February 7, 2001

Mr. J. S. Keenan, Vice President
Brunswick Steam Electric Plant
Carolina Power & Light Company
Post Office Box 10429
Southport, North Carolina 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2 - SAFETY EVALUATION FOR PROPOSED ALTERNATIVE INSPECTIONS FOR CONTAINMENT ATMOSPHERE CONTROL AND STANDBY GAS TREATMENT SYSTEMS (TAC NOS. MB0248 and MB0249)

Dear Mr. Keenan:

By letter dated October 12, 2000, as supplemented December 18, 2000, and January 9, 2001, you requested that the NRC approve an alternative to performing examinations of the Containment Atmosphere Control And Standby Gas Treatment Systems at the Brunswick Steam Electric Plant, Units 1 and 2. These examinations are required by Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). The alternative was proposed pursuant to the provisions of 10 CFR 50.55a(a)(3)(i).

The NRC staff finds that authorization of your alternative examination would provide assurance of structural integrity and, therefore, an acceptable level of quality and safety. Accordingly, pursuant to 10 CFR 50.55a(g)(6)(ii)(A)(5) and 10 CFR 50.55a(a)(3)(i), your proposed alternative examination is authorized. The staff's Safety Evaluation is enclosed.

Please contact Donnie Ashley at (301) 415-3191 if you have any questions regarding this matter.

Sincerely,

/RA/

Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NO. 26 FOR THE THIRD 10-YEAR INSERVICE INSPECTION PROGRAM

BRUNSWICK STEAM ELECTRIC PLANT UNITS 1 AND 2

CAROLINA POWER & LIGHT COMPANY

DOCKET NUMBERS 50-325 AND 50-324

1.0 INTRODUCTION

Preservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code and applicable addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) states that alternatives to the requirements of Paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

In a letter dated October 12, 2000, as supplemented December 18, 2000, and January 9, 2001, Carolina Power & Light Company (CP&L, the licensee) requested NRC approval of an alternative to the test requirements of ASME Code, Section XI, Subarticle IWC-2500-1, Examination Category C-H, for Brunswick Steam Electric Plant, Units 1 and 2. The Code of record for BSEP, Units 1 and 2 is the 1989 edition of the ASME B&PV Code.

2.0 DISCUSSION

The Materials and Chemical Engineering Branch has reviewed the information submitted by the licensee in its request to perform an alternative inservice inspection (ISI).

2.1 Components

The components that will be affected are a portion of the Containment Air Control (CAC) system and the entire Standby Gas Treatment (SGT) system, all of which are Class 2 components.

2.2 Code Requirements

The Code requirements for the applicable items are given in Subarticle IWC-2500-1, Examination Category C-H, of ASME Section XI, 1989 edition. Table IWC-2500-1 requires the CAC and SGT systems to be pressure tested and visually (VT-2) examined once per inspection period.

2.3 Licensee's Code Relief Request

The licensee has requested approval to use an alternative to IWC-2500-1.

2.4 Licensee's Proposed Alternative

Carolina Power & Light (CP&L) Company requests approval of an acceptable alternative to verify the structural integrity of the subject components. Structural integrity of the CAC and SGT systems will be verified, each refueling outage, by performing a structural integrity walkdown of accessible surfaces of the systems during each refueling outage. Certified and trained personnel will perform the structural integrity walkdowns.

2.5 Licensee's Basis for Requesting an Alternative

The SGT system and supporting CAC components [consist] of suction piping, two parallel 100 percent capacity filter trains and blowers, and a discharge vent.

The SGT system and supporting CAC components perform several functions following a design basis Loss-Of-Coolant Accident (LOCA) and during other conditions when the Reactor Building Ventilation System is isolated. Their safety related functions include: (1) maintaining the Secondary Containment structure at a negative pressure of 0.25 inches of water by controlled venting of the building atmosphere at a rate of 100 percent of the structure volume per day, and (2) removing the halogens and other fission products from the atmosphere vented from the Drywell and/or Suppression Chamber following a LOCA. These components also perform several non-safety related functions.

