



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 120 TO FACILITY OPERATING LICENSE NO. NPF-21  
WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
NUCLEAR PROJECT NO. 2  
DOCKET NO. 50-397

1.0 INTRODUCTION

By letter dated January 13, 1994, Washington Public Power Supply System (the licensee) requested an amendment to license NPF-21 to change the Technical Specifications (TSs) for the Washington Nuclear Plant Unit 2 (WNP-2) on an emergency basis. This proposed amendment would allow WNP-2 to continue plant operation without full compliance with the requirements for demonstration that the response time of the Emergency Core Cooling System is within the limits specified in Technical Specification (TS) 3/4.3.3.

On January 10, 1994, a condition of noncompliance with the WNP-2 TS was identified as part of the Technical Specification Surveillance Improvement Project (TSSIP). It was identified that the testing performed to satisfy Surveillance Requirement (SR) 4.3.3.3 did not adequately measure the total response time of two in-series relays in the logic string for the opening of the injection valve in the Low Pressure Core Spray (LPCS) and the Residual Heat Removal (RHR) B and C low pressure Emergency Core Cooling System (ECCS) loops, and three in-series relays in the logic string for the injection valve in the RHR A low pressure ECCS loop. On January 12, 1994, it was also discovered that the response time testing had not adequately measured the total response time of the relays in the logic string for the pump start. This situation was true for each of the four ECCS loops although the details for the different logic strings are slightly different. Failure to satisfy the response time testing specified in SR 4.3.3.3 requires that the applicable systems be declared inoperable. This involves all four low pressure ECCS systems and would require that the plant be taken to cold shutdown.

WNP-2 requested an emergency TS change to add a note to the surveillance requirements in TS 3/4.3.3, which would allow a delay in the response time testing for the low pressure ECCS until startup following the next Cold Shutdown, but no later than startup following the completion of the Spring 1994 Refueling Outage. This note would be added to SR 4.3.3.3.

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## 2.0 DISCUSSION

During the performance of the TSSIP review for compliance with the requirements associated with SR 4.3.3.3 and Table 3.3.3-3, it was noted that response time testing procedures did not measure the entire response time from sensor actuation until the ECCS equipment is capable of performing its safety function, i.e., valves travel to their required position and pump discharge pressure reaches required values. Specifically, the interval not measured is the time from logic relay coil energization to contact operation in the injection valve control circuit. This affects Division I and II low pressure ECCS. The existing response time testing procedures measure the system response time from the sensed parameter to the energization of the first logic relay and from the injection valve hand switch until the injection valves are open. The testing does not measure the interval from the logic relay coil pickup to injection valve control circuit contact closure.

For the ECCS low pressure pumps, actual testing initiation signals were measured at a point in the logic string which did not include certain logic components. The logic not included in the testing were one relay in the logic string to the LPCS and RHR B/C pumps and two relays in the logic string for the RHR A pump. The response time testing did include pump initiation until stable pump discharge pressure was achieved. Logic System Functional Testing had been performed which established that the circuits are functional, including both pumps and associated injection valves. These functional tests did not require that the timing of the function be measured.

The TS acceptance criteria for the applicable response times require that the time be less than or equal to 43 seconds. In these four ECCS, the licensee has stated that "the most limiting margin as established by the acceptance criteria of the surveillance procedures for the response of the opening of the injection valves is 11 seconds. The response time of the portion of the logic circuits not measured is expected to be less than 0.5 seconds. The corresponding remaining margin to the TS acceptance criteria will therefore be in excess of 10 seconds."

For the relay associated with pump start, the licensee has stated that "the most limiting margin to the TS limit of 43 seconds established by testing from the sensor initiation through achieving adequate pump discharge pressure is 20.6 seconds. The response time for the operation of the logic circuits not yet measured is expected to be less than 0.5 seconds. The corresponding margin to the TS acceptance criteria will therefore be in excess of 20 seconds."

The relays in question are General Electric HMA or HFA types, which do not have time delay features. Degradation in this type of relay is typically a failure to function, not a degraded response time. The licensee has stated that the manufacturer's qualification data for this type of relay indicates an expected pickup time of less than 100 milliseconds.

The licensee has stated that they have reviewed WNP-2 Operating Events Review files, the Nuclear Plant Reliability Data System database, and INPO Operating Experience, and there was no indication of a generic failure mechanism



applicable to the pickup times of HMA or HFA relays. The licensee also stated that a review of the WNP-2 maintenance history did not identify any concerns with these relays that would impact their response time.

The licensee has evaluated the HMA and HFA relay designs and their applications at WNP-2, and has concluded that the relays will perform their intended safety function within specified time requirements. The licensee feels that a plant shutdown for response time testing would not provide significant additional assurance that the relays would actuate within specified time requirements. Additionally, in order to support the response time testing of each low pressure ECCS during power operation, an entire division, consisting of two ECCS loops and the associated emergency diesel generator, would need to be disabled during the performance of the test. The licensee believes that there is less risk to safe plant operation in relying on the existing functional testing than in testing at power or creating an additional plant transient by taking the plant to Cold Shutdown to perform the required response time test on each of the four ECCS loops.

