



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 171 TO FACILITY OPERATING LICENSE NO. DPR-46  
NEBRASKA PUBLIC POWER DISTRICT  
COOPER NUCLEAR STATION  
DOCKET NO. 50-298

## 1.0 INTRODUCTION

By letter dated June 15, 1995, Nebraska Public Power District (the licensee) submitted a request for changes to the Cooper Nuclear Station, Technical Specifications (TSs). The requested changes would revise the logic system functional test (LSFT) definition and revise the Emergency Core Cooling System (ECCS) LSFT surveillance interval from 6 months to 18 months for the core spray, residual heat removal, high pressure coolant injection, reactor core isolation cooling, and automatic depressurization systems.

## 2.0 EVALUATION

### 2.1 Background

Logic systems are comprised of detection devices activated by a certain physical condition (e.g., pressure switches, temperature switches, etc.) and decision making relay networks that will cause a safety system component or device (e.g., pump, valve, etc.) to operate when needed. Each relay in a decision making logic network has one or more contact pairs associated with it. A logic system functional test is a test of all relays and contacts in these decision making networks to assure that the system will operate as designed upon demand.

### 2.2 Logic System Functional Test Definition Revision

The licensee proposed changes to the definition of logic system functional test contained in TS Section 1.0. The proposed change clarifies the definition to indicate that the test may be performed as a series of sequential, overlapping, or total system steps such that the entire logic system is tested. The proposed change would eliminate the current requirement to test the actuated device, where practicable, as part of the LSFT.

The proposed change adopts wording consistent with the definition of LSFT contained in the improved Standard Technical Specifications for BWR-4 reactors (NUREG-1433). The elimination of the requirement to test the actuated device as part of the LSFT is also consistent with NUREG-1433, as the operability

of these devices is typically verified on a more frequent basis by other TS surveillance requirements. The staff concludes that the change to the TS definition of LSFT clarifies the existing definition and is therefore acceptable.

### 2.3 Logic System Functional Test Surveillance Interval Revisions

The licensee proposed to revise the surveillance interval for performance of the LSFT from once/6 months to once/18 months for the following systems:

- Core Spray System
- Residual Heat Removal System Logic Bus Power Monitor<sup>1</sup>
- High Pressure Coolant Injection System
- Reactor Core Isolation Cooling System
- Automatic Depressurization System

The licensee evaluated the impact of this change on the reliability of the ECCS logic systems. The licensee's review determined that the logic system reliability is not significantly changed by increasing the surveillance interval from once/6 months to once/18 months. The licensee stated that this conclusion is supported by a review of the ECCS logic system surveillance testing history, which demonstrated reliable past logic system performance. The licensee also reported that results of recently performed expanded scope testing resulted in successful testing of additional logic system contacts which, due to previous oversight, had never been tested.

The licensee also evaluated the option of retaining the once/6 month surveillance frequency and shutting down the reactor every six months to perform these surveillances. They concluded that this would result in an increase in core damage frequency due to the increased probability of safety system challenges associated with reactor shutdowns. The licensee stated that, alternatively, performing the surveillance testing during power operations in lieu of conducting a plant shutdown would require the installation of jumpers and/or test blocks to prevent various safety system actuations. These actions would temporarily render the associated functions inoperable during performance of the testing, as well as introduce the potential for inadvertent ECCS actuation. Based on these considerations, the licensee stated that extending the ECCS logic system functional testing surveillance intervals from once/6 months to once/18 months to allow the tests to be performed during plant shutdown would result in a net safety enhancement.

Changing the frequency of various LSFTs from once/6 months to once/18 months increases the surveillance interval. However, the reliability of the mechanical components of a safety system remain unchanged because these

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The frequency of the logic system functional test for residual heat removal system "Initiation" and "Pump & Valve Control" were revised to once/18 months by Amendment No. 140, dated May 22, 1991.

components are functionally tested or calibrated at unchanged intervals. The staff notes that industry reliability studies have shown that overall safety system reliabilities are not dominated by the reliability of the logic system, but by that of the mechanical components, (e.g., pumps and valves). Since the probability of a relay or contact failure is small, relative to the probability of a mechanical component failure, increasing the LSFT interval represents no significant change in the overall safety system unavailability.

The staff recognizes that LSFTs are complicated surveillance tasks which have a significant potential for undesired actuations and operator error which can cause undesirable plant transients. Additionally, system redundancy is reduced during the performance of the test. LSFTs are best performed during a plant outage, thus reducing the potential for unplanned transients at power. Performing the LSFTs at intervals of up to 18 months is consistent with the interval that the NRC has determined to be adequate to achieve the goal of high safety system availability, considering uncertainties in component failure rates, uncertainties in common mode failure rates, and reduced redundancy during testing and component wear caused by testing. The staff therefore, finds the proposed increase in the surveillance interval for the affected LSFTs to once/18 months acceptable.

### 3.0 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 comment.

### 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 and changes surveillance requirements. 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 (60 FR 37096). Accordingly, the 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 the amendment.

### 5.0 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.

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Date: September 7, 1995