



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA ST., N.W., SUITE 3100  
ATLANTA, GEORGIA 30303

Report Nos.: 50-325/83-01 and 50-324/83-01

Licensee: Carolina Power and Light Company  
411 Fayetteville Street  
Raleigh, NC 27602

Docket Nos.: 50-325 and 50-324

License Nos.: DPR-71 and DPR-62

Facility Name: Brunswick 1 and 2

Inspection at Brunswick site near Southport, North Carolina

Inspector: W. C. Liu 1/25/83  
W. C. Liu Date Signed

Approved by: J. J. Blake 1/25/83  
J. J. Blake, Section Chief Date Signed  
Engineering Program Branch  
Division of Engineering and Operational Programs

SUMMARY

Inspection on January 4-7, 1983

Areas Inspected

This routine, unannounced inspection involved 22 inspector-hours on site in the areas of structural modifications, additional safety-related pipe supports and restraints, etc., in response to Plant Unique Analysis Report for Mark 1 Containment Program, and Seismic Analysis for As-Built Safety-Related Piping Systems (IEB 79-14).

Results

Of the areas inspected, no violations or deviations were identified.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*C. Dietz, General Manager, BSEP
- \*T. Wyllie, Manager, Engineering and Construction
- \*E. Bishop, Manager, Technical Services
- \*D. Novotny, Sr. Specialist, Regulatory Compliance
- \*B. Hinkley, Project Engineer, NSSS/ISI
- \*D. Rudoff, Project QA Engineer - OQA
- \*A. Worth, Principal Engineer, Mechanical
- \*E. Tomlinson, Jr., Sr. Engineer, Torus Sub-Unit

Other licensee employees contacted included QC inspectors, design engineers, technicians and office personnel.

#### NRC Resident Inspector

- \*D. Myers

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on January 7, 1983, with those persons indicated in paragraph 1 above. The licensee was informed of the inspection findings listed below. The licensee acknowledged the inspection findings with no dissenting comments.

- a. (Open) Unresolved Item, 324, 325/83-01-01, Plant Unique Analysis Report - Column Loads Verification, paragraph 5.
- b. (Open) Inspector Followup Item, 324, 325/83-01-02, Plant Unique Analysis Report - Electric Penetration Box Relocation, paragraph 7.
- c. (Open) Unresolved Item, 324, 325/83-01-03, Plant Unique Analysis Report - Vacuum Breaker Evaluation, paragraph 9.

### 3. Licensee Action on Previous Enforcement Matters

Not inspected.

### 4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. Two unresolved items identified during this inspection are discussed in paragraphs 5 and 9.

## 5. Structural Modifications - Units 1 and 2

The inspector performed a general review of the Plant Unique Analysis Report (PUAR) that was submitted by the licensee and noted the following modifications that are necessary in order to ensure the intended margins of safety to the existing vent system structures in the torus area.

- a. All downcomers will be reduced in length by 12" and tie locations will be adjusted accordingly.
- b. All downcomer/vent header intersections will be stiffened by providing 1/2" plate stiffeners as shown in Figure 3.6.1.1-2 of PUAR.
- c. Four new columns will be provided at each vent/vent header intersection. These columns are to be attached to the header by means of a 1" X 6" ring welded to the header. Figures 3.5.2-1 and 3.6.1.3-3 show the position of the ring and the orientation of the columns.
- d. Platform support columns will be modified. All the existing beams and columns except the crossing rod assemblies, will be replaced by 6" diameter pipes. New 6" diameter pipe columns will be added above the platforms to resist pool swell loads.
- e. Torus Monorail was not acceptable when subjected to froth impingement forces. As a result, 24 additional supports for each unit were required and had been installed for both units.

During the inspection, the inspector informed the licensee that the 69 kips used for the column design at each vent header described in section 1.12 of PUAR is inconsistent with the load shown in Figure 1.12-1 where 90 kips is shown on the same column. At the time of this inspection the licensee could not provide the calculations for the subject columns for review. The licensee indicated that they would submit a supplement to Region II at a later date. Pending completion of the supplement, to be furnished by the licensee, this item is identified as Unresolved Item, 324, 325/83-01-01, Plant Unique Analysis Report - Column Loads Verification.

Within the areas inspected, no violations or deviations were identified.

## 6. Safety-Related Pipe Support and Restraints - Units 1 and 2

The following piping systems were reanalyzed in accordance with the Plant Unique Analysis Report.

### a. Residual Heat Removal (RHR) Test Line

Analysis based on existing supports showed that the piping and supports were highly overstressed due to froth impingement forces. The licensee stated that the modifications have been completed by removing four existing pipe supports and replacing these supports with eight new pipe supports for each piping system.

b. RHR Containment Cooling Line

Analysis of the existing pipe line showed that it was not acceptable. As a result, four new pipe supports have to be added to the piping system. The licensee indicated that the installation of these new pipe supports has been completed since July, 1982 for both units.

