



Natural Gas Pipelines: Regulation and Risk for North Carolina

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Introduction

The extraction of natural gas through hydraulic fracturing and horizontal drilling has boomed in the last decade. New technology has allowed extraction of natural gas from previously unattainable sources in unconventional shale plays; and the production of natural gas in the US is predicted to continue increasing in the near future. The US Energy Information Administration estimates the United States will be the world's largest producer of natural gas by 2017. To achieve this level of production, new pipelines are being built and new infrastructure is being added throughout the US. Some North Carolina legislators are attempting to attract the fracking industry to the state to exploit the comparatively small natural gas reserves in the Deep and Dan River Basins. However, it's doubtful that gas development would bring more than a few hundred new jobs, or economic benefits to more than a few large landowners, contractors and operators.¹ A 2012 US Geological Survey reassessment estimated that resources in NC could meet the state's natural gas demands for—at most—5.6 years, not including burgeoning usage by former coal fired plants converted to natural gas.²

This report will provide general information on the US natural gas pipeline system as well as some specifics of regulation and pipeline development in North Carolina, and a newly proposed interstate pipeline that will terminate in NC.

Natural Gas Pipeline System

The figure below explains the process of natural gas transportation, from the extraction to the end user.

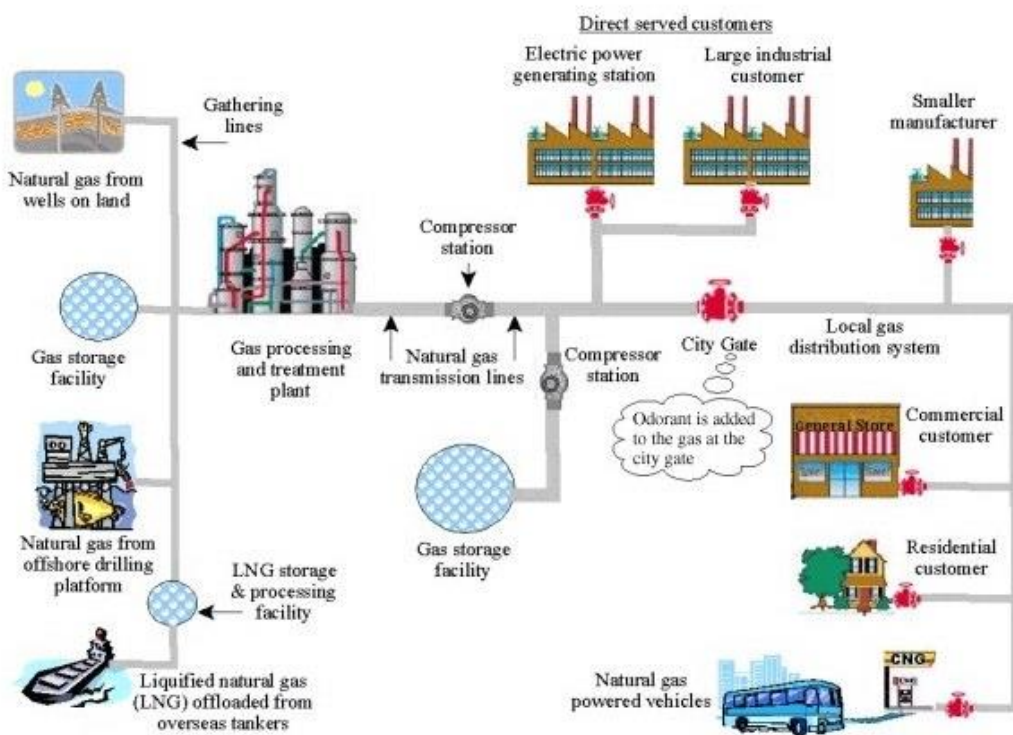


Figure 1 Source: Pipeline and Hazardous Materials Safety Administration (PHMSA)

The pipes used in the natural gas pipeline system range from 1/2 inch, to 42 inches in diameter. Pipelines in the system can be divided into the following types:

- Gathering lines –traditionally small diameter pipelines that move natural gas from the wellhead to the natural gas processing plant, or to a larger transmission line. Because of current extensive shale gas development, gathering pipelines now often have a larger diameter than previously.
- Transmission lines – large diameter, long-distance pipelines that transport natural gas from the producing area to market areas; also made of steel.
- Distribution lines – located in communities to distribute natural gas to homes and businesses through mains and service lines. Constructed from many different materials including cast iron, steel, copper, and plastic pipe; but the most common is plastic pipe.^{3 4 5 6}

Pipeline components

- Compressor stations – Natural gas is highly pressurized as it travels through a transmission pipeline. Compressor stations maintain the pressure of gas along traveling through the line, as the gas loses pressure due to friction. They are spaced at 40-100 mile intervals.
- Metering stations – These stations measure the flow of gas along the line.
- Valves – Necessary to control the flow of gas. The valves are placed at 5 to 20 mile intervals along the pipeline.
- Control stations or industrial control systems – These are used to monitor and control the gas as it travels through the pipeline network.⁷

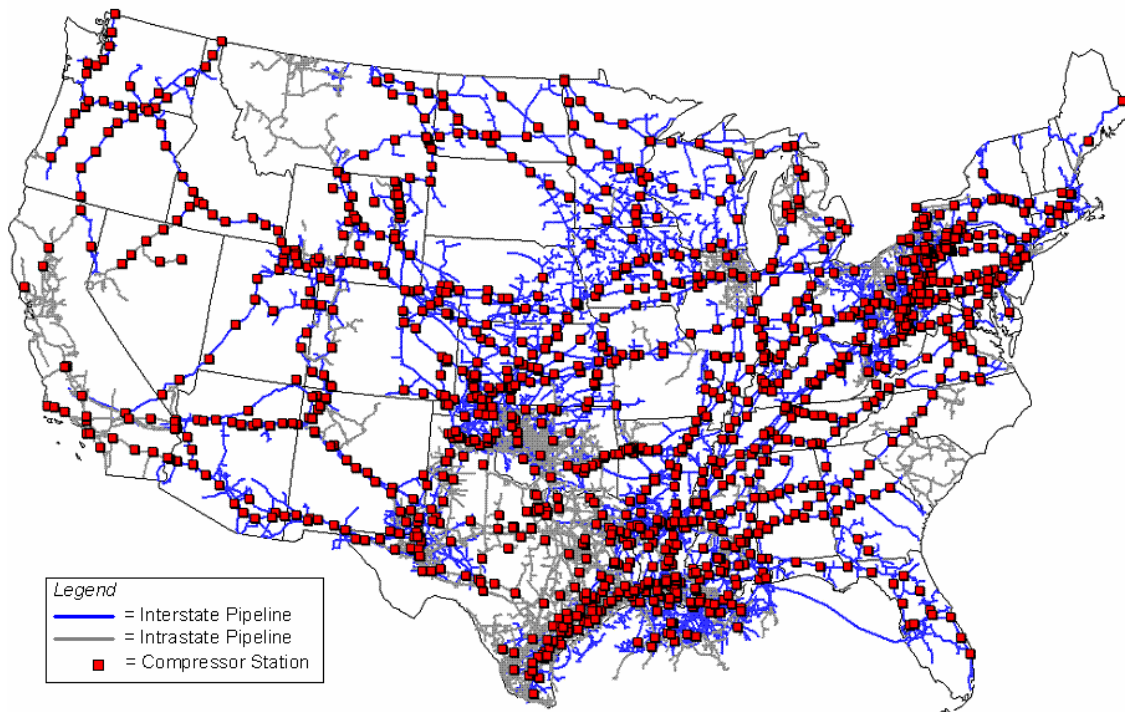


Figure 2 Natural Gas Pipeline Network. Source: US Energy Information Administration (EIA), 2009

