

MAKING STATE GAS PIPELINES SAFE AND RELIABLE

AN ASSESSMENT OF STATE POLICY

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As the safest and least costly method of transporting energy, oil and gas pipelines deliver the resources necessary for electricity generation, transportation, and heating and cooling. Every year, more than 2 million miles of pipelines deliver trillions of cubic feet of natural gas and hundreds of billions of tons of liquid petroleum in the United States.¹ Ensuring the reliability and safety of this massive pipeline infrastructure is critical to households, businesses and industries across the United States.

After the natural gas pipeline explosion in California in 2010 and another fatal pipeline explosion in Pennsylvania, more focus has been placed on state and federal pipeline safety. Although the federal government is primarily responsible for pipeline oversight, state involvement varies. Nine states are authorized to act as interstate agents to inspect interstate pipelines, and most pipeline inspections are carried out by state regulatory agencies, which are responsible for intrastate pipeline safety.

The importance of pipeline infrastructure is likely to grow due to the tremendous increase in U.S. natural gas supplies that can be accessed with new drilling technologies. Its role in electricity generation is increasing, as is the amount of natural gas that is transported across the country.

NCSL's analysis of pipeline safety data found that the number of accidents per mile of pipeline varies from state to state, and states that dedicate more time to inspections experience fewer accidents. However, some states experience substantially more accidents than others that dedicate comparable time to inspections.

NCSL's key findings include:

- The total number of significant incidents—those that incur consequences such as fatality or injury requiring in-patient hospitalization, \$50,000 or more in total costs (1984 dollars), or liquid release resulting in a fire or explosion—that states experienced from 2000 to 2009 ranged from one in New Hampshire to 531 in Texas with a median of 30.
- In 2009, *Inspection Person Days*—the number of days spent in the field conducting inspections—varied from 62 in Maine to 4,368 in New York, with a median of 499.
- In 2009, *Inspection Person Days per 1,000 Miles of Natural Gas Transmission Pipeline* ranged from 26 in Montana to 1,305 in Rhode Island, a 50-fold difference. The median for all states is 107.
- States that dedicate less time to inspections generally experience more significant incidents, which suggests that more inspection time can reduce the amount of incidents. On average, states with less than 400 *Inspection Person Days* a year experienced 1.55 significant accidents per 1,000 miles of pipeline, whereas states with more than 400 *Inspection Person Days* experienced an average of 0.9 significant incidents, a 41 percent decrease. When an outlier state is omitted from the analysis, the decline is even more substantial—resulting in a 75 percent decrease.

Contents

Breaking it Down: Understanding the Terminology	2
Federal and State Responsibilities	2
Pipeline Accidents	3
Natural Gas as an Expanding Industry	3
State and Federal Action.....	4
Conclusion.....	6
Additional Resources.....	6
Appendix.....	8
Notes	21



- In 2010, at least 11 states considered and four states enacted legislation related to pipeline safety. Most bills would improve pipeline security and create committees to study safety concerns, increase penalties for safety violations, or upgrade emergency response plans.

Breaking It Down: Understanding the Terminology

The United States maintains about 2 million miles of natural gas distribution mains and pipelines, 321,000 miles of gas transmission and gathering pipelines, 175,000 miles hazardous liquid pipeline, and 114 active liquid natural gas plants that are connected to natural gas transmission and distribution systems.² Table 1 in the Appendix provides a breakdown of pipeline mileage by state and type of pipeline.

The pipeline system includes:

- *Gathering lines* that collect and move products from sources such as wells on land or offshore to storage or processing.
- *Transmission lines* to transport large quantities of natural gas or hazardous liquids over long distances from gathering lines or storage facilities to distribution centers, storage facilities, power plants, industrial customers and municipalities. Petroleum transmission lines deliver crude oil to refineries and refined products to market. Most transmission pipelines are located underground.
- *Distribution lines*, which come in two forms. Main distribution lines move gas to industrial customers. Smaller distribution lines connect businesses and homes. Distribution lines usually are installed in underground utility easements along streets.
- *Gas pipeline commodities* include natural gas, hydrogen gas, propane gas and synthetic gas. Almost all gas gathering lines are for natural gas. Distribution and transmission are mostly for natural gas, but include some propane and hydrogen.

Federal and State Responsibilities

Both federal and state agencies regulate pipelines across the United States. Interstate pipelines are managed by the Federal Energy Regulatory Commission (FERC) and the U.S. Department of Transportation (DOT). The Federal Energy Regulatory Commission regulates pipelines, storage, natural gas transportation in inter-

state commerce, and liquefied natural gas facility construction. It also oversees operation of pipeline facilities at U.S. points of entry for natural gas imports and exports and analyzes environmental impacts of natural gas projects.

Once natural gas pipeline projects are operating, the Department of Transportation's Pipeline and Hazardous Material Safety Administration (PHMSA), acting through the Office of Pipeline Safety (OPS), regulates, monitors and enforces safety. The OPS collaborates with partnering agencies and departments to ensure pipeline operation safety, security, monitoring and compliance. As of June 2010, 88 full-time PHMSA pipeline inspectors were employed to conduct the comprehensive OPS inspection and enforcement program to ensure that pipeline operators comply with all safety regulations.³

Although the federal government is responsible for developing, issuing and enforcing pipeline safety regulations, most inspections are conducted by state regulatory agencies, which are responsible for regulation, inspection and enforcement of pipelines within state boundaries. The state agency regulations must be at least as stringent as the federal regulations. Many states experience more pipeline-related incidents than others, however, and may wish to consider strengthening their oversight standards.

OPS or PHMSA certifies state agencies annually to perform their regulatory duties, and OPS also can authorize states to inspect interstate pipelines, although it retains enforcement responsibilities. Arizona, Connecticut, Iowa, Michigan, Minnesota, New York, Ohio, Washington and West Virginia are authorized to act as interstate agents.

Recent accidents and increasing dependence on U.S. natural gas supplies have sharpened concern for pipeline security and safety. After a natural gas pipeline explosion in California in September 2010, state lawmakers discussed changing state law to increase oversight of natural gas pipelines during a legislative hearing in October 2010. Several incidents in Pennsylvania raise questions about the safety of the nation's massive, aging infrastructure. Investigators are seeking the exact trigger of the most recent explosion, and at least three pending pieces of legislation in Pennsylvania (HB 102, SB 325 and HB 344) would provide for civil penalties for gas pipeline safety violations and regulation of certain operators.

Alaska and Hawaii are the only states completely regulated by OPS. Table 2 in the Appendix outlines which state agencies regulate interstate and intrastate gas and hazardous liquid pipelines.

