U.S. Department
of Transportation
**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Ave., S.E.
Washington, DC 20590

August 2, 2017

The Honorable Bill Shuster
Chairman
Committee on Transportation and Infrastructure
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

I am pleased to submit the Report on State-level Policies That Encourage or Present Barriers to the Repair and Replacement of Leaking Natural Gas Pipelines as required by Section 30 of the Protecting our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2016, Public Law No. 114-183.

Section 30 of the 2016 PIPES Act directed PHMSA to submit a report to Congress on State-level policies that encourage the repair and replacement of leaking natural gas distribution pipelines or systems that pose a safety threat and that may create barriers for entities to conduct work to repair and replace leaking natural gas pipelines or distribution systems. The report must include recommendations on Federal or State policies or best practices to improve safety by accelerating the repair and replacement of leaking natural gas pipelines or systems, and to include consideration of the potential impact of the implementation of such recommendations on ratepayers or end users of the distribution pipeline systems. PHMSA conducted a State-by-State review of repair and replacement policies and reviewed State-level policies that may create barriers for operators to conduct the work necessary to repair and replace leaking natural gas pipelines or distribution systems.

I have sent a similar letter to the Ranking Member, and Chairmen and Ranking Members of the Committee on Energy and Commerce, and the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

Sincerely,

Howard W. McMillan
Acting Deputy Administrator

Enclosure

U.S. Department
of Transportation
**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Ave., S.E.
Washington, DC 20590

August 2, 2017

The Honorable Peter A. DeFazio
Ranking Member
Committee on Transportation and Infrastructure
United States House of Representatives
Washington, DC 20515

Dear Congressman DeFazio:

I am pleased to submit the Report on State-level Policies That Encourage or Present Barriers to the Repair and Replacement of Leaking Natural Gas Pipelines as required by Section 30 of the Protecting our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2016, Public Law No. 114-183.

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Howard W. McMillan
Acting Deputy Administrator

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1200 New Jersey Ave., S.E.
Washington, DC 20590

August 2, 2017

The Honorable Greg Walden
Chairman
Committee on Energy and Commerce
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

I am pleased to submit the Report on State-level Policies That Encourage or Present Barriers to the Repair and Replacement of Leaking Natural Gas Pipelines as required by Section 30 of the Protecting our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2016, Public Law No. 114-183.

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Howard W. McMillan
Acting Deputy Administrator

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U.S. Department
of Transportation
Pipeline and Hazardous Materials Safety Administration

1200 New Jersey Ave., S.E.
Washington, DC 20590

August 2, 2017

The Honorable Frank Pallone
Ranking Member
Committee on Energy and Commerce
United States House of Representatives
Washington, DC 20515

Dear Congressman Pallone:

I am pleased to submit the Report on State-level Policies That Encourage or Present Barriers to the Repair and Replacement of Leaking Natural Gas Pipelines as required by Section 30 of the Protecting our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2016, Public Law No. 114-183.

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Sincerely,

Howard W. McMillan
Acting Deputy Administrator

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U.S. Department
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**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Ave., S.E.
Washington, DC 20590

August 2, 2017

The Honorable Lamar Smith
Chairman
Committee on Science, Space and Technology
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

I am pleased to submit the Report on State-level Policies That Encourage or Present Barriers to the Repair and Replacement of Leaking Natural Gas Pipelines as required by Section 30 of the Protecting our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2016, Public Law No. 114-183.

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Sincerely,

Howard W. McMillan
Acting Deputy Administrator

Enclosure

U.S. Department
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**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Ave., S.E.
Washington, DC 20590

August 2, 2017

The Honorable Eddie Bernice Johnson
Ranking Member
Committee on Science, Space and Technology
United States House of Representatives
Washington, DC 20515

Dear Congresswoman Johnson:

I am pleased to submit the Report on State-level Policies That Encourage or Present Barriers to the Repair and Replacement of Leaking Natural Gas Pipelines as required by Section 30 of the Protecting our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2016, Public Law No. 114-183.

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Howard W. McMillan
Acting Deputy Administrator

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U.S. Department
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Materials Safety
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1200 New Jersey Ave., S.E.
Washington, DC 20590

August 2, 2017

The Honorable John Thune
Chairman
Committee on Commerce, Science, and Transportation
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

I am pleased to submit the Report on State-level Policies That Encourage or Present Barriers to the Repair and Replacement of Leaking Natural Gas Pipelines as required by Section 30 of the Protecting our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2016, Public Law No. 114-183.

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Acting Deputy Administrator

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U.S. Department
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**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Ave., S.E.
Washington, DC 20590

August 2, 2017

The Honorable Bill Nelson
Ranking Member
Committee on Commerce, Science, and Transportation
United States Senate
Washington, DC 20510

Dear Senator Nelson:

I am pleased to submit the Report on State-level Policies That Encourage or Present Barriers to the Repair and Replacement of Leaking Natural Gas Pipelines as required by Section 30 of the Protecting our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2016, Public Law No. 114-183.

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Howard W. McMillan
Acting Deputy Administrator

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U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

Report on State-level Policies That Encourage or Present Barriers to the Repair and Replacement of Leaking Natural Gas Pipelines

Executive Summary

This report addresses PHMSA's requirements under the Section 30 of the Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2016 (PIPES Act of 2016).[1] Section 30, requires PHMSA to conduct a State-by-State review of State-level policies that encourage the repair and replacement of leaking natural gas distribution pipelines, or systems that pose a safety threat. It noted that this may include policies such as timelines to repair leaks and limits on cost recovery from ratepayers. The section also requires PHMSA to review State-level policies that may create barriers for operators to conduct the work necessary to repair and replace leaking natural gas pipelines or distribution systems. In preparation for this report, PHMSA considered recommendations for Federal or State policies or best practices that improve safety by accelerating the repair and replacement leaking natural gas pipelines or systems, as well as consider the potential impact of the implementation of such recommendations on ratepayers or end users of the distribution pipeline systems.

Background

Federal and State regulations require gas distribution pipeline system operators to periodically survey their pipeline systems for leaks and promptly repair "hazardous" leaks[2]. Operators must also conduct written integrity management (IM) programs that include the identification and implementation of measures designed to reduce the risks from pipeline failures. These measures must include effective leak management programs, unless all leaks are repaired when found.

Distribution Pipeline Leak Considerations

Two factors are associated with programs for the repair or replacement of leaking natural gas distribution pipelines: 1) age and material, and 2) the number of unrepaired leaks.

Age and Material – Pipeline age and material are significant distribution pipeline risk indicators. Cast iron, wrought iron, and bare steel pipes are among the oldest in use and are considered high-risk candidates for accelerated replacement programs. PHMSA provides an annually-updated online inventory of cast and wrought iron and bare steel gas distribution pipelines that shows decreasing trends in the mileage of these pipes by decade of installation.

Unrepaired Leaks – Federal regulations call for the "immediate repair or continuous action of a gas distribution pipeline leak until the conditions are no longer hazardous." However, repairs of non-hazardous leaks may be delayed, depending on applicable State pipeline safety regulations.

---

[1] Public Law No. 114-183

[2] 49 CFR §192.1001 defines a hazardous leak as a leak that represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous.

Based on operator annual data[3], nationwide in 2015 there were 50 leaks outstanding (not repaired) per 1,000 miles of gas distribution pipeline.

Required Reviews – Methodology

To address the requirements of the PIPES Act of 2016, Section 30, PHMSA collaborated with the National Association of State Pipeline Safety Representatives (NAPSR) to gather data regarding State-level policies that encourage or constrain the repair and replacement of leaking natural gas distribution pipelines. Forty-eight states, the District of Columbia, and Puerto Rico responded to the NAPSR questionnaire. There were no responses for Hawaii and Alaska as they do not participate in the pipeline safety program. We should note that 18 states and Puerto Rico never had cast or wrought iron pipe, or have replaced all of it.

Review Results

State Regulations – **Fifty-two percent** of the states have state-specific regulations addressing the repair of gas distribution pipeline leaks. The remaining states defer to the Federal regulation requiring only that *hazardous* leaks be repaired promptly.

Policies, Rules, and Best Practices – **Forty-eight percent** of the states have policies, rules and/or best practices to encourage distribution pipeline operators to accelerate the repair or replacement of leaking gas distribution pipelines. Nearly all states reportedly expect operators to implement the Gas Piping Technology Committee (GPTC)[4] Gas Leakage Control Guidelines for Natural Gas Systems (GPTC Guidelines) which provide more specific leak classification and action criteria than the Federal regulations.

Incentives – **Sixty percent** of the states provide incentives for high-risk pipe replacement, mostly in the form of accelerated cost recovery through rate increases.