During normal plant operation, the SGT system is in a standby mode and aligned to take suction on the Reactor Building atmosphere in case an automatic start signal is received. During normal operation, the affected components will experience minimal pressures.

With most ISI Class 2 systems, this type of visual examination is beneficial. Unlike the SGT system, the components associated with most ISI Class 2 systems contain water or steam and are pressurized during the system functional test. As such, leakage can be observed during the pressure test. However, for the SGT system, the affected components will experience minimal or negative pressure during a system functional test. As such, leakage exiting the piping is unlikely during this test. Because of how this system operates, this Code-required pressure test does not provide an effective method to detect leakage. As such, the performance of this test and visual examination provides no compensating increase in quality and safety.

CP&L has determined that the proposed alternative will provide an acceptable level of quality and safety for the following reasons:

1. Since the system functional test is not an [effective] method for identifying structural distress, CP&L will perform a structural integrity walkdown of accessible surfaces once each refueling outage.

   CP&L considers this walkdown a more comprehensive inspection and an acceptable alternative to the Code requirement for the following reasons. The structural integrity walkdown will not be limited to those components within the system functional test system boundary. Because of the normal lineup of this

system, some of the safety-related components would not be examined during the first and second inspection [periods]. The ASME Code, Section XI, does not require a visual (VT-2) examination of components that are outside the normal system lineup and are not pressurized.

The structural integrity walkdown will be controlled in accordance with a plant approved process and will be performed by qualified personnel. The plant approved process will delineate examination methods that will allow the detection of degradation mechanisms and timely correction of any unacceptable indications.

Certified and properly trained personnel will perform the structural integrity walkdowns. Personnel performing these inspections will be certified in accordance with ANSI/ASME N45.2.6. This level of certification will ensure that the capability and visual acuity of the personnel is sufficient to detect evidence of potential degradation. This level of certification will also provide an acceptable alternative to the Code requirement for VT-2 examiners.

This walkdown of all accessible surfaces once each refueling outage will ensure the integrity of this system and provide an acceptable level of quality and safety.

2. Not performing the system functional test or the visual (VT-2) examination of the SGT system and supporting CAC components will not compromise quality or safety.

   The SGT and CAC systems were designed and constructed and tested commensurate to ASME Code, Section III, Class 2 and for seismic forces in accordance with seismic class I requirements.

   In addition to the non-destructive examinations performed on the components by their manufacturer, each butt weld associated with this piping had a surface and volumetric examination performed. Following completion of the construction, the piping was also hydrostatically tested. As such, these components were constructed and tested to high quality standards.

   During routine operation of this system, the affected components are not subject to a harsh environment. These components are located inside the Reactor Building and are not exposed to any environment that would be harmful to carbon steel materials. Since the process medium is the Reactor Building atmosphere during normal plant operation, the interior surfaces of these components are also not subject to a harsh environment. Although some condensation may be present, these components were designed with adequate corrosion margin. Any such condensation would be expected to collect in the bottom interior of these components. If this condensation were to result in sufficient corrosion to cause structural distress of these components, this distress would be expected to be observable on the accessible portions of the piping components during the structural integrity walkdowns.

In addition to the structural integrity walkdowns, these components are periodically tested commensurate with the safety function to be performed. The operability of these safety-related components is assured by the performance of a series of surveillance requirements specified in BSEP, [Units] 1 and 2, Technical Specification Surveillance Requirements 3.6.4.3.1 and 3.6.4.3.2. These surveillance requirements demonstrate acceptable operation of this system by verifying system flow, differential pressure across the various filters including the heaters and moisture separators, mechanical efficiency of the filters, the ability of the heaters to maintain relative humidity, and the ability of the charcoal to remove the appropriate amount of radionuclide. Since these requirements are verified with the system in operation, the test results are an indicator of actual system performance and operability.

3. The SGT and CAC systems are classified as standby systems under the Maintenance Rule (i.e., 10 CFR 50.65) based on their classification as safety related and their design function of mitigating the consequences of design basis accidents and transients.