PHMSA recently released a report that includes 56 recommendations to guide key stakeholders such as local government, property owners, pipeline operators, and real estate commissions on how to improve their safety efforts. The report focuses on transparency and information-sharing. (To access its full text, visit <http://primis.phmsa.dot.gov/comm/publications/PIPA/PIPA-Report-Final-20101117.pdf>.)

Pipeline Accidents

Although pipeline incidents have decreased, measures of risk—an increase in overall population, energy consumption and pipeline mileage—have risen. PHMSA defines a serious incident as an event involving a fatality or injury requiring in-patient hospitalization. During the last two decades, pipeline incidents involving death declined 50 percent,⁴ but 1,087 serious pipeline incidents occurred. Ninety-one percent were related to gas pipelines; of these, 78 percent were related to gas distribution lines.⁵

Significant incidents—a subset of serious incidents—incur consequences such as fatality or injury requiring in-patient hospitalization, \$50,000 or more in total costs (1984 dollars), or liquid release resulting in a fire or explosion. During the last 20 years, 364 fatalities and 3,406 injuries occurred.

To see significant incident data (2000-2009) by state including total number of incidents, average per year, total number of fatalities, distribution of incidents by type of pipeline and total resulting property damage, see Table 3 in the Appendix. Louisiana data may appear abnormal due to incidents related to Hurricane Katrina.

Federal reporting standards are similar throughout the United States and, although states do not submit reports to PHMSA or OPS, pipeline operators report incidents directly. As pipeline mileage increases, so do accidents; however, the number of significant incidents in some states were more than double that

of other states with comparable gas pipeline mileage. The total number of significant incidents that occurred from 2000-2009 ranged from one in New Hampshire to 531 in Texas, with a median of 30. The data do not reflect pipeline mileage differences between states, however. The next section, *Natural Gas as an Expanding Industry*, explores key variations and relationships between incidents and pipeline mileage.

Natural Gas as an Expanding Industry

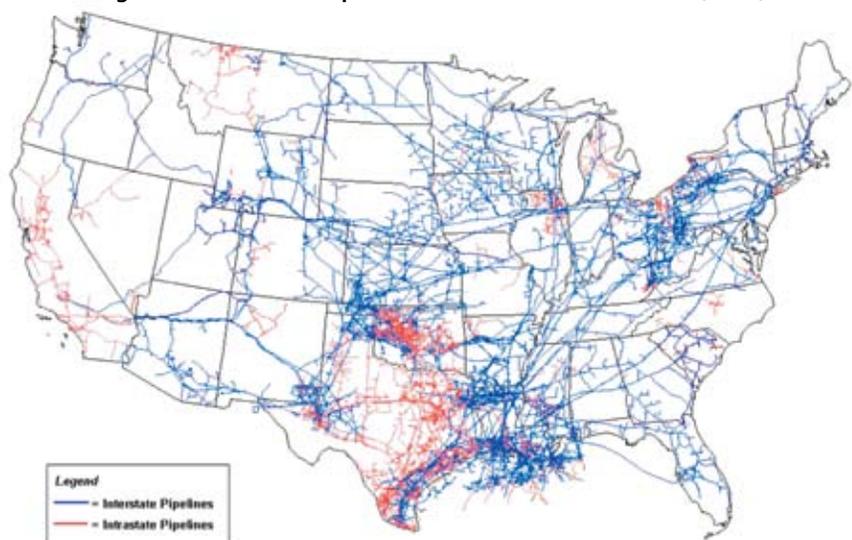
- Interstate vs. Intrastate
- Variation of Incidents Despite Similar Inspection Efforts
- Population Density and Pipeline Mileage per Square Foot of Land

In 2008, 72 percent of North America's natural gas supply was produced in the United States, 21 percent in Canada and 6 percent in Mexico.⁶ The U.S. natural gas pipeline grid that delivers this supply encompasses:

- 305,000 miles of interstate and intrastate transmission pipelines with 1,400 compressor stations,
- more than 11,000 delivery points,
- 5,000 receipt points,
- 1,400 interconnection points,
- 400 underground storage facilities, and
- 24 hubs or market centers.

Two-thirds of the lower 48 states depend almost entirely on interstate pipeline systems for natural gas supplies.^{7,8} Figure 1 illustrates this intricate network.

Figure 1. Natural Gas Pipeline Network—Lower 48 States (2009)

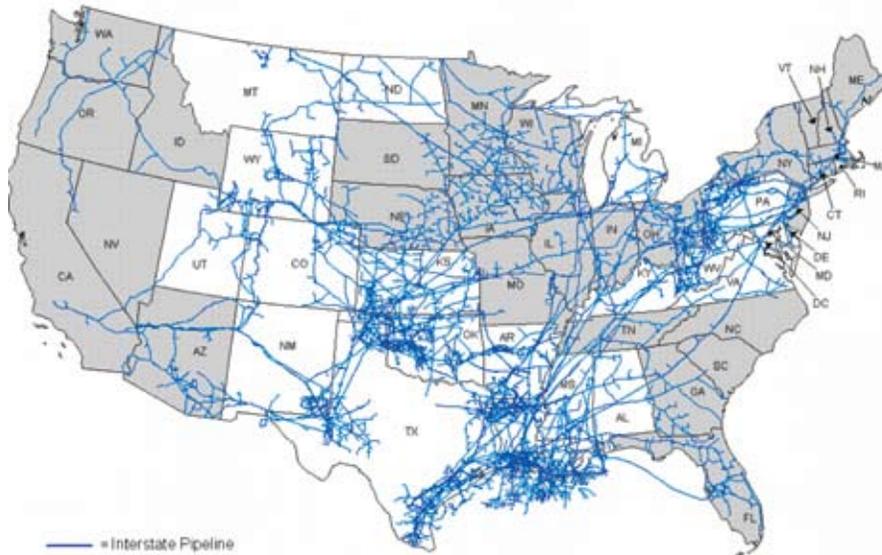


Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System

Interstate

About 71 percent of all U.S. natural gas transmission is made up of interstate natural gas pipeline. In Figure 2, the 31 states in grey obtain at least 85 percent of their natural gas from the interstate network.

Figure 2. Interstate Natural Gas Supply Dependency (2007)



Note: EIA determines state's relative dependence on the interstate natural gas pipeline network for suppliers by calculating the level of natural gas consumed within the state (2007) relative to the amount of natural gas produced within the state. If no natural gas is produced within the state, it depends entirely on the interstate network.

Source: U.S. Energy Information Administration, Form EIA176 "Annual Report of Natural Gas and Supplemental Gas Supply and Disposition," *About U.S. Natural Gas Pipelines, Transporting Natural Gas*: http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/dependstates_map.html, n.d.

