



Pipeline Safety in Washington State



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STATE OF WASHINGTON
Citizens Advisory Committee on
Pipeline Safety

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The Citizens Committee on Pipeline Safety would like to present this “state of our State” report on pipeline safety, prepared by the Pipeline Safety Trust, with the support of the Washington State Utilities and Transportation Commission.

This report provides a primer on pipelines, their construction, operation and regulation both within Washington State and nationally. Focused on ease of understanding, this report is concise and helpful to all who would like to understand the benefits and risks of pipeline operations and oversight.

The report also lays out recommendations in areas for further discussion and actions, such as:

- Pipeline Consultation Zones
- Land Use Planning/Model Ordinances
- High Consequence Areas criteria

While not exhaustive, the recommendations provide a starting point for industry, government and citizen discussions.

With proper operation and guided oversight, our pipeline network will continue to provide our energy needs well into the future.

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Background & Purpose



Pig Launchers on a hazardous liquid pipeline near Mt. Vernon, WA

Background

In 1999 a pipeline tragedy in Bellingham, Washington killed three young men playing in a city park, destroyed an entire salmon stream, and provided a wake up call for the need to increase pipeline safety across the nation. In Washington State two new organizations grew out of that tragedy. The first one was the governor-appointed Citizens Committee on Pipeline Safety (CCOPS), created by the governor and the state legislature “to advise the state agencies and other appropriate federal and local government agencies and officials on matters relating to hazardous liquid and gas pipeline safety, routing, construction, operation, and maintenance.” The other was the national Pipeline Safety Trust (PST), a non-profit based out of Bellingham, which was created by the victims’ families and the community, and funded with four million dollars of the criminal penalties that resulted from that tragedy. The PST was the dream of parents who lost their children in the pipeline failure, and was to serve as a watchdog group over the pipeline industry and regulators alike to try to ensure that another tragedy like Bellingham would not occur again anywhere else. The creation of the PST gained written support from then Washington Governor Gary Locke, the Washington State Utilities and Transportation Commission (WUTC), the Washington State Citizens Committee on Pipeline Safety, state legislators, many local governments, and pipeline safety advocates nationwide.

Purpose and scope of report

David Danner, the chairman of the Washington Utilities and Transportation Commission (WUTC), challenged CCOPS a few years ago to draft a report that would review how well measures already in place are doing to ensure the safety of the pipelines in Washington State, and to make recommendations for what could be changed to

make pipelines even safer. CCOPS embraced this idea, but as a volunteer advisory committee that only meets four times a year it believed such a report was beyond its ability without assistance. It asked the PST to draft such a report independently with the intention that they would then review it and endorse the parts they agreed with, and the WUTC supported the initiative by providing \$9,700 of funding.

The purpose of this report is to provide an easy-to-understand primer of how pipelines are routed, constructed, operated, maintained, regulated, and inspected in Washington State and the shared responsibilities that the pipeline industry, regulators, local government, and citizens have to ensure continued safe operations. The scope is focused on the safe operations of the pipelines themselves and does not get into associated concerns about the impacts from the production or use of the various fuels that the pipelines transport.

To complete the report the PST met with CCOPS twice before the first draft was provided, talked with and received clarification from the WUTC Pipeline Safety Program staff, requested information from Pipeline and Hazardous Materials Safety Administration (PHMSA), and acquired information through three different surveys. The surveys were targeted at three different stakeholder groups – elected officials, emergency responders, and representatives from pipeline companies operating in Washington. The survey questions and results, and other information used to produce this report, can be found on the report’s webpage.¹

¹ Pipeline Safety in Washington State: <http://pstrust.org/pipeline-safety-in-washington-state/>

Summary of Recommendations

Recommendations for WUTC

WUTC-1: The WUTC should review WAC 480-93 and WAC 480-75 to ensure better consistency between natural gas and hazardous liquid rules.

WUTC-2: The WUTC and Governor should continually work to ensure implementation of the yet to be adopted parts of the state legislature's intent in the state's Pipeline Safety Act of 2000 (see page 21 for specific bullets).

WUTC-3: The WUTC should review their authority on tribal lands and consider the need for an agreement with tribal governments regarding jurisdiction and technical assistance where pipelines occur on reservations to ensure the WUTC has lawful access to those pipelines if an inspection or incident investigation is warranted.

WUTC-4: The WUTC should consider the need for an agreement regarding jurisdiction and technical assistance with the Department of Defense relating to the safety of any military pipelines operating off military bases, such as the one that serves the Whidbey Naval Air Station.

WUTC-5: The WUTC should ensure that land use and emergency planners in each county with active pipelines receive a copy of FEMA 2015 report Hazard Mitigation Planning: Practices for Land Use Planning and Development near Pipelines.

WUTC-6: The WUTC should work with the Legislature to amend RCW 19.122.033 to also apply to applications for long and short subdivisions, binding site plans, boundary line adjustments, and planned unit developments. Further, these rules should apply, when appropriate, during the design phase of a project (e.g. pre-application) rather than at the time of preliminary or final approval.

WUTC-7: The WUTC should incorporate some real-world checks to verify the effectiveness of operators' public awareness programs by surveying affected stakeholders along operators' routes, e.g., management and staff of hard-to-evacuate buildings like nursing homes, assisted living facilities, schools, hospitals, etc. to determine if the public awareness programs are reaching these audiences.

WUTC-8: The WUTC should augment the public awareness program rules, for intrastate operators, to include operator websites as a mandatory message delivery

method and include a review of operator websites in its public awareness audits to ensure all baseline messages required by API RP 1162 and system maps (at least for transmission lines) are included and easily accessible on each operator's website. The WUTC should actively explore options to make the same changes apply to interstate operators.

WUTC-9: The WUTC should continue to apply for PHMSA One Call and State Damage Prevention Grants and use awarded money, along with money from the Damage Prevention Account, to fund targeted training programs for excavators and utility locators, as well as general promotion of the One Call system.

WUTC-10: The WUTC should work with the Washington Utilities Coordinating Council and the Washington Dig Law Safety Committee to provide better, easily accessible information about the Safety Committee's operations, how the complaint process works, how hearings and enforcement procedures work, and clear information about their recommendations and results.

WUTC-11: The WUTC or group similar to the Dig Law Group should propose an agreed upon change to the Dig Law — RCW 19.122 — that incorporates positive response into the law.

WUTC-12: In future updates of the state's Dig Law, the WUTC needs to work with the legislature to better address the concerns and issues associated with private non-commercial landowners and homeowners, and ensure that educational materials detailing how to properly proceed with excavation once utilities are marked is easily available and provided to such users of the One Call system.

WUTC-13: The WUTC should continue to update its website as needed, focusing on increasing accessibility to pipeline safety information and making information easier to understand.

WUTC-14: The WUTC should publish maps showing areas that are identified as High Consequence Areas by PHMSA and operators.

WUTC-15: The WUTC should ensure that the pipeline safety program coordinates with the Department of Ecology in reviewing emergency plans, integrity management plans, designation and updates of high conse-

quence areas, and consideration of necessary preventive and mitigative measures for hazardous liquid pipelines, so that inspectors can determine whether operators properly identify and update pipeline segments that “could affect” a high consequence area that includes navigable waters and choose appropriate preventive and mitigative measures in their integrity management plans to protect those areas.

Recommendations for CCOPS

CCOPS-1: CCOPS should strive to be more proactive, and review and provide comment on pipeline safety issues the committee has the ability to successfully weigh in on.

CCOPS-2: CCOPS should review the structural issues associated with the committee (meeting schedule, membership expertise and makeup, membership recruitment, term limits, etc.) and make necessary recommendations to address identified issues, particularly if the committee desires to take a more proactive oversight role.

CCOPS-3: CCOPS should reach out more directly to the impacted and concerned public, especially around active pipeline issues, to give them a voice and to better understand their concerns. (See examples of current pipeline issues on this report's webpage).²

CCOPS-4: CCOPS webpage should include a way for citizens to contact CCOPS leadership directly.

CCOPS-5: CCOPS should review the WUTC's 2004 Public Awareness Strategy Report with a focus on how they may be able to help reinvigorate that report's goal to “create and nurture a network of pipeline safety leaders.”

CCOPS-6: CCOPS should identify and design a small group (less than 10) of pipeline safety indicators that help them and the public understand how Washington State is doing in keeping pipelines safe. These indicators should be updated and discussed each year by the committee to help focus the committee's efforts, and published on the CCOPS webpage.

CCOPS-7: CCOPS should distribute the model consultation zone ordinance developed by the Municipal Research and Services Center (MRSC) to all elected officials and planning directors in jurisdictions where transmission pipelines occur to help those jurisdictions implement the consultation requirements under RCW 19.122.033(3) & (4). CCOPS should then work with the

12 counties among the 15 fastest-growing counties with pipelines that currently have no, or minimal pipeline safety provisions within their code, to encourage adoption of consultation zones.

Recommendations for WUTC and CCOPS

WUTC/CCOPS-1: The WUTC and CCOPS should work with the Washington State Legislature to amend Revised Code of Washington and/or the Washington State Department of Commerce to amend Washington Administrative Code to require cities annexing property to show pipeline easements on maps of the areas proposed for annexation.

WUTC/CCOPS-2: CCOPS and the WUTC should consider developing a system to provide local elected bodies short pipeline safety briefings that would emphasize where information is available, and which issues they have some control over such as land use encroachments along pipelines, damage prevention, and emergency response preparedness and training.

Recommendations for Other Groups

OG-1: CCOPS, the Pipeline Association of the Northwest, and Paradigm should consider a way to involve CCOPS in the review of “clearinghouse” sorts of public awareness efforts, particularly in terms of Washington State focused websites, to ensure that a broader range of stakeholder voices are represented and that material provided accurately represents the entirety of the state's pipeline system.

OG-2: The WUTC, Washington Utilities Coordinating Council, the National Utility Contractors Association of Washington, and the Washington Dig Law Safety Committee should all make information about upcoming excavation and locator trainings more readily available on their websites.

OG-3: The National Utility Contractors Association of Washington should make a list of those contractors who have completed their Dig Safe Certification program with the date of completion easily available online.

OG-4: The WUTC, Washington Utilities Coordinating Council, and the Washington Dig Law Safety Committee should provide a link to that list of certified excavators on their own website, and promote use of certified excavators as a way to incentivize the training programs.

OG-5: Pipeline operators in Washington State should review recommendations in API RP 1162 for what should be available on their website, and ensure that such information is easy to find.

² Pipeline Safety in Washington State: <http://pstrust.org/pipeline-safety-in-washington-state/>

Acronyms List

ADB: Advisory Bulletin
API: American Petroleum Institute
API RP: American Petroleum Institute Recommended Practice
CBYD: Call Before You Dig
CCOPS: Citizens Committee on Pipeline Safety
CFR: Code of Federal Regulations
CGA: Common Ground Alliance
CP: Cathodic Protection
DIRT: Damage Information Reporting Tool
EFSEC: Energy Facility Site Evaluation Council
EPA: Environmental Protection Agency
FEMA: Federal Emergency Management Agency
FERC: Federal Energy Regulatory Commission
FOIA: Freedom of Information Act
GIS: Geographic Information System
HCA(s): High Consequence Area(s)
HDD: Horizontal Directional Drilling
HVL: Highly Volatile Liquids
ILI: Inline Inspection
LNG: Liquefied Natural Gas
MAOP: Maximum Allowable Operating Pressure
MOP: Maximum Operating Pressure
MRSC: Municipal Research and Services Center
NAPSR: National Association of Pipeline Safety Representatives
NPMS: National Pipeline Mapping System
NTSB: National Transportation Safety Board
OPA: Oil Pollution Act of 1990
PG&E: Pacific Gas & Electric
PHMSA: Pipeline and Hazardous Materials Safety Administration
PIPA: Pipelines and Informed Planning Alliance
PST: Pipeline Safety Trust
RCW: Revised Code of Washington
RP: Recommended Practice
SCA: Site Certification Agreement
SCADA: Supervisory Control and Data Acquisition
TRB: Transportation Research Board
WAC: Washington Administrative Code
WUTC: Washington State Utilities and Transportation Commission

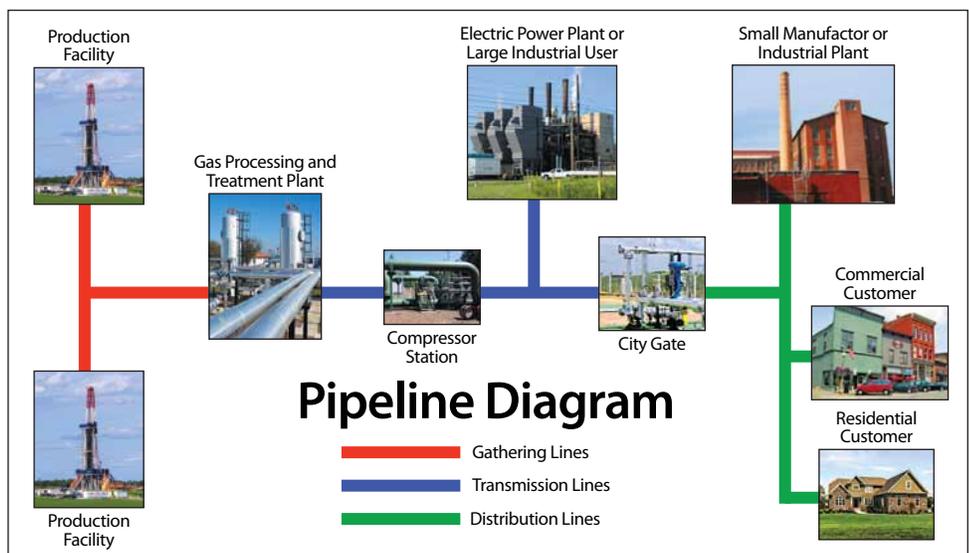
Pipeline Basics



Gas Transmission Pipeline Failure, near Auburn, WA

WHAT KINDS OF PIPELINES ARE IN WASHINGTON STATE?

There are three main types of pipelines in Washington State: hazardous liquid pipelines, gas transmission pipelines, and gas distribution pipelines. This diagram shows a complete natural gas pipeline system, although in Washington State we don't have any production areas or gathering lines. Understanding the different types of pipelines is important because each type of pipeline has different safety considerations and is regulated under different rules by potentially different agencies.



Hazardous Liquid Pipelines: These are the lines that move crude oil to refineries and then move refined products (gasoline, jet fuel, diesel, and by-products) from the refineries to other markets. Highly Volatile Liquids (HVLs) such as propane, butane, etc. that take a gaseous form at normal pressures move through these pressurized hazardous liquid pipelines as liquids.

Gas Transmission Pipelines: These are the relatively larger, higher-pressure pipelines that move gas from storage or post-production processing plants to where

the gas is distributed to our homes and businesses. They operate at pressures in the range of 200 to over 1500 pounds per square inch.

Gas Distribution Pipelines: A distribution line is a relatively small, lower pressure pipeline used to supply natural gas directly to our homes and businesses. A distribution line is located in a network of piping located downstream of a natural gas transmission line. The “city gate” is where a transmission system feeds into a lower pressure distribution system. Gas distribution pipelines comprise, by far, the most mileage of pipes; they carry odorized gas (with the characteristic smell of rotten eggs) throughout urban areas.

