DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

49 CFR Part 192

[Docket No. PHMSA--2005--21305, Notice 2] RIN 2137-AE26

Pipeline Safety: Polyamide-11 (PA-11) Plastic Pipe Design Pressures

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA); DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: PHMSA proposes to revise the Federal pipeline safety regulations to allow certain thermoplastic pipelines made from new Polyamide-11 (PA-11) pipe to be designed using a higher design factor and to raise the design pressure limit for the same pipelines. Design pressure calculations and design pressure limitations for all other thermoplastic pipes (PE-polyethylene, PB-polybutylene, PVC-polyvinyl chloride, etc.) would remain unchanged. These rule changes would allow pipeline operators to operate certain pipelines constructed of new PA-11 pipe at higher operating pressures than currently allowed by the existing rules.

This would allow pipeline operators to take advantage of the strength characteristics of PA-11 pipe.

DATES: Anyone interested in filing written comments on this proposal must do so by February 7, 2008. PHMSA will consider late comments filed so far as practical.

ADDRESSES: Comments should reference Docket No. PHMSA-2005-21305 and may be submitted in the following ways:

E-Gov Web Site: http://www.regulations.gov. This site allows the public to enter comments on any Federal Register notice issued by any agency.

Fax: 1-202-493-2251.

Mail: Docket Management System: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE, Washington, DC 20590.

Hand Delivery: DOT Docket Management System; U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE., Washington, DC 20590 between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

Instructions: Identify the docket number, PHMSA-2005-21305, at the beginning of your comments. If you submit your comments by mail, submit two copies. To receive confirmation that PHMSA received your comments, include a self-addressed stamped postcard. Internet users may submit comments at http://www.regulations.gov.

Note: Comments are posted without changes or edits to http://www.regulations.gov , including any personal information provided. There is a privacy statement published on the internet at http://www.regulations.gov .

FOR FURTHER INFORMATION CONTACT: Richard Sanders at (405) 954-7214, or by e-mail at Richard.Sanders@dot.gov; or Wayne Lemoi at (404) 832-1160, or by e-mail at Wayne.Lemoi@dot.gov.

SUPPLEMENTARY INFORMATION:

Background

Theoretical Maximum Design Pressure for Plastic Pipe

Plastic pipe is used to transport various products in both pressure and non-pressure applications. In pressure service, such as the transport of water or natural gas, the theoretical maximum internal design pressure for plastic pipes is independent of the product being transported. That is, the theoretical maximum design pressure of a plastic pipe is a function of (1) the pipe's physical dimensions and (2) the long-term hydrostatic strength (LTHS) of the pipe material.

The physical dimensions used to calculate the design pressure of a plastic pipe are its outside diameter and wall thickness. In practice these physical dimensions are often expressed by a standard dimension ratio (SDR), which is the ratio of a pipe's average specified outside diameter to the minimum specified wall thickness of the pipe. For a given pipe diameter, the higher the SDR the thinner the pipe wall. Typical SDRs are specified in industry standards developed by the American National Standards Institute (ANSI).

The LTHS used to calculate the design pressure of a plastic pipe is usually represented in pipe design formulas by an assigned value known as the hydrostatic design basis (HDB). The HDB is a reflection of a plastic pipe's ability to resist internal pressure over long periods of time. The Hydrostatic Stress Board of the Plastics Pipe Institute (PPI) assigns an HDB to a plastic pipe material based on testing of the material using the industry accepted test methods published by ASTM International. The HDB for various plastic pipes can be found in the PPI Technical Report, TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds (see http://plasticpipe.org/publications/technical reports.html).

Allowable Design Pressure for Plastic Pipe

For safety reasons, plastic pipe in any service is not allowed to operate up to its theoretical maximum internal design pressure. That is, the theoretical maximum design pressure for plastic pipe in service is reduced by a safety factor to calculate an allowable design pressure, which is the pressure at which a pipe can safely operate. Safety factors, commonly referred to as design factors, are generally built into plastic pipe design pressure formulas to account for unknowns in the pipeline operations and environment. For example, plastic pipes used in water service may use a design factor of 0.50, which reduces the allowable design pressure to 50 percent of the theoretical maximum design pressure. For transporting natural gas, the

Federal pipeline safety regulations set the design factor at a more conservative 0.32 due to the increased hazards associated with transporting natural gas as compared to water. This design factor limits a plastic pipe's allowable design pressure to 32 percent of its theoretical maximum design pressure. This proposed rulemaking would increase the design factor for plastic pipe in natural gas service to 0.40 (40 percent) for certain PA-11 pipe.

