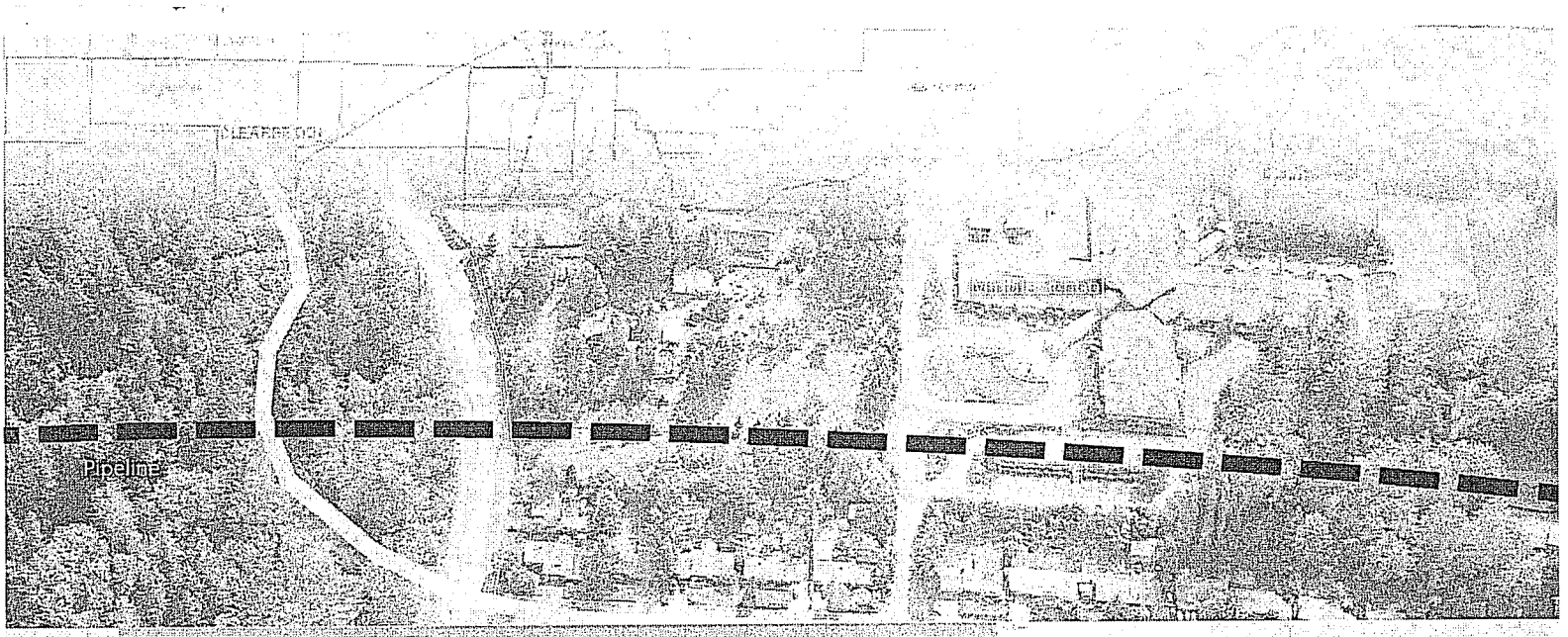

Local Government Guide to pipelines

participation

preparedness

pipeline safety

Pipeline Safety TRUST

Credible. Independent. In the public interest.

First edition, 2014

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The Pipeline Safety Trust promotes pipeline safety through education and advocacy, increased access to information, and partnerships with residents, safety advocates, government, and industry, resulting in safer communities and a healthier environment.

This 2014 Local Government Guide to Pipeline Safety and the ongoing work of the Pipeline Safety Trust would not be possible without the guidance and diligent work of the following people:

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September, 2014

Contents

This Guide is written for those involved with local government to provide basic information about the pipeline system. It is our goal to offer local government leaders, staff, and elected representatives an understanding of how pipelines are operated and regulated, what role local governments can play in planning for new development around existing pipelines, planning for new pipelines entering their communities, preventing and preparing for pipeline accidents, and where to find more information about these topics.

The US has well over 2.5 million miles of pipelines. This Guide is particularly targeted at regions where pipelines intersect with high consequence areas, or areas where people and the environment are otherwise most at risk.

Plenty of uncertainty and ongoing change surrounds the US pipeline system: tens of thousands of miles of new pipelines are currently installed each year across the country, many of which are unregulated rural gathering lines fed from thousands of new wells; at the same time our populated areas are growing and changing near existing pipelines. There is ample reason to engage in understanding pipeline issues: human activities and pipelines pose risks to each other, and it is only through engaging with these issues and acting appropriately on that knowledge that we can effectively reduce the risks.

Significant Incidents – All Pipelines

Year	Number	Fatalities	Injuries	Property Damage
2002	258	12	49	$121,401,236
2003	296	12	71	$159,410,078
2004	310	23	56	$307,958,445
2005	334	13	47	$1,421,220,668*
2006	257	19	34	$151,527,351
2007	268	15	47	$145,217,151
2008	279	8	55	$568,538,490
2009	275	13	62	$173,465,021
2010	263	19	104	$1,675,945,706
2011	287	12	51	$378,219,983
2012	248	10	55	$207,683,247
2013	292	9	46	$300,090,076
Totals	3,367	165	677	$5,610,677,452

*$466.5 million of this figure is damage done to distribution pipelines from Hurricane Katrina

Source: PHMSA Significant Incident Files, April 1, 2014

A decade ago, the Transportation Research Board (TRB) of the National Academies conducted a comprehensive study of pipeline safety and land use practices to better understand land use planning issues, and published the results in 2004 as *TRB Special Report 281, Transmission Pipelines and Land Use: A Risk-Informed Approach;* subsequently the Pipelines and Informed Planning Alliance (PIPA) formed and published a report on recommended land use practices in late 2010. Both of these reports can be found using links in Section 6.2 of this guide.

These reports touch on, but do not answer important questions related to a local government's role with pipelines, some of which are listed here:

"It looked more like something out of a science fiction movie than what you would expect out of what would have been a very densely populated neighborhood."

NTSB Investigator Nancy McAtee, Fire & Explosion Specialist, speaking about the Glenview neighborhood 2010 gas pipeline disaster in San Bruno, CA.

What kind of a say or a responsibility should local government have in how people are treated when new pipelines come through their jurisdictions?

In what way should local government be engaged if a pipeline changes or increases product transported, or reverses flow direction?

What kind of a role should local government have in how close pipelines can be built to certain types of structures?

Should there be strict disclosure requirements that local governments could enforce on both people selling land with pipelines on it, and on pipeline companies installing new pipelines through their jurisdictions?

We do not set out to answer these questions for you, but instead to provide the tools you need to answer them in a way that fits with your particular situation.

While we hope this guide provides you with enough information to better understand pipelines, in many ways we are only scratching the surface. If you find that you want to know more, below are some great places to start. There are more resources listed in Section 6.2:

- The Pipeline Safety Trust website – *www.pipelinesafetytrust.org*.
- The Pipeline and Hazardous Materials Safety Administration's Office of Pipeline Safety website – *phmsa.dot.gov/pipeline*.
- Or to join the discussion regarding pipeline safety nationwide, and learn about news regarding pipelines from across the country, go to the following website to be part of the Safepipelines group – *tech.groups.yahoo.com/group/safepipelines/*.

