

DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

[Docket No. PHMSA-2026-0166]

Pipeline Safety: Distribution Integrity Management Program Considerations for Plastic Piping and Components

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA),
Department of Transportation (DOT).

ACTION: Notice; issuance of advisory bulletin.

SUMMARY: PHMSA is issuing this advisory bulletin to remind owners and operators of natural gas distribution systems of requirements under the distribution integrity management program (DIMP) regulations regarding certain plastic piping and components.

FOR FURTHER INFORMATION CONTACT: Nancy White by phone at 202-923-8268 or by e-mail at Nancy.White1@dot.gov.

SUPPLEMENTARY INFORMATION: On March 24, 2023, a natural gas distribution incident occurred in West Reading, Pennsylvania, resulting in seven fatalities, 10 injuries, the destruction of one building, and damage to two nearby buildings. The National Transportation Safety Board (NTSB) investigated the incident and subsequently issued Pipeline Investigation Report NTSB/PIR-25/01 (“Investigation Report”).¹

In the Investigation Report, NTSB issued Safety Recommendation P-25-1 to PHMSA, advising the Agency to issue an advisory bulletin (ADB) to all regulated gas distribution pipeline operators “referencing distribution integrity management

¹ NTSB, PIR-25/01, *UGI Corporation Natural Gas-Fueled Explosion and Fire, West Reading, Pennsylvania, Mar. 24, 2023* (Mar. 18, 2025) (NTSB/PIR-25/01), available at <https://www.nts.gov/investigations/AccidentReports/Reports/PIR2501.pdf>.

program regulations and encouraging operators to: [c]omplete a one-time inventory of all plastic assets that are located in environments that experience or are at risk of elevated temperatures; [c]ontinue, during maintenance and new construction projects, to identify plastic assets that are in elevated temperature environments; and [e]valuate and mitigate risks to deter the degradation of these assets.”² NTSB also issued Safety Recommendation P-25-2 to PHMSA, advising the issuance of an ADB “that reviews the details of the March 24, 2023, natural gas-fueled explosion and fire in West Reading, Pennsylvania, and advises all regulated natural gas distribution pipeline operators to address the risk associated with Aldyl A service tees with Delrin inserts, including replacing or remediating them.”³

This ADB alerts owners and operators of natural gas distribution pipeline systems to the West Reading incident; outlines NTSB’s findings, recommendations to PHMSA, and probable cause; and provides guidance to operators on implementing DIMP requirements under 49 Code of Federal Regulations (CFR) part 192, subpart P. These regulations require gas distribution pipeline operators to develop and implement a DIMP and to demonstrate an understanding of their gas distribution system, including identifying “the characteristics of the pipeline’s design and operations and the environmental factors that are necessary to assess the applicable threats and risks to its gas distribution pipeline.” PHMSA reminds operators to consider accelerated degradation risks associated with elevated temperature environments and encourages operators to complete an inventory of plastic pipe and components that may be susceptible to such environments. The advisory bulletin also summarizes relevant past PHMSA advisories, guidance, Frequently Asked Questions, and research related to brittle-like cracking of plastic pipe, temperature-related degradation, and management of plastic piping materials.

² NTSB/PIR-25/01 at 85.

³ *Id.*

Guidance and advisory bulletins are intended to provide clarity regarding an operator's existing legal obligations but are not themselves rules meant to bind the public in any way; they do not assign duties, create legally enforceable rights, or impose new obligations that are not otherwise contained in regulations. Accordingly, this guidance will not be relied upon by the Department as an independent basis for affirmative enforcement action or other administrative penalty.

I. Advisory Bulletin (ADB-2026-01)

To: Owners and Operators of Natural Gas Distribution Pipeline Systems.

Subject: Distribution Integrity Management Program Considerations for Plastic Piping and Components

Advisory: On March 24, 2023, a natural gas distribution incident occurred in West Reading, Pennsylvania, resulting in seven fatalities, 10 injuries, the destruction of one building, and damage to two nearby buildings. The National Transportation Safety Board's (NTSB) investigation into this incident revealed the gas distribution operator's retired 1982 Aldyl A service tee with Delrin insert leaked natural gas, which migrated underground into the basement of a candy factory building, accumulated, and then ignited by an unknown source, causing an explosion.⁴ NTSB determined the probable cause of the incident was:

[D]egradation of a retired 1982 Aldyl A polyethylene service tee with a Delrin polyacetal insert that allowed natural gas to leak and migrate underground into the R.M. Palmer Company candy factory buildings, where it was ignited by an unknown source. Contributing to the degradation of the service tee and insert were significantly elevated ground temperatures from steam escaping R.M. Palmer Company's corroded underground steam pipe, located near the service tee, that had been unmarked and cracked. Contributing to the steam pipe crack was

