigated prior to a return to critical. In addition, other alarms and indications (as provided in Section 15.4.6.1 of the CPSES FSAR) are available to the operator which allow for the detection of an inadvertent boron dilution.

In view of these alarms and indications, together with the procedures, training, and activities previously mentioned, the NRC believes that reasonable assurance has been provided to minimize the likelihood of an inadvertent boron dilution event during the time interval proposed for the temporary TS revisions. Should such an event occur, these actions provide reasonable assurance of timely detection and mitigation.

The staff has reviewed the proposed temporary TS changes for CPSES which assume no credit for the BDMS and which will remain in effect for Unit 1 until six months after criticality following the second refueling outage. Similar changes will be addressed separately for Unit 2 to allow a six-month evaluation period of the BDMS following initial criticality. Based on the above safety evaluation, we find these proposed changes acceptable during the proposed time interval.

### 3.0 STATE CONSULTATION

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

### 4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to 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 previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (57 FR 8941). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(1). 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.

### 5.0 CONCLUSION

The Commission has concluded, based on the consideration 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.

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Date: June 8, 1992