Table 1: Mileage of Regulated Pipelines – U.S. and Washington*

	U.S.	Washington
Gas Transmission	300,318	1,967
Gas Gathering	17,707	0
Gas Distribution Mains	1,286,181	22,854
Gas Distribution Service Lines	923,558	22,385
Crude Oil	75,738	69
Refined Products	62,390	732
HVLs (like propane, butane, etc)	68,834	5
Total	2,734,726	48,011

* Data from PHMSA as of 9/18/2017

Another important way that pipelines are differentiated is to distinguish between **interstate pipelines** and **intra-state pipelines**. Interstate pipelines are typically longer transmission pipelines that cross state lines; intrastate pipelines are typically transmission or distribution pipelines that lie wholly within a single state.

While most pipelines fit into the inter- and intrastate pipeline definition above, there are some instances where a pipeline may appear to be an interstate pipeline when it's actually treated as an intrastate pipeline. In other words, crossing a state line is not the sole determinant for categorizing an inter- or intrastate pipeline. For more information see: [49 CFR 195, Appendix A](#).

WHERE ARE THE PIPELINES IN WASHINGTON STATE?

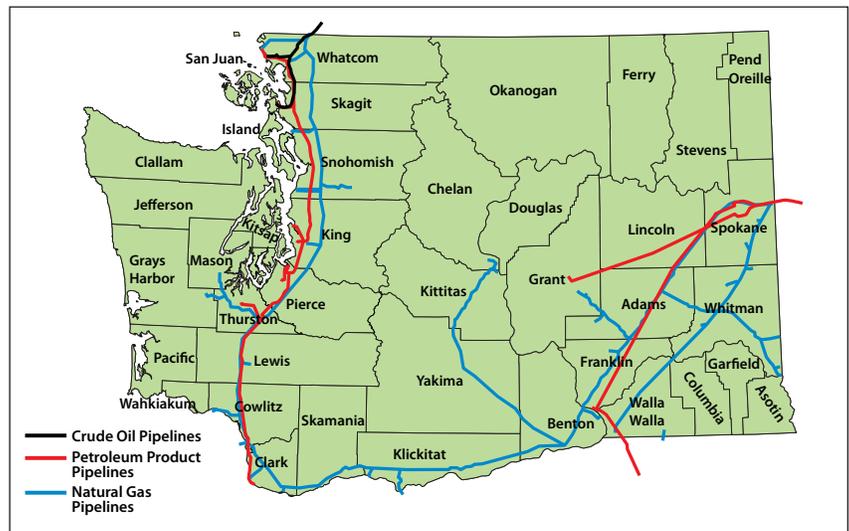
As of 2016, the United States has more than 2.7 million miles of pipelines. As shown in Table 1, most of these (approximately 92%) carry gas — predominantly natural gas — and the rest (approximately 8%) carry hazardous liquids. Hazardous liquid and natural gas pipelines are governed by separate regulations. Whether and how pipelines are regulated also depends on what product is carried and where the pipeline is located.

This map shows the major transmission pipelines in the state. According to the most recent data there are 30 pipeline operators in Washington operating 48,012 miles of pipelines. Twenty of the pipelines carry various gases and 11 carry hazardous liquids such as gasoline, jet fuel, and crude oil. Slightly over 63% by length of the pipelines in this state are made of polyethylene plastic, which is used mainly in the low pressure gas distribution network.

The public may access a more detailed version of the map below, on a county-by-county basis, through the National Pipeline Mapping System (NPMS)³ or view slightly more accurate maps from the WUTC on their website.⁴

Both systems take practice to navigate, but once a person figures it out it is possible to zoom in to get an idea of where these types of pipelines are generally located and some basic information about the pipelines themselves. While these types of maps can provide an idea of where pipelines are located in a neighborhood, they should never be used as an indication of where it might be safe to dig. The mandatory One Call system — 811 in Washington State — is the only way to identify the exact location of a pipeline, and is discussed in more detail later in this report.

The WUTC provides basic information including individual maps of major pipeline systems in Washington. That information can be found under "List of Pipelines We Inspect" on the WUTC website.⁵ You can also find the maps of all the pipeline systems over ten miles long in the state on this report's webpage as well.⁶



Map of crude oil, petroleum product and natural gas pipelines in Washington State. (Data source: WUTC)

- NPMS - <https://pvnpm.phmsa.dot.gov/PublicViewer/>
- WUTC Pipeline Maps - <https://www.utc.wa.gov/regulatedIndustries/transportation/pipeline/Pages/pipelineMaps.aspx>
- Pipelines WUTC inspects - <https://www.utc.wa.gov/publicSafety/pipelineSafety/>
- Pipeline Safety Report Website - <http://pstrust.org/pipeline-safety-in-washington-state/>

WHO REGULATES PIPELINES AND WHERE DO THE REGULATIONS COME FROM?

Pipeline Safety Regulations

Pipeline and Hazardous Materials Safety Administration (PHMSA)

Ultimately the U.S. Congress has responsibility for setting the framework under which pipeline safety regulations operate in the country through Title 49 of the U.S. Code in chapters 601 through 605. 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 through Title 49 of the Code of Federal Regulations (CFR) in parts 190, 191, 192, 193, 194, 195, 198 and 199. Most of these regulations are performance-based. For example, pipeline operators are required by the federal regulations to operate and repair pipelines in a safe manner so as to prevent damage to persons or property, but the way in which they do so is generally not spelled out prescriptively. This flexibility allows pipeline operators to prioritize pipeline inspections and repairs in areas with higher populations or risk factors, but it also makes the regulations more ambiguous and challenging to enforce.

Washington State Utilities and Transportation Commission (WUTC)

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 those 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 carry out inspections on interstate pipelines, although only PHMSA regulations can apply and PHMSA remains in charge of any enforcement that may come out of state led inspections. Local governments, such as cities and counties, are not allowed to create rules to regulate the operational safety of pipelines, though they may have involvement in emergency response, routing and siting issues, and franchise or easement agreements.

The Washington Utilities and Transportation Commission (WUTC) has received authorization from PHMSA to oversee all intra- and interstate regulated pipelines in the state. There are currently only three other states (Arizona, Minnesota, New York) that have been given this level of authority for both natural gas and hazardous

liquid pipelines. The WUTC also oversees three liquefied natural gas facilities, an underground natural gas storage site, propane storage sites, and natural gas master meters. Master meters are small natural gas distribution systems operated and maintained by schools, hospitals or by residential complexes such as apartment buildings and mobile home parks.

Regulations and rules related to pipeline safety in Washington State are located in the following sections of Revised Code of Washington (RCW) and Washington Administrative Code (WAC) respectively:

- [RCW 19.122: Underground Utilities](#)
- [RCW 81.88: Gas and Hazardous Liquid Pipelines](#)
- [WAC 480-93: Gas Companies—Safety](#)
- [WAC 480-75: Hazardous Liquid Pipelines—Safety](#)

Spill Response Planning and Prevention Regulations

After the Exxon Valdez spill in Alaska, Congress amended the Clean Water Act by passing the Oil Pollution Act of 1990, and put into place requirements for the prevention of, preparedness for, and response to oil discharges, with the goal of preventing oil from reaching navigable waters and adjoining shorelines, and to contain and clean up any spills. Spill response planning is governed by both state and federal agencies.

Pipeline and Hazardous Materials Safety Administration (PHMSA)

Under the requirements of the Oil Pollution Act of 1990, and regulations and executive orders implementing it, pipeline operators are required to submit an Oil Spill Response Plan to PHMSA, showing how operators will prepare for and respond to a worst-case discharge from their on-shore pipelines. These plans must be submitted every five years, unless circumstances warrant a new plan sooner than five years. The plan must include procedures for responding to a spill safely and quickly. In the past, heavily redacted versions of these plans were posted to the PHMSA website “to help federal, state and local officials strengthen and coordinate planning and prevention activities.” Unfortunately, with an update to PHMSA website, the agency has stated it will no longer post these plans and they must be obtained through a Freedom of Information Act (FOIA) request.

Washington State Department of Ecology

Department of Ecology is responsible for spill response preparedness within Washington State. Plans submit-

ted to Ecology can be the same as those submitted to PHMSA. Plans are made available to the public for a 30-day comment period and they are available via public records request. Unlike PHMSA, Ecology circulates these plans largely un-redacted. Ecology also requires quarterly reports on the amount of hazardous liquids moved by pipeline. The rules for prevention planning reside in WAC Section 173-180 Facility oil handling standards, 173-182 Oil spill contingency plan, and 173-185 Oil movement by rail and pipeline notification.

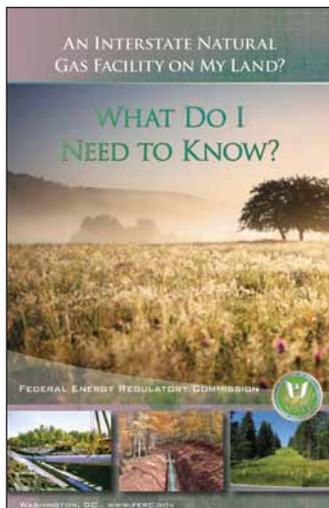
Environmental Protection Agency/U.S. Coast Guard

The The Environmental Protection Agency (EPA) is the lead federal response agency for oil spills in inland waters and the U.S. Coast Guard is the lead agency for spills in coastal waters and deepwater ports.

Siting of new pipelines

Federal Energy Regulatory Commission (FERC)

For new interstate gas lines, once the pipeline company has a pipeline proposal and route in mind they must apply to



the Federal Energy Regulatory Commission (FERC) for approval. That approval comes in the form of a Certificate of Public Convenience and Necessity. Before that approval is granted, FERC undertakes a complete environmental review that normally includes development of an environmental impact statement.

There is a citizen's guide to the FERC process on its website.⁷ The guide describes

the FERC process, including when pre-filing occurs, when an application is filed, the deadlines for intervening in the FERC proceeding, and how to find information on the FERC website regarding a particular project.

Energy Facility Site Evaluation Council (EFSEC)

In Washington State, EFSEC is responsible for recommending approval or denial of crude or refined petroleum or liquid petroleum product pipelines larger than six inches in diameter and greater than 15 miles in length. They are also responsible for recommending approval or denial of intrastate natural gas, synthetic fuel, gas, or liquefied petroleum gas pipelines larger than 14 inches in diameter

and greater than 15 miles in length. EFSEC recommendations are submitted to the Governor. If EFSEC determines that a proposed pipeline under its jurisdiction will produce minimal adverse effects on the environment and meets its construction and operation standards, the board recommends approval of a Site Certification Agreement (SCA).

WHAT IS THE RISK AND HOW DO THE REGULATIONS ACCOUNT FOR RISK?

Risk is one of those things that one person cannot really define for another, since each person thinks about risks in their own personal way. While some feel that skydiving is a risk worth taking, others won't even go up in the airplane. In other words, it is not possible for us to tell others whether the pipelines in Washington State are safe enough. All we can do is to try to provide enough information so individuals can make that decision on their own, and then work with others in their community to set policies based on the beliefs of as many people as possible.

Risk is made up of two different factors both of which need to be carefully considered when deciding how risky an activity is. Those factors are the probability that an event will occur (chance a pipeline will rupture or leak), and the possible consequences if it does.

Probability

First let's take a look at some of the publicly available data to try to get a sense of the probability of a pipeline incident occurring in Washington State.

PHMSA maintains a database of a variety of different incident types.⁸ In this section of the report we are using the "Significant Incident" data from PHMSA which is based on the following criteria:

1. Fatality or injury requiring in-patient hospitalization
2. \$50,000 or more in total costs, measured in 1984 dollars
3. Highly volatile liquid releases of 5 barrels or more or other liquid releases of 50 barrels or more
4. Liquid releases resulting in an unintentional fire or explosion
5. Does not include gas distribution incidents caused by a nearby fire or explosion that impacted the pipeline system

7 FERC Website - <http://www.ferc.gov/for-citizens/citizen-guides.asp>

8 See <http://www.phmsa.dot.gov/pipeline/library/data-stats> for both online pipeline incident data and downloadable files.

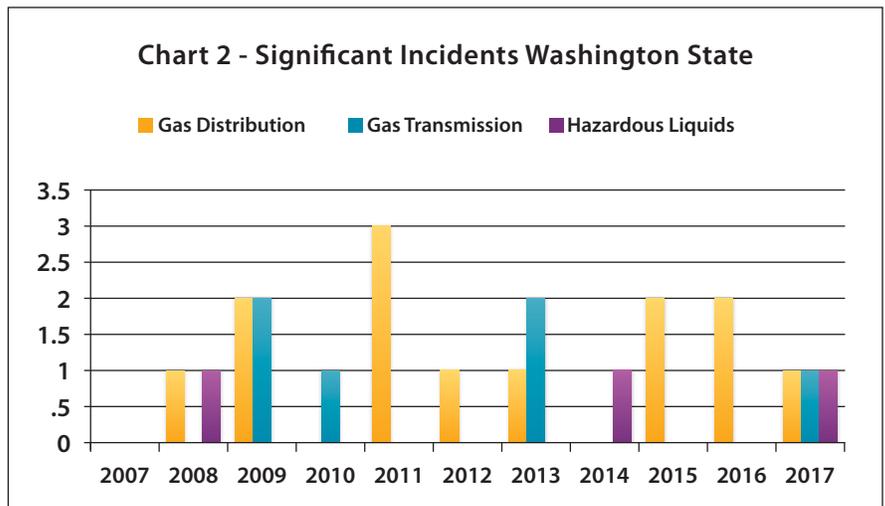
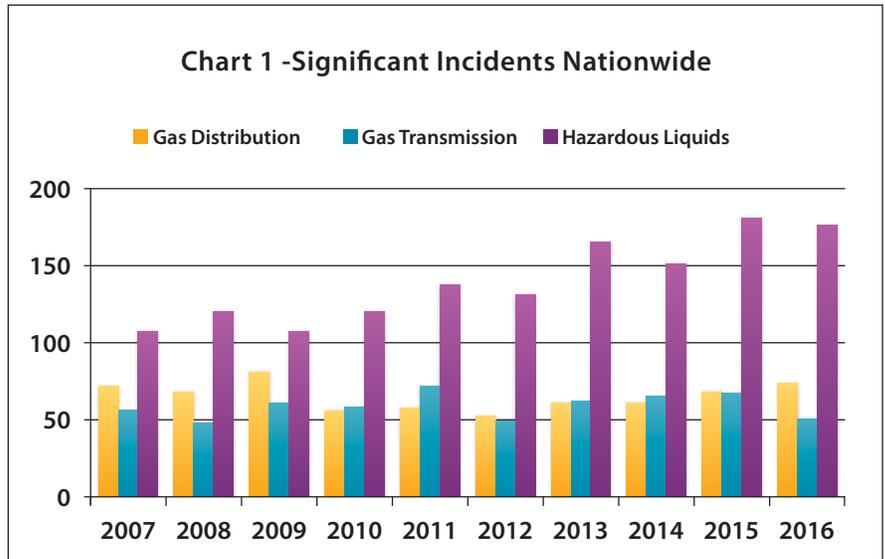
Table 2 shows the number and some of the consequences of all the significant incidents in Washington since 1997. The biggest and most costly pipeline failure occurred in 1999 when two boys and a young man were killed in a pipeline rupture and explosion in Bellingham.

It is difficult to evaluate how Washington's statistics compare to national averages, or the probability of a failure in Washington, because Washington has had so few failures in the past 20 years that trends cannot really be determined. Charts 1 and 2 show the significant incidents over the past decade where it does appear that nationally the number of incidents is increasing on hazardous liquid pipelines (while the amount spilled is actually decreasing). There is no real discernable trend on any of the different pipeline types in Washington.

