

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-346/82-14(DETP)

Docket No. 50-346

License No. NPF-3

Licensee: Toledo Edison Company
Edison Plaza
300 Madison Avenue
Toledo, OH 43652

Facility Name: Davis-Besse Nuclear Power Station, Unit 1

Inspection At: Davis-Besse Site, Port Clinton, OH

Inspection Conducted: April 19, 20, and 23, 1982

K.D. Ward
Inspector: K. D. Ward

5/10/82

D.H. Danielson
Approved By: D. H. Danielson, Chief
Materials and Processes Section

5/10/82

Inspection Summary

Inspection on April 19, 20, and 23, 1982 (Report No. 50-346/82-14(DETP))
Areas Inspected: Damage to auxiliary feedwater headers inside "A" and "B" steam generators. This inspection involved a total of 16 inspector-hours by one NRC inspector.
Results: No items of noncompliance or deviations were identified.

DETAILS

Persons Contacted

The Toledo Edison Company (TECo)

*C. Daft, QA Director
T. Murray, Station Superintendent
T. Myers, Nuclear Licensing Manager
R. Peters, Operational Licensing Specialist
B. Werner, Administrative Coordinator
J. Lingenfelter, Technical Engineer

Babcock and Wilcox Company (B&W)

C. Thompson, Group Leader, ISI
E. Painter, Jr., SG Outage Coordination
L. Lowman, SG Performance Unit Engineer

The Hartford Steam Inspection and Insurance Company

T. Sanford, Authorized Nuclear Service Inspector (ANII)

The inspector also contacted and interviewed other licensee and contractor employees.

*Denotes those present at the exit interview.

Functional or Program Areas Inspected

1. General

Ref. a. NRC Report 50-346/82-11 (Inservice Inspection)

b. NRC Report 50-346/82-12 (Inservice Inspection)

c. NRC Report 50-346/82-13 ("A" and "B" SG)

2. While Unit 1 was shut down for refueling and during routine eddy current examinations (ET) of the periphery tubes in the "A" and "B" SG's, B&W personnel identified indications of tube denting in the vicinity of the auxiliary feedwater ring headers. The following are the results of the eddy current examinations:

"A" Steam Generator "X" Axis Area

<u>Row</u>	<u>Tube</u>	<u>Indication</u>
83	130	22% thru wall
94	129	29% thru wall
105	121	medium ding (4-7 mils)
115	114	small ding (less than 4 mils)

"B" Steam Generator "X" Axis Area

<u>Row</u>	<u>Tube</u>	<u>Indication</u>
48	123	Medium ding (4-7 mils) and extra large ding (over 12 mils)
49	124	extra large ding
54	127	22% thru wall
58	129	Small ding (less than 4 mils, (20% of thru wall)
61	126	45% thru wall
64	126	Small ding
69	130	52% thru wall
88	126	Small and medium dings
94	129	Small ding
98	127	Small ding
103	124	Medium ding
104	123	Medium ding

No items of noncompliance or deviations were identified.

3. The following are tubes that had debris signals located between #15 top support plate (TSP) and the upper tube sheet (UTS). The examinations used to locate the debris was with eddy current and profilom ry.

"A" Steam Generator

<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>
7	54	6	51	6	50	46	1
104	1	146	50	146	51	106	119
105	122	103	124	88	126	86	126
91	126	112	117	69	130	64	126
58	129	94	129	81	129	83	130
98	127	113	116	115	114	116	113
54	127	20	84	4	45	140	2
7	53	2	3	148	37		

The following are tubes that have debris indications located by profilometry that were not noted with eddy current.

<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>
104	123	134	32	146	1	105	1

Debris indications located by eddy current and profilometry:

"B" Steam Generator

<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>
69	130	61	126	58	129	83	130
88	126	94	129	98	127	40	117

<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>
54	127	64	126	49	124	48	123
146	1	146	51	104	123	103	124
81	129	88	126	48	123	64	126

Debris indications located by profilometry only.

<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>
83	130	91	126	103	24	104	123
110	117						

No items of noncompliance or deviations were identified.