Design Pressure Limitations for Plastic Pipe in Natural Gas Service

For plastic pipe used to transport natural gas, the allowable design pressure is limited by the Federal pipeline safety regulations in two ways. First, as explained above, the plastic pipe design pressure formula in § 192.121 contains a built-in limitation of 0.32, which limits the allowable design pressure to 32 percent of the theoretical maximum design pressure. Second, the allowable design pressure calculated using the design formula in § 192.121 cannot exceed the design pressure limitations in § 192.123. For plastic pipes produced before July 14, 2004, the design pressure cannot exceed 100 pounds per square inch gauge (psig) (689 kilopascal (kPa)) for pipelines in distribution systems and in class 3 or 4 locations. For PE 2406 and PE 3408 polyethylene thermoplastic pipe produced after July 14, 2004, the allowable design pressure cannot exceed 125 psig (862 kPa) for 12-inch iron pipe size (IPS) [nominal pipe diameter] or less. This proposed rulemaking would increase the design pressure limit from 100 psig (689 kPa) to 200 psig (1378 kPa) for certain PA-11 pipe.

Arkema Rulemaking Petitions

In October 2004 Arkema, Inc. (Arkema), a manufacturer of PA-11 thermoplastic pipe, submitted two petitions to PHMSA requesting we revise 49 CFR 192.121 and 192.123. The first petition requested an increase in the design factor from 0.32 to 0.40 in § 192.121 for new PA-11 plastic pipes. The second petition requested an increase in the design pressure limit in § 192.123 from 100 psig (689 kPa) to 200 psig (1378 kPa) for new 2-inch IPS, PA-11 plastic pipes. These changes would allow new 2-inch IPS, PA-11 pipeline systems to be operated up to an allowable design pressure determined by the increased design factor of 0.40 or 200 psig (1378 kPa), whichever is less. The design factor and design pressure limits for all other plastic pipes would remain unchanged.

Arkema asserted in its petition that new PA-11 material will pose less risk to the public at a design factor of 0.40 than older thermoplastic piping materials used with a 0.32 design factor. Arkema also asserted that allowing an increased design pressure will allow gas companies to replace steel pipeline systems with 2-inch plastic pipe operating up to 200 psig (1378 kPa), and avoid the risk of corrosion failure in steel pipes. A detailed technical justification, including performance test results for PA-11 pipe and a discussion of its history and use, is provided in the petitions. This information may be read in docket PHMSA-2005-21305.

Public Comments

On June 22, 2005, PHMSA published a notice in the Federal Register (70 FR 36093) seeking comments on the Arkema petitions. We received

comments from two operators of PA-11 trial systems, one local gas distribution company, the Gas Piping Technology Committee (GPTC), the American Gas Association (AGA), the Illinois Commerce Commission (ICC), two plastic pipe fitting manufacturers and a plastics pipe consultant. All commenters supported the Arkema petitions. The ICC recommended that PHMSA consider requiring additional protection to prevent third-party damage to higher pressure natural gas lines and suggested adding a warning tape or other technology to protect these lines during digging. As a result of the public comments and recommendations made by PHMSA's staff, Arkema submitted two amended petitions to PHMSA on April 6, 2006. No public comments have been received for or against Arkema's amended petitions, which are discussed in detail below.

Arkema Amended Rulemaking Petitions

On April 6, 2006, Arkema submitted two amended petitions to PHMSA to replace the original petitions of October 2004. The new petitions addressed the public comments received by PHMSA and recommendations made by PHMSA's staff. In the first amended petition, Arkema requested an increase in the design factor in § 192.121 from 0.32 to 0.40 for new PA-11 pipe of all pipe diameters with two conditions. First, the minimum wall thickness for pipe of a given diameter must be SDR-11 or thicker. Second, the rapid crack propagation (RCP) characteristics of each new pipe diameter or thicker wall for an already tested diameter must be measured using accepted industry standard test methods. Arkema subsequently notes that since its original petition, industry test methods, including RCP testing, now have been completed to qualify new 4-inch pipe, which had not been tested at the time of the original petition. Therefore, PHMSA proposes to update the regulation to allow the revised design factor for new PA-11 up to 4-inch diameter pipe and appurtenances.

