



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 148 TO FACILITY OPERATING LICENSE NO. DPR-59
POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
DOCKET NO. 50-353

INTRODUCTION

By letter dated May 31, 1989 and amended by letter dated July 18, 1989, the Power Authority of the State of New York (PASNY or the licensee), requested changes to the Technical Specifications (TS) for the James A. FitzPatrick Nuclear Power Plant. The changes would modify the Residual Heat Removal (RHR) surveillance criteria to reflect deletion of the Low Pressure Coolant Injection (LPCI) System loop selection logic scheme. In addition, the amendment would clarify the use of the terms "demonstrate" and "verify" throughout the TS so that they are used consistently to specify the requirements of the various surveillance tests, to clarify the testing requirements, and to eliminate the need for redundant and unnecessary surveillance tests.

DESCRIPTION

The design of the RHR system includes four pumps, divided into two loops. During conditions which indicate a loss of coolant accident (LOCA), all four pumps automatically start and valves align to the LPCI mode to inject water from the suppression chamber to flood the reactor vessel.

For the first operating cycle of the plant, the LPCI System was designed so that the cross-connect valve between the two RHR loops was maintained open. Therefore, when a LOCA signal was received the loop selection logic (using pressure transducers) determined which reactor recirculation loop was broken, prevented these LPCI injection valves from opening, and allowed the LPCI injection valves to the other (intact) loop to open. Thus, flow from all four RHR pumps was injected into the intact loop.

However, with the issuance of Appendix K to 10 CFR Part 50 in 1974, the emergency core cooling system (ECCS) acceptance criteria became more conservative. As a result, a plant modification was developed which was designed to ensure that, even with the single most limiting equipment failure (failure of a LPCI injection valve to open), the flow from two LPCI pumps would be available to reflood the vessel in the event of a LOCA. The modification involved elimination of the loop selection logic and shutting the cross-connect valve to divide the LPCI discharge into two independent loops. In addition, a closure signal was added to the recirculation pump discharge valves upon receipt of a LOCA signal.

With this arrangement, two RHR pumps per loop will discharge into their respective recirculation loop upon receipt of a LOCA signal. Even if a single LPCI injection valve fails to open, the flow from the other two LPCI pumps is available. This arrangement enhances system reliability.

Since the original LOCA analysis relative to the LPCI System assumed a minimum of three RHR pumps were operable, the TS surveillance requirement was based on three-pump operation. This requirement was stated in the TS as: "three RHR pumps must deliver at least 23,100 gpm against a system head corresponding to a reactor vessel pressure of 20 psig." Thus, the minimum flow value specified in related test procedures was 7700 gpm for each pump (33% of 23100).

The proposed TS change would specify that the minimum acceptable criteria for each pump is: "9900 gpm against a system head corresponding to a reactor vessel to primary containment differential pressure of greater than or equal to 20 psid."

A loss of coolant analysis was performed by the General Electric Company and reported in the Reload Analysis Report, NEDC-31317P, dated October 1986. It assumed that the loop selection logic was removed and each RHR loop injected independently into the recirculation system. The minimum RHR pump flows used in the analysis at a vessel pressure of 20 psid was 17,500 gpm for two pumps discharging into one loop (i.e., loss of one loop) or 19,800 gpm for two pumps discharging into two loops (i.e., loss of one pump per loop). Under either of these conditions, the report determined that the LOCA design criteria was satisfied. Therefore, the minimum acceptable flow value of 9,900 gpm (50% of 19,800) for each pump conforms to the flow assumed for the loss of coolant analysis, and is the value submitted by the licensee in this amendment.

The other change related to the RHR System would replace "psig" (pounds per square inch gauge) with "psid" (pounds per square inch differential) for the discharge pressure specified in the surveillance requirement. This is in conformance with the Reload Analysis Report which specifies the differential pressures between the suppression chamber and the reactor vessel (psid) rather than the pump discharge pressure (psig). Also, this conforms to present plant practices. Since this does not change the acceptance criteria of the test, the effect of the proposed change is to clarify its meaning.

The NRC staff agrees with the licensee that, as explained above, the changes to the RHR surveillance test acceptance criteria will ensure operability of the pump and are, therefore, acceptable.

The other changes proposed by the licensee would clarify the meaning of surveillance requirements specified in the TS by consistently using the words "demonstrate" and "verify." The proposal would eliminate the need for redundant and unnecessary surveillance tests performed to satisfy overlapping requirements and make the surveillance tests performed to ensure equipment operability more consistent with a generic letter issued on April 10, 1980 concerning use of the term "operable." The use of the term and its TS definition was reviewed and found to be acceptable in Amendment No. 83 issued on August 28, 1984.

