



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

Report Nos.: 50-369/88-19 and 50-370/88-19

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 Conducted: June 27 - July 1, 1988

Inspector: *R. W. Newsome*  
R. W. Newsome

7/21/88  
Date Signed

Approved by: *J. J. Blake*  
J. J. Blake, Chief  
Materials and Processes Section  
Engineering Branch  
Division of Reactor Safety

7/21/88  
Date Signed

SUMMARY

Scope: This routine, unannounced inspection was conducted on site in the areas of Unit 2 Nondestructive Examination (NDE) activities associated with the Resistance Temperature Detector (RTD) system modifications, independent review of radiographs associated with the Upper Head Safety Injection System (UHSIS) piping deletion, and Inservice Inspection (ISI) and Preservice Inspection (PSI) being accomplished during this outage. Also, inquiries and discussions with regard to Bulletins 88-02 and 88-05.

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

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*N. Atherton, Compliance Production Specialist
- \*W. Goodman, Quality Assurance (QA) Technical Support Supervisor
- \*B. Hamilton, Superintendent Technical Services
- \*S. LeRay, Licensing
- D. Mayes, Maintenance Engineer
- \*R. Sharpe, Compliance Engineer
- \*B. Travis, Operations
- T. Troutman, QA Inservice Inspection (ISI)
- \*G. Underwood, QA, ISI, Operations

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

#### Other Organizations

Babcock and Wilcox  
R. Patterson, ISI Supervisor

#### NRC Resident Inspectors

- \*R. Croteau, Resident Inspector
- \*D. Nelson, Resident Inspector

\*Attended exit interview

### 2. NDE of RTD System Fabricated Modifications, Unit 2 (57050) (57060) (57090)

The inspector examined documents and records as indicated below to determine whether NDE was being conducted in accordance with applicable procedures, regulatory requirements, and licensee commitments. The applicable fabrication code is the American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME B&PV) Code, Section III, 1983 edition. Westinghouse Electric Corporation (W) is making the modifications using their personnel and working under the (W) QA program.

- a. The inspector reviewed the below listed procedures for procedure approval, requirements for qualification of NDE personnel, and compilation of required records.

<u>Procedure</u>	<u>Title</u>
NDE-240 (RO)	Liquid Penetrant Examination
NDE-110 (RO)	Visual Examination
NDE-10 (R16)	General Radiography Procedure

The inspector reviewed Liquid Penetrant (PT) Procedure NDE-240 to ascertain whether it had been reviewed and approved in accordance with the established QA procedures. The above procedure was reviewed for technical adequacy and conformance with the ASME Code Section V, Article 6, and other licensee commitments/requirements in the below listed areas: specified method; penetrant material identification; penetrant materials analyzed for sulfur; penetrant materials analyzed for total halogens; acceptable pre-examination surface; drying time; method of penetrant application; surface temperature; solvent removal; surface drying prior to developing; type of developer; examination technique; evaluation technique; and, procedure requalification.

The inspector reviewed Visual (VT) examination Procedure NDE-110 to determine whether it contained sufficient instructions to assure that the following parameters were specified and controlled within the limits permitted by the applicable code, standard, or any addition specification requirement: methods - direct visual, remote visual or translucent visual; application - hydrostatic testing, fabrication procedure, visual examination of welds, leak testing, etc.; how visual examination is to be performed; type of surface condition available; method or implement used for surface preparation, if any; whether direct or remote viewing is used; special illumination, instruments, or equipment to be used, if any; sequence of performing examination, when applicable; data to be tabulated, if any; acceptance criteria is specified and consistent with the applicable code section or controlling specification; and, report form completion.

The inspector reviewed Radiography (RT) Procedure NDE-10 to determine whether it contained sufficient information to assure that the following parameters were specified and controlled within the limits permitted by the applicable code, or any additional specification requirements: type of material to be radiographed; material and weld surface condition requirements; type of radiation source, effective focal spot or effective source size; film brand or type; number of films in cassette; minimum source to film distance; type and thickness of intensifying screens and filters; quality of radiographs; film density and contrast for single and composite viewing; use of densitometers for assuring compliance with film density requirements; system of radiograph identification; use of location markers; methods of reducing and testing for back-scatter; selection of penetrameters including penetrometer placement; number of penetrameters; shims under penetrameters; radiographic technique for double wall viewing; and, evaluation and disposition of radiographs.

- b. The below listed radiographs were independently interpreted by the NRC inspector to determine if radiographic quality was in accordance with the applicable procedure and Code requirements and to specifically verify the following: penetrometer type, size, and placement; penetrometer sensitivity; film density and density variation; film identification; film quality; weld coverage; and, disposition of the welds.