International Pipelines

Pipelines sometimes cross national boundaries. In North America, pipelines connect natural gas from fracking to tar sand extraction, where natural gas liquids are added to heavier tar sands oil, in order to facilitate transportation through pipelines.⁸ In November 2013, the Obama administration approved the Cochin Reversal Project, a pipeline that will cover 1900 miles between the US and Canada, to transport gas condensate (liquids) from Illinois to Alberta, where it will be used to thin tar-sands oil.⁹ The company Kinder-Morgan is behind the project, which will involve reversing and expanding an existing pipeline in collaboration with Velocity Midstream, a company that has built much of the gas infrastructure in the Eagle Ford shale basin in Texas. The Cochin Reversal Project will use gas liquids from fracking operations in the Eagle Ford.¹⁰ This international pipeline is of note because it demonstrates how increasing demand for tar sands oil production has increased the market for products of natural gas fracking.

The Keystone Pipeline, a controversial international pipeline owned by TransCanada Corporation, transports crude oil from the tar sands in Alberta, Canada, to refineries in Nebraska and Illinois. Proposed extension of the Keystone system would deliver oil to the Gulf Coast for refining and export. Though some of the northern sections of the pipeline are still awaiting approval from the US government, the southern leg, from Cushing, Oklahoma to the Gulf Coast, began transporting crude oil in January 2014. The extension of the Keystone pipeline through ecologically sensitive areas of Nebraska has been widely protested by environmentalists and Nebraska officials, resulting in a change in the proposed route.¹¹ Resistance to the State Department approval of the Keystone KL Pipeline expansion continues, based on impacts to global climate.

Interstate pipelines

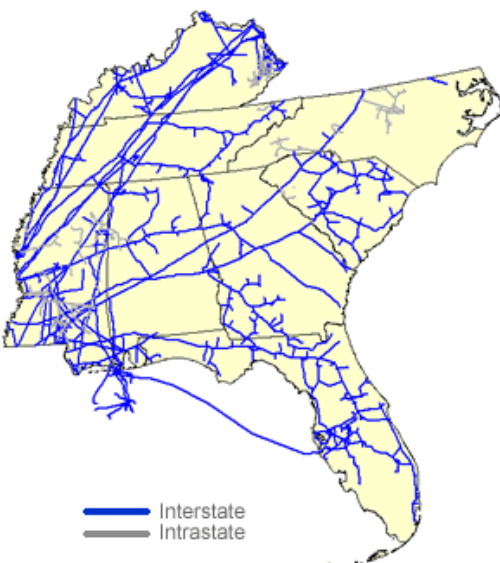


Figure 3, shows major interstate pipelines in the South East. Source: Energy Information Agency (2009)

The construction of interstate natural gas pipelines is regulated by the Federal Energy Regulatory Commission (FERC). The commission approves the location, construction and operations of pipelines and storage facilities of natural gas. FERC requires companies to make a public notification of the construction of a pipeline, and to do an environmental analysis. The public can provide comments during various stages of the process. The company proposes the location, and alternative routes; but it is FERC that determines which route is preferable to communities and the environment. Endangered species and historic buildings have some regulatory protections.¹²

Once constructed, interstate pipelines are overseen and inspected by the Office of Pipeline Safety through the PHMSA (Pipeline and Hazardous Materials Administration), part of the Department of Transportation.

Transco is the major interstate pipeline passing through North Carolina. It is owned by Williams, a major energy infrastructure company based in Tulsa, Oklahoma that operates 15,000 miles of natural gas pipelines in the US. The Transco pipeline system brings gas from the Gulf coast of Texas, Louisiana, Mississippi and Alabama, through Georgia, South Carolina, North Carolina, Virginia, Maryland, and Pennsylvania to deliver gas to the New Jersey and New York City areas, traveling 1,800 miles.¹³

Though the flow of gas in Transco currently runs south to north, it is expected to reverse direction in December 2015 and move gas from the Marcellus shale to supply the South, when Williams expects to complete its \$600 million

southeast expansion project. This could potentially make fracking in North Carolina even less economically viable, bringing a high volume of easily accessible gas.¹⁴



The Cardinal Pipeline connects North Carolina customers to the Transco pipeline. It is co-owned by Williams and Cardinal Pipeline Company LLC, and supplies distributors Piedmont Natural Gas Company and PSNC Energy. The Cardinal Pipeline is a 24-inch diameter pipeline that carries gas 105 miles from Rockingham County to Raleigh, NC. Though a subsidiary of the interstate system Transco, it is considered an intrastate pipeline, and is inspected by the North Carolina Utilities Commission.¹⁵

Also along the Transco route is the Pine Needle ‘peaking’ facility located in Stokesdale, NC. It has facilities to liquefy 20 million cubic feet of natural gas per day. Lowering the temperature

Figure 4 Transco pipeline, Cardinal pipeline, and NC LNG storage facility . Source: Williams Company

of natural gas in order to turn it into a liquid makes it easier to transport through pipelines. Pine Needle also has a storage capacity of 4 billion cubic feet. It provides peak demand and storage service to customers of the Transco pipeline system. It is co-owned by Williams Gas Pipeline Transco, Pine Needle natural gas company, Piedmont, PSNC, and several other companies.¹⁶



Figure 6 aerial view of the Pine Needle LNG storage facility. Source: Google Earth

Figure 5 Lake Norman in NC, with blue line indicating pipelines

North Carolina crosses Lake Norman (see figure 6), the largest lake in the state and a state park.¹⁷

Future Interstate Pipelines in North Carolina

In April 2014, Duke Energy and Piedmont Natural Gas announced they were jointly seeking proposals for an interstate natural gas pipeline to supply North Carolina. Five proposals were submitted, with three being announced publically, from Dominion Resources, Spectra Energy and EQT/Next Era Energy.^{18,19,20}

On September 2, 2014, Duke Energy and Piedmont Natural gas announced that they had selected Dominion Resources to design and build the project. Dominion expects to finalize the “Atlantic Coast” pipeline route by summer of 2015, and

Part of the Transco pipeline in

it will take an estimated 2 years to build the pipeline. See Figure 7 for a proposed route of the Atlantic Coast pipeline. It will cost between \$4.5 billion and \$5 billion to construct, up from initial estimates of \$2 billion.^{21, 22} The pipeline will be jointly owned by four energy companies: Dominion (45%), Duke Energy (40%), Piedmont Natural Gas (10%), and AGL Resources, an energy company from Atlanta that owns Virginia Natural Gas, with 5%.²³