1. Introduction

1.1 Information and Risk

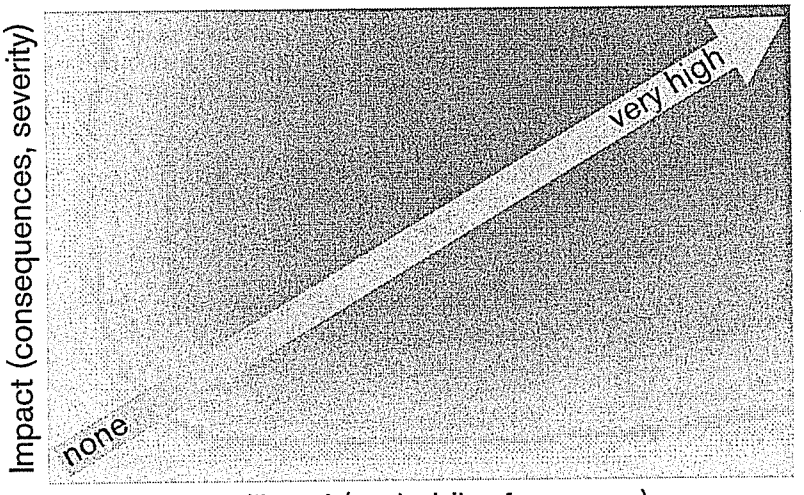
With over 2.6 million miles of oil and gas pipelines in the United States, and booming domestic production with associated new pipeline development, local governments and citizen leaders are looking for pipeline information to inform their efforts. That information is in many different locations and is often frustratingly hard to find.

In this Guide, we provide helpful information and tools, give context to pipeline risks, and offer some creative examples of how others have put this information to work for increased safety.

Pipelines and people pose risks to one another. A major natural gas transmission pipeline has a potential to rupture and explode, harming people and property; a major hazardous liquid pipeline has a potential to spill its contents into a river, contaminate drinking water, or release hazardous vapors, causing public health and environmental problems; a gas distribution line has a potential to leak and ignite causing an explosion in a city. At the same time, people digging or excavating in the vicinity of a pipeline may cause damage to the line, leading to a leak or rupture; a landowner or city may improperly plant deep-rooted trees too near a pipeline, introducing a potential damage source to that line.

These types of risks pose the potential for what are typically called low-probability, high-consequence events. They do not have a high likelihood of occurring, but if they do occur, the impact can be tragic and severe.

Some communities have variously implemented excavation damage prevention strategies, targeted land use planning where pipelines and people are in proximity, undertaken spill and hazard mitigation planning, or simply offered their citizens and employees information about pipelines in their communities. All these examples should help local governments understand the array of options available to them for implementing their own well- targeted efforts to protect their communities and surrounding environment, as well as the pipelines in their midst.



Risk Matrix
Communities need to decide for themselves what constitutes acceptable risk

The Current U.S. Pipeline System:

- 185,000 miles of onshore and offshore Hazardous Liquid pipelines
- 320,000 miles of onshore and offshore Gas Transmission and Gathering pipelines
- 2,138,000 miles of Natural Gas Distribution mains and service pipelines

1.2 Pipelines 101

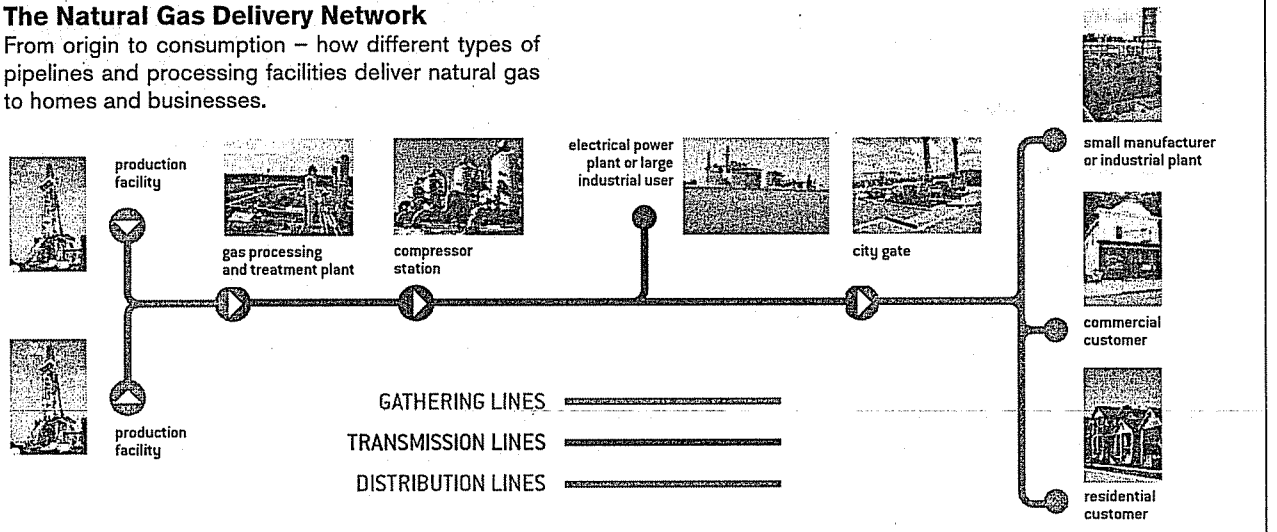
Those in the oil and gas world talk of the upstream, midstream, and downstream aspects of the industry; pipelines often have a roll in each of these. Who regulates pipelines and under what set of regulations depends on what the pipeline carries, how much it carries, and where it goes. Pipelines are categorized into several types:

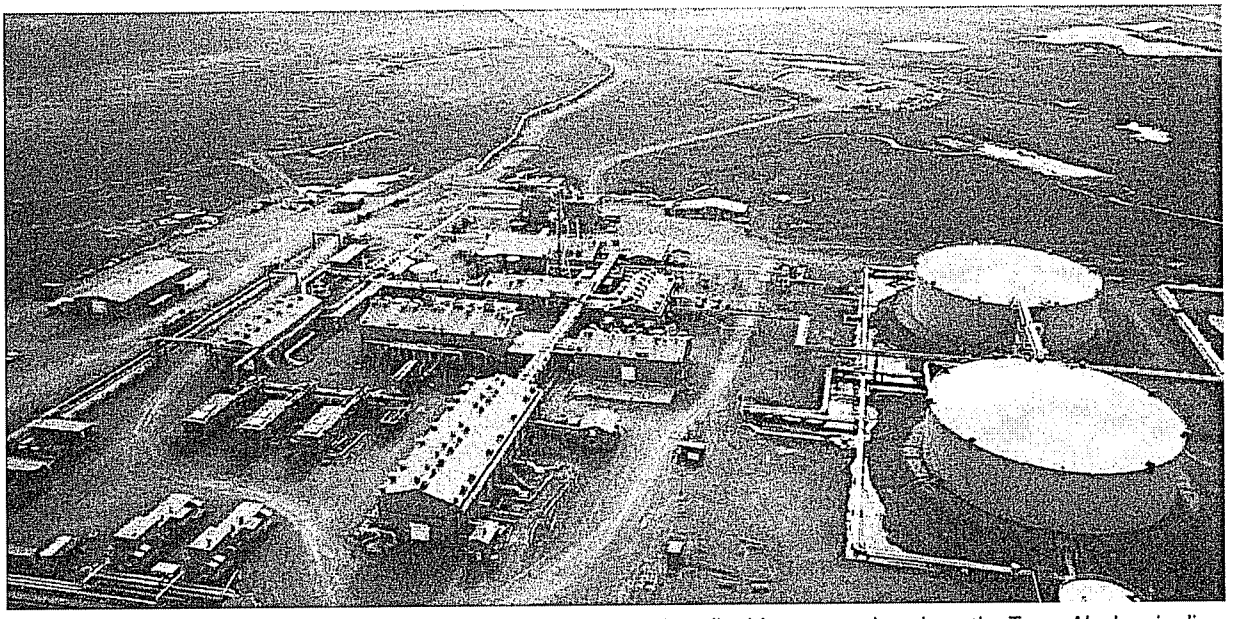
- **Hazardous Liquid pipelines** carry crude oil and refined fuels such as gasoline, diesel and jet fuel.
- **Natural Gas pipelines** carry natural gas.
- **Transmission pipelines** are the large lines that move gas and liquids long distances around the country, often at high pressures.
- **Distribution pipelines** are smaller lines that deliver natural gas to our individual homes and businesses.
- **Gathering pipelines** transport gas and crude oil away from the point of production (wellhead) to another facility for further refinement or to transmission pipelines.
- **Interstate pipelines** are lines that cross state boundaries.
- **Intrastate pipelines** are those that operate entirely within one state. Some large pipelines that cross state boundaries are classified as intrastate if the pipeline ownership changes at the state line.