<u>Weld ID</u>	<u>Radiographic View</u>
NC2F2-8C	0-1,1-2,2-3,3-4,4-5,5-0
NC2F3-14A	0-1,1-2,2-3,3-4,4-5,5-6,6-7,7-0
NC2F4-9A	0-1,1-2,2-3,3-4,4-5,5-6,6-7,7-0
NC2F2-13A	0-1,1-2,2-3,3-4,4-5,5-6,6-7,7-0
NC2F1-13A	0-1,1-2,2-3,3-4,4-5,5-0
NC2F1-12A	0-1,1-2,2-3,3-4,4-5,5-0

- c. The inspector reviewed the calibration documentation for the below listed radiographic film interpretation equipment.

Densitometer - Serial No. 26083

- d. Records of completed nondestructive examinations were selected and reviewed to ascertain whether: the method(s), technique, and extent of the examination complied with the applicable NDE procedure; findings were properly recorded and evaluated by qualified personnel; programmatic deviations were recorded as required; personnel, instruments, calibration blocks, and NDE materials (penetrants, couplants) were designated. Records selected for this review are listed below.

<u>Weld ID</u>	<u>Method</u>
NC2F2-8A	PT/VT
NC2F2-19A	VT
NC2F1-19B	PT
NC2F1-20B	PT
NC2F3-15A	PT/VT
NC2F3-17A	PT/VT
NC2F3-17B	PT/VT
NC2F2-18A	PT/VT
NC2F2-18B	PT/VT
NC2F2-8C	RT
NC2F3-14A	RT
NC2F4-9A	RT
NC2F2-13A	RT
NC2F1-13A	RT
NC2F1-12A	RT

- e. The inspector reviewed the below listed liquid penetrant materials certification records to ascertain if the sulfur and halogen content of the material was within acceptable content limits.

<u>Material</u>	<u>Batch Number</u>
Liquid Penetrant	85K050
Cleaner/Remover	87L009
Developer	86B070

- f. The inspector reviewed the qualification documentation for the below listed Westinghouse examiners in the following areas: employer's name; person certified; activity qualified to perform; effective period of certification; signature of employer's designated representatives; basis used for certification; and, annual visual acuity, color vision examination and periodic recertification.

Method-Level

<u>Examiner</u>	<u>RT</u>	<u>PT</u>	<u>VT</u>
MJS	--	II	II
GWB	--	II	II
MJF	--	II	II
JES	III	--	--

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

3. UHSIS Piping Deletion Radiography Unit 2 (57090)

Radiography activities associated with the new welds generated by the deletion of piping in the safety injection system were reviewed as documented below. All radiography was performed by Duke Power Company personnel.

- a. The inspector reviewed RT Procedure NDE-10 Rev. 16 "General Radiography Procedure," to determine whether it contained sufficient information to assure that the following parameters were specified and controlled within the limits permitted by the applicable code, or any additional specification requirement: type of materials to be radiographed; material and weld surface condition requirements; type of radiation source; effective focal spot or effective source size; film brand or type; number of films in cassette; minimum source to film distance; type and thickness of intensifying screens and filters; quality of radiographs; film density and contrast for single and composite viewing; use of densitometers for assuring compliance with film density requirements; system of radiograph identification; use of location markers; methods of reducing and testing for back-scatter; selection of penetrameters including penetrometer placement; number of penetrameters; shims under penetrameters; radiographic technique for double wall viewing; and, evaluation and disposition of radiographs.

- b. The inspector performed an independent evaluation of the below listed finally accepted weld radiographs to determine if radiographic film quality was in accordance with the applicable procedure and Code requirements and to specifically verify the following: penetrameter type, size, and placement; penetrameter sensitivity; film density and density variation; film identification; film quality; and weld coverage.

<u>Weld ID</u>	<u>Radiographic View</u>
NI2FW23-16	0-1,1-2,2-3,3-4,4-5,5-0
NI2FW23-9	0-1,1-2,2-3,3-4,4-5,5-0
NI2FW173-1	0-1,1-2,2-3,3-4,4-5,5-0
NI2FW173-7	0-1,1-2,2-3,3-4,4-5,5-0
NI2FW173-3	0-1,1-2,2-3,3-4,4-5,5-0
NI2FW173-5	0-1,1-2,2-3,3-4,4-5,5-0

- c. The inspector reviewed the associated examination records for the above listed welds to determine compliance with procedure requirements for examination records and to determine if the reported disposition of the welds was consistent with the independent evaluation and in compliance with the applicable Code and specification requirements. The inspector found no discrepancies.
- d. A review of qualification records for three radiographic examination personnel was accomplished to determine whether the qualification records reflect the employer's name, person certified, activity qualified to perform, level of qualification, effective period of certification, basis used for certification, and annual visual acuity.
- e. The inspector reviewed the weld process control sheets and the detailed process control sheets for welds NI2FW173-1 and NI2FW173-5 to ascertain if the documents were complete and accurate.