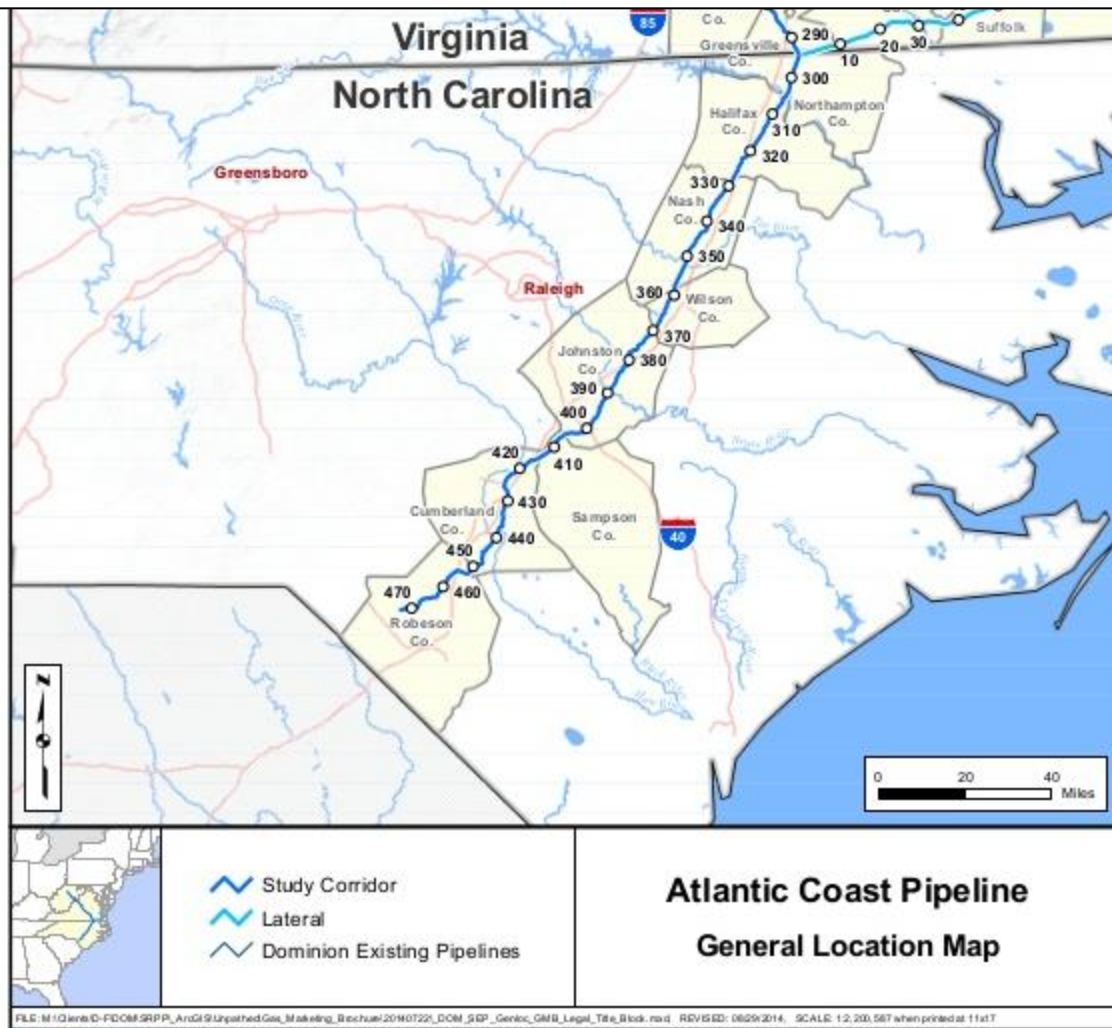
The pipeline is being touted as good for industrial development, as many areas along the proposed route are more than 10 miles from the nearest natural gas hookup, particularly in Johnston County.²⁴ However, the main purpose of the natural gas pipeline will be to supply Duke Energy, with its 5 natural gas power plants in NC, and one new natural gas plant being built in South Carolina. Most of the natural gas transported will be bought by Duke Energy, Piedmont Natural Gas, PSNC Energy, and two Virginia utilities. The remaining capacity will be available for industries and businesses.²⁵

The interstate pipeline will flow in one direction, and will not transport gas if any is drilled in North Carolina. The pipeline will be 42 inches in diameter in West Virginia and Virginia, and 36 inches in diameter in North Carolina, and will have the capacity to transport up to 1.5 billion cubic feet of natural gas daily. Dominion will need a width of 110 feet for construction, and a 50-foot corridor for the buried line. They will also require permanent access for maintenance, including prohibiting buildings and trees in the easement.²⁶

Negotiations with landowners to finalize the route could take several years, and companies could resort to seizing land through eminent domain. As of late July, before Dominion's proposal was officially accepted, it had already notified more than 1,000 landowners in a 400 foot corridor about survey work to be done on their land.²⁷ Residents along proposed pipeline routes are concerned about the affect to their property, and with justification. If landowners do not want to cooperate, the pipeline operator can "condemn" the property for an easement, and negotiate the value of the property afterwards. An easement is an acquired privilege or right, such as a right-of-way, afforded a person or company to make limited use of another person's or company's real property.²⁸ Under NC's eminent domain laws, private companies can appropriate public or private property on the condition that it is "necessary and in the public interest"; and pipelines for the transportation of gas are allowed under that statute.²⁹ If FERC authorizes the project, and a necessary easement cannot be negotiated with a landowner, the company is granted the right of eminent domain under section 7(h) of the Natural Gas Act and the procedures set forth under the Federal Rules of Civil Procedure (Rule 71A).³⁰ If this happens, the landowner can receive monetary compensation, but it is determined by the courts.³¹ Some landowners could make money from the loss of their land, while others would make very little, depending on the specifics of the situation.

Because it is an interstate pipeline, the project will require review and approval by the Federal Energy Regulatory Commission (FERC). FERC's approval process has been criticized as being too expedient and its review process too lenient towards industry. This issue has been brought up especially in regards to the Cove Point LNG export terminal in Calvert County, Maryland. FERC has not yet permitted this project, but could in the near future, despite 150,000 opposing public comments.³²

Figure 7: Proposed Route of future Dominion interstate pipeline. Source: Dominion Resources



Federal Energy Regulatory Commission and Public Input

According to their website, Federal Energy Regulatory Commission members are appointed by the President of the United States with the consent of the Senate, and there is no review of FERC decisions by the President or Congress. The Commission is funded entirely through fees and charges from the industries it regulates.³³

A grassroots group based in Pennsylvania, the Sane Energy Project, maintains that FERC has never denied any permit for an oil or gas infrastructure project, unless the operator itself withdrew the application. They say "the FERC regulatory/permitting process is designed and orchestrated to render public opinion meaningless, ineffective, and destined to fail."³⁴ Furthermore, FERC has steadily decreased the amount of time they spend on each permit.³⁵

However, public input is still essential in any FERC project, and due to the decreasing time involved in the FERC process, including public participation, it is essential that stakeholders and potentially affected community members have an understanding of the FERC permitting process, and are engaged from the earliest opportunity. Figure 8 shows a diagram of public input opportunities in the FERC process for the Atlantic Coast Pipeline project.

