



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 180 TO FACILITY OPERATING LICENSE NO. DPR-71
AND AMENDMENT NO. 211 TO FACILITY OPERATING LICENSE NO. DPR-62
CAROLINA POWER & LIGHT COMPANY
BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
DOCKET NOS. 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated October 23, 1995, the Carolina Power & Light Company (the licensee) submitted a request for changes to the Brunswick Steam Electric Plant, Units 1 and 2, Technical Specifications (TS). The requested changes would revise Section 3.4.4.b of the TSs to delete the applicability of the primary coolant water chemistry limits when the primary system is being chemically decontaminated and the reactor vessel is defueled.

2.0 EVALUATION

During reactor operation, an oxide film or layer builds up on the surfaces of all material exposed to the primary coolant. The oxide film entraps corrosion products, some of which are strong gamma emitters (e.g., cobalt-60) which result in high radiation levels in the vicinity of the piping, valves, pumps and other components. The only way the material can be removed is by mechanical means (e.g., scraping), with high pressure sprays (e.g., hydrolyzing) or chemically. Except for small sections of piping or small components where the surfaces are accessible, chemical decontamination is the only feasible means of removing some or most of the oxide film to reduce radiation levels. The chemical solutions or solvents used vary depending on the materials of construction, the results of corrosion test programs, disposal options for the waste solutions, the time available, the level of decontamination expected to be achieved, and other factors, but generally involve strong oxidizing agents, (e.g., alkaline permanganate), weak acids, (e.g., citric acid), chelating agents, (e.g., EDTA), inhibitors and various proprietary solutions.

Section 3.4.4 requires that the chemistry of the reactor coolant system shall be maintained within the limits specified in Table 3.4.4-1 "at all times." The licensee proposes to change "at all times" to "operational conditions 1, 2, 3, 4, and 5," which covers all modes of operation from power operation (operational condition 1) to refueling (operational condition 5). Thus, there is no change in the applicability. The asterisk with operational condition 5 will refer to a proposed footnote that will read "except during planned chemical decontamination activities (with the reactor vessel defueled)."

Section 3.4.4.a of the current TS specifies the water chemistry conditions that must be maintained during "operational condition 1, 2, and 3." There are no proposed changes to this section. Section 3.4.4.b specifies the water chemistry conditions that must be maintained "at all other times." The licensee proposes to change the latter to "in operational conditions 4 and 5." Since modes 4 and 5 (shutdown and refueling) are the only two operational modes not covered by 3.4.4.a, there is no change in applicability. This is only a more precise definition of what constitutes "at all other times." The asterisk with operational condition 5 will refer to the footnote described above.

Table 3.4.4-1 lists the reactor coolant system chemistry limits that must be maintained during operational condition 1, 2 and "at all other times." The licensee proposes to define the latter as operational condition "3, 4, and 5." This is simply a redefinition of what constitutes "at all other times." There are no changes in any of the chloride or conductivity limits. The asterisk with operational condition 5 will refer to a footnote which will read "Except during planned chemical decontamination activities (with the reactor vessel defueled)."

The licensee also proposes to add a paragraph to BASES Section 3/4.4.4 on Chemistry to discuss water chemistry conditions during decontamination of the primary system. Because of the addition of this paragraph on page B 3/4 4-3, some of the material in Section 3/4 4.6 now on page B 3/4 4-3 is being relocated, without changes, to page B 3/4 4-4.

As noted previously, the decontamination solvents generally involve acidic and/or alkaline solutions. Compared to the essentially "pure" water of primary coolant, these solvents have high conductivity (low resistivity) and pHs well above or below the relatively neutral pH of demineralized water. The water chemistry limits in Section 3.4.4 of the TS are based on the primary coolant being demineralized water. The limits are not appropriate during decontamination of the primary system. The licensee's proposed changes to Section 3.4.4 are to reflect this fact. The proposed changes specify that the water chemistry limits are only suspended when the reactor vessel is defueled and chemical decontamination is in process. The licensee will have to thoroughly flush the primary system with demineralized water (particularly pockets where suspended corrosion products and other material may settle) and restore the water chemistry quality specified in Table 3.4.4-1 before existing Mode 5. The proposed changes are acceptable.

This safety evaluation does not assess any particular decontamination process or processes that the licensee might use to remove the corrosion product oxide film from the base metal. In accordance with 10 CFR 50.59, the licensee has to conduct adequate corrosion test loop studies (or rely on tests conducted by others) to assess both general corrosion of the base metals as well as the potential for specific corrosion attack (e.g., pitting corrosion, crevice corrosion, etc.), optimal temperatures and circulation rates, potential hideout during flushing and all the other considerations in selecting the solutions to be used.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding (60 FR 56364). Accordingly, the amendments meet 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 amendments.

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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

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