U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-456
License Nos:	NPF-72
Report No:	50-456/96017(DRS)
Licensee:	Commonwealth Edison Company Opus West III 1400 Opus Place Downers Grove, IL 60515
Facility:	Braidwood - Unit 1
Location:	Braidwood Site, Braidwood, IL
Dates:	October 21-25, November 5 and November 26, 1996
Inspectors:	M. S. Holmberg, Reactor Inspector(DRS)
Approved by:	Wayne Kropp, Chief Engineering Branch 1

Report Details

II. Maintenance

M1 Conduct of Maintenance

M1.1 Observation of Unit 1 Steam Generator (SG) Inservice Inspection (ISI)

a. Inspection Scope (73753, 73755, 73052)

Westinghouse Electric Corporation contracted nondestructive examination (NDE) personnel performed eddy current testing (ET) of the Unit 1 SGs using multi-frequency equipment to examine the SG roll transition zone. Inspectors observed work, reviewed ISI procedures, personnel certifications and reviewed data associated with ET of the SG tubes.

b. Observations and Findings

The inspection scope included a motor rotated pancake coil (MRPC) inspection of 100 percent of the hot leg side tubes at the roll transition region, with a ET probe containing a +Point™ coil, 0.115 inch diameter pancake coil and a 0.080 inch diameter pancake coil. During a October 24, 1996 conference call, NRR staff requested the licensee staff to determine if the current inspection scope (e.g. not performing a cold leg side SG inspection of SG tube roll transitions), met licensee commitments. On subsequent conference call on October 31, 1996 with NRR, the licensee stated that current commitments were met and discussed the basis for not performing a cold leg side inspection. The inspector reviewed licensee commitments in letters of November 9, 1996, May 24, 1996 and NRC letter to D.L. Farrar of May 22, 1996, and found no deviations from the written commitments to the SG inspection scope, which was not specific in nature.

Inspectors identified that Braidwood Station "SG Eddy Current Data Analysis Guidelines", revision 13, lacked definitive guidance for confirming the disposition of ET indications as manufacturing burnish marks (MBM) when initially detected by MRPC inspections. Inspectors questions prompted the licensee to issue change sheet 1 to these guidelines to require comparing prior history records of ET MBM calls at an MBM location identified by MRPC inspection to confirm the call.
As a result of ET of the Unit 1 SGs, greater than one percent of the tubes in each SG were classified as defective and the following SG tube repairs were planned:

SG	Sleeved tubes	Plugged tubes
A	181	43
B	0	295
C	446	172
D	272	27
Totals	899	537

The predominant type of ET indication identified were single circumferential indications (SCI) at the SG tube roll transition region (indicative of outside diameter stress corrosion cracking (ODSCC)).

In-situ pressure testing was performed on ten SG tubes (five in SG A and five in SG B) with ET indications, to gather tube leakage and/or burst pressure data, to evaluate steam generator tube integrity. Licensee staff discussed the results of this testing with NRR staff on a phone call held November 4, 1996. As a result of this testing two tubes in SG B and two tubes in SG B were reported to have measurable leakage. The identified SG tube leakage was as follows:

SG B

Tube (Row/ Column)	Pressure (psi)	Leak Rate (gpm)
21/76	1800 2500 3200	0.003 0.02 0.1
22/73	700 1000 1300	0.13 0.19 0.5*

* Leakage exceeded pump capacity above this pressure.

SG A

Tube ID (Row/ Column)	Pressure (psi)	Leak Rate (gpm)
23/41	3100	0.001
27/55	3200	0.001
27/60	5000	0.006

Burst testing was subsequently performed on each of the tubes identified above and resulted in no tube bursts. On the November 4, 1996 call, NRR requested the licensee staff to provide information to confirm that the SG tubes with measurable tube leakage were "bound" by current analysis (e.g. that steam generators met the licensing basis during the last cycle of operation). The licensee's staff reported that the preliminary assessment (based on a temperature corrected calculated leak rate of 2.1 gpm for tube 22/73 (SG B) at the main steam line break (MSLB) differential pressure) was that operation had been conducted within the licensing basis. Subsequent to the November 4 meeting, the licensee was able to perform in-situ pressure test on tube 22/73 with a higher capacity pump at 2300 psi and the measured tube leakage was 1 gpm. The temperature corrected leakrate at the MSLB pressure (2600 psi) was calculated to be 1 gpm. At a November 14, 1996 meeting with the NRR staff, the licensee presented the results of the in-situ pressure testing. These results, demonstrated that during the last cycle of operation for SG tubes with measurable leakage, leakage was within limits allowed by the licensing basis (26.8 gpm).

