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

Report Nos.: 50-369/84-22 and 50-370/84-19

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

Docket Nos.: 50-369 and 50-370

License Nos.: NPF-9 and NPF-17

Facility Name: McGuire 1 and 2

Inspection Dates: July 30 - August 8, 1984

Inspection at McGuire site near Charlotte, North Carolina

Inspectors: _____ 8/21/84
N. Economos Date Signed

for _____ 8/21/84
W. Ang Date Signed

Approved by: _____ 8/21/84
J. J. Blake, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Areas Inspected

This routine, unannounced inspection involved 45 inspector-hours onsite in the areas of Inservice Inspection-review and evaluation of records - Unit 1; observation of Unit 2 coolant pump "2A" number 1 seal replacement; and two-inch decay heat (ND) pipe break and pipe support failures - Unit 2.

Results

No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*G. W. Cage, Superintendent of Operations
*D. Mendezoff, Licensing Engineer
*D. J. Rains, Superintendent of Maintenance
*R. P. Ruth, Project Senior QA Engineer
*A. F. Batts, QA Technical Support Supervisor
*P. J. Helton, Project ISI Coordinator
J. M. Howard, Systems Maintenance Coordinator
*B. Moore, Systems Engineer
**D. L. Canup, Supervising Design Engineer
**M. S. Sills, Supervising Design Engineer
**D. G. Cook, Supervising Design Engineer
**R. Rila, Mechanical Maintenance Engineer
**T. L. McConnell, Superintendent of Technical Services

Other licensee employees contacted included technicians, mechanics, and office personnel.

NRC Resident Inspector

W. T. Orders, Senior Resident Inspector

*Attended exit interview on August 7, 1984
**Attended exit interview on August 8, 1984

2. Exit Interview

The inspection scope and findings were summarized on August 7 and 8, 1984, with those persons indicated in paragraph 1 above. Unresolved item 370/84-19-01, "Concrete Expansion Anchor Repair," was discussed with the licensee. The licensee acknowledged the unresolved item, expressed disagreement regarding the inadequacy of the repairs, and agreed to consider further corrective action.

3. Licensee Action on Previous Inspection Findings

Not inspected.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve noncompliance or deviations. The new unresolved item identified during this inspection is discussed in paragraph 7.

5. Inspector Followup (92701)

(Closed) Inspector Followup Item 369/84-06-01, Measurement of Black Light Intensity. The inspector discussed with cognizant licensee personnel the matter of recording the time(s) when black light intensity measurements were taken during magnetic particle inspections. In response, the licensee representative stated that the applicable procedure has now been revised to provide added instructions regarding this matter to NDE technicians. The inspector reviewed the revised procedure, NDE-26, Rev. 4, and closed this item.

6. Independent Inspection Effort (92706)

a. Reactor Coolant Pump "2A" Number 1 Seal Leakage Repair (Unit 2)

In the process of shutting down the unit for repairs to blowdown valve (BB141), the licensee noted excessive leakage past the number 1 leak-off seal in the "2A" reactor coolant pump. The event was reported to the Region on July 27, 1984, and documented in the Morning Report dated July 30, 1984. MP/O/A/7150/39, Reactor Coolant Pump Removal and Replacement, was the licensee's controlling document for this activity, and it provided step-by-step instructions with provisions for QC inspection and signoffs. The document referenced Westinghouse (W) Operating Manual MCM 1201.01.193. Seal replacement was being performed under work request number 11895, NC Pump 2A, No. 1 seal. The inspector discussed the repair/replacement work with cognizant licensee personnel and observed part of the seal dissassembly effort which included the removal of numbers 2 and 3 seal leak-off assemblies. Quality documents reviewed included W quality release QR-26228, for replacement parts and receiving inspection reports for certain replacement parts including seal service kit #MC 20416, No. 2 seal ring #MC 13457, No. 3 seal collar #MC 13456 seal ring and runner set #MC20790.

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

b. Decay Heat (ND) Two Inch Line Break (Unit 2)

On August 6, 1984, the licensee reported that a two inch socket weld, ND2FW22-23, on the ND system inside the auxiliary building failed, releasing 3500 to 4000 gallons of water on the floor in that vicinity. The line is used as part of the letdown system and interfaces with the chemical volume control (NV) system through valve 2NV121. The licensee postulated that the break resulted from a transient condition believed to be a water hammer. Along with the socket weld failure, the licensee stated that ten hangers in the vicinity had sustained minor to extensive damage. The socket weld is on the horizontal leg of a 90°ELL located at elevation 745' - 7¼" near column KK of the auxiliary building, zone A-3, and appears in drawings MC 2414-04.42, 01 and 02, ISO MCFI-2ND22, Rev. 8. The line is classified as ASME Code Class 2 and was fabricated to ASME Code Section III (71S71) requirements.

