



Consumers
Power
Company

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Harold R Denton, Director
Office of Nuclear Reactor Regulation
Division of Licensing
US Nuclear Regulatory Commission
Washington, DC 20555

MIDLAND NUCLEAR COGENERATION PLANT
MIDLAND DOCKET NOS 50-329, 50-330
SER OPEN ITEM RELATED TO CRACKING IN THE
REACTOR COOLANT SYSTEM MAKEUP NOZZLES
FILE 0505.16, M1.9 SERIAL 22343

REFERENCE: T M NOVAK (NRC) LETTER TO J W COOK DATED AUGUST 11, 1982

The above referenced NRC correspondence of August 11, 1982 requested that we advise the Staff of what action(s) will be taken for Midland to deal with the potentially generic issue of makeup nozzle cracking. This issue was identified and discussed initially in Section 5.4.3.1 of the NRC's Midland Safety Evaluation Report (SER) of May 1982 and was identified as outstanding Open Item 8 in this document.

Consumers Power Company has joined with other utilities who are owners of B&W 177 fuel assembly plants to investigate the problem, determine the cause of the cracks and to develop a solution. B&W has prepared a report for Consumers Power Company summarizing the results of this investigation. That report, B&W Document Number 77-1141514-00 titled "Babcock & Wilcox 177 Fuel Assembly Owner's Group Safe End Task Force Report on Generic Investigation of HPI/MU Nozzle Component Cracking," is enclosed. The report also serves to document information presented to the NRC by B&W and the owners in a meeting held in Bethesda on December 16, 1982 at the request of Mr Sydney Miner.

The Midland High Pressure Injection (HPI) nozzles and thermal sleeves are of similar design and material as is typical of most other B&W 177 FA units. At Midland, each HPI nozzle is separated from the first upstream check valve by several feet of pipe. The Midland thermal sleeves had been contact rolled at the outboard end according to B&W specifications. This construction was typical of most B&W 177 FA units. Radiographs showed that possible gaps existed between the expanded thermal sleeve and the safe end at some of the nozzles.

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B&W developed a modified design thermal sleeve for the repair of the Crystal River 3 makeup nozzle. This modified sleeve (see Figure 8 of the report) has a bell shaped flare at the outboard end to prevent migration of the sleeve into the cold leg. The modified sleeve, which requires replacement of the safe end, was designed to incorporate this improvement while maintaining the same basic configuration as the original design. This modified sleeve was also installed in certain repaired nozzles at Rancho Seco, Oconee and ANO. The design features of the modified thermal sleeve are presented in Section 9.0 of the report. It should be noted that this design was developed in response to the immediate requirements at Crystal River 3 and was implemented before the investigations of the task force were completed.

The modified thermal sleeve is not being used on Midland. Instead, the existing HPI thermal sleeves have been reworked in place in accordance with the recommendations of Section 14.0 of the report. This reworking included:

1. Visual examination to record the general condition of each thermal sleeve prior to repair.
2. Visual examination of the inboard and outboard weld buttons to verify that their number, size and locations are as required.
3. Contact roll expansion of the existing inboard collar and the drilling of (approximately 0.116 inch diameter) holes through the collar at the three, six, nine and twelve o'clock positions. This step is in addition to the recommendations of Section 14.0 of the report. Due to the unirradiated condition of the Midland units, it was possible for workers to enter the upper cold legs to perform this drilling.

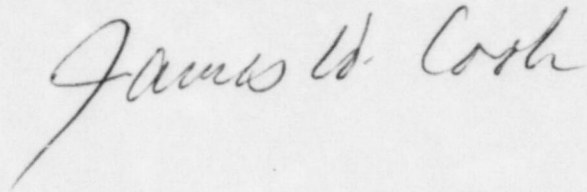
This step allows the repaired thermal sleeve to adopt one of the advantages of the modified sleeve since expansion of this collar will prevent cantilever beam flexing of the thermal sleeve about the outboard roll, and increase the natural frequency of the sleeve. This reduces stress at the outboard roll due to any vibration of the thermal sleeve. (Section 9.2, Item 4 of the report.) Holes were drilled through the collar to provide venting and draining of the annulus between the thermal sleeve and the nozzle/safe end. A contact roll was specified to allow for differential axial expansion of the thermal sleeve and the nozzle.)

4. Hard roll expansion of the outboard collar area of the thermal sleeve as recommended in Section 14.0 of the report. The required post-roll inside diameter was determined for each thermal sleeve based on that nozzle/safe end/thermal sleeve's particular dimensions. The roll was designed to ensure attainment of a tight thermal sleeve-to-safe end joint. (The verified existence of weld buttons and a tight thermal sleeve-to-safe end roll provides a means of retaining the thermal sleeve in place making replacement with modified thermal sleeves unnecessary.)

Section 14.0, Item 4 and Section 12.0 of the report concern detailed stress analysis of the nozzles. This activity is of particular interest to owners of operating plants who wish to evaluate the effects of past transients and then determine the remaining life expectancy, in cycles, of each nozzle. Since the Midland nozzles are new and have experienced no

transients, Consumers Power Company is not participating in this activity. A detailed stress analysis of each nozzle is being performed by B&W. This activity is part of the normal Stress Report preparation process.

Section 11.0 of the report describes an Augmented Inservice Inspection Plan. We propose to implement inservice inspection provisions based on the recommendations for repaired nozzles. This inspection is intended to confirm periodically that the thermal sleeves remain in the as-installed position.



JWC/RLT/HWD/bjb

CC RWHernan, NRC (2), w/a
RJCook, Midland Resident Inspector, w/o

CONSUMERS POWER COMPANY
Midland Units 1 and 2
Docket No 50-329, 50-330

Letter Serial 22347 Dated April 11, 1983

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits correspondence which addresses an issue and closes an action item identified in the NRC's correspondence of August 11, 1982. This is issue, identified as Outstanding Item 8 which discussed in Section 5.4.3.1 of the Midland SER (May 1982), CONSUMERS POWER COMPANY relates to the cracking of the makeup nozzles.

By J W Cook
J W Cook, Vice President
Projects, Engineering and Construction

Sworn and subscribed before me this 25th day of April, 1983

Pamela J. Giffen
Notary Public
Jackson County, Michigan

My Commission Expires Sept 8, 1984