The appropriateness of the use of the terms "demonstrate" and "verify" was evaluated throughout the TS by the licensee and the NRC staff. Where a specification requires testing at a specific frequency, or the intent is clearly to require performance of an actual test, or to determine operability of a component or system, no TS change was proposed and the word "demonstrate" is used. However, if the TS criteria is such that operability should be determined by ensuring that the associated surveillance tests have been performed with satisfactory results within the specified time interval, the term "verify" has been substituted.

For example, Specification 4.10.D.1.b, requires a shutdown margin demonstration when two control rods are withdrawn from the reactor core for maintenance. Since the intent of the requirement is to perform a test, the term "demonstrate" is retained. In contrast, if a subsystem or component is inoperable, the proposed change would delete the requirement to actually perform a test of redundant systems or equipment to prove operability if the surveillance tests have been performed within the required test interval and there is reasonable assurance that no degradation of system operability exists. Under these conditions, the term "verify" is used.

Additionally, if an engineering evaluation is used to determine operability, neither term can be clearly applied and a phrase such as "investigation has shown" is used. This affects control rod drive collect housing failure evaluation on TS page 89 and snubber operability on page 145c.

None of the proposed changes related to this issue would affect the existing normal surveillance testing requirements, nor would they affect the testing performed when equipment is returned to service from an inoperable condition, nor would they affect the In Service Testing (IST) program. Also, the term "demonstrate" was retained for all tests related to the Emergency Diesel Generators.

Other specific proposed changes related to this issue are as follows:

1. For the following, failure of a component will require that operability of redundant components be verified, rather than demonstrated:
 - a. Standby Liquid Control System, Specification 4.4.B.
 - b. Core Spray System, Specification 4.5.A.2
 - c. LPCI Subsystem, Specification 4.5.A.3.a
 - d. RHR pump or RHR Service Water Pump, Specification 4.5.B.2
 - e. Containment Cooling Mode of the RHR System, Specification 4.5.B.3
 - f. High Pressure Coolant Injection System, Specification 4.5.C.1.a

- g. Automatic Depressurization System (ADS), Specification 4.5.D.2
 - h. Reactor Core Isolation Cooling System, Specification 4.5.E.2
 - i. Standby Gas Treatment System, Specification 4.7.B.2
 - j. Battery Room Ventilation, Specification 4.11.C.1
2. For the Emergency Service Water (ESW) System, the alternate testing requirements would be clarified to indicate that with one ESW System inoperable, it is the operability of the unaffected diesel generator system which must be demonstrated to be operable. A literal interpretation of the present TS would require testing of both diesel generator systems, which is not consistent with the operability criteria, nor is it possible due to the loss of the cooling water. Also, the proposed change would require verification, rather than demonstration, of the operability of the emergency loads upon loss of the ESW System.
 3. To verify availability of offsite power, a proposed change to Specification 4.9.B.6 would require verification that the electrical line is energized, in addition to the present requirement to verify correct breaker alignment. This would clarify the conditions necessary to ensure that the offsite line is operable.
 4. The information in the Bases Section corresponding to the proposed TS changes would be modified as necessary to reflect the proposed changes to the requirements.
 5. The term "LPCI mode" would be replaced with "LPCI subsystem" in Specification 3.5.A.3.b to more clearly indicate that the requirements apply to one LPCI subsystem rather than the whole LPCI System.

Rather than the performance of a test to demonstrate operability of redundant equipment, the licensee has determined that verification is more appropriate as described above. In effect, this verification is a check to determine that the redundant equipment is not inoperable, rather than the establishment of test conditions which show that the equipment will operate. This is consistent with the desire to reduce the number of unnecessary challenges to the continued operability of the equipment by reducing, somewhat, the number of surveillance tests performed.

In summary, these changes which involve the use of "demonstrate" and "verify" terminology clarify the TS by improving consistency, conform to the definition of "operable," will enhance component reliability by reducing unnecessary

surveillance tests, do not involve modifications to any system, and potentially improve associated systems reliability. Also, sufficient controls will be exercised to ensure that no indications which may affect operability will not be detected. For these reasons, and as explained above, the staff finds the changes acceptable.

Another proposed change involves Specification 3.5.A.3.a which addresses the condition when one RHR pump is made or found to be inoperable. Since loss of one RHR pump would render the associated LPCI Subsystem inoperable, this condition is also addressed in Specification 3.5.A.3.b which addresses the situation when one LPCI subsystem is made or found to be inoperable. Continued operation for seven days is allowed by each. Therefore, to eliminate duplication the licensee has proposed, and the NRC finds acceptable, the elimination of the present Specification 3.5.A.3.A.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in a requirement with respect to the use of a facility component located within the restricted area, as defined in 10 CFR Part 20, and changes to 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 offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final no significant hazards consideration finding with respect to this amendment. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth 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 this amendment.

CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: December 26, 1989

PRINCIPAL CONTRIBUTOR:

D. LaBarge