Barriers – No barriers to operators replacing high-risk pipelines were noted to result from state policies. Other barriers were noted, most frequently: costs, local construction permitting delays, the availability of qualified workforce, location, and weather.

Recommendations

States – About **44 percent** of the states responding to the NAPSR query recommended accelerating repair or replacement of leaking natural gas pipelines to improve safety. However, many acknowledged that operators cannot fund repair and replacement programs without the ability to recover costs. Some called for Federal dollars to offset replacement costs and reduce the impacts of rate increases to customers. Many called for more prescriptive Federal and State regulations or policies regarding pipeline replacement. This included calls for specific

[3] Source: PHMSA Pipeline Data Mart (PDM) Portal (January 30, 2017)
[4] The GPTC includes representatives from PHMSA, utilities, manufacturers, PHMSA, the National Transportation Safety Board (NTSB), State regulators, and the general public. The American Gas Association (AGA) is the Secretariat for the GPTC.

timeframes to repair or replace high-risk pipe, and for non-hazardous leaks to be recognized as pipeline failures and not accepted as normal operating conditions.

1. PHMSA should continue to encourage states, State utility commissions and other rate-setting organizations, and operators to accelerate high-risk pipe replacement, as well as promote cost recovery programs that effectively facilitate decisions through the cost-efficient and timely repair and replacement of pipelines with leaks.
2. PHMSA should continue to increase pipeline safety awareness among pipeline operators and rate setting organizations as it relates to leaks on pipeline distribution systems. This could be done through the Gas Pipeline Advisory Committee, Chairs of rate setting authorities, and the National Association of Pipeline Safety Representatives.
3. PHMSA should conduct a study to determine if additional regulations requiring the repair of all leaks would significantly improve pipeline safety and warrant the cost of implementing such regulations. PHMSA believes an additional study is necessary to determine if additional regulatory requirements would significantly improve safety on distribution pipeline systems.

Introduction

The Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2016 (PIPES Act of 2016), Public Law No. 114-183, Section 30, required PHMSA to:

SEC. 30. REVIEW OF STATE POLICIES RELATING TO NATURAL GAS LEAKS.

(a) REVIEW.—The Administrator of the Pipeline and Hazardous Materials Safety Administration shall conduct a State-by-State review of State-level policies that—

> (1) encourage the repair and replacement of leaking natural gas distribution pipelines or systems that pose a safety threat, such as timelines to repair leaks and limits on cost recovery from ratepayers; and
>
> (2) may create barriers for entities to conduct work to repair and replace leaking natural gas pipelines or distribution systems.

(b) REPORT.—Not later than 1 year after the date of the enactment of this Act, the Administrator shall submit to the Committee on Transportation and Infrastructure and the Committee on Energy and Commerce of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report containing the findings of the review conducted under subsection (a) and recommendations on Federal or State policies or best practices to improve safety by accelerating the repair and replacement of natural gas pipelines or systems that are leaking or releasing natural gas. The report shall consider the potential impact, including potential savings, of the implementation of such recommendations on ratepayers or end users of the natural gas pipeline system.

(c) IMPLEMENTATION OF RECOMMENDATIONS.—If the Administrator determines that the recommendations made under subsection (b) would significantly improve pipeline safety, the Administrator shall, not later than 1 year after making such determination, and in coordination with the heads of other relevant agencies as appropriate, issue regulations, as the Administrator determines appropriate, to implement the recommendations.

Background

Federal Pipeline Safety Requirements for Gas Distribution Pipelines

Our energy transportation network in the United States consists of over 2.7 million miles of gas and hazardous liquid pipelines. These pipelines are operated by approximately 3,000 companies, large and small.

Natural gas pipelines exist in all fifty states and have a good safety record relative to the huge volume of gas they transport daily. Most of them are located underground to protect them from

damage and protect our communities from incidents that might occur from pipeline damage. However, excavation damage continues to be a leading contributor to pipeline leaks and failures.

Gas distribution systems consist of distribution main lines and service lines. Distribution main lines (mains) are generally installed in underground utility easements alongside streets and highways. Distribution service lines run from the mains into homes or businesses. Distribution main and service lines are not generally indicated by above-ground markers. There are 2.2 million miles of gas distribution pipelines, which comprise 81 percent of all gas and hazardous liquid pipelines.

Excavation damage can result in pipeline leaks and system failures, and is a leading cause of pipeline incidents. It is important that excavators ensure before digging that gas lines (and other underground utilities) are located and the locations are marked. Marking the locations of underground facilities enables the excavator to avoid damaging the lines during excavation.

Under Federal [49 CFR Part 192.706 Transmission and 192.723 Distribution] and State regulations, gas transmission and distribution pipeline operators, including gas distribution system operators, must periodically survey their pipeline systems for leaks. Distribution pipeline system operators must also conduct written integrity management (IM) programs as required by 49 CFR Part 192 Subpart P, that include the identification and implementation of measures designed to reduce the risks from failures of gas distribution pipelines. These measures must include effective leak management programs (unless all leaks are repaired when found) [§ 192.1007(d)].

Operators must measure their IM program performance [§ 192.1007(e)] to include:

i) Number of hazardous leaks[5] either eliminated or repaired as required by §192.703(c)… (or total number of leaks if all leaks are repaired when found), categorized by cause;

ii) Number of excavation damages;

iii) Number of excavation tickets (receipt of information by the underground facility operator from the notification center);

iv) Total number of leaks either eliminated or repaired, categorized by cause;

v) Number of hazardous leaks either eliminated or repaired as required by §192.703(c) (or total number of leaks if all leaks are repaired when found), categorized by material; and

vi) Any additional measures the operator determines are needed to evaluate the effectiveness of the operator's IM program in controlling each identified threat.

Operators must report, on an annual basis, the four measures listed in paragraphs (i) through (iv) above, as part of the annual report required by §191.11. An operator also must report the four

[5] 49 CFR §192.1001 defines a hazardous leak as a leak that represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous.

measures to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline [§ 192.1007(g)].

Pipeline Leak Considerations

Age and Material

Pipeline age and material are significant risk indicators. Gas distribution pipelines constructed of cast iron, wrought iron, and bare steel represent the oldest pipelines and those that pose the highest-risk for potential leaks. Many of these pipelines were installed over 60 years ago and are still in use. However, the degrading nature of iron alloys, the lack of protective coating on bare steel, and older pipe joint designs make these types of pipelines candidates for accelerated replacement programs.

The amount of cast iron, wrought iron, and bare steel pipe in use in gas distribution systems has declined significantly in recent years, especially in the amount of distribution service lines, due to increased state and federal safety initiatives and pipeline operators' replacement efforts. The Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 called for DOT to conduct a state-by-state survey on the progress of cast iron pipeline replacement. To illustrate the progress pipeline operators are making in the replacement of aging gas pipelines, PHMSA provides an annually-updated online inventory of high-risk pipeline infrastructure by state. Specifically, the dynamic inventory highlights efforts to replace cast and wrought iron and bare steel gas distribution pipelines and shows trends in pipeline miles by decade of installation. As of 2016, 2.9 percent of gas distribution service lines were made from cast iron, wrought iron, or bare steel pipe.

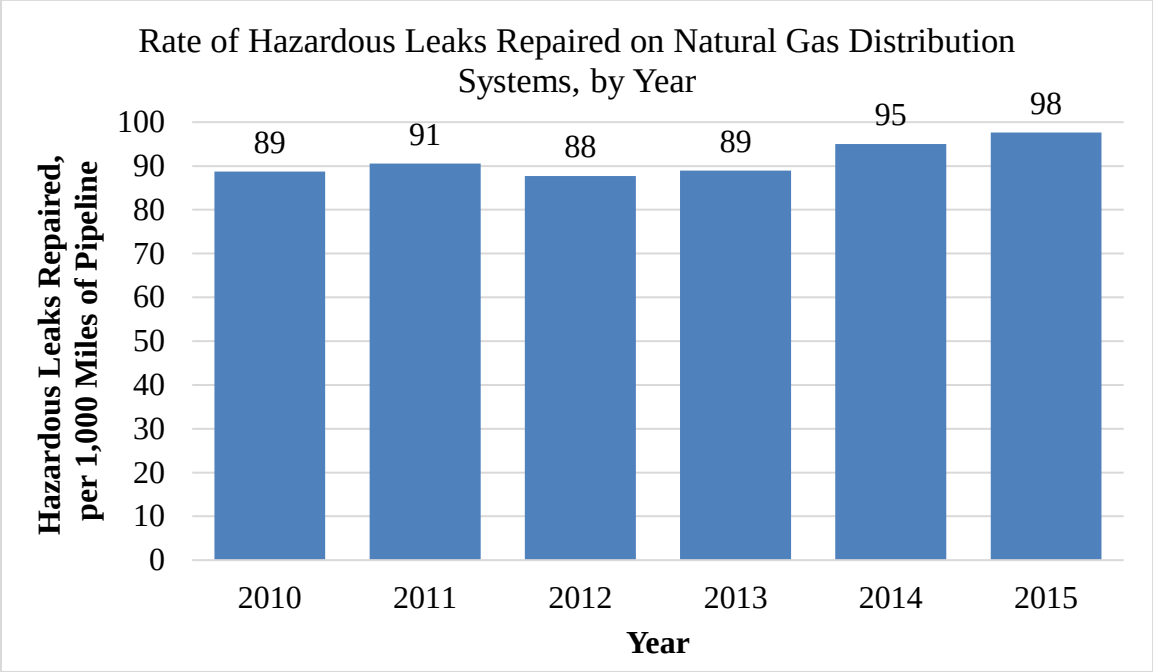
Appendix A shows the iron and bare steel gas distribution pipeline inventories as of December 15, 2016.