Natural Gas Pipelines and Compressor Stations – Natural gas is moved out of production areas and to processing plants by gathering lines. After processing, the gas is moved through transmission pipelines as a result of a series of compressors creating pressure differentials – the gas flows from an area of high pressure to an area of relatively lower pressure. Compressors are powered by electric or natural gas fired engines that compress or squeeze incoming gas and push it out at a higher pressure. Natural gas is compressed in transmission pipelines to pressures typically ranging from 500 to 1400 pounds of pressure per square inch. Compressor stations are generally built every 50 to 100 miles along the length of a transmission pipeline, allowing pressure to be increased as needed to keep the gas moving. The "city gate"

The Natural Gas Delivery Network

From origin to consumption – how different types of pipelines and processing facilities deliver natural gas to homes and businesses.

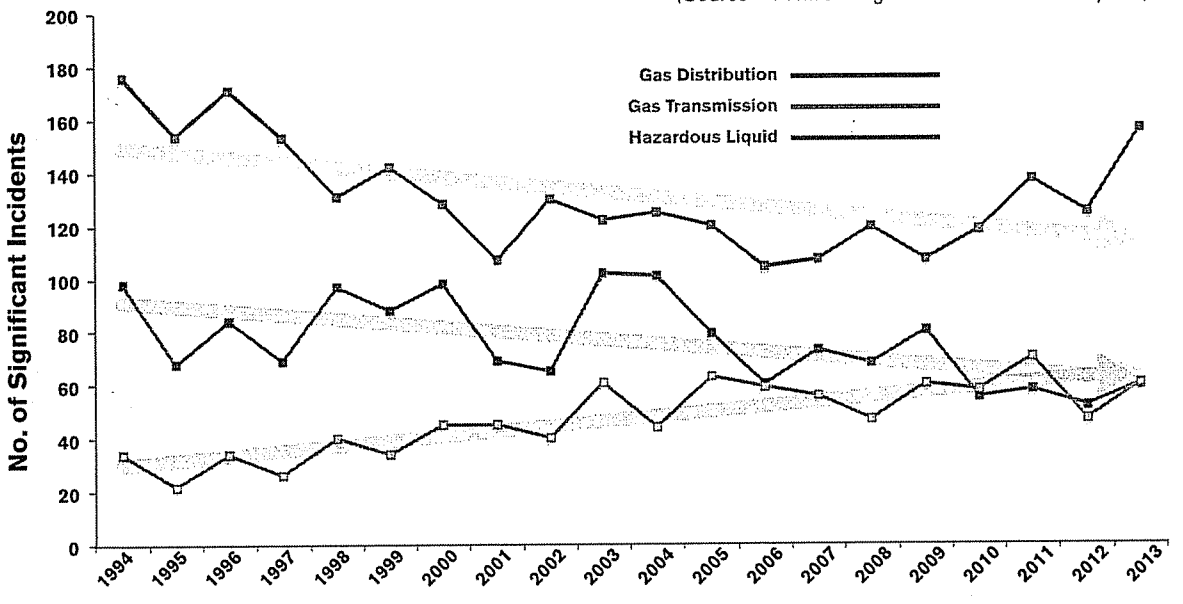




A hazardous liquid pump station along the Trans-Alaska pipeline.

is where a transmission system feeds into a lower pressure distribution system that brings natural gas directly to homes and businesses. The city gate is typically the location where odorant is added to the gas, giving it the characteristic smell of rotten eggs.

Hazardous Liquid Pipelines and Pump Stations – Gathering lines bring crude oil out of production areas and to larger transmission lines that often take the crude oil to refineries. Once the crude oil has been refined, transmission lines carry the refined products to end-users or to storage and distribution facilities for transportation to consumers. The product is pushed through the pipeline by large pump stations situated every 20-100 miles along the line depending on the product, terrain and pressure at which the pipeline is operating. Most



The total number of incidents for gas distribution and hazardous liquid pipelines has declined over the past two decades, while incidents for gas transmission pipelines have increased slightly.

liquid fuels move through the pipeline at between 3 to 8 miles per hour. It is estimated that the cost of transporting the crude oil and then the refined products through the pipeline network adds about two and a half cents to the cost of a gallon of gas at the pump.

1.3 Why Pay Attention?

Local governments have an important role to play in looking out for the community welfare, economic development, orderly growth, environmental protection, and many other attributes that contribute to a vibrant community. While pipeline regulations exist on the federal and perhaps state level, these mainly focus on *safety*, leaving the protection of other unaddressed community attributes in the hands of state or local government. Some state and local entities are calling for more thorough national regulations to strengthen protection for their citizens, at the same time that federal regulatory agencies rely on states to take a significant oversight role. Over the next decade or so, perhaps more guidance and support will come from federal officials on these issues, but in the meantime, states and ultimately local governments are left to fill whatever holes exist in this community safety net.

States vary in the degree to which they participate in pipeline safety initiatives. The inside back cover of this Guide provides a snapshot of options states have to be involved, and a number of these are relevant to local governments as well. State attorneys general can play a key role in providing coordination and funding to support local governments in their involvement with pipeline issues, as can elected leaders, state agencies, and utility boards or commissions.

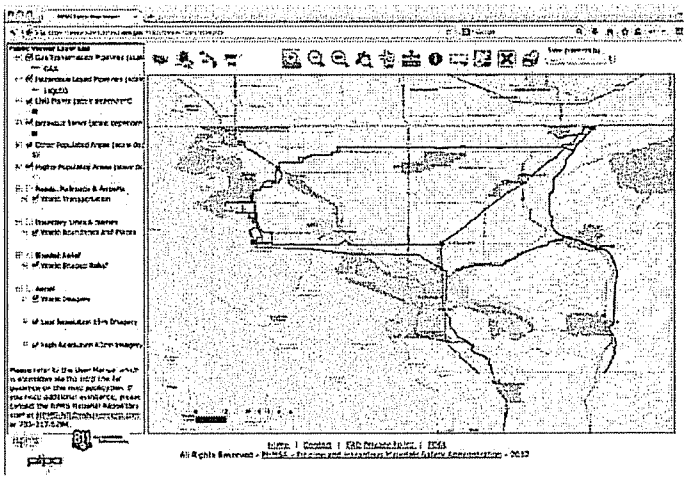
These are complex issues in a complicated regulatory system. The boundaries imposed on local communities' involvement in pipeline safety issues are often unclear. There is no substitute for a qualified, experienced attorney in your state who is familiar with the issues involved if you have specific questions about legal rights and responsibilities.

A spill into the Kentucky River. In the past five years, an average of over 4.5 million gallons of hazardous liquids have spilled from pipelines each year, and more than 56% is never recovered.

