CP&L
Carolina Power & Light Company
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OCT 19 1989

A. B CUTTER
Vice President
Nuclear Services Department

SERIAL: NLS-89-217
10CFR50.90

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 & 50-324/LICENSE NOS. DPR-71 & DPR-62
REQUEST FOR LICENSE AMENDMENT
MAIN STEAM LINE RADIATION MONITOR SETPOINT CHANGE
HYDROGEN WATER CHEMISTRY

Gentlemen:

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 for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2.

The proposed change adds a footnote to Tables 2.2.1-1 and 3.3.2-2 for the adjustment of the Main Steam Line Radiation Monitors trip setpoints to compensate for the increased background radiation levels while the Hydrogen Water Chemistry System is in service.

Enclosure 1 provides a detailed description of the proposed changes and the basis for the changes.

Enclosure 2 details the basis for the Company's determination that the proposed changes do not involve a significant hazards consideration.

Enclosure 3 provides instructions for incorporation of the proposed changes into the Technical Specifications for each unit.

Enclosure 4 provides a summary of the proposed Technical Specification changes for each unit on a page by page basis.

Enclosure 5 provides the proposed Technical Specification pages for Unit 1.

Enclosure 6 provides the proposed Technical Specification pages for Unit 2.

The use of the Hydrogen Water Chemistry System during power operation is highly desirable as it is known to mitigate intergranular stress corrosion cracking of stainless steel piping. Brunswick-2 is currently shutdown for recirculation piping replacement and scheduled for restart in mid-February 1990. Brunswick-1 will start a similar outage in 1990. The effective use of

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the Hydrogen Water Chemistry System is dependent upon the issuance of this request. The Company therefore requests that this amendment be issued by February 1, 1990.

Please refer any questions regarding this submittal to Mr. M. R. Oates at (919) 546-6063.

Yours very truly,

A. B. Cutter

ABC/MAT

Enclosures:

1. Basis for Charge Request
2. 10 CFR 50.92 Evaluation
3. Instructions for Incorporation
4. Summary List of Revisions
5. Technical Specification Pages - Unit 1
6. Technical Specification Pages - Unit 2

cc: Mr. Dayne H. Brown
Mr. S. D. Ebneter
Mr. W. H. Ruland
Mr. E. G. Tourigny

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.

William T Bryson
Notary (Seal)

My commission expires: Aug 16, 1992

ENCLOSURE 1

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
NRC DOCKETS 50-325 & 50-324
OPERATING LICENSES DPR-71 & DPR-62
REQUEST FOR LICENSE AMENDMENT
MAIN STEAM LINE RADIATION MONITOR SETPOINT CHANGE
HYDROGEN WATER CHEMISTRY

BASIS FOR CHANGE REQUEST

Proposed Change

The proposed amendment adds a footnote to Table 2.2.1-1, Item 6 and Table 3.3.2-2, Item 1.c.1 to allow adjusting of the Main Steam Line Radiation Monitor (MSLRM) trip setpoints value to compensate for the increased radiation levels encountered while the Hydrogen Water Chemistry (HWC) system is in operation.

Basis

A hydrogen injection test was performed during January 1987. Amendment 131 for Brunswick-2 was issued on December 10, 1986 in support of the hydrogen injection test. Based on the evaluation of the test data, CP&L has decided to pursue HWC on a permanent basis. Installation of the HWC system for Brunswick-2 is complete and in process for Brunswick-1. The purpose of HWC is to mitigate IGSCC of susceptible reactor piping material by introducing gaseous hydrogen into the reactor coolant which combines with oxygen to form water. During use of hydrogen chemistry, N-16 becomes volatile and, as a result, radiation levels in the main steam will increase. This amendment will permit increasing the MSLRM trip setpoint values to compensate for the expected higher background radiation levels that result from operation with the HWC system in service.

The design and installation of the permanent hydrogen water chemistry facility at Brunswick was reviewed by the NRC during a site visit on August 23 and 24, 1988. As a result of this review, the Staff concluded that the hydrogen and oxygen supply facilities, hydrogen and oxygen injection systems, instrumentation and controls, and safety considerations meet the recommendations of EPRI NP 5283-SR A - September 1987. This conclusion is documented in a memorandum from Frank J. Witt, Chemical Engineer, Chemical Engineering Branch to Conrad E. McCracken, Chief, Chemical Engineering Branch, dated September 6, 1988.

