UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-325/90-53 and 50-324/90-53

Licensee: Carolina Power and Light Company
P. O. Box 1551
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: December 17-21, 1990

Inspector: N. Economos 1/22/91
N. Economos Date Signed

Approved by: J. J. Blake 1/22/91
J. J. Blake, Chief Date Signed
Materials and Processes Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was performed as a follow-up to that documented in Report No. 90-47 and was conducted in order to observe recirculation pipe replacement activities in Unit 1. Observed pipe installation activities included, in process welding and inspections, nondestructive examinations, repairs, nonconformance documentation and resolution, valve replacement and feedwater nozzle N4D ISI indication evaluation.

Results:

By observation, document review and through discussions with cognizant personnel, the inspector determined pipe replacement was progressing on schedule, preliminary and final NDE examination showed field/production welds maintained a high level of quality, thermal treatment had been performed without any significant concerns, two reactor water cleanup inlet isolation valves F001 and F004 had been replaced using automatic welding procedures with good results and feedwater nozzle N4D, ISI identified indications were evaluated and reported to NRR for their concurrence.

In these repair and replacement activities management demonstrated considerable strength in their commitment to assure that quality was achieved, technical issues were properly resolved, and that organization staffing and training maintained high quality standards.

In the areas inspected, violations or deviations were not identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*K. B. Altman, Regulatory Compliance Manager
D. Baker, Shift Coordinator/Welding Specialist
M. R. Foss, Supervisor - Regulatory Compliance
E. Betz, Level III Examiner Corporate
J. E. Gates, Jr., Mechanical Engineer, Nuclear Engineering Design (NED)
*J. H. Gee, Design Control Engineer
*T. W. Gillman, Mechanical Engineer, NED
*J. L. Harness, General Manager Brunswick Nuclear Project (BNP)
*R. E. Helme, Manager, Technical Support
J. R. Holder, Manager Outages and Modifications
R. R. Johnson, Project Manager Recirculation Pipe Replacement (RPR)
T. Pitchford, Lead Engineer, PRP
*J. Spencer, Assistant to Vice President, BNP
*R. L. Warden, Maintenance Manager
*K. A. Williamson, Manager, NED

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, mechanics, security force members, technicians, and administrative personnel.

Other Organizations

General Electric Nuclear Energy

R. Cameron, Project QC Supervisor
A. Ketcham, Assistant Project Manager
R. Markling, Shift Supervisor
P. Radovich, Shift Supervisor
P. Roeder, Project Manager

NRC Resident Inspectors

W. Levis, Resident Inspector (RI)
D. Nelson, RI
*R. Prevatte, Senior RI

*Attended exit interview

2. Replacement of Recirculation Piping, Unit 1 (2512/13)

This inspection was conducted as a follow-up to those documented in Reports 90-22 and 90-47. Areas inspected and discussed in these reports included administrative controls, design changes and design engineering

involvement, specifications, material replacement and procurement, personnel training, qualification of welding procedures and welders as well as, applicable codes and standards for replacement pipe installation, examination and testing.

a. Welding (55050)

At the time of this inspection, the inspector noted that the recirculation pipe replacement project (RPR), had progressed past the midway point in that six recirculation risers and one core spray riser had been installed. Of these, final radiographs had been taken and accepted on nozzle to safe end welds for recirculation nozzles N2A, N2C, N2E N2K and on core spray nozzle N5A. The remaining six recirculation nozzle to safe end welds and, the other similar weld on core spray riser B were either in progress or approaching completion. On two different occasions, the inspector entered the dry-well and observed weld fabrication in progress with emphasis on appearance of the weldment, weld bead condition and cleanliness/housekeeping in the area around the weld location and inside the drywell area. In a similar manner the inspector monitored welding through the TV monitors situated outside the dry-well building and observed the settings on the power supply consoles and/or welding control equipment to verify compliance with applicable qualified welding procedure parameters and the licensee's installation specification(s) No. 248-158. As a follow-up to this inspection effort, the inspector reviewed GE's field travelers for nozzles N2A, N2C, N2D and N2E-N2K to verify completeness, accuracy and adherence to licensee specification requirements.

Within these areas the inspector noted that weld N2G, safe end to nozzle was shown, by inprocess radiography, to contain rejectable fabrication type indications which required field repairs. The inspector reviewed the radiographs of the subject weld, concurred with the findings, the corrective measures taken to repair and, the documentation of the activity.

Within these areas violations or deviations were not identified.

b. Radiographic Film Review (57090)

Radiographs of completed welds which were selected for review were as follows:

Recirculation Piping

Weld Number	Pipe Configuration
1B32FFA-12-FWRRB10A	Sweep-O-Let to Pipe
1B32FF^-12-FWRRB12A	Reducer to Pipe
1B32FFE-12-FWRRB14A	Sweep-O-Let to Pipe

Weld Number (cont'd)	Pipe Configuration
1B32FFF-12-FWRRA10A	Sweep-O-Let to Pipe
1B32FFA-12-FW701	Pipe to Safe End
1B32FFC-12-FW703	Pipe to Safe End
1B32FFE-12-FW705	Pipe to Safe End
1B32FFF-12-FW706	Pipe to Safe End
1B32FFG-12-FW707	Pipe to Safe End
1B32FFK-12-FW710	Pipe to Safe End
1B11N2A-RPV-FWABA	Safe End to Nozzle
1B11N2C-RPV-FWABA	Safe End to Nozzle
1B11N2E-RPV-FWABA	Safe End to Nozzle
1B11N2F-RPV-FWABA	Safe End to Nozzle
1B11N2J-RPV-FWABA	Safe End to Nozzle
1B11N2K-RPV-FWABA	Safe End to Nozzle
Core Spray Piping	
*1E21FF-4-FW1C515A	Pipe to Transition
1B11N5A-RPV-FWRNA16A	Safe End to Nozzle

*Radiographs of the completed weld depicted rejectable fabrication indications, porosity and lack of fusion, at stations 0-1 and 2-3. These defects were located, removed and the weld was undergoing repair at the end of this inspection. The above final radiographs were reviewed, to determine their conformance with code acceptance criteria and the applicable specification. Also, by this review the inspector verified film quality and penetrameter type size and location; sensitivity, film density, film identification and weld coverage.