Arkema's second amended petition requested a revision to § 192.123 to allow the use of PA-11 pipe at a maximum allowable operating pressure of up to 200 psig (1378 KPa) for SDR-11 pipe at diameters of up to 4-inch IPS. This request is based on the availability of complete PA-11 piping systems, results from a three-year research program by the Gas Technology Institute (GTI) and the successful testing of exhumed samples from field installations of PA-11. Therefore, PHMSA is proposing to allow the use of PA-11 pipe at a maximum of 200 psig (1378 kPa). Arkema also supported the ICC recommendation to require warning tape and included proposed draft rule language in its amended petition to address this issue.

Polyamide-11 (PA-11) Plastic Piping Research and Evaluation

The GTI sponsored laboratory and field research on PA-11 pipe and piping systems beginning in the late 1990s. The research was accomplished by Nicor Technologies (Nicor). Final reports on this laboratory and field research are in the docket for this rulemaking.

In 1997, Nicor began with laboratory research on the physical, mechanical, and chemical properties of PA-11 pipe materials. Nicor used comprehensive laboratory testing and evaluation protocols to examine PA-11 pipe materials from three individual production samples and concluded that overall "the results of the comprehensive short term and long term testing * * * indicate that PA-11 pipe is a suitable plastic

alternative to steel systems operating at higher pressure and under exposure to high temperatures for a short period of time."

Nicor followed up the laboratory research on the properties of PA- 11 pipe materials with additional laboratory and field research on the economic feasibility of using PA-11 gas distribution piping systems at higher operating pressures and temperatures than currently permitted for plastic materials. Nicor performed laboratory tests on numerous PA-11 fittings and appurtenances. This was followed by the field testing of a PA-11 trial piping system installed at a Nicor private test site in Illinois, where Nicor installed approximately 400 feet of PA-11 pipe using three different installation techniques: Plowing, directional boring and open trenching. Nicor concluded that the "results of the trial installation of PA-11 piping system have successfully demonstrated that PA-11 piping systems can be safely and effectively installed at higher operating pressures."

Nicor used the results of the research on the PA-11 trial system to petition the ICC and PHMSA for a waiver to install and operate a PA-11 pipeline system at pressures above 100 psig (689 kPa) in Woodstock, Illinois. The ICC and PHMSA approved the waiver. The pipeline was installed in December 1999. This has allowed GTI and Nicor to continue the research on PA-11 piping systems. This final phase allowed the researchers to evaluate the effects of high operating pressures (150 psig), moisture, aging and other factors on an actual operating natural gas pipeline system. The study concluded, "PA-11 has met or exceeded all of the provisions contained within ASTM D2513-99 [American Society of Testing Materials, Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings, D2513-99] Appendix XI for the use of new materials in underground natural gas distribution application[s]."

To continue and expand the research on PA-11, GTI solicited several utilities to participate in field trials across the United States. The utilities sought and received both Federal and State waivers to allow some of the PA-11 trial systems to be designed using a 0.40 design factor in the plastic pipe design formula in § 192.121 and to operate at pressures above the plastic pipe design limitations in § 192.123. The PA-11 trial systems were installed from December 1999 to November 2004 in Arizona, Illinois, Louisiana, New Mexico, Tennessee and Utah in various geographic, climatic and operating temperature and pressure environments. Three of the trial systems were designed using a design factor of 0.40. One system was designed using an HDB of 1600 psig at a temperature of 140[deg] F. All the trial systems operate between 60 psig (413 kPa) and 200 psig (1378 kPa) with half operating above 175 psig (1206 kPa). The GTI final report on this research, Utility Participation in PA-11 Evaluation Project, March 2005, is in the docket for this rulemaking.