Construction on pipelines cannot begin until FERC issues a certificate, it is accepted by the company, and the company receives all other needed permits. Once a certificate is issued, construction may begin within a few weeks. Because of the planning involved, companies may try to obtain easement agreements before being issued a certificate by FERC. In the case that FERC does not approve a certificate, the initial easement agreement is usually void, though it depends specifically on the wording of the right-of-way contract, and disputes over the wording of the agreement are subject to State law.³⁶

Until a certificate is issued by FERC, pipeline companies are subject to state and local trespass laws and may not go on a landowner's property without permission. Some states have laws that allow a company to access property for survey purposes. In most cases, the company will notify landowners in advance.³⁷

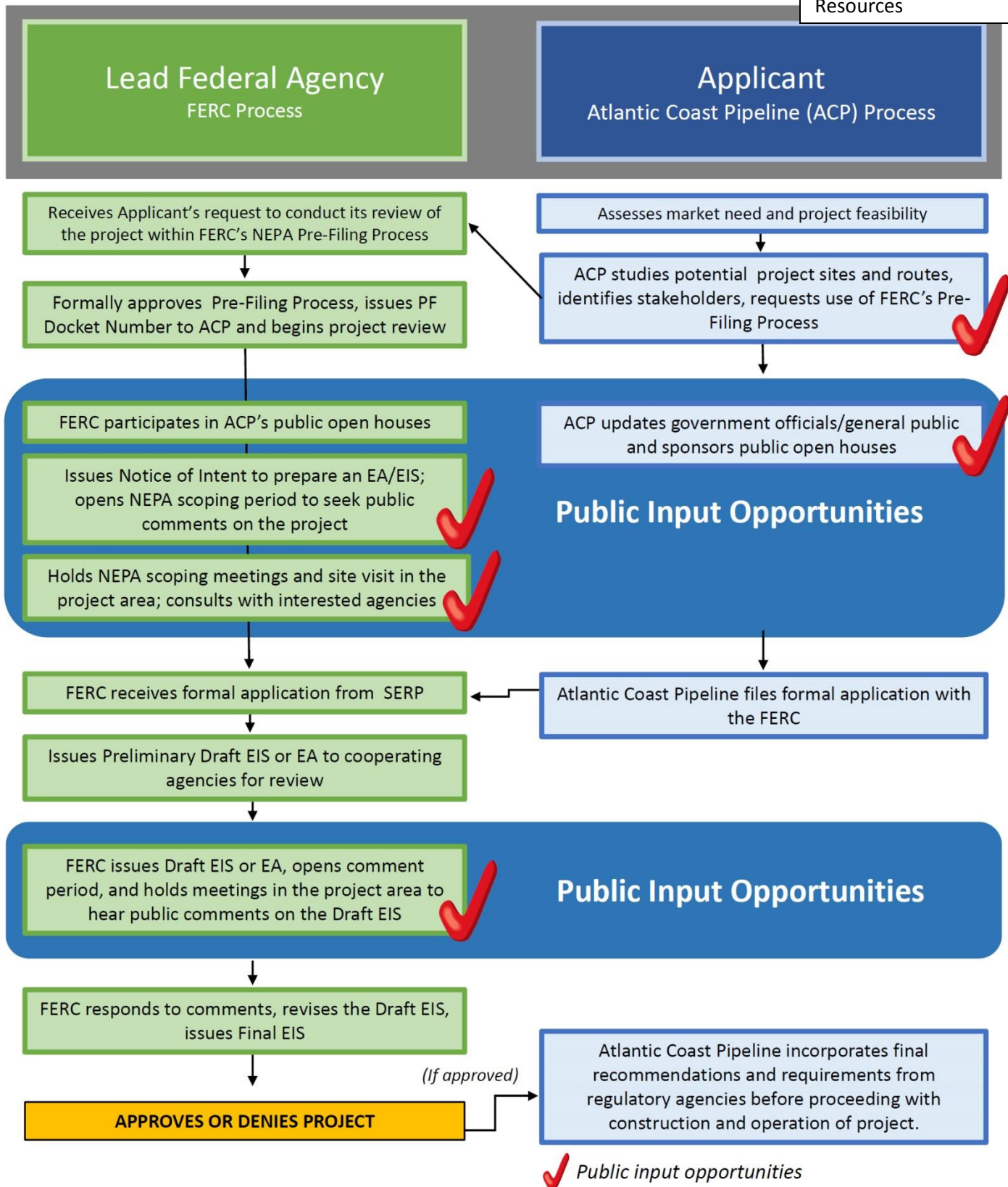
There are many helpful tips for landowners who are confronting the possibility of a pipeline coming through their property. One thing to keep in mind is that refusing to let a pipeline company come on your property to survey will not deter the project, and may negatively affect the landowner, as the company will proceed without accurate data and will only use assumptions about the terrain. Pipeline companies allocate millions of dollars for the certification process, including dealing with landowners who don't want to negotiate. Written agreements with the company should specify the terms of access to a landowner's property. Once the pipeline company is issued a certificate by FERC, the pipeline company can condemn the property, diminishing the landowner's grounds to object.³⁸

For landowners in the path of a pipeline, holding out on an agreement with a pipeline company is not likely to get the landowner a higher offer. Because they have the power of eminent domain and can condemn properties, pipeline companies have no incentive to give in to people who are holding out. Though the process of going to court may cost the pipeline company more in the short run, in the long run it saves them money, so it discourages holdouts. Former FERC lawyer Carolyn Elefant recommends that if a landowner has a genuine disagreement over the price offered for their property, they can try to negotiate a better price by submitting their own appraisal information, or by disputing the pipeline's assumptions.³⁹

Landowners should not be misled by the long time a pipeline company needs to satisfy all the conditions of their permit. In most cases, a pipeline company does not need to wait for a FERC certificate to be issued in order to initiate eminent domain proceedings. In fact, pipeline companies usually begin this process ahead of time, in order to expedite their project. Once the pipeline company is in the pre-filing stage of their application with FERC, they must give notices to landowners in the path of the pipeline. These notices include a deadline for intervening. Interventions are important because they grant people the right to receive copies of filings and appeal a decision in court. If you miss the deadline, you miss out on important rights. Because the pipeline company is also required to post public notices in newspapers, not knowing about the deadline is not considered an excuse for missing a deadline. Similarly, people not directly affected by the pipeline can be indirectly affected, will not be given official notice, but may still want to be informed.⁴⁰

Figure 8: Public Input Opportunities with the Atlantic Coast Pipeline.
Source: Dominion Resources

Federal Energy Regulatory Commission (FERC) Environmental Review Process



Below is a table of some ways stakeholders can participate in the process, and general best practices for interacting with FERC, from a document from the Law Offices of Carolyn Elefant, called “Knowing and Protecting Your Rights When an Interstate Gas Pipeline Comes to Your Community”, available at <http://lawofficesofcarolynelefant.com/wpcontent/uploads/2010/06/FINALTAGguide.pdf>