4. In SG "A" and "B" there were eight pins and eight brackets in each, but only four in each SG could be viewed because of the clearance. The inspector observed the following by visual examination and fibroscope.

"A" Steam Generator

- a. The outer vertical member of the auxiliary feedwater (AFW) header box was distorted (concave) over most of the area viewed. The amount of distortion was estimated to be up to 4 1/2".
- b. The inner side (tube side) of the header appeared to be square based on a very limited inspection.
- c. No cracks were observed in any welds or base material.
- d. The AFW nozzle thermal sleeve appeared to be correctly positioned in the header.
- e. The dowel pins at two of the four locations were missing and none were found.
- f. The dowel pin at one location was not engaged with the outer bracket tab.
- g. Several tabs (inner and outer) were bent away from the shroud, in one case up to approximately 1/2".
- h. Four header bracket locations on "X" axis side of the generator were visually examined. A summary of results is given below:
 - The dowel pins at each of the four locations were missing.
 - Two outer bracket tabs were broken off.
 - The bottom hole ligament on one inner and one outer bracket tab is torn out.

- Several remaining tabs (inner and outer) were bent away from the shroud, in one case up to 1 3/4".
- i. Five loose parts were observed in the bottom of the steam annulus - near "X" axis (i.e., three pins and two bracket tabs). All parts have been retrieved. A summary of the parts is given below:
- Each pin was somewhat bent.
 - The plug weld was still evident on one end of the pin.
 - There was some evidence of wear on the pin's ends and center.
 - There was evidence of "step-like" depressions on the pins.
 - The brackets showed evidence of wear. Dowel pin holes were elliptical.
 - The bracket appeared to be broken off at a 45° angle at the weld.

The inspector observed the following by fibescope only:

"B" Steam Generator

- a. The outer vertical member of the AFW header box was distorted (concave) over most of the area viewed. The amount of distortion was estimated to be up to 4".
- b. The inner side (tube side) of the header appeared to be square based on a very limited inspection.
- c. No cracks were observed in any weld or base material.
- d. The AFW nozzle thermal sleeve is outside the header. The thermal sleeve is misaligned with the hole in the header by approximately 1". The thermal sleeve is below the hole in the header.
- e. Four header bracket locations on the "X" axis side of the generator were visually examined. A summary of results is given below:
 - The dowel pins at two of the four locations were missing.
 - The dowel pin at one location was not engaged with the outer bracket tab.
 - Several tabs (inner and outer) were bent away from the shroud, in one case up to approximately 1/2".
- f. Approximately one third of the area could be viewed.

No items of noncompliance or deviation were identified.

5. On April 23, 1982, the inspector attended a meeting in the NRC Headquarters in Bethesda, MD with personnel representing Davis-Besse (TECo), Rancho Seco (SMUD), Oconee (Duke Power), and Babcock Wilcox (B&W), to discuss the damage and recommendations.

Davis-Besse discussed the following:

- a. Eddy current examination of peripheral tubes.
- b. The outward wall of the header distorted inward (concave) as much as 4 1/2".
- c. Certain header support brackets bent, the bottom ligament torn out, or have broken off.
- d. Dowel pins missing at six of eight locations examined.
- e. Evidence of wear on dowel pins and brackets.
- f. The three dowel pins and two brackets retrieved from the steam annulus area in Unit 1, "A" steam generator.
- g. Thermal sleeve outside the header on Unit 1, "B" steam generator.

Rancho Seco indicated they had approximately the same problems and did not go into detail.

Oconee shut down April 23, 1982 and hopes to have a report on their once through steam generator auxiliary feedwater header assembly by May 1, 1982.

TECo, SMUD and Duke Power formed a "Task Force" to determine how to examine the entire header, determine what happened and determine how to accomplish a repair. B&W is researching the design.

The NRC was informed that this is the first time for the headers to be examined and that there was no problem in the operation of the plants prior to the examination.

The NRC requested to be informed as the results progress.

No items of noncompliance or deviations were identified.

Exit Interview

The inspector met with C. Daft at the conclusion of the inspection. The inspector summarized the scope and findings of the inspection noted in this report.