

Pipeline Typology and Glossary

1. Pipeline Typology

The oil and gas industry has two main sectors: an upstream (oil and gas producing) sector and a downstream (refining, petrochemical manufacturing, marketing, and gas distribution) sector. Pipelines play a key role in and connect the two sectors. The pipeline system transports products from the oil or gas wellhead to industrial complexes and end-use customers. There are several types of pipelines: (a) flow lines and gathering pipelines; (b) feeder and transmission pipelines; (c) distribution pipelines; (d) product pipelines; and (e) chemical pipelines. Each of these lines has a different function.

Flow Lines and Gathering Pipelines: Pipelines are referred to as “flow lines” and “gathering lines” when they connect wells or other facilities such as batteries or gas processing facilities. Flow lines typically range in size from 2 to 4 inches in diameter, whereas gathering pipelines range from 4 to 12 inches in diameter. Flow lines and gathering pipelines transport natural gas, crude oil, produced water and a variety of hydrocarbon product mixtures.

Feeder and Transmission Pipelines: Pipelines connecting oil and gas fields with transmission pipelines are called “feeder pipelines”. Feeder pipelines normally carry liquid hydrocarbons such as crude oil, natural gas liquids, and high-vapor products such as propane and butane. Typically, feeder pipelines range in size from 6 to 20 inches in diameter. Transmission pipelines typically range in size from 20 to 48 inches in diameter. Transmission pipelines carry oil, natural gas, and natural gas liquids from the producing regions of the country to the marketplace.

Distribution Pipelines: Pipelines delivering natural gas from transmission pipelines to homes and businesses are called “distribution pipeline” systems. Distribution pipelines can be as large as 36 inches in diameter. However, most are much smaller, ranging in size from 1 to 6 inches in diameter. These pipelines generally operate at lower pressures than the transmission pipelines and are owned and operated by local distribution companies. Distribution pipelines are not specifically addressed in this Guideline.

Product Pipelines: Pipelines carrying refined products from refineries to distribution centers such as bulk-loading terminals are referred to as “product pipelines”. Product pipelines typically carry such refined petroleum products as gasoline, diesel, heating oil, or jet fuel. These pipelines range from 6 to 12 inches in diameter and normally operate at lower pressure than natural gas pipelines.

Chemical Product Pipelines: Most pipelines have been developed for the transportation of oil and gas. However, a number of pipelines are also used for the transportation of chemical products, which can be liquids or gases. Chemical products transported by pipeline include oxygen, nitrogen, ammonia, and ethylene, each with its own hazard potential. While these product pipelines are not specifically addressed in this Guideline, land use planning requirements related to these pipelines are essentially identical.

2. Glossary¹

API: American Petroleum Institute

ASME¹: American Society of Mechanical Engineers

Corridor (Pipeline): A pipeline corridor is a linear area where two or more pipelines (either part of the same or different pipeline systems) are closely grouped in a single right-of-way. (OPS)

Distribution Pipeline (Distribution Line): A distribution line is a line used to supply natural gas to the consumer. A distribution line is located in a network of piping located downstream of a natural gas transmission line. As defined in natural gas pipeline safety regulations, a distribution line is a pipeline other than a gathering or transmission line.

Easement: An easement is an acquired privilege or right, such as a right-of-way, afforded a person or company to make limited use of another person or company's real property. For example, the municipal water company may have an easement across your property for the purpose of installing and maintaining a water line. Similarly, oil and natural gas pipeline companies acquire easements from property owners to establish rights-of-way for construction, maintenance and operation of their pipelines. (OPS)²

Emergency: A present or imminent event that requires prompt coordination of actions or special regulation of persons or property to protect the health, safety and/or welfare of people or to limit damage to property.

Encroachment: Encroachment refers to the unauthorized use of a right-of-way in violation of the terms by which the right-of-way was established (e.g., easement).

Federal Energy Regulatory Commission (FERC): The Federal Energy Regulatory Commission is an independent regulatory agency within the Department of Energy that:

- Regulates the transmission and sale for resale of natural gas in interstate commerce;
- Regulates the transmission of oil by pipeline in interstate commerce;
- Regulates the transmission and wholesale sales of electricity in interstate commerce;
- Licenses and inspects private, municipal, and state hydroelectric projects;
- Oversees related environmental matters;
- Administers accounting and financial reporting regulations and conducts of jurisdictional companies; and

¹ This is a general glossary of terms related to pipelines and land use. Some of these terms may not be found in the report and its appendices.

² Pipeline Easement is a legal right, acquired from a property owner, to use a strip of land for installation, operation and maintenance of a pipeline. The widths of these easements vary considerably. (MRSC)

- Approves siting and abandonment of interstate pipeline facilities.

Gas: As used in pipeline safety regulations gas is considered to be natural gas, flammable gas, or gas which is toxic or corrosive. Gases are normally compared to air in terms of its density. Since the specific gravity of air is 1.0, any gas with a specific gravity less than 1.0 will rise and usually disperse. Gas having a specific gravity greater than 1.0 will fall and collect near the ground or in low-lying areas such as trenches, vaults, ditches, and bell holes. Such occurrences can be hazardous to human health and safety.

Hazardous Liquid: Pipeline safety regulations identify petroleum, petroleum products, or anhydrous ammonia as hazardous liquids.