The Proposed Rule

Proposed Regulations

PHMSA is proposing to change the design pressure limits in § § 192.121 and 192.123 for certain PA-11 pipes. The changes would allow new 4-inch IPS or less, SDR-11, PA-11 pipelines to be designed using a design factor of 0.40 (in lieu of 0.32) in the plastic pipe design formulas in

§ 192.121. The design pressure limit in § 192.123 would be raised from 100 psig (689 kPa) to 200 psig (1378 kPa) for new 4-inch IPS or less, SDR-11, PA-11 plastic pipe used in distribution system pipelines and in pipelines in class 3 and 4 locations. This would allow design pressures up to the design pressure calculated in § 192.121 but not greater than 200 psig (1378 kPa). All other design pressure limitations would remain unchanged.

Basis for Increasing the Design Factor for PA-11 Plastic Pipe

When 49 CFR Part 192 was first promulgated in 1970 there were multiple design factors for plastic pipe based on the class location in which the pipeline was installed. They ranged from 0.20 in class 4 locations to 0.32 in class 1 locations. In 1977, the Materials Transportation Board (MTB) [now PHMSA] proposed a single design factor within the range of 0.32 to 0.50 to be used in the plastic pipe design formula in § 192.121 (see 42 FR 8386). This single factor would allow operators to use the same pipe for identical design pressures throughout their systems, thus saving the cost of keeping various pipes and matching components in inventory for different class locations. At the time of that proposal, some commenters, including the Technical Pipeline Safety Standards Committee (TPSSC) suggested that a design factor of 0.40 be adopted, based on its many years of satisfactory use prior to adoption of the more conservative factor in § 192.121.

Other commenters favored a single design factor equal to 0.50. This view was stated for several reasons, but it was based primarily on the fact that plastic pipe did not have a history of pressure failures. After considering the several arguments favoring either 0.40 or 0.50, a 0.32 design factor was adopted. The more conservative increment was chosen to protect against unforeseeable events and has remained in effect since May 1978.

The 0.32 design factor was accepted as a conservative value based on the state of plastic pipe technology in 1978. Advances in plastic pipe technology coupled with the extensive laboratory and field research on PA-11 by Nicor under the sponsorship of the GTI, provide sufficient evidence that the design factor can be increased to 0.40 for certain PA-11 pipes without compromising safety. This evidence includes the history of the PA-11 trial systems, which have been operating safely for several years at increased operating pressures. Moreover, increasing the design factor may allow PA-11 pipe to be used in lieu of steel pipe in some locations, thereby reducing corrosion, a primary factor in pipeline failures.

Basis for Increasing the Design Pressure Limit for PA-11 Plastic Pipe

When 49 CFR Part 192 was first promulgated in 1970 the design pressure limit for plastic pipe used in distribution systems and class 3 or 4 locations was set at 100 psig (689 kPa), which was the design pressure limit in ANSI B31.8 Standard, Gas Transmission Distribution and Piping Systems. The design pressure was raised in 2004 for PE 2406 and 3408 thermoplastic pipe because of new developments in polyethylene materials and better technology for detecting the rate of crack growth, i.e., slow crack growth.

When PHMSA was considering the pressure limit increase for PE 2406 and PE 3408 thermoplastic pipes, eleven of the commenters on the proposed new rule agreed the proposed increase in the design pressure limit was warranted. AGA, for example, noted that modern polyethylene pipe was already being reliably operated at pressures greater than 100 psig (689 kPa) under waivers granted by State pipeline safety regulators. AGA further contended that the reliability of newer polyethylene pipe was supported by laboratory and field analysis of the long-term hydrostatic strength of the polyethylene materials.

Bay State and Northern Natural Gas, two natural gas distribution system operators, suggested that the design pressure limit be established per International Organization for Standardization (ISO) standards, which allow any design pressure permitted by the measured HDB. UGI Utilities suggested an even higher maximum allowable pressure. However, because there was insufficient data to conclude that pipelines operating at such pressures would operate safely, PHMSA concluded that prescribing a maximum pressure higher than 125 psig was unsupported at that time. The design pressure limit for existing pipe and new pipes other than PE 2406 and PE 3408, such as PA-11, remains at 100 psig (689 kPa).