2. Where Are The Pipelines?

2.1 Accessing Mapping Information

Basic information about the location of hazardous liquid and gas transmission pipelines nationwide, as well as breakout tanks and liquefied natural gas plants, can be found through the National Pipeline Mapping System (NPMS) managed by U.S. Department of Transportation (USDOT) – Pipeline and Hazardous Materials Safety Administration (PHMSA). Mapping data for pipelines and associated facilities in a specific region may also be available from the pipeline operators themselves, or from the state government division that regulates public utilities and services (typically the public service/utilities commission/board).



NPMS screenshot of pipelines (red & blue), highly populated areas (orange), and other populated areas (green) in Whatcom County, WA.

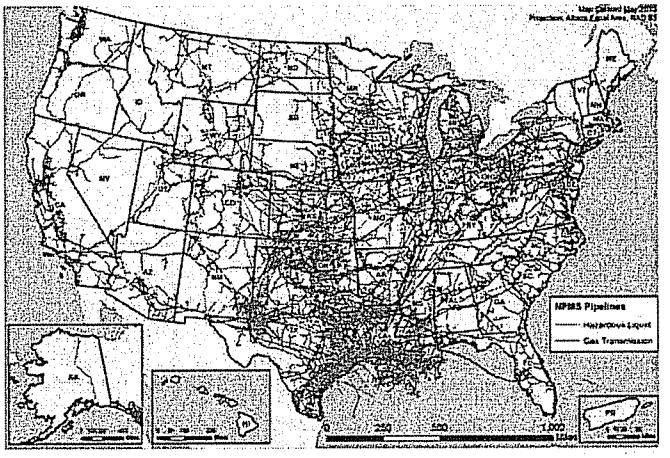
The PHMSA NPMS website (*www.npms.phmsa.dot.gov*) offers a "NPMS public map viewer" that allows anyone to see pipeline locations on a county-by-county basis nationwide, though the system may present significant challenges to a new user. The maps shown include population areas, roads, and the option to view over an aerial base map.

A few more options are available from PHMSA for those in local or regional government. Government employees can request login information (through the NPMS website) to be able to access this data in a couple different ways: either raw GIS data or online access. The online Pipeline Information Management Mapping Application (PIMMA) provides location and attribute information for pipelines in a county along with the ability to create PDF maps for printing. For jurisdictions that produce their own maps from raw GIS data, PHMSA offers data in an ESRI format with the same location information, attributes, and metadata that are viewable in PIMMA, but that can be viewed and analyzed in combination with other GIS data.

Pipeline attributes on the public viewer show the operator, operator identification number, pipeline status, contact information, pipeline product transported, and sometimes additional information such as pipe diameter. The spacial accuracy of the data is +/- 500 feet, and certainly NOT sufficient for locating pipes in the ground. Data is updated as it becomes available, typically once a month. Additional information for governments includes depiction of designated 'Unusually Sensitive Areas' (USAs) and 'High Consequence Areas' (HCAs) based on ecological, population, and drinking water attributes that stem from US Census, PHMSA, and Bureau of Transportation Statistics data.[1] To see all the mapping data that pipeline operators are required to submit to NPMS, see the PHMSA guide here: *www.npms.phmsa.dot.gov/Documents/Submission_Guide.pdf*.

1 For detailed definitions of HCA and USA, see 49 CFR 195, App C (I) and 49 CFR 192.903

PHMSA does not have a process for receiving feedback from governments on the accuracy of the data depicted. Should a local government notice an important feature (e.g. a drinking water source) that is omitted from the maps, they should notify PHMSA as well as any operators of pipelines that run through the area. Operators are required to incorporate new information on HCAs and USAs when they are made aware of it, so it is important to notify pipeline operators in writing if you notice an omission or error.



Hazardous Liquid And Gas Transmission Pipelines
A national network of transmission pipelines moves fuel to millions of facilities and people every day. (map courtesy PHMSA)

3. An Overview of Pipeline Safety Regulations & Operations

3.1 Regulating Pipeline Safety

The U.S. Congress has ultimate responsibility for setting the framework under which pipeline regulations operate in the country. The U.S. Department of Transportation through the Pipeline and Hazardous Materials Safety Administration (PHMSA) is primarily responsible for issuing and enforcing the minimum pipeline safety regulations. The federal pipeline safety laws allow for states to accept the responsibility to regulate, inspect, and enforce safety rules over intrastate pipelines within their borders under an annual certification from PHMSA. If a state receives such intrastate authority they can set regulations that are more stringent than what PHMSA sets as long as the state rules do not conflict with the federal regulations. PHMSA also can enter into an agreement with the state pipeline regulator to allow the state to carry out inspections, but not enforcement of regulations, on interstate pipelines. States that choose to be involved through certification or agreement are eligible for reimbursement of most their program costs from PHMSA; states typically charge the pipeline operators user fees to cover the remaining costs.

Local governments may not enact regulations regarding the *safety* aspects of pipeline operations that are regulated by the federal government. For example, they cannot stipulate a lower operating pressure, conduct additional inspections, require lines to be constructed with thicker steel, or require leak-detection sensors on federally-regulated lines. While local government cannot regulate pipeline safety, some local jurisdictions have managed to get some pipeline companies to voluntarily agree to safety improvements as part of easement or franchise agreements. Local governments may regulate other aspects of pipelines, as long as those regulations are consistent with state law and not preempted.

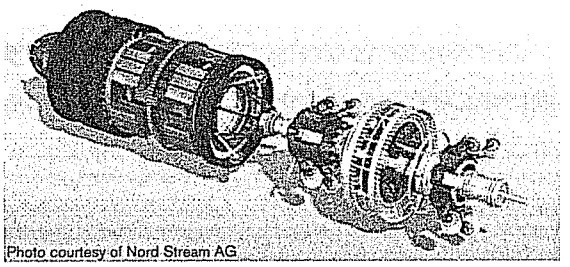


Photo courtesy of Nord Stream AG

The 'smart pig' is one of a variety of types of in-line inspection devices that specialize in finding particular problems in pipelines such as corrosion, dents and gouges.

Pipeline Inspections

Pipeline inspections are done by both the operating company and the regulators. The majority of physical inspections are done by the pipeline operators. The requirements governing such pipeline inspections vary depending on the pipeline's contents, location and other factors. Inspections by pipeline companies take many forms, each with a different purpose. Some of those inspection techniques include:

- aerial fly-overs looking for leaks and activities that might damage the line;
- trucks driving the right-of way or an inspector on foot with leak detection equipment;
- internal inspections performed by a "smart pig" – a machine that travels through the pipeline with a variety of sensors that can detect corrosion, dents or other weaknesses in the pipes; and
- physically digging up the pipeline and inspecting it.

State and federal regulators also perform inspections, but these inspections mainly involve review of the company's paperwork to see if they are following the regulations and using properly qualified staff, as well as some spot-checking of facilities and construction work. For more information about the types of inspections undertaken by regulators, visit: *primis.phmsa.dot.gov/comm/reports/operator/OperatorInspGlossary.html*.

3.2 Pipeline Safety Requirements During Design and Construction

Choosing Pipe

Pipe sections are fabricated in steel rolling mills and inspected to assure they meet government and industry safety standards. Generally between 40 and 80 feet in length, they are designed specifically for their intended location in the pipeline. A variety of soil conditions and geographic or population characteristics of the route will dictate different requirements for pipe size, strength, wall thickness and coating material. Not all pipe is steel; some low pressure pipelines use different materials such as other metals, plastic or composites.

The Regulations

The overarching pipeline safety statutes that Congress has passed can be found in:

U.S. Code, Title 49, Subtitle VIII, Chapter 601

The minimum federal regulations adopted by PHMSA can be found in: Title 49 of the Code of Federal Regulations (CFR), Parts 190-199

Want to know what agency in your state regulates pipelines, and what authority they have?

See Appendix A for links and resources.

