

GENERAL  ELECTRIC

NUCLEAR POWER SYSTEMS DIVISION

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*George Lank*

*84-360*

*June 8/1*

*pt 21 84360  
Publicly Available*

April 20, 1984

MFN# 049-84

U.S. Nuclear Regulatory Commission  
Office of Inspection and Enforcement  
Washington, D.C. 20555

Attention: 

Gentlemen:

SUBJECT: TELECON - CONDITION GERMANE TO SAFETY

Please find attached the memo of telecon to W. Joe Collins on April 20, 1984. This telecon dealt with a condition germane to safety involving microfissuring in induction bent piping which was discovered during fabrication. The piping was being fabricated as replacement piping for the recirculation system. This communication is intended to fulfill the GE commitment to inform the NRC of conditions of general safety interest which are not reportable under 10CFR Part 21.

Very truly yours,

*George Stramback*

G. B. Stramback  
Safety Evaluation Programs Manager  
BWR Standardization  
Nuclear Safety and Licensing Operation

GBS:pc/1G

Attachment

cc: L. S. Gifford (GE-Bethesda)  
W. J. Collins (NRC-Bethesda)  
PRC File



*Collins followed  
IN 84-41 issued  
recd 7/20  
Jms*

*IE19*

MEMO OF TELECON:

DATE: April 20, 1984

TIME: 8:30

PERSON CALLING: *George B. Stramback* George B. Stramback/E. J. Romesberg, GE

PERSON CALLED: W. J. Collins, NRC-I&E

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SUBJECT: GERMANE CONDITION - MICROFISSURING IN 316 NG PIPING

We communicated via phone with Joe Collins of the NRC I&E Branch on April 20 regarding notification of a Germane Condition on microfissures in induction bent piping which were discovered during fabrication.

We stated that GE had completed evaluation of the Potentially Reportable Condition and had determined that it was not reportable since it did not constitute a substantial safety hazard. However, since it did involve grain boundary flaws in replacement piping fabricated using the induction bending process, we felt that it was a subject of general interest for generic application.

Background:

The concern is grain boundary microfissuring in the outer radius of 12-inch riser bends and double bends in the recirculation pipe base metal. This condition resulted from the applied fabrication process for replacement recirculation piping. This process included induction heating bending of piping for the ring header and vertical risers and is performed at the Engineered Piping Systems Division of Johnson Controls in Clearfield, Utah. After a number of production pipes had been bent by this process, the concern of microfissuring surfaced. Using special ultrasonic (UT) and dye penetrant (PT) measurement techniques, it was revealed that microfissures (~ 0.2-0.003 inches long) were present in all of the risers (10) and double bends (4) that had been bent for Hatch, Brunswick and Pilgrim. The piping involved came from three heats of material. The microfissures found would not be revealed by the required ASME code tests. Tensile tests of samples containing these microfissures showed no discernible loss of tensile strength. Therefore, the ASME code requirements for piping were satisfied.

All induction bent headers were tested using the sensitive UT&PT and were free of microfissures. The bend radius for these header pipes was less severe (6% strain versus 25% strain for risers).

GE considers that any significant amount of microfissuring is unacceptable in piping utilized for IGSCC mitigation since the long-term effects are not known. Although it is expected that the material would probably have lasted the life of the plant, the conservative approach was taken and all

W. J. Collins  
Page 2  
April 20, 1984

the piping containing microfissures has been rejected. As part of the induction bending process qualification program for production of microfissure free piping, 28 full-size/reduced arc specimens and three full 90° pre-production bends from two heats of material were successfully made, thereby qualifying the new process.

None of the induction bent piping which contained microfissures was ever installed in a plant. Only piping for Hatch 2 and Pilgrim had been delivered to the site when microfissuring was discovered by GE. Since then, process parameters have been modified and all piping with microfissures has been withdrawn and new microfissure-free piping has been or is being provided. All future induction bent components provided by GE will be tested by the special UT process and any components containing any grouping or clusters of indications which exceed the GE acceptance criteria as given in the GE presentation to NRC on 3/21 will be unacceptable. Using this highly sensitive UT technique and this acceptance criteria will assure high quality induction bent products.

Assuming the worst scenario and microfissures had gone undetected, and the piping had been installed, a significant safety hazard would not have existed. The material met code requirements and was not sensitized and as such, the probability of failure would have been essentially unchanged. Flaw growth, if it occurred at all, would be slow and would not have been expected to go through the wall. Furthermore, the leak before break argument (as in IGSCC cases) would still be valid and the plant would be shut down and depressurized per tech spec requirements upon detection of leaks by the leak detection system.

GBS:pc:csc/L04201

cc: R. Villa  
E. J. Romesberg  
PRC File