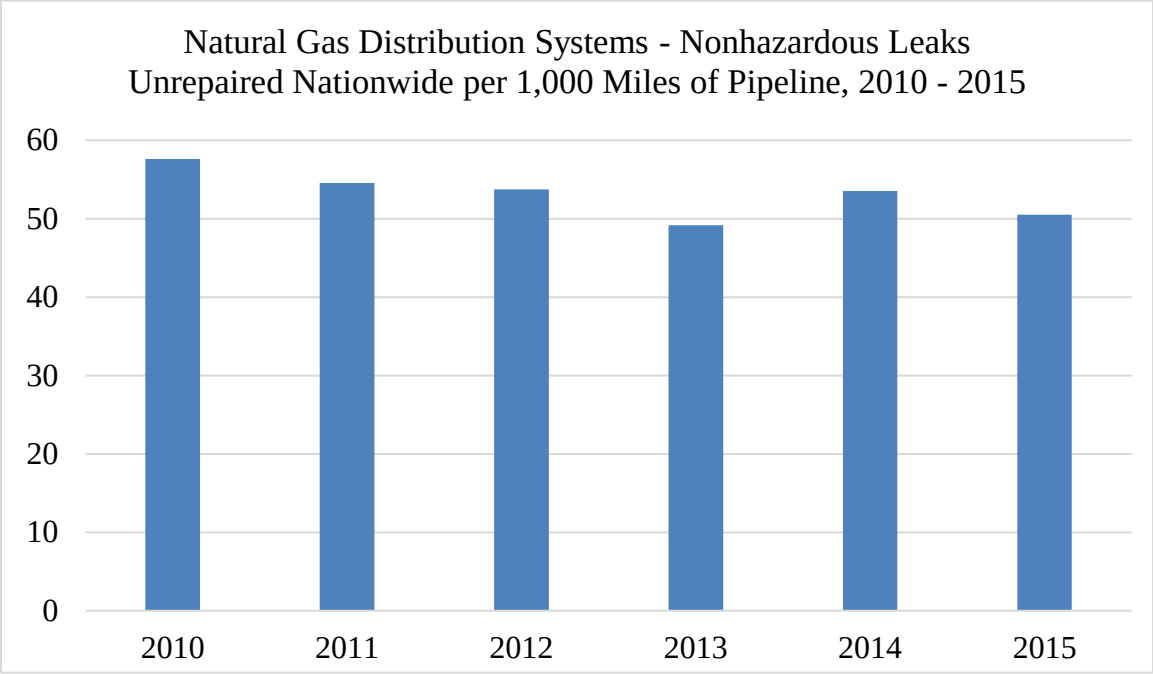
Leak Repairs

A hazardous leak on a natural gas distribution pipeline, as defined in 49 CFR §192.1001, is a leak that represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous. 49 CFR §192.703(c) requires that hazardous leaks must be repaired promptly.

Leaks that are not deemed hazardous may be repaired immediately or their repair may be delayed into the future, depending on the requirements of any applicable state pipeline safety regulations. Distribution pipeline operators must report annually the number of non-hazardous leaks, regardless of pipe material, that are identified and not repaired. Based on data obtained from PHMSA, the total leaks repaired has remained constant from 2010 to 2015 at 225 to 240.

To provide an idea of the scope of gas distribution pipeline leaks, the following graphs show the trends nationwide for gas distribution pipelines of leaks repaired and nonhazardous leaks outstanding (identified but not repaired) over several years, 2010 to 2015.





Gas distribution leak data is segregated by state and provided to the public on PHMSA's Stakeholder Communications website (http://primis.phmsa.dot.gov/comm/states.htm) under State Program Performance Metrics.

Appendix B of this report shows gas distribution system leak data for 2015 only.

GPTC Guide

The Accredited Standards Committee (ASC) Z380, Gas Piping Technology Committee (GPTC) develops and publishes ANSI Z380.1, GPTC Guide for Gas Transmission, Distribution and Gathering Piping Systems (GPTC Guide). The GPTC includes representatives from PHMSA, utilities, manufacturers, the National Transportation Safety Board (NTSB), State regulators, and the general public. The American Gas Association (AGA) is the Secretariat for the GPTC.

The GPTC Guide is a consensus standard following the ANSI Essential Requirements and the GPTC's own operating procedure that is approved by the American National Standards Institute (ANSI). The GPTC typically issues addenda to the GPTC Guide three times a year and reissues the entire guide with the addenda incorporated once every three years. The latest edition was published in 2015 and the next full edition will be published in 2018.

The GPTC does not encourage the use of the GPTC Guide in State or Federal regulations. This comes out of the ASC's long 45 plus year history of augmenting performance-based regulatory language with practical, how-to guidance. This position is typically reinforced in each three-year edition by an acknowledgement letter from PHMSA. The following is from the GPTC Guide Preface:

> "The guide material is advisory in nature and contains guidance and information for consideration in complying with the [Federal] Regulations. As such, it is not intended for public authorities or others to adopt the Guide in mandatory language, in whole or in part, in laws, regulations, administrative orders, ordinances, or similar instruments as the sole means of compliance."

GPTC Guide, Guide Material Appendix G-192-11, Gas Leakage Control Guidelines for Natural Gas Systems, Table 3a, provides leak classification and action criteria. These criteria provide more guidance and specificity for recognizing and classifying natural gas pipeline system leaks and taking actions to mitigate them than the requirements found in the Federal regulations (reference 49 CFR 192.703(c) and 49 CFR Part 192 Subpart P).

Some, but not all states have adopted the GPTC Guide, Table 3a criteria into their state pipeline safety regulations by reference or incorporation. However, virtually all states have regulations that expect distribution pipeline system operators to incorporate and follow the GPTC Guidelines in their leak classification and repair procedures, or similar criteria equivalent to the guidelines. Implementation of the GPTC Gas Leakage Control Guidelines for Natural Gas Systems does not alleviate the operator from the necessity to comply with Federal pipeline safety regulations.

Review Methodology

To facilitate the timely and efficient gathering of data and information needed to address the requirements of the 2016 PIPES Act, Section 30, PHMSA reached out to its state pipeline safety partners represented by the National Association of State Pipeline Safety Representatives (NAPSR). NAPSR is a non-profit organization of state pipeline safety representatives who serve to promote pipeline safety and is PHMSA's closest partner in pipeline safety. NAPSR member states with PHMSA certification oversee the distribution pipeline systems safety throughout most of the Nation. Learn more about NAPSR at: http://www.napsr.org/

NAPSR queried its state pipeline safety representatives to gather data necessary to respond to the statutory requirements. The state representatives were asked to respond to yes/no questions to generate data to provide a broad view of the status of State-level policies that encourage or create barriers to the repair and replacement of leaking natural gas distribution pipelines or systems that pose a safety threat. Forty-eight states, the District of Columbia, and Puerto Rico responded to the NAPSR questionnaire. There were no responses for Hawaii and Alaska as they do not participate in PHMSA's pipeline safety program.

Review Results

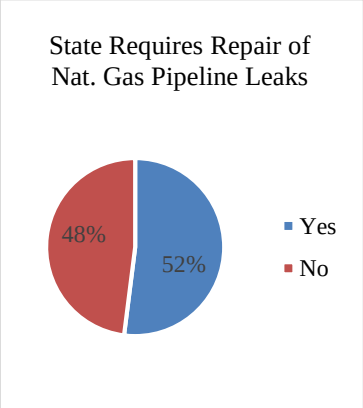
The following information is based on the results of the NAPSR survey. It is important to note that 18 states and Puerto Rico, as surveyed by NAPSR, never had cast iron and wrought iron pipe or have eliminated all of it.