Pipe Burial

Mechanical equipment, such as a wheel trencher or backhoe, is used to dig the pipe trench. Occasionally, rock drilling and blasting is required to break rock in a controlled manner. Excavated material is temporarily stockpiled to be used again in the backfill operation. In some locations, horizontal directional drilling (HDD) as well as boring is used to place pipe, instead of trenching. Pipeline trenches are dug deep enough to allow for an adequate amount of cover when the pipe is buried. Federal regulations require that hazardous liquid pipelines be buried between 18 and 48 inches below the surface, and that buried gas transmission and regulated gathering lines be between 18 and 36 inches below the surface, depending on location and soil properties. For example, more depth is required in normal soil conditions near residential or developed areas (36 inches) and certain water body crossings (48 inches for liquid lines), and less depth where rock excavation is required. The depth of burial must be according to the regulations at the time of burial, but there is nothing that requires this depth be maintained over time. River scouring and other circumstances that result in reduced depth of cover over time can increase the risk of pipe leaks and failures.

Welding of Steel Pipelines

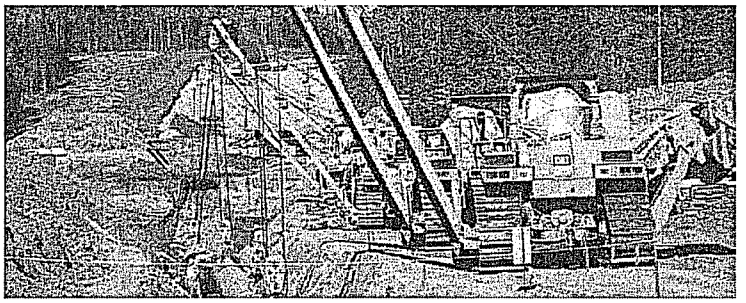
To carry out the welding process, the pipe sections are temporarily supported along the edge of the trench and aligned. The various pipe sections are then welded together into one continuous length, using various welding procedures. As part of the quality-assurance process, each welder must pass qualification tests to work on a particular pipeline job, and each weld procedure must be approved for use on that job in accordance with federally adopted welding standards. Welder qualification takes place before the project begins. Each welder must complete several welds using the same type of pipe as that to be used in the project. The welds are then evaluated by placing the welded material in a machine and measuring the force required to pull the weld apart. It is interesting to note that a proper weld is actually stronger than the pipe itself.

For higher stress pipelines over 6 inches in diameter, a second level of quality-assurance occurs, wherein qualified technicians sample a certain number of the welds (the sample number varies based on the population near the pipeline) using radiological techniques (i.e., X-ray or ultrasonic inspection) to ensure the completed welds meet federally prescribed quality standards. The technician processes and analyzes the film on site, using – depending on the technique chosen – either digital equipment or a portable or van-equipped darkroom. If the technician detects certain flaws, the weld is repaired or cut out, and a new weld is made.

Coatings
Several different types of coatings may be used to coat the pipe at the factory and the joints made in the field, with the most common at this time being fusion bond epoxy or polyethylene heat-shrink sleeves. Prior to application, the bare pipe is thoroughly cleaned to remove any dirt, mill scale or debris. The coating is then applied and allowed to dry. After field coating and before the pipe is lowered into the trench, the entire coating of the pipe is inspected to ensure that it is free from defects.

Lowering and Backfilling
Once the pipeline is welded and coated, it is lowered into the trench. Lowering is done with multiple machines called sidebooms. This equipment acts in tandem to lift and lower segments of the assembled pipeline into the trench in a smooth and uniform manner to prevent damage.

Once the pipeline is lowered into the ground, the trench is backfilled with either a backhoe or padding machine depending on the soil makeup. Care should be taken to protect the pipe and coating from sharp rocks and abrasion as the backfill is returned to the trench. In areas where the ground is rocky and coarse, the backfill material is screened to remove rocks or the pipe is covered with a material to protect it from sharp rocks and abrasion. Alternatively, clean fill may be brought in to cover the pipe. Once the pipe is sufficiently covered, the coarser soil and rock can then be used to complete the backfill. As the backfill operations begin, the excavated material is returned to the trench in reverse order, with the subsoil put back first, followed by the topsoil. This ensures the topsoil is returned to its original position.


The sideboom is a machine used in pipeline construction.

Valves and Valve Placement
A valve is a mechanical device installed in a pipeline and used to control the flow of gas and liquid. Some valves have to be operated manually by pipeline personnel, some valves can be operated remotely from a control room, and some valves are designed to operate automatically if a certain condition occurs on the pipeline. If a pipeline should fail, how quickly the valves can be closed and the distance between the valves are some of the main determinations for how much fuel is released.

Operating Pressure and Testing
Maximum allowable operating pressure (MAOP) for natural gas pipelines, and maximum operating pressure (MOP) for liquid pipelines, are the maximum internal pressure at which a pipeline or pipeline segment may be continuously operated. These pressures are set at levels meant to ensure safety by requiring that the pressure does not cause undue stress on the pipeline. How this pressure is determined is defined in federal regulations and is based on a number of different factors such as the location of the pipeline, pipe wall thickness, previous pressure tests, and the pressure ratings of various components.

Generally, but with certain exceptions, all newly constructed transmission pipelines must be hydrostatically tested before they can be placed into service. The purpose of a hydrostatic pressure test is to identify and eliminate any defect that might threaten the pipeline's ability to sustain its maximum operating pressure plus an additional safety margin. A pipeline is designed to a specified strength based on its intended operating pressure. Hydrostatic pressure testing consists of filling the pipeline with water, and raising and sustaining the internal pressure to a specified level above the intended operating pressure. Critical defects that cannot withstand the pressure will fail. Upon detection of such failures, the defects are repaired or the affected section of the pipeline is replaced and the test resumed until the pipeline "passes."

Hydrostatic testing is not the only means for detecting pipe defects. For example, inline inspection (ILI) technologies are used that permit the identification of specific types of defects, such as corrosion. But because not all lines can be inspected with ILI tools and because of the need to find types of imperfections that are not currently easily detected by ILI technology, hydrostatic testing is an accepted method for demonstrating that a pipe segment is ready to be in service.

3.3 Pipeline Safety Requirements During Operation

Corrosion Protection

Unprotected steel pipelines are susceptible to corrosion. Without corrosion protection every steel pipeline will eventually deteriorate. Corrosion can weaken the pipeline and make it unsafe. There are the three common methods used to control corrosion on pipelines:

- Cathodic protection (CP) uses direct electrical current to counteract the normal external corrosion of a metal pipeline. CP is used where all or part of a pipeline is buried underground or submerged in water. On new pipelines, CP can help prevent corrosion from starting; on existing pipelines, CP can help stop existing corrosion from getting worse.

- Pipeline coatings and linings defend against corrosion by protecting the bare steel.

- Corrosion inhibitors are substances that can be added to a pipeline to decrease the rate of attack of internal corrosion on the steel since CP cannot protect against internal corrosion.

Supervisory Control and Data Acquisition System (SCADA)

A SCADA is a pipeline computer system designed to gather information such as flow rate through the pipeline, operational status, pressure, and temperature readings. Depending on the pipeline, this information allows pipeline operators to know what is happening along the pipeline, and allows quicker reactions to equipment malfunctions, failures and releases. Some SCADA systems also incorporate the ability to remotely operate certain equipment, including compressors, pump stations, and valves. This allows operators in a control center to adjust flow rates in the pipeline as well as to isolate certain sections of a pipeline. Many SCADA systems also include leak detection systems based on the pressure and mass balance in the pipelines. Unfortunately, leak detection systems are not yet capable of identifying all leaks; PHMSA data through 2013 shows that only about 11% of hazardous liquid and gas transmission pipeline incidents were initially detected by SCADA or other computerized leak detection.

