

Glossary of Terms/Concepts for High-Volume Hydraulic Fracturing (HVHF)

Acid Mine Drainage (AMD): Runoff caused by water flowing over and through sulfur-rich areas, such as coal or metal mines, which has a negative effect on the environment. There are proposals to use AMD as a source for water for HVHF with the help of recycling facilities to reduce AMD's impact on waterways.

Appalachian Basin: The subterranean geologic formations that roughly follow the Appalachian Mountain range. The United States Department of Energy associates the Appalachian basin with the Marcellus Shale, the Devonian Shale, primarily of Ohio, and the Utica Shale in Virginia.

Abandoned Well: A well that is no longer in use, whether dry, inoperable, or no longer productive. Also called orphan wells.

Agricultural Easement: A legal property interest that dedicates land to agricultural uses, forfeiting the right to develop the land for other purposes.

Agricultural zones: Land open only to agricultural development with the intention of preserving and protecting the farming community and culture of an area.

Analyte: A substance or chemical constituent being analyzed.

Antrim Shale: A shale deposit located in the northern Michigan basin that is a Devonian age rock formation lying at a relatively shallow depth of 1,000 feet. Gas has been produced from this formation for several decades primarily via vertical, rather than horizontal, wells. The Energy Information Administration (EIA) estimates the technically recoverable Antrim shale resource at 20 trillion cubic feet (tcf).

Aquiclude: An impermeable body of rock that may absorb water slowly, but does not transmit it.

Aquifer: An underground geological formation, or group of formations, containing water. A source of ground water for wells and springs.

Aquitard: A geological formation that may contain ground water but is not capable of transmitting significant quantities of it under normal hydraulic gradients.

Assay: A test for a specific chemical, microbe, or effect.

Bakken Shale: A rock unit from the Late Devonian to Early Mississippian age occupying about 200,000 square miles (520,000 km²) of the subsurface of the Williston Basin, underlying parts of Montana, North Dakota, Saskatchewan and Manitoba. The application of hydraulic fracturing and horizontal drilling technologies have caused a boom in Bakken production since 2000, primarily in North Dakota. In April 2013, the US Geological Survey released a new figure for expected ultimate recovery of 7.4 billion barrels of oil.

Barnett Shale: A newly developed major play within the Fort Worth Basin in Northeast Texas. Wells are in the 6,000-to-8,000 foot depth range and the EIA estimated technically recoverable resource is 43 tcf.



Best Management Practices (BMP): BMPs are methods or techniques that have consistently shown results superior to those achieved with other means and are thereby used as a benchmark. Communities experiencing HVHF can create a series of agreements with companies operating in their area (either legally or non-legally binding) in order to ensure the best and safest development of their resources.

Biocide: Any substance that kills or retards the growth of microorganisms.

Biodegradation: The chemical breakdown of materials under natural conditions.

Bonding: The use of legal documents to secure companies' responsibility for repair to roads if damage occurs through greater-than-average use.

Borehole: The hole or shaft in the earth made by a well drill; also, the uncased drill hole from the surface to the bottom of the well.

Brine: A salt water and chemical mix that is produced after fracturing a well (also called *flowback*). This liquid can come out of the ground with very high Total Dissolved Solids (TDS) levels and often toxic substances such as barium and strontium, as well as a very high salt content.

Caney Shale: Located in Arkoma Basin of Northeastern Oklahoma; has only recently been developed following the success of the Barnett Shale in Texas.

Casing: Pipe cemented in the well to seal off formation fluids and to keep the hole from caving in.

Clean Water Act: The primary federal law in the United States governing water pollution. Passed in 1972, the objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. Disposal of flowback into surface waters of the United States is regulated by the National Pollutant Discharge Elimination System (NPDES) permit program. The Clean Water Act authorizes the NPDES program. The law, however, exempts stormwater discharges (surface water runoff resulting from rain or snow) from oil and gas drilling and production activities from this permitting requirement. In addition, the 2005 Energy Policy Act, in addition to the SDWA exemption, broadened this exemption to include stormwater discharge from oil and gas construction activities.

Closed Loop System: Generally refers to drillers operating with a water cycle that is never exposed to the open air, unlike containment ponds. Closed loop drillers might operate on a well pad that is too isolated or too small to allow for construction of a pond.

Coalbed: A geological layer or stratum of coal parallel to the rock stratification.

Coalbed Methane (CBM): A form of natural gas extracted from coal beds.

Comprehensive Plan: A plan, or any portion thereof, adopted by the City Planning Commission and the City Council showing the general location and extent of present and proposed physical facilities including housing, industrial, and commercial uses, transportation, parks, schools, and other community activities. This plan establishes the goals, objectives, and policies of the city.



Conductor Casing: The first string of casing in a well. It may be lowered into a hole drilled into the formations near the surface and cemented in place; it may be driven into the ground by a special pile driver (in such cases, it is sometimes called drive pipe). Its purpose is to prevent the soft formations near the surface from caving in and to conduct drilling mud from the bottom of the hole to the surface when drilling starts. Also called conductor pipe, drive pipe.

