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

Report Nos.: 50-269/91-25, 50-270/91-25, and 50-287/91-25

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-269, 50-270, and 50-287

License Nos.: DPR-38, DPR-47 DPR-55

Facility Name: Oconee 1, 2, and 3

Inspection Conducted: September 3-6, 1991

Inspector: N. E. Economos — Date Signed: 10-4-91

Approved by: J. J. Blake, Chief
Materials and Processes Section
Engineering Branch
Division of Reactor Safety — Date Signed: 10/4/91

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the area of Unit 1 inservice activities with emphasis on once through steam generator (OTSG) tube plugging repairs, components cooling check valve replacement and associated welding, boric acid corrosion prevention programs, evaluation of primary loop indication identified by ultrasonic examination during this outage.

Results:

By observation, interviews and a review of records and procedures, the inspector ascertained that plugging of the cracked welded plugs installed in previous outages was being done with prototype equipment developed for this project. Engineers and technicians directing and/or performing this task were found to be well trained and exercised conservatism in their decisions. Record keeping of work activities was satisfactory.

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

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

*H. B. Baron, Station Manager
*J. Batton, Nuclear Production Engineer
B. W. Carney, Mechanical Technical Support Engineer
*T. J. Coleman, Site ISI Coordinator, QA
*W. W. Foster, Maintenance Superintendent
*W. T. McClure, Tech Support, QA
*B. Millsaps, Maintenance Services Manager
*R. A. Morgan, QA Director

Other licensee employees contacted during this inspection included technical support, QA, and administrative personnel.

Other Organizations

B&W Nuclear Services Company
M. M. Munsterman, Welding Foreman
B. Stallings, Project Manager

NRC Resident Inspectors

P. Harmon, Senior Resident Inspector
*B. B. Desai, Resident Inspector
W. K. Poertner, Resident Inspector

*Attended exit interview

Inservice Inspection Unit 1

This inspection was conducted as a follow-up to that documented in Report No. 50-269/91-20 for the purpose of observing the welding of plugs on previously explosively plugged tubes. This action became necessary when it was discovered that the explosive plugs had exhibited cracking.

2. Welding (55050)

a. Once Through Steam Generator (OTSG) Welded Plug Repair, Unit 1

The eddy current (EC) inspection of welded plugs in OTSGs "1A" and "1B" disclosed evidence of crack indications and the licensee concluded that corrective action would be necessary prior to returning the unit to service. The number of tubes with plugs requiring repair was as follows:

	S/G 1A	S/G 1B
Cold Leg		
-- Lower Tube Sheet	0	25
Hot Leg		
-- Upper Tube Sheet	19	104

B&W Nuclear Service Company (B&W) was contracted to provide technical support and manpower for this task. ASME Code Section XI, 1989 Edition IWB-4230, (Code) was invoked as the controlling document for this repair. Because this edition of the Code has not been approved by the Commission, the licensee requested and received permission from NRR to proceed with the repair under the rules of the subject Code edition (see Region II Report No. 91-20 for further details on this matter). As discussed in the aforementioned report, the repair plugs were welded to the tubes using the automatic gas tungsten arc process (TIG) with NiCr-3 Inconel filler metal wire. The actual welding was done by remote control to minimize exposure to radiation. The welding equipment was developed specifically for this repair by Welding Services of Atlanta, GA, while the milling machine and plug handling equipment used to weld-prep (spot-face) the tube ends, and to transport the repair plugs were developed by B&W. Because the milling and handling equipment were prototypes, B&W encountered a number of mechanical problems, which included metal cutting, handling and locating the plugs in the tube ends. However, as the repair progressed, these difficulties were resolved and the job was completed satisfactorily.

The repair plugs were made from Inconel 690 material produced from heat number NX6977HK, Lot number 12. The material was provided by INCO Alloys to B&W under QA Package 23-1200823-00. Certificate(s) of conformance and certified material test reports on the subject plugs were reviewed and found in order.

The repair activity was controlled by a Process Traveler entitled Remote Welded Plug Installation, number 50-1203388-00. This document provided detailed work instructions for the project which included hole preparation, remote welded plug installation, remote welded plug repair and line item documentation of work performed. Completed welds were visually inspected per VT-1 procedure, Visual Examination of S/G Tube Plug Welds, Rev. 0, written to comply with ASME Code Section XI (86W86), IWA-2000 and Section V, Article 9, 1986 Edition. Third party inspection (ANI) was provided by Hartford Boiler Company.

The inspector reviewed technical support documents and quality records including personnel qualifications, materials receipt inspection reports, certifications, inspection results, nonconformance reports and QA/QC inspections of completed welds. Following is a list of tubes where some of the aforementioned problems were incurred.

Tube No.	OTSG	Problem	Resolution
*87-126	"B"	Tungsten Electrode stuck	Corrected by welding repair
147-11	"A"	Weld imperfection "fish eye"	Corrected by welding repair
73-1	"A"	Incomplete weld due to weld head position	Repositioned equipment and completed joint
*98-126	"B"	Arcing because of equipment problem	Corrected by welding repair

*Nonconformance reports were written on these tubes to document multiple repairs.