State Policies That Encourage Repair and Replacement of Leaking Natural Gas Distribution Pipelines or Systems That Pose a Safety Threat

Regulations

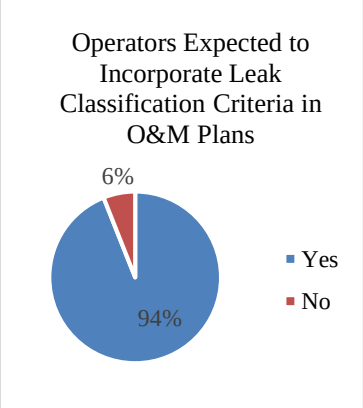
Fifty-two percent of the states have regulations that address the repair of leaks on natural gas distribution pipelines. Virtually all states expect that operators incorporate the GPTC guidance or similar criteria to classify gas distribution system pipe leaks for repair into their operation and maintenance (O&M) plans.

- Does the state have specific regulations that require pipeline operators to repair natural gas distribution pipeline non-hazardous leaks?



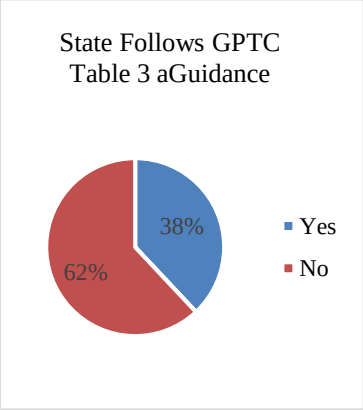
The results indicate that 52 percent of the states have regulations that address the repair of leaks on natural gas distribution pipelines.

- Do state regulations expect that gas pipeline operators have incorporated the GPTC guidance or similar criteria to classify gas distribution system pipe leaks for repair into their O&M plans?



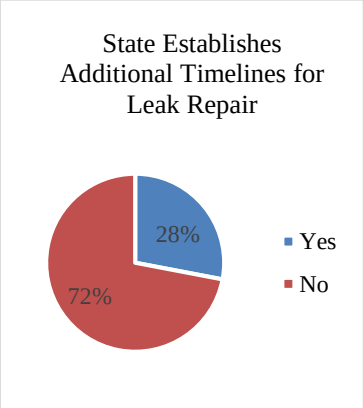
The results indicate that virtually all states (94 percent) have regulations that expect gas pipeline operators have incorporated the GPTC guidance or similar criteria to classify gas distribution system pipe leaks for repair into their operation and maintenance (O&M) plans.

- Does the state follow Gas Piping Technology Committee (GPTC) Table 3a guidance for leak repair and leak grading classification?



The results indicate that only 38 percent of the states follow the GPTC Table 3a guidance for leak repair and leak grading classification.

- Does the state establish additional timelines beyond those suggested by GPTC for repairing gas distribution system pipeline leaks?



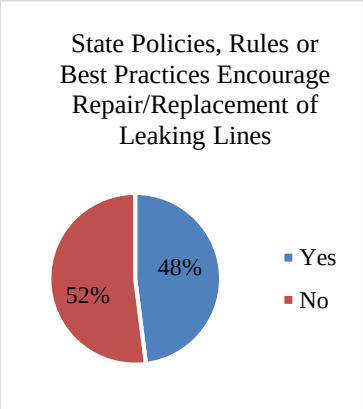
The results indicate that 28 percent of the states establish additional timelines beyond those suggested by GPTC for repairing gas distribution system pipeline leaks.

(In addition to Yes or No, the NAPSR query allowed respondents to select an additional and possibly ambiguous choice of "let operators use GPTC guidelines." To better reflect the results, those responses have been included as "No.")

Encouragement

Forty-eight percent of states have policies, rules and/or best practices that serve to encourage system operators to accelerate the repair or replacement of leaking gas distribution pipelines. These are primarily in the form of regulatory requirements to do so, in addition to the expectation that operators will follow and implement the GPTC Guidelines. About half of the states currently have State specific regulations to address natural gas distribution system leaks.

- Does the state have policies, rules and/or best practices that serve to encourage system operators to accelerate the repair or replacement of leaking gas distribution pipelines?

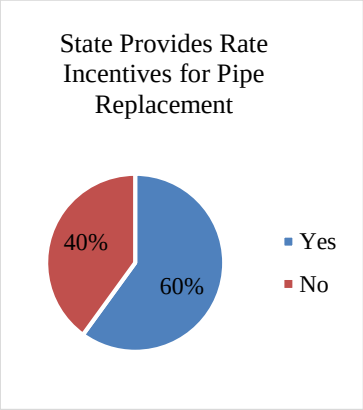


The results indicate that 48 percent of states have policies, rules and/or best practices that serve to encourage system operators to accelerate the repair or replacement of leaking gas distribution pipelines.

Incentives

Sixty percent indicated their state provides incentives for high-risk or at-risk pipe replacement. Incentives mostly come in the form of programs to accelerate rate recovery, or the reduction in natural gas lost during transportation, for the replacement costs of high-risk pipelines. These may come in the form of tracking programs that enable the pipeline operator to track, report, and more quickly recoup such costs. Cost recovery may occur outside of normal rate cases or may be included as consideration in rate cases either automatically or on a case-by-case basis.

- Does the state provide incentives for high-risk or at-risk pipe replacement?

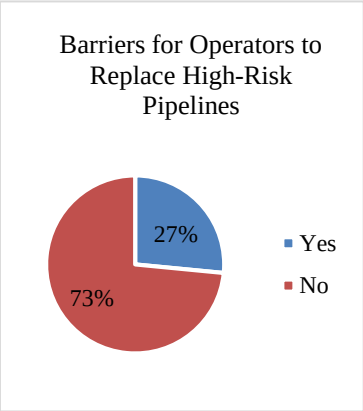


The results indicate that 60 percent of states provide rate incentives for high-risk or at-risk pipe replacement.

State Perceptions on Barriers for Operators to Repair and Replace Leaking Natural Gas Pipelines or Distribution Systems

Seventy-three percent of states indicated that there are no barriers. Others indicated there are barriers; most frequently noted were cost and cost recovery, permitting, the availability of qualified workforce, location, and weather. No responses indicated there were any state policies that presented barriers to pipeline replacements.

- Are there barriers to operators for replacing high-risk pipelines?



From the results, 73 percent of respondents indicated that there are no barriers in their states to operators replacing high-risk pipelines.

What are the Barriers

The most frequently noted barriers were cost and cost recovery. Other noted barriers were the availability of qualified workforce, location, permitting, and weather.

- Costs – Several states indicated that cost was a barrier. Issues include:
  - Small municipal systems may not have funding or financing available to conduct extensive pipeline replacement projects.
  - Years of inappropriate rate-recovery mechanisms decoupled rate-recovery from true asset engineering service life (the expected time in use based on engineering estimates). Appropriate service life for many pipeline materials was more guesswork than fact, and there was no incentive or requirement to replace systems that had reached the end of their engineering service life but were still in use and generating revenue.
  - Accelerated rate-recovery is an appropriate and rather straight-forward process, but some operators have struggled to demonstrate risk in rather simplified filings (as opposed to the full complexity of a Distribution Integrity Management Program or DIMP review) to an adequate level for utilities commission approvals.
  - Municipal utilities' rates are not regulated by the public service commission. The cost of replacing pipelines must be spread across a smaller customer base than the larger local distribution companies, which creates a significant impact to the smaller operator's customers.

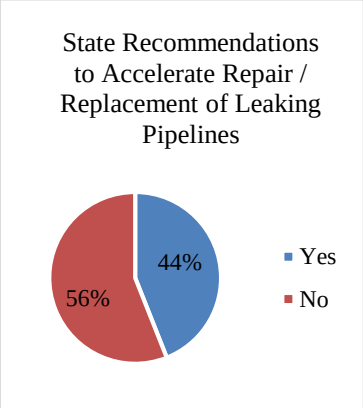
    - Difficulties in determining the extent and scope of a sustainable pipeline replacement program, wherein the operator must be able to acquire resources, including labor, to complete annual requirements.
    - Excessive, out-of-scope permitting costs. Municipalities may require operators to commit to post-project civil improvements before issuing permits, such as requiring operators to commit to restoring entire streets, and installing sidewalks with wheelchair ramps before issuing permits.
    - Some municipalities have increased the construction permit costs to exceedingly high levels.
- Permitting – Various permitting issues may impact pipeline replacement projects:
    - Municipalities may impose restrictions or moratoriums on street openings on streets that have been newly constructed, repaired, or re-paved.
- Qualified workforce – Several states indicated that the unavailability of qualified workers necessary to complete pipeline replacement projects was a barrier.
- Location – Some states indicated that the location of pipeline replacement projects could prohibit timely and cost-effective completion. For example, projects located in congested downtown areas.
- Weather – In some cases, weather, including seasonal variations, can impact the ability to complete projects.

