Duke Power®
A Duke Energy Company

GARY R. PETERSON
Vice President
McGuire Nuclear Station

Duke Power
MG01VP / 12700 Hagers Ferry Road
Huntersville, NC 28078-9340

704 875 5333
704 875 4809 fax
grpeters@duke-energy.com

June 22, 2004

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: McGuire Nuclear Station
Docket Nos. 50-369
Steam Generator In-Service Inspection Report
Unit 1, End of Cycle (EOC) 16

Pursuant to ASME Section XI, Paragraph IWA-6230, Duke Energy Corporation hereby submits the attached Inservice Inspection (ISI) Outage Summary report for McGuire Unit 1 EOC 16.

Questions regarding this submittal should be directed to Kay Crane, McGuire Regulatory Compliance (704) 875-4306.

Gary R. Peterson

Attachment

A047

cc: L. A. Reyes
U. S. Nuclear Regulatory Commission
Regional Administrator, Region II
Atlanta Federal Center
61 Forsyth St. Suite 23T85
Atlanta, GA 30303

J. J. Shea
NRC Senior Project Manager (MNS)
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Joe Brady
Senior Resident Inspector (MNS)
U. S. Nuclear Regulatory Commission

Steam Generator Outage Summary Report

McGuire Unit 1 2004
Outage EOC 16

Location: Hwy. 73, Cowans Ford, North Carolina 28216

NRC Docket No. 50-369

National Board No. 44

Commercial Service Date: December 1, 1981

Owner: Duke Energy Corporation
526 South Church St.
Charlotte, N.C. 28201-1006

Revision 0

Prepared By: _____ Date: 6-17-04

Reviewed By: _____ Date: 6.17.04

Approved By: _____ Date: 6-17-04

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Uncontrolled Distribution

2	Hartford Steam Boiler Inspection and Insurance Corporation (AIA)
3	State of North Carolina Department of Labor C/o J. M. Givens, Jr.

FORM NIS-1 OWNER'S DATA REPORT FOR INSERVICE INSPECTIONS

As required by the Provisions of the ASME Code Rules

1. Owner: Duke Energy Corporation, 526 S. Church St.. Charlotte, NC 28201-1006
   (Name and Address of Owner)

2. Plant: McGuire Nuclear Station, Highway 73, Cowans Ford, N. C. 28216
   (Name and Address of Plant)

3. Plant Unit: 1

4. Owner Certificate of Authorization (if required) N/A

5. Commercial Service Date: December 1, 1981

6. National Board Number for Unit 44

7. Components Inspected:

Component	Manufacturer	Manufacturer Serial No.	State or Province No.	National Board No.
Steam Generator 1A	BWI	7701-04	NC-302668	157
Steam Generator 1B	BWI	7693-01	NC-302669	146
Steam Generator 1C	BWI	7701-03	NC-302670	155
Steam Generator 1D	BWI	7701-02	NC-302671	154

Note: Supplemental sheets in form of lists, sketches, or drawings may be used provided (1) size is $8\frac{1}{2}$ in. x 11 in., (2) information in items 1 through 6 on this data report is included on each sheet, and (3) each sheet is numbered and the number of sheets is recorded at the top of this form.

FORM NIS-1 (Back)

8. Examination Dates Oct. 11, 2002 to April 12, 2004

9. Inspection Period Identification: First Period

10. Inspection Interval Identification: Third Interval

11. Applicable Edition of Section XI 1995 Addenda 1996

12. Date/Revision of Inspection Plan: Tech Spec 5.5.9

13. Abstract of Examinations and Test. Reference attached NRC Inspection Report dated 4/19/99.

14. Abstract of Results of Examination and Tests. Reference attached NRC Inspection Report dated 4/19/99.

15. Abstract of Corrective Measures. Reference attached NRC Inspection Report dated 4/19/99.

We certify that a) the statements made in this report are correct b) the examinations and tests meet the Inspection Plan as required by the ASME Code, Section XI, and c) corrective measures taken conform to the rules of the ASME Code, Section XI.