As explained above, the design pressure of thermoplastic pipe is a function of the physical dimensions and HDB of the pipe. Therefore, for plastic pipes of the same physical dimensions, or SDR, the calculated design pressure is directly proportional to the HDB. PA-11 has an HDB twice that of PE 2406. Therefore, the design pressure of PA-11 calculated using the plastic pipe design formula in § 192.121 is twice the design pressure of PE 2406. For SDR-11 pipe, the calculated design pressure of PA-11 is 160 psig, while the design pressure of PE 2406 is 80 psig. With the current design pressure limit of 100 psig in § 192.123 for distribution systems and class 3 or 4 locations, however, PA-11 is limited to a design pressure of only 4 percent of its HDB while the PE 2406 can operate up to 6.4 percent of its HDB. If PE 2406 can safely operate at 6.4 percent of its HDB, 80 psig, then it stands to reason that PA-11 should also be allowed to operate at 6.4 percent of its HDB, 160 psig, all else being equal.

But all else is not equal. Existing regulations allow certain sizes of PE 2406 pipes to operate up to 125 psig (10 percent of HDB) in distribution systems and class 3 or 4 locations. For example, a PE 2406, SDR-7 pipeline with a calculated design pressure of 133 psig could operate up to 125 psig (10 percent of HDB), but a PA-11, SDR-7 pipeline would be limited to 100 psig (4 percent of HDB) in the exact same application. If the design limits were applied equally based on the long-term pressure carrying capability of each pipe, the PA-11, SDR-7 pipeline would be allowed to operate up to 250 psig (10 percent of HDB).

The proposed regulation would only allow pipelines constructed from 4-inch IPS or less, PA-11, SDR-11 pipe to be operated up to 200 psig (8 percent of HDB). This requires two actions. First, the design factor in § 192.121 would have to be raised to 0.40, as explained above, so the calculated design pressure will equal 200 psig (1378 kPa). Second, the design pressure limit in § 192.123 would have to be raised to 200 psig (1378 kPa) to allow PA-11 pipelines to operate at 200 psig (1378 kPa) in distribution systems and class 3 or 4 locations. PHMSA believes these changes would not be inconsistent with pipeline safety because

the HDB of PA-11 is twice that of PE 2406. Moreover, the extensive laboratory and field research, coupled with the successful field trial systems, validate that PA-11 pipelines can safely operate up to 200 psig (1378 kPa).

Regulatory Analyses and Notices

Privacy Act Statement

Anyone may search the electronic form of comments received in response to any of our dockets by the name of the individual submitting the comment (or signing the comment if submitted for an association, business, labor union, etc.). You may review the Department of Transportation's (DOT) complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477).

Executive Order 12866 and DOT Policies and Procedures

This proposed rulemaking is not a significant regulatory action under section 3(f) of Executive Order 12866 (58 FR 51735) and, therefore, was not reviewed by the Office of Management and Budget. This proposed rulemaking is not significant under the Regulatory Policies and Procedures of the Department of Transportation (44 FR 11034).

Installing PA-11 is not mandated; it is optional. PHMSA believes operators may choose to install PA-11 pipe, rather than some other type of pipe, only if it is the most cost-effective alternative available. Consequently, PHMSA anticipates that the benefits of this proposal will equal or exceed its costs. Any gas transmission operators with (or installing) pipelines in class 3 or 4 locations could potentially be affected by the proposed rulemaking. Furthermore, all gas distribution operators could potentially be affected by the proposed rule. In total, PHMSA estimates that the proposed rule could potentially affect 900 gas transmission operators and 1,450 gas distribution system operators. The draft economic evaluation is available for review and comment in the docket.

Regulatory Flexibility Act

Under the Regulatory Flexibility Act (5 U.S.C. 601 et seq.), PHMSA must consider whether rulemaking actions would have a significant economic impact on a substantial number of small entities. PHMSA estimates that the proposed rulemaking could potentially affect as many as 479 transmission system operators that are small entities, as well as 1,131 gas distribution systems that are small entities.

The proposed rule mandates no action by gas pipeline operators. Rather, it provides operators with an option to use PA-11 pipe in certain pipeline systems based on economic, operations or other considerations. Consequently, the proposal imposes no economic burden on these potentially affected gas pipeline operators. PHMSA concludes this proposed rulemaking would not have a significant negative economic impact on any small entity.

Executive Order 13175

PHMSA has analyzed this rulemaking according to Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments." Because the proposed rule would not significantly or uniquely affect the communities of the Indian tribal governments or impose substantial direct compliance costs, the funding and consultation requirements of Executive Order 13175 do not apply.