High Consequence Area (HCA): A high consequence area is a location that is specially defined in pipeline safety regulations as an area where pipeline releases could have greater consequences to health and safety or the environment. Regulations require a pipeline operator to take specific steps to ensure the integrity of a pipeline for which a release could affect an HCA and, thereby, the protection of the HCA.

High Population Area: A high population area is an urbanized area, as defined and delineated by the U.S. Census Bureau, which contains 50,000 or more people and has a population density of at least 1,000 people per square mile. High population areas are considered high consequence areas.

High-Vapor Pressure Hydrocarbons: Such products as propane, butane and other natural gas liquids that can quickly convert to gaseous form at atmospheric pressure. Because they are more volatile, these liquids require pipelines with relatively high compression and other special engineering design.

Interstate Pipeline: An interstate pipeline is a pipeline that extends beyond the boundaries of one state. Technically speaking: An interstate pipeline is a pipeline or that part of a pipeline that is used in transportation of hazardous liquids or natural gas in interstate or foreign commerce.

Intrastate Pipeline: An intrastate pipeline is a pipeline or that part of a pipeline that is entirely contained within one state's borders. An intrastate pipeline system may be under a state's regulatory jurisdiction as long as that state has a pipeline safety and inspection program that meets or exceeds the federal program. The state may opt to have its intrastate pipelines regulated by federal inspectors.

Lateral: A lateral is a segment of a pipeline that branches off of the main or transmission line to transport the product to a termination point, such as a tank farm or a metering station.

Local Distribution Company (LDC): A local distribution company is a pipeline operator responsible for distributing natural gas locally to its customers. An LDC purchases gas from gas pipeline transmission companies for resale to the consumer.

LDC's operate and maintain the underground network piping, regulators, and meters that connect to each residential and commercial customer.

Locate: Locate refers to the process of determining the existence and location of an underground facility, such as an oil or gas pipeline, and indicating that location through the use of stakes, flags, paint or some other customary manner. Such markings identify the location of the underground facility so that excavators can avoid damage to the facility when digging.

Low-Vapor Pressure Hydrocarbons¹⁸: Such products as oil, synthetic oil and heavy oil, which flow through pipelines in liquid form.

Mitigation: Actions taken to alleviate, reduce the severity of, or moderate the consequences of failure.

Office of Pipeline Safety (OPS): OPS is the agency within the Pipeline and Hazardous Materials Administration (PHMSA), that is responsible for regulating the safety of design, construction, testing, operation, maintenance, and emergency response of U.S. oil and natural gas pipeline facilities.

One-Call System: A one-call system is a system that allows excavators (individuals, professional contractors, and governmental organizations) to make one telephone call to provide notification of their intent to dig to underground facility operators. The one call center will then notify all underground facility operator members of the intended excavation along with the date and location of the excavation. The facility operators or, in some cases, the one-call center can then locate the facilities before the excavation begins so that extra care can be taken to avoid damaging the facilities. All 50 states within the U.S. are covered by one-call systems. Most states have laws requiring the use of the one-call system at least 48 hours before beginning an excavation.

Operator: An operator is a company or person who is responsible for the operation, maintenance and management of the pipeline.

Pipeline: Used broadly, pipeline includes all parts of those physical facilities through which gas, hazardous liquid, or carbon dioxide moves in transportation. Pipeline includes but is not limited to: line pipe, valves and other appurtenances attached to the pipe, pumping/compressor units and associated fabricated units, metering, regulating, and delivery stations, and holders and fabricated assemblies located therein, and breakout tanks.

Pipeline Easement: a legal right, acquired from a property owner, to use a strip of land for installation, operation and maintenance of a pipeline. The widths of these easements vary considerably. (MRSC)

Pipeline Operator: A pipeline operator is a company or person who is responsible for the operation, maintenance and management of the pipeline.

Prevention: Actions taken to avoid pipeline damage or failure.

Rights-of-Way (ROW): A rights-of-way is a defined strip of land on which an operator has the rights to construct, operate, and/or maintain a pipeline. The operator may own a ROW outright or an easement may be acquired for specific use of the ROW. (OPS)

Risk: The potential for loss, injury or damage to occur.

Risk Assessment: Risk assessment is a step in the risk management process. Risk assessment is measuring two quantities of the risk, the magnitude of the potential loss, and the probability that the loss will occur. Risk assessment may be the most important step in the risk management process, and may also be the most difficult and prone to error. Once risks have been identified and assessed, the steps to properly deal with them are much more programmatical.

Setback: Minimum distances a house or building must be from the pipeline.

Temporary Working Space: An area of land within which certain activities are authorized for a specified purpose and period of time, typically of short duration.

Third Party Damage: Third-party damage includes all outside force damage to underground facilities (e.g., pipelines) that can occur during excavation activities. Responsibility for preventing underground facility damage is shared by all stakeholders.

Transmission Pipeline (Transmission Line): Transmission pipeline" means a gas pipeline that transports gas within a storage field, or transports gas from an interstate pipeline or storage facility to a distribution main or a large volume gas user, or operates at a hoop stress of twenty percent or more of the specified minimum yield strength.

Washington Utilities and Transportation Commission (WUTC): The Pipeline Safety Section of the WUTC is responsible to ensure public health and 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 local governments and communities