Intrastate

In the lower 48 states, more than 90 intrastate natural gas pipelines link producers to local markets and the interstate pipeline network. As the top natural gas consuming state, Texas' intrastate pipelines account for 45,000 miles of its 58,000 miles of natural gas pipelines. California, ranked second for natural gas consumption, is dominated by only a few distribution companies, including Southern California Gas (SoCal) and California Gas Transmission Company (PG&E)—two of the nation's largest distribution companies.

Variation of Incidents Despite Similar Inspection Efforts

All states except Alaska and Hawaii conduct natural gas pipeline inspections and report efforts as *Inspection Person Days*, the number of days spent in the field conducting inspections. Data reveal that, in 2009, *Inspection Person Days* varied from 62 in Maine to 4,368 in New York with a median of 499.⁹

Pipeline mileage varies substantially across states, however, and *Inspection Person Days* per mile of pipeline may be a more accurate reflection of inspection activity since it indicates how much time states spend inspecting comparable lengths of pipeline. *Inspection Person Days per 1,000 Miles of Natural Gas Transmission Pipeline* ranges from 26 in Montana to 1,305 in Rhode Island, a 50-fold difference, with a median of 107. To access this data, see Table 4 in the Appendix. Alaska and Hawaii are omitted since the Office of Pipeline Safety (OPS) regulates, enforces and inspects all activity there, and the District of Columbia is not included.

NCSL's analysis reveals that states that dedicate less time to inspections generally experience more significant incidents, which suggests that more inspection time results in less incidents. On average, states with less than 400 *Inspection Person Days* a year experienced 1.55 significant accidents per 1,000 miles of pipeline, whereas states with more than 400 *Inspection Person Days* experi-

enced an average of 0.9 significant incidents, a 41 percent decrease. When an outlier state is omitted from the analysis, the decline is even more substantial—resulting in a 75 percent decrease.

However, some states experience more incidents than those that devote similar amounts of time for inspections. For example, the 22 states dedicating less than 100 *Inspection Person Days* a year experienced between 0.41 and 4.60 significant incidents per 1,000 miles of pipeline. Regulators in some states may want to consider ensuring proper inspection practices, possibly through more stringent rules and regulations rather than by allotting more time to inspection.

Figure 3 in the Appendix illustrates the relationship between *Inspection Person Days per 1,000 Miles of Natural Gas Pipeline* and *Gas Transmission Significant Accidents per 1,000 Miles of Gas Transmission Pipeline*.

Population Density and Pipeline Mileage per Square Foot of Land

Data reveal substantial variation among the number of significant incidents involving all gas pipelines when compared to population density and pipeline mileage per square foot of land (pipeline density). A positive relationship exists, however, between significant incidents and natural gas transmission pipeline density, which indicates that states with higher pipeline density may require more stringent oversight. This relationship does not hold for population density. To access this dataset, please see Table 5 in the Appendix. Figure 4 in the Appendix illustrates the relationship between incidents and pipeline density.

State and Federal Action

State Action

In 2010, at least 11 states considered and four states enacted legislation related to pipeline safety. Most bills would improve pipeline security and create committees to study safety concerns, increase penalties for safety violations, or upgrade emergency response plans. Some encourage infrastructure development and seek tax incentives to increase natural gas pipeline capacity.

- **Alaska** adopted two resolutions to encourage pipeline development. One (HCR 2) requests the governor to pursue development of a natural gas pipeline to provide energy security, and SCR 21 requires development of an in-state natural gas pipeline plan.
- In **California**, a pending bill (AB 56) would make the Public Utilities Commission responsible for development, submission and administration of a state pipeline safety program certification for natural gas pipelines. Senate Bill 44, also pending, would require the Public Utilities Commission to establish response standards for owners or operators of commission-regulated gas pipeline facilities. Response plans must be compatible with federal regulations.
- **Hawaii** enacted Senate Bill 880, repealing the Public Utilities Commission's responsibility for pipeline safety and inspection functions, since this has been the responsibility of the Federal Office of Pipeline Safety since 1993.
- In **Illinois**, House Bill 6130 and Senate Bill 1927 would require the Commerce Commission to annually inspect all pipelines in the state that transport carbon dioxide to ensure their safety and feasibility. As often as deemed necessary, the commission would monitor and conduct investigations, and the operator must cooperate.
- **Michigan** considered five-pipeline related bills in 2010. House Bill 6502 and Senate Bill 1542, still pending, would require notification of the Department of Natural Resources and Environment in the event of a pipeline spill. House Bill 6504, also pending, would ensure that siting of a pipeline would not likely adversely affect public health, safety or welfare, or the environment. Senate Bill 1549, pending, relates to petroleum pipeline operating permits, and Senate Bill 1565 would modify environmental cleanup procedures relating to releases of regulated substances into soil or groundwater from an underground storage tank.
- **Nebraska's** LR 435 provided for an interim study resolution to examine oil and natural gas pipeline issues in the state.
- In **New York**, four pending bills deal with oil or natural gas pipelines. Senate Bill 3761 would provide penalties for gas safety violations. AB 8442 relates to penalties for gas safety violations and would increase the related civil penalty. One bill, AB 542, would prohibit oil or natural gas drilling operations or pipelines on or beneath certain water sources, and AB 8456 would establish environmental safety permits for liquefied natural gas facilities.
- **Ohio** is considering a bill (SB 152) that would create the Underground Protection Commission of Ohio and the State Underground Protection Advisory Committee; it would require compliance of the public safety program for interstate pipelines. The bill also would make a facility responsible for repairing damages and liable for injury of people or property resulting from damaged underground utility facilities. Another bill (SB 196) would modify environmental and safety standards and provide for leak, spill and explosion warning systems. Ohio revised the Oil and Gas Law in SB 165 relating to pipelines.
- **Oklahoma** enacted two bills (SB 300 and SB 2169). One authorizes promulgation of rules relating to an incident on a gathering pipeline unit not subject

to certain safety regulations. The other creates the Task Force on Tax Incentives to Increase Natural Gas Pipeline Capacity. It directs the task force to study current tax incentives available to the natural gas pipeline transmission industry.

- A failed bill in **Pennsylvania** (HB 744) would have provided requirements for natural gas distribution companies with regard to operation and maintenance of service lines. HB 1128 would have increased civil penalties for gas pipeline safety violations. House Bill 2693, which also failed, would have regulated operators that transport gas and hazardous liquids and provided civil penalties for gas pipeline safety violations. A pending bill (SB 1045) would authorize the commonwealth to join the Mid-Atlantic Area Natural Gas Corridor Compact to promote regional cooperation in the location, approval and construction of cross-border natural gas pipelines in the Mid-Atlantic region by development of a regional pipeline siting council.
- **Tennessee** enacted SB 2912, which includes carbon dioxide transported via interstate pipeline in provisions stating that pipeline corporations do not confer upon the State Regulatory Authority any power to adopt standards for pipeline systems or transportation of gas subject to the jurisdiction of the federal power commission, as prohibited in the Natural Gas Pipeline Safety Act.