Recommendations

State Recommendations

Forty-four percent of the states provided recommendations on Federal or State policies or best practices to improve safety by accelerating repair and/or replacement of leaking natural gas pipelines or pipeline systems. Comments noted from many of the states acknowledged that pipeline repair and replacement programs cost money and operators cannot fund such programs without passing on the costs to rate payers in the form of higher rates. Federal grants were recommended by some to offset the costs and defer or mitigate the rate increase impact.

- Does the state have any recommendations on Federal or State policies or best practices to improve safety by accelerating repair and/or replacement of leaking natural gas pipelines or pipeline systems?



Forty-four percent of the states recommended changes or additions to Federal or State policies or best practices to improve safety by accelerating repair and/or replacement of leaking natural gas pipelines or pipeline systems. Detailed explanations were requested.

The following recommendations are aggregated from the recommendations from the states:

- Improve cost recovery mechanisms to encourage accelerated pipeline replacement and repair.

  State utility commissions and other rate-setting organizations should be encouraged to focus more on the necessity of effective and timely pipeline repair and replacement programs to ensure pipeline safety. They should encourage operators to do a better job of demonstrating the necessity of those programs to facilitate decisions on cost recovery. Pipeline operators should engage State utility commissions and other rate-setting organizations early in the process for pipeline repair and replacement programs, to help them understand the necessity for the programs relative to ensuring pipeline safety and to demonstrate the financial costs of implementing those programs.

- Increase pipeline safety awareness among pipeline operators and rate setting organizations.

  PHMSA should continue to issue advisory bulletins regarding safety issues. Advisory bulletins should include recommendations for accelerating pipeline replacement and repair to ensure safety. Responding to advisory bulletins can support states and operators to justify accelerated pipeline replacement programs and necessary cost recovery.

- Increase Federal funding support for operator pipeline replacement programs.

  PHMSA should make grants and subsidies available to states to support operators to fund accelerated pipeline replacement projects and to offset rate increases. Funding could also be used to develop and implement workforce development programs for replacing and inspecting pipelines.

- Require more aggressive action by operators to address high-risk distribution pipelines and pipeline leaks to ensure safety. PHMSA should revise current Federal regulations, making 49 CFR 192 Subpart I and DIMP regulations more prescriptive to require operators to increase the inspection frequency on high-risk pipelines, accelerate the replacement of high-risk pipelines, and repair leaks within specified timeframes.

  Distribution pipeline leaks should be recognized as pipeline failures and not accepted as normal operating conditions, and pipeline repair/replacement time frames for both hazardous and non-hazardous leaks should be mandated (suggestions were from three to 12 months).

  When hazardous leaks are addressed through temporary repairs, operators should be required to periodically monitor and evaluate to ensure the temporary repair remains effective.

  PHMSA and the states should review annual leak data and take actions to communicate with operators with high numbers of hazardous leaks, and increase the frequency of inspections for those operators until sufficient monitoring and mitigation of risks has been demonstrated.

PHMSA Recommendations

- PHMSA should continue to encourage states, State utility commissions and other rate-setting organizations, and operators to accelerate high-risk pipe replacement, as well as promote cost recovery programs that effectively facilitate decisions through the cost-efficient and timely repair and replacement of pipelines with leaks.
- PHMSA should continue to increase pipeline safety awareness among pipeline operators and rate setting organizations as it relates to leaks on pipeline distribution systems. This could be done through the Gas Pipeline Advisory Committee, Chairs of rate setting authorities, and the National Association of Pipeline Safety Representatives.

- Conduct a study to determine if additional regulations requiring the repair of all leaks will provide public safety benefits that warrant the cost of implementing such regulations, and if non-regulatory actions could be taken to obtain similar outcomes to additional regulatory requirements.

PHMSA believes an additional study is necessary to determine if additional regulatory requirements for grading and repairing all distribution pipeline system leaks, as well as non-regulatory actions, can significantly improve pipeline safety. Consideration should be given to the extent pipeline distribution operators have adopted GPTC leak grading and repair procedures into their operator and maintenance plans.

Appendix A – Iron and Bare Steel Distribution Pipeline Mileage

Gas Distribution Cast/Wrought Iron Pipelines

Data Source: US DOT Pipeline and Hazardous Materials Safety Administration Portal - Data **as of 12/13/2016**

Year: 2015

(Sorted by Main Miles)

State	Main Miles	% of Total Main Miles	Service Count	% of Total Service Count
NEW JERSEY	4,586	13.2%	0	0.0%
NEW YORK	3,960	8.1%	6,375	0.2%
MASSACHUSETTS	3,315	15.4%	1,492	0.1%
PENNSYLVANIA	2,901	6.0%	78	0.0%
MICHIGAN	2,812	4.9%	15	0.0%
ILLINOIS	1,431	2.3%	65	0.0%
CONNECTICUT	1,349	16.9%	37	0.0%
MARYLAND	1,318	8.9%	31	0.0%
ALABAMA	1,076	3.5%	219	0.0%
MISSOURI	916	3.3%	0	0.0%
RHODE ISLAND	769	24.0%	137	0.1%
TEXAS	657	0.6%	0	0.0%
DISTRICT OF COLUMBIA	412	34.0%	0	0.0%
NEBRASKA	388	3.0%	0	0.0%
LOUISIANA	354	1.3%	962	0.1%
OHIO	315	0.5%	10	0.0%
VIRGINIA	263	1.2%	77	0.0%
INDIANA	209	0.5%	0	0.0%
FLORIDA	168	0.6%	0	0.0%
NEW HAMPSHIRE	113	5.9%	22	0.0%
DELAWARE	76	2.5%	0	0.0%

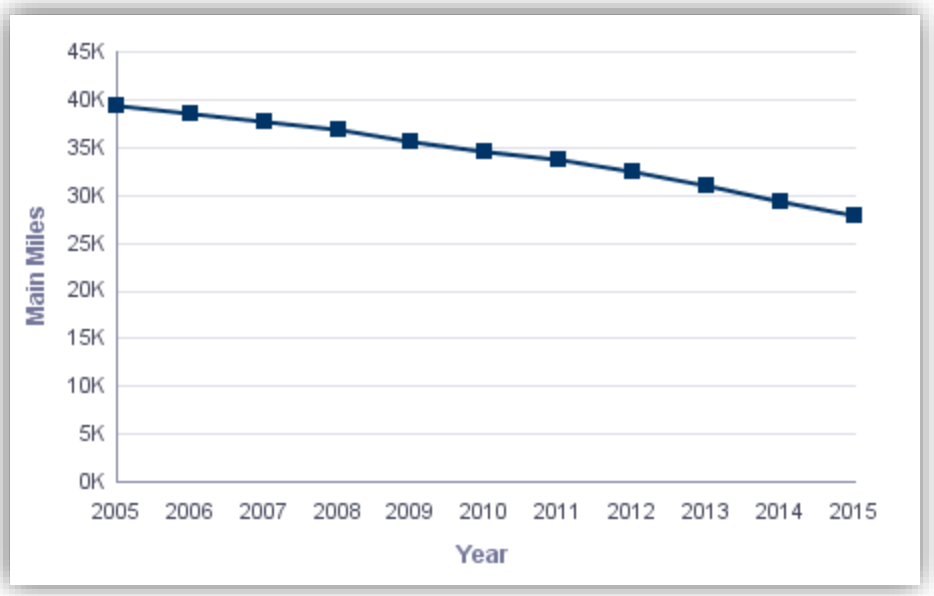
CALIFORNIA	60	0.1%	0	0.0%
KANSAS	58	0.3%	0	0.0%
KENTUCKY	56	0.3%	454	0.1%
ARKANSAS	50	0.2%	0	0.0%
MAINE	45	3.8%	30	0.1%
MISSISSIPPI	44	0.3%	1	0.0%
TENNESSEE	39	0.1%	0	0.0%
WEST VIRGINIA	14	0.1%	23	0.0%
MINNESOTA	10	0.0%	0	0.0%
GEORGIA	5	0.0%	0	0.0%
COLORADO	0	0.0%	0	0.0%
IOWA	0	0.0%	0	0.0%

