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

Report No. 50-261/79-13

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

Facility Name: H. B. Robinson, Unit 2

Docket No. 50-261

License No. DPR-23

Inspection at Robinson Site Near Hartsville South Carolina

Inspectors: B. R. Crowley — Date Signed 7/10/79

Accompanying Personnel: A. R. Herdt (June 20-21)

Approved by: A. R. Herdt, Section Chief, RC&ES Branch — Date Signed 7/10/79

SUMMARY

Inspected on June 20-22, 1979

Areas Inspected

This special, announced inspection involved 26 inspector-hours on-site in the areas of steam generator feedwater line cracking and CRDM weld leaks (Licensee Event Report (LER) 79-11).

Results

Of the 2 areas inspected, no apparent items of noncompliance or deviations were identified.

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## DETAILS

1. Persons Contacted

Licensee Employees

*R. B. Starkey, Jr., Plant Manager
H. S. Zimmerman, Maintenance Supervisor
J. M. Curley, Engineering Supervisor
N. J. Chiangi, Engineering & Construction QA Manager
B. W. Garrison, QA Supervisor
W. J. Flanagan, Senior Engineer
J. Winslow, Mechanical Equipment Engineer
M. Reese, Welding Engineer (Harris)
D. M. Sullivan, Materials Science Laboratory Supervisor
G. L. Dickens, Engineer

Other licensee employees contacted included construction craftsmen, technicians, security force members, and office personnel.

Other Organizations

E. H. Williams, Senior Materials & Welding Engineer (Westinghouse)
H. S. Hinnant, Site Manager (Newport News Industrial Corporation)

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on June 22, 1979 with the person indicated in Paragraph 1 above. The inspection included examination of site activities relative to feedwater line cracking and review of site actions relative to recent CRDM seal weld leaks (LER 79-11). The licensee agreed to supplement LER 79-11 with additional information by August 15, 1979 (see paragraph 6).

3. Licensee Action on Previous Inspection Findings

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Independent Inspection Effort

Due to recently reported cracking in steam generator feedwater lines in several PWR plants, Carolina Power and Light Company radiographically (RT) inspected Robinson feedwater line welds and adjacent base material from the steam generators to the first restraint in each line. The RT inspection revealed cracks in each line in the reducer base material near the steam generator nozzle to reducer weld. The reducers were cut out of the system. The inspector was on site during the period the reducers were being removed and observed/reviewed the following:

a. Configuration of Feedwater Lines

The three feedwater loops are 16-inch diameter schedule 100 (1.031" wall thickness) carbon steel pipe connected to 18-inch diameter steam generator nozzles using 19-inch X 16-inch carbon steel reducers. The 19-inch ends of the reducers are machined to fit the 18-inch nozzles. The 16-inch end of the reducer is welded to a 90 degree ell which is welded to a straight section of pipe running downward. The straight section of pipe is 16-feet long for loops "A" and "C" and 19 feet long for loop "B". The other end of the straight section is welded to another 90 degree ell which is where the first pipe hanger is located. In addition to the pipe hanger at the second ell, loop "A" also has a restraint on the straight section of pipe betweeen the two ells.

b. Observation/Review of Inspection Results

(1) The inspector reviewed the following RT film:

<u>Loop A</u>

Nozzle to Reducer: FW-12
Reducer to 1st Ell: W-2
1st Ell to Pipe: W-1

<u>Loop B</u>

Nozzle to Reducer: FW-21
Reducer to 1st Ell: W-2
1st Ell to Pipe: W-1
Pipe to 2nd Ell: FW-20

<u>Loop C</u>

Nozzle to Reducer: FW-33
Reducer to 1st Ell: W-2
1st Ell to Pipe: W-1
Pipe to 2nd Ell: FW-32

In addition original construction radiographs for the three nozzle to reducer welds were reviewed.

Review of the recently taken radiographs revealed circumferential cracking in the reducer base material as previously reported by the licensee. Loops "B" and "C" appeared to be cracked more severely than "A" and the cracking appeared to be concentrated at the intersection of the counterbore and the counterbore taper. Circumferentially, the cracks were typically located between 1 to 5 o'clock and 7 to 11 o'clock. The cracks did not appear in the original construction radiographs.

(2) All reducers were visually examined by the inspector upon removal from the system. The cracking observed on the radiographs was visually detectable on the ID surface. In "C" reducer, where RT indicated the most severe cracking, there appeared to be a shallow notch machined at the intersection of the counterbore and the counterbore taper. In addition, the taper appeared to be very sharp rather than the required 10 degree angle. Rough machining marks were visible in all reducers in the counterbore and counterbore taper areas.

The inspector also observed the inside of the nozzles. There appeared to be a good 4 to 1 taper at the counterbore on all nozzles. Some rough machining marks were visible in the counterbore and taper areas. Also, some short intermittent cracks were visible in the counterbore area. However, at the time of the visual inspection, the nozzle ID's had not been cleaned up and visual inspection was not very reliable. After removal of the bucking rings and surface cleanup, the nozzle ID's were Liquid Penetrant (PT) inspected. The PT inspection revealed indications in the counterbore area of nozzles "B" and "C" ("A" had not been PT inspected while the inspector was at the site) and near the thermal sleeve of nozzle "B".

It should be noted that the licensee's repair plans require replacement of all reducers and PT and repair of all Nozzle ID's.

c. Materials

Based on a reviewed of available drawings and material ordering data the following material specifications are applicable:

- Steam Generator Nozzle - SA508 C1.2
- Reducer - SA106 Gr.B
- Pipe - SA106 Gr B

d. Welding and Heat Treatment

The inspector reviewed the applicable construction welding procedure, EBASCO WP-57, and available field weld records to obtain the following information for the reducer to nozzle welds:

- Joint Type - Backing Ring
- Filler Material - E7018A1
- Preheat - 250 degrees Fahrenheit
- PWHT - 1150 degrees Fahrenheit

e. Repair

Newport News Industrial Corporation (NNI) has been contracted by the licensee to remove the reducers, make necessary repairs to the nozzles and install new reducers. At the time of the inspection, a proposed welding procedure, NNI Instruction 1444-K-W001 had been written and qualification preparations were being made. The inspector reviewed the proposed instruction.

Within the areas inspected, no items of noncompliance or deviations were identified.

6. Review of Licensee Event Report (LER) LER 79-11, CRDM Canopy Seal Weld Leaks

The inspector examinined the licensee's analysis of the event, corrective action taken, and discussed the LER with licensee representatives. In addition, the inspector reviewed the weld repair procedure, Westinghouse Process Specification Supplement 82127SK, Rev. 2, and welder qualification records for the repairs. This examination and discussions with licensee personnel reveal that the LER does not fully describe the problems encountered during the weld repairs to fix the leaks. One weld required 3 repair cycles to fix the leak which started out to be a pinhole. Prior to start of the third repair, PT indications approximately 1-inch long were found in the repair area. The licensee agreed that the LER would be supplemented by August 15, 1979 to provide additional information. This LER will remain open pending receipt of supplementing information from the licensee.