The inspector reviewed eight new pipe support as-built drawings for the RHR test line and four new pipe support as-built drawings for the RHR containment cooling line for verification of as-built configuration. In addition, calculations for the design of the RHR containment cooling line pipe supports and restraints were sampled and reviewed to verify licensee compliance with commitments and NRC requirements. Calculations were also reviewed to verify conformance of as-built configurations.

Based on this review, no violations or deviations were identified.

7. Electric Penetration Box - Units 1 and 2

In accordance with the Plant Unique Analysis Report, the bottom of the electric penetration box is subjected to the pool swell impact and drag load while the door receives froth impingement forces. Calculations showed maximum stresses of 353 ksi at the bottom plate and 357 ksi at the door. These stresses are unacceptable as compared with allowable of 31.95 ksi. These loads are too large to accommodate any feasible structural modifications. It was decided to relocate the box to eliminate loads resulting from pool swell. The licensee indicated that they have decided to eliminate the box and will utilize a splice approach. This work will be implemented under plant modification Nos. 81-251 and 81-252. Pending completion of the licensee's commitment and NRC requirements, this item is identified as Inspector Followup Item, 324, 325/83-01-02, Plant Unique Analysis Report - Electric Penetration Box Relocation.

Based on this review, no violations or deviations were identified.

8. Schedule for Modifications - Units 1 and 2

During the inspection the licensee provided the following tentative schedule for various modification activities previously noted in paragraphs 5 and 6:

<u>PARAGRAPH</u>	<u>DESCRIPTION</u>	<u>DATE INSTALLATION COMPLETED</u>
5.a	Downcomer length and tie modification	Unit No. 1 - May, 1983 Unit No. 2 - March, 1984
5.b	Downcomer/vent header intersection stiffening	Unit No. 1 - May, 1983 Unit No. 2 - March, 1984
5.c	Four new columns at each vent/vent header intersection	Unit No. 1 - May, 1983 or June, 1984 Unit No. 2 - Dec., 1983

<u>PARAGRAPH</u> (continued)	<u>DESCRIPTION</u>	<u>DATE INSTALLATION COMPLETED</u>
5.d	Platform support beam and column replacement	Unit No. 1 - June, 1984 Unit No. 2 - Dec., 1983
5.e	Torus monorail additional supports	*Unit No. 1 - Aug., 1982 *Unit No. 2 - June, 1982
6.a	RHR test line additional pipe supports	*Unit No. 1 - Sept., 1982 *Unit No. 2 - June, 1982
6.b	RHR containment cooling line additional pipe supports	*Unit No. 1 - Aug., 1982 *Unit No. 2 - June, 1982

\*Complete Installations

Based on this review, no violations or deviations were identified.

9. Additional Analysis Identification - Units 1 and 2

Based on description in the Plant Unique Analysis Report, the analysis of the suppression pool strainers and the evaluation of the vacuum breaker were not identified. During the inspection the licensee provided the following information:

- a. ZURN INDUSTRIES, INC. performed the analysis for the suppression pool strainers under order Nos. 82-N-4965 thru 4968, dated 1/27/82. The strainers are analyzed for stress, function, and elastic stability when subjected to seismic accelerations, submerged structural loads, live and dead loads, and operating loads. The stress due to these loads are within ASME Code limits. The strainers are considered satisfactory for the specified service.
- b. CONTINUUM DYNAMICS, INC. performed the evaluation of the Mark I vacuum breaker under purchase order No. 205-XJ102 for the General Electric Company, dated August, 1982. It is noted that neither GE nor the licensee has performed technical review with regard to the evaluation. Pending completion of a technical review by the licensee for this analysis, this item is identified as Unresolved Item, 324, 325/83-01-03, Plant Unique Analysis Report - Vacuum Breaker Evaluation.

Within the areas inspected, no violations or deviations were identified.

10. Seismic Response Spectra Curves - Units 1 and 2

Figure 3.3.1.4-1, Design response spectra curves in the Plant Unique Analysis Report is not well defined as compared with data shown in Table 3.3.1.4-1. The licensee indicated a supplement that will incorporate the changes will be submitted to Region II for further review.

Based on this review, no violations or deviations were identified.

11. Seismic Analysis for As-Built Safety-Related Piping Systems (25529)(IEB 79-14) - Units 1 and 2

The inspector reviewed the following isometric drawings to verify analysis requirements and the licensee commitments:

<u>DRAWING NO.</u>	<u>PIPING SYSTEM</u>
9527-D-2846 Sh.165	Reactor Core Isolation Cooling System
9527-D-2846 Sh.112	Reactor Water Clean-up System
9527-D-6554	Residual Heat Removal System
9527-D-6555	Residual Heat Removal System

It was found that data point 35 (anchor location) was missing on sheet 165D as a result of drawing revisions. In addition, the inspector re-inspected the QC approved Hanger No. 1RCC-50PG-271 as-built drawing for compliance with inspection requirements.

Within the areas inspected, no violations or deviations were identified.