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November 20, 1978

Mr. Boyce H. Grier, Director  
U.S. Nuclear Regulatory Commission  
Region 1  
631 Park Avenue  
King of Prussia, Pennsylvania 19406

Dear Mr. Grier:

NRC INSPECTION 50-311/77-26  
SUPPLEMENTAL INFORMATION  
NO. 2 UNIT  
SALEM NUCLEAR GENERATING STATION

In our memorandum of May 9, 1978, we outlined actions taken and proposed to confirm the integrity of those weld joints that were not heat treated in full accord with ANSI B31.7. As stated in that letter, NDE would be performed on three of those welded joints during hydrostatic testing. Also, a severe heat treatment along with NDE and mechanical tests would be performed on surplus main steam piping at Salem.

This testing has been completed and a summary of the tests and results follows. From these tests and our experience with the heat treatment procedure, we conclude that the heat treatment, although not in full accord with ANSI B31.7 had no detrimental effect on the Salem Piping.

#### Heat Treatment Test

For information and reference purposes, a heat treatment was performed on surplus main steam piping. The pipe was A-155 KC 70, 1-1/8" thick, 30" diameter and 20 feet in length with an existing circumferential weld at the center and welded longitudinal seams. The pipe was oriented in the horizontal position with one of the longitudinal seams at 12 o'clock. The circumferential seam was heat treated in accordance with the following parameters:

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Heating Rate - 640°F/hour  
Maximum temperature change in 5 minutes - 73° (heating)  
Peak Temperature - 1330°F  
Maximum Cooling Rate - 840°F/hour  
Maximum temperature change in 5 minutes - 53°  
Holding time - 40 minutes at 1200°F

These heating and cooling rates are far in excess of those allowed by ANSI B31.7. Before and after heat treatment, hardness readings were taken and magnetic particle, radiographic and ultrasonic testing were performed. During the heat treatment, acoustic monitoring was performed. Several sections of interest were removed from the pipe for metallurgical (microetch) and mechanical testing (tensile, bend, impact).

The acoustic emission test located ten sources (four Grade B and six Grade C), none of which were considered rejectable. In accordance with a proposed ASME standard, the sources were classified as follows:

Grade A - If it occurs during pressure build-up, pressurization should be halted. Confirm results as relevant by other nondestructive examination methods.

Grade B - Recordable and reportable for future comparison.

Grade C - Further evaluation or correlation not required.

Although not a pressure test, the above criteria was applied to the heat treatment test. The six Grade C sources were dismissed with no further action required and other methods of NDE were recommended for investigating the four Grade B sources.

Ultrasonic, radiographic and magnetic particle testing were used to investigate the Grade B sources and other areas of the pipe. Magnetic particle and radiographic testing did not locate any defects generated by the postweld heat treatment. Ultrasonic testing only located insignificant and geometric indications. There was no significant difference in the mechanical tests from heat treated and non-heat treated areas. Microetch tests revealed no defects.

#### Hydrostatic Test

The heat treatment charts of those joints from Units 1 and 2 that were not heat treated in accordance with ANSI B31.7 were reviewed. Three joints representing the more excessive heating and cooling rates were selected for acoustic monitoring during hydrostatic testing. These joints ranged in thickness from 1 to 3.75 inches. For comparison, another joint that was heat treated in accordance with ANSI B31.7 was monitored.

Prior to hydrostatic testing, the joints were magnetic particle and ultrasonically tested. Hardness readings were taken before hydrostatic testing and showed normal levels of hardness for the material. Acoustic monitoring was performed during hydrostatic testing and ultrasonic testing was performed again after hydrostatic testing.

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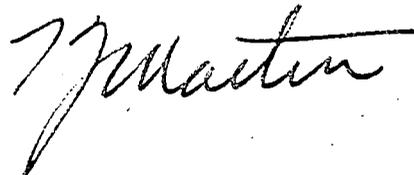
Acoustic monitoring located ten sources, seven of which were Grade C and three Grade B. Ultrasonic testing of the joints and Grade B sources revealed both insignificant and geometric indications with no apparent changes in the before and after tests. The magnetic particle test before hydrostatic testing revealed no recordable indications.

This testing represents a thorough investigation of the postweld heat treatment problem and adequately demonstrates the integrity of the Salem main steam piping.

Complete test results of the above will be available at the Salem site for your review during the week of December 4, 1978.

If you require any additional information, we will be pleased to discuss it with you.

Very truly yours,

A handwritten signature in cursive script, appearing to read "J. J. Martin". The signature is written in dark ink and is positioned to the right of the typed name "Boyce H. Grier".