⁴ NTSB/PIR-25/01 at vii-viii.

soil movement and R.M. Palmer Company's lack of awareness of the pipe's corroded state. Contributing to the natural gas leak was UGI Corporation's lack of awareness of the nearby steam pipe, which led to an incomplete integrity management program evaluation that did not consider or manage the risk posed by the steam pipe. Contributing to the accident's severity was R.M. Palmer Company's insufficient emergency response procedures and training of its employees, who did not understand the hazard and did not evacuate the buildings before the explosion.⁵

NTSB found that "without sufficient threat information available for analysis in its [DIMP], UGI could not effectively evaluate and address the risk to pipeline integrity of plastic piping in elevated temperature environments and that by not addressing the threat posed by the steam pipe, UGI's DIMP was not effective in preventing the accident."⁶ NTSB's report noted that elevated ground temperature may cause increased slow crack growth in susceptible plastic piping materials, and the crack growth rate can increase exponentially with small increases in temperature. Elevated temperature can also increase the rate of thermal decomposition in the Delrin insert material.⁷

NTSB found that "operators may not be aware of where they may have plastic natural gas assets that are vulnerable to degradation in elevated temperature environments, so appropriate mitigations may not be in place."⁸ In addition, NTSB found that "UGI lacked procedures and training for its field crews to report sources of elevated temperatures near their assets thus the threat posed by the steam pipe was not

⁵ NTSB/PIR-25/01 at 84.

⁶ NTSB/PIR-25/01 at vii.

⁷ NTSB/PIR-25/01 at 58, 67.

⁸ NTSB/PIR-25/01 at vii.

identified, and mitigative measures were not implemented.”⁹ NTSB concluded that “the 1982 retired service tee leaked because of degradation caused by exposure to elevated temperatures [from steam escaping through a crack in a nearby corroded steam pipe]; more specifically, slow crack growth of the Aldyl A tower shell and thermal decomposition of the Delrin insert.”¹⁰

Following its investigation, NTSB issued several safety recommendations, including Safety Recommendation P-25-1, advising PHMSA to issue an advisory bulletin (ADB) to all regulated gas distribution pipeline operators “referencing distribution integrity management program regulations and encouraging operators to: [c]omplete a one-time inventory of all plastic assets that are located in environments that experience or are at risk of elevated temperatures; [c]ontinue, during maintenance and new construction projects, to identify plastic assets that are in elevated temperature environments; and [e]valuate and mitigate risks to deter the degradation of these assets.”¹¹ NTSB also issued Safety Recommendation P-25-2 advising PHMSA to issue an ADB reviewing the details of the incident and advise “all regulated natural gas distribution pipeline operators to address the risk associated with Aldyl A service tees with Delrin inserts, including replacing or remediating them.”¹²

PHMSA and its predecessor Agency, the Research and Special Programs Administration (RSPA), previously issued several ADBs addressing premature brittle-like cracking¹³ in older plastic pipe materials relevant to the West Reading incident:

⁹ NTSB/PIR-25/01 at vii-viii.

¹⁰ NTSB/PIR-25/01 at 59.

¹¹ NTSB/PIR-25/01 at 85.

¹² *Id.*

¹³ *Brittle-like cracking* refers to crack initiation in a plastic pipe wall which does not immediately result in a full break but is followed by stable crack growth at stress levels much lower than the pipe material’s yield stress.

- ADB-99-02¹⁴ advised operators of the potential susceptibility of certain plastic pipe installed between 1960 and the early 1980s to premature failure due to brittle-like cracking.
- ADB-02-07¹⁵ provided recommendations for identifying and managing brittle-like cracking for certain vintage polyethylene pipe and noted the susceptibility of older plastic pipe to premature failure by brittle-like cracking. Susceptible materials included “low-ductile inner wall ‘Aldyl A’ polyethylene piping manufactured by Dupont Company before 1973” and polyethylene gas pipe designated PE 3306. It also identified other environmental, installation, and service conditions that could contribute to premature failure of polyethylene pipe such as inadequate support and backfill during installation; rock impingement; nearby excavation; service temperatures; and higher ground temperatures.
- ADB-07-01¹⁶ updated the list of pipe material susceptible to brittle-like cracking to include Delrin insert tap tees and Plexco service tee Celcon (polyacetal) caps.

In addition, PHMSA issued ADB-2012-03, *Notice to Operators of Driscopipe® 8000 High Density Polyethylene Pipe of the Potential for Material Degradation*, 77 FR 13387 (Mar. 6, 2012). This ADB alerted operators using Driscopipe 8000 high-density polyethylene (HDPE) pipe of the potential for material degradation. At the time of the ADB’s publication, the root cause of the material degradation had not been determined. The manufacturer has since investigated and determined the root cause of degradation to be thermal oxidation for both Driscopipe

¹⁴ RSPA, ADB-99-02, *Potential Failures Due to Brittle-Like Cracking of Older Plastic Pipe in Natural Gas Distribution Systems*, 64 FR 12212 (Mar. 11, 1999).

