

Dated: February 24, 1984.

Clyde T. Lusk, Jr.,

Rear Admiral, U.S. Coast Guard, Chief, Office of Merchant Marine Safety.

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Research and Special Programs Administration

49 CFR Parts 192 and 195

[Amdts. 192-47 and 195-30; Docket PS-58]

Transportation of Natural and Other Gas and Hazardous Liquids by Pipeline; Temperature Limits on Steel Pipe That Has Been Cold Expanded To Meet the Specified Minimum Yield Strength

AGENCY: Materials Transportation Bureau (MTB) Research and Special Programs Administration, Transportation.

ACTION: Final rule.

SUMMARY: These amendments increase the temperature limit to which steel pipe that has been cold expanded to meet the specified minimum yield strength (SMYS) may be heated without a reduction in design pressure. The limit now is 600° F and temperatures above 800° F are needed to remove defects called "hard spots." Research shows that a temperature of 900° F can be withstood for up to 1 hour without reducing the yield strength of the pipe and that the limit can be safely increased to permit the removal of hard spots and to eliminate a potential cause of hydrogen stress cracking (HSC).

EFFECTIVE DATE: April 2, 1984.

FOR FURTHER INFORMATION CONTACT: William A. Gloe, 202-426-2082, regarding the content of these amendments, or the Dockets Branch, 202-426-3148, regarding copies of the amendments or other information in the docket.

SUPPLEMENTARY INFORMATION:

Background

This final rule is based on a petition by the American Society of Mechanical Engineers (ASME) Gas Piping Standards Committee citing research work performed by the Battelle Memorial Institute of Columbus, Ohio, review by the MTB, and subsequent incorporation of the recommended changes into the "Gas Transmission and Distribution Piping Systems," ANSI/ASME B31.8 Code. The Battelle report, entitled "The Effect of Tempering on the Mechanical Properties of Cold Expanded Line-Pipe Steels," shows that hard spots

(undesirable hardened areas on the surface of the pipe) can be removed by heating to temperatures between 800 and 900° F. Mechanical properties are not affected if the time of heating is limited to 1 hour or less. The effect achieved is to reduce the hardness of the hard spot and to eliminate a potential cause of HSC that could result in eventual failure of the pipeline.

Sections 192.105 and 195.108 presently require that if steel pipe that is cold worked to meet the SMYS is heated, other than by welding, to 600° F or more, the design pressure must be limited to 75 percent of that normally calculated. This requirement imposes a penalty in terms of operating pressure that is unacceptable for most pipelines, and in effect, prohibits the heating of steel pipe that has been cold worked, as described, to a temperature higher than 600° F.

The Battelle report discusses the origin of the heating limitation as having been in the ANSI B31.8 Code since it was issued in the mid-1950's and describes selection of the 600 degree limit as follows:

At that time, the temperature of 600 F was selected by committee discussion and judgement; the decision was not based on performance or operating data. The original thought was that, if the pipe were heated above 600 F, the increase in yield strength of the steel caused by cold work (cold expansion) during the manufacture of the pipe would be lost because of stress relief.

In developing the rule based on the Battelle testing, MTB uses the term "cold expansion" rather than "cold work" both for consistency with the testing actually performed and to clarify applicability.

Notice of Proposed Rulemaking

An NPRM published on September 13, 1979 (44 FR 53185), proposed to increase the temperature limitation in §§ 192.105 and 195.108 from 600° F to 900° F, with the added provision that heating between 600 and 900 degrees may not exceed 1 hour. The NPRM provided the background for the proposal in terms of effects on gas pipelines because the ASME petition addressed only Part 192. Also, according to data available to MTB, pipeline failure due to hard spots and subsequent HSC have only occurred in gas pipeline systems. The NPRM used the ASME petition as a basis for also amending Part 195 because of the similarity of both rules, although the problem of HSC is not known to have occurred in hazardous liquid pipelines.

The NPRM also proposed that an exception from the temperature limitation be added for stress relieving as a part of welding, and that operators

have and follow written procedures for thermally removing hard spots within the revised time and temperature limits. The proposed new sections requiring written procedures have been deleted in this final rule for the reason that the industry has adopted the basic proposal, and MTB believes that operators will develop corresponding written procedures without the need for Federal regulation. Because the Battelle study did not include testing of X-70 grade cold expanded steel line pipe (pipe having a minimum yield strength of 70,000 psi), MTB requested that commenters provide any data that may be available to aid in determining whether X-70 grades should be excluded from the more relaxed rule. Responses are discussed in the following Discussion of Comments.