Conesauga Shale: Cambrian Age shale deposits located in north central Alabama currently being evaluated for development.

Containment Ponds (also called Reserve Pits): Ponds intended to capture waste from power plants, industrial complexes, and drilling sites. Challenges in using this conventional method include managing the volume of waste product; installation and maintenance costs; contamination of land and/or water due to pit failure and associated cleanup costs; potential for pollution due to leaching.

Conventional Natural Gas Reservoir: A geological formation in which the natural gas is in interconnected pore spaces, much like a kitchen sponge, that allows easier flow to a well.

Corrosion Inhibitor: A chemical compound that decreases the corrosion rate of a metal or an alloy.

Cracker Plant: A 'midstream' facility which breaks down large molecules from oil and natural gas into smaller ones. For example, an ethane cracker plant creates ethylene, an important base chemical in the chemical and plastics industry, from ethane, a substance found in Natural Gas Liquids (NGLs, also known as 'wet gas').

Cryogenic Plant: A type of natural gas processing plant (mid-stream facility) that uses low temperatures to condense the collected natural gas to a liquid state, making it easier to separate the component hydrocarbons and transport the gas.

Cuttings: The broken bits of solid material (usually rock) removed from a borehole drilled in the HVHF process. Cuttings usually travel back to the surface with the returning drilling fluid. Cuttings from the Marcellus (and possibly Utica) Shale can have higher levels of NORM (naturally occurring radioactive material) than is commonly found due to the character of the rock.

Directional Drilling: The process that allows drillers to sink a well to a certain depth and then aim it in a lateral direction toward a target area. Directional drilling allows greater access to hard-to-reach stores of gas or oil and it means drillers can cover more territory with one well.

Devonian Shale: The general term used to describe the thick sequence of shales in the Appalachian Basin that has been produced for more than a century. Development was greatest in the 1930s-through-1980s, using vertical wells and explosive fracturing. However, any shale deposited during the Devonian geologic period (360 million to 406 million years ago) is considered Devonian shale.

Delaware River Basin Commission (DRBC): This multi-state agency includes the governors of Pennsylvania, New Jersey, Delaware, and New York on its board. It regulates water withdrawals from the Delaware River as well as effluent into the river. It has been at the center of the debate over drilling in Northeastern Pennsylvania. Recently it issued an executive order halting most drilling in its watershed.



Drilling Rig (Rig): Usually a large-standing structure employing a drill that creates holes or shafts in the ground for purposes of accessing and producing natural gas or oil from subsurface deposits. Sometimes referred to as the “Christmas trees” when lit up at night.

Dry gas: One of two types of raw natural gas, dry gas contains low amounts of condensable compounds, also called natural gas liquids or NGLs (such as butane and propane), making it more “pipeline ready.” Gas is considered to be “dry” when it is composed of almost entirely methane.

Environmental Protection Agency (EPA): An agency of the U.S. federal government which was created for the purpose of protecting human health and the environment by writing and enforcing regulations based on laws passed by Congress. It has the responsibility of maintaining and enforcing national standards under a variety of environmental laws, in consultation with state, tribal, and local governments. It delegates some permitting, monitoring, and enforcement responsibility to U.S. states and the federal recognized tribes. EPA enforcement powers include fines, sanctions, and other measures. The agency also works with industries and all levels of government in a wide variety of voluntary pollution prevention programs and energy conservation efforts.

Exploration and Production Companies (E & P): The first step in the process of harvesting natural gas; they find the natural gas, drill, and get the gas out of the ground. Midstream companies then collect and process the natural gas (using cryogenic or non-cryogenic plants). Pipeline companies then take over and transport the gas.

Evaporation Pits: A common brine disposal technique intended to recover the brine product (water evaporates leaving behind a concentrated salt solution). Best used in arid regions because rainfall will hinder the process. As with containment ponds, there are concerns regarding leaching and overflow, as well as air pollution.

Eagle Ford Shale: A newly discovered (2009) shale play located in several counties in south Texas. The average gross thickness of the shale is 350 feet and it produces from depths varying from 4,000 to 14,000 feet. Eagle Ford is the most active shale play in the world, with about 250 rigs operating at any single time and the technically recoverable resource is estimated by EIA to be 21 tcf.

Eastern Gas Shales Project: A program initiated by the U.S. Department of Energy in the late-1970s to evaluate the gas potential of – and to enhance gas production from – the extensive Devonian and Mississippian black shales located in the Appalachian, Illinois and Michigan basins of the eastern United States. The program not only identified and classified shales throughout the three basins, but also focused on developing and implementing new drilling, stimulation and recovery technologies to increase production potential. Between 1978 and 1992, DOE spent about \$137 million on the program, which helped develop and demonstrate directional and horizontal drilling technology.

Fayetteville Shale: Newly developed shale deposit located in the Arkoma Basin of Arkansas, lying at a depth of 1,500-to-6,500 feet. Previously produced from vertical wells but all current wells are horizontal. Technically recoverable resource