Pre Application / Early Application Stage	Obtain as much information about the proposed route as possible
	Register to subscribe to assigned docket to receive information or intervene if deadlines have been established
	Create groups (landowners) or taskforces (agencies) to stay abreast of the application process
	For landowners, filing comments as a unified group on common issues is preferable to filing dozens of comments (though all landowners should intervene as individuals as well as part of the group)
	For municipal and county groups, sometimes intervention requires approval or authorization. Obtain approval <i>as early as possible!</i>
Scoping Process	Participate in scoping process to identify issues that require study.
	File comments on completed scoping process.
	Obtain copies of studies performed and review them; if budget permits, hire experts to review and comment on studies.
	Ask FERC to make site visit and conduct siting meeting in the community.
	Propose alternative routes for review
Environmental Review	File comprehensive comments on environmental assessment (EA) or environmental impact statement (EIS). Reference specific pages of EA or EIS for comment
	File comments within deadline provides
	If you have not intervened by this stage, you MUST do so by deadlines set in environmental document
	Emphasize impacts to property and specifically ask FERC to consider alternatives
Certificate Issuance by FERC	Review order and determine whether to seek rehearing
	Time for rehearing is 30 days after order, so public bodies should seek authorization to file rehearing as soon as possible
	If rehearing is filed, raise <i>all</i> possible issues. If issues are not raised on rehearing, they are deemed waived.
	Seek stay of order if properties are subject to eminent domain or where state and local permits have not yet been issued (unlikely that stay will issue, but ask for it anyway)
	If order is seriously problematic, contact legislators for assistance in influencing the FERC process
	FERC order will contain multiple conditions. <i>Review order and determine which conditions apply to you or your constituency so that you can monitor the pipeline’s compliance.</i>
Post-Certificate Activities Compliance	Monitor pipeline’s compliance with conditions of certificate
	Report any violations of certificate conditions to FERC (if FERC related – e.g. premature construction), state authorities (e.g. violation of applicable state or local requirements), or DOT Office of Pipeline Safety (for violations of

	safety standards)
	For affected landowners or NGOs, stay involved in remaining state and local permit processes and intervene/participate as necessary to protect rights
	If entitled to state specific plans, review and comment
	Once certificate is issued, pipeline can seek access. Negotiate agreements to allow terms of access and report violations to FERC, Dispute Resolution Office.
	Document all pipeline activity on property with photos or memos to file.
Rehearing and Judicial Review	Determine whether to challenge pipeline action in court (challenge goes to federal district court).
Easement Acquisition and Eminent Domain	Retain an attorney to advise on easement acquisition
	Draft terms of easement to contemplate potential changes to route and concomitant changes in terms of easement
	Include provisions for damages and restoration in easement agreement
	For substantial tracts of land of large value, seek independent consultant.
	Determine whether to litigate eminent domain disputes; cooperate with other landowners to share costs and possibly extract better deal (but realize that holding out will not necessarily result in substantially more dollars).

Compressor Stations

According to Federal Energy Regulatory Commission (FERC), the land for a compressor station is typically purchased from the landowner rather than obtained by an easement, through negotiation or by exercise of eminent domain. Usually the pipeline company purchases 10 to 40 acres along the pipeline route for compressor stations. Five acres of the land is necessary for the compressor station itself, the remaining acreage serves as a noise buffer.⁴¹ Compression stations for interstate pipelines must meet a day-night sound level of 55 decibels.⁴² There are currently three compressor stations in North Carolina, all part of the Transco interstate pipeline. As components of interstate pipelines, they are inspected by the Pipelines and Hazardous Materials Safety Administration (PHMSA).



36.330443,-79.830106
in Reidsville, NC



35.88014,-80.330048
in Lexington, NC



35.170248,-81.417063
in Kings Mountain, NC

Figure 9: Compressor Stations in North Carolina. Source: Google Earth

Gathering Lines

The US Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) regulates natural gas gathering lines based on their proximity to populated and environmentally sensitive areas. PHMSA does not regulate most gathering lines in the US because they are located in rural, less populated areas, considered "Class 1" areas. In these areas, gathering lines are essentially not regulated at all.⁴³

Pennsylvania only adopted legislation that gives their Public Utilities Commission some control over gathering lines in 2012. But, consistent with federal regulations, gathering lines in rural areas of Pennsylvania are still considered private lines, and are not regulated by the state. Pipeline operators negotiate easements with landowners, and if local planning commissions want information on where the pipelines have been built, they must ask the operators, rather than being notified. Another consequence of this limited regulation is that, as each gas company independently develops its own gathering lines, they often end up running parallel routes, doubling potential impacts to the environment and landowners.⁴⁴

Regulation of Pipelines in North Carolina

Interstate pipeline construction is regulated by the Federal Energy Regulatory Commission (FERC). Once pipelines are operational, they are overseen by the Pipeline and Hazardous Materials Safety Administration (PHMSA). Intrastate pipeline construction in North Carolina, as in most states, is overseen by state regulatory agencies, which are responsible for inspection, regulation and enforcement.

Intrastate pipelines represent about 29% of the 305,000 miles of gas transmission pipelines in the US as of 2008 and are regulated by each state's public utilities commission.⁴⁵ In North Carolina they are under the jurisdiction of the North Carolina Utilities Commission (NCUC), which is responsible for inspection and monitoring of all intrastate pipelines and compressor stations. They have four full time inspectors.⁴⁶

The NCUC regulates the natural gas companies' pricing practices and service, and approves new projects, but it does not determine the route of new pipelines. Companies are not required to disclose the environmental reviews or the location of new infrastructure to the public in order to begin construction.

In North Carolina, the NC Utilities Commission (NCUC) is responsible for inspection and monitoring of all intrastate pipelines, including compressor stations. Requests for new intrastate pipelines in North Carolina receive approval from the NCUC in the form of a Certificate of Public Convenience and Necessity (CPCN). The NCUC has already granted a CPCN in service areas of all local distribution companies (LDCs) in North Carolina, covering almost the entire state (See Figure 10).⁴⁷ The four local distribution companies in North Carolina are: Piedmont Natural Gas (Piedmont), Public Services Company of North Carolina (PSNC), Frontier Natural Gas, and Toccoa Natural Gas (See Figure 10, next page).⁴⁸ LDCs only need to go to the NCUC if they propose to run a pipeline through another LDC's territory, or if more than one distribution company work together on a joint project.⁴⁹ Environmental reviews that need approval from the state environmental agency, DENR, would only occur if a proposed pipeline would cut through federal or state land, or use federal or state funds. Local distribution companies have to notify the NCUC when constructing certain new distribution lines that operate at a higher pressure, by submitting a "G100 sub 92 docket." Additionally, there is a federal requirement for LDCs to have a public awareness program to provide safety information to the affected public, emergency officials, local public officials and excavators.⁵⁰

The NCUC adopts safety standards for the operation of natural gas pipeline facilities in the state, and requires that all gas operators file reports of accidents, as well as copies of their construction, operation, and maintenance standards and

procedures. According to state law, the NCUC can take disciplinary measures against operators that are not in compliance with safety standards. The NCUC is also authorized to make cooperative agreements with the US DOT and PHMSA for inspection of all natural gas pipelines in the state. According to Bill Gilmore, deputy director of the Natural Gas division of the NCUC, the Commission contracts with the US DOT to enforce their regulations. The NCUC's regulations cannot be weaker than federal standards, or the agency could lose part of its federal funding.

