



**Consumers
Power
Company**

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Mr J G Keppler, Regional Administrator
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND PROJECT -
DOCKET NOS 50-329 AND 50-330
DESIGN OF INTERNAL AUXILIARY FEEDWATER
HEADER IN B&W STEAM GENERATOR
FILE: 0.4.9.62 SERIAL: 17504

This letter provides an interim 50.55(e) report concerning the B&W steam generator auxiliary feedwater header. This item was declared "potentially reportable" in a telephone conversation with R C Knop of your staff on May 26, 1982. The decision to make this item "potentially reportable" was based on the damage recently experienced by other utilities (Davis-Besse, Rancho Seco and Oconee #3), which have steam generator internal auxiliary feedwater header of a similar design to Midland. Consumers Power Company is presently working closely with both B&W and other utilities, having similar designed steam generators, to address the problem and develop a long-term solution.

The following provides a description of the internal header which exists on the Midland Project.

Attachment 1 shows a longitudinal view of the Once Through Steam Generator (OTSG) and indicates the position of the internal AFW header. Attachment 2 shows a longitudinal view of the internal AFW header at the single AFW nozzle position. As indicated in these attachments, the internal AFW header is mounted on top of the upper shroud between the 15th Tube Support Plate and the Upper Tube Sheet. The internal AFW ring header is constructed of 3/8 inch plate metal with a 13 inch by 5 inch rectangular cross-section. There is a single AFW nozzle injecting into the header to fill the header with water. The water flows into the steam generator tube bundle through sixty 1 1/2 inch diameter holes located near the top of the header and equally spaced around it. The header rests on the top of the shroud and is attached to it by eight pairs of brackets which are equally spaced around the header. Each bracket (or Tab) measures 1 1/2 inches wide x 2 3/8 inches long x 3/8 inch thick and is welded to the header. A 2 11/16 inches long x 3/4 inch diameter

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dowel pin is welded to the inner bracket and slip-fit through the shroud and the outer bracket to hold the header in place while allowing for differential thermal movement between the header and the shroud.

The damage that has been experienced at the operating plants consist of deformations of the header, bent brackets, missing dowel pins, and apparent contact between the header components and the tubes. We understand the operating plants are providing more details to the NRC on the damage experienced at their Units.

The cause of the damage is being investigated. However, the apparent cause of the deformation of the internal auxiliary feedwater header is its inability to withstand the large thermal and pressure forces generated when cold auxiliary feedwater is injected into the header. During normal operation, the header would be filled with super-heated steam as the header sits in the upper super heat region of the OTSG. When cold auxiliary feedwater (80°F) is injected into the rectangular header, very large local pressure differences can occur with large steam-water contact areas which cannot be locally compensated for quickly enough through the 1½ inch diameter flow holes. Except for the extra strength weld areas, the 3/8 inch plate walls are not reinforced and are apparently inadequate for the loads generated under these conditions. In addition to the possibly large pressure drop areas, the header itself experiences very high thermal differences when the cold APW enters the header and begins to fill from the bottom up and flows around the header from the single nozzle. While the exact failure process is not totally known, the above forces are believed to be the dominant factors.

The most probable modification that will be implemented at Midland is the installation of an external ring header similar to those presently being installed at the above referenced operating plants. Another option related to APW system operation as a means of preventing damage to the existing intact Midland design is also being investigated.

We anticipate that further information regarding corrective action will be available by July. Required plant modifications are expected to be complete by October 1982.

Another report, either interim or final, will be sent on or before July 30, 1982.