Certificate of Authorization No. (if applicable) NA Expiration Date NA

Date 6-17- 2004 Signed Duke Energy Corp. By Luke Beam
Owner

CERTIFICATE OF INSERVICE INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and the State of Province of NC employed by *The Hartford Steam Boiler Inspection & Insurance Company of Connecticut have inspected the components described in this Owner's Report during the period 3/15/04 to 3/26/04, and state that to the best of my knowledge and belief, the Owner has performed examinations and tests and taken corrective measures described in the Ownersí Report in accordance with the Inspection Plan and as required by the ASME Code, Section XI.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the examinations, test, and corrective measures described in this Ownersí Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection

Jerome L. Swan Commissions NC 1524 N I
Inspector's Signature National Board, State, Province, and Endorsements

Date 6/17 20 04

* The Hartford Steam Boiler Inspection & Insurance Company of Connecticut
200 Ashford Center North
Suite 205
Atlanta, GA. 30338

20440-9 (2/2002)

FRAMATOME ANP

ENGINEERING INFORMATION RECORD

Document Identifier 51 - 5044677-00

Title McGuire Nuclear Station Unit 1 EOC 16 Eddy Current Examination Technical Summary

PREPARED BY:	REVIEWED BY:
Name Dennis Greene	Name Kyle Rogers
Signature [signature] Date 5-12-04	Signature [signature] Date 05/12/04

Technical Manager Statement: Initials MW3

Reviewer is Independent.

Remarks:

This report summarizes the results of the eddy current examinations performed on the tubes in four steam generators at Duke Power Company's McGuire Nuclear Station Unit 1 during the 16th refueling outage (EOC 16).

1.0 Introduction

Eddy current examinations were performed on the 0.688" OD x 0.040" wall Inconel 690 tubing in all four steam generators during McGuire Nuclear Station's Unit 1 Refueling Outage sixteen (16).

2.0 Technical Summary

This section provides a technical summary of the eddy current examinations performed at Duke Energy's McGuire Nuclear Station Unit 1 Refueling Outage sixteen (16).

McGuire Unit 1 has the following design characteristics: 1,180 MW Pressurized Water Reactor (PWR) Westinghouse 4 loop Nuclear Steam Supply System (NSSS). The steam generators are Babcock & Wilcox International (BWI) CFR 80 vertical U-bend type generally containing 6,633 tubes each. Personnel from FANP performed the examinations during the 16th refueling outage.

A .560" diameter tuned bobbin coil full length examination was performed on 6,632 tubes in steam generator A, 3,649 tubes in steam generator B, 3,743 tubes in steam generator C and 6,629 tubes in steam generator D. A .540" diameter 3 coil .115" Pancake/.080" Pancake/Plus-Point motorized rotating coil MRPC® probe was used to examine 1327 top of tubesheets (+2" to -8") and special interest locations in the straight sections in each steam generator. A .520" diameter 2 coil .115" Pancake/Plus-Point motorized rotating coil MRPC® was utilized to inspect u-bend special interest locations in all four steam generators. All existing plugs were visually inspected. One (1) tube was removed from service in steam generator A. No tubes were removed from service in steam generators B, C and D. THE TUBE WAS REMOVED FROM SERVICE by PLUGGING - CB CAUTHEN
CB Cauthen 6-17-04

2.1 Summary

The following summarizes the results of eddy current examinations for all four steam generators.

Note: Attachment 1 contains a list of all three-letter codes and acronyms used throughout this report. Attachment 2 contains the eddy current results from all four CFR80 steam generators for McGuire Unit 1 Refueling Outage 16.

A S/G:

- Eddy current examinations began on 3/15/04 @ 2000 and were completed on 3/27/04 @ 2300.
- 6,632 tubes were examined with a bobbin coil probe.
- 0 tubes were reported to have indications of 40% TW or greater with the bobbin coil probe examination.
- 0 tubes were reported to have indications of 20-39% TW with the bobbin coil probe examination.
- 41 tubes were reported to have 46 indications of 0-19% TW with the bobbin coil probe.
- 43 tubes were examined for Special Interest Locations.
- 1327 Hotleg top-of-tubesheets were examined.
- 1 tube was removed from service by plugging.
- See Attachment 2 for details.

B S/G:

- Eddy current examinations began on 3/15/04 @ 1200 and were completed on 3/22/04 @ 1800.
- 3,649 tubes were examined with a bobbin coil probe.
- 0 tubes were reported to have indications of 40% TW or greater with the bobbin coil probe examination.
- 2 tubes were reported to have 3 indications of 20-39% TW with the bobbin coil probe examination.
- 20 tubes were reported to have 21 indications of 0-19% TW with the bobbin coil probe examination.
- 80 tubes were examined for Special Interest Locations.
- 1327 Hotleg top-of-tubesheets were examined.
- No tubes were removed from service.
- See Attachment 2 for details.

C S/G:

- Eddy current examinations began on 3/15/04 @ 1400 and were completed on 3/25/04 @ 2300.
- 3,743 tubes were examined with a bobbin coil probe.
- 0 tubes were reported to have indications of 40% TW or greater with the bobbin coil probe examination.
- 0 tubes were reported to have indications of 20-39% TW with the bobbin coil probe examination.
- 29 tubes were reported to have 29 indications of 0-19% TW with the bobbin coil probe examination.
- 103 tubes were examined for Special Interest Locations.
- 1327 Hotleg top-of-tubesheets were examined.
- No tubes were removed from service.
- See Attachment 2 for details.