Local governments and gas distribution companies have been granted the authority of eminent domain for the purpose of gas production, storage, transmission and distribution systems. North Carolina's current eminent domain laws grant natural gas producers "broad authority" to take private property, particularly for the construction of pipelines, with no clearly defined limits.⁵¹ As gas distribution companies are treated as utilities for compensation purposes on their pipeline and other infrastructure projects, with a guaranteed rate of return on investment in projects, they have an incentive to create new pipelines with recovery of costs plus a profit margin through their customer rates. As a result, these companies are economically interested parties to increase gas production and consumption through legislative action, including support of fracking and use of natural gas in public vehicles.

Because CPCNs have already been granted for most of the state and with "broad authority" of eminent domain for distribution companies, there is minimal regulation of local distribution company projects. Any new distribution pipelines built as a result of the fracking boom would not require new permission from the NCUC. According to the North Carolina Utilities Commission, it is not known what, if any, regulatory authority would apply to gathering lines to transport gas from production wells to treatment facilities and the distribution system. Regulations would address issues such as: reporting the location of gathering lines to state and local agencies, siting and installation criteria, inspections, leak monitoring and maintenance.⁵² Comments made by some Mining and Energy Commission members appear to be asserting MEC authority to regulate gathering lines, rather than the NCUC.

Natural gas distribution companies from North Carolina can also do business in other states. One example is the acquisition from Piedmont Natural Gas of 24% of the 122 mile new proposed Constitution pipeline in Pennsylvania and New York; other partners are Williams, Cabot Oil and Gas and WGL Holdings. The pipeline will bring natural gas from the Marcellus shale in Pennsylvania to northeast markets.⁵³ Piedmont's investment in the new pipeline is \$180 million.⁵⁴

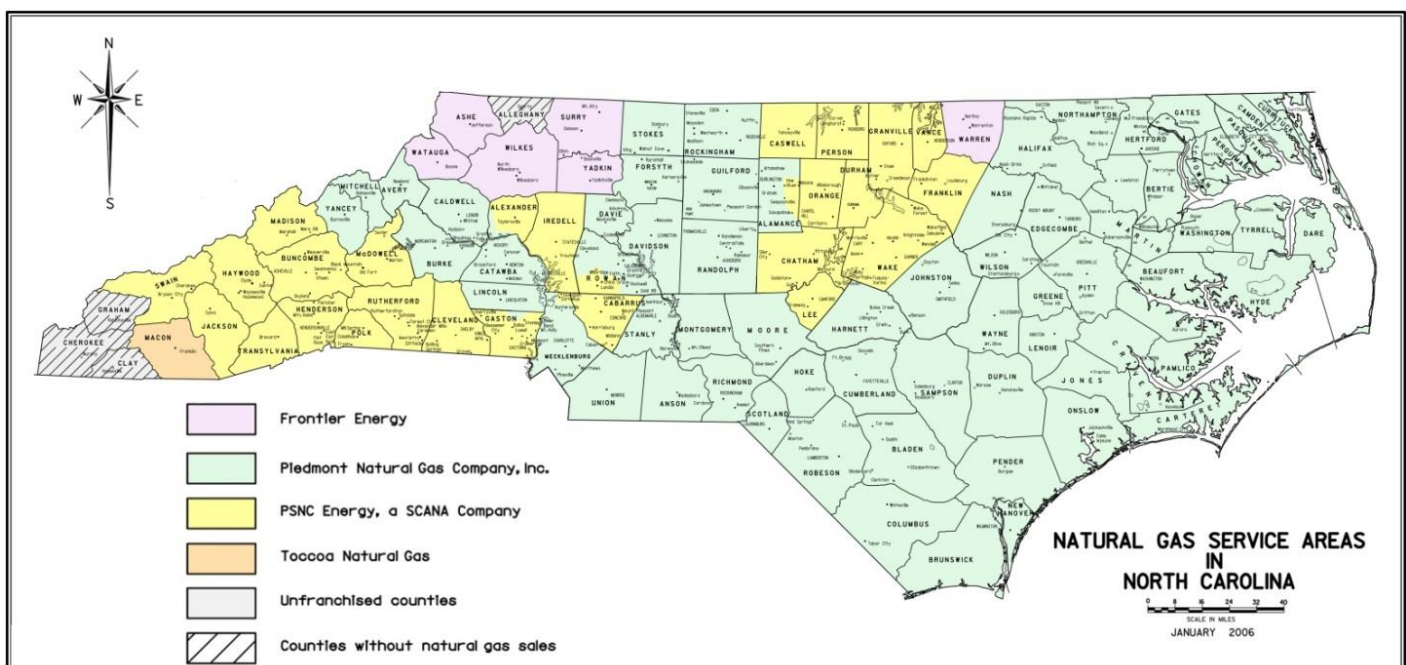


Figure 10 Natural gas companies service territories. Source: North Carolina Utilities Commission

Sutton Power Plant Served By New Transmission Line

In early 2010, Progress Energy Carolinas (now merged with Duke Energy) asked the NCUC to approve a new 620 MW gas-fired power plant near Wilmington, along with retirement of 3 coal-fired generating units in the Sutton Steam Plant complex. The company also expressed the need for a new natural gas pipeline to supply fuel for the power plants.⁵⁵

Piedmont Natural Gas (Piedmont) notified the NCUC in April of 2010 of its plan to build a pipeline for the new Sutton power plant. This is part of a multi-year agreement of construction of infrastructure by Piedmont from 2001, although the agreement itself is confidential.⁵⁶ Completed in 2013, the 133-mile, \$217 million pipeline allows Piedmont to expand business in eastern NC.⁵⁷

At the beginning of 2012, Davidson College filed a complaint with the NCUC about the new Sutton pipeline crossing through its Ecological Preserve. College officials had tried to contact Piedmont in 2010, asking for the location of the new pipeline, but did not receive a response until early 2012. Davidson College then urged Piedmont to change the route, to avoid damage in their ecologically sensitive area, but Piedmont did not provide any alternative route. It was not until Davidson College hired a lawyer and officially complained to the NCUC that Piedmont proposed a change in the pipeline route and continued with the project.⁵⁸

Duke Energy and Pipelines

In 2012, Duke Energy and Progress Energy combined, and Duke Energy is now the largest corporate utility in the world, with a monopoly over electric power production in almost all of North Carolina. Duke Energy's 2013 Integrated Resource Plan shows their intent to increase natural gas production capacity from 18% to 29% in the next 20 years. Because Duke Energy also plans to increase its total energy capacity, the natural gas consumption would leap from 3,259 MW today to 7,512 MW in 2032, more than doubling Duke's use of natural gas.⁵⁹

Since 2011, Duke Energy has built five natural gas plants in North Carolina, establishing its future reliance on natural gas from fracking. But Duke Energy's interests also include the purchase, transmission, and sale of natural gas,⁶⁰ with examples including natural gas distribution services in Ohio and Kentucky⁶¹ and the Spectra Pipeline in New York City.⁶² In 2000, Duke partnered with ConocoPhillips for "pipeline system focus", completing a nearly 500 mile Eastern Gas Pipeline in Australia.⁶³ They also partnered with natural gas infrastructure giant Williams Companies on the 674 mile Buccaneer Gas Pipeline in the Gulf of Mexico and Florida.⁶⁴ Duke-ConocoPhillips Midstream prides itself on being "the second largest natural gas gatherer and producer in North America".⁶⁵

Duke Energy has come to dominate crucial aspects of the natural gas market. In North Carolina, Duke has a close relationship with Piedmont Natural Gas (Piedmont), which has completed a 128-mile natural gas pipeline to Duke's Sutton plant near Wilmington, and also services Duke's Dan River plant.⁶⁶ Piedmont also has contracts for Duke's other natural gas plants and seems to be solidifying control over the natural gas market in NC.⁶⁷ Piedmont has signed a 15 year contract to obtain a "meaningful portion" of its natural gas supplies from the Marcellus Shale.⁶⁸

Duke Energy and Piedmont clearly have much to gain from fracking, in the state of North Carolina and beyond, through an increased supply of natural gas, and an increased reliance on gas infrastructure.