Based on its review, the staff agrees that there is sufficient margin in the response time requirements to account for any minor variations in the actual response times. The staff also finds that since these are not time-delay relays, the operating history shows that the likelihood of a failure affecting the time delay beyond this margin is small. The staff also agrees that there is less risk in relying on the existing functional testing than in testing at power or taking the plant to Cold Shutdown to perform the required test. For these reasons, the staff concurs with the emergency TS amendment to allow the delay of the response time testing for the low pressure ECCS until startup following the next Cold Shutdown, but no later than the startup following the completion of the Spring 1994 Refueling Outage.

### 3.0 EMERGENCY CIRCUMSTANCES

The licensee is conducting an ongoing TSSIP that includes an in-depth technical review of the surveillance procedures to ensure they meet TS surveillance requirements. The review criteria include proper test methodology, procedure consistency, technical accuracy, and reference bases for all acceptance criteria. During conduct of the TSSIP review for TS surveillance requirement 4.3.3.3, "Emergency Core Cooling System Actuation Instrumentation," and associated Table 3.3.3-3, "Emergency Core Cooling System Response Times," the licensee determined that the response time testing procedures did not measure the entire response time from sensor actuation until the ECCS equipment is capable of performing its function (i.e., valves travel to their required position and pump discharge pressures reach required values). Failure to perform the required surveillances rendered the associated systems inoperable at the time the condition was identified.

The licensee identified the condition at 6:15 PM PST on January 10, 1994, and entered action statement 30 of TS 3.3.3, Table 3.3.3-1, declaring all trains of LPCS and RHR inoperable. Without relief, this would have required, in accordance with TS 3.0.3, that the plant be in at least STARTUP within 6 hours, HOT SHUTDOWN within 12 hours, and in COLD SHUTDOWN within the next 24 hours. The licensee based its request on its belief that there was



reasonable assurance that the relay response times are adequate, and that the safety risks involved in testing the relays at power or the inherent risks involved in reactor shutdown to perform the testing outweigh the benefits of verbatim compliance with TS requirements in this instance. The emergency amendment permits continued power operations without checking the relay response times until startup from the next cold shutdown of the reactor.

The licensee requested, at approximately 1:50 PM PST on January 11, 1994, that the NRC staff exercise its discretion not to enforce the TS requirements of TS 3.3.3, Table 3.3.3-1. The NRC staff provided verbal approval of the enforcement discretion during a conference call on January 11, 1994. The licensee provided formal documentation of its request for enforcement discretion by letter dated January 13, 1994, and the NRC staff provided written confirmation of its decision to grant enforcement discretion by letter dated January 14, 1994. The licensee submitted its request for emergency amendment to the TS on January 13, 1994. The staff has concluded that the circumstances warrant issuance of an emergency amendment.

#### 4.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission has made a final determination that the amendment involves no significant hazards consideration. Under the Commission's regulations in 10 CFR 50.92(c), this means that operation of the facility in accordance with the proposed 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 accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

The staff has evaluated the proposed changes against the above standards as required by 10 CFR 50.91(a) and has concluded that:

- a. The change does not involve a significant increase in the probability or consequences of an accident previously evaluated:

The only components affected by this TS change that have not been adequately response time tested are relay coils and contacts. The relays are accident mitigating features and are not considered in the initiating sequences for any accidents previously evaluated. Hence, the change does not affect the probability of an accident previously evaluated.

Design and industry experience with the specific relays affected by the TS change demonstrate that there are no generic failure mechanisms applicable to the response time of these relays, nor is there any plant specific data in the plant maintenance history that would impact their response time. This same data demonstrates that relay degradation is evidenced by failure to function, rather than degraded response times. In addition, the operation of these relays has been demonstrated through logic system functional tests performed each refueling outage, the latest of which was completed in June 1993. This provides reasonable

assurance that the relays that have not been tested would, when tested, yield response times well within the assumptions of the accident analyses, and would therefore not affect the consequences of an accident previously evaluated.

- b. The change does not create the possibility of a new or different kind of accident from any accident previously evaluated:

The proposed change does not create any new modes of operation of any equipment, system configuration, or initial conditions affecting plant operations than were assumed in the design analysis of the plant. Thus, the change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

- c. The change does not involve a significant reduction in a margin of safety:

The current plant design basis, as described in the Final Safety Analysis Report (FSAR) Sections 15.6 and 6.3, establishes a design margin that requires low pressure ECCS systems to be fully injecting within 43 seconds of actuation signal. This same margin is defined in TS Table 3.3.3-3, "Emergency Core Cooling System Response Times." This margin ensures compliance with 10 CFR 50.46 for ECCS performance requirements to ensure fuel integrity is maintained. The licensee has performed response time testing of most of the components in the circuits affected by this TS change, and the most limiting tested circuit is 11 seconds from the design margin. Given a typical relay response time of less than 100 milliseconds, the expected response time of the untested circuits is less than 0.5 seconds, which would not cause the affected circuits to exceed the design margin of 43 seconds. Thus the TS change would not significantly affect the margin of safety established by the current TS.

## 5.0 STATE CONSULTATION

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

## 6.0 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 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 staff has made a determination that this amendment involves no significant hazards consideration. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth





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in 10 CFR 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.

7.0 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 Contributors: Paul Loeser  
Jim Clifford

Date: January 31, 1994



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