Discussion of Comments

Comments were received from the API, the American Gas Association (AGA), the Interstate Natural Gas Association of America (INGAA), ASME Gas Piping Standards Committee, the New England Gas Association, seven oil and gas pipeline operators, and one commenter from the nuclear industry. With the exception of the comment from UNC Naval Products, a division of the United Nuclear Corporation, all commenters concurred with the proposed rule.

General

Comments in response to the NPRM were generally of the following nature:

It is recognized in the industry and elsewhere that the removal of hard spots is most beneficial. As such, INGAA concurs with MTB's proposed limit of 900 F to permit the removal of these hard spots * * *.

Other commenters stressed the recognition that regulations can be relaxed, and in so doing increase pipeline safety overall, such as this comment by the AGA:

We encourage any actions which will provide in a reasonable manner a potential for increased pipeline safety. Certainly the reduced potential for hydrogen-stress cracking presented by this rulemaking would enhance pipeline safety, and [heating] is the only practicable method for removing this potential resulting from hard spots.

The one negative commenter made four observations:

(1) Thermal methods for the removal of hard spots would not be necessary if additional controls were imposed during manufacture;

(2) Hard spots may be caused by alloy segregation rather than localized quenching alone;

(3) Hard spots may occur on pipe that is not cold expanded as well, and

(4) If hard spots are due to austenite transformation as a result of cold work, then the noncold expanded pipe will slowly transform during service.

MTB believes that the fact that hard spots and HSC have occurred in gas transmission lines supports the need for a thermal method of removal, and that further discussion of the nature of hard spot formation and possible prevention in manufacture is beyond the scope of this rulemaking. However, MTB is currently taking action through the appropriate industry committee to assure that additional controls in pipe manufacture will be utilized. Although hard spots may also occur on noncold expanded pipe, there is no temperature limitation in the regulations to prevent their removal by thermal treatment.

UNC Naval Products also argued that the heating limit for 1 hour should not be as high as 900° F for reasons of possible embrittlement, and that an exception for stress relieving as a part of welding should not be made. As explained in the NPRM, MTB recommended the 900° F temperature limit after review of the Battelle test data, and had considered that the range of 100 degrees (from 800 to 900° F) was necessary as a practical working tolerance for thermal removal of hard spots in the field. Subsequent to issuance of the NPRM, both Battelle and the ASME agreed with the 900° F limit and withdrew their previous recommendation of 825° F as a temperature limitation. In their letter comment on the NPRM, the ASME concurred with MTB by stating:

"We feel that the change made to the original petition * * * * * primarily raising the temperature from 825 degrees F to 900 degrees F is in order and appropriate. We also discussed this with the original Battelle researchers and they concur."

MTB does not take issue with the United Nuclear commenter's view as it may be applicable to certain grades of alloy steel and makes no general recommendation to heat alloy steels after quenching in the range of 800 to 900° F. Certain alloy grades whose properties are attained by quenching and tempering are known to be susceptible to a precipitation type embrittlement (temper embrittlement) when heated in this range after quenching or being slow cooled through the range. This rulemaking is limited to consideration of more ductile line pipe steels whose properties may be enhanced by cold work during cold expansion, but that are basically low carbon, carbon-manganese, or

microalloyed grades that are not susceptible to temper embrittlement.

The NPRM made an exception for stress relief of welds because §192.239(g) specifies a minimum stress relief temperature of 1,100° F. More importantly, §192.239(b) requires that welds be thermally stress relieved under certain conditions. Stress relieving is normally only required on welds that join thick wall fittings with relatively thinner wall pipe, where the fitting absorbs the heat of welding more quickly than the pipe, cooling the weld too rapidly, and resulting in possible embrittlement of the weld. The same effect occurs in the stress relieving cycle. Although the weld may be heated to 1,100 degrees, the thinner wall pipe dissipates the heat and the heating effect on the pipe is insufficient to cause a reduction in yield strength. This, plus the fact that the typical joint that may be stress relieved offers additional hoop strength by the nature of its design mitigates any possible problem in weakening of the pipe end adjacent to the weld. Section 192.239(a) specifies that stress relieving must be carried out as prescribed by Section VIII of the ASME Boiler and Pressure Vessel Code (1977 edition), and Section VIII requires testing of the effect of stress relieving as a part of welding procedure qualification. With these provisions, and acknowledging that stress relieving would be performed only on rare occasions where there is no other remedy, MTB believes that the exception for stress relief is appropriate.