Within the areas inspected violations or deviations were not identified.

c. Motor-Operated Valve Upgrade

Two motor-operated inlet isolation valves, F001 and F004 were replaced as part of the motor-operated valve (MOV) upgrade program, implemented through plant modification 89-072, "Replacement of reactor water cleanup valves 1-G31-F001 and, -F004". This work effort was in progress at the time of this inspection. Existing valves were the flex wedge gate design which are susceptible to thermal binding and potential bonnet overpressurization. The replacement valves were identified as six inch diameter, 900 pound DD Gate valves with SNNB-00 motor actuator mountings. The original valves were purchased in accordance with USAS B31.1-67 Power Piping Code requirements. Report number 7992.017-S-M-45, was issued by United Engineering (UE&C), to reconcile the requirements of the aforementioned code with the updated and currently applicable code ANSI B31.1-86. The code and related acceptance criteria for welding,

inspection and testing was ASME Section III, 1986 Edition and Section XI 1980 Edition with 1981 Winter Addenda. Valve quality records which were reviewed for completeness and conformance with code requirements included manufacturing travellers, testing reports, i.e., hydrostatic test results, receipt inspections and certificates of conformance. The valves were installed by GE using their Recirculation Piping Replacement (RPR), program and contractual agreement with the licensee.

Welds were fabricated with the automatic gas tungsten (TIG) process and the qualified weld procedures used for the RPR project. At the close of the inspection, the inspector was informed that radiographs of the newly fabricated welds were examined and found acceptable. The inspector observed these welds and adjacent base material for workmanship, cleanliness and suitability for ISI examinations.

Within these areas violations or deviations were not identified.

3. Identification and Evaluation of Ultrasonic Indication in Feedwater Weld 1B21N4D -SW1-2

Report No. 89-35 described the licensee's program in response to Generic Letter 88-01 and NUREG-0313 Revision 2. The report also identified certain dissimilar metal welds, in the feedwater and core spray systems which had not been included in the subject program but which the licensee agreed to evaluate and examine accordingly. Unresolved Item 325,324/89-35-03 "Apparent NUREG-0313, Rev. 2, Program Inadequacies" was generated to follow-up on this issue during future inspections. A total of nine (9), dissimilar metal i.e., inconel to carbon steel and/or inconel metal welds were identified as being potentially susceptible to intergranular stress corrosion cracking (IGSCC) attack.

Because these welds had not been ultrasonically examined using refracted longitudinal (RL) wave type transducers, the licensee committed to do this type of examination during this outage. The nine welds subjected to this type of examination were as follows:

1B21N4A-2-FWRN4A45-3
1B21N4B-3-SW1-2
1B21N4B-3-SW2-3
*1B21N4D-5-SW1-2
1B21N4B-3-FWRN4B135-3
1B21N4C-6-SW1-2
1B21N4C-6-SW2-3
1B21N4C-6-FWRN4C225-3
1B21N4D-5-FWRN4D315-3

Following the UT examination, the licensee stated that no relevant indications were observed using the 45° shear, and 45° and 60° RL transducers. One non-geometric indication was recorded in the weld marked with an asterisk.

According to GE's summary UT report, this indication has a depth of 3/8 inches and total length of one (1) inch, which means that the remaining weld ligament, has a thickness of approximately 0.46 inches.

The indication has been characterized as a planar reflector that is circumferentially oriented, and located on the upstream side of the weld. It has an amplitude of less than 100 percent DAC, and therefore, it is not considered reportable by the applicable code - ASME Section XI 1980 Edition with 1981 Addenda. As a precautionary measure, the licensee contracted Structural Integrity Associates (SIA) to evaluate the indication.

This evaluation was performed in accordance with ASME Code, Section XI, IWB-3640, 1986 Edition, and the requirements of NUREG-0313, Rev. 3, and demonstrates that the weld can be returned to service for at least one operating cycle. In addition to the crack growth analysis, SIA also performed a leak-before-break analysis for the recorded indication to demonstrate that in the unlikely event that the flaw would propagate through-wall, adequate margins exist between the leakage flaw size and the critical flaw size to preclude compromising plant safety.

During a conference call between the NRC Staff and CP&L on Thursday, December 20, 1990, CP&L committed to monitor the crack growth rate of the Inconel 182 material in the BSEP Unit 1 Crack Arresting Verification (CAV) system. The CAV system crack growth data will be monitored to assure that the crack growth rate, assumed in the flaw evaluation, remains conservative. CAV system data will be analyzed on a monthly basis, and any anomalies in crack growth rates will be evaluated to ensure that the feedwater system integrity is not compromised, and that the plant can continue to be operated safely.

4. Exit Interview

The inspection scope and results were summarized on December 21, 1990, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below. Although reviewed during this inspection, proprietary information is not contained in this report. Dissenting comments were not received from the licensee.