On the webpage for this report we have provided a list of all the individual reportable incidents on all pipelines in Washington State since 1997 with the significant incidents highlighted, and from that list it is clear that significant incidents are relatively uncommon. A calculation (incidents/years/ pipeline miles) of the national rate of incidents on all pipelines over the past 20 results in a rate of 0.1016 significant incidents per year per 1000 miles of pipe. The same rate calculation for Washington is 0.0447, or 2.27 times safer than the national average. Just using this rate you would expect a significant failure on any specific mile of pipeline in Washington State once every 22,371 years, and the chance of death would be once every 243,902 years. While such mathematical calculation do provide some general context, of course different types of pipelines have different probabilities, and different locations even among the same types of pipelines also have different probabilities. The bottom line is that the probability of a pipeline failing in any specific location is very, very small.

One other consideration is the cause of pipeline failures. Charts 3 and 4 on the following page compared the causes of significant failures on all pipelines over the past decade both nationally and in Washington. Remember again that there have been so few failures on

	Number of Incidents	Number of Deaths	Number of Injuries	Property Damage	Gallons Spilled
Hazardous Liquids	9	3	8	\$68,987,408	317,814
Gas Transmission	14	0	0	\$8,765,828	
Gas Distribution	19	1	10	\$7,241,968	
LNG Facilities	1	0	0	\$47,593,577	
Totals	43	4	18	\$132,588,781	317,814



pipelines in Washington State that drawing too many conclusions from the data only from this state is hard to do, but there are a couple of things to note here. One is that while nationally a significant cause of failures is corrosion, we have seen no corrosion failures in this state. The other is the large percentage of failures caused by "other outside force" damage. Both in this state, and nationally, this cause percentage has increased in the last decade and for distribution pipelines is now the second leading cause of significant incidents.

Chart 3 - Significant Incident Cause Breakdown 10 Year Average (2007-2016)

System Type: All State: Washington

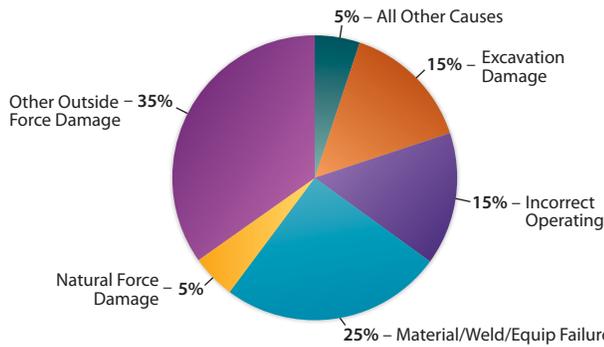
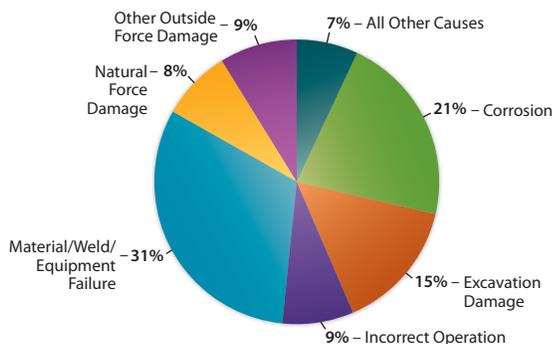


Chart 4 - Significant Incident Cause Breakdown 10 Year Average (2007-2016)

All Pipelines Nationwide



Gas infrastructure vulnerable to outside force damage.

Most of these incidents are caused by vehicles driving into gas infrastructure, such as the gas regulator shown hanging in a driveway in the picture above.

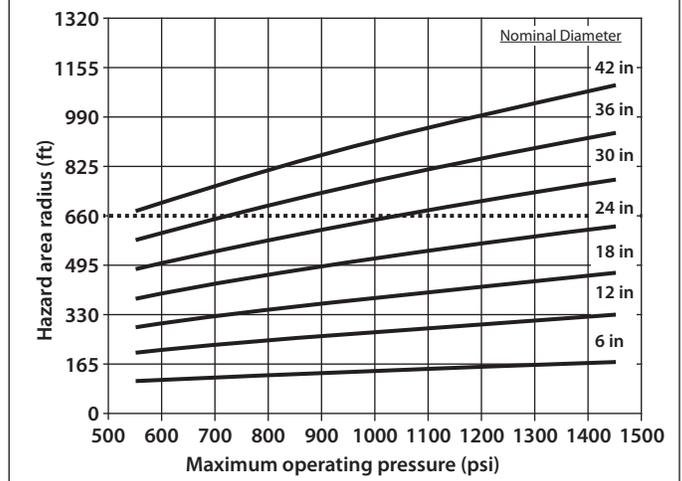
Consequence of failures

For natural gas pipelines, it is fairly easy to predict a potential impact zone around a pipeline failure that ruptures and ignites. The federal regulations use a formula based on the size and pressure of the pipeline that predicts the “potential impact radius,” and that radius is then used to define some elements of the regulations. Chart 5 depicts the relationship between pipe size and

pressure that determines this potential impact radius,⁹ and the associated graphic shows how that radius can be used to consider the potential impacts of a gas transmission pipeline failure on a particular area.

For hazardous liquid pipelines, predicting the consequence area is much more difficult because of the different products involved and because the products may flow long distances based on the terrain and whether they reach water. While each pipeline operator is required to do an analysis of whether a failure along any section of the pipeline could affect a high consequence area, that information is not shared with the public. The best that the public can do is to look at their own area and compare that with the consequences of past liquid failures. In our own state, the 1999 Olympic Pipe Line failure in Bellingham is a good example of what is possible. In that failure gasoline flowed nearly two miles down a creek until ignition took place killing every living thing within and near the creek, including two boys and a young man.

Chart 5



Example of potential impact radius.

⁹ A Model For Sizing High Consequence Areas Associated With Natural Gas Pipelines - <http://pstrust.org/docs/C-FERstudy.pdf#search=%22C-fer%22>

The National Transportation Safety Board investigates many of the most significant incidents and the reports of their investigations are publicly available¹⁰ and serve as a clear example of the consequences when pipelines fail. These photos from major failures on the three different types of pipelines here in Washington also show potential consequences.

How the regulations address varying risks

Pipelines in more densely populated areas, and areas that are unusually sensitive to environmental damage from hazardous liquid releases, are called out in the regulations for greater protections. These are often referred to as High Consequence Areas (HCAs).

For natural gas pipelines HCAs are determined by population density, and to a large part that is determined by the class location, especially for a gas transmission pipeline. The class locations defined in the gas pipeline regulations consider the area within 220 yards of any given 1-mile stretch of a pipeline:

- Class 1: rural areas with ten or fewer homes/apartments;
- Class 2: an area with more than 10 but fewer than 46 homes/apartments;
- Class 3: an area with 46 or more homes/apartments, or areas of public assembly that regularly are occupied by 20 or more people; and
- Class 4: where buildings with four or more stories above ground are prevalent.

Most HCAs for gas transmission pipelines are in class 3 and 4 areas. Within HCAs the regulations require higher standards of care on pipelines. Some examples for gas transmission pipelines would include greater safety factors for the pressure the pipeline can be operated at, more frequent valves, more comprehensive testing of welds after construction, greater analysis and mitigation of risks including the use of in-line inspection devices every seven years. Rules for gas pipelines do not take into account potential environmental risk.

Federal hazardous liquid pipeline regulations do not include class locations, although the WUTC rules for intrastate hazardous liquid pipelines have incorporated class location definitions to increase safety by controlling the design factors used for the construction of new pipelines. All liquid pipeline regulations

do have additional protections for populated areas and also unusually sensitive environmental areas built into them through integrity management requirements that are discussed elsewhere.



2003 rupture (with no ignition) of a natural gas transmission pipeline near Toledo, WA



1999 failure of a hazardous liquid pipeline in Bellingham, WA



2016 explosion from a gas distribution pipeline in Seattle, WA

¹⁰ NTSB Pipeline Investigations - <http://www.nts.gov/investigations/AccidentReports/Pages/pipeline.aspx>

Pipeline Safety Requirements During Design, Construction and Operation



Construction of Gas Transmission Pipeline

Many of the pipelines in place today were constructed before regulations existed for pipelines. Some of the current regulations have to do with ongoing operations and maintenance, and apply to both existing and new lines. Existing “grandfathered” pipelines built prior to 1979 for hazardous liquid pipelines, or prior to 1968 for gas pipelines, may not have been constructed according to the current regulations. What are pipeline operators required to do to maintain safe pipelines? In this section, we go through basic information and dive more deeply into some technical issues that are relevant to Washington State.

CHOOSING PIPE

The majority of transmission pipelines are steel, 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 gathering, transmission and distribution pipelines use other materials such as other metals, plastic or composites.

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. The material that is excavated dur-

ing trenching operations is temporarily stockpiled on the non-working side of the trench. This material will be used again in the backfill operation. In some limited locations, horizontal directional drilling (HDD) as well as boring is used to place pipe.

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 in the federal regulations that requires this depth be maintained over time.

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 manual, semiautomatic or automatic 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 tensile testing 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. If the technician detects certain flaws, the weld is repaired or cut out, and a new weld is made.

COATINGS ON STEEL PIPELINES

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 pieces of specialized construction equipment called side-booms. 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 damaging the pipe.

Once the pipeline is lowered into the ground, the trench is backfilled, to ensure that the pipe and its coating are not damaged. This is generally accomplished with either a backhoe or padding machine depending on the soil makeup.

Care is 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.

VALVES AND VALVE PLACEMENT

A valve is a mechanical device installed in a pipeline and used to control the flow of fuel. 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

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. These pressures are defined in federal regulations and are 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.

TESTING

Generally, but with certain exceptions, all newly constructed transmission pipelines must be pressure tested before they can be placed into service. The purpose of a 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 (often referred to as smart pigs) are used that permit the identification of specific types of defects, such as corrosion, dents, and excavation damage. But because not all pipelines can be inspected with ILI tools and because of the need to find types of imperfections that are not currently detected by ILI technology, hydrostatic testing is an accepted method for demonstrating that a pipe segment is ready to be in service.

CORROSION PROTECTION

Unprotected steel pipelines are susceptible to corrosion, and without proper corrosion protection steel pipelines will eventually deteriorate. Corrosion can weaken the pipeline and make it unsafe. Luckily, technology has been developed to allow corrosion to be controlled in many cases, if applied correctly and maintained consistently.

Here are the three common methods used to control corrosion on pipelines:

- Cathodic protection (CP) is a system that 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 are principal tools for defending 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 (SCADA) SYSTEM

A SCADA system 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 for normal operations, and to equipment malfunctions, failures and releases. Some SCADA systems also incorporate the ability to remotely operate certain equipment - including compressors, pump stations, and valves - allowing 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's 2012 leak detection study¹¹ shows that only

about 17% of hazardous liquid and gas transmission pipeline incidents were initially detected by SCADA or other computerized leak detection.

RIGHT-OF-WAY PATROLS

Regulations require regular patrols of pipeline right-of-ways to check for indications of leaks and 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 them to be done by aerial inspection.

LEAKAGE SURVEYS

Regulations also require regular leakage surveys for all types of natural gas pipelines along the pipeline routes. Personnel 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 may be deemed non-hazardous, do not need to be repaired immediately, and are not uncommon on gas pipeline systems.

ODORIZATION

All distribution pipelines, and some natural gas 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. Most often Mercaptan is added as an odorant to give the natural gas that familiar rotten egg smell.

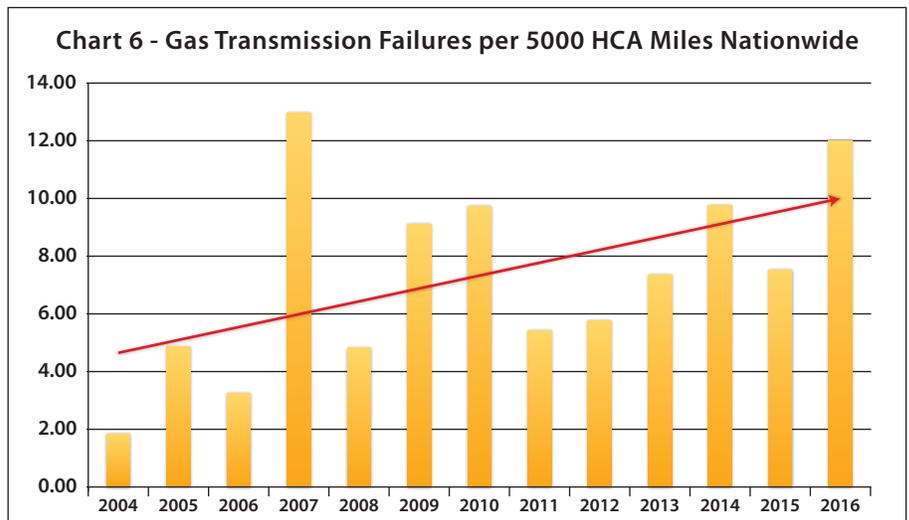
INTEGRITY MANAGEMENT

Integrity Management refers to a set of federal rules that specify how pipeline operators must develop a plan to identify, prioritize, assess, evaluate, repair and validate the integrity of their pipelines. Some form of this requirement for comprehensive analysis through integrity management applies to both transmission and distribution pipelines. Gathering lines are exempt from these requirements. While the plans are updated frequently when things change, a minimum reassessment period for covered pipelines is defined in the federal regulations. For gas transmission pipelines, integrity management requires lines that are located *within* High Consequence Areas (mainly more populated areas) to be reassessed by their operators at least every seven years. For hazardous liquid pipelines, integrity management rules require lines *that could affect* HCAs to be reassessed by their operators at least every five years. Unfortunately, the National Pipeline Mapping System does not yet depict the HCA boundaries used by operators, despite congressional direction that it should. Reassessment of pipelines is done mainly with internal inspection devices, but may also be done through pressure tests or direct assessment. Once inspected, the

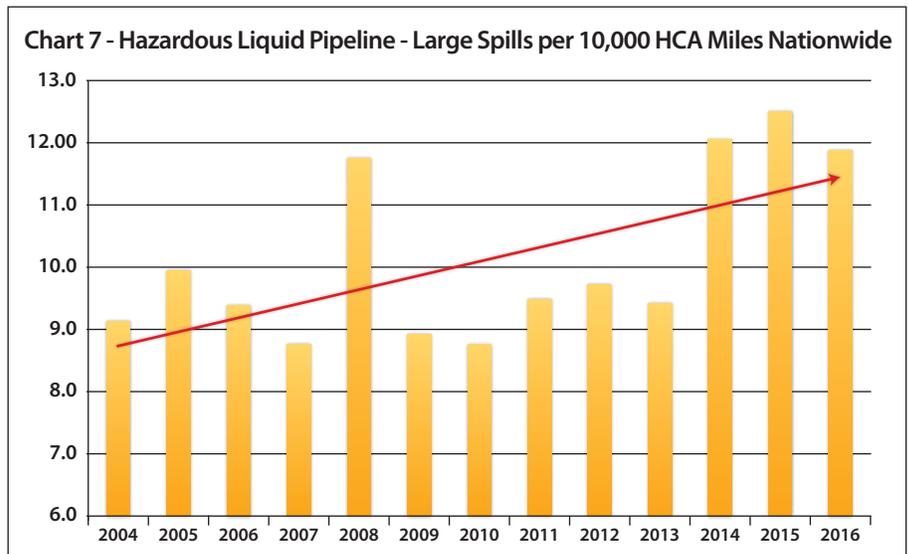
11 PHMSA, Final Report, Leak Detection Study – DTPH56-11-D-000001: <https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/technical-resources/pipeline/16691/leak-detection-study.pdf>

rules require that operators respond to certain anomalies found on their pipeline in certain ways within certain timeframes. In the first nine years of this program, these rules required over 53,000 repairs be made to gas and liquid transmission pipelines that fall within HCAs. Only about 7%¹² of the gas transmission pipelines, and 43%¹³ of hazardous liquid pipelines nationwide fall within the definition of HCAs so are required to do these important inspections, although many operators provide such inspections beyond just the HCAs.