Request for Data on X-70 Pipe Grade Steels

While recognizing that there are variables in the manufacture of X-70 line pipe that are not comparable with earlier, lower strength pipe grades, MTB chose to include X-70 as well as other grades in this rulemaking. However, MTB requested data to aid in determining whether X-70 pipe steels were properly included or should be specifically excluded from the proposed heating limitation. No actual data was received to indicate that allowing the heating of cold expanded X-70 pipe to 900° F for 1 hour would have any adverse effect. The Tennessee Gas Pipeline Company and the ASME commented that the requested information is unnecessary because the cold expansion of X-70 pipe is not done for the enhancement of yield strength, but rather for the purpose of attaining roundness, straightness, and dimensional tolerance control as required by the pipe specifications. Tennessee also asserted that this was true for a large percentage of X-60 and

X-65 pipe and submitted data on X-60 pipe to support its position. If the data is representative of X-70 pipe, the Tennessee Gas Pipeline Company and ASME comments support a conclusion that the heating limitation of §§192.105 and 195.106 would not apply and an exclusion is not necessary for X-70 pipe.

Conversely, the one negative commenter, UNC Naval Products, recommended against including X-70 line pipe steels having somewhat higher alloy contents without specific study. The commenter did not further explain what might be gained by specific study and offered no data to indicate that a safety hazard might be encountered if X-70 line pipe steels were not excluded from the final rule.

The purpose of the temperature limitation of §§192.105 and 192.106 is to assure a factor of safety relative to the possible reduction in yield strength by heating and applies only to steel line pipe that has been cold expanded to meet the SMYS. If the mechanics of attaining the finished pipe yield strength do not depend on cold expansion, the limitations of §§192.105 and 192.106 do not apply. However, in the absence of comprehensive data to show whether or not there is positive plate to pipe shift in yield strength with cold expansion, the only reliable means to determine applicability is to heat the material in question for the time necessary, and to conduct destructive testing as was done in the Battelle study. The complete report for this testing is contained in the docket file for this proceeding for the review of interested persons.

Advisory Committee Review

Section 4(b) of the Natural Gas Pipeline Safety Act of 1968, as amended (49 U.S.C. 1673(b)), requires that each proposed amendment to a safety standard established under that statute be submitted to a 15-member advisory committee for its consideration. The committee, composed of persons knowledgeable about transportation of gas by pipeline, considered the proposed amendments to §§192.105 and 192.713 at a meeting in Washington, D.C., on April 15-17, 1980. In its report dated July 3, 1980 (a copy of which is in the docket), the committee found the proposed amendments, as set forth in a NPRM to be technically feasible, practicable, and reasonable.

Similarly, Section 204(b) of the Hazardous Liquid Pipeline Safety Act of 1979 (49 U.S.C. 2003(b)) requires that the proposed amendments to §§195.106 and 195.422 be submitted for consideration by a 15-member advisory committee composed of persons knowledgeable

about the transportation of hazardous liquids by pipeline. The committee considered about the proposed amendments, as set forth in the NPRM, at a meeting in Washington, D.C., on December 7-8, 1982. The report of the committee dated March 9, 1983, states that "By a unanimous vote in favor, the 13 Committee members present (1 absent) found the Notice of Proposed Rulemaking as drafted by the MTB staff to be technically feasible, practical, and reasonable." A copy of the committee report is in the docket.

Classification

This final rule is considered to be nonmajor under Executive Order 12291 and nonsignificant under the DOT regulatory policies and procedures (44 FR 11034; February 26, 1979). Because the economic impact of this action is minimal, albeit favorable on the economy, further evaluation is unnecessary. The change made is a liberalization of requirements based on actual test data and can have no adverse impact.

Since the impact of this final rule is expected to be minimal, the agency certifies that it will not have a significant economic impact on a substantial number of small entities.

List of Subjects

49 CFR Part 192

Pipeline safety, Pipe design, Design formula for steel pipe.

49 CFR Part 195

Pipeline safety, Ammonia, Petroleum, Internal design pressure.