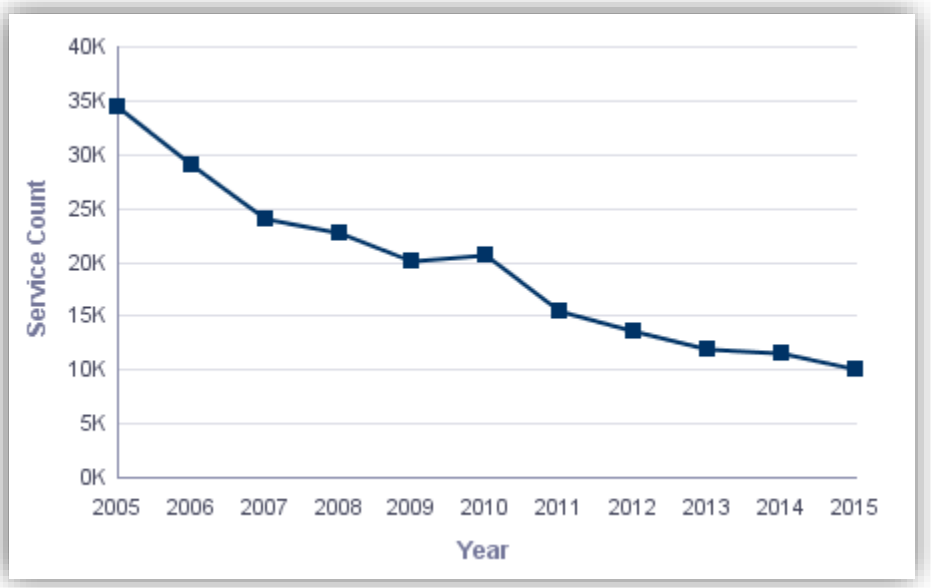
Gas Distribution Cast/Wrought Iron Main Miles and Service Count State Trend

Data Source: US DOT Pipeline and Hazardous Materials Safety Administration Portal - Data **as of 12/13/2016**

State: ALL

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Main Miles	39,342	38,598	37,721	36,774	35,486	34,592	33,669	32,427	30,904	29,359	27,771
Service Count	34,466	29,069	24,002	22,781	20,171	20,728	15,408	13,511	11,991	11,618	10,028





Gas Distribution Bare Steel Pipelines

Data Source: US DOT Pipeline and Hazardous Materials Safety Administration Portal - Data as of **12/13/2016**

Year: 2015

(Sorted by Main Miles Bare Steel)

State	Main Miles Bare Steel	% of Total Main Miles	Service Count	% of Total Service Count
OHIO	7,672.29	13.3%	147,170	4.2%
PENNSYLVANIA	7,208.44	15.0%	274,084	9.6%
NEW YORK	6,138.13	12.6%	291,466	9.1%
TEXAS	5,851.42	5.5%	121,212	2.5%
CALIFORNIA	3,797.00	3.6%	16,718	0.2%
KANSAS	3,256.42	14.5%	101,526	10.6%
WEST VIRGINIA	2,860.14	26.4%	78,206	18.4%
MASSACHUSETTS	1,566.40	7.3%	172,621	13.2%
NEW JERSEY	1,333.00	3.8%	216,648	9.2%
MICHIGAN	1,251.65	2.2%	45,475	1.4%
ARKANSAS	1,245.11	6.2%	22,020	3.2%
OKLAHOMA	1,188.13	4.5%	45,819	3.5%
MISSOURI	1,120.35	4.1%	10,787	0.7%
FLORIDA	804.90	2.9%	30,144	3.5%
KENTUCKY	694.92	3.7%	22,359	2.6%
INDIANA	651.79	1.6%	48,797	2.4%
LOUISIANA	615.79	2.3%	25,180	2.2%
ALABAMA	567.70	1.8%	149,858	13.8%
ARIZONA	538.67	2.2%	10,639	0.8%
NEBRASKA	501.02	3.9%	4,123	0.7%
VIRGINIA	496.73	2.3%	13,064	1.0%
MISSISSIPPI	464.98	2.8%	832	0.1%
MINNESOTA	345.15	1.1%	1,886	0.1%
ILLINOIS	276.07	0.4%	23,660	0.6%
RHODE ISLAND	266.00	8.3%	37,992	19.5%

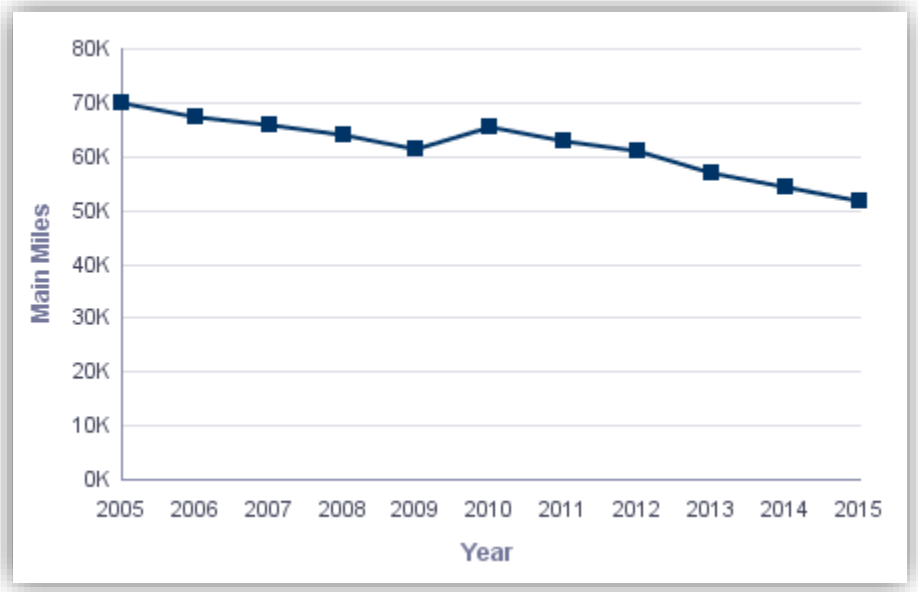
State	Main Miles Bare Steel	% of Total Main Miles	Service Count	% of Total Service Count
MARYLAND	258.66	1.7%	83,971	8.2%
COLORADO	183.09	0.5%	16,995	1.1%
IOWA	172.49	1.0%	6,942	0.7%
CONNECTICUT	155.99	2.0%	50,816	11.5%
HAWAII	101.80	16.7%	6,764	19.6%
NEW MEXICO	84.95	0.6%	10,257	1.6%
GEORGIA	52.28	0.1%	10,599	0.5%
TENNESSEE	43.77	0.1%	1,676	0.1%
SOUTH DAKOTA	27.69	0.5%	1,828	0.8%
DISTRICT OF COLUMBIA	24.96	2.1%	7,039	5.7%
WYOMING	24.93	0.5%	3,028	1.6%
NEW HAMPSHIRE	16.58	0.9%	6,309	6.9%
DELAWARE	11.83	0.4%	692	0.4%
NORTH DAKOTA	8.30	0.2%	75	0.0%
MONTANA	8.12	0.1%	101	0.0%
ALASKA	7.99	0.2%	0	0.0%
SOUTH CAROLINA	6.00	0.0%	386	0.1%
OREGON	3.02	0.0%	35	0.0%
WASHINGTON	3.00	0.0%	86	0.0%
MAINE	0.72	0.1%	138	0.4%
NEVADA	0.00	0.0%	1	0.0%
WISCONSIN	0.00	0.0%	2	0.0%

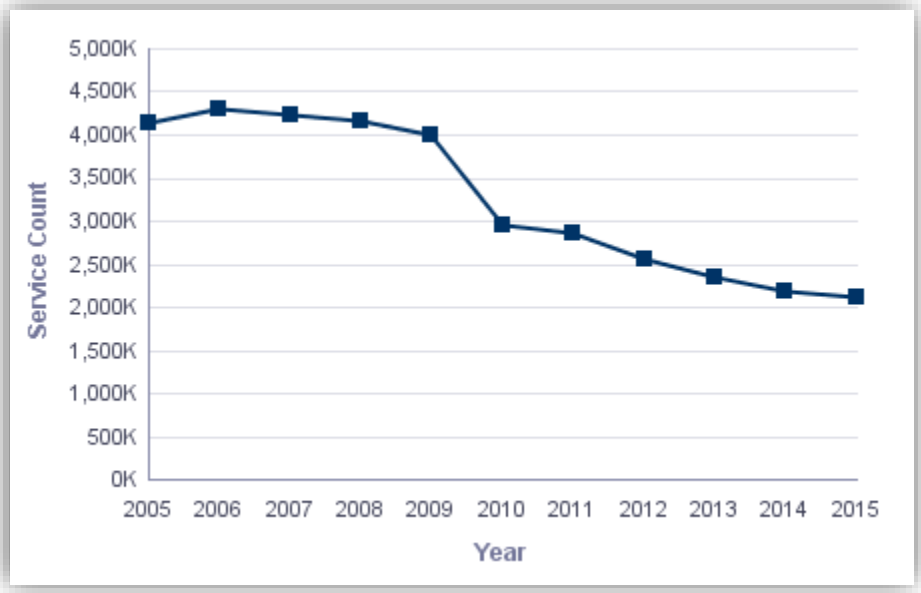
Gas Distribution Bare Steel Main Miles and Service Count State Trend