The licensee has removed, for destructive and nondestructive examination, the 90° ELL with the broken socket weld, the horizontal run adjacent to the break, the 90° ELL at the opposite end of the pipe run, the attached 2'4" vertical run along with the 90° ELL attached at the bottom of the vertical. The inspector discussed the failure with cognizant personnel and ascertained that the licensee had fabricated a new subassembly to replace the section cut-out for investigation. Also, the inspector observed the fracture surface of the weld, reviewed radiographs of the original sockets welds on the above mentioned 90° ELLs, and reviewed quality records for the original and replacement materials. At the time of this inspection, the cut pipe section and the fitting with the broken weld were located inside a plexiglass container because of high activity. This condition, along with handling difficulties and poor lighting conditions, precluded a detailed examination of the fraction surface. Therefore, it was impossible at this time to ascertain whether the entire fracture was the result of the water hammer force or whether the postulated vibration in this line had initiated a crack in the weld which propagated to total failure as a result of the water hammer. In order to obtain more information in this area, the licensee has contracted W to perform a failure analysis on these parts.

The inspector requested and the licensee has agreed to provide results of this analysis as it becomes available. At the close of this inspection, the evening of August 7, 1984, the licensee was preparing to install the newly fabricated subassembly to replace the section cut for examination. The new socket welds were fabricated and inspected in accordance with ASME Code Section III (71S71) requirements.

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

7. Repair Of Detailed Unit 2 CVCS System Pipe Supports

On August 6, 1984, the licensee reported that a CVCS letdown line cracked and leaked. Subsequent inspection by the licensee identified possible damage to 14 pipe supports. The licensee evaluated the occurrence, and based on available data, felt that the piping involved had been inadvertently partially drained, air had been introduced into the system and trapped. With these conditions, the licensee felt that a water hammer occurred upon opening valve 2ND32 and allowing RHR pressure and flow into the CVCS letdown line. The licensee postulated that the water hammer resulted in the piping socket weld joint failure and pipe support damage. The piping and pipe supports were not designed for the forces (water hammer) that it experienced. A sampling review of pipe support calculations and pipe support installation records for the affected pipe support was performed and revealed no discrepancies.

The licensee's Operations and Design Engineering Department had determined the bounds for potential piping and pipe support damage. Maintenance Department and QA Department inspections were in progress. The licensee stated that a total of 139 pipe supports will be inspected for visible damage. Repair of the 14 supports with possible damage had been initiated on shutdown request numbers 7783 and 7784. Any other identified pipe support damages will be similarly repaired. The damaged pipe support weld replacement is addressed in paragraph 6. The licensee stated that all affected piping will be hydrostatically tested. The licensee stated that the potential vent path and air source which resulted in the subsequent water hammer was the packing area of valve 2NV121. The licensee stated that a vibration monitor would be temporarily installed on 2NV121 to determine if vibration could have caused the loosening of the packing nuts and packing. In addition, the licensee stated that locknuts will be installed on the packing gland. The licensee further stated that additional corrective action is being considered - slowly opening valve 2NV32 to slowly activate the letdown line, piping modifications to preclude air being trapped in the piping, etc.

A review of the corrective action for the repair of damaged pipe support concrete expansion anchors indicated that the licensee intended to replace concrete expansion anchors that had completely pulled out with the same size concrete expansion anchors. The same holes that the anchors pulled out of were to be re-used if no visible surface damage was noted. The installed anchors would be torqued using original construction specifications. The licensee stated that the torque provided an equivalent tensile load on the concrete expansion anchors equal to two to three times the design load. The licensee felt that the torque test verified adequacy of the installation.

During a telephone conversation between the licensee and RII on August 10, 1984, the licensee was informed of the following:

a. The licensee should document design calculations showing that the torque performed on the repaired concrete expansion anchors provided a tensile load equivalent to 2-3 times the actual loads that the repaired concrete expansion anchors are designed for.

b. The licensee should consider a revision of their concrete expansion anchor repair procedure to provide visual inspection of the old hole for the concrete expansion anchor of the concrete.

c. The licensee should consider performing tests to verify the adequacy of the repair procedure used by simulating reinstallation of a concrete expansion anchor after it had pulled completely out of its hole.