The hydrogen injection test involved introduction of hydrogen into the secondary condensate booster pumps at increasing injection rates ranging from 0 to 34 scfm. While the injection was in progress, extensive radiological monitoring was conducted and the electrochemical potential (ECP) of the recirculation piping was measured. In addition, startup testing of the hydrogen injection system was performed with hydrogen injection rates ranging from 0 to 15 scfm. Based on the results of these tests, CP&L believes that a

hydrogen injection rate of less than 20 scfm will be necessary to achieve an ECP reading of -230 mV (SHE), thereby inhibiting IGSCC.

The MSLRM setpoint is specified in TS Tables 2.2.1-1 and 3.3.2-2 as 3.0 times the full power background radiation level. Without hydrogen water chemistry, the normal full power background radiation level for the MSLRMs is approximately 115 mrem/hr. Based on observations during the hydrogen injection test and startup testing of the system, it is expected that the background radiation level will increase to approximately 350 mrem/hr at an injection rate of 20 scfm. Since the normal full power MSLRM setpoint is established at 300 mrem/hr, a license amendment is necessary to allow the MSLRM setpoint to be increased during operation of the HWC system.

The proposed change specifies when the HWC system can be operated and identifies restrictions associated with changing the MSLRM setpoints. First, the HWC system cannot be placed in service until reactor power reaches 20% of Rated Thermal Power. This restriction is based on the Control Rod Drop Accident which is only of concern at power levels below 20% of Rated Thermal Power. After reaching 20% of Rated Thermal Power the MSLRM setpoint can be increased since no other FSAR Chapter 15 accident scenarios take credit for the operation of the MSLRM scram and isolation setpoint. Within 24 hours after decreasing below 20% of Rated Thermal Power or after the HWC system has been shutoff, the background level and associated setpoint shall be returned to the normal full power values. If a power reduction event occurs so that the reactor power is below 20% of Rated Thermal Power for longer than 24 hours without the required setpoint change, control rod motion shall be suspended (except for scram or other emergency action) until the necessary adjustments are made.

As stated above, an extensive radiological monitoring program was conducted during performance of the hydrogen injection test. Radiation surveys were taken during each incremental increase in hydrogen injection at various points inside and outside the plant. Based on these surveys, the Company has determined that:

1. At the projected injection rate, no additional plant shielding is necessary nor are revised access control measures warranted. Worker doses will be maintained ALARA at all times.

2. The overall turbine building shine increases slightly within the protected area, however, at the anticipated normal injection rate, the increase can be considered negligible since the radiation levels will be well below the 10 CFR 20.101 restricted area dose standards of 1.25 rem/quarter whole body.

3. Outside the site boundary, there are no measurable increased in radiation levels and, therefore, the 10 CFR 20.105, 10 CFR 100.11, and 40 CFR 190 site boundary doses are not affected.

Therefore, CP&L concludes that, since there are no appreciable affects on either onsite or offsite doses, the general public is not impacted by the

operation of the HWC system. CP&L intends to follow the latest available EPRI Guidelines for BWR Hydrogen Water Chemistry.

ENCLOSURE 2

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
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10 CFR 50.92 EVALUATION

The Commission has provided standards in 10 CFR 50.92(c) for determining whether a significant hazards consideration exists. 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 an 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. Carolina Power & Light Company has reviewed this proposed license amendment request and determined that its adoption would not involve a significant hazards consideration. The bases for this determination are as follows:

Proposed Change

The proposed amendment adds a footnote to Table 2.2.1-1, Item 6 and Table 3.3.2-2, Item 1.c.1 to allow adjusting of the Main Steam Line Radiation Monitor (MSLRM) trip setpoints value to compensate for the increased radiation levels encountered while the Hydrogen Water Chemistry (HWC) system is in operation.

Basis

The change does not involve a significant hazards consideration for the following reasons:

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The only accident scenario which takes credit for the MSLRM high radiation scram and isolation setpoint is the Control Rod Drop Accident (CRDA) as described in the Brunswick FSAR Chapter 15. Specifically, the Main Steam Isolation Valves (MSIVs) are assumed to receive an automatic closure signal at 0.5 seconds after detection of high radiation in the main steam lines and to be fully closed at 5 seconds from the receipt of the closure signal. The MSLRMs are provided to detect a gross failure of the fuel cladding. When high radiation is detected, a trip is initiated to reduce the continued failure of fuel cladding. At the same time, the MSIVs are closed to limit the release of fission products. The trip setting is high enough above background radiation levels to

prevent spurious trips yet low enough to promptly detect gross failures in the fuel cladding.