Data Source: US DOT Pipeline and Hazardous Materials Safety Administration Portal - Data **as of 12/13/2016**

State: ALL

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Main Miles	69,798	67,408	65,689	64,127	61,432	65,656	62,996	61,186	56,879	54,456	51,908
Service Count	4,146,310	4,306,596	4,225,567	4,161,369	4,005,567	2,961,317	2,858,822	2,555,171	2,361,817	2,179,598	2,120,026





Appendix B – 2015 Natural Gas Distribution Pipeline Leak Data

Data Source: US DOT Pipeline and Hazardous Materials Safety Administration PDM Portal
Summary of Gas Distribution Pipeline Mileage and Performance Data, 1/30/2017

Table 1 – 2015 Leak Data Sorted by State

State	Mains Miles	Services Miles	Total Miles	Total Leaks Repaired	Hazardous Leaks Repaired	Total # Leaks Outstanding
AK	3,404.90	2,439.50	5,844.40	407	379	0
AL	30,953.60	26,638.70	57,592.30	11,275	4,724	4,314
AR	20,183.90	8,277.30	28,461.20	7,103	3,061	3,556
AZ	24,548.00	15,165.60	39,713.60	10,701	4,634	163
CA	105,353.30	94,745.70	200,099.00	70,446	18,481	10,965
CO	35,859.00	19,844.00	55,703.00	7,593	3,112	1,229
CT	7,984.00	5,964.30	13,948.30	3,568	1,613	105
DC	1,214.00	1,129.30	2,343.30	1,417	807	203
DE	3,104.50	2,302.30	5,406.80	1,041	475	56
FL	28,003.50	13,700.70	41,704.20	10,604	4,330	360
GA	44,492.90	40,048.90	84,541.80	19,122	7,073	929
HI	610	424.7	1,034.70	589	228	141
IA	18,152.30	14,942.10	33,094.40	6,104	1,831	727
ID	8,256.90	7,010.00	15,266.90	1,151	895	540

State	Mains Miles	Services Miles	Total Miles	Total Leaks Repaired	Hazardous Leaks Repaired	Total # Leaks Outstanding
IL	61,629.40	53,146.70	114,776.10	23,719	10,347	9,328
IN	40,597.50	35,199.60	75,797.10	10,568	5,000	1,381
KS	22,456.10	10,268.60	32,724.70	4,654	2,383	1,419
KY	18,615.30	10,872.70	29,488.00	7,202	2,889	985
LA	27,098.20	13,407.10	40,505.30	9,912	4,022	2,204
MA	21,576.40	15,223.20	36,799.60	16,904	9,472	763
MD	14,805.70	13,390.30	28,196.00	11,113	4,359	1,894
ME	1,170.60	493.8	1,664.40	481	154	0
MI	57,866.90	54,231.80	112,098.70	24,404	8,087	4,748
MN	31,891.10	25,292.70	57,183.80	9,955	4,780	877
MO	27,347.80	18,811.50	46,159.30	9,203	3,816	6,438
MS	16,793.70	11,407.70	28,201.40	7,089	2,996	1,240
MT	7,147.30	4,406.60	11,553.90	1,022	496	45
NC	30,355.20	25,333.80	55,689.00	10,147	3,880	4,785
ND	3,590.60	2,491.70	6,082.30	618	374	330
NE	12,776.80	7,291.70	20,068.50	3,224	617	264
NH	1,920.00	1,211.30	3,131.30	809	348	52
NJ	34,791.50	32,966.10	67,757.60	19,397	9,015	4,029
NM	13,881.80	6,081.00	19,962.80	1,412	928	291
NV	9,905.30	8,583.60	18,488.90	2,542	1,730	4
NY	48,683.80	37,654.60	86,338.40	32,084	15,733	353
OH	57,642.10	44,408.20	102,050.30	35,171	13,531	10,166
OK	26,352.50	7,649.80	34,002.30	6,778	3,365	2,091

State	Mains Miles	Services Miles	Total Miles	Total Leaks Repaired	Hazardous Leaks Repaired	Total # Leaks Outstanding
OR	15,614.90	11,879.00	27,493.90	2,465	797	742
PA	47,953.90	28,737.40	76,691.30	30,698	9,391	2,843
PR	33.7	0.3	34.00	25	0	0
RI	3,210.00	2,435.50	5,645.50	1,312	995	49
SC	20,799.30	16,168.30	36,967.60	8,547	3,225	1,496
SD	5,645.00	3,634.70	9,279.70	938	502	97
TN	39,048.40	26,396.40	65,444.80	12,959	5,776	2,623
TX	106,234.40	45,534.20	151,768.60	48,494	20,374	17,222
UT	17,491.80	9,838.50	27,330.30	2,932	2,445	4
VA	21,298.00	19,081.80	40,379.80	9,775	4,631	1,711
VT	788.6	630.9	1,419.50	91	60	1
WA	22,704.30	22,166.80	44,871.10	4,411	1,730	2,142
WI	38,998.90	29,711.40	68,710.30	8,115	2,479	2,300
WV	10,850.20	2,430.60	13,280.80	5,844	1,182	2,330
WY	5,258.60	1,981.70	7,240.30	568	280	127
Totals	1,276,946.40	913,084.70	2,190,031.10	536,703	213,832	110,662

Table 2 - 2015 Leak Data Sorted by Total # Leaks Outstanding

State	Mains Miles	Services Miles	Total Miles	Total Leaks Repaired	Hazardous Leaks Repaired	Total # Leaks Outstanding
TX	106,234.40	45,534.20	151,768.60	48,494	20,374	17,222
CA	105,353.30	94,745.70	200,099.00	70,446	18,481	10,965
OH	57,642.10	44,408.20	102,050.30	35,171	13,531	10,166
IL	61,629.40	53,146.70	114,776.10	23,719	10,347	9,328
MO	27,347.80	18,811.50	46,159.30	9,203	3,816	6,438
NC	30,355.20	25,333.80	55,689.00	10,147	3,880	4,785
MI	57,866.90	54,231.80	112,098.70	24,404	8,087	4,748
AL	30,953.60	26,638.70	57,592.30	11,275	4,724	4,314
NJ	34,791.50	32,966.10	67,757.60	19,397	9,015	4,029
AR	20,183.90	8,277.30	28,461.20	7,103	3,061	3,556
PA	47,953.90	28,737.40	76,691.30	30,698	9,391	2,843
TN	39,048.40	26,396.40	65,444.80	12,959	5,776	2,623
WV	10,850.20	2,430.60	13,280.80	5,844	1,182	2,330
WI	38,998.90	29,711.40	68,710.30	8,115	2,479	2,300
LA	27,098.20	13,407.10	40,505.30	9,912	4,022	2,204
WA	22,704.30	22,166.80	44,871.10	4,411	1,730	2,142
OK	26,352.50	7,649.80	34,002.30	6,778	3,365	2,091
MD	14,805.70	13,390.30	28,196.00	11,113	4,359	1,894
VA	21,298.00	19,081.80	40,379.80	9,775	4,631	1,711
SC	20,799.30	16,168.30	36,967.60	8,547	3,225	1,496
KS	22,456.10	10,268.60	32,724.70	4,654	2,383	1,419
IN	40,597.50	35,199.60	75,797.10	10,568	5,000	1,381