Integrity Management is more than just running smart pigs and then digging up weaknesses identified. The intent of Integrity Management is to continually assess the threats to a section of pipeline, preventing failures, mitigating potential consequences, and integrating data about that section from all operational activities back into the threat assessment. Somewhere along the way, that system is not working properly, because even though many anomalies have been found and repaired as a result of the required inspections and repairs, the number of incidents on gas transmission and hazardous liquid pipelines in areas covered by integrity management has actually risen in the years since Integrity Management became the law (see charts 6 & 7).^{12, 13} While there are clearly opportunities to improve the implementation of Integrity Management, the basic theory of risk assessment, inspection, verification, program changes, and re-inspection that should lead to continuous improvement of pipeline safety seems sound. In the future, applying Integrity Management requirements beyond HCAs for transmission pipelines may help lead pipeline operators to their stated goal of zero pipeline incidents.



Gas Transmission Pipeline Integrity Management Performance



Hazardous Liquid Pipeline Integrity Management Performance

12 PHMSA Gas Transmission Pipelines Integrity Management Performance Measures - https://opsweb.phmsa.dot.gov/primis_pdm/gt_imp_perf_nat_sum.asp

13 PHMSA Hazardous Liquid Pipelines Integrity Management Performance Measures - https://opsweb.phmsa.dot.gov/primis_pdm/hl_imp_perf_nat_sum.asp

Pipeline Issues of Importance in Washington State



Hazardous Liquid Pipeline Easement near homes, Bellingham, WA

OVERSIGHT OF PIPELINE SAFETY BY THE WUTC PIPELINE SAFETY DIVISION

History of the program

The history of the WUTC goes back over 100 years. It began in 1905 as the Washington Railroad Commission, and in 1911 the Washington Legislature changed the name of the agency to the Washington Public Service Commission, expanding its jurisdiction to include electric and gas service. The commission has regulated both the utility and transportation industries since 1961, when it was given its current name.

The pipeline safety program within the WUTC began inspecting intrastate natural gas systems within Washington in 1955. Intrastate hazardous liquid pipelines were added to WUTC's authority in 1996. In 2000, spurred on by the Olympic Pipe Line tragedy, the Legislature approved a Pipeline Safety Act¹⁴ directing the program to seek federal approval to include inspections of all interstate pipelines stating:

“The legislature recognizes that additional federal authority is needed to implement a comprehensive pipe-

line safety program and by this act and other measures directs the state to seek that authority.”

That same Pipeline Safety Act stated as goals:

“It is also the intent of the legislature that the governor work with the state congressional delegation in seeking:

- ***To amend the federal pipeline safety act to delegate authority to qualified states to adopt and enforce standards equal to or more stringent than federal standards;***
- ***State authority to administer and enforce federal requirements related to pipeline safety; and***
- ***Higher levels of funding for state and federal pipeline safety activities and for states to respond to pipeline accident emergencies.”***

In 2003, after working closely with the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) for two years, the pipeline safety program became the lead inspector for all interstate pipeline inspections and incidents within the state of Washington. The WUTC can make recommendations to PHMSA but does not have enforcement authority over interstate pipelines.

¹⁴ Pipeline Safety Act - <https://www.utc.wa.gov/publicSafety/Documents/Pipeline%20Safety%20Act-HB%202420.pdf>

WUTC and Pipeline Safety Program Organization

The WUTC is run by three commissioners who are appointed by the governor and confirmed by the state senate. Approximately 170 employees assist the commissioners in running the WUTC.¹⁵ The commission’s budget for the 2017-19 biennium is \$71 million. The WUTC’s Pipeline Safety Program has 14 employees, including the Pipeline Safety Director. The Pipeline Safety Director manages the pipeline safety program, while the Chief Pipeline Safety Engineer directs all compliance activities by the program’s eight pipeline inspectors. The remainder of the staff provides administrative, budget and policy support, as well as focusing on priority programs such as damage prevention efforts. All lead inspectors are federally certified, having completed training in all federal and state pipeline safety regulations, as well as advanced investigator training.

Current Pipeline Safety Program

The commission is currently responsible for developing and enforcing safety standards for intrastate natural gas and hazardous liquid pipelines located within the state, and also inspects the portions of interstate natural gas and hazardous liquid pipelines located within Washington State. For interstate pipelines the standards and enforcement actions are the responsibility of PHMSA.

The current mission of the Pipeline Safety Program is to ensure public health, safety and environmental quality by:

- Conducting quality inspections of hazardous liquid and natural gas pipeline companies
- Improving safety laws and regulations
- Educating local communities on pipeline safety issues
- Providing technical assistance to pipeline operators, local governments and communities, and
- Enforcing laws and regulations in a fair & equitable manner

The WUTC’s current strategic plan¹⁶ also includes a “Tactical Goal” to “*Improve protection of underground utility facilities that provide essential services.*”

The pipeline safety program is supported through a combination of federal grants and pipeline fees. In accordance with state laws¹⁷ and commission rules,¹⁸ company fees are allotted among gas and hazardous liquid pipeline companies based on a combination of the total pipeline miles reported each year to the commission and an effort-based allocation system. The program requires staff to track all hours that are spent directly with a specific pipeline company, and allocates fees based on each company’s percentage of hours worked. Pipeline fees are determined each year before September 1.

Pipeline Safety Program Evaluation

Table 3 - States with Interstate Agent Status	
Natural Gas	Hazardous Liquid
AZ	AZ
CT	MN
IA	NY
MI	VA
MN	WA
NY	
OH	
WA	

To evaluate the success of the WUTC’s Pipeline Safety Program we looked at efforts under each of the stated goals of the Program’s mission. We also surveyed pipeline operators, elected officials, and emergency responders in the state, reviewed a select number of enforcement actions, compared WUTC efforts to efforts in other states, reviewed PHMSA’s evaluations of the WUTC program, and re-

viewed incident data. What we found is described under each mission section below.

We believe that the WUTC program took a substantial step toward greater safety by requesting and receiving as much state authority as is currently possible to regulate, inspect and enforce rules for intrastate pipelines, and also interstate agency status to inspect interstate pipelines in Washington. While intrastate status allows the agency to set even stronger standards, the interstate agent status provides the WUTC the ability to provide the citizens of Washington better and more timely inspections on the major pipelines in the state, as well as building a program that is better equipped to meet the needs of both the pipeline operators as well as the potentially affected public. As shown in Table 3 there are currently only three other states (Arizona, Minnesota, and New York) that have been given this level of authority for both natural gas and hazardous liquid pipelines.

15 WUTC Organizational Chart - <https://www.utc.wa.gov/aboutUs/Documents/Agency%20Overall%20Org%20Chart.pdf>

16 WUTC Strategic Plan - <https://www.utc.wa.gov/aboutUs/Documents/2017-2019UTCStrategicPlan.pdf>

17 Washington Pipeline Safety Funding Bill - <https://www.utc.wa.gov/publicSafety/Documents/Pipeline%20Safety%20Funding%20Bill%20-%20SB%205182.pdf>

18 WAC 480-75-240 - Annual pipeline safety fee methodology - <http://apps.leg.wa.gov/wac/default.aspx?cite=480-75-240>, <http://apps.leg.wa.gov/wac/default.aspx?cite=480-93-240>

“Conducting quality inspections of hazardous liquid and natural gas pipeline companies”

Each year PHMSA evaluates state pipeline safety programs. Natural gas programs are evaluated separately from hazardous liquid programs. The evaluation is a fairly comprehensive look at both the program’s annual progress report as well as an on-site review of the state’s inspection, compliance, accident investigation, training, and excavation damage prevention records and activities.¹⁹ PHMSA provides an incentive as part of this review by tying the amount of federal grant support for the state program to the program’s performance score.

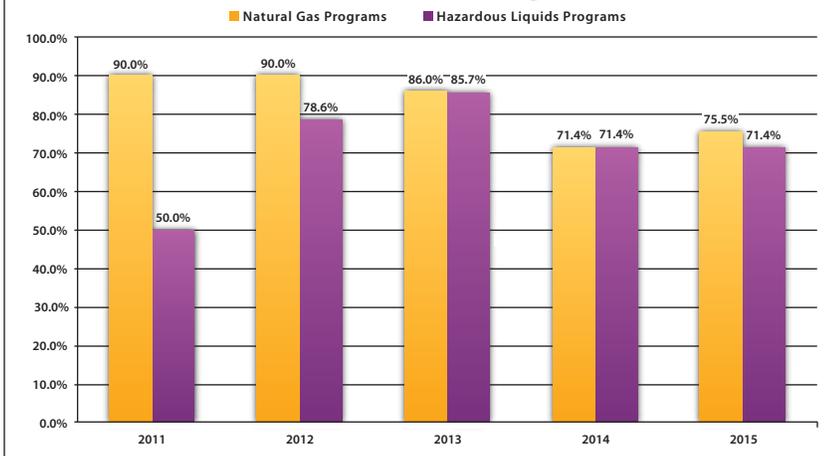
especially in the densely populated Midland and Parkland neighborhoods. Although no accidents due to third party damage have been reported, additional markers may be some insurance to continue this trend into the future.”

In August of 2017 a contractor did strike the pipeline in the Parkland neighborhood, and at this time whether additional signs had been installed as recommended is not known.

Table 4 - PHMSA's WUTC Program Evaluation Scores

	Natural Gas Program	Hazardous Liquid Program
2011	100.00%	97.85%
2012	100.00%	100.00%
2013	99.80%	100.00%
2014	99.35%	99.80%
2015	100.00%	100.00%

Chart 6 - Percent of States With Scores Lower Than Washington



We also provided an anonymous survey to all the pipeline operators in Washington State to gain their insights into a number of issues. Overall their opinion about the WUTC staff seems positive in areas such as fairness, consistency, and knowledge. Chart 7 shows how operators that deal with regulators in other states compare with the WUTC regulators.

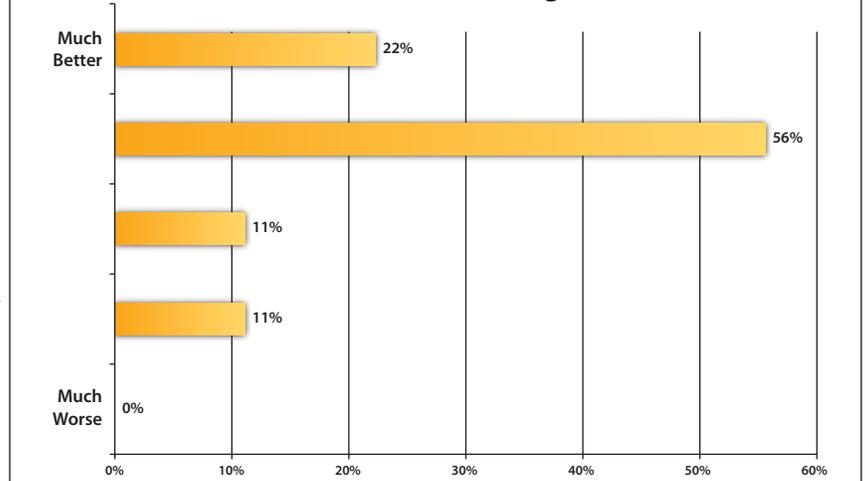
“Improving safety laws and regulations”

We looked at how proactive the WUTC has been at improving pipeline safety laws. As discussed above, the minimum safety standards are set by the federal government, but states can set stricter standards for the intrastate pipelines they regulate. The National Association of Pipeline Safety Representatives (NAPSR) publishes from time to time a compendium of what initiatives individual states have that go beyond

Looking at the past five years of evaluation scores it is clear that Washington has scored very well. Table 4 shows Washington’s scores and Chart 6 gives a comparison with the other states.

We also reviewed a select number of the WUTC’s inspection reports, which they make available to the public.²⁰ The inspections appeared comprehensive to us and the reports to the companies appeared to be timely. We were happy to see safety recommendations in some of the reports that go beyond the required rules. For example the 2016 inspection of the McChord Pipeline stated that, “additional markers along the pipeline route would be a prudent investment in public awareness,

Chart 7 - If you operate pipelines in other states, please rate how you think the WUTC regulators compare to other state or PHMSA regulators

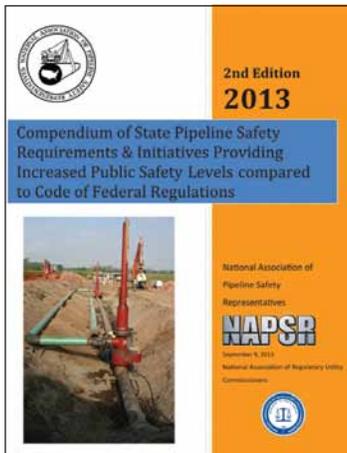


19 Information on PHMSA State Program Evaluations - <https://www.phmsa.dot.gov/working-phmsa/state-programs/state-oversight>

20 WUTC Pipeline Inspection Reports - <https://www.utc.wa.gov/regulatedIndustries/transportation/pipeline/Pages/InspectionReports-ByCompany.aspx>

the federal safety standards. The most recent version²¹ of the compendium lists 1361 state pipeline safety initiatives that go beyond federal standards, and Washington is shown to have 70 of those. Only four states (Maine, Michigan, New Hampshire and Wisconsin) have more initiatives listed. A few of the more unique rules that Washington has that go beyond the federal rules include:

- A rule that requires intrastate gas transmission operators to get approval from the WUTC to build certain new pipelines near buildings and highways.²²
- A requirement that leak detection systems on intrastate hazardous liquid pipelines must be capable of detecting an eight percent of maximum flow leak within fifteen minutes or less.²³
- A requirement that local governments as part of their permitting activities ensure that transmission pipeline companies are notified when excavation or construction will occur within 100 feet of a pipeline easement.²⁴



As noted in the Damage Prevention section, the WUTC has worked hard over the past decade to improve many aspects of the State's underground damage prevention law. The WUTC is also one of the few states that consistently provides comments

on PHMSA's major rulemakings, and the current chairman of the WUTC serves as a member of PHMSA's Technical Pipeline Safety Standards Committee²⁵ which reviews and comments on all federal natural gas rulemakings.

In our review of the pipeline safety rules for the state we did note that there seem to be some inconsistencies

between the rules for hazardous liquid pipelines and those for natural gas pipelines. For example, intrastate gas transmission operators need to get WUTC approval before building certain pipelines near buildings and highways (WAC 480-93-020), yet there is no similar requirement for hazardous liquid operators. Similarly for intrastate hazardous liquid pipelines there is a requirement that a company maintain the depth of cover (WAC 480-75-640), yet there is no similar requirement for natural gas transmission pipelines. While we could find no evidence that these inconsistencies have caused a problem, we think it makes sense to try to harmonize rules where possible for similar risks.