D S/G:

- Eddy current examinations began on 3/16/04 @ 0000 and were completed on 3/26/04 @ 1700.
- 6,629 tubes were examined with a bobbin coil probe.
- 0 tubes were reported to have indications of 40% TW or greater with the bobbin coil probe examination.
- 0 tubes were reported to have indications of 20-39% TW with the bobbin coil probe examination.
- 14 tubes were reported to have 15 indications of 0-19% TW with the bobbin coil probe examination.
- 22 tubes were examined for Special Interest Locations.
- 1327 Hotleg top-of-tubesheets were examined.
- No tubes were removed from service.
- See Attachment 2 for details.

2.2 Examinations

The examination, analysis, equipment and personnel were in compliance with the requirements of the FANP Multi-Frequency Eddy Current Examination of Tubing (ISI-400) latest revision, Written Practice for Personnel Qualification in Eddy Current Examination (ISI-24) latest revision, Eddy Current Acquisition Guidelines for Duke Power Company's CFR80 Steam Generators and Eddy Current Analysis Guidelines for Duke Power Company's CFR80 Steam Generators.

The steam generator tubing examinations were performed by technicians qualified to Level II, or Level I under direct supervision of personnel qualified to Level II in accordance with FANP procedure ISI-24 (latest revision). The data was evaluated by personnel qualified to a minimum of Level IIA in accordance with FANP procedure ISI-24 (latest revision). The examination and evaluation procedures used during the eddy current examinations were approved by personnel qualified to Level III in accordance with FANP procedure ISI-24 (latest revision). All inspection frequencies were generated using a Zetec MIZ®-30 remote data acquisition unit.

The bobbin coil examinations were performed with .560 inch diameter probes. The inspection frequencies used were 650, 320, 170 and 35 kHz operating in both differential and absolute modes. A 650/170 kHz differential tube support plate suppression mix was used to enhance the detection of indications occurring at TSP intersections.

The special interest examinations were performed with .540" and .520" diameter motorized rotating coil MRPC® probes. The inspection frequencies used were 300, 200, 100 and 15 kHz. A 300/100 kHz TSP suppression mix on the pancake coil was used to enhance the detection of indications occurring at TSP intersections.

Official results of the data analysis were recorded on optical disks and verified by two Eddy Current Data Management systems: Framatome Data Management System, (FDMS) and EddyNet® Inspection Management System, (EIMS). These systems are used to check the data for invalid analysis entries, perform data sorting routines, ensure all the proper tubes were examined and to printout final data sheets.

2.3 Areas of Concern

Eddy current examinations cannot, in all cases, determine the actual cause of damage. The signal recorded during the eddy current examination can be used to estimate the physical size of any tube damage detected (i.e., penetration into the wall, axial extent), however, the actual type of degradation and its cause can only be determined by tube removal and metallurgical studies.

a) Loose Parts – Loose parts, or damage attributed to loose parts impact or fretting, may be present adjacent to tubes in the periphery. Indications of loose parts and damage associated with loose parts have been detected in the CFR80 SG's.

b) Mechanical Wear – Indications indicative of TSP or FB wear have been indentified and reported in the CFR80 steam generators. Analysts shall be aware of the possibility of wear type indications and report any indication indicative of wear in accordance the Analysis guidelines.

c) Tube-to-Tube Contact – Tube-to-tube contact/proximity has been identified as an area of concern for the CFR80 replacement steam generators. A number of tubes in the CFR80 design generators have been identified as representative of tubes that are touching or in close proximity. The area of concern is the entire U-bend area and shall be monitored for indications indicative of degradation. Any indications indicative of tube-to-tube contact wear shall be reported in accordance the Analysis guidelines.

2.4 Results

A number of indications within all four steam generators were given a non-quantifiable (NQI) code in the percent through-wall column. This code was used during the bobbin examinations for indications where an accurate depth determination could not be made.

Additionally, a number of indications within all four generators were reported as an Absolute Drift Indication (ADI) in the percent through-wall column. These are indications that could not be accurately quantified on differential channels.

2.5 RSG A, B, C, and D results

Attachment 2 details the results of the various eddy current examinations performed in RSG A, B, C, and D. A total of 1 tube was removed from service in CFR80 steam generator "A" during refueling outage 16. This tube was removed from service due to an SVI above the cold leg top of tubesheet. This was a special interest exam following an indication reported from bobbin data.