A review of ET data from 1995 and 1994 SG inspections was performed to gather data, to assess the growth rate for circumferential ODSCC at the SG roll transitions. This review was performed using Zetec Eddynet™ 95 ET data analysis software, vice Westinghouse data analysis software used during the original inspection. Based on reviews of this ET data, the licensee identified rejectable ET indications which were present and not identified in previous outages for each SG. The lead ISI engineering manager stated that a review of this data would be conducted on November 13-14, 1996, by Westinghouse, to determine the reason for not identifying these ET indications in previous outages. The reasons for rejectable ET indications that were present in ET data from previous outages, which were subsequently identified during the October, 1996 SG ET inspection, is considered an unresolved item, pending review of the licensees investigation results and supporting ET data (50-456/96017-01(DRS)).

c. Conclusions

Indications of steam generator (SG) tube degradation that were identified during eddy current (ET) were predominantly single circumferentially oriented indications located in the tube roll transition region, indicative of outside diameter stress corrosion cracking (ODSCC). Efforts to assess growth rates for circumferential ODSCC in SG tubes by performing a historical ET data reviews/comparisons and in-situ pressure testing to evaluate SG tube integrity demonstrated an aggressive program for managing SG tube degradation. However, the inspector had concerns with ET indications detected this outage which were present but not identified during prior outages. Additionally, the inspectors questions prompted a change in eddy current data analysis guidelines, which indicated that opportunities exist for improvement in SG data analysis guidelines.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Inspector Review of Updated Safety Analysis Report (UFSAR)

While performing the inspections discussed in this report, the inspectors reviewed UFSAR sections:

3.9.3.1.1	Component and Component Supports Purchased In accordance with NSSS Specification
3.9.3.1.2	Balance of Plant Components and Component Supports
5.2	Integrity of the Reactor Coolant Pressure Boundary Component and Subsystem Design
6.6	Inservice Inspection of Class 2 and 3 Components

The inspectors did not identify any UFSAR discrepancies as a result of this special review.

V. Management Meetings

X1 Exit Meeting Summary

At the conclusion of the inspection on October 25, 1996, and final phone exit on November 26, 1996, the inspector met with licensee representatives identified herein and summarized the scope and findings of the inspection activities. The inspector questioned licensee personnel as to the potential for proprietary information in the likely inspection report material discussed at the exit. No proprietary information was identified.

PERSONNEL CONTACTED

Commonwealth Edison Company (ComEd)

G. Stanley, Site Vice President
T. Tulon, Station Manager
D. Christiana, Site Engineering
J. Meister, Engineering and Construction Manager
R. Gesior, Steam Generator Group
L. Alexander, Steam Generator Engineer
M. Cassidy, NRC Coordinator
H. Pontius, Nuclear Licensing Administrator

INSPECTION PROCEDURES USED

IP 73753:	Inservice Inspection
IP 73755:	Inservice Inspection, Data Review and Evaluation
IP 73052:	Inservice Inspection, Review of Procedures

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-456/96017-01(DRS)	URI	Rejectable ET indications for the Unit 1 SGs that were present and not identified during previous SG inspections.

LIST OF ACRONYMS USED

ASME	American Society of Mechanical Engineers
DRS	Division Of Reactor Safety
ET	Eddy Current Testing
GL	Generic Letter
gpm	Gallons Per Minute
IR	Inspection Report
ISI	Inservice Inspection
MBM	Manufacturing Burnish Mark
MCI	Multiple Circumferential Indications
MMI	Mixed Mode Indications
NDE	Nondestructive Examination
NRC	Nuclear Regulatory Commission
NRR	Office Of Nuclear Reactor Regulation
ODSCC	Outside Diameter Stress Corrosion Cracking
psi	Pounds Per Square Inch
SCI	Single Circumferential Indication
URI	Unresolved Item
UFSAR	Updated Final Safety Analysis Report