CP&L

Carolina Power & Light Company

AUG 22 1986

SERIAL: NLS-86-233
86TSB11

Director of Nuclear Reactor Regulation
Attention: Mr. Dan Muller
BWR Project Directorate #2
Division of BWR Licensing
United States Nuclear Regulatory Commission
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NOS. 50-325 & 50-324/LICENSE NO. DPR-62
REQUEST FOR LICENSE AMENDMENT
HYDROGEN WATER CHEMISTRY PREIMPLEMENTATION TEST

Dear Sir:

SUMMARY

In accordance with the Code of Federal Regulations, Title 10, Parts 50.90 and 2.101, Carolina Power & Light Company (CP&L) hereby requests a revision to the Technical Specifications (TS) for the Brunswick Steam Electric Plant Unit No. 2. The proposed change allows a temporary revision to the setpoint for Main Steam Line Radiation High scram and isolation. This change will allow the Company to test the feasibility of a Hydrogen Water Chemistry System as a mitigator of Intergranular Stress Corrosion Cracking (IGSCC) of stainless steel piping at Brunswick. CP&L plans to perform this test in November 1986. In addition, minor administrative changes, such as redesignation of footnotes, have been made.

DISCUSSION

CP&L intends to perform a hydrogen injection test on the primary coolant system of Brunswick-2. The purpose of the hydrogen injection test is to determine the feasibility of hydrogen water chemistry control as a means of reducing IGSCC of stainless steel piping. The test involves the addition of hydrogen to the primary coolant at increasing increments over a range of approximately 0 to 70 SCFM. As a result, the radiolysis of water is suppressed, thereby lowering the free oxygen concentration in the reactor coolant. The reduction of free oxygen eliminates one of the necessary causative agents of IGSCC.

A by-product of the oxygen suppression by hydrogen addition is an increase of radiation levels from the main steam lines caused by nitrogen-16 (N-16). The increased carry over of nitrogen is due to a conversion of N-16 from a soluble form to a volatile form in the reactor. The requested revisions to TS Tables 2.2.1-1, 3.3.2-1, and 3.3.2-2 permit a temporary increase in the Main Steam Line Radiation High scram and isolation setpoints to allow operation with the expected higher radiation levels resulting from hydrogen injection. The main steam radiation-high setpoint will remain at three times the background radiation level; however, the background radiation level used to determine the high radiation setpoint will be increased prior to the test based on a calculation of the anticipated background level. The change also permits the full load background

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radiation level to be adjusted during the test to correct for uncertainties in the initial computation. At the maximum planned hydrogen injection rate, an increase of approximately one to five times the normal main steam line background radiation level is expected. The pretest setpoints will be restored promptly following conclusion of the test and whenever power is decreased to less than 22 percent of rated thermal power. The hydrogen injection test will be discontinued whenever reactor power is reduced to less than 22 percent of rated thermal power.

Since hydrogen injection will result in approximately a one- to five-fold increase in background radiation levels, extensive radiation surveys will be conducted at regular intervals during the test to monitor the actual doses. The surveys will be performed by qualified CP&L health physics technicians using approved site procedures. The objectives of the survey program will be: 1) to provide data for shielding design should additional shielding be necessary; 2) to determine radiation levels at the site boundary; 3) to determine the potential effects on operation and maintenance activities; and 4) to determine the impact on the site ALARA program.

As stated above, the increased radiation levels are a result of an increased carry over of N-16 in the main steam. Due to the short half-life of N-16, the Company does not expect hydrogen injection to have a significant effect on the gaseous effluent release rates. Therefore, the increased radiation levels will have no effect on the health and safety of the public. Radiation protection measures will be implemented to maintain doses to plant personnel as low as reasonably achievable. These measures include: scheduling the test during a weekend and at nights to the extent feasible in order to minimize the number of on-site personnel affected; establishing access control by health physics personnel in accordance with existing site procedures; and training of operations personnel in test procedures prior to the start of the test to ensure efficient performance of duties.

The only event which takes credit for the main steam line high radiation scram and isolation setpoint is the design basis control rod drop accident (CRDA). As stated in the Bases Section 2.0 of the Brunswick TS, the main steam line radiation monitors are provided for detection of gross fuel failure. The consequences of a CRDA are most severe under hot standby conditions. They are increasingly less severe above 10 percent power due to faster Doppler response and lower rod worths. Above 20 percent power, the consequences are of minimal concern. Since the Main Steam Line Radiation Monitor setpoint will only be adjusted at power levels above 22 percent, there is no impact on the probability or consequences of the control rod drop accident.