In addition to the above, the inspector noted that in the upper tube sheet of OTSG/"B", a small section of the clad, along with three tubes 85-125, 85-126 and 86-126, sustained some damage during the spot-facing/machining operation. The licensee stated that the damage incurred because of an indexing problem with the milling machine. This caused the machine to cut at an angle of approximately 28 degrees off the vertical. The licensee's follow-up inspection and evaluation disclosed that a section of tube 85-125 was machined down to the clad/tube-sheet interface location which exposed a small area (0.027") of the alloy steel tube-sheet. Damage to the other two tubes, 85-126 and 86-126, was relatively minor.

Following the close of this inspection, the inspector ascertained that the licensee took the following remedial actions on the subject tubes:

85-125 Drill hole in existing explosive plug; reroll tube and install a roll plug.

85-126 Drill hole in existing explosive plug and install a rolled plug with stabilizer.

86-126 No remedial action required.

In reference to the exposed alloy steel material on the upper tube-sheet of OTSG "B", the licensee stated that an engineering evaluation had been performed which determined that it was acceptable to leave the affected area in the as is condition for one fuel cycle. A repair procedure to correct the damage will be developed and implemented at the next refueling outage. It is the inspector's understanding that the licensee contacted NRR by memorandum to apprise them of the use of ASME Code Section XI, 1989 Edition and the

aforementioned damage to the tube-sheet. Through discussions with NRR staff, the inspector ascertained that NRR has concurred with the licensee's position on the use of the 1989 Edition of the Code and that the proposed remedial action(s) are under evaluation.

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

b. Check Valve Replacement

Discussions with Maintenance Services management disclosed that replacement of problem swing check valves was scheduled for this outage. For the most part, the problem was related to accelerated degradation of valve internals which resulted in their failure to perform their design function or to pass required testing. The majority of these check valves were found in the feedwater system, component cooling and circulating water systems. The valves ranged in size from three to ten inches in diameter. Four check valves from the component system were selected for a review and evaluation of material, installation and testing records. The subject replacement valves were identified as follows:

Valve #	Size	Type	QA Tag #
ICC-20	6-inch diam.	Swing Soft Seat	62401
ICC-24	6-inch diam.	Swing Soft Seat	62401
ICC-76	2-1/2 inch diam.	Swing Soft Seat	62404
ICC-77	2-1/2 inch diam.	Swing Soft Seat	62404

These replacements were performed on work requests 54053 through 54055, respectively. Maintenance procedures used in this task included:

MP/0/A/1800/001	Process Record (tools and materials inventory)
MP/0/A/1810/014	Valves and piping - Welded - Removals and Replacement - Class A-F
MP/0/B/1810/015, Change 11	Process record of procedure reviewed
MP/0/A/1720 Change 17	System hydro

The controlling code of record for welding and testing was USAS Power Piping Code B31.1. The welds were classified as Duke Class F and as such were visually inspected following weld completion. The replacement valves were purchased to meet ASME Code Section III, Class 3 (89W89) requirements, delineated in on Duke's purchase orders

A12669-77-003 and -004 and the applicable specification. The inspector reviewed quality records including work travelers, code data reports, material certifications, certificates of compliance and receipt inspection reports for the subject valves and associated replacement piping.

The new welds were fabricated with a combination gas tungsten arc/shielded metal arc (TIG/SMAW) weld procedure qualified to ASME Code Section IX requirements. The inspector reviewed procedure qualification records and performance records for welders who fabricated the replacement welds. These welders were identified by stencil number W91, 455 and 585.

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

3. Boric Acid Corrosion Prevention Program Units 1 and 2 (62001)

Discussions were held with the licensee's cognizant engineer to ascertain whether the essential elements of Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," were being implemented. These elements were to include, but not be limited to, a documented program, approved working procedures providing clear guidance for performing activities specified by the program and objective evidence to verify implementation of programmatic requirements. Administrative controls for this task is provided through Operations Management Procedure (OPMN) 1-6, Rev. 5, and Maintenance Directive 5.3.7, Conducting and Documenting Reactor Building Boron Inspections. Inspection records spanning a period of three years were reviewed. These records documented observations and corrective actions taken as required. Based on this work effort, the inspector concluded that the licensee has adequately responded to Generic Letter 88-05 requirements through a comprehensive inspection program that provides for identification of problem areas and the mechanism to take appropriate corrective action as required.

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

4. Review and Evaluation of ISI Records Unit 1 (73755)

In the previous inspection, documented by Report No. 91-20, the inspector reported that a code rejectable indication had been identified in a primary loop piping weld No 1P1B15, figure number B09.011.036. The indication was discovered during a scheduled inservice inspection by ultrasonic examination. A problem investigation report, #1-091-0085, was issued and following an evaluation by the licensee's Level III examiner to confirm its validity, the licensee expanded the weld population by adding eleven more welds to the inspection plan as required by the Code.

During this inspection, the inspector reviewed the weld selection and inspection results which identified no further problems. Since the close of this inspection, the inspector ascertained that the licensee performed a fracture analysis and determined that the indication in the weld did not compromise weld integrity. This analysis will be reviewed by this inspector on a future inspection.

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

5. Exit Interview

The inspection scope and results were summarized on September 6, 1991, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results. Dissenting comments were not received from the licensee.