“Educating local communities on pipeline safety issues”

For well over a decade the WUTC has shown significant leadership in trying to figure out how best to engage local communities about pipeline safety, and supporting efforts that do just that. The WUTC is one of only three states (Michigan and California being the other two) that support a pipeline advisory committee (CCOPS) that can serve the valuable role of helping educate and engage local government and citizens on a range of pipeline safety issues. In 2004, as PHMSA issued new Public Awareness requirements, the WUTC took the proactive and unique approach of hiring two consulting firms to research how public awareness could be done most effectively. That research led to a WUTC policy paper²⁶ that concluded:

“WUTC’s research strongly supports an emphasis on the part of all stakeholders in pipeline safety awareness programs on focused outreach through a diverse network of pipeline safety advocates.”

That effort also led to the ongoing recognition within the WUTC that regulators have an important role to play in building awareness. With that in mind the WUTC has continued to maintain in-house expertise in public education and awareness, sought ways to improve their website to serve as a hub of pipeline safety information for the state, and proactively worked with a variety of stakeholders on focused efforts to inform decision making in ways that improves pipeline safety.

One example of the WUTC's proactive efforts on pipeline safety is their ongoing involvement and leadership on issues around land uses near transmis-

21 2013 NAPSR Compendium - <http://nebula.wsimg.com/6ecf26d5414294efd6164b577a73265d?AccessKeyId=8C483A6DA79FB79FC7FA&disposition=0&alloworigin=1>

22 WAC 480-93-020 Proximity Considerations - <http://app.leg.wa.gov/wac/default.aspx?cite=480-93-020>

23 WAC 480-75-300 Leak detection - <http://app.leg.wa.gov/wac/default.aspx?cite=480-75-300>

24 RCW 19.122.033 Notice of excavation to pipeline companies - <http://app.leg.wa.gov/RCW/default.aspx?cite=19.122.033>

25 PHMSA's Technical Pipeline Safety Standards Committee - <https://www.phmsa.dot.gov/standards-rulemaking/pipeline/pipeline-advisory-committees>

26 Pipeline Safety Public Awareness Programs, 2004 - <https://www.utc.wa.gov/regulatingIndustries/transportation/Transportation-Documents/UTC%20Public%20Awareness%20Strategy%20Report%20-%20Final%202004.pdf>

There is not another state in the nation that comes close to the leadership that the WUTC has provided on these land use issues.

related to the risk from pipeline failures in populated areas. In 2004 the TRB released a report – Transmission Pipelines and Land Use²⁷ – that succinctly sums the problem up as follows:

“The primary objectives of pipeline-related land use measures are to reduce the risk of damaging the pipelines by keeping human activity away from their immediate vicinity and to minimize the exposure of those living and working near a transmission pipeline in the event of an accident. Jurisdiction over land use matters traditionally rests with local governments, which results in wide variations in practices. However, most local governments do not address pipeline issues; when they do, they have few or no data on which to base land use regulations.”

While the federal regulators tried to decide how to respond to this report, the WUTC brought together involved stakeholders for a series of workshops that led to the release of the WUTC’s own report in 2006 - Land Use Planning In Proximity to Natural Gas and Hazardous Liquid Transmission Pipelines in Washington State.²⁸ That project led to many other efforts in the state, (discussed elsewhere in this report), to help local governments understand their responsibilities and authority regarding land use near such pipelines. The PST believes there is not another state in the nation that comes close to the leadership that the WUTC has provided on these land use issues.

Another example of where the WUTC Pipeline Safety Program has exceeded most other state’s public education efforts relates to the creation and distribution of maps of transmission pipelines. Where pipelines are located in communities is one of the basic facts needed to help create better engagement of local government and the public. The WUTC has created maps of these pipelines that are more accurate than the federal National Pipeline Mapping System, and makes them easily available on their website and distributes the Geographic Information System (GIS) layers to local governments to improve land use and emergency planning.

27 Transmission Pipelines and Land Use - <http://onlinepubs.trb.org/onlinepubs/sr/sr281.pdf>

28 Land Use Planning In Proximity to Natural Gas and Hazardous Liquid Transmission Pipelines in Washington State (2006) - <https://www.utc.wa.gov/publicSafety/Documents/LandUseReport-Final.pdf>

sion pipelines. As far back as 1988 the Transportation Research Board of the National Academies (TRB) recognized a number of issues

Finally, we are unaware of another state utility commission in the country that has proactively encouraged and worked with a citizen advisory committee to find a way to independently review a commission’s pipeline safety program. Funding this report, and making information needed to complete it easily available, with no strings attached regarding conclusions or recommendations speaks highly of the WUTC’s commitment to public involvement and continuous improvement, and ought to serve as an example to other states and the pipeline industry when looking for ways to improve public trust.

“Providing technical assistance to pipeline operators, local governments and communities”

Many of the technical assistance programs that the WUTC’s Pipeline Safety Program provides, such as land use issues, damage prevention, and maps, are discussed in other sections of this report. PHMSA also requires states to provide training and qualification seminars to pipeline operators at least every three years, a requirement that the WUTC has always met.

In other parts of the country we have seen public confusion and jurisdictional conflicts when pipelines cross tribal reservation lands, or when pipelines are operated by the military off military bases, making them potentially non-jurisdictional to state regulators. While we could find no evidence that either of these situations have caused problems in Washington, we did note that there are pipelines crossing tribal reservations, and in at least Island County a pipeline operated by the Whidbey Navel Air Station. We think it would be good for the WUTC to have clear agreements regarding both jurisdiction and technical assistance with tribal governments, as well as the military, before any such issues arise.

“Enforcing laws and regulations in a fair & equitable manner”

Whether laws are being enforced fairly and equitably is difficult to judge. In our survey of pipeline companies in Washington we asked them how they would rate their

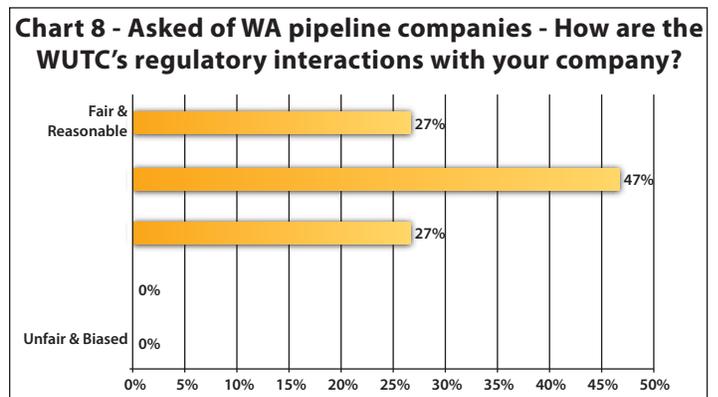


Chart 9 - Compliance actions per mile of intrastate gas pipeline - 2006 - 2015

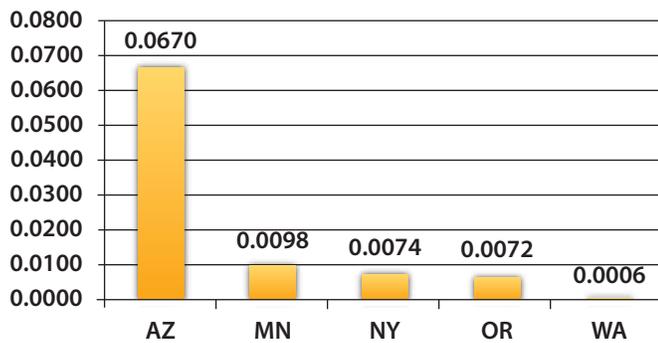


Chart 10 - Average fine per penalty assessed on intrastate pipelines - 2006 - 2015

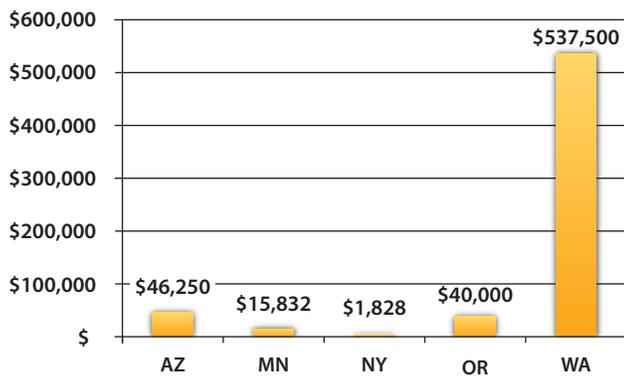


Chart 11 - Number of penalties assessed per compliance action taken - 2006 - 2015

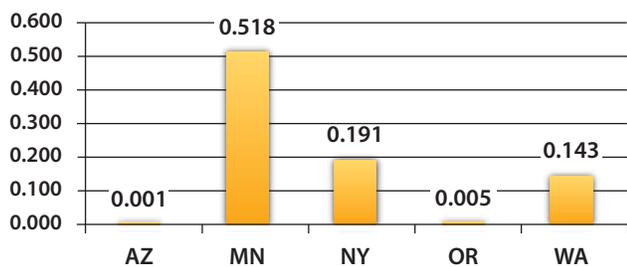
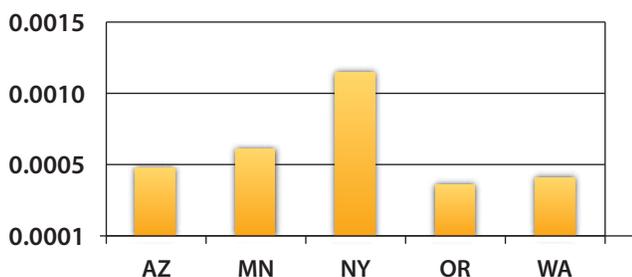


Chart 12 - All distribution pipeline incidents per mile of pipe 2006 - 2015



regulatory interactions with WUTC staff, and as you can see Chart 8, overall companies gave the WUTC good marks for being fair and reasonable.

We also looked at the number and level of proposed fines for both safety violations and excavation damages, and the actual amount of fines collected. What we found was that the WUTC appears ready to use their enforcement authority when needed to correct behavior, but then allows companies to reduce their fines by committing to spend time and money to correct issues throughout their systems, and not violate similar rules again for a period of time.

Finally, as shown in Charts 9-12, using PHMSA data²⁹ we tried to compare the enforcement data for the WUTC with the neighboring state of Oregon, and with the three other states that also have both hazardous liquid and natural gas pipeline interstate agent status. While we find the charts interesting the only thing that we can draw from them is that pipeline systems varying a good deal from jurisdiction to jurisdiction, so enforcement programs vary also. We would be interested in the WUTC's explanation of why the number of compliance actions per mile of pipeline are so much lower than nearly every other state we reviewed.

Recommendations:

WUTC-1: The WUTC should review WAC 480-93 and WAC 480-75 to ensure better consistency between natural gas and hazardous liquid rules.

WUTC-2: The WUTC and Governor should continually work to ensure implementation of the yet to be adopted parts (in bold below) of the state legislature's intent in the state's Pipeline Safety Act of 2000.

- To amend the federal pipeline safety act to delegate authority to qualified states to adopt and enforce standards equal to or **more stringent than** federal standards;
- State authority to administer **and enforce** federal requirements related to pipeline safety; and
- **Higher levels of funding** for state and federal pipeline safety activities and for states to respond to pipeline accident emergencies.

WUTC-3: The WUTC should review their authority on tribal lands and consider the need for an agreement with tribal governments regarding jurisdiction and techni-

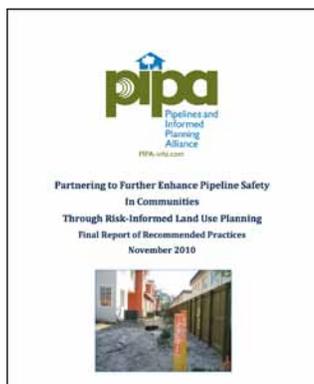
29 PHMSA, State Specific Data - <https://primis.phmsa.dot.gov/comm/states.htm>

cal assistance where pipelines occur on reservations to ensure the WUTC has lawful access to those pipelines if an inspection or incident investigation is warranted.

WUTC-4: The WUTC should consider the need for an agreement regarding jurisdiction and technical assistance with the Department of Defense relating to the safety of any military pipelines operating off military bases, such as the one that serves the Whidbey Naval Air Station.

LAND USE PLANNING AND PIPELINES

There are two ways to think about land use planning and pipelines. The first is to utilize planning tools to limit impacts of new pipelines on existing land uses.



For the siting of nearly all new pipelines, the pipeline company decides on a general route they prefer for their 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 every pipe-

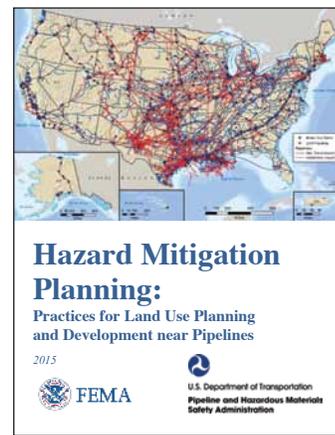
line, and varies greatly depending on the type of pipeline and the proposed location. As was discussed earlier, companies wishing to construct interstate gas pipelines must apply to the Federal Energy Regulatory Commission (FERC) for construction and route approval. And for all other pipelines proposed to be constructed in Washington— greater than six inches in diameter and 15 miles in length — the Energy Facility Site Evaluation Council (EFSEC) has authority for siting and routing per RCW 80.50. The county and city where a project is proposed can appoint a voting member to the EFSEC for review of that project. Local governments otherwise have little say or involvement with siting and routing of pipelines, but they may engage in the state or federal activities by providing comments at the appropriate points in the process. Local governments in other states have used their zoning powers to require conditional use permits for the construction of certain pipelines.

The second way to think about land use planning and pipelines is once pipelines are built. Local governments can use the power granted to them by the state to protect health, safety and general welfare to coordinate and regulate new development near pipelines. Many pipelines

existed prior to surrounding development, and housing density sometimes increases in areas near pipelines that once were predominantly undeveloped rural areas. Local governments can enact regulations governing the type of buildings and construction that can occur near existing pipelines, requiring consultation with the pipeline operator, establishing setbacks or enacting a variety of other land use permit requirements.