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

#### 4. Inservice Inspection (ISI) and Preservice Inspection (PSI) Unit 2

The inspector examined documents, activities, and records as indicated below to determine whether ISI/PSI was being conducted in accordance with applicable procedures, regulatory requirements and licensee commitments. The applicable code for ISI/PSI is American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME B&PV) Code, Section XI, 1980 edition with addenda through Winter 1980. Duke Power Company (DPC) nondestructive examination personnel are performing the liquid penetrant (PT) examinations while Babcock and Wilcox (B&W) personnel are performing the ultrasonic (UT) and primary eddy current (EC) examination evaluation for Duke Power. Duke Power personnel are being used to collect the EC data and are performing a secondary examination data evaluation.

The licensee has completed modifications to the RTD system and had deleted portions of the Upper Head Safety Injection System piping. These activities have resulted in new weld joints being introduced into these systems which require PSI examinations. The inspector has reviewed some of the documentation associated with the PSI of these new welds. These reviewed are documented in the following subparagraphs.

a. Observation of Work and Work Activities (73753) (73053B)

The inspector observed work activities and reviewed certification records of equipment, materials, and NDE personnel which had been and will be utilized during the required ISI/PSI examinations. The observations and reviews conducted by the inspector are documented below.

- (1) The inspector reviewed the below listed liquid penetrant materials certification records to ascertain if the sulfur and halogen content of the material was within acceptable content limits. These materials were used to perform PSI examinations.

<u>Materials</u>	<u>Batch Number</u>
Liquid Penetrant	85L045
Cleaner/Remover	85M053
Developer	85K080

(2) Steam Generator Tubing Eddy Current (EC) Examination

The inspector observed the Eddy Current activities indicated below. The observations were compared with the applicable procedures and the Code in the following areas: methods for maximum sensitive is applied; method of examination has been recorded; examination equipment has been calibrated in accordance with the applicable performance reference; required coverage of steam generator tubes occurs during the examination; acceptance criteria is specified or referenced and is consistent with the procedure or the ASME Code; and, results are consistent with the acceptance criteria.

In-process Eddy Current inspection data evaluation was observed for the following Steam Generator D tubes:

<u>Row</u>	<u>Column</u>
2	67
2	66
2	65
2	64
2	63
2	62
2	61

<u>Row</u> (continued)	<u>Column</u>
1	8
2	7
2	6
2	5
2	4
2	3
2	2
2	69
2	68
41	64
11	63
10	64
24	58
26	67
43	69

(3) The inspector reviewed the qualification documentation for two DPC PT examiners in the following areas: employer's name; person certified; activity qualified to perform; effective period of certification; signature of employer's designated representative; basis used for certification; and, annual visual acuity, color vision examination, and periodic recertification.

b. ISI/PSI Data Review and Evaluation (73755) (73055)

Records of completed nondestructive examinations were selected and reviewed to ascertain whether: the method(s), technique, and extent of the examination complied with the ISI plan and applicable NDE procedures; findings were properly recorded and evaluated by qualified personnel; programmatic deviations were recorded as required; personnel, instruments, calibration blocks, and NDE materials (penetrants, couplants) were designated. Records selected for this review are listed.

ISI UT DATA

<u>Weld No.</u>	<u>ISI Item No.</u>
2NI2F-557	B09.011.422
2NI2F-559	B09.011.423
2NI2F-563	B09.011.424
2NI2F-751	B09.011.420
2NI2F-550	B09.011.421
2PZR-W3SE	B05.020.003
2PZR-4ASE	B05.020.004
2NI2F-571	B09.011.426
2NI2F-57	B09.011.427
2NIP-19'-1	B09.011.425
2PZR-9	B02.012.002
2NI2F-2747	B09.011.418
2NIP-131-1	C05.021.362



The inspector compared current UT examination results with randomly selected previous examination results. The results were in general agreement.