¹⁵ RSPA, ADB-02-07, *Notification of the Susceptibility to Premature Brittle-like Cracking of Older Plastic Pipe*, 67 FR 70806 (Nov. 26, 2002).

¹⁶ PHMSA, ADB-07-01, *Updated Notification of the Susceptibility to Premature Brittle-Like Cracking of Older Plastic Pipe*, 72 FR 51301 (Sep. 6, 2007).

7000 and 8000 HDPE piping. The manufacturer also concluded that the potential for thermal oxidation increases with increased temperature of the pipe and with increased time at the elevated temperature conditions.¹⁷ Together, these advisories alerted operators to the risk of premature, brittle-like cracking and outline contributing environmental and installation factors.

More recently, PHMSA published ADB-2020-02, *Overpressure Protection on Low-pressure Natural Gas Distribution Systems*,¹⁸ which reminded operators of their obligation to comply with gas DIMP regulations, including requirements for an operator to demonstrate knowledge of their system and to identify the characteristics of its pipeline design, operation, and environment when assessing applicable threats and risks.¹⁹ The ADB also provided guidance in identifying threats, ranking risk, and determining and implementing measures designed to reduce the risk of failure. Specifically, PHMSA advised that “[a] potential accident of relatively low likelihood but one that would produce significant consequences may be a higher risk than an accident with somewhat greater likelihood, but one that is not expected to produce major consequences.”²⁰

PHMSA has also provided ongoing guidance through its Distribution Integrity Management Frequently Asked Questions (FAQs) stating that brittle-like cracking of Aldyl A piping should be considered a threat in a DIMP under the category of “material,” even if operators have not experienced any issues or leaks from Aldyl A piping. The FAQ notes that “premature brittle-like cracking of certain Aldyl ‘A’ pipe,

¹⁷ See <https://www.cpchem.com/sites/default/files/2020-05/DriscopipeDegradation.pdf> and <https://apgasif.org/wp-content/uploads/2015/07/Driscopipe-degradation-111213.pdf>.

¹⁸ PHMSA, ADB-2020-02, *Overpressure Protection on Low-pressure Natural Gas Distribution Systems*, 85 FR 61097 (Sep. 29, 2020).

¹⁹ *Id.* at 61099, 61100.

²⁰ *Id.* at 61101.

along with other vintages and manufacturer[s'] products, is a well-documented problem in the [gas distribution] industry.”²¹

Through its DIMP Enforcement Guidance,²² PHMSA further clarified that “[p]otential threats are threats where the operator has not necessarily experienced a leak (i.e., release of gas) but they have conditions conducive to the threat,” including “[p]ipe materials susceptible to brittle failure modes.”²³ The guidance advises that operators use information sources such as operation and maintenance procedures, purchase orders, material lists from old field orders or standards, information from industry sources (e.g., plastic pipe data committee), and PHMSA advisories.²⁴

Further, PHMSA sponsored a research and development project completed in April 2024 titled “*Validating Models for Predicting Gas Migration and Mitigating its Occurrences/Consequences*.”²⁵ The project’s final report, hereby known as Gas Migration Report, discussed how environmental surface conditions affect underground gas migration and noted that “[c]hanges in surface conditions impact how far and how fast the gas travels below the ground. Moisture, snow, and asphalt can block gas from escaping the surface and result in gas moving both downwards and outwards away from the leak location.”²⁶

Collectively, these actions demonstrate PHMSA’s longstanding commitment to address safety concerns associated with older plastic pipe materials and to provide guidance on DIMP requirements. PHMSA continues to remind owners and operators

²¹ PHMSA, *Gas Distribution Integrity Management Frequently Asked Questions*, at 15 (Oct. 26, 2015), <https://www.phmsa.dot.gov/pipeline/gas-distribution-integrity-management/gas-distribution-integrity-management-faqs>.

²² PHMSA, *Gas Distribution Pipeline Integrity Management Enforcement Guidance*, <https://www.phmsa.dot.gov/pipeline/enforcement/dimp-enforcement-guidance> (December 7, 2015) (“DIMP Enforcement Guidance”).

²³ *Id.* at 19.

²⁴ *Id.* at 58.

²⁵ *Understanding of the Degree to Which Parameters Affect the Subsurface Natural Gas Migration with Significant Flow Rates*, (Apr. 29, 2024) (“Gas Migration Report”), available at: <https://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=917>.