Paperwork Reduction Act

This proposal does not impose any new information collection requirements.

Unfunded Mandates Reform Act of 1995

This proposed rulemaking does not impose unfunded mandates under the Unfunded Mandates Reform Act of 1995. It does not result in costs of $100 million or more to either State, local, or tribal governments, in the aggregate, or to the private sector, and is the least burdensome alternative that achieves the objective of the proposed rulemaking.

National Environmental Policy Act

PHMSA has analyzed the proposed rulemaking for purposes of the National Environmental Policy Act (42 U.S.C. 4321 et seq.) and preliminarily determined the proposed rulemaking may provide minor beneficial impacts on the quality of the human environment due primarily to a potential reduction in corrosion leaks if PA-11 pipe is used to replace steel pipe. The draft environmental assessment is available for review and comment in the docket. PHMSA will make a final determination on environmental impact after reviewing the comments on this proposal.

Executive Order 13132

PHMSA has analyzed the proposed rulemaking according to Executive Order 13132 ("Federalism"). The proposal does not have a substantial direct effect on the States, the relationship between the national government and the States, or the distribution of power and responsibilities among the various levels of government. The proposed rulemaking does not impose substantial direct compliance costs on State and local governments. This proposed regulation would not preempt state law for intrastate pipelines. Therefore, the consultation and funding requirements of Executive Order 13132 do not apply.

Executive Order 13211

Transporting gas impacts the nation's available energy supply. However, this proposed rulemaking is not a "significant energy action" under Executive Order 13211 and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Further, the Administrator of the Office of Information and Regulatory Affairs has not identified this proposal as a significant energy action.

List of Subjects in 49 CFR Part 192

Gas, Natural gas, Pipelines, Pipeline safety.

For the reasons provided in the preamble, PHMSA proposes to amend 49 CFR Part 192 as follows:

PART 192--TRANSPORTATION OF NATURAL GAS AND OTHER GAS BY PIPELINE: MINIMUM FEDERAL SAFETY STANDARDS

1. The authority citation for part 192 continues to read as follows:

Authority: 49 U.S.C. 5103, 60102, 60104, 60108, 60109, 60110, 60113, 60116, and 60118; and 49 CFR 1.53.

2. Revise § 192.121 to read as follows:

§ 192.121 Design of plastic pipe.

Subject to the limitations of § 192.123, the design pressure for plastic pipe is determined by either of the following formulas:

$$P = 2 S t (DF) / (D-t)$$

$$P = 2S (DF) / (SDR-1)$$

Where:

P = Design pressure, gauge, psig (kPa).

S = For thermoplastic pipe, the HDB is determined in accordance with the listed specification at a temperature equal to 73[deg] F (23[deg] C), 100[deg] F (38[deg] C), 120[deg] F (49[deg] C), or 140[deg] F (60[deg] C). In the absence of an HDB established at the specified temperature, the HDB of a higher temperature may be used in determining a design pressure rating at the specified temperature by arithmetic interpolation using the procedure in Part D.2 of PPI TR-3/2004, HDB/PDB/SDB/MRS Policies (incorporated by reference, see § 192.7). For reinforced thermosetting plastic pipe, 11,000 psig (75,842 kPa).

t = Specified wall thickness, inches (mm).
D = Specified outside diameter, inches (mm).
SDR = Standard dimension ratio, the ratio of the average specified outside

(1) The design pressure does not exceed 200 psig (1378 kPa);
(2) The pipe size is nominal pipe size (IPS) 4-inch or less;
(3) The pipe has a standard dimension ratio of SDR-11 only; and
(4) Pipes with design pressures above 100 psig (689 kPa) shall be buried with a warning tape or other device sufficient to warn an excavator of the presence of a high pressure gas line near the tape or other device before reaching the burial depth of the pipeline.

Issued in Washington, DC, on December 27, 2007.

Jeffrey D. Wiese,
Associate Administrator for Pipeline Safety.

[FR Doc. E8-33 Filed 1-7-08; 8:45 am]

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alternative to steel systems operating at higher pressure and under exposure to high temperatures for a short period of time."