So far in 2011, legislators in California, Hawaii, Nebraska, New York, Oklahoma, Pennsylvania, South Carolina, South Dakota and Texas have introduced bills relating to gas pipeline safety:

- In **California**, SB 216 would designate the Public Utilities Commission as the state authority responsible for administering a state pipeline safety program for natural gas pipelines. The PUC would implement and enforce a one-call notification program, and evaluate current practices to determine if new standards should be adopted to enhance public safety in regards to location of pipelines and use of block valves.
- Recognizing that **Hawaii** is one of only two states without state oversight of natural gas pipeline safety, policymakers introduced SB 84 and HB 481, which would authorize the public utilities commission to establish, inspect and enforce safety standards consistent with federal safety standards for gas pipelines.

- A pending bill in **Nebraska** (LB 340) would adopt the Hazardous Liquid Pipeline Notification Act to ensure that the state considers protection of natural resources, socioeconomic impacts, public disclosure and opportunity for public input when installing pipelines. Also pending in Nebraska, LB 578 and LB 629 address pipeline issues.
- Assembly Bill 1238 in **New York** (pending) would establish environmental safety permit requirements for liquefied natural gas facilities.
- In **Oklahoma**, House Bill 1424 would grant the Corporation Commission power to enforce maintenance and operation standards for certain pipelines.
- **Pennsylvania's** pending HB 102 would raise a certain civil penalty maximum for gas pipeline safety violations from \$10,000 to \$100,000. Similarly, SB 325 and HB 344 would further impose civil penalties for violations.
- **South Carolina** is considering HB 3100, which would establish a committee to review minimum safety standards for natural gas pipeline facilities and transportation of natural gas. The committee would make recommendations to improve facility design, installation, inspection, testing, construction, extension, replacement and maintenance.
- Senate Bill 23 in **South Dakota** would amend pipeline safety inspection regulations by updating certain citations to federal regulations.
- Legislation in **Texas**, HB 1124, relates to gas pipeline safety requirements in certain counties.

Federal Action

The U.S. Congress is taking the most comprehensive approach to address pipeline safety issues in three pending bills. Senate Bill 3824 would strengthen the Pipeline Safety and Enforcement Act to provide for enhanced safety and environmental protection in pipeline transportation and reliability in the transportation of energy products by pipeline. The resolution also would increase the number of full-time equivalent employees of the Pipeline Hazardous Materials Safety Administration by at least 100 compared to the current number.

Senate Bill 3856 would create the Pipeline Transportation Safety Improvement Act of 2010 and provide enhanced safety and environmental protection in pipeline transportation and reliability in the transportation of energy products by pipeline. The bill would provide

minimum pipeline standards and civil penalties for major violations. House Resolution 6295 also would enhance pipeline safety and provide communities with access to improved information concerning the equipment and operations of pipeline facilities.

Conclusion

Ensuring pipeline reliability and safety is critical as more natural gas is transported across the country. Although it may be difficult to compare safety across states since rules for resource transportation, pipeline construction, testing and inspection differ, pipeline incidents reported are comparable. Variation in the number of accidents, despite similar time spent on inspections, may reflect deficiencies in state regulations, oversight or reporting requirements. Data reveal that states with more natural gas transmission pipeline mileage per square mile of land experience more significant accidents, and, generally, states that spend more time per mile of pipeline on inspections experience fewer incidents. As the nation's pipeline network continues to expand, states may need to develop more stringent pipeline safety and inspection regulations.

Additional Resources

The Pipeline and Hazardous Materials Safety Administration's pipeline safety regulations: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?sid=ca3d88e943c9b3619f96ac3d22f1c200&c=ecfr&tpl=/ecfrbrowse/Title49/49cfrv3_02.tpl%20.

To learn more about the role of the Office of Pipeline Safety (OPS) within the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA), and to gather state pipeline and incident data, see <http://primis.phmsa.dot.gov/comm/Index.htm?nocache=9124>.

To learn more about the Federal Energy Regulatory Commission's (FERC) specific duties, visit www.ferc.gov/industries/gas.asp.

Appendix

Table 1. Pipeline Mileage in the United States

State/ Jurisdiction	Hazardous Liquid ¹	Gas Transmission	Gas Gathering	Gas Distribution ²	Total	Total Gas Pipeline Mileage
Alabama	2,193	7,004	507	29,727	39,431	37,238
Alaska	1,168	833	73	2,929	5,003	3,835
Arizona	699	6,596	25	23,680	31,000	30,301
Arkansas	1,761	7,386	584	19,558	29,289	27,528
California	6,926	12,414	403	102,475	122,218	115,292
Colorado	2,690	8,093	621	33,754	45,158	42,468
Connecticut	85	584	0	7,591	8,260	8,175
Delaware	48	284	0	2,773	3,105	3,057
Florida	471	4,843	0	25,017	30,331	29,860
Georgia	2,109	4,360	0	42,591	49,060	46,951
Hawaii	96	45	0	610	751	655
Idaho	659	1,533	0	7,737	9,929	9,270
Illinois	6,961	9,738	1	60,744	77,444	70,483
Indiana	3,470	5,101	12	39,586	48,169	44,699
Iowa	4,161	7,926	0	17,437	29,524	25,363
Kansas	9,476	14,692	194	21,933	46,295	36,819
Kentucky	903	7,089	543	16,881	25,416	24,513
Louisiana*	16,208	31,158	5,417	25,579	78,362	62,154
Maine	340	429	0	656	1,425	1,085
Maryland	369	921	0	14,179	15,469	15,100
Massachusetts	91	1,096	0	21,027	22,214	22,123
Michigan	2,879	9,303	337	55,096	67,615	64,736
Minnesota	3,876	5,468	0	29,369	38,713	34,837
Mississippi	4,235	10,866	107	15,459	30,667	26,432
Missouri	4,936	4,605	0	26,422	35,963	31,027
Montana	3,048	5,307	107	7,156	15,618	12,570
Nebraska	2,822	5,838	6	12,238	20,904	18,082
Nevada	209	1,708	0	9,548	11,465	11,256
New Hampshire	104	239	0	1,830	2,173	2,069
New Jersey	560	1,475	0	33,086	35,121	34,561
New Mexico	6,184	6,241	458	13,594	26,477	20,293
New York	1,070	4,341	534	47,331	53,276	52,206
North Carolina	1,123	3,858	0	27,906	32,887	31,764
North Dakota	1,931	2,132	2	2,898	6,963	5,032
Ohio	3,732	10,194	1,137	56,207	71,270	67,538
Oklahoma	10,610	12,772	976	24,439	48,797	38,187
Oregon	430	2,385	0	15,006	17,821	17,391