Right-of-way Patrols

Regulations require pipeline operators to conduct regular patrols of pipeline rights-of-way to check for indications of leaks and to ensure that no excavation activities are taking place on or near the right-of-way that may compromise pipeline safety. For transmission pipelines, these patrols are often accomplished by aerial patrols, but federal regulations do not require aerial inspection. Pipeline operators must be able to access the right-of-way in an emergency, but no federal regulations require the right-of-way to be free of specific vegetation or trees. The individual easements or contracts made between the landowner and the pipeline operator typically govern these types of issues. While certain trees too close to pipelines may cause problems with pipeline coatings or the lines themselves, trees in the right-of-way are more often cleared by operators in order to provide a more highly visible corridor that can conveniently be patrolled by air.

Natural Gas Leakage Surveys and Odorization
Regulations require regular leakage surveys for all types of natural gas pipelines along the pipeline routes. Pipeline operator employees or contractors walk or drive the route using specialized equipment to determine if any gas is leaking and to then quantify the size of the leak. Very small leaks are a typical part of most gas pipeline systems.

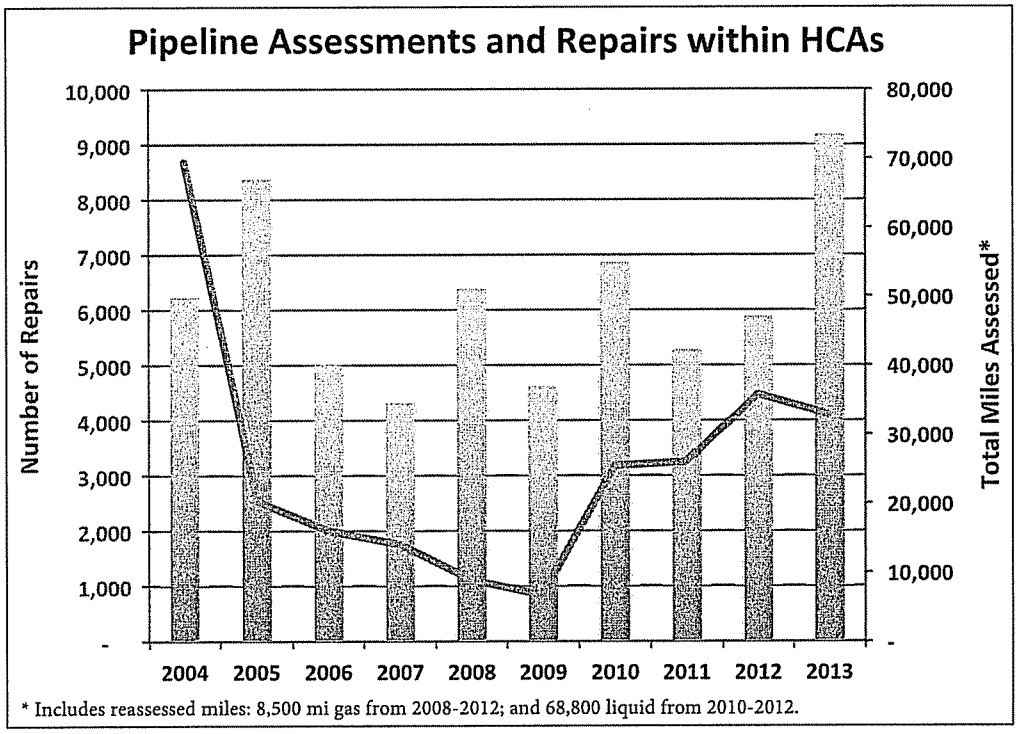
All distribution pipelines, and some transmission and gathering lines (mainly those in highly populated areas), are required to be odorized so leaking gas is readily detectable by a person with a normal sense of smell.

Integrity Management
Integrity Management refers to a set of federal rules that specify how pipeline operators must identify, prioritize, assess, evaluate, repair and validate the integrity of their pipelines. Operators of both transmission and distribution pipelines are required to have some form of integrity management program that applies to pipelines in certain locations. Gathering lines are exempt from these requirements.

For gas transmission pipelines, integrity management rules require lines that are located *within* High Consequence Areas (mainly more populated areas) to be re-inspected by their operators at least every seven years. For hazardous liquid pipelines, integrity management rules require lines that *could affect* High Consequence Areas (HCAs) to be re-inspected by their operators at least every five years. Unfortunately, the National Pipeline Mapping System does not at the time of this writing depict the HCA boundaries used by operators, despite congressional direction that it should.

Re-inspection of pipelines is done mainly with internal inspection devices, but may also be done through pressure tests or direct assessment (DA should be used only under circumstances permitted by regulation, most commonly when only external corrosion is suspected). Once inspected, the rules require that operators respond to certain anomalies found on their pipeline.

In the first 9 years of this program, these rules required over 53,000 repairs to gas and liquid transmission pipelines that fall within High Consequence Areas. Unfortunately, only about 7% of the gas transmission pipelines, and 43% of the hazardous liquid pipelines nationwide are required to perform these integrity management inspections.



4. New Development Or New Pipelines Within Communities

4.1 Who has Land Use Responsibility?

The previous chapter discussed ways in which the pipeline operators must construct, install, and operate their pipelines in accordance with federal minimum regulations. Those *safety and inspection* issues are under federal jurisdiction, with some states choosing to participate through certification or a formal agreement with the Pipeline and Hazardous Materials Safety Administration (PHMSA). There are many other issues that arise that do not sit squarely under federal jurisdiction, however, and in this chapter we tackle the nuances of land use and pipelines for both existing and newly proposed lines.

Local and regional governments' land use authority can be a pathway for coordination and regulation of new development near existing pipelines, or for involvement with proposed new pipeline development within existing communities. A number of factors come into play that determine the possibility and extent of a local governments' involvement in these areas.

Local governments, including cities, townships, and counties (or boroughs or parishes), differ significantly in terms of governance, structure and responsibilities. For counties, many of them exercise powers that are explicitly dictated by state law (the so-called "Dillon's Rule"); and some decide their own structure, functions and fiscal organization (home rule authority). For cities, some are created by direct state action – through a charter, for example – but most are created because state statutes authorize citizens in a particular geographic area who need or desire local services to form a local unit of government. States determine how much authority each type of government may exercise. While municipal systems among many states are similar in policy, method, and practice, there are numerous variations, exceptions, and differences in form and function which exist even within a single state.[2] This differentiation makes it challenging to provide guidance that is applicable to local governments across the board.

Most regional and municipal governments use a comprehensive planning process to help guide their growth and development. Comprehensive plan language (or the absence of language) can hinder or bolster local ordinance development or permitting activities related to pipelines.