Attachment 1

CODE	DESCRIPTION
ADI	Absolute Drift Indication
AXI	Axial Indication
BLG	Bulge
BOR	Boron
CHT	Chatter
CHG	Historical comparison has been performed and indication has Changed based on the criteria
FANP	Framatome ANP
DNT	Dent
DWI	Dent With Indication
FC	Final Calibration
FCL	Final Calibration Late
HNI	Historical comparison has been performed and indication has not Changed based on criteria
IC	Incomplete Roll
IV	Independent Verification of tube identification
IDOK	Tube ID verified; This code shall be used to identify tubes acquired More than once during the current outage. Use of this requires tube to tube comparison or fingerprinting of the affected tube(s)
INF	Indication Not Found
INR	Indication Not Reportable
IRR	Irregular Roll
IDI	Inside Diameter Indication
L3R	Level III Review
MSG	Analyst Message
MAI	Multiple Axial Indication
MCI	Multiple Circumferential Indication
MMI	Mix Mode Indication
MVI	Multiple Volumetric Indication
MRPC	Motorized Rotating Pancake Coil
NDD	No Degradation Detected
NEX	No Expansion
NFC	No Final Calibration
NSR	Needs SGME Review
NQI	Non-Quantifiable Indication
OBS	Obstructed
OD	Outside Diameter
ODI	Outside Diameter Indication
OVR	Over Roll
OXP	Over Expansion
PID	Positive Indentification
PLG	Plugged Tube
PLP	Possible Loose Part

★ NQS NON-QUANTIFIABLE SIGNAL (FRAMATOME OMITTED FROM REPORT) INSERTED BY DUKE - CB CAUTHEN - CB Cauthen 6-17-04

PVN	Permeability
PWSCC	Primary Water Stress-Corrosion Cracking
QA	Quality Assurance
RBD	Retest - Bad Data
RFB	Retest- Fan Bar using a wear standard for sizing
RIC	Retest - Incomplete
RNC	Retest - Number Check
ROB	Retest - Obstructed
SAI	Single Axial Indication
SCI	Single Circumferential Indication
SI	Special Interest
SVI	Single Volumetric Indication
TEA	Tube End Anomalies
TSP	Tube Support Plate
TW	Through Wall
TWD	Through Wall Depth
UTP	Upper Tubesheet Primary face
UTS	Upper Tubesheet Secondary face
VOL	Volumetric indication
WAR	Wear
WTG	Wetting/Leaking

Attachment 2

MNS 1 EOC 16 CFR80 A, B, C, and D Eddy Current Results.

Bobbin Examinations

	Steam Generator "A" Tubes Tested: 6632		Steam Generator "B" Tubes Tested: 3649	
	Tubes With Indications	Number of Indications	Tubes With Indications	Number of Indications
TWD > 40%	0	0	0	0
TWD 20-39%	0	0	2	3
TWD < 20%	41	46	19	20
Fan Bar Wear	41	46	20	21
ADI	3	3	13	13
DNT	95	95	96	96
HNI	38	45	50	58
INF	0	0	1	1
INR	9	11	5	5
NQI	2	4	1	1
PVN	0	0	0	0

	Steam Generator "C" Tubes Tested: 3743		Steam Generator "D" Tubes Tested: 6629	
	Tubes With Indications	Number of Indications	Tubes With Indications	Number of Indications
TWD > 40%	0	0	0	0
TWD 20-39%	0	0	0	0
TWD < 20%	29	29	15	16
Fan Bar Wear	28	28	14	15
ADI	10	10	7	7
DNT	124	124	57	57
HNI	63	76	49	64
INF	1	1	2	2
INR	16	16	13	14
NQI	8	12	2	2
PVN	1	1	0	0

Special Interest Examinations including PLP bounding RPC and HL-TTS RPC retests with wear standard)

	Steam Generator "A" Tubes Tested: 43/1327		Steam Generator "B" Tubes Tested: 80/1327	
	Tubes With Indications	Number of Indications	Tubes With Indications	Number of Indications
Wear	38	43	9	9
NQS	0	0	0	0
VOL	2	2	3	3
SAI	0	0	0	0
MAI	0	0	0	0
SCI	0	0	0	0
MCI	0	0	0	0
MMI	0	0	0	0
SVI	1	3	0	0
MVI	0	0	0	0
DNT	0	0	0	0
PLP	0	0	4	5

	Steam Generator "C" Tubes Tested: 103/1327		Steam Generator "D" Tubes Tested: 22/1327	
	Tubes With Indications	Number of Indications	Tubes With Indications	Number of Indications
Wear	25	31	12	13
NQS	0	0	0	0
VOL	2	2	1	1
SAI	0	0	0	0
MAI	0	0	0	0
SCI	0	0	0	0
MCI	0	0	0	0
MMI	0	0	0	0
SVI	0	0	0	0
MVI	0	0	0	0
DNT	0	0	0	0
PLP	0	0	0	0