Gas Transmission Pipeline Vulnerabilities

The boom of the shale gas industry in recent years has increased production of natural gas, pipelines and facilities, as well as the probability of accidents. The Pipeline and Hazardous Materials Safety Administration (PHMSA) has calculated that over the past 20 years, there have been an average of 49 serious incidents per year nationally, resulting each year in 18 fatalities, 73 injuries, over \$35 million in property damage, and 8,462 barrels of gas spilled.⁶⁹ Figure 11 shows a trend in accidents from natural gas transmission pipelines from 1990 to 2009.⁷⁰

Some key facts related to aging pipeline infrastructure:⁷¹

- > 50% of current pipeline infrastructure of the country was built between the 1950's and 1960's
- 3% of the distribution pipelines made out of cast or wrought iron were built between 1900's and 1950
- > 12% of the nation's cross-country gas transmission pipelines were built prior to the 1950's
- The first federal regulations on pipeline safety were implemented in 1968, based on standards followed by most of the states
- Modern coating materials of steel pipelines have improved over time – the first pipelines had no coating at all
- Pipe welding has evolved – much of current infrastructure used outdated welding techniques
- According to a report from FERC (2010), when a pipeline is retired, most of the time only the above ground facilities are removed. It is up to FERC to order the removal of the underground pipes, and sometimes that information can be stated in the easement.⁷²

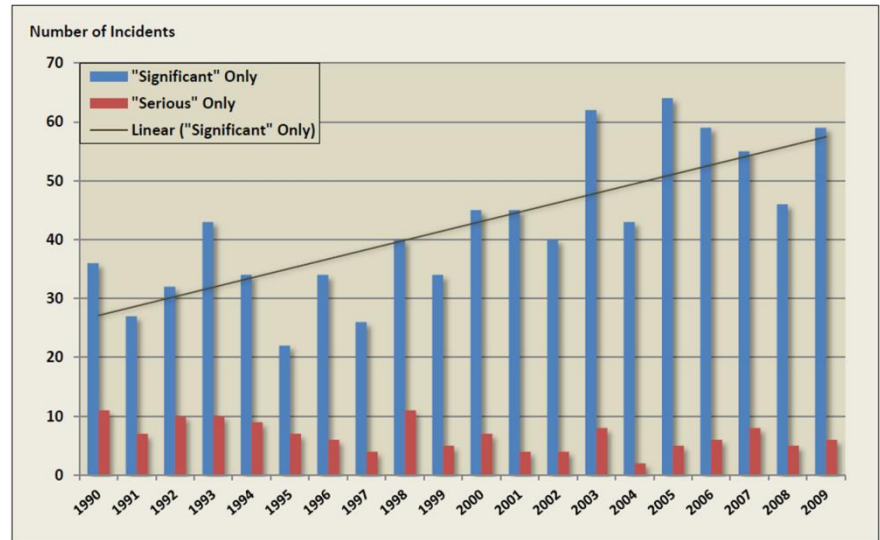


Figure 11 Trends in Natural Gas Transmission Onshore Incidents: 1990-2009. Source: PHMSA

Freezing is a common occurrence in natural gas pipeline systems, and can be potentially damaging to gathering pipelines. The production and gathering pipeline systems contain gas that is the least processed, potentially including water vapor. In freezing temperatures, this can turn into ice formations that can damage pipelines and objects protruding into the line, such as sample probes and meters. By the time natural gas reaches Local Distribution Companies, it has been processed and refined enough so that there is little risk of freezing.⁷³

According to a PHMSA advisory, severe flooding can adversely affect the safety of pipelines. In October 1994, high flood waters near Houston, TX resulted in 8 pipeline failures and compromised the integrity of several other pipelines.⁷⁴ In July, 2011 a failure of a pipeline owned by Exxon occurred near Laurel, MT resulting in the release of 1,500 barrels of crude oil in the Yellowstone River during excessive flooding and adverse weather; the US DOT proposed \$1.7 million in civil penalties.⁷⁵ Record flooding in Colorado in 2013 resulted in at least one broken pipeline in Weld County, with other pipelines exposed and sagging.⁷⁶

Planning, Local Governments, and Pipelines

The Pipelines and Informed Planning Alliance (PIPA) is sponsored by the department of Pipeline and Hazardous Materials Safety Administration (PHMSA), an agency of the Department of Transportation. PIPA is a collaborative initiative of pipeline safety stakeholders (local governments, landowners, emergency responders, developers, state and federal regulators) whose goal is to reduce risks and improve the safety of affected communities and transmission pipelines through the communication and implementation of PIPA recommended practices.⁷⁷ It recommends certain practices to reduce accidents with gas pipelines, such as informed land use planning, safe construction and safe excavation, including a number to call before digging.⁷⁸

The Pipelines and Informed Planning Alliance recommends that local governments have updated maps of the transmission pipelines, as local governments are responsible for setback rules to reduce the risk of pipelines accidents.⁷⁹ However, a 2013 study suggests that half of the municipalities in North Carolina do not have transmission maps, as it is often a difficult process for the local governments to obtain them. Though the Department of Transportation's Office of Pipeline Safety has maps of all transmission pipelines, the information has been classified since 2001. Local governments can petition the federal agency for the information, but local governments sometimes lack the time or are unaware of how to obtain that information.⁸⁰

Federal pipeline safety regulations require pipeline operators to conduct continuing public awareness programs to the public, emergency officials, local public officials, and excavators. Emergency officials and local public officials must be provided information about the location of transmission pipelines to enhance emergency response and development planning. Operators must periodically review their programs for effectiveness and enhance the programs as needed.⁸¹

Most local governments in North Carolina use only a few tools to mitigate pipeline hazards, while a variety of approaches, including regulatory, informational and incentive approaches, are available to them. Regulatory approaches include zoning, special ordinances and setbacks in communities. Information approaches refer to public access to data such as maps, easements, and deed restrictions to identify transmission pipelines. Incentives encourage developers and land owners to avoid development in hazardous areas. Regulatory tools require the most effort and resources from the government. But without local regulations, companies are left on their own to comply with the suggested tools with little enforcement, resulting in only a small portion of companies following recommendations.⁸²

In a 2013 study by the US Government Accounting Office (GAO) regarding pipeline permitting, the agency recognized the importance of public comments in the permitting process. FERC mandates companies to allow public comments, but according to the report, the time frame is very short and the process is so complicated, that it is difficult for the public to know when and how to comment.⁸³

Gas Pipeline Accidents

All states conduct natural gas pipeline inspections and report efforts to the Department of Transportation. As of 2009 in North Carolina, there are 120.7 inspection person days per 1000 miles of pipeline, slightly more than the average 106.9 across the US. North Carolina also has about an average amount of significant incidents per 1,000 miles of pipeline: 1.02, compared to the national average of 1.2.⁸⁴ Data shows that generally, states with more inspections per 1,000 feet have less significant incidents in a state. But due to various factors, such as pipeline density, age of infrastructure, and strength of local regulations, this is not always the case.