James W. Cook

DTP/lr

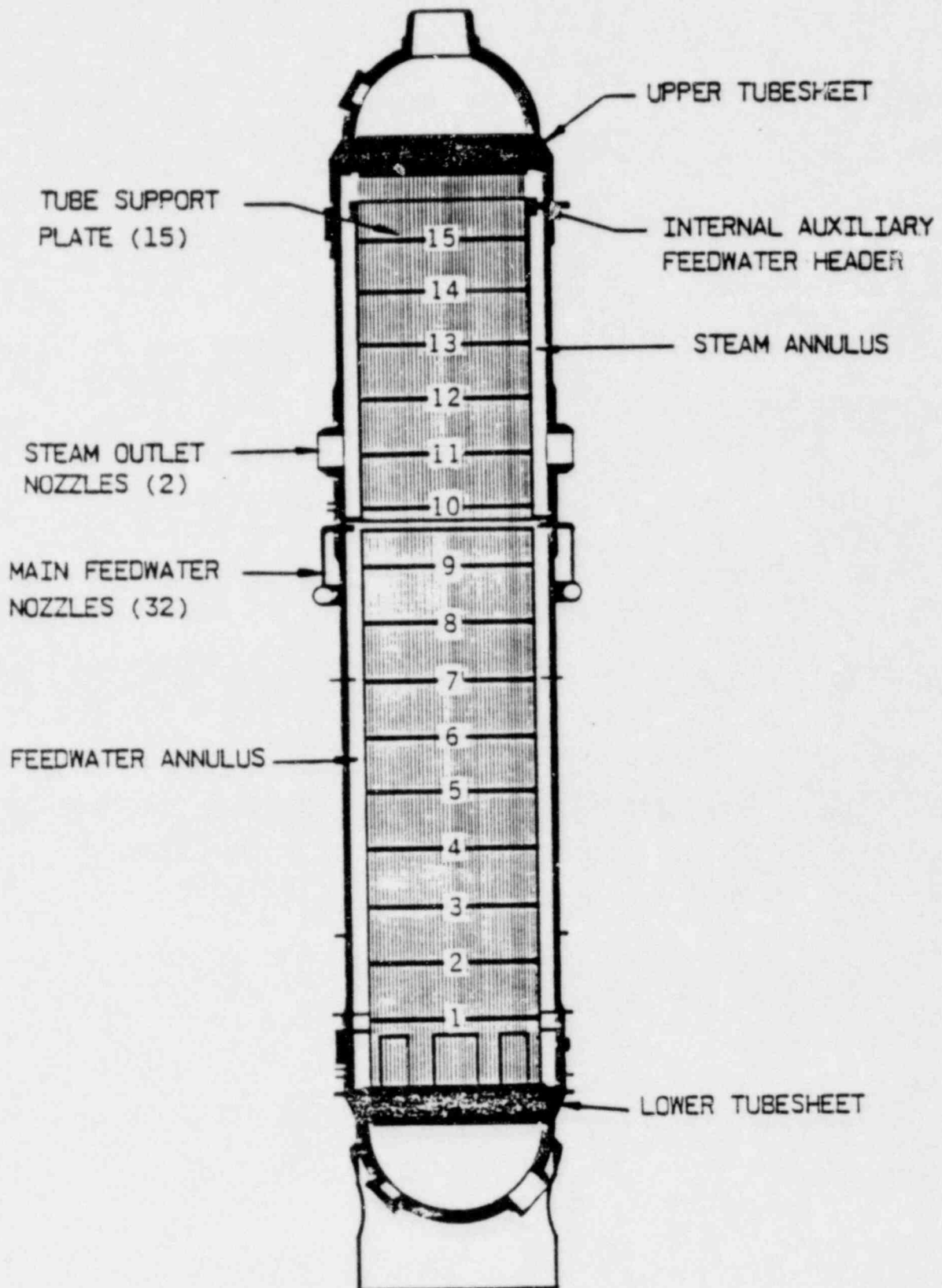
Attachments (2)

CC: Document Control Desk, NRC
Washington, DC

RJCook, NRC Resident Inspector, Midland Site

CC: CBechhoefer, ASLB Panel
RSDecker, ASLB Panel
FPCowan, ASLB Panel
JHarbour, ASLB Panel
AS&L Appeal Panel
MMCherry, Esq
MSinclair
BStamiris
CRStephens, USNRC
WDPaton, Esq, USNRC
FJKelly, Attorney General
SHFreeman, Asst Attorney General
WHMarshall
GJMerritt, Esq, TNK&J
Great Lakes QA Managers

177FA ONCE-THROUGH
STEAM GENERATOR (OTSG)
LONGITUDINAL VIEW



Internal AFW Header Design Longitudinal Section