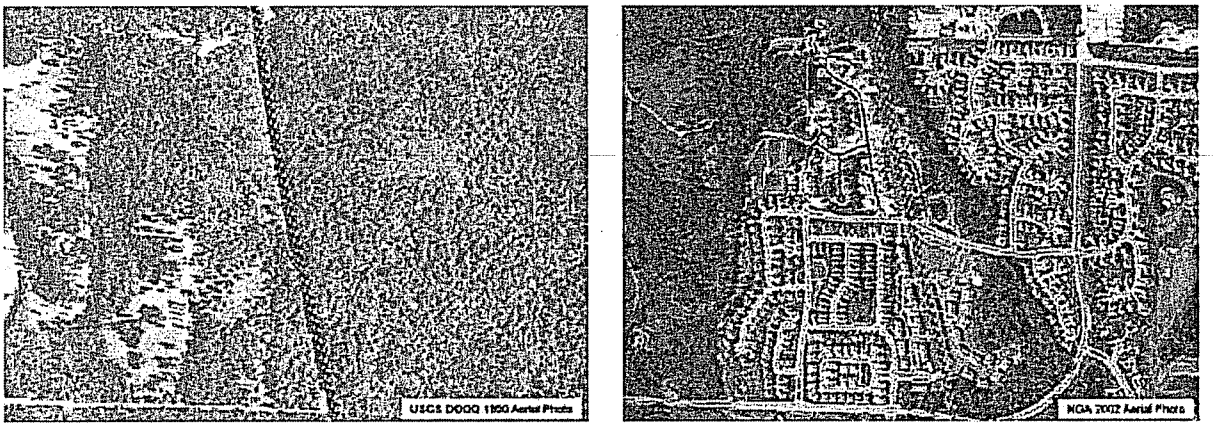
Local governments that are actively involved with pipelines and development differ in the degree to which their plans discuss pipelines

Comprehensive Plans

While Comprehensive Plan language can vary widely, it is helpful if the plan can generally:

- acknowledge existing and proposed pipelines or energy infrastructure;
- recognize the benefits and risks of these;
- acknowledge the need to
  - monitor existing and proposed infrastructure development activity,
  - enact regulations complimentary to state and federal law, and
  - encourage increased communication with pipeline or infrastructure operators;
- reference related county and statewide planning goals; and
- describe desired coordination with county and state agencies on new pipeline or related energy infrastructure projects.

2 See more at: www.naco.org and www.nlc.org.



In the twelve year period between the aerial on the left, and the one on the right, what was once a rural area surrounding a pipeline is now developed with residential homes, reflecting a similar pattern that has happened across the nation.

Example

Development Regulation in Areas Near Existing Pipelines

The Pipelines and Informed Planning Alliance issued a report in 2010 that provides recommended practices, model documents, and photographic examples related to development near pipelines.

Brookings County, South Dakota adopted a "Transmission Pipeline Risk Reduction Overlay District" (see Revised Zoning Ordinance of Brookings County, Article 24) requiring early consultation among stakeholders when any development is proposed within 660 feet of a transmission pipeline.

The City of Austin, Texas adopted rules for "Development near a Hazardous Pipeline" (see §25-2-516) which require higher restrictions on development with closer proximity to the hazardous liquid pipeline. New construction is generally prohibited within 200 feet, and specific uses requiring evacuation assistance are generally prohibited within 500 feet of the pipeline.

More examples at:
pstrust.org/trust-initiatives-programs/planning-near-pipelines

specifically. Some may refer to infrastructure in general, transportation or energy infrastructure, or specifically to hazardous liquid or intrastate gas pipelines or both. Municipalities need to choose the language most appropriate for them, depending on the state laws and local context, and provide adequate definitions to clarify the intent.

4.2 New Development Near Existing Pipelines

State and local governments can coordinate and regulate development near pipelines with their land use authority. They can enact regulations governing the type of construction that can occur near existing pipelines, requiring consultation with the pipeline operator, establishing setbacks or a variety of other land use permit requirements.

The federal government through the Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA) recognized the importance of the role local governments play when they supported the formation of the Pipelines and Informed Planning Alliance (PIPA) in 2007, which worked for three years to develop a list of recommended development practices in proximity to pipelines and pipeline rights-of-way. Twenty-nine of the 43 recommended practices specifically speak to things local governments can do to encourage safety near transmission pipelines; these are listed in Appendix B. Many of the recommendations are woven throughout this chapter, including those incorporating the existence of pipelines into other planning processes and infrastructure projects, as well as the importance of safe excavation practices. Recommendations stress the need to have a relationship with local pipeline operators that includes open communication. Many of these recommended practices encourage reducing risks in ways that could also be applied to the construction of new pipelines.

One example recommended practice is the use of consultation areas or zones (see the sidebar example of Brookings County, South Dakota). While consulting with pipeline operators is a good idea in many circumstances, it is absolutely essential for public safety when constructing any sort of development nearby. A consultation zone ordinance requires property developers to consult with pipeline operators when proposing construction within a specified distance from a transmission pipeline. Early and open consultation helps protect the integrity of the pipeline and the safety of the property and the people who will use it.

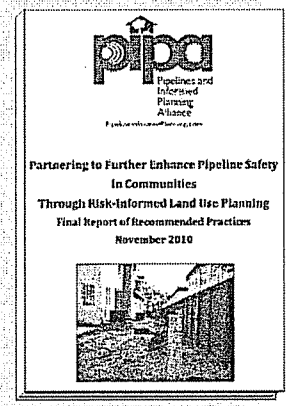
In considering regulation of development near existing pipelines, there are many issues at play. Robust discussion of these issues prior to rezoning or master planning areas is preferred, though municipalities also have these discussions during permitting processes. Ordinances can allow flexibility based on the specific context, but without one, communities may forgo the opportunity to provide timely input on a project. The existence of a local ordinance, along with careful attention to the details of the existing pipeline infrastructure, the planned or proposed development, and answers to local questions, can result in appropriately-crafted permit conditions or development agreements, and a more well informed and prepared community. Here is an abbreviated list of questions local government staff may wish to ask in the planning of development areas near pipelines:

- Will development regulations apply to new construction, redevelopment, additions?
- What types of structures make sense at what distance from the pipeline?
- Are structures likely to be used by many people or few?
- Is overnight accommodation allowed?
- Is the presence of vulnerable or hard to evacuate populations likely?
- Are adequate evacuation routes available?
- Will the specifics of the pipeline change what the development regulations require?[3]
- Is water for emergency use readily available?

Examples of what some communities have done are listed in the sidebar (at left), and referenced documents and sample ordinances are available on the Trust website. Appendix C contains a sample checklist for planning, design, communication, permitting, and site plan review developed by the PIPA team; more helpful documents are available on the PIPA website listed in Section 6.2.

The Final Report of Recommended Practices from the Pipelines and Informed Planning Alliance (PIPA) offers this advice:

"Local governments should consider the risks, including both likelihood and consequences, of transmission pipeline incidents when making decisions related to land use planning and development. They should make full use of available resources and communicate with the operators of the transmission pipelines in their communities to better understand the characteristics of the specific pipelines involved and the characteristics of the surrounding area that affect risks. Local government decisions might include:



- Constraints on activities on or near transmission pipeline rights-of-way;
- Restrictions on the types of land use and development that is allowed along transmission pipeline rights-of-way;
- Specific design or construction features of the development;
- Measures to facilitate emergency response and evacuation in the event of a transmission pipeline incident."

4.3 Siting and Routing of New Pipelines

For nearly all new pipeline siting, the pipeline company decides on a general route they prefer for their proposed pipeline, and possibly some alternative routes. Once they feel fairly confident with the feasibility of their chosen route, the more formal process with various government agencies begins. That process is not consistent for all types of pipelines, but varies greatly based on the type of pipeline and where it is to run. Pipelines that will cross international or state boundaries (interstate lines) have different siting processes than those that will stay within just one state (intrastate lines).

Siting of Interstate Natural Gas Pipelines

Once the pipeline company has a pipeline proposal and route in mind for a new interstate gas line, they must apply to the Federal Energy Regulatory Commission (FERC) for approval. That

3 A study conducted by C-FER Technologies for the Gas Research Institute in 2000 is frequently cited for its method of calculating a hazard area radius – often referred to as potential impact radius (PIR) – for natural gas pipelines based on their maximum operating pressure and pipe diameter. The PIR ranges from 150 feet (small, low-pressure lines) to over 1,000 feet (large, high-pressure lines), and represents an area proximal to the pipeline where the heat intensity in the event of a rupture and fire would be hazardous to people and property. [Stephens, Mark J. A Model for Sizing High Consequence Areas Associated with Natural Gas Pipelines. Gas Research Institute, 2000.] Accordingly, some municipalities base their pipeline setbacks on product type, pipe pressure, and pipe diameter.

