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

Report Nos.: 50-325/84-24 and 50-324/84-24

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 Conducted: August 13-15 and August 18, 1984

Inspector: for J. L. Coley — 9/12/84 Date Signed

Approved by: J. J. Blake, Section Chief — 9/12/84 Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This special announced inspection involved 20 inspector-hours on site in the area of sizing of previously identified crack indications (Unit 2).

Results: No violations or deviations were identified.

REPORT DETAILS

1. Licensee Employees Contacted

*C. Dietz, General Manager, Brunswick Nuclear Project
**B. Parks, Manager, Technical Support
**M. Hill, Manager, Technical and Administrative Support
L. Wheatley, ISI, Engineer
B. Hinkley, Supervisor, Engineering
S. Williams, ISI Coordinator

Other licensee employees contacted included technicians and office personnel.

Other Organizations

J. Ingamells, Project Leader, Southwest Research Institute (SwRI)
E. Ruessher, Level III Examiner, (SwRI)
J. Briggs, Level III Examiner, General Electric (GE)

NRC Resident Inspector

*L. Garner, Resident Inspector

*Attended exit interview on August 15, 1984
**Attended exit interview on August 18, 1984

2. Exit Interview

The inspection scope and findings were summarized on August 15, 1984 and August 18, 1984, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspection findings.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Sizing of Previously Identified Crack Indications - Unit 2

Brunswick Unit 2 was shut down on November 2, 1983, in accordance with an NRC Order issued on August 26, 1983, to inspect all ASME Class 1 austenitic stainless steel piping that are susceptible to intergranular stress corrosion cracking in the recirculation, residual heat removal (RHR), core spray,

and reactor water clean-up (RWCU) piping systems. During this shutdown period, ultrasonic examinations were performed on 131 welds. Of these, 102 welds were in the recirculation system, 5 welds were in the RHR system, and 24 welds were in the RWCU system. The core spray system piping was made of carbon steel which was resistant to IGSCC.

Personnel from General Electric (GE) and Lambert, McGill, and Thomas (LMT) performed the ultrasonic testing (UT) for the licensee. The "amplitude-drop" method was used for crack depth measurements, with additional crack depth measurements using crack trip diffraction performed on all defective welds that were not repaired. The worst of the two crack depth measurements was used in the flaw evaluation of the unrepaired welds. The results of the UT examinations indicated that a total of 19 welds showed reportable linear indications, of which eight were 28" recirculation welds, two were 22" recirculation manifold welds, five were 12" recirculation riser welds, one was a 20" RHR weld, and three were 6" RWCU welds. All reported UT indications were short and shallow, and were in the weld heat-affect-zone (HAZ). Short axial cracks with depths not over 20% of the wall thickness were reported in two 28" recirculation welds and one 20" RHR weld. The deepest circumferential crack, which had a depth of 22% of the wall thickness, was reported in a 28" recirculation weld (2-B32-28"-B-5). Except for weld 2-B32-22-AM-5, the reported crack lengths in all defective welds did not exceed 2.375". Weld 2-B32-22-AM-5 was reported to have a total crack length of 11.5" (about 17% of the circumference) and a maximum crack depth of 20% of the wall thickness.

NUTECH performed flaw evaluations on all defective welds for the licensee. The results of NUTECH's flaw evaluations, including crack growth calculations, indicated that 11 (eight 28" recirculation welds, two 22" recirculation manifold welds, one 20" RHR weld) of the 19 defective welds did not require overlay repair because the calculated flaw sizes of those 11 welds at the end of a 6-month period did not exceed two-thirds of the new Code allowable limit (ASME Section XI, IWB-3600).

NUTECH also performed weld overlay design and repairs for the licensee. Eight of the 19 defective welds were weld overlay repaired. The overlay thickness was designed to meet the new IWB-3600 limits.

On March 12, 1984, Brunswick 2 shutdown for a planned refueling outage. During this outage, the licensee had General Electric perform sizing reverification of the cracks reported in the November 1983 outage for the 11 welds that had not received an overlay repair. Region II subsequently discovered, however, that the licensee only required General Electric to perform sizing reverification using the amplitude drop method. This method of sizing had been proven to be unreliable for sizing intergranular stress corrosion cracking and the technique alone did not duplicate the initial sizing effort. In order that accurate sizing be performed to determine actual crack growth, CP&L contracted Southwest Research Institute (SwRI) to perform sizing reverification of weld Nos. 2-B32-22-AM-5 and 2-B32-28-B-5

which represented the worst reported crack condition. SwRI used the multi-pulse observation sizing technique for sizing and performed the examinations using a highly specialized transducer (SLIC-40 Module), developed specifically for sizing by SwRI. On August 18, 1984, the inspector observed SwRI calibration and examination of the above welds. The following sizing data was confirmed by the inspector:

Weld No.	Defect No.	Previous Depth Readings	Depth of Indication Using (SwRI) SLIC-40
2-B32-22AM-5	#1	20% Throughwall	10% Throughwall
2-B32-2B-B-5	#1	22% Throughwall	10% Throughwall
	#2	15% Throughwall	15% Throughwall
	#3	19% Throughwall	15% Throughwall

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