Table 1. Pipeline Mileage in the United States (continued)

Jurisdiction	Hazardous Liquid ¹	Gas Transmission	Gas Gathering	Gas Distribution ²	Total	Total Gas Pipeline Mileage
Pennsylvania	2,532	10,324	510	47,051	60,417	57,885
Rhode Island	17	95	0	3,124	3,236	3,219
South Carolina	808	2,631	0	19,884	23,323	22,515
South Dakota	521	1,655	0	4,371	6,547	6,026
Tennessee	1,135	4,832	0	36,712	42,679	41,544
Texas	56,375	66,918	6,659	92,333	222,285	165,910
Utah	1,509	3,621	5	15,968	21,103	19,594
Vermont	175	70	0	646	891	716
Virginia	1,128	2,950	10	20,127	24,215	23,087
Washington	796	1,946	0	21,464	24,206	23,410
West Virginia	171	3,941	608	10,309	15,029	14,858
Wisconsin	1,822	4,326	0	36,951	43,099	41,277
Wyoming	5,720	6,610	154	4,721	17,205	11,585
District of Columbia	4	20	0	1,192	1,216	1,212
Median	1168	4,360	1	19,884	26,477	24,513

Notes:

1. Derived from the National Pipeline Mapping System by PHMSA (October 2010). *Hazardous Liquids* are liquids considered dangerous to human health or safety or the environment when used incorrectly. Petroleum (and petroleum products) or anhydrous ammonia are identified as hazardous liquids for pipeline safety regulations (49CFR 195.2).¹

2. Gas distribution service lines (which connect distribution lines to the end users) are not included in this mileage.

Source: Office of Pipeline Safety, PHMSA Pipeline Safety Program (Washington, D.C.: U.S. Department of Transportation, n.d.); <http://primis.phmsa.dot.gov/comm/>.

Table 2. Pipeline Regulation

State/ Jurisdiction	Agency	Interstate Gas		Intrastate Gas		Interstate Hazardous Liquid		Intrastate Hazardous Liquid	
		OPS	State	OPS	State	OPS	State	OPS	State
Alabama	Gas Pipeline Safety Section, PUC	X			X	X			X
Alaska	All OPS-regulated	X		X		X		X	
Arizona	Pipeline Safety Section, Gas Services Division, Arizona Corporate Commission		X		X		X		X
Arkansas	Pipeline Safety Section, PSC	X			X	X		X	
California	California Office of the State Fire Marshal	X			X		X		X
Colorado	Gas Pipeline Safety Division, PUC	X			X	X		X	
Connecticut	PUC		X		X	X		X	
Delaware	PSC	X		Agreement	X	X		X	
Florida	PUC	X			X	X		X	
Georgia	Pipeline Safety Office, PUC	X			X	X		X	
Hawaii	All OPS-regulated	X		X		X		X	
Idaho	Gas Pipeline Safety Division, PUC	X			X	X		X	
Illinois	Pipeline Safety Division, Illinois Commerce Commission	X			X	X		X	
Indiana	Pipeline Safety Division, Indiana Utility Regulatory Commission	X			X	X		X	
Iowa	Safety and Engineering Section, Iowa Utilities Board		X		X	X		X	
Kansas	Pipeline Safety Division, Kansas Commerce Commission	X			X	X		X	
Kentucky	Gas Branch, PUC	X			X	X		X	Agreement
Louisiana	Office of Conservation, Louisiana Department of Natural Resources	X			X	X			X

Table 2. Pipeline Regulation (continued)									
State/ Jurisdiction	Agency	Interstate Gas		Intrastate Gas		Interstate Hazardous Liquid		Intrastate Hazardous Liquid	
		OPS	State	OPS	State	OPS	State	OPS	State
Maine	Gas Safety Division, PUC	X			X	X		X	
Maryland	Pipeline Safety Division, PUC	X			X	X			X
Massachusetts	Pipeline Engineering/Safety Division, Massachusetts Department of Telecommunications and Energy	X			X	X		X	
Michigan	Gas Safety Office, PUC		X		X	X		X	
Minnesota	Office of Pipeline Safety, State Fire Marshal Division, Minnesota Department of Public Safety		X		X		X		X
Mississippi	PUC	X			X	X			X
Missouri	Gas Safety and Engineering Division, PUC	X			X	X		X	
Montana	Gas Pipeline Safety Division, PUC	X			X	X		X	
Nebraska	Deputy State Fire Marshals, Fuels Division, Nebraska State Fire Marshals Office	X			X	X		X	
Nevada	Gas Pipeline Safety Division, PUC	X			X	X		X	
New Hampshire	Pipeline Safety Division, PUC	X			X	X		X	

Table 2. Pipeline Regulation (continued)

State/ Jurisdiction	Agency	Interstate Gas		Intrastate Gas		Interstate Hazardous Liquid		Intrastate Hazardous Liquid	
		OPS	State	OPS	State	OPS	State	OPS	State
New Jersey	Bureau of Pipeline Safety, New Jersey Board of Public Utilities	X			X	X		X	
New Mexico	Pipeline Safety Bureau, Transportation Division, New Mexico Public Regulation Commission	X			X	X			Agreement
New York	Office of Gas and Water, New York State Department of Public Service		X		X		X		X
North Carolina	Pipeline Safety Section, North Carolina Utility Commission	X			X	X		X	
North Dakota	Testing and Safety Division, PSC	X			X	X		X	
Ohio	Gas Pipeline Safety Section, PUC		X		X	X		X	
Oklahoma	Pipeline Safety Section, Gas Services Division, Oklahoma Corporation Commission	X			X	X			X
Oregon	Gas Pipeline Safety Division, PUC	X			X	X		X	
Pennsylvania	Gas Safety Division, Bureau of Transportation and Safety, PUC	X			X	X		X	
Rhode Island	Gas Safety Division, PUC	X			X	X		X	
South Carolina	Pipeline Safety Office, PUC	X			X	X			Agreement
South Dakota	Pipeline Safety Division, PUC	X			X	X		X	

Table 2. Pipeline Regulation (continued)

