PI-82-0112

December 22, 1982

Mr. J. Malcolm Gray
Micro alloying International, Inc
Suite 360
7670 Woodway
Houston, TX 77063

Dear Mr. Gray:

This answers your letter of November 9, 1982, and previous correspondence from Mr. R. T. Hill of Nucorp Energy, Inc., concerning the qualification of induction heated pipe bends under 49 CFR Parts 192 and 195. You state in your letter that "The mechanical properties of the pipe body, weld and HAZ of induction bends meet or exceed the properties of the as-received pipe, therefore, it appears that the spirit, and the reason underlying Paragraphs 195.106(a) and 192.105(b), is not applicable to the product under discussion."

A previous January 27, 1982 letter from Nucorp Energy, Inc., to which you refer, concomitantly makes the statement, "Because the mechanical properties of induction heated bends are obtained through the heating, quenching and, where applicable, post bend tempering operations, there is not a degradation of mechanical properties.

Though your statements may be correct, we are unable to obtain a corroborative meaning from Section 192.105(b) and 195.106(a) that would exempt what in effect are "hot bends" from the stated derating requirements. Lacking any other support, the Materials Transportation Bureau (MTB) must find that the above sections are applicable.

Precedent information for this decision may be found in American National Standards Institute (ANSI) standards B31.8 and B31.4, the 1967 and 1966 editions, respectively, from which the DOT regulations were originally developed. We note that there has been no substantive change in these documents with regard to reducing the pipe design pressure for the effect of heating steel pipe that has been cold worked to meet the specified minimum yield strengths.

Section 841.233 of the 1967 edition of ANSI B31.8 states that "Hot bends made on cold worked or heat treated pipe shall be designed for lower stress levels in accordance with Section 841.14(e)." Section 841.14(e) specifies the 600 degree Fahrenheit temperature limit and provides the derating factor to be used in the design formula of Section 841.1, which is identical with the requirements of the DOT regulations.

Because the regulations in question originated within the industry, the MTB has limited technical background upon which to offer relief and can only suggest that you review your purchase records and other test data to determine if, in fact, you are using pipe that has been cold worked to meet the specified minimum yield strength. The MTB has a rulemaking underway to raise the temperature limits set by the above-referenced sections of the DOT regulations, but because of limited data that has been made available the proposed revision may not alleviate your problem. We would, however, be happy to consider any further technical data you may wish to submit on this subject before a final rule is issued. A copy of the Notice of Proposed Rulemaking is enclosed for your information.

We trust that this will provide a complete answer to your correspondence. In the event that you have any further question, let us hear from you.

Sincerely,
Richard L. Beam
Associate Director for Pipeline Safety Regulation
Materials Transportation Bureau

Micro alloying International, Inc
Suite 360
7670 Woodway
Houston, TX 77063

November 9, 1982

Mr. M. A. Judah
Acting Associate Director for Pipeline Safety Regulations
U.S. Department of Transportation
400 Seventh Street, S.W.
Room 8423
Washington, D.C. 20590

Re: Pipe Bends Produced by Induction Heating & Quenching

Dear Mr. Judah:

We refer to correspondence dated January 27 and April 19, 1982 between our colleague, Mr. R. T. Hill of Nucorp Energy, Inc., and the various offices of the DOT (copies attached).

Our interest relates to interpretation of the Code of Federal Regulations, particularly the derating of cold worked pipe which has been heated above 600 F, except by welding.

The cycle of induction heating, bending and quenching closely parallels that utilized in the manufacture of primary pipe by the quenching and tempering process. In fact, the relevant metallurgical processes are indistinguishable from those operative in conventional heat-treating practices. After critical engineering assessment induction bends have been included in several major installations. The growing acceptance in the pipeline industry can be traced to the advantages cited in the enclosed brochure.

The mechanical properties of the pipe body, weld and HAZ of induction bends meet or exceed the properties of the as-received pipe, therefore, it appears that the spirit, and the reasoning underlaying, Paragraphs 195.106(a) and 192.105(b), is not applicable to the product under discussion.

Since we are actively involved in the qualification and application of induction bent pipe we would greatly appreciate hearing from you concerning the interpretation of Federal Regulations by OPSR and distinctions applicable to quenched and tempered product.

Please let us know if we can supply technical data or answer any questions that you may have on this subject. Also, note that we are available to meet with you if this will assist in the timely resolution of this contentious issue.

Yours faithfully,
J. Malcolm Gray