Some major accidents to occur recently in the US are as follows: ⁸⁵

1. On December 13, 2005, an apartment building exploded in Bergenfield, NJ. Three residents of the apartment were killed, 5 more were injured, and the building was destroyed. The accident happened because of damage to a natural gas distribution pipeline from the excavation of an oil tank that was buried in a parking lot next to the apartment building. ⁸⁶
2. On March 5, 2008 there was a natural gas explosion in Plum Borough, Pennsylvania, killing a man and seriously injuring a 4 year old girl; 3 houses were destroyed and 11 houses damaged. The probable cause was excavation damage to a 2-inch natural gas distribution line. ⁸⁷
3. On January 10, 2014, a 12-inch gas line in the Enka region of Asheville, NC, exploded. No one was injured, though flames shot 200 feet into the air. The gas line was damaged in 2003 when some of the exterior metal was scraped off. It was inspected for leaks twice a year, and nothing had been detected. ⁸⁸
4. On March 4, 2014, one woman was killed and 7 were injured in Ewing Township, NJ, when a gas pipeline exploded. A contractor damaged a PSE&G gas line while working on an electrical problem. Both contractors and PSE&G workers were working to fix the problem when the line ignited for unknown reasons. 55 homes were damaged, with 15 to 22 uninhabitable. ⁸⁹

One of the most devastating natural gas pipeline accidents occurred on September 9, 2010, when a 30 inch diameter interstate natural gas segment owned by Pacific Gas and Electric (PG&E) ruptured in a residential area in San Bruno, California. The natural gas ignited a fire; here is the list of the damage:

- 8 people killed, 10 people with serious injuries, 48 people with minor injuries
- 38 homes were destroyed, 70 homes damaged
- 74 vehicles were damaged or destroyed
- Cost of the pipeline repair was \$13,500,000 and the cost of loss of natural gas was \$263,000

The probable cause of the accident, according to the National Transportation Safety Board, was inadequate quality control of the 1956 line and poor weld on the pipe, and an inadequate pipeline integrity management program which failed to detect the defective pipe section. The pipeline did not have an automatic shut off valve or remote control valve to stop the flow of gas. It took PG&E 95 minutes to stop the flow of gas from the pipeline. The California Public Utilities Commission (CPUC) failed to detect the inadequacies on the PG&E pipeline integrity management program, according to the report. The DOT and CPUC had granted exemptions for the pipeline regulatory requirements to check the pressure. ⁹⁰ On September 2, 2014, the California Public Utilities Commission penalized Pacific Gas and Electric Co (PG&E) a record \$1.4 billion; the largest safety-related penalty even imposed by the commission. The fine covers 3,798 violations of federal and state laws that PG&E committed over several years, including the San Bruno explosion. ⁹¹

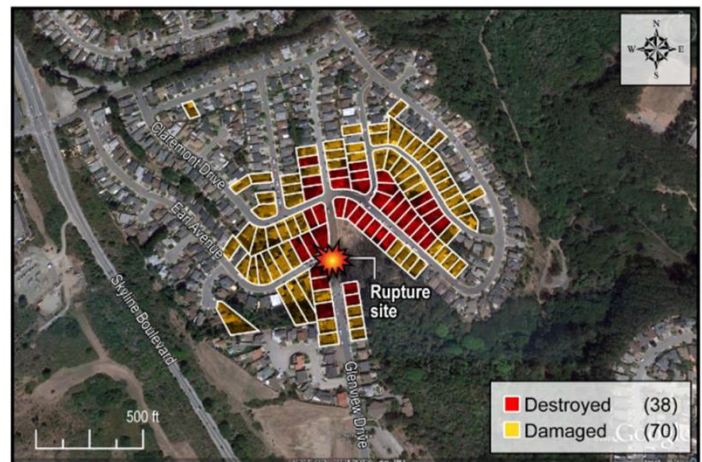


Figure 12 Report on San Bruno accident. Source: National Transportation Safety Board

After the San Bruno, CA accident, the National Transportation Safety Board (NTSB) recommended that PHMSA amend the grandfathered exemptions, thus requiring all gas transmission pipelines constructed before 1970 to be subject to hydrostatic pressure testing. The grandfather clause allowed pipelines that had safely operated prior to the pipeline

safety maximum allowable operating pressure (MAOP) regulations to continue to operate under similar conditions without retroactively applying recordkeeping requirements or requiring pressure tests.^{92,93}

In a bulletin issued in May, 2012 PHMSA explained that the grandfather clause will be addressed in a future rulemaking. The bulletin also says that by the beginning of 2013, operators of gas transmission pipelines will submit data regarding verification of records in urban and suburban locations, and in rural “high consequence” areas. Operators should review their records and determine whether they are adequate to support operating parameters and conditions on their pipeline systems; or if an extra action is needed to comply with the parameters and assure safety.⁹⁴

After the San Bruno pipeline explosion, the National Transportation Safety Board launched an investigation into the Pipeline and Hazardous Materials Safety Administration (PHMSA). It found several weaknesses in PHMSA’s policies and procedures for managing its State Pipeline Safety Program, as well as its oversight of State safety programs. The investigation found that the PHMSA’s guidelines, policies and procedures are not sufficient to ensure that State inspections cover all Federal requirements and pipeline operators maintain safety standards. The PHMSA’s oversight of State pipeline safety programs was deemed insufficient, and their lapses have resulted in safety weaknesses in State programs.⁹⁵

Conclusions and Recommendations

It is important that in the construction of new facilities and infrastructure for natural gas, the public and environmental assessments be included in the process, in order to reduce or avoid environmental and community impacts, and increase safety through public awareness of the presence of pipelines. Companies must be held responsible for protection of the public they are serving; so all regulatory processes must be transparent and include the public from the start. We recommend that local distribution companies be required to hold a longer public comment period for new constructions, increase requirements for public notifications, and increase inspections of existing pipelines.

Where service areas have been established by a long-standing “certificate of convenience and necessity”, gas companies must be required to file plans for pipeline construction with state Utility Commission officials and notify all parties and local governments whose properties may be impacted by eminent domain and pipeline construction.

Exemptions to testing of old pipelines must be overturned, and frequency increased, to prevent serious accidents due to pipeline ruptures.

With the possibility of the fracking industry coming to North Carolina, there will be a need to construction of new gathering pipelines to transmit gas from drilling wells to processing plants. Though the Mining and Energy Commission seems to assume regulatory power over the gathering lines, we strongly recommend that this function be given to the NCUC instead. Regulation of gathering lines must be among those explicitly laid out and approved by the MEC and General Assembly *before* allowing issuance of fracking permits in NC.

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