



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

1.0 INTRODUCTION

By letter dated October 21, 1999, Carolina Power & Light Company (CP&L, the licensee) requested a revision to the Technical Specifications (TS) for the Shearon Harris Nuclear Power Plant (HNP). The proposed amendment would implement selected improvements described in NRC Generic Letter (GL) 93-05, "Line-Item Technical Specifications To Reduce Surveillance Requirements For Testing During Power Operation," dated September 27, 1993. Specifically, the licensee proposed to modify the following TS to be consistent with GL 93-05: (1) TS 4.1.3.1.2 - change the frequency of the control rod movement test to quarterly; (2) TS 4.6.4.1 - change the frequency of the hydrogen monitor analog channel operational test to quarterly; (3) TS 4.3.3.1 (Table 4.3-3) - change the radiation digital channel operational test to quarterly; (4) TS 4.4.6.2.2.b. - change the time for remaining in cold shutdown without leak testing the reactor coolant system pressure isolation valves to 7 days; (5) TS 4.4.3.2 - change the testing of the capacity of pressurizer heaters to once per 18 months; (6) TS 4.6.4.2.a. - change the hydrogen recombiner functional test to once per 18 months; and (7) TS 4.7.1.2.1.a - change the frequency of testing auxiliary feedwater pumps to quarterly.

2.0 BACKGROUND

The NRC conducted a comprehensive examination of Surveillance Requirements (SRs) in the TS that require testing during power operation. The evaluation is documented in NUREG-1366, "Improvements to Technical Specification Surveillance Requirements," dated December 1992. The staff found that while the majority of testing at power is important, safety can be improved, equipment degradation decreased, and an unnecessary burden on personnel resources eliminated by relaxing a small fraction of the TS testing intervals. Based on the results of the evaluations, the NRC issued GL 93-05 to provide guidance to licensees for preparing license amendments to incorporate the TS changes recommended by NUREG-1366.

3.0 EVALUATION

The licensee has proposed changing the frequency of the following SRs to incorporate the recommendations of GL 93-05.

SR 4.1.3.1.2 - control rod movement test

The licensee proposed changing the frequency of SR 4.1.3.1.2, control rod movement test, from monthly to quarterly.

SR 4.1.3.1.2 is a test performed to determine if the control rods are immovable. The control rods may be immovable either because of an electrical problem in the control rod drive circuitry or because the control rod is mechanically stuck. The concern with this test is that it causes reactor trips or dropped rods. NUREG-1366 described a review of plant trip data from 1986 through July 1988 that found three reactor trips that occurred during fuel rod motion testing. NUREG-1366 also states that most stuck rods are discovered during plant startup during initial pulling of the rods or during rod drop testing.

The control rod system at HNP has a successful operational record as demonstrated by previous successful control rod movement tests. In addition, adequate control rod performance has been demonstrated by the applicable components not currently (as of September 20, 1999) being on the 10 CFR 50.65, maintenance rule, (a)(1) list.

In view of the successful operational record demonstrated by the control rod movement tests during power operation, NUREG-1366 recommends that the surveillance interval for control rod testing be changed from every 31 days to quarterly.

This proposed change is consistent with the recommendations of GL 93-05, NUREG-1366, and with HNP's operating experience. The staff, therefore, finds the proposed change acceptable.

SR 4.6.4.1 - hydrogen monitor analog channel operational test

The licensee proposed changing the frequency of SR 4.6.4.1, hydrogen monitor analog channel operational test, from monthly to quarterly.

Hydrogen monitors are used to monitor hydrogen concentration in containment following a loss-of-coolant accident (LOCA) and are designed to be consistent with Regulatory Guide 1.2, "Control of Combustible Gas Concentrations in Containment following a LOCA." These monitors are used only after a LOCA to tell the operator when to initiate the hydrogen recombiners. The hydrogen recombiners are not required for a period of hours to days after a large break LOCA.

The hydrogen monitoring system at HNP has a successful operational record as demonstrated by previous successful analog channel operational tests. In addition, adequate hydrogen monitoring performance has been demonstrated by the applicable components not currently (as of September 20, 1999) being on the 10 CFR 50.65, maintenance rule, (a)(1) list.

NUREG-1366 recommends that the hydrogen monitoring channel operational test be revised to a quarterly requirement in part because the hydrogen monitors serve as an indicating function and are only required after an accident in which the core is damaged.

This proposed change is consistent with the recommendations of GL 93-05, NUREG-1366, and with HNP's operating experience. The staff, therefore, finds the proposed change acceptable.

SR 4.3.3.1 (Table 4.3-3) - radiation monitor digital channel operational test

The licensee proposed changing the frequency of SR 4.3.3.1 (Table 4.3-3), radiation monitor digital channel operational test, from monthly to quarterly.

HNP radiation monitors in TS 4.3.3.1 (Table 4.3-3) are digital microprocessor-controlled components. The current monthly digital channel operational test consists of reducing the alarm setpoint to less than the current reading and verifying that the alarm and/or trip function occurs. The monitors are digital; therefore, the setpoint cannot drift.

The TS radiation monitoring system at HNP has a successful operational record as demonstrated by previous successful calibration and analog channel operational tests. In addition, adequate radiation monitoring performance has been demonstrated by the applicable components not currently (as of September 20, 1999) being on the 10 CFR 50.65, maintenance rule, (a)(1) list due to operational history.

NUREG-1366 recommends changing the monthly channel functional test to quarterly in order to decrease licensee burden and increase the availability of radiation monitors.

This proposed change is consistent with the recommendations of GL 93-05, NUREG-1366, and with HNP's operating experience. The staff, therefore, finds the proposed change acceptable.