Compressed hydrogen will be supplied to the plant site in gaseous form via tube-tank trucks. The trucks will be located in accordance with the requirements of NFPA Code No. 50A, "Gaseous Hydrogen Systems at Consumer Sites," Section 5.0. A detailed review of the hydrogen water chemistry test will be performed in accordance with 10 CFR 50.59. This review will address the bulk storage of hydrogen on-site during the test.

The hydrogen distribution system consists of supply lines, control valves, a safety relief valve, and an excess flow check valve. The supply lines will be routed outdoors from the supply truck to the main service corridor. The lines will then be routed to the south end of the corridor and into the Brunswick-2 condensate booster pump rooms. To ensure that combustible levels of hydrogen are not reached, the lines will be leak tested prior to the start of the test and hydrogen leakage monitors will be utilized during the test. The

hydrogen monitors will be located at the condensate booster pumps, near the control valves, and at various locations along the supply line. The monitors will alarm and isolate the hydrogen supply when hydrogen concentration exceeds 2 percent. Based on the above, CP&L has determined that the hydrogen supply and distribution system meets the requirements of Section C.5.d of Branch Technical Position CMEB 9.5.1 (NUREG-0800).

SIGNIFICANT HAZARDS ANALYSIS

The Commission has provided standards for determining whether a significant hazards consideration exists in 10 CFR 50.92(c). A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of any accident previously evaluated; (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. CP&L has reviewed this request and determined that:

1. The proposed amendment does not involve a significant increase in the probability or consequences of any accident previously evaluated. The only event which takes credit for the main steam line high radiation scram and isolation setpoint is the Controd Rod Drop Accident (CRDA). As stated in Bases Section 2.0 of the Brunswick TS, the main steam line radiation monitors are provided for detection of gross fuel failure. The consequences of a CRDA are most severe under hot standby conditions. They are increasingly less severe above 10 percent power due to faster Doppler response and lower rod worth. Above 20 percent power, the consequences are of minimal concern. Since the Main Steam Line Radiation Monitor setpoint will only be adjusted at power levels above 22 percent, there is no significant impact on the probability or consequences of the control rod drop accident. The administrative change to footnote designation has no affect on the probability or consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated because the changes do not affect the design of any safety-related systems and as such do not affect the performance of any safety functions. Revising a setpoint does not introduce the possibility of a new or different accident. The administrative change to footnote designation does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant decrease in a margin of safety. A temporary increase in the Main Steam Line High Radiation scram and isolation setpoints does not create the possibility of a new type of accident nor does it impact any accident previously evaluated other than the control rod drop accident. The provisions of the change allow the setpoints to be altered only when reactor power is at or above 22 percent. Above 20 percent power, the consequences of a CRDA are minimal and, therefore, the change in setpoint has no significant effect on the margin of safety for this accident. Due to the short half-life of N-16 (7 seconds), the increased carry over of N-16 in the main steam will not have a significant effect on the gaseous effluent release rates. Therefore, the proposed change will not present a risk to the public's health and safety. The administrative change to footnote designation does not involve a decrease in a margin of safety.

Based on the above reasoning, CP&L has determined that the proposed amendment does not involve a significant hazards consideration.

ADMINISTRATIVE INFORMATION

The revised Brunswick-2 TS pages are provided in Enclosure 1. The Company has evaluated this request in accordance with the provisions of 10 CFR 170.12 and determined that a license amendment application fee is required. A check for $150 is enclosed in payment of this fee. Issuance of this amendment is required by October 31, 1986 in order to support the hydrogen water chemistry preimplementation test.

Please refer any questions regarding this submittal to Mr. Sherwood R. Zimmerman at (919) 836-6242.

Yours very truly,

A. B. Cutter - Vice President
Nuclear Engineering & Licensing

MAT/vaw (3985MAT)

Enclosure

cc: Mr. W. H. Ruland (NRC-BNP)
Dr. J. Nelson Grace (NRC-RII)
Mr. E. Sylvester (NRC)

A. B. Cutter, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

Ruby R. Morgan
Notary (Seal)

My commission expires: 11/27/89

RUBY R. MORGAN
NOTARY
PUBLIC
WAKE COUNTY, N. C.