Nicor followed up the laboratory research on the properties of PA- 11 pipe materials with additional laboratory and field research on the economic feasibility of using PA-11 gas distribution piping systems at higher operating pressures and temperatures than currently permitted for plastic materials. Nicor performed laboratory tests on numerous PA-11 fittings and appurtenances. This was followed by the field testing of a PA-11 trial piping system installed at a Nicor private test site in Illinois, where Nicor installed approximately 400 feet of PA-11 pipe using three different installation techniques: Plowing, directional boring and open trenching. Nicor concluded that the "results of the trial installation of PA-11 piping system have successfully demonstrated that PA-11 piping systems can be safely and effectively installed at higher operating pressures."

Nicor used the results of the research on the PA-11 trial system to petition the ICC and PHMSA for a waiver to install and operate a PA-11 pipeline system at pressures above 100 psig (689 kPa) in Woodstock, Illinois. The ICC and PHMSA approved the waiver. The pipeline was installed in December 1999. This has allowed GTI and Nicor to continue the research on PA-11 piping systems. This final phase allowed the researchers to evaluate the effects of high operating pressures (150 psig), moisture, aging and other factors on an actual operating natural gas pipeline system. The study concluded, "PA-11 has met or exceeded all of the provisions contained within ASTM D2513-99 [American Society of Testing Materials, Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings, D2513-99] Appendix XI for the use of new materials in underground natural gas distribution application[s]."

To continue and expand the research on PA-11, GTI solicited several utilities to participate in field trials across the United States. The utilities sought and received both Federal and State waivers to allow some of the PA-11 trial systems to be designed using a 0.40 design factor in the plastic pipe design formula in § 192.121 and to operate at pressures above the plastic pipe design limitations in § 192.123. The PA-11 trial systems were installed from December 1999 to November 2004 in Arizona, Illinois, Louisiana, New Mexico, Tennessee and Utah in various geographic, climatic and operating temperature and pressure environments. Three of the trial systems were designed using a design factor of 0.40. One system was designed using an HDB of 1600 psig at a temperature of 140[deg] F. All the trial systems operate between 60 psig (413 kPa) and 200 psig (1378 kPa) with half operating above 175 psig (1206 kPa).

Existing regulations allow certain sizes of PE 2406 pipes to operate up to 125 psig (10 percent of HDB) in distribution systems and class 3 or 4 locations. For example, a PE 2406, SDR-7 pipeline with a calculated design pressure of 133 psig could operate up to 125 psig (10 percent of HDB), but a PA-11, SDR-7 pipeline would be limited to 100 psig (4 percent of HDB) in the exact same application. If the design limits were applied equally based on the long-term pressure carrying capability of each pipe, the PA-11, SDR-7 pipeline would be allowed to operate up to 250 psig (10 percent of HDB).

The proposed regulation would only allow pipelines constructed from 4-inch IPS or less, PA-11, SDR-11 pipe to be operated up to 200 psig (8 percent of HDB). This requires two actions. First, the design factor in § 192.121 would have to be raised to 0.40, as explained above, so the calculated design pressure will equal 200 psig (1378 kPa). Second, the design pressure limit in § 192.123 would have to be raised to 200 psig (1378 kPa) to allow PA-11 pipelines to operate at 200 psig (1378 kPa) in distribution systems and class 3 or 4 locations. PHMSA believes these changes would not be inconsistent with pipeline safety because the HDB of PA-11 is twice that of PE 2406. Moreover, the extensive laboratory and field research, coupled with the successful field trial systems, validate that PA-11 pipelines can safely operate up to 200 psig (1378 kPa).

The Proposed Rule

Proposed Regulations

PHMSA is proposing to change the design pressure limits in § § 192.121 and 192.123 for certain PA-11 pipes. The changes would allow new 4-inch IPS or less, SDR-11, PA-11 pipelines to be designed using a design factor of 0.40 (in lieu of 0.32) in the plastic pipe design formulas in § 192.121. The design pressure limit in § 192.123 would be raised from 100 psig (689 kPa) to 200 psig (1378 kPa) for new 4-inch IPS or less, SDR-11, PA-11 plastic pipe used in distribution system pipelines and in pipelines in class 3 and 4 locations. This would allow design pressures up to the design pressure calculated in § 192.121 but not greater than 200 psig (1378 kPa). All other design pressure limitations would remain unchanged.