To assist local communities with planning near pipelines, in 2010 PHMSA published the final report of the Pipelines and Informed Planning Alliance (PIPA), a three-year effort to provide information and recommendations on the types of tools local government can use to regulate new development near existing pipelines. Forty-three recommended practices are contained in the report, and 29 of them speak specifically to local governments about things they can do to encourage safety near transmission pipelines. These recommendations stress the importance of having a relationship with local pipeline operators that includes open communication, incorporating the existence of pipelines into planning process and infrastructure projects, and the importance of safe excavation practices. One example of a specific recommendation is the use of consultation areas or zones that require early consultation among stakeholders when any development is proposed within a specified distance from a transmission pipeline. In 2015, the Federal Emergency Management Agency (FEMA) produced the report Hazard Mitigation Planning: Practices for Land Use Planning and Development near Pipelines. This report built on PHMSA's earlier effort, and was thought to be better positioned for action by local government emergency planners. In our survey of emergency planners 81% said they had never received a copy of the report. All recommendations and reports mentioned above can be found on the PIPA report website.³⁰

Over the past decade CCOPS, WUTC, PST, MRSC, and the Association of Washington Cities have coordinated a number of efforts to reach out to elected officials and local government planners to encourage adoption of PIPA recommendations. While these efforts



30 PHMSA-Land Use Planning and Transmission Pipelines webpage - <http://primis.phmsa.dot.gov/comm/pipa/LandUsePlanning.htm>

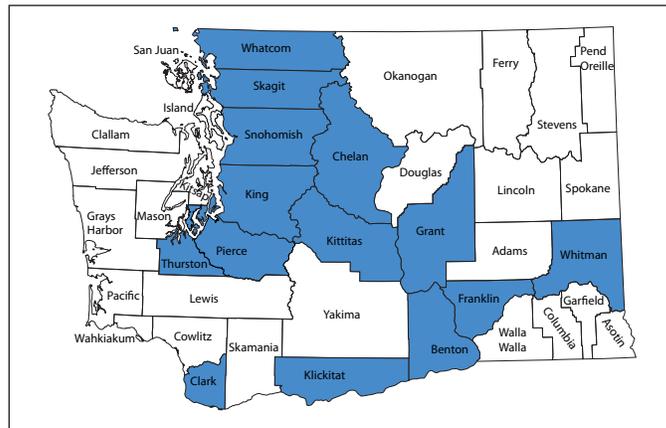
have been more successful than in any other state in the nation, they have only led to the adoption of PIPA recommended practices by a handful of communities in the state. Much of this effort is documented on the MRSC's Planning Near Pipelines website (<http://mrsc.org/Home/Explore-Topics/Public-Safety/Special-Topics/Pipeline-Safety/Planning-Near-Pipelines.aspx>).

In Washington State, city and county governments have a role to play in pipeline safety and oversight. Federal and state regulations generally preclude local governments from adopting any regulations that require a pipeline operator to take any actions regarding the safe operation of a pipeline. Pipeline operators, however, might willingly enter into development agreements or mitigation agreements that include additional safety aspects in certain situations, in response to local conditions. There are actions that local governments take that are not precluded, such as negotiated rights-of-way agreements, spill and emergency preparations and response, or land use and zoning provisions.

Twenty-nine of the 39 counties in Washington State contain a hazardous liquid and/or gas pipeline system. Some of those systems are very small while some of them contain segments of interstate or international systems. Of the 15 counties with transmission pipelines, all of them have gas pipelines and 10 of them have hazardous liquid pipelines within their boundaries.

Counties like King, Pierce, Clark and Snohomish contain many cities with pipelines running through them or immediately adjacent. It is in these areas, and places that cities intend to expand their boundaries, that are of most concern when it comes to planning for pipeline safety. Areas that are not already urbanized are of special importance because they are not already defined by an urban form. These green fields are where planning can have the most influence. Undeveloped areas that are not already within a city, are primarily the responsibility of the county although the county may coordinate with the city utilizing development agreements or other mechanisms.

For the purposes of this report, we've chosen to focus our recommendations more on county level planning for a number of reasons. First, if a county is experiencing growth, it is typically shared between multiple jurisdictions within a county. Second, because counties often coordinate with the cities within their borders, working with a county to engage in planning for pipelines can lead to that county taking the lead in working with their cities to adopt similar policies and regulations. Finally, cities all have a different approach to planning and implementing annexations. Until areas on the fringe of



Fifteen fastest-growing counties with transmission pipelines in Washington State according to Office of Financial Management data.

cities are part of their adjacent city, they are under the jurisdiction of the county. Planning that takes place in these unincorporated urban growth areas often carries over when these areas are annexed into the city later on.

After identifying the 15 fastest-growing counties in Washington, we reviewed each county's planning and development codes, looking for evidence of regulations pertaining to planning near pipelines.

Of the 15 fastest-growing counties with transmission pipelines in Washington State, only three have a section of their code that calls for a consultation zone or something similar — King, Skagit and Whatcom counties. Skagit and Whatcom counties have adopted virtually identical provisions that place a consultation zone around pipelines in their counties, requiring the County to contact the pipeline operator when new subdivisions are planned within a certain distance. King County has adopted a setback system. The flaw with King's approach is that it allows for many circumstances in which a modified setback may be granted.

Whitman and Benton counties call for pipelines that are near proposed subdivisions to be included in proposed plat maps. Island County only calls for a pipeline to be shown on a map at time of application for a surface mining permit. All of the other fastest growing counties, including three of the five fastest growing, have no reference in their code that is relevant to pipeline safety.

All counties with pipelines in Washington State and cities within those counties that also have pipelines should adopt consultation zones, similar to those adopted in Skagit and Whatcom counties. Getting planners to engage in this issue is key to ensuring that these consultation zones are adopted. Unfortunately, pipeline safety is an issue that is frequently put to the side in favor of state mandates on growth management, water availability, critical areas protection, and other pressing issues.

The key to ensuring that counties adopt consultation zones is talking directly with planners and elected officials to spark interest and build understanding. The expense of adopting these zones is limited to staff time and with a model ordinance and support, the planners' job is much easier.

In addition to activities that individual jurisdictions could do, RCW 19.122.033 or "The Dig Law," requires local governments issuing building permits to notify the pipeline operator when it issues the permit and requires as a condition of the permit that the applicant consult with the pipeline company when constructing within 100 feet of a right of way or utility easement. The RCW allows some flexibility to local jurisdictions that adopt ordinances about the notification distance. It's unclear, however, if any jurisdiction is even aware of this provision in the Dig Law. Lack of knowledge about a law renders such a law ineffective. Furthermore, the fact that this law does not even apply until the issuance of building permits, prevents pipeline companies from knowing about pre-building activities like subdivisions in which they could have far more influence when it comes to designing development patterns that protect the pipeline and the public.

Recommendations:

CCOPS-7: CCOPS should distribute the model consultation zone ordinance developed by the MRSC to all elected officials and planning directors in jurisdictions where transmission pipelines occur to help those jurisdictions implement the consultation requirements under RCW 19.122.033(3) & (4). CCOPS should then work with the 12 counties among the 15 fastest-growing counties with pipelines that currently have no, or minimal pipeline safety provisions within their code, to encourage adoption of consultation zones.

PUBLIC AWARENESS, EDUCATION, INVOLVEMENT AND COMMUNICATION PROGRAMS

INDUSTRY PUBLIC AWARENESS PROGRAMS

In 2002, Congress passed a law requiring pipeline operators to create a "public awareness" program on the use of one-call systems (call before you dig), the hazards from unintended releases, and how the public should respond to these releases. Congress also authorized PHMSA to adopt standards prescribing the elements of an effective

As part of this report we surveyed the elected members of city councils and county councils/commissions in jurisdictions where pipelines exist. The survey was emailed to 379 elected officials in 30 counties and 39 cities, and we had a response rate of 15.6%. The electeds responding had an average of 6.2 years in office. Elected officials are one of the target groups for required public awareness information, so we wanted to see what they remember of the information they receive. As you can see from the two charts below about 40% of the officials don't recall ever receiving any information, and of those that do recall getting information more than a third of them either did not think the information was helpful or can't recall the information enough to have an opinion about it.

Chart 13 - Do you recall ever receiving any pipeline safety information from pipeline companies that operate in your jurisdiction?

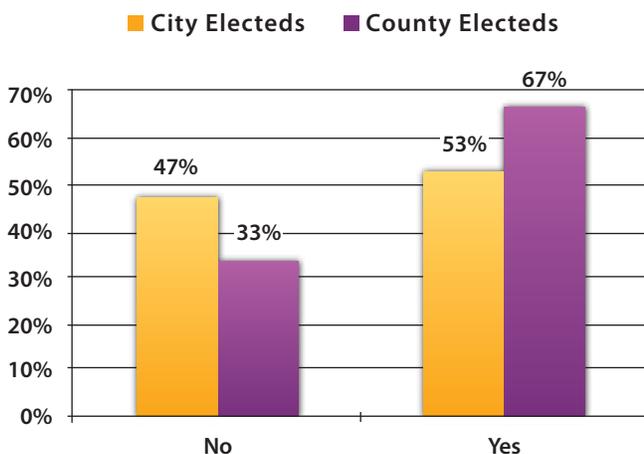
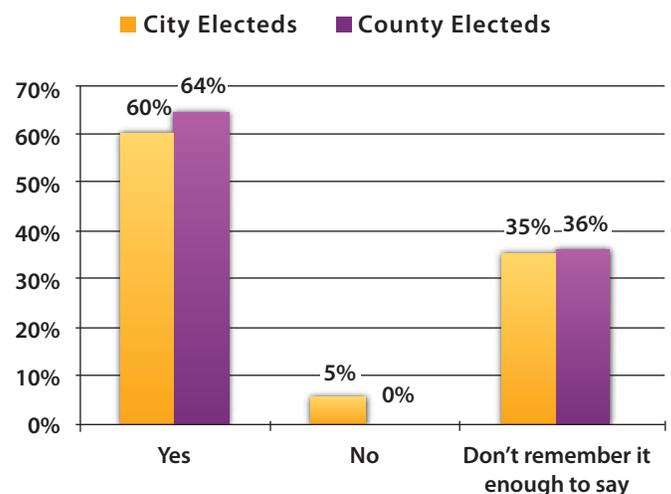
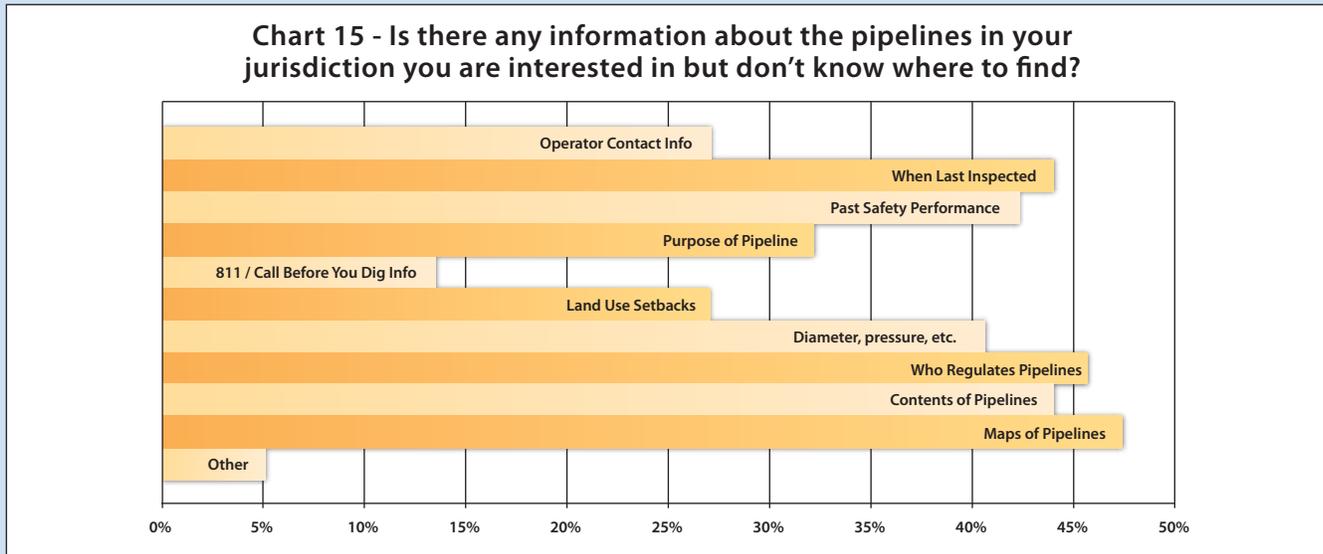


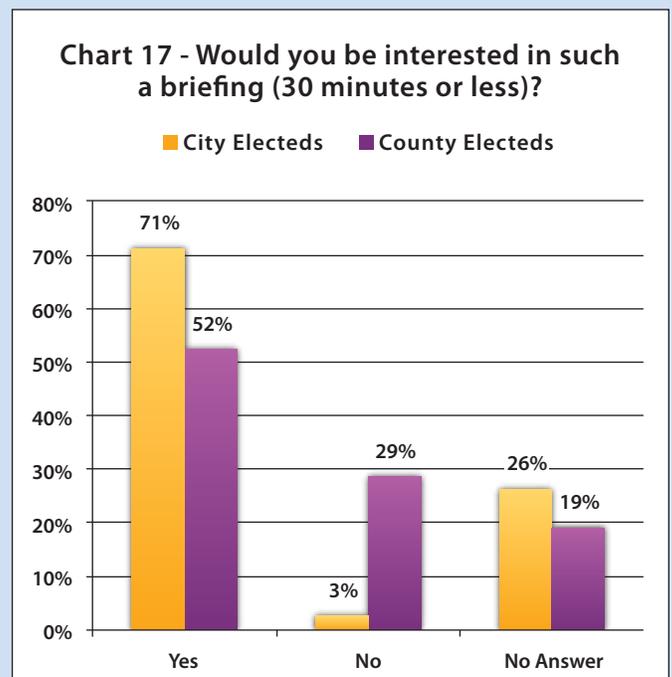
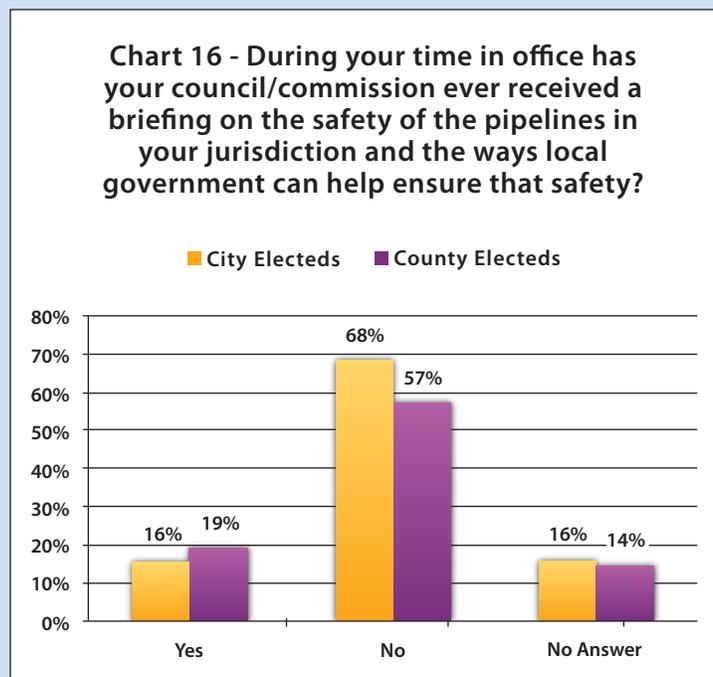
Chart 14 - If you remember getting information, do you think the information was helpful?



We also asked if there was information about the pipelines in their jurisdictions that they were interested in but did not know where to find. Many of the options we provided them with are types of information that is supposed to be provided as part of required Public Awareness communications from pipeline operators. The chart below shows the percentages of all respondents who were interested in certain information.



We also asked if during their time in office they had ever had a pipeline safety briefing, and if they would be interested in such a short briefing. The charts below show that a majority of electeds had never had such a briefing, but would appreciate one.



tive public education program and to develop material for use in the program. At the same time, the pipeline industry began to develop a private standard through the American Petroleum Institute (API): Recommended Practice (RP) 1162. That RP was published in 2003, and was incorporated by reference into the PHMSA regulations in 2005, rather than PHMSA undertaking to write its own regulations. The RP contains a process guide for operators and several pages of tables with recommended communication topics, delivery timelines, and me-

dia. Both the RP and the regulation identify four specific audiences: the affected public (i.e., those who live or congregate near pipelines, or are natural gas customers); emergency officials; local public officials; and excavators.

