

PI-72-0106

April 13, 1972

Mr. A. G. Barkow
Natural Gas Pipeline Company of America
122 South Michigan Ave.
Chicago, Illinois 60603

Dear Mr. Barkow:

This is in answer to your letter of March 14, 1972, regarding paperback film for radiography, and the film's acceptability under the Department's pipeline safety regulations.

There are two sets of Federal pipeline safety regulations which include requirements for the nondestructive testing of field girth welds. One is the gas pipeline safety regulations contained in part 192 of the Code of Federal Regulations (49 CFR Part 192) which is titled "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards." The other is the set of regulations over liquid pipeline carriers engaged in the transportation hazardous materials and petroleum in interstate and foreign commerce. These regulations are located in Part 195 of the Code of Federal Regulations (49 CFR Part 195) and are titled "Transportation of Liquids by Pipeline."

The gas safety regulations in Paragraph 192.243 (a) require that "nondestructive testing of welds must be performed by any process, other than trepanning, that will clearly indicate defects that may affect the integrity of the weld." This is a performance standard in that no particular process is specified.

The liquid safety regulations are also performance oriented concerning the nondestructive testing of welds. Paragraph 195.234(a) requires that "A weld may be nondestructively tested by any process that will clearly indicate any defects that may affect the integrity of the weld." The liquid safety regulations also require in Paragraph 195.234(g) that film, when radiography is used, "must be retained for three years after the line is placed in operation."

The safety goal in welding is to produce a weld that will be free of defects which might impair the structural integrity of the weld. Any nondestructive testing process which will assure that this goal is accomplished by complying with the regulations cited above will be acceptable to the Department.

Please contact me if I can be of any further assistance in this matter.

Sincerely
Original signed by:
Joseph C. Caldwell
Director
Office of Pipeline Safety

NGPL
Natural Gas Pipeline Company of America
122 South Michigan Ave.
Chicago, Illinois 60603

March 14, 1972

Mr. Joseph C. Caldwell
Office of Pipeline Safety
Department of Transportation
Washington, D. C. 20590

Dear Mr. Caldwell:

Recently, a manufacturer of radiographic film for the pipeline industry has started to market a so called paper back film. It is my understanding that other film producers are likewise planning to market a similar product. This product has been tried out by various laboratories and in the field and does produce very satisfactory radiographic film. A section of such film is attached hereto.

Some question has risen as to whether this film will be accepted as complying with the requirements of API Standard 1104 and whether it will be acceptable to the Department of Transportation, Office of Pipeline Safety. As a member of API Standard 1104 Committee, I have given this matter considerable attention and have in fact, made numerous tests of the product at my laboratory under simulated field conditions on standard size pipe of various diameters. From the standpoint of interpretive possibility, I find that a paper back film is every bit as sharp and as easy to read as the regular film. This paper back film has many advantages, the chief of which is that it can be read dry within minutes after the exposure is made. The real advantage here is that radiography could be held as close to the welding as possible, thus the results of the radiographic examination could be used immediately to take corrective measures, as far as welding is concerned.

Two questions in connection with the use of this material are: 1) can paper back film be classified as film? By definition, film is a transparent material with a thin film of photo sensitive emulsion. Using this definition, of course, paper back film does not qualify as film. However, if we define film as a negative image of an object, then paper back film will comply. 2) API Standard 1104 requires that radiographic film have a density of 1.5 to 2.5 H & D.

H & D scale applies only to transparent or translucent objects. Again this requirement does not apply to paper back film. On the other hand, there is also a reflective scale which is just about 1/2 of the H & D scale. Thus, 0.8 on the reflective scale is approximately equal to 2.0 on the H & D scale, as far as readability is concerned. Here again we do have an apparent conflict.

It is my personal feeling that since the paper back film is a negative, it can be classified as a film. Also, the H & D density requirement pertains to transmitted light and therefore, is not applicable to paper back film. However, to make these points perfectly clear, I would like to propose a new paragraph to API Standard 1104 to read as follows:

Paragraph 8.10 Paper Based Film

"Paper based film may be used providing it will meet all of the requirements of Section 8.0 with the exception of the density requirement, Paragraph 8.9. Paper based film shall have the same sensitivity, definition and interpretive value as transparent based film"

I believe that with this added paragraph, we could use this product without in any way jeopardizing the quality requirements for radiographic examination. Before proposing this addition to API Standard 1104, I would appreciate any comments that you have in this matter. I might state that I have had numerous telephone calls regarding paper back film and am of the opinion that there is a great desire to use the film if it will meet the approval of the Office of Pipeline Safety.

As stated before, there are many advantages in the use of this material, and I can find nothing, as far as the product is concerned, which would in any way deteriorate the interpretation of defects or reduce its interpretive value.

Very truly yours,
A.G. Barkow Chairman
Radiographic Sub-Committee
API Standard 1104