The licensee agreed to consider the three items noted above. Pending further RII inspection and evaluation of licensee action to verify adequacy of the repair of concrete expansion anchors, this was identified as unresolved item 370/84-19-01, "Concrete Expansion Anchor Repair."

No violations or deviations were identified.

8. Inservice Inspection-Data Review and Evaluation (73755)

At the time of this inspection, the Unit 1 ISI work effort for this outage had been completed and the data compiled in a report entitled, ... Unit 1 1984 First Refueling Outage. A copy of this report was forwarded to Region II on June 19, 1984.

In summary, the report included the inservice inspection plan, the inspection results for each item, a summary for each category of examinations, certification data for all personnel, material, and equipment, and corrective action taken when unacceptable conditions were found.

The Class 1 Inservice Inspection included examination of each component of the Westinghouse NSSS System and associated piping. The Westinghouse NSSS System consists of the reactor vessel (CE), four steam generators (Westinghouse) identified as 1A, 1B, 1C and 1D, the pressurizer (Westinghouse), four reactor coolant pumps (Westinghouse Model 93A), and associated primary coolant system piping. In addition, Class 2 & 3 inspections were performed as required by code, details of which were included in the report.

There were no Class 1 reportable indications found during Outage 1.

Augmented inspections performed during this outage consisted of the following:

- Reactor Coolant Pump Flywheel Exam
- Steam Generator Tube Exams on the Preheater Section
- Steam Generator Feedwater Modification
- Thermal Sleeves Removal
- Reactor Coolant Pump Support Lugs Exam
- Pipe Rupture Protection
- IE Bulletin No. 79-13 Feedwater System

The applicable code for the ISI is the ASME Bioler and Pressure Vessel Code, Section XI, 1980 Edition with Addenda through W80. Additional codes and standards applicable to this inspection were as follows:

a. USNR Regulatory Guide 1.14, Revision 1, Reactor Coolant Pump Flywheel Integrity

b. USNR Regulatory Guide 1.83, Revision 1, Inservice Inspection of Pressurized Water Reactor Item Generator Tubes

c. USNR Regulatory Guide 1.150, Revision 0, Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations

(1) Records for the examination areas listed below were reviewed to ascertain whether the records contained or provided reference to: examination results and data sheets; equipment data; calibration data sheets; evaluation data; records on extent of examination;

records relative to deviations from program; disposition of findings; re-examination after repair; and identification of NDE materials.

	Item No.	Weld	Examination Type
Reactor Vessel	B01.030.001	Vessel & flange 0°-180°	U/T
	B01.040.001	Vessel head & flange	U/T
	B06.010.010-5	Closure head nuts 1 - 5	M/T
	B06.030.0C1-5	Closure studs	U/T, M/T
Pressurizer	B08.02.001	Support skirt lower head	M/T
Pipe ≥4"ϕ	B09.011.014	1NC 73-5	U/T, P/T

Records of reactor pressure vessel head to flange weld, B01.040.001, which was examined from 0° to 120°, was reviewed in the areas of:

a. Method extent and technique comply with ISI program

b. Examination data are within acceptable criteria

c. Recording, evaluation, and disposition of findings are in compliance with applicable procedures

In addition, records of selected pipe welds which included some within the pressure boundary system were reviewed to ascertain whether the following requirements were met:

a. Major deviations between initial and final calibrations

b. Documentation of recordable indications in a manner that would permit accurate evaluation and documentation

c. Evaluation/Review of examination data by qualified level II or III examiner

d. Evaluation of examination data is within code and/or procedural requirements.

e. Incomplete examinations and results were repeated to permit full evaluation as applicable.

The welds selected for this work effort were as follows:

Item	Weld #	Size	Type of Exam
B09.001.015	1NC-102-9	10" x 1.00	U/T, P/T
B09.011.031	1ND1F-237	14" x 1.25	U/T, P/T
B09.011.020	1NC1F-1-4(RC Loop 1)	31" x 2.5"	U/T, P/T
B09.011.400	INI-200-2	6" x 0.719"	U/T, P/T
C05.021.04	1CF1F-715	16" x .844"	R/T
C05.021.05	1CF1F-716	16" x .844"	R/T

A review of eddy current inspection results for S/Gs "A", "B", "C", and "D", disclosed that six tubes were plugged in S/G "A" and one in S/G "C".

Within the areas of inspection, no deviations or violations were identified.