State/ Jurisdiction	Agency	Interstate Gas		Intrastate Gas		Interstate Hazardous Liquid		Intrastate Hazardous Liquid	
		OPS	State	OPS	State	OPS	State	OPS	State
Tennessee	Gas Pipeline Safety Division, Tennessee Regulatory Authority	X			X	X		X	
Texas	Pipeline Safety Section, Gas Services Division, Texas Railroad Commission	X			X	X			X
Utah	Gas Pipeline Safety Division, PUC	X			X	X		X	
Vermont	Director of Engineering, Vermont Department of Public Service	X			X	X		X	
Virginia	Division of Utility and Railroad Safety, Virginia State Corporation Commission	X			X		X		X
Washington	Washington Utilities and Transportation Commission		X		X		X		X
West Virginia	West Virginia Public Service Commission		X		X	X			X
Wisconsin	Pipeline Safety Program, Natural Gas Division, Wisconsin Public Service Commission	X			X	X		X	
Wyoming	Gas Pipeline Safety Division, PUC	X			X	X		X	
District of Columbia	PUC	X			X	X		X	

Source: Office of Pipeline Safety, PHMSA Pipeline Safety Program (Washington, D.C.: U.S. Department of Transportation, n.d.); <http://primis.phmsa.dot.gov/comm/>.

Table 3. Significant Incidents (2000-2009)¹

State/ Jurisdiction	Total	Average (per year)	Fatalities (total)	Hazardous Liquid	Gas Transmission	Gas Gathering	Gas Distribution	Property Damage (total 2009 \$)
Alabama	39	4	7	13	11	0	15	\$8,317,577
Alaska	21	2	0	5	1	1	14	\$13,407,236
Arizona	38	4	2	3	8	0	27	\$2,296,511
Arkansas	37	4	5	10	16	0	11	\$5,344,660
California	177	18	9	88	22	2	65	\$111,273,890
Colorado	43	4	1	14	9	0	20	\$18,207,937
Connecticut	12	1	2	3	0	0	9	\$6,140,784
Delaware	3	0	0	1	0	0	2	\$1,053,705
Florida	24	2	2	5	10	0	9	\$8,528,897
Georgia	44	4	1	18	6	0	20	\$18,763,347
Hawaii	5	1	0	4	0	0	1	\$1,382,826
Idaho	11	1	1	3	7	0	1	\$2,834,260
Illinois	117	12	2	66	15	0	36	\$58,696,756
Indiana	46	5	7	15	10	0	21	\$19,464,585
Iowa	37	4	0	24	7	0	6	\$9,884,631
Kansas	118	12	3	75	29	0	14	\$61,461,844
Kentucky	29	3	2	8	12	1	8	\$62,839,405
Louisiana*	226	23	6	93	101	21	11	\$1,134,371,904
Maine	3	0	0	1	0	0	2	\$557,885
Maryland	32	3	1	1	5	0	26	\$73,996,245
Massachusetts	21	2	4	3	0	0	18	\$8,154,568
Michigan	62	6	5	15	12	1	34	\$23,586,090
Minnesota	57	6	5	28	7	0	22	\$36,095,320
Mississippi	49	5	6	16	24	0	9	\$13,863,396
Missouri	42	4	2	14	9	0	19	\$17,517,454
Montana	17	2	1	10	2	0	5	\$8,991,874
Nebraska	23	2	2	7	7	0	9	\$5,015,096
Nevada	13	1	1	2	2	0	9	\$6,895,130
New Hampshire	1	0	0	0	0	0	1	\$591,190
New Jersey	32	3	2	10	4	0	18	\$14,255,769
New Mexico	58	6	15	31	5	1	21	\$7,247,444
New York	43	4	13	7	4	0	32	\$17,367,582
North Carolina	28	3	1	7	4	0	17	\$14,094,015
North Dakota	15	2	0	12	1	0	2	\$6,185,034
Ohio	74	7	6	29	11	0	34	\$36,556,331
Oklahoma	113	11	3	84	18	0	11	\$40,457,734
Oregon	12	1	3	2	1	0	9	\$2,671,987
Pennsylvania	117	12	10	26	27	0	64	\$70,632,471
Rhode Island	6	1	0	1	0	0	5	\$789,362
South Carolina	5	1	0	1	1	0	3	\$1,422,874
South Dakota	5	1	0	1	2	0	2	\$1,511,823
Tennessee	16	2	0	3	2	0	11	\$84,118,516
Texas	531	53	15	345	112	16	58	\$364,906,600

Table 3. Significant Incidents (2000-2009)¹ (continued)

State/ Jurisdiction	Total	Average (per year)	Fatalities (total)	Hazardous Liquid	Gas Transmission	Gas Gathering	Gas Distribution	Property Damage (total 2009 \$)
Utah	24	2	2	9	3	0	12	\$7,443,279
Vermont	1	0	0	0	0	0	1	\$205,536
Virginia	38	4	2	7	3	0	28	\$51,174,094
Washington	19	2	1	4	7	0	8	\$4,992,460
West Virginia	19	2	4	1	12	1	5	\$5,819,593
Wisconsin	30	3	4	10	6	0	14	\$16,420,926
Wyoming	40	4	3	28	10	0	2	\$6,310,816
District of Columbia	3	0	0	0	0	0	3	\$342,244
Median	30	3	2	8	6	0	11	\$8,991,874

Note:

1. PHMSA defines significant incidents as those reported by pipeline operators with the following conditions: a) fatality or injury requiring in-patient hospitalization; b) \$50,000 or more in total costs (1984 dollars); c) highly volatile liquid releases of five or more barrels or other liquid releases of 50 barrels or more; d) liquid release results in fire or explosion. Significant incidents include all serious incidents.

Source: Office of Pipeline Safety, PHMSA Pipeline Safety Program (Washington, D.C.: U.S. Department of Transportation, n.d.); <http://primis.phmsa.dot.gov/comm/>.