Based on the foregoing, 49 CFR Parts 192 and 195 are amended as follows:

Part 192—[AMENDED]

- Section 192.105(b) is revised.

§ 192.105 Design formula for steel pipe.

(b) If steel pipe that has been subjected to cold expansion to meet the SMYS is subsequently heated, other than by welding or stress relieving as a part of welding, the design pressure is limited to 75 percent of the pressure determined under paragraph (a) of this section if the temperature of the pipe exceeds 900° F (482° C) at any time or is held above 600° F (316° C) for more than 1 hour.

(Authority citation for Part 192 is: 49 U.S.C. 1672 and 1804; 49 CFR 1.53, and Appendix A of Part 1)

Part 195—[AMENDED]

2. Section 195.106 is amended by revising the "F" factor to read as follows:

§ 195.106 Internal design pressure.

(a) * * *
 $F = A$ design factor of 0.72, except that a design factor of 0.60 is used for pipe, including risers, on a platform located offshore or on a platform in inland navigable waters, and 0.54 is used for pipe that has been subjected to cold expansion to meet the specified minimum yield strength and is subsequently heated, other than by welding or stress relieving as a part of welding, to a temperature higher than 900° F (482° C) for any period of time or over 600° F (316° C) for more than 1 hour.

(Authority citation for Part 195 is: 49 U.S.C. 2002; 49 CFR 1.53, and Appendix A of Part 1)

Issued in Washington, D.C., on February 24, 1984.

L. D. Santman,
 Director, Materials Transportation Bureau.

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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 37

Geological and Geophysical Exploration of the Coastal Plain, Arctic National Wildlife Refuge, Alaska

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The Fish and Wildlife Service is revising the guidelines at 50 CFR Part 37 for geological and geophysical exploration of the coastal plain, Arctic National Wildlife Refuge, Alaska (48 FR 16838-16870), by modifying the dates for filing exploration plans for seismic and surface geologic exploratory activities. This modification is necessary to provide the Service additional time to analyze preliminary data collected from exploratory activities conducted during the winter of 1983-84 and to assess the environmental impacts related to these exploratory activities before processing newly proposed exploration plans. This modification will allow the Service to better evaluate newly proposed exploration plans in order to determine their utility for providing data and information about the oil and gas production potential of the coastal plain while avoiding significant adverse impacts on the refuge's fish and wildlife, their habitat and environment. This

action has no effect on exploration plans for the coastal plain which have already been approved pursuant to these guidelines.

In addition, minor errors made in the coastal plain's legal description are being corrected.

EFFECTIVE DATE: March 1, 1984.

FOR FURTHER INFORMATION CONTACT:

Dr. Robert Putz, Regional Director, Region 7, U.S. Fish and Wildlife Service 1011 East Tudor Road, Anchorage, Alaska 99503, telephone number (907) 786-3542.

SUPPLEMENTARY INFORMATION: On April 19, 1983, the Service published at 48 FR 16838-16870 guidelines for geological and geophysical exploration of the coastal plain, Arctic National Wildlife Refuge (ANWR), Alaska (50 CFR Part 37). These guidelines were promulgated as regulations pursuant to subsection 1002(d)(1) of the Alaska National Interest Lands Conservation Act of 1980 (ANILCA). They prescribe how to obtain approval to conduct exploratory activities and place limitations on the way in which such activities can be conducted. The purpose of such exploration is to obtain data and information about the oil and gas production potential of the coastal plain, which will be used in preparing a report to Congress. The report will contain, among other things, a recommendation on the desirability of further oil and gas exploration, development and production in the area and an evaluation of the adverse effects of these activities on the refuge's fish and wildlife, their habitats, and other resources.

The guidelines give anyone wishing permission to explore ANWR's coastal plain two opportunities to submit an exploration plan. The first filing date was May 20, 1983. The second filing date is March 1, 1984.

The Service has determined that analysis of preliminary data collected as a result of exploratory activities conducted during the winter of 1983-84 and assessment of the environmental impacts related to those activities will not be complete by March 1, 1984, and that this analysis and assessment will be beneficial in processing any additional exploration plans that are submitted on a second filing date. Therefore, the Service is amending 50 CFR § 37.21(b) to modify the March 1, 1984, date. Section 37.21(b) is being revised to require anyone not already authorized who wishes to conduct seismic exploration of the coastal plain during the period from October 1, 1984, through May 31, 1986, or any portion thereof, to submit an exploration plan