²⁶ *Id.* at 72.

of natural gas distribution systems of the DIMP requirement to demonstrate an understanding of their system using knowledge “developed from reasonably available information.”²⁷ This includes having access to and gaining additional information that allows for understanding of pipe construction, location, age, material composition, and environmental conditions of the underground and surrounding environment. Specifically, operators must identify “the characteristics of the pipeline’s design and operations and the environmental factors that are necessary to assess the applicable threats and risks to its gas distribution pipeline.”²⁸ PHMSA further reminds operators of the DIMP requirements to consider threats that may accelerate crack growth or degradation and to determine and implement measures designed to reduce the risks of pipeline failure.

In addition, PHMSA reminds operators that under § 192.325(c) plastic mains must be installed with sufficient clearance or insulation from any sources of heat to prevent the heat from undermining the integrity of pipelines and ancillary components, and from impairing the serviceability of the pipe.

PHMSA advises gas distribution pipeline operators to take the following actions to address risks associated with certain plastic natural gas pipeline assets exposed to elevated temperatures:

1. Review NTSB’s Pipeline Investigation Report PIR-25-01 on the details of the March 24, 2023 incident in West Reading and the risks associated with Aldyl A piping and Aldyl A tees with Delrin polyacetal inserts.
2. Review advisory bulletins ADB-99-02, ADB-02-07, ADB-07-01, ADB-2012-03, and ADB-2020-02; DIMP Frequently Asked Questions; DIMP Enforcement Guidance; and the Gas Migration Report.

²⁷ Section 192.1007(a).

²⁸ Section 192.1007(a)(1).

3. Develop and implement an integrity management plan, based on reasonably available information, to identify the characteristics of the pipeline's design and operations, as well as environmental factors such as sources of elevated temperatures (*e.g.*, underground steam lines or electric lines), that are necessary to assess applicable threats and risks to its gas distribution pipelines (§§ 192.1005 and 192.1007(a)(1)).
4. Consider these environmental factors (*e.g.*, sources of elevated temperatures) to identify existing and potential threats. Consideration may include completing an inventory of all plastic pipe and components potentially susceptible to premature failure due to slow crack growth or brittle-like cracking, and those that may be susceptible to accelerated degradation in environments that experience or may experience elevated temperatures ("plastic assets") (§ 192.1007(b)). Operators must consider, as categories of threat, materials, welds, and any other issues that could threaten the integrity of its pipeline (§ 192.1007(b)). Susceptible materials of plastic assets may include:
 - Plastic pipe installed between 1960 and early 1980s.
 - Low-ductile inner wall Aldyl A piping manufactured by DuPont Company before 1973.
 - Polyethylene gas pipe designated PE 3306.
 - Aldyl A tees with Delrin polyacetal insert.
 - Plexco service tee Celcon (Polyacetal) caps.
 - Driscopipe 7000 and 8000 High Density Polyethylene Pipe.
5. Where elevated temperatures may pose a threat to plastic assets, identify additional information needed to assess the threat and develop a plan to gather information over time through activities conducted on the pipeline, such as design, operations, maintenance, and construction (§ 192.1007(a)(3)).

6. Evaluate and rank the risks associated with identified plastic assets that are exposed to, or may be exposed to, elevated temperatures (§ 192.1007(c)). Operators should consider the effects of various surface conditions on the potential extent and migration rate of natural gas from an underground leak when evaluating and ranking risks. PHMSA reiterates guidance provided in advisory bulletin ADB-2020-02: a potential incident of relatively low likelihood, but one that would produce significant consequences, may entail a higher risk than an incident with somewhat greater likelihood, but that is not expected to produce major consequences.
7. Determine and implement measures to reduce the risks associated with the failure of plastic distribution pipeline assets (§ 192.1007(d)). These measures must include an effective leak management program. Such measures may also include replacement or remediation efforts designed to reduce the risk to plastic assets; opportunistic material type verification during routine operation and maintenance; additional leak surveys; or integration of leak survey results to support prioritizing segments for replacement.
8. Maintain records, for a period of at least 10 years, demonstrating compliance with requirements of part 192, subpart P (§ 192.1011). Such records may include location and material type of operators' pipe and components; documents supporting threat identification and risk analysis; and records documenting measures implemented by the operator to reduce the risk to its pipeline.
9. When constructing new or replacement plastic mains, provide sufficient clearance or insulation from any sources of heat to prevent the heat from impairing the serviceability of the pipe, in accordance with requirements in § 192.325(c).

PHMSA notes that this advisory bulletin does not have the force and effect of law and is not meant to bind owners, operators, or the public in any way. This guidance will not be relied upon by the Department as an independent basis for affirmative enforcement action or other administrative penalty.

Issued in Washington, D.C., on January 21, 2026, under authority delegated in § 1.97.

Linda Daugherty,
Acting Associate Administrator for Pipeline Safety

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