Table 4. Natural Gas Pipeline Inspection (2009)

State	Natural Gas Inspection Person Days ¹	Inspection Person Days per 1,000 Miles of Gas Transmission Pipeline	Significant Accidents per 1,000 Miles of Gas Transmission Pipeline ²
Alabama	1128	161.7	1.58
Arizona	1266	194.6	1.23
Arkansas	645	85.5	2.12
California	787	65.9	1.84
Colorado	395.4	48.9	1.11
Connecticut	342	585.6	0.00
Delaware	87	289.0	0.00
Florida	996	204.5	2.05
Georgia	1009	228.1	1.36
Idaho	135	88.8	4.60
Illinois	928.5	97.8	1.58
Indiana	771.5	144.7	1.88
Iowa	404.8	48.7	0.84
Kansas	850	58.9	2.01
Kentucky	463	62.9	1.63
Louisiana	1358	45.1	3.36
Maine	62	144.2	0.00
Maryland	495.7	516.4	5.21
Massachusetts	844.5	764.3	0.00
Michigan	502	56.0	1.34
Minnesota	596.01	107.7	1.26
Mississippi	553.5	50.7	2.20
Missouri	584	124.3	1.92
Montana	99	25.7	0.52
Nebraska	382	65.6	1.20
Nevada	802	477.9	1.19
New Hampshire	171.5	708.7	0.00
New Jersey	398	273.0	2.74
New Mexico	535	81.9	0.77
New York	4368	960.4	0.88
North Carolina	473	120.7	1.02
North Dakota	94	43.7	0.46
Ohio	1630	159.3	1.08
Oklahoma	1030	78.5	1.37
Oregon	372	155.4	0.42
Pennsylvania	1041	104.3	2.71
Rhode Island	124	1305.3	0.00
South Carolina	319	120.7	0.38

Table 4. Natural Gas Pipeline Inspection (2009) (continued)

State	Natural Gas Inspection Person Days ¹	Inspection Person Days per 1,000 Miles of Gas Transmission Pipeline	Significant Accidents per 1,000 Miles of Gas Transmission Pipeline ²
South Dakota	116.5	71.7	1.23
Tennessee	445	90.8	0.41
Texas	2768	50.4	2.04
Utah	270	74.9	0.83
Vermont	92	1295.8	0.00
Virginia	1542.1	522.6	1.02
Washington	636.14	329.4	3.63
West Virginia	420	106.2	3.03
Wisconsin	434	96.3	1.33
Wyoming	177.33	27.2	1.54
Median	498.85	106.9	1.2

Notes:

1. Inspection person days represent the number of days spent in the field conducting inspections. Some states such as Virginia may have included inspection person days for enforcing Damage Prevention Laws

2. PHMSA Pipeline Safety Program and author's calculations

Source: Inspection Person Days provided by PHMSA, obtained from 2010 certification documents reporting activity for 2009.

Table 5. Natural Gas Transmission Pipeline Mileage and Incidents

State	Natural Gas Transmission (NGT) Pipeline Mileage (2010) ¹	NGT Mileage per Square Foot of Land ²	Population per Square Mile of Land ³	Population Density (population per sq. mile) per Mile of NGT Pipeline	Gas Transmission Significant Incidents (2000-2009)
Alabama	6,976	0.137	92.79	0.013	11
Arizona	6,507	0.057	58.04	0.009	8
Arkansas	7,543	0.145	55.49	0.007	16
California	11,940	0.077	237.00	0.020	22
Colorado	8,090	0.078	48.45	0.006	9
Connecticut	584	0.121	726.20	1.243	0
Delaware	301	0.154	453.08	1.505	0
Florida	4,871	0.090	343.76	0.071	10
Georgia	4,424	0.076	169.74	0.038	6
Idaho	1,521	0.018	18.68	0.012	7
Illinois	9,497	0.171	232.27	0.024	15
Indiana	5,333	0.149	179.08	0.034	10
Iowa	8,308	0.149	53.84	0.006	7
Kansas	14,424	0.176	34.45	0.002	29
Kentucky	7,366	0.185	108.59	0.015	12
Louisiana	30,093	0.691	103.12	0.003	101
Maine	430	0.014	42.72	0.099	0
Maryland	960	0.098	583.14	0.607	5
Massachusetts	1,105	0.141	841.02	0.761	0
Michigan	8,970	0.158	175.51	0.020	12
Minnesota	5,535	0.070	66.15	0.012	7
Mississippi	10,911	0.233	62.93	0.006	24
Missouri	4,697	0.068	86.92	0.019	9
Montana	3,856	0.026	6.70	0.002	2
Nebraska	5,826	0.076	23.37	0.004	7
Nevada	1,678	0.015	24.07	0.014	2
New Hampshire	242	0.027	147.70	0.610	0
New Jersey	1,458	0.197	1,173.97	0.805	4
New Mexico	6,534	0.054	16.56	0.003	5
New York	4,548	0.096	413.89	0.091	4
North Carolina	3,919	0.080	192.58	0.049	4
North Dakota	2,152	0.031	9.38	0.004	1
Ohio	10,232	0.250	281.88	0.028	11
Oklahoma	13,124	0.191	53.69	0.004	18
Oregon	2,394	0.025	39.85	0.017	1
Pennsylvania	9,980	0.223	281.25	0.028	27
Rhode Island	95	0.091	1,007.92	10.610	0
South Carolina	2,644	0.088	151.49	0.057	1
South Dakota	1,625	0.021	10.71	0.007	2

Table 5. Natural Gas Transmission Pipeline Mileage and Incidents (continued)

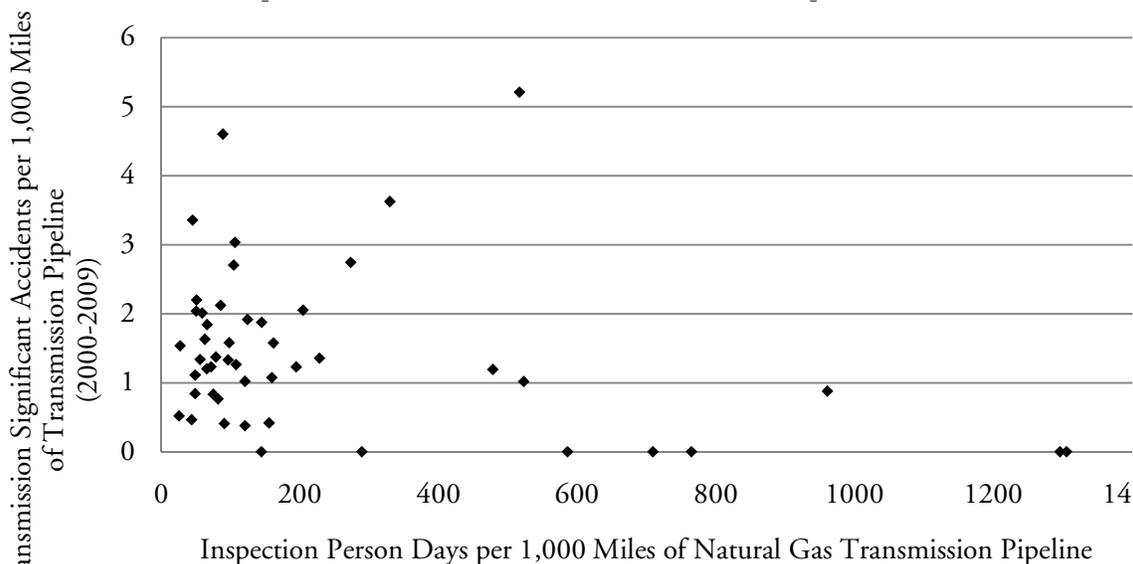
State	Natural Gas Transmission (NGT) Pipeline Mileage (2010) ¹	NGT Mileage per Square Foot of Land ²	Population per Square Mile of Land ³	Population Density (population per sq. mile) per Mile of NGT Pipeline	Gas Transmission Significant Incidents (2000-2009)
Tennessee	4,901	0.119	152.76	0.031	2
Texas	54,933	0.210	94.66	0.002	112
Utah	3,605	0.044	33.90	0.009	3
Vermont	71	0.008	67.22	0.947	0
Virginia	2,951	0.075	199.09	0.067	3
Washington	1,931	0.029	100.15	0.052	7
West Virginia	3,955	0.164	75.58	0.019	12
Wisconsin	4,507	0.083	104.12	0.023	6
Wyoming	6,510	0.067	5.61	0.001	10
Median	4,623	0.089	97.40	0.019	7