SR 4.4.6.2.2.b. - RCS pressure isolation valves leak testing

SR 4.4.6.2.2.b currently requires that the reactor coolant system (RCS) pressure isolation valves (PIVs), specified in Table 3.4-1, be demonstrated operable by verifying leakage to be within limits prior to entering Mode 2 whenever the plant has been in cold shutdown for 72 hours or more and if leakage testing has not been performed in the previous 9 months. The licensee proposed changing the time in cold shutdown before the valves must be leak tested from 72 hours to 7 days.

The RCS PIVs at HNP have a successful operational record as demonstrated by previous successful leakage tests. In addition, adequate RCS PIV performance has been demonstrated by the applicable components not currently (as of September 20, 1999) being on the 10 CFR 50.65, maintenance rule, (a)(1) list.

NUREG-1366 states that making the conduct of this surveillance contingent upon being shut down 72 hours or more has a potential for causing problems resulting from a hurried recovery. The staff stated that extending the surveillance test interval associated with this surveillance does not alter the associated risk. NUREG-1366 recommends increasing the 72-hour time for remaining in cold shutdown without leak testing the RCS isolation valves to 7 days.

This proposed change is consistent with the recommendations of GL 93-05, NUREG-1366, and with HNP's operating experience. The staff, therefore, finds the proposed change acceptable.

SR 4.4.3.2 - pressurizer heater capacity

The licensee proposed changing the frequency of SR 4.4.3.2, pressurizer heater capacity test, from quarterly to once per refueling interval (i.e., once per 18 months).

Pressurizer heaters at HNP are normally used in modes 1-4. The backup heaters (groups "A" and "B") are used during normal operation (not dedicated safety-related pressurizer heaters) and are credited with meeting the requirements of TS 4.4.3.2. Indication of electrical current (amps) for pressurizer heaters is provided on the main control board for groups "A" and "B."

Operators can monitor pressurizer heater performance for groups "A" and "B" during routine operation.

The TS pressurizer heaters at HNP have a successful operational record as demonstrated by previous successful capacity tests. In addition, adequate performance of TS pressurizer heaters has been demonstrated by the applicable components not currently (as of September 20, 1999) being on the 10 CFR 50.65, maintenance rule, (a)(1) list.

NUREG-1366 states that the operator should be aware of the status of both proportional and backup pressurizer heaters during normal operation and that 92 days appears too frequent for capacity tests. NUREG-1366 recommends performing the capacity test once during each refueling interval.

This proposed change is consistent with the recommendations of GL 93-05, NUREG-1366, and with HNP's operating experience. The staff, therefore, finds the proposed change acceptable.

SR 4.6.4.2.a. - hydrogen recombiner functional test

The licensee proposed changing the frequency of SR 4.6.4.2.a, hydrogen recombiner functional test, from once per 6 months to once per refueling interval (i.e., once per 18 months).

The hydrogen recombiner system removes the hydrogen gases that accumulate in the containment atmosphere following a design-basis LOCA. NUREG-1366 describes a search of industry Licensee Event Reports (LERs) performed by the staff to determine the reliability of hydrogen recombiners. As a result of the study, the NRC staff concluded that hydrogen recombiners were highly reliable. NUREG-1366 recommends that, because of the redundancy and the high reliability of the system, the surveillance test interval of the functional test be changed to once each refueling interval.

HNP has two hydrogen recombiners and a containment hydrogen purge system. The hydrogen recombiner system at HNP has a successful operational record as demonstrated by previous successful functional tests. In addition, adequate performance of the hydrogen recombiner system has been demonstrated by the applicable components not currently (as of September 20, 1999) being on the 10 CFR 50.65, maintenance rule, (a)(1) list.

This proposed change is consistent with the recommendations of GL 93-05, NUREG-1366, and with HNP's operating experience. The staff, therefore, finds the proposed change acceptable.

SR 4.7.1.2.1.a - auxiliary feedwater pump testing

The licensee proposed changing the frequency of SR 4.7.1.2.1.a, auxiliary feedwater pump (AFWP) testing, from monthly to quarterly.

NUREG-1366 discusses two studies (EPRI report NP-4264 and NUREG/CR-4597) in which it was determined that a significant cause of failures of AFWPs is testing the pump by recirculating flow through a minimum flow line which is not adequately sized. Although an increase in recirculating line size would reduce failure of AFWPs during testing, adequate flow might not be available to the steam generators during an accident. Increasing the recirculation line would require isolation of the recirculation flow path during an accident. This could require

a complicated interlock which would close valves on the recirculation line when an actual demand signal was present.

NUREG-1366 proposed an alternate method for reducing AFWP failures, due to testing, by reducing the frequency of AFWP testing from monthly to quarterly. NUREG-1366 states that reducing the frequency of testing AFWPs may increase the overall availability by reducing failures and equipment degradation. Testing AFWPs on a quarterly staggered test basis would still provide for monthly system testing. Furthermore, requiring quarterly AFWP testing would provide for consistency between the TS and the ASME Code, which also requires class 2 pumps (such as AFWPs) to be tested quarterly.

The AFWPs at HNP have a successful operational record as demonstrated by previous successful functional tests. Additionally, adequate performance of the AFWPs has been demonstrated by the applicable components not currently (as of September 20, 1999) being on the 10 CFR 50.65, maintenance rule, (a)(1) list.

This proposed change is consistent with the recommendations of GL 93-05, NUREG-1366, and with HNP's operating experience. The staff, therefore, finds the proposed change acceptable.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes the 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 (64 FR 62705). Accordingly, the 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 the amendment.

6.0 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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