NEDO-10527, Supplement 1, "General Electric Rod Drop Accident Analysis For Large Boiling Water Reactors," dated July 1972, concluded that the consequences of the CRDA are most severe under Hot Standby conditions. Furthermore, the consequences of the CRDA are increasingly less severe above 10 percent power due to a faster Doppler response and a lower rodworth. Finally and most importantly, this report concluded that above 20% of Rated Thermal Power the consequences of the CRDA are minimal. Therefore, the proposed change specifies when the HWC system can be operated and identifies restrictions associated with changing the MSLRM setpoints. First, the HWC system cannot be placed in service until reactor power reaches 20% of Rated Thermal Power. This restriction is based on the Control Rod Drop Accident which is only of concern at power levels below 20% of Rated Thermal Power. After reaching 20% of Rated Thermal Power the MSLRM setpoint can be increased since no other FSAR Chapter 15 accident scenarios take credit for the operation of the MSLRM scram and isolation setpoint. Within 24 hours after decreasing below 20% of Rated Thermal Power or after the HWC system has been shutoff, the background level and associated setpoint shall be returned to the normal full power values. If a power reduction event occurs so that the reactor power is below 20% of Rated Thermal Power for longer than 24 hours without the required setpoint change, control rod motion shall be suspended (except for scram or other emergency action) until the necessary adjustments are made.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed change does not affect the design of any safety related systems and as such does not affect the performance of any safety related functions. The proposed amendment allows the operation of a new system, that is the HWC system. This system has been extensively analyzed by EPRI, approved for use by the NRC, and in operation at a number of facilities.

The design and installation of the permanent hydrogen water chemistry facility at Brunswick was review by the NRC during a site visit on August 23 and 24, 1988. As a result of this review, the Staff concluded that the hydrogen and oxygen supply facilities, hydrogen and oxygen injection systems, instrumentation and controls, and safety considerations meet the recommendations of EPRI NP 5283-SR A - September 1987. This conclusion is documented in a memorandum from Frank J. Witt, Chemical Engineer, Chemical Engineering Branch to Conrad E. McCracken, Chief, Chemical Engineering Branch, dated September 6, 1988.

3. The proposed amendment does not involve a significant reduction in the margin of safety.

The proposed amendment includes specific requirements regarding the operation of the HWC system:

- Operation of the HWC system is only permitted above 20% of Rated Thermal Power.

- When the HWC system is in operation, the MSLRM setpoints can be adjusted upward to account for the increase in the background main steam line radiation levels.

- Within 24 hours after decreasing reactor power to below 20% of Rated Thermal Power, the setpoints must be readjusted to their pre-HWC system operation levels.

- If the power level falls below 20% for longer than 24 hours without the setpoint change, control rod motion is suspended (except for scrams or other emergency situations) until the setpoint adjustment is made.

These requirements will assure that the HWC system is operated safely and with sufficient margin such that spurious MSL isolations are precluded while maintaining the ability to detect any gross failures in the fuel cladding.

As discussed in Item 1, A CRDA is the only accident which takes credit for the MSL isolation trip function. However, above 20% of Rated Thermal Power, the consequences of the CRDA ar minimal. Therefore, the change has no significant affect on the margins of safety for this accident scenario.

The increase in background radiation levels has been analyzed and it has been determined that neither plant personnel nor the health and safety of the public are at risk when operating with the HWC system.

Based on the above, it is concluded that the proposed amendment does not involve a significant reduction in a margin of safety.

As demonstrated above, the proposed amendment does not involve a significant hazards consideration. This conclusion is further substantiated when the Examples of Amendments That Are Considered Not Likely To Involve Significant Hazards (Federal Register Volume 51, Number 44 dated March 3, 1986) are reviewed. Specifically, this change can be considered to meet Example (ii) of the above cited FR in that the proposed change ". . . constitutes an additional limitation, restriction or control not presently included in the Technical Specifications." The proposed change identifies specific limitations for the operation of the HWC system and imposes control rod restrictions during the setpoint adjustment process thereby serving to include in the Technical Specifications additional control not currently present. In addition, the design and installation of the permanent hydrogen water chemistry facility at Brunswick was reviewed by the NRC during a site visit on August 23 and 24, 1988. As a result of this review, the Staff concluded that

the hydrogen and oxygen supply facilities, hydrogen and oxygen injection systems, instrumentation and controls, and safety considerations meet the recommendations of EPRI NP 5283-SR A - September 1987. For these reasons, CP&L concludes that the proposed amendment satisfies the criteria identified for a Category 2 Technical Specification change.