Potential Topics For Interstate Gas Pipeline Operators To Address At Community Consultation Meetings

A local government can design both the form and substance of a consultation meeting. Ask the pipeline operator to send knowledgeable project staff, not public relations consultants or right-of-way agents. Tell them you would like the public to hear answers to the following questions at the meeting:

- Size, pressure and potential impact radius of proposed line.
- Size of permanent right of way and whether temporary work space. easements will be sought the entire length of the pipeline. If yes - how big?
- For what portion of the planned capacity of the line is the pipeline product already committed through binding contracts?
- Is the operator willing to route the line to avoid putting residences or hard to evacuate facilities, like schools and hospitals, too near the line (within the potential impact radius)?
- Describe the erosion control and restoration requirements of the FERC Upland Erosion Control, Revegetation and Maintenance Manual (http://www.ferc.gov/industries/gas/enviro/plan.pdf) and the FERC Wetland and Waterbody Construction and Mitigation Procedures (www.ferc.gov/industries/gas/enviro/procedures.pdf) and explain to the attendees that the minimum requirements established by those documents become part of the certificate, and that the landowners have the right to file a formal complaint with FERC if the operator does not live up to those minimum requirements.
- Ask a local emergency manager or first responder to attend the meeting, review the proposed route and raise any issues with respect to emergency access, water supplies for fire flows, proximity to essential public facilities (fire and police stations, water supplies, hospitals, etc) and any other concerns they may have about the proposed route.
- Planned location of compressor stations or other above-ground facilities and standards for visual and sound screening
- How many pipelines will be allowed in the right of way, and can any of the pipelines be converted to different fuels in the future?

approval comes in the form of a Certificate of Public Convenience and Necessity from FERC. Before that approval is granted, FERC is supposed to undertake a complete environmental review that normally includes development of an environmental impact statement.[4] The process is quite extensive and includes opportunities for local governments and community members to become involved. Many who have been through the FERC process question whether FERC's mission to provide energy to consumers across the nation sometimes trumps individual communities' concerns and protection of the environment. There is a citizen's guide to the FERC process on its website: *www.ferc.gov/for-citizens/citizen-guides.asp.* An attorney who frequently represents individuals and communities in FERC proceedings has written a guide for state agencies, local governments and landowners on the FERC process: *lawofficesofcarolynelefant.com/wp-content/uploads/2010/06/FINALTAGguide.pdf.*

FERC encourages operators to communicate early on with local jurisdictions directly. Depending on the proposal and the issues at play, that communication may focus primarily on emergency management personnel, planners, elected officials, or others. The operator may choose to use the FERC pre-filing process, which requires that the operator gather information about the route and affected stakeholders before ever filing an application for a certificate of public convenience and necessity, or the operator may begin consultation meetings after an application is filed with FERC. In either event, local jurisdictions should raise any questions and concerns they have about the routing of the pipeline, construction of related above ground facilities, and compliance with local ordinances that are not preempted by federal authority at these meetings. It is best if concerns raised at these meetings can be transmitted to the operator in writing as well. The local governing body may wish to formally adopt a resolution to transmit its comments to FERC once an application is filed and FERC docket number assigned. There are opportunities for individuals and local governments to make comments on the application, to sign up for electronic notice of everything filed for that Docket number, and to formally intervene in the process. The deadlines are important and the decision of whether or not to intervene or to comment on the application is one the local government should make well before any deadlines preclude it from having that choice.

As of this writing, FERC does not have a process to compensate individuals or local governments for their time and expenses involved with participation. In Canada, the National Energy Board does have such a process (see *www.neb-one.gc.ca/clf-nsi/rthnb/pblcprtcptn/prtcpntfndngprgrm/prtcpntfndngprgrm-eng.html*) which helps remove some of the barriers to greater public involvement.

4 Rules for the FERC environmental review process are contained in 18 CFR §380. The resource reports required during new application review are described specifically in §380.12.

Meetings between the operator and the potentially affected landowners in the community are also typical. It is important for a local government to remember that it can control the format of consultation meetings held between the operator and the local government, and in some cases, its citizens. If the local government holds a public meeting and invites the operator, would the citizens be better served with a town hall format, where the entire audience is able to hear questions and answers? Or is there a need for an open house format, where more one-on-one discussions can take place? Or would more information specific to the jurisdiction be obtained from the operator if the elected officials or their staff were to ask the questions at a formal meeting of the body, with minutes being kept and the public in attendance? While many operators prefer the open house format, most citizens appreciate the opportunity to hear as a group some basic information and answers to questions asked by the audience or their representatives in a town hall format. Meetings can also be designed to incorporate both styles, or another alternative approach. The local jurisdiction can choose the format that is best for its citizens, choose the facility, and invite the operator to participate.

Many pipeline operators who apply to FERC use the voluntary pre-filing environmental review process to identify and scope issues at an early stage. If a locality thinks FERC should include specific factors in their review (see sidebar for general examples) based on particular local circumstances, or require an operator to abide by specific local permits, they should bring those issues to FERC's attention as early in the process as possible, ideally during the prefiling stage, and at the very latest, during the scoping comment period. Notifying both the operator and FERC of these issues early in the process brings the local issues of importance to a higher level of attention, and increases the likelihood that they will be specifically addressed in the environmental impact statement.

A local government may choose to simply file comments with FERC, or they may apply to become an official intervenor in a FERC proceeding. As an intervenor, a local government has the opportunity to represent the interests of its citizens, and to be regularly informed about the process as it moves forward. It can also apply for a re-hearing with FERC if it is dissatisfied with the final FERC decision.

State and local agencies may not prohibit or unreasonably delay the construction or operation of a project approved by FERC, but route changes, mitigation requirements, or other conditions requested by a local government may be able to be negotiated through the process, or included as conditions of FERC's final order of project approval. Operators applying to FERC must still obtain all needed federal permits. Any state or local permits that are issued related to the project must be consistent with the conditions of the authorization of an approved FERC project.

Siting of Interstate Hazardous Liquid Pipelines

There is no complete federal permitting process for the routing of interstate hazardous liquids pipelines, and a much larger role for states and local governments to play in routing for liquid lines if they choose to do so.

If a pipeline crosses an international border (Canada or Mexico), then the U.S. State Department takes the lead on the proposal in a process similar to the one described for FERC above, with involvement of

Example

Pipeline siting and routing regulation – Colorado

Colorado law has given local governments some control over areas and activities of state interest within their bounds since 1974. This includes 'major facilities of a public utility,' including all gas and liquid hydrocarbon pipelines that serve utilities. Statutes also state: "The public utilities commission and public utilities shall take into consideration and, when feasible, foster compliance with adopted land use master plans of local governments..." (CRS 24-65.1-101 et.seq.)

Adams County calls out 'major facilities' in their zoning code, and also has a provision stating that uses similar to other conditional uses can be processed as a conditional use. Using this direction in their code, they review all new pipeline and related proposals (except distribution service lines) to determine whether they should go through the conditional use process by requiring thorough review of the proposed project prior to application in a conceptual review meeting. During the conceptual review meeting, the discussion includes information about the purpose of the pipeline, the need for the project, the alternative routes, potential impacts and proposed mitigation, etc. Pipeline development has increased dramatically, and they have established clear expectations with operators for how the application process goes. A typical new transmission pipeline proposal, for example, must include route alternatives, and neighborhood meetings, and ends with approval by the Board of County Commissioners, including a development agreement that outlines the requirements agreed to by the operator. View project documents at the Adams County Planning website: *www.co.adams.co.us/index.aspx?NID=988*

More examples at: *pstrust.org/trust-initiatives-programs/planning-near-pipelines/planning-ordinances*