The API recommended practice is based on a one-way model of “educating” the public rather than involving the public as partners in a risk communication effort. Decisions about content are typically made before there is any contact with the identified audiences to find

out what they know and what they want to know. The RP also appears to conflate risk communication with public relations, by encouraging operators to explain how safe pipelines are and how necessary they are to the economy. Operators had until June 2006 to prepare programs to comply with the regulations. PHMSA and state inspectors undertook the first round of audits/inspections of public awareness programs in 2010-2011. The measure of effectiveness was one area where operators nationwide had challenges meeting PHMSA's audit's expectations.

API is currently undertaking to write a third edition of the recommended practice. It remains to be seen whether PHMSA will incorporate it into regulation and whether it will resolve these two large shortcomings: the lack of two-way communication with stakeholder groups, and the measurement of effectiveness. There is plenty of anecdotal evidence nationwide that the annual mailing of a calendar or magnet or flyer does little to educate residents or local governments about the risks to the community from the presence of pipelines. Our surveys of city and county elected officials, as shown in Charts 13-17, also indicate that improvements are needed, and that elected officials are interested in pipeline safety information.

There are currently two other third-party sources of pipeline public awareness information for Washington citizens. The Pipeline Association of the Northwest (<http://panw.pipelineawareness.org/>), which is part of the larger national Pipeline Association for Public Awareness (A nonprofit corporation made up of the pipeline industry to provide pipeline safety and emergency preparedness information to residents, businesses, farmers, excavators, emergency responders and public officials) and the Washington Pipeline Awareness website (<http://wa.pipeline-awareness.com/home/>) operated by Paradigm (a private company that does many of the required public awareness outreach requirements for companies across the country). Both of these efforts provide valuable information to a variety of stakeholder groups, although since in some instances the information only includes a select number of the local operators (members or clients) it can create an incorrect picture of the totality of pipelines in a particular area to a website visitor. The PST believes that such coordination of pipeline public awareness efforts across companies operating in an area is a good thing, but better care and coordination must be taken to ensure that the complete picture is being provided. We also think that such efforts could be improved by review and comment by non-industry third parties.

Recommendations:

WUTC-8: The WUTC should augment the public awareness program rules, for intrastate operators, to include operator websites as a mandatory message delivery method and include a review of operator websites in its public awareness audits to ensure all baseline messages required by API RP 1162 and system maps (at least for transmission lines) are included and easily accessible on each operator's website. The WUTC should actively explore options to make the same changes apply to interstate operators.

WUTC-7: The WUTC should incorporate some real-world checks to verify the effectiveness of operators' public awareness programs by surveying affected stakeholders along operators' routes, e.g., management and staff of hard-to-evacuate buildings like nursing homes, assisted living facilities, schools, hospitals, etc. to determine if the public awareness programs are reaching these audiences.

OG-1: CCOPS, the Pipeline Association of the Northwest, and Paradigm should consider a way to involve CCOPS in the review of "clearinghouse" sorts of public awareness efforts, particularly in terms of Washington State focused websites, to ensure that a broader range of stakeholder voices are represented and that material provided accurately represents the entirety of the state's pipeline system.

EXCAVATION DAMAGE PREVENTION

One of the leading causes of deaths and injuries from pipeline incidents is from damage to pipelines related to excavation activities. These types of incidents are almost completely preventable, and over the past two decades a significant effort has taken place to identify and implement best practices to prevent these incidents, as well as upgrade state damage prevention programs and enforcement. Charts 18 and 19 show some specifics of this issue in Washington State.

In 2000 the national Common Ground Alliance (CGA) was formed to help enhance worker safety, and better protect the public and underground infrastructure during excavation activities. Since that time CGA has successfully developed a system to adopt national best practices, and produced and updated the Best Practices Guide. CGA was also instrumental in the adoption of the national 811 Call Before You Dig number, as well as the Damage Information Reporting Tool (DIRT) to identify the root cause of incidents that occur as a result in breakdowns in the one call process.

Starting in 2009, PHMSA began to assess the adequacy of various aspects of each state's damage prevention

Chart 18 - Washington State Gas Distribution Pipeline Leaks by Cause 2005-2016

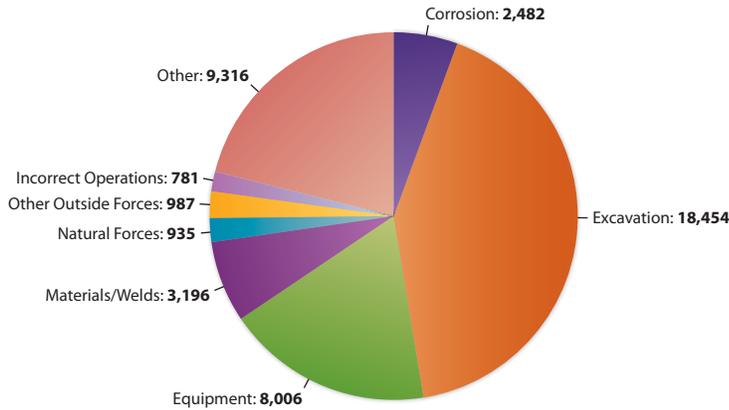


Chart 19 - Washington State Gas Distribution Pipeline Excavation Damages by Root Cause 2015 & 2016

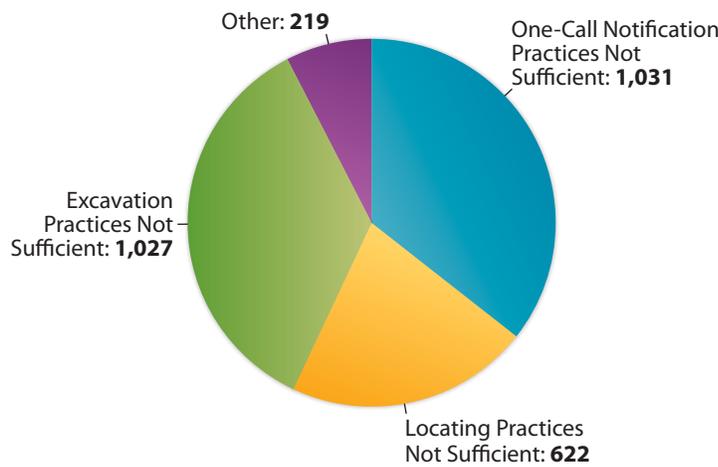
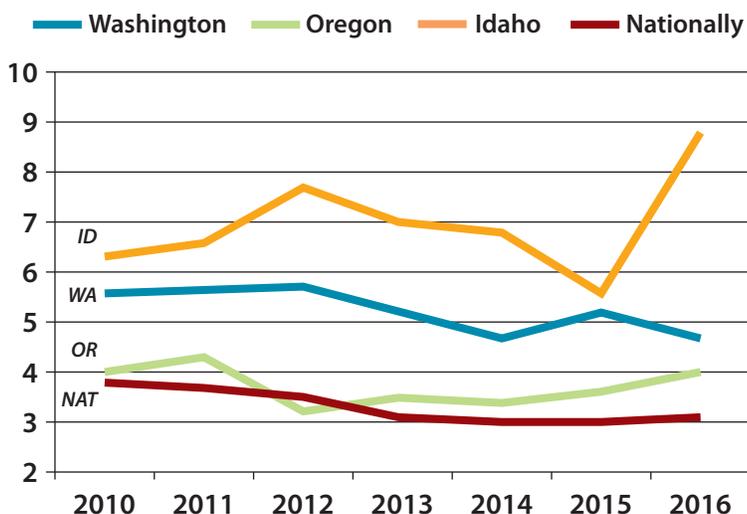


Chart 20 - Gas Distribution Pipeline Excavation Damages Per Thousand One-Call Tickets



program,³¹ and in 2015 they passed a rule that spelled out how they would determine if a state's damage prevention program was adequate, the steps they would take to correct inadequate programs, and the process PHMSA could use to enforce damage prevention laws against excavators if a state was not doing it adequately. This effort by PHMSA helped drive states to improve their damage prevention rules, and Washington State was no exception.

In the 2009 PHMSA assessment, Washington State's Damage Prevention program was found to be inadequate both in terms of an "enforcement agencies' role to help resolve issues" and "fair and consistent enforcement of the law." In 2009, the WUTC spearheaded formation of the Dig Law Group; a consortium of regulated utilities, utility districts of all types, cities, counties, contractors, and excavators. The goals of the Dig Law Group were to address PHMSA concerns, and to draft significant updates to the state's Underground Utility Damage Prevention Law.³² Two years of work by the Dig Law Group resulted in a much revised law that includes clearer enforcement definitions and procedures, requires reporting of damages to underground utilities, establishes a Safety Committee of stakeholder representatives to review complaints of alleged underground utility violations, and establishes the Damage Prevention Account where fines are deposited to be used for educational purposes to improve excavation safety. In PHMSA's last assessment (2014) of State Damage Prevention programs only 20 states received perfect scores, Washington being one of them.

WUTC takes "Call Before You Dig" very seriously, traveling throughout the state to educate people about the danger of digging even a small hole without a locate request. In Washington, as in all states, a person who wishes to dig calls 811 a few days before doing so. This call triggers a series of requests to utilities operating in the area, asking them to visit the identified area and mark the location of the facilities on the ground so the person who wishes to dig in that area knows where they can and can't dig and what kind of tools are appropriate for the job so they don't damage existing

31 Characterization of State Damage Prevention Programs - <https://primis.phmsa.dot.gov/comm/SDPPC-Discussion.htm?nocache=7122>

32 Underground Utility Damage Prevention Law - <http://apps.leg.wa.gov/rcw/default.aspx?cite=19.122>

utilities. This program leads to less frequent unintentional damage to underground utilities including pipelines and is a key part of Washington's damage prevention program.

One aspect that is still missing from the state's Dig Law is positive response. The law currently requires that excavators must "not excavate until all known facility operators have marked or provided information regarding underground facilities." Unfortunately, there is no way for many casual users of the One Call system to know whether all known facility operators have followed their responsibilities under the law and marked their facilities. This can be corrected by a positive response system that tells excavators when all utilities have been marked.

Also, non-commercial landowners and homeowners are hard to educate about excavation damage because there are barriers to using the system. Some of those barriers include the belief (often correct) that they know where the utilities are on their property, how to mark where they want the locate done, how to safely dig once the One Call markings are on the group, and revulsion to "permanent" paint on their landscape. This can be mitigated with better education to this stakeholder group, and through updates through the Dig Law.

With the changes in the state's dig law, and the creation of the Safety Committee, the state's damage prevention program has become more proactive and hopefully effective. With money from both the Damage Prevention Account and PHMSA One Call grants, multiple successful trainings were held for both excavators and locators. Since 2014 enforcement proceedings were conducted in 56 cases for a total of \$156,000 in proposed fines. As seen in Chart 20 the trend line for damages per 1000 one-call tickets is going in the right direction and compares well with neighboring states. Washington State has had no deaths or injuries caused by excavation damage to pipelines in the past decade, and we hope that with a continued emphasis on damage prevention by all involved stakeholders that safety records continues while the number of damages from excavation also decreases further.

Recommendations:

WUTC-9: The WUTC should continue to apply for PHMSA One Call and State Damage Prevention Grants and use awarded money, along with money from the Damage Prevention Account, to fund targeted training programs for excavators and utility locators, as well as general promotion of the One Call system.

WUTC-10: The WUTC should work with the Washington Utilities Coordinating Council and the Washington

Dig Law Safety Committee to provide better, easily accessible information about the Safety Committee's operations, how the complaint process works, how hearings and enforcement procedures work, and clear information about their recommendations and results.

WUTC-11: The WUTC or group similar to the Dig Law Group should propose an agreed upon change to the Dig Law — RCW 19.122 — that incorporates positive response into the law.

WUTC-12: In future updates of the state's Dig Law, the WUTC needs to work with the legislature to better address the concerns and issues associated with private non-commercial landowners and homeowners, and ensure that educational materials detailing how to properly proceed with excavation once utilities are marked is easily available and provided to such users of the One Call system.

OG-2: The WUTC, Washington Utilities Coordinating Council, the National Utility Contractors Association of Washington, and the Washington Dig Law Safety Committee should all make information about upcoming excavation and locator trainings more readily available on their websites.

OG-3: The National Utility Contractors Association of Washington should make a list of those contractors who have completed their Dig Safe Certification program with the date of completion easily available online.

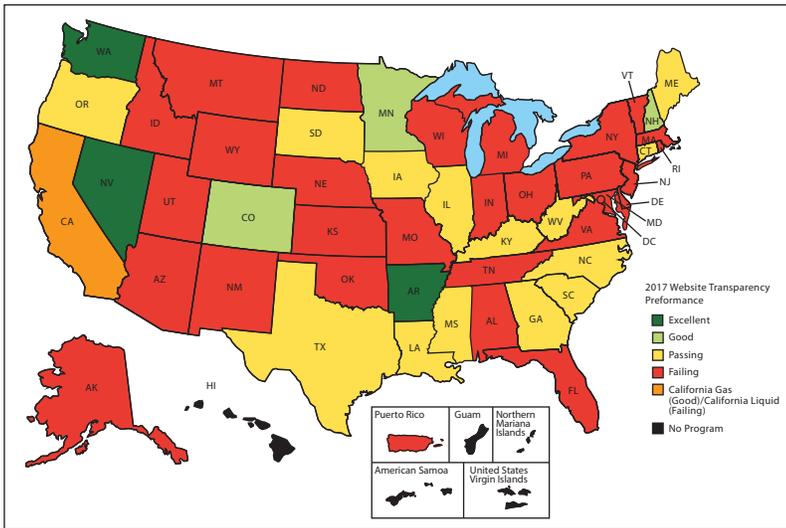
OG-4: The WUTC, Washington Utilities Coordinating Council, and the Washington Dig Law Safety Committee should provide a link to that list of certified excavators on their own website, and promote use of certified excavators as a way to incentivize the training programs.

TRANSPARENCY OF INFORMATION

Since 2011, the PST has conducted an annual website transparency review for state agencies that regulate pipeline safety on behalf of PHMSA. The PST publishes a report of those findings on its website and in its Fall newsletter, prior to its annual conference.

We evaluate each website on the following criteria:

- Ease of finding the state agency's website and contact information for agency staff;
- Accessibility of state and federal rules and statutes;
- The description of the scope of the state's authority (and lack of authority);



Results of the Trust's 2017 state regulator pipeline safety website review

- Existence of transmission pipeline maps and operator contact information;
- Availability of inspection records, and incident, enforcement and excavation damage data; and
- Information about siting and routing of new pipelines.

PHMSA doesn't establish any standard for what should be included in a pipeline safety agency's public website, or even that these agencies should have one. If the agency is interested in doing all they can to have a well-informed public, having a robust online presence helps to serve that purpose.

The PST utilizes the criteria described in this section to give states a numerical score — up to 33 points — and identifies their website as either “excellent” (a perfect score), “good” (25-32 points), “passing” (17-24 points), or “failing” (16 points or less). As shown on the map above, in 2017, 21 states received a score of “passing” or better. For several years, WUTC has invested time and energy in maintaining and improving their online presence for pipeline safety information. WUTC achieved a perfect score in both 2016 and 2017.

The WUTC gets a perfect score for their website because it includes all the information that should be available on a pipeline safety website in a way that is easy to navigate and understand.