   Performance monitoring groups, along with performance criteria, have been established for the affected components. Using this [criteria], the System Engineer periodically monitors performance data to evaluate the effectiveness of maintenance. This data is reviewed at a frequency commensurate with the safety significance of the system.

Since the system operability is verified by surveillance requirements and the walkdowns each refueling outage will ensure structural integrity, there is no safety significance associated with not performing the system functional test or the visual (VT-2) examination. Because of the SGT system operating characteristics, the performance of the system functional test is not an effective method for assuring integrity of these components. As such, the described alternative will provide an [acceptable] level of quality and safety pursuant to 10 CFR 50.55a(a)(3)(i).

3.0 EVALUATION

For Class 2 components, ASME Section XI, IWC2500-1 of the Code requires that a System Pressure Test and VT-2 be conducted. IWC-5221, System Pressure Test, states that nominal operating pressure of the system functional test shall be acceptable as the system test pressure. However, during the system functional test of the CAC and SGT systems at Brunswick, the associated piping is under a slight negative pressure. Performing the Code-required inspection will not achieve the purpose of the Code requirements, which is to effectively detect leakage.

The proposed alternative includes a structural integrity walkdown once every outage (instead of every inspection period) to detect evidence of leakage, such as structural distress and evidence of degradation, including coating degradation. If a crack exists, it would likely cause paint irregularities and the appearance of surface rust staining, which would be observable since the piping is painted and un-insulated. The walkdown would also provide reasonable assurance of the structural integrity of the piping systems.

The subject systems have a low potential of experiencing degradation due to the following reasons:

(1) The systems were built per USA Standard (USAS) Code for pressure piping, B31.1.0, 1967 Edition, which contains similar requirements to those of the ASME Code, Section III, Class 2. As such, the CAC and SGT systems were constructed and tested to high quality standards.

(2) Prior to installation, non-destructive examinations were performed on each pressure-retaining component. Following the installation, each butt weld associated with this piping had a surface and volumetric (i.e., 100% radiography) examination performed. In addition, the piping was hydrostatically tested.

(3) The systems were previously examined using Helium Detection method (as part of TMI Action Items), which was beyond the Code requirements. No evidence of leakage was found during that examination.

(4) The environment to which the systems are exposed is an ambient containment atmosphere. During normal operations, the CAC and SGT systems are in standby mode. When purging through the exhaust fan, pressure is controlled between -0.25 to 1 psig. The systems will not be exposed to a severe environment or harsh conditions.

As discussed above, the systems were constructed and tested per ASME Code quality. Previous NDE examinations have demonstrated their leakage integrity. The systems are in standby mode most of the time and will not be exposed to any harsh environment. The leakage integrity and structural integrity will not be challenged in a manner that would result in any significant degradation. The frequent structural walkdown will ensure that evidence of degradation would be detected in a timely manner. Furthermore, the system operability testing also provides evidence of the leakage integrity of the piping.

Certified and properly trained personnel will perform the structural integrity walkdown. Personnel performing these inspections will be certified in accordance with ANSI/ASME N45.2.6. This level of certification will ensure that the capability and visual acuity of the personnel are sufficient to detect evidence of potential degradation. Since the personnel will be specifically trained to look for evidence of degradation and structural deterioration for the particular systems, the level of certification will provide an acceptable alternative to those required by the Code for VT-2 examiners.

Based on the above evaluation, the staff finds that performance of the alternative examination offers reasonable assurance of the structural and leakage integrity of the systems and provides an acceptable level of quality and safety.

4.0 CONCLUSION

The staff concludes that compliance with the Code-required system functional test with VT-2 would not effectively detect leakage or evidence of leakage. The proposed alternative will provide an acceptable level of quality and safety. The staff has determined that granting this

request is authorized by law and will not endanger life or property or the common defense and

security and is otherwise in the public interest. Accordingly, granting the licensee's request to use the alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for Brunswick's CAC and SGT systems during the current 10-year interval.

Principal Contributor: Z. B. Fu

Date: February 7, 2001

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Units 1 and 2

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