



Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

April 27, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555



Subject: Byron Station Units 1 and 2
Braidwood Station Units 1 and 2
Steam Generator Tube Inservice
Inspection
NRC Docket Nos. 50-454, 50-455,
50-456 and 50-457

Dear Mr. Denton:

This is to provide information regarding our plans for periodic eddy current examination of the Byron and Braidwood steam generator tubes. Review of this information should close Confirmatory Issue 12 of the Byron Safety Evaluation Report.

Attachment A to this letter delineates the extent and frequency of eddy current inspection of steam generator tubes. The preservice examination of these tubes has been described previously and was approved in the Byron SER.

Please address question regarding this matter to this office.

One signed original and fifteen copies of this letter and the attachment are provided for your use.

Very truly yours,

T. R. Tramm
Nuclear Licensing Administrator

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ATTACHMENT A

INSERVICE INSPECTION OF STEAM GENERATOR TUBES BYRON AND BRAIDWOOD STATIONS EDDY CURRENT PROGRAM PLAN

1. INTRODUCTION

- 1.1 The Eddy Current Program Plan developed herein has been prepared to meet the requirements of Section XI of the ASME Boiler and Pressure Vessel Code, "Rules for Inservice Inspection and Nuclear Power Plant Components", 1980 Edition, up to and including Winter 1981 Addenda.

Eddy Current Inspection of Steam Generator Tubes is an effective means of determining defects because it detects the presence of defect-caused variations in effective electrical conductivity and/or magnetic permeability.

The Eddy Current Program Plan set forth herein will attempt to maximize the detection of defects while complying with Regulatory Guide 1.83, Revision 1, "Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes", and Westinghouse Standard Technical Specification 3/4.4.6 "Steam Generators."

2. INSERVICE INSPECTION

2.1 SAMPLE SELECTION

Sample selection for the inservice inspection of steam generators will be done in the manner described in sections 2.1.1 through 2.1.3. During all inspections the following shall apply:

- a. All non-plugged tubes that previously had detectable wall penetrations greater than 20% through wall, in any steam generator, shall be included in the sample tube selection size.
- b. Any selected tube that does not permit the passage of the Eddy Current probe shall be recorded and an adjacent tube selected and subjected to the tube inspection.

2.1.1 First Inspection

During the first inservice inspection, two steam generators shall be selected for inspection. Selection shall be made on the basis of preservice inspection results with the two steam generators in the most degraded condition selected. If preservice inspection results show all steam generators in the same initial condition, two shall be selected at random.

Tubes selected for this inspection shall be made at random and consist of 6% of the tubes in each of the two steam generators selected. Additional steam generator tubes shall be inspected in accordance with Table 2.1-1.

2.1.2 Second and Third Inspections

The second and third inservice inspections will each examine one steam generator not inspected during the first inspection.

Tube selection for these inspections shall be made at random and consist of 12% of the tubes in the selected steam generator. Additional steam generator tubes shall be inspected in accordance with Table 2.1-1.

2.1.3 Subsequent Inspections

The fourth and subsequent inspections may be limited to one steam generator on a rotating schedule encompassing 3% of the total tubes in all generators, provided the results from the first, second and third inspections indicate that all steam generators are performing in a like manner.

If it is found that all steam generators are not performing in a like manner, the examination sequence shall be modified to inspect the most severe conditions.

Tube selection for these inspections shall be made at random and consist of 12% of the tubes in the selected steam generator. Additional steam generator tubes shall be inspected in accordance with Table 2.1-1.

2.2 INSPECTION INTERVALS

2.2.1 First Inservice Inspection

The first inservice inspection will be performed after six effective full power months but before twenty-four calendar months after initial criticality. This schedule shall be followed unless it happens that the first refueling outage extends past the twenty-four month date, at which point, an Eddy Current Inspection shall be performed during this refueling outage.

2.2.2 Subsequent inservice inspection shall be performed on eighteen month intervals to coincide with refueling outages.

If two consecutive inspections not including the preservice inspection, result in all inspection results falling into category C-1, or if two consecutive inspections demonstrate that all tubes with previous detectable wall penetration (greater than 20%) have not undergone significant (greater than 10%) further penetration, inspection frequency will be extended to thirty-six month intervals. If while under this extended inspection schedule an inspection shows results in category C-3, the inspection schedule shall return to eighteen month intervals until the above criterion for extension to thirty-six months is met.

3. ACCEPTANCE CRITERION

The result of each inservice inspection will be classified into one of the following three categories.

- a. C-1, less than 5% of the total tubes inspected are degraded tubes and none of the tubes are defective.
- b. C-2, one or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are more degraded tubes.
- c. C-3, more than 1% of the total tubes inspected are defective, or more than 10% of the total tubes are inspected are degraded.

In all inspections, previously degraded tubes must exhibit significant (greater than 10%) further wall penetrations to be included in the above percentage calculations.

3.2 Acceptance Limits

- a. As used in this program.:
 - 1) DEGRADATION means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.
 - 2) DEGRADED TUBE means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation.
 - 3) DEFECT means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.
 - 4) PLUGGING LIMIT means the imperfection depth at or beyond which the tube shall be removed from service and is equal to 40% of the nominal tube wall thickness.

- 5) TUBE INSPECTION means an inspection of the steam generator tube from the point of entry (Hot Leg Side) completely around the U-bend to the top support of the Cold Leg Side.

4. REPORTS

Records and reports for Eddy Current testing shall be prepared and retained in accordance with Article's IWA-6000, and Article IV-7000 of Section XI of the ASME Boiler and Pressure Vessel Code. In addition, the results of any steam generator tube inspection which falls into category C-3 will be reported to the Commission.

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TABLE 2.1-1

STEAM GENERATOR TUBE INSPECTION

1ST SAMPLE INSPECTION			2ND SAMPLE INSPECTION		3RD SAMPLE INSPECTION	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of S Tubes per S. G.	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug defective tubes and inspect additional 2S tubes in this S. G.	C-1	None	N/A	N/A
			C-2	Plug defective tubes and inspect additional 4S tubes in this S. G.	C-1	None
					C-2	Plug defective tubes
					C-3	Perform action for C-3 result of first sample
	C-3	Perform action for C-3 result of first sample	N/A	N/A		
	C-3	Inspect all tubes in this S. G., plug de- fective tubes and inspect 2S tubes in each other S. G. Prompt notification to NRC	All other S. G.s are C-1	None	N/A	N/A
			Some S. G.s C-2 but no additional S. G. are C-3	Perform action for C-2 result of second sample	N/A	N/A
			Additional S. G. is C-3	Inspect all tubes in each S. G. and plug defective tubes. Prompt notification to NRC	N/A	N/A

$$S = 3 \frac{N}{n} \%$$

Where N is the number of steam generators in the unit, and n is the number of steam generators inspected during an inspection