State	Mains Miles	Services Miles	Total Miles	Total Leaks Repaired	Hazardous Leaks Repaired	Total # Leaks Outstanding
MS	16,793.70	11,407.70	28,201.40	7,089	2,996	1,240
CO	35,859.00	19,844.00	55,703.00	7,593	3,112	1,229
KY	18,615.30	10,872.70	29,488.00	7,202	2,889	985
GA	44,492.90	40,048.90	84,541.80	19,122	7,073	929
MN	31,891.10	25,292.70	57,183.80	9,955	4,780	877
MA	21,576.40	15,223.20	36,799.60	16,904	9,472	763
OR	15,614.90	11,879.00	27,493.90	2,465	797	742
IA	18,152.30	14,942.10	33,094.40	6,104	1,831	727
ID	8,256.90	7,010.00	15,266.90	1,151	895	540
FL	28,003.50	13,700.70	41,704.20	10,604	4,330	360
NY	48,683.80	37,654.60	86,338.40	32,084	15,733	353
ND	3,590.60	2,491.70	6,082.30	618	374	330
NM	13,881.80	6,081.00	19,962.80	1,412	928	291
NE	12,776.80	7,291.70	20,068.50	3,224	617	264
DC	1,214.00	1,129.30	2,343.30	1,417	807	203
AZ	24,548.00	15,165.60	39,713.60	10,701	4,634	163
HI	610	424.7	1,034.70	589	228	141
WY	5,258.60	1,981.70	7,240.30	568	280	127
CT	7,984.00	5,964.30	13,948.30	3,568	1,613	105
SD	5,645.00	3,634.70	9,279.70	938	502	97
DE	3,104.50	2,302.30	5,406.80	1,041	475	56
NH	1,920.00	1,211.30	3,131.30	809	348	52
RI	3,210.00	2,435.50	5,645.50	1,312	995	49

State	Mains Miles	Services Miles	Total Miles	Total Leaks Repaired	Hazardous Leaks Repaired	Total # Leaks Outstanding
MT	7,147.30	4,406.60	11,553.90	1,022	496	45
NV	9,905.30	8,583.60	18,488.90	2,542	1,730	4
UT	17,491.80	9,838.50	27,330.30	2,932	2,445	4
VT	788.6	630.9	1,419.50	91	60	1
AK	3,404.90	2,439.50	5,844.40	407	379	0
ME	1,170.60	493.8	1,664.40	481	154	0
PR	33.7	0.3	34.00	25	0	0
Totals	1,276,946.40	913,084.70	2,190,031.10	536,703	213,832	110,662

Table 3 - 2015 Leak Data Sorted by Total # Leaks Outstanding per 1,000 Miles of Pipeline

State	Mains Miles	Services Miles	Total Miles	Total Leaks Repaired	Hazardous Leaks Repaired	Total # Leaks Outstanding	Leaks Repaired per 1,000 Miles of Pipe	Hazardous Leaks Repaired per 1,000 Miles of Pipe	Leaks Outstanding per 1,000 Miles of Pipe
WV	10,850.20	2,430.60	13,280.80	5,844	1,182	2,330	440.0	89.0	175.4
MO	27,347.80	18,811.50	46,159.30	9,203	3,816	6,438	199.4	82.7	139.5
HI	610	424.7	1,034.70	589	228	141	569.2	220.4	136.3
AR	20,183.90	8,277.30	28,461.20	7,103	3,061	3,556	249.6	107.5	124.9
TX	106,234.40	45,534.20	151,768.60	48,494	20,374	17,222	319.5	134.2	113.5
OH	57,642.10	44,408.20	102,050.30	35,171	13,531	10,166	344.6	132.6	99.6
DC	1,214.00	1,129.30	2,343.30	1,417	807	203	604.7	344.4	86.6
NC	30,355.20	25,333.80	55,689.00	10,147	3,880	4,785	182.2	69.7	85.9
IL	61,629.40	53,146.70	114,776.10	23,719	10,347	9,328	206.7	90.1	81.3
AL	30,953.60	26,638.70	57,592.30	11,275	4,724	4,314	195.8	82.0	74.9
MD	14,805.70	13,390.30	28,196.00	11,113	4,359	1,894	394.1	154.6	67.2
OK	26,352.50	7,649.80	34,002.30	6,778	3,365	2,091	199.3	99.0	61.5
NJ	34,791.50	32,966.10	67,757.60	19,397	9,015	4,029	286.3	133.0	59.5
CA	105,353.30	94,745.70	200,099.00	70,446	18,481	10,965	352.1	92.4	54.8
LA	27,098.20	13,407.10	40,505.30	9,912	4,022	2,204	244.7	99.3	54.4
ND	3,590.60	2,491.70	6,082.30	618	374	330	101.6	61.5	54.3
WA	22,704.30	22,166.80	44,871.10	4,411	1,730	2,142	98.3	38.6	47.7
MS	16,793.70	11,407.70	28,201.40	7,089	2,996	1,240	251.4	106.2	44.0
KS	22,456.10	10,268.60	32,724.70	4,654	2,383	1,419	142.2	72.8	43.4

State	Mains Miles	Services Miles	Total Miles	Total Leaks Repaired	Hazardous Leaks Repaired	Total # Leaks Outstanding	Leaks Repaired per 1,000 Miles of Pipe	Hazardous Leaks Repaired per 1,000 Miles of Pipe	Leaks Outstanding per 1,000 Miles of Pipe
VA	21,298.00	19,081.80	40,379.80	9,775	4,631	1,711	242.1	114.7	42.4
MI	57,866.90	54,231.80	112,098.70	24,404	8,087	4,748	217.7	72.1	42.4
SC	20,799.30	16,168.30	36,967.60	8,547	3,225	1,496	231.2	87.2	40.5
TN	39,048.40	26,396.40	65,444.80	12,959	5,776	2,623	198.0	88.3	40.1
PA	47,953.90	28,737.40	76,691.30	30,698	9,391	2,843	400.3	122.5	37.1
ID	8,256.90	7,010.00	15,266.90	1,151	895	540	75.4	58.6	35.4
WI	38,998.90	29,711.40	68,710.30	8,115	2,479	2,300	118.1	36.1	33.5
KY	18,615.30	10,872.70	29,488.00	7,202	2,889	985	244.2	98.0	33.4
OR	15,614.90	11,879.00	27,493.90	2,465	797	742	89.7	29.0	27.0
CO	35,859.00	19,844.00	55,703.00	7,593	3,112	1,229	136.3	55.9	22.1
IA	18,152.30	14,942.10	33,094.40	6,104	1,831	727	184.4	55.3	22.0
MA	21,576.40	15,223.20	36,799.60	16,904	9,472	763	459.4	257.4	20.7
IN	40,597.50	35,199.60	75,797.10	10,568	5,000	1,381	139.4	66.0	18.2
WY	5,258.60	1,981.70	7,240.30	568	280	127	78.4	38.7	17.5
NH	1,920.00	1,211.30	3,131.30	809	348	52	258.4	111.1	16.6
MN	31,891.10	25,292.70	57,183.80	9,955	4,780	877	174.1	83.6	15.3
NM	13,881.80	6,081.00	19,962.80	1,412	928	291	70.7	46.5	14.6
NE	12,776.80	7,291.70	20,068.50	3,224	617	264	160.6	30.7	13.2
GA	44,492.90	40,048.90	84,541.80	19,122	7,073	929	226.2	83.7	11.0
SD	5,645.00	3,634.70	9,279.70	938	502	97	101.1	54.1	10.5

State	Mains Miles	Services Miles	Total Miles	Total Leaks Repaired	Hazardous Leaks Repaired	Total # Leaks Outstanding	Leaks Repaired per 1,000 Miles of Pipe	Hazardous Leaks Repaired per 1,000 Miles of Pipe	Leaks Outstanding per 1,000 Miles of Pipe
DE	3,104.50	2,302.30	5,406.80	1,041	475	56	192.5	87.9	10.4
RI	3,210.00	2,435.50	5,645.50	1,312	995	49	232.4	176.2	8.7
FL	28,003.50	13,700.70	41,704.20	10,604	4,330	360	254.3	103.8	8.6
CT	7,984.00	5,964.30	13,948.30	3,568	1,613	105	255.8	115.6	7.5
AZ	24,548.00	15,165.60	39,713.60	10,701	4,634	163	269.5	116.7	4.1
NY	48,683.80	37,654.60	86,338.40	32,084	15,733	353	371.6	182.2	4.1
MT	7,147.30	4,406.60	11,553.90	1,022	496	45	88.5	42.9	3.9
VT	788.6	630.9	1,419.50	91	60	1	64.1	42.3	0.7
NV	9,905.30	8,583.60	18,488.90	2,542	1,730	4	137.5	93.6	0.2
UT	17,491.80	9,838.50	27,330.30	2,932	2,445	4	107.3	89.5	0.1
AK	3,404.90	2,439.50	5,844.40	407	379	0	69.6	64.8	0.0
ME	1,170.60	493.8	1,664.40	481	154	0	289.0	92.5	0.0
PR	33.7	0.3	34.00	25	0	0	735.3	0.0	0.0
Totals	1,276,946.40	913,084.70	2,190,031.10	536,703	213,832	110,662	245.1	97.6	50.5