ISI EC Data

<u>SG-A</u>		<u>SG-B</u>	
<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
11	44	4	94
8	85	31	91
43	68	7	111
6	58	17	109
22	87	46	83
31	88	45	84
34	97	26	70
5	77	17	62
25	42	47	68

  

<u>SG-C</u>		<u>SG-D</u>	
<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
3	95	10	2
5	66	9	61
13	66	29	25
2	62	45	55
9	12	6	43
10	13	20	43
3	11	18	48
49	60	12	34
49	56	12	11

The above EC data reviews were compared with the applicable procedures and the Code in the following areas: the multichannel eddy current examination equipment has been identified; material permeability has been recorded; method of examination has been recorded; and, results are consistent with acceptance criteria.

By the conclusion of the NRC inspection, all EC examinations had been completed. The final examination results will be reported to the NRC in accordance with TECH SPEC requirements. The status for the steam generators is listed below.

	<u>SG-A</u>	<u>SG-B</u>	<u>SG-C</u>	<u>SG-D</u>
Tubes to be plugged	42	35	52	37
Previously plugged tubes	<u>150</u>	<u>156</u>	<u>146</u>	<u>139</u>
TOTAL	192	191	198	176

PSI PT Data

<u>Weld No.</u>	<u>System</u>
NI2FW-173-1	UHSIS
NI2FW-173-3	UHSIS
NI2FW-173-5	UHSIS
NI2FW-173-7	UHSIS
NC2F1-12A	RTD
NC2F1-13A	RTD
NC2F1-19A	RTD
NC2F1-19B	RTD
NC2F1-20A	RTD
NC2F1-20B	RTD
NC2F2-8A	RTD
NC2F2-8B	RTD
NC2F2-8C	RTD
NC2F2-13A	RTD
NC2F2-18A	RTD
NC2F2-18B	RTD
NC2F2-19A	RTD
NC2F2-19B	RTD
NC2F3-14A	RTD
NC2F3-15A	RTD
NC2F3-17A	RTD
NC2F3-17B	RTD
NC2F4-6A	RTD
NC2F4-9A	RTD
NC2F4-18A	RTD
NC2F4-18B	RTD

Within the areas inspected, no violations or deviations were identified

## 5. IE Bulletins (92703)

- a. Bulletin 88-02, Rapidly Propagating Fatigue Cracks in Steam Generator Tubes.

Discussions with corporate and site licensee personnel regarding the eddy current examinations, assessment of flow peaking factors for tube stability, and determination of which tubes are not effectively supported by Anti-Vibration Bars (AVB), indicated the following:

- Historical Eddy Current data has been reviewed for the steam generator tubing at this site. No classic denting was detected in the area of interest for these tubes. No tube plugging will be done as a result of the review of historical data or as a result of the current eddy current examination tube denting evaluations for Unit 2. Additional Eddy Current examinations will be conducted for Unit 1 during the November 1988 outage.

- No tube plugging will be accomplished at this site due to insufficient tube stability factors as a result of flow peaking. Evaluations, with regard to flow peaking tube stability ratios comparable to the tube rupture at North Anna, show that the flow peaking effects in these steam generators are well below those at North Anna, according to the licensee.
- Determination of which tubes may not be effectively supported by AVB's is still under consideration. Westinghouse has been contracted to make this determination; however, historical eddy current data was not sufficient to adequately make the determination. Additional eddy current data was taken during this outage for Unit 2 and is being forwarded to Westinghouse for further evaluation. A formal report is expected from Westinghouse in the near future with regard to Unit 2. Additional eddy current data is scheduled to be acquired during the Unit 1 outage in November 1988, and this data will be forwarded to Westinghouse at that time.

Discussions with licensee personnel indicated that an ongoing dialogue between Duke Power Company and the NRC, with regard to other areas of concern discussed in the bulletin, has existed since March 1988. These additional areas of concern were not addressed during this inspection.

- b. Bulletin 88-05, and 88-05, Supplement 1: Nonconforming Materials Supplied by Piping Supplies, Inc. at Folsom, New Jersey and West Jersey Manufacturing Company at Williamstown, New Jersey.

Inquiries regarding this bulletin were made by the inspector in order to confirm that actions were being taken by the licensee that will resolve the problems identified in the bulletin. The licensee is not required to officially respond to this bulletin until mid-July 1988.

Discussions with the licensee and a review of preliminary documentation supplied by the licensee shows that an action plan for the response to this bulletin has been established and is currently being pursued. Preliminary documentation indicates that to date four lots of suspect materials have been identified that contain a total of 38 items. Of the 38 items identified, four from each lot have been hardness tested and three of the items are installed, however, the three installed items are located in non-safety related systems.

The licensee is still in the process of determining how much suspect material may be located at this site and plans to formally respond to the bulletin at a later date as stipulated by the bulletin.

6. Exit Interview

The inspection scope and results were summarized on July 1, 1988, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results. Although reviewed during this inspection, proprietary information is not contained in this report.