For a site that is very narrowly focused on pipeline safety, WUTC's website gets a fair amount of traffic. The pipeline safety site receives more than 150 unique visits per month on average. The agency's Call Before You Dig (CBYD) website receives more than 500 unique visits per month on average and is evidence of the WUTC's commitment to the efficacy of that program.

A good website requires constant review and revision as circumstances change. Oftentimes a state may set up a website that contains solid and relevant information at the time, but over time it will become out-dated and needs to be revised. Washington is constantly updating their site, including a recent switch to a different platform. And, historically, interested persons could sign up for a listserv to get information about pipeline safety in Washington State sent to their inbox. WUTC is transitioning to a new method for operating this listserv, which should be live in 2018. As long as WUTC continues to take the same active approach to their website, it will continue to be a solid resource for Washingtonians who want to learn more about pipeline safety in their state.

But transparency is about more than having a good website. One of the more frustrating things for the public is not having access to information that would help them understand the risk of pipeline leaks, spills and ruptures

Table 5

Company	Finding Pipeline Website	Information about Pipeline Safety	Direct Contact for Pipeline Safety	Map(s) of System	Basic information about system	Call Before You Dig Information	Recognizing and reporting problems
Avista	X	X	X			X	X
Cascade Natural Gas	X	X	X	X	X	X	X
Ellensburg Energy Services	X	X	X			X	X
Enumclaw Natural Gas	X	X	X			X	
Ferndale Pipeline System							
Gas Transmission NW LLC	X		X	X	X		
KB Pipeline							
McChord Pipeline	X	X	X	X	X	X	X
Northwest Natural	X	X	X	X	X	X	X
Northwest Pipeline LLC	X		X		X		
Olympic Pipe Line	X	X	X	X	X	X	X
Phillips 66	X	X	X	X		X	X
Puget Sound Energy	X	X	X			X	X
Tesororo Logistics NW Pipeline	X	X	X	X	X	X	X
Trans Mountain Pipeline	X	X	X	X	X	X	X

in areas they care about. One of the most closely guarded pieces of information in the world of pipelines is the location of HCAs. These areas are known to both the operator and the regulator, but they should also be available to the public and local governments who often have local knowledge regarding HCAs.

In addition to evaluating the pipeline safety website for WUTC, PST reviewed the websites of the larger pipeline operators in Washington State for this report. In our mini transparency review, we evaluated company websites for the criteria shown in Table 5, which closely aligns with recommendations in API RP 1162 for public awareness info to be included on company websites. Companies only received credit for criteria if finding the information was easy.

Recommendations:

WUTC-13: The WUTC should continue to update its website as needed, focusing on increasing accessibility to pipeline safety information and making information easier to understand.

WUTC-14: The WUTC should publish maps showing areas that are identified as High Consequence Areas by PHMSA and operators.

OG-5: Pipeline operators in Washington State should review recommendations in API RP 1162 for what should be available on their website, and ensure that such information is easy to find.

CITIZENS COMMITTEE ON PIPELINE SAFETY (CCOPS)

After the 1999 Olympic Pipeline tragedy the Washington State Legislature created the Citizens Committee on Pipeline Safety (CCOPS).

“to advise the state agencies and other appropriate federal and local government agencies and officials on matters relating to hazardous liquid and gas pipeline safety, routing, construction, operation, and maintenance. The committee shall serve as an advisory committee for the commission on matters relating to the commission’s pipeline safety programs and activities.”

Members of the committee are appointed by the governor. The committee consists of nine voting members representing the public, including local government, and elected officials. Four non-voting members represent owners and operators of hazardous liquid and gas pipelines. The members serve three year staggered terms. The committee is staffed by the WUTC's Pipeline Safety Program, and currently meets four times a year.

CCOPS is one of only three such state advisory committees in the nation, and as such has some unique power granted to it by congress in the Pipeline Safety Improvement Act of 2002.

SEC. 24. STATE PIPELINE SAFETY ADVISORY COMMITTEES.

Within 90 days after receiving recommendations for improvements to pipeline safety from an advisory committee appointed by the Governor of any State, the Secretary of Transportation shall respond in writing to the committee setting forth what action, if any, the Secretary will take on those recommendations and the Secretary’s reasons for acting or not acting upon any of the recommendations.

During its initial years CCOPS had much to focus on with the WUTC taking on more pipeline oversight, local governments in Washington trying to learn from the Bellingham tragedy and better protect their citizens, and new rules being worked on at both the state and federal level. During those initial years the “public” members of committee were nearly all actively involved with these pipeline safety initiatives, including landowner right-of-way issues, local government franchise agreements, involvement with state and federal rulemakings, proposed new pipelines, and land use issues near pipelines.

As time has passed, and many of these critical initiatives have been accomplished or matured, the makeup of the majority of the “public” members has changed from those actively involved in pipeline safety issues to a majority who are interested, but not actively involved. As the committee transitioned to less frequent meetings, and membership became not as engaged in pipeline safety issues, the culture of the committee also transitioned from a proactive committee suggesting, investigating and recommending actions, to a reactive committee that desires education on the issues, and reviews information presented to them. This gradual transition from proactive to reactive poses a dilemma for the committee to find a path where they can meet their legislative mandate *“to advise the state agencies and other appropriate federal and local government agencies and officials on matters relating to hazardous liquid and gas pipeline safety, routing, construction, operation, and maintenance.”*

The committee is also challenged to recruit and keep informed and engaged members due to the low frequency nature of pipeline issues and incidents in Washington, and by turnovers within the public membership from normal levels of resignations, and the member distribution and term limits imposed by the Governor’s office.

Even with these challenges, it would appear to us that CCOPS is well suited to provide insight and assistance on non-technical pipeline safety issues such as required public awareness adequacy, land use issues around pipelines, transparency of information from agencies and the industry, damage prevention, landowner and local government easement issues, emergency response preparedness, and providing an independent sounding board when pipeline issues arise in communities.

Recommendations:

CCOPS-1: CCOPS should strive to be more proactive, and review and provide comment on pipeline safety issues the committee has the ability to successfully weigh in on.

CCOPS-2: CCOPS should review the structural issues associated with the committee (meeting schedule, membership expertise and makeup, membership recruitment, term limits, etc.) and make necessary recommendations to address identified issues, particularly if the committee desires to take a more proactive oversight role.

CCOPS-3: CCOPS should reach out more directly to the impacted and concerned public, especially around active pipeline issues, to give them a voice and to better understand their concerns. (See examples of current pipeline issues in the state on this report's webpage).

CCOPS-4: CCOPS webpage should include a way for citizens to contact CCOPS leadership directly.

CCOPS-5: CCOPS should review the WUTC's 2004 Public Awareness Strategy Report with a focus on how they may be able to help reinvigorate that report's goal to "create and nurture a network of pipeline safety leaders."

CCOPS-6: CCOPS should identify and design a small group (less than 10) of pipeline safety indicators (two examples in Chart 21 and 22 below) that help them and

the public understand how Washington State is doing in keeping pipelines safe. These indicators should be updated and discussed each year by the committee to help focus the committee's efforts, and published on the CCOPS webpage.

SPILL AND EMERGENCY RESPONSE PLANNING

What is required by federal and state law?

Pipeline operators are required by federal law to prepare two different kinds of plans to prepare for pipeline emergencies: Emergency plans (for gas lines pursuant to 49 CFR 192.615 and for hazardous liquid lines under 195.402 and 403) and, for hazardous liquid lines meeting certain criteria, oil spill response plans under the Oil Pollution Act of 1990 (OPA) – the law passed after the *Exxon Valdez* tanker spill in Alaska. The federal regulations for oil spill response plans can be found at 49 CFR Part 194. OPA explicitly permits states to establish their own spill response requirements and does not preempt them. Washington state prepares geographic response plans and requires operators to submit Facility Response Plans under state rules adopted to implement OPA. WAC Chapter 173-182.

Emergency Response Planning

Natural Gas

The regulations for gas emergency plans are not complicated and are quite short. Although each section has a few descriptive clarifiers, it boils down to this:

- 1) Each operator has to have a written plan on how it will respond to a list of various emergencies, including personnel and equipment available, shutdown procedures, notification of fire, police and other public officials, service restoration, etc.
- 2) The plan has to be furnished to supervisors, employees must be trained to it, and following an emergency, actions must be reviewed to determine if the plan was followed; and
- 3) Each operator "shall establish and maintain liaison with appropriate fire, police and other public officials" to coordinate responses and preparedness. 192.615(c).

That last requirement, to maintain a liaison with local first responders, is one aspect of emergency planning efforts that came under serious scrutiny following the failure of a following the failure of a Pacific Gas & Electric (PG&E)

Chart 21 - Washington: Gas Pipeline Inspector Qualification

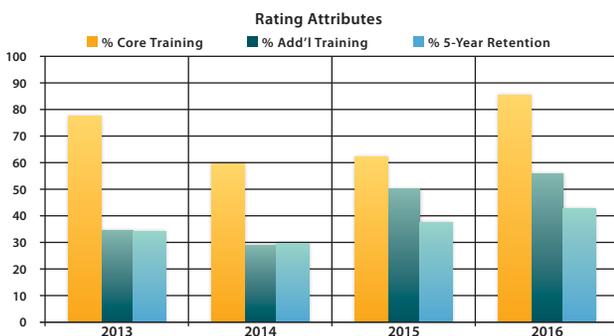


Chart 22 - Washington: Hazardous Liquid Pipeline Inspector Qualification



transmission line in San Bruno, California, when the San Bruno fire chief testified that he was completely unaware that there was a gas transmission line in that neighborhood. Following San Bruno, PHMSA issued an advisory bulletin to operators, [ADB-10-08](#), reminding them of their regulatory obligations to make their pipeline emergency response plans available to local emergency response officials. The National Transportation Safety Board (NTSB) went even further in its report: one of the many new safety recommendations it made to PHMSA following San Bruno was to “[r]equire operators of natural gas transmission and distribution pipelines and hazardous liquid pipelines to provide system-specific information about their pipeline systems to the emergency response agencies of the communities and jurisdictions in which those pipelines are located. This information should include pipe diameter, operating pressure, product transported, and potential impact radius.” (P-11-8) This recommendation, if implemented, would provide local emergency management and first responders with the information they need to appropriately plan responses and preventative and mitigating measures for dealing with the presence of a transmission line through their jurisdictions. PHMSA has not yet responded to this recommendation beyond issuing the Advisory Bulletin.

As part of this report we surveyed emergency responders about what information and assistance they have received from pipeline companies that operate in their jurisdictions. Table 6 shows the percentage of emergency responders (mainly emergency planners) who said they had received a variety of information and assistance.

Hazardous Liquid Emergency Response Planning

Each hazardous liquid pipeline operator must also develop an emergency response plan describing the operator’s procedures for responding to and containing releases. It must include procedures for prompt and effective response to emergencies; personnel, equipment, instruments, tools, and material needed; taking neces-

sary action, such as emergency shutdown or pressure reduction, to minimize the volume released; control of the released liquids; minimizing public exposure to spilled liquids; notifying emergency responders; and reviewing the efficacy of emergency procedures following any accident. Operators must review and, if needed, update the plan every calendar year. They must also create an emergency response training program. Neither PHMSA nor the WUTC reviews or approves these plans, but they do assess these procedures in inspections. If PHMSA determines that the plan must be amended to provide a reasonable level of safety, it cannot do so without giving the operator notice and providing an opportunity for a hearing. In 2010, PHMSA advised operators that they are required to share the emergency plans with local emergency responders, and would face fines if they do not.

PHMSA has sole authority to determine the emergency planning requirements for interstate pipelines; states may not alter these requirements or directly enforce them. However, states may impose more stringent requirements on intrastate pipelines if they have a certified program for the regulation of intrastate pipelines. Washington has adopted specific requirements that these plans must include procedures to respond to earthquakes and for assessing, monitoring and remediating areas subject to landslides. WAC 480-75-660(1). The federal regulations for hazardous liquid emergency plans and training are found at 49 CFR 195.402 and 403.

Interaction of Federal Regulations and Department of Ecology’s Spill Planning Program

Under both federal and state law, hazardous liquid pipeline operators must develop plans to respond to spills and must report spills when they occur.

In the wake of the 1989 Exxon Valdez disaster, Congress passed the Oil Pollution Act (OPA) in 1990. The OPA, an amendment to the Clean Water Act, establishes a tiered planning process to respond to oil spills that threaten navigable waters. The broadest geographic tiers, the Area Contingency Plans, are developed by the EPA and the US Coast Guard, and identify the locations that are sensitive to oil pollution. PHMSA is responsible for reviewing the facility response plans of onshore transportation facilities, including oil pipelines, to ensure that they are in compliance with the OPA and area plans. Under the regulations found in 49 CFR Part 194, PHMSA requires operators to determine the potential worst case discharge scenario by calculating maximum figures for response times, release times, and flow

Table 6 - Which of the following have pipeline companies provided to you?

Opportunities for first responder training specific to pipeline incidents	50% Yes
Copies of their emergency response or spill response plans	45% Yes
Tabletop or field exercises for pipeline incidents	23% Yes
Emergency response equipment or funding for equipment.	5% Yes
Maps of pipelines	73% Yes
Emergency contact information	73% Yes
System specific information such as MSDS sheets, operating pressures, diameter of pipe, location of shutoff valves, etc.	23% Yes
Detailed information about their response capabilities	23% Yes

rates. The plans must also identify environmentally and economically sensitive areas, divide responsibilities among federal, state, and local responders, and include procedures for spill detection and mitigation. PHMSA's regulations allow operators to incorporate by reference appropriate procedures from their Pipeline Safety Act-mandated manuals for operations, maintenance, and emergencies into the OPA-mandated facility response plans.

States may impose additional requirements for facility response plans under the OPA as long as the requirements are at least as stringent as the federal standards, and PHMSA allows plans prepared for state compliance to be submitted to PHMSA for compliance with Part 194, so operators needn't prepare two separate plans. Only a handful of states have adopted any spill response requirements, and fewer still – notably including Washington – have adopted regulations that exceed those of PHMSA.

The Washington program, perhaps the strongest in the nation, and certainly the most transparent, is administered by the Department of Ecology under rules found at WAC Chapter 173-182. It mandates public participation (a 30-day notice and comment period for each new or revised plan) and detailed response plans including plans for heavy, non-floating oils. Spill response plans are made available through public records requests, and are available for review during public comment periods, allowing the public to determine whether sensitive environmental areas and high populations areas have been properly identified and whether sufficient response resources have been placed along the pipelines allowing for quicker responses. It also requires regular drills of spill response plans, both tabletop and in the field, including some unannounced drills, a practice that most closely duplicates an actual emergency. Recent improvements to the program include the addition of a Community Air Monitoring program in Area Contingency plans, ensuring that public health effects of spills from volatile compounds released from pipelines will be monitored, allowing emergency responders to make better-informed decisions.

Recommendations:

WUTC-15: The WUTC should ensure that the pipeline safety program coordinates with the Department of Ecology in reviewing emergency plans, integrity management plans, designation and updates of high consequence areas, and consideration of necessary preventive and mitigative measures for hazardous liquid pipelines, so that inspectors can determine whether operators properly identify and update pipeline segments that “could affect” a high consequence area that includes navigable waters and choose appropriate preventive and mitigative measures to in their integrity management plans protect those areas.



Cleanup of Crude Oil Pipeline Spill, Kalamazoo River, Michigan