Notes:

1. Office of Pipeline Safety, PHMSA Pipeline Safety Program (Washington, D.C.: U.S. Department of Transportation, n.d.); <http://primis.phmsa.dot.gov/comm/>.
2. Author's calculations from most current land area estimates extracted from U.S. Census Bureau (2000), 2010.
3. Author's calculations from most current population estimates (July 2009) extracted from U.S. Census Bureau, 2010.

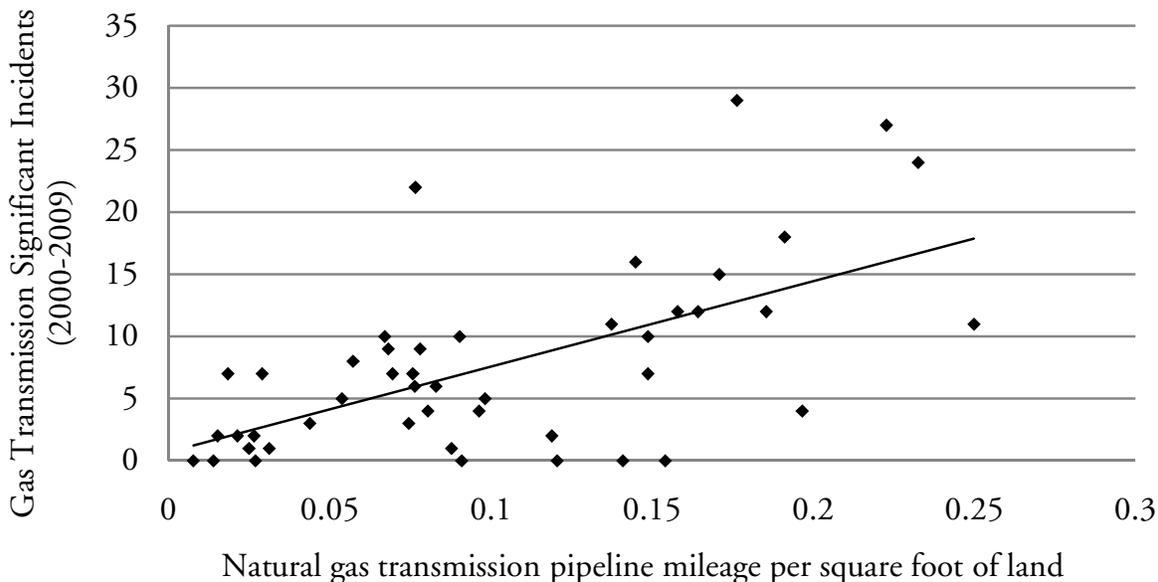
Source: PHMSA Pipeline Safety Program, U.S. Census Bureau, and author's calculations, 2010.

Figure 3. Inspection Person Days vs. Gas Transmission Significant Accidents (per 1,000 Miles of Natural Gas Transmission Pipeline)



Source: Person Years provided by PHMSA (obtained from 2010 certification documents reporting activity for 2009). Incident and mileage data gathered from PHMSA Pipeline Safety Program (individual state pages), 2010.

Figure 4. Natural Gas Transmission Pipeline Mileage per Square Foot of Land vs. Gas Transmission Significant Incidents



Note: Louisiana is not included.
 Source: Significant incident and natural gas transmission pipeline mileage data gathered from PHMAS Pipeline Safety Program (2010); state land areas gathered from the U.S. Department of Commerce, Bureau of the Census (2000); and author's calculations, 2010.

Notes

1. U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration, *General Pipeline FAQs* (Washington, D.C.: U.S. DOT, Aug. 29, 2007); http://www.phmsa.dot.gov/portal/site/PHMSA/menuitem.ebdc7a8a7e39f2e55cf2031050248a0c/?vgnnextoid=a62924cc45ea4110VgnVCM1000009ed07898RCRD&vgnnextchannel=f7280665b91ac010VgnVCM1000008049a8c0RCRD&vgnnextfmt=print#QA_5.

2. U.S. Department of Transportation Pipeline and Hazardous Materials Safety Program, Stakeholder Communications, *Pipeline Basics* (Washington, D.C.: U.S. DOT, n.d.); <http://primis.phmsa.dot.gov/comm/PipelineBasics.htm>.

3. U.S. Department of Transportation Pipeline and Hazardous Materials Safety Program, Stakeholder Communications, *Inspection* (Washington, D.C.: U.S. DOT, n.d.); <http://primis.phmsa.dot.gov/comm/InspectionEnforcement.htm>.

4. Cynthia L. Quarterman, U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Hearing on Hazardous Liquid Pipeline Safety: Regulated vs. Unregulated (Washington, D.C.: U.S. DOT, June 2010); <http://testimony.ost.dot.gov/test/quarterman4.pdf>.

5. U.S. Department of Transportation Pipeline and Hazardous Materials Safety Program, Stakeholder Communications, *Serious Pipeline Incidents* (Washington, D.C.: U.S. DOT, n.d.); <http://primis.phmsa.dot.gov/comm/reports/safety/SerPSI.html?nocache=3828> and author's calculations.

6. Northwest Gas Association, *Natural Gas Supply Serving the Pacific Northwest* 5, no. 2 (West Linn, Ore.: NWGA, n.d.)

7. U.S. Energy Information Administration, *About U.S. Natural Gas Pipelines* (Washington, D.C.: EIA, n.d.); http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/index.html.

8. U.S. Energy Information Administration, *About U.S. Natural Gas Pipelines, Interstate Natural Gas Pipeline Segment*, (Washington, D.C.: EIA, n.d.); http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/interstate.html.

9. Author's calculations with data gathered by PHMSA from 2010 certification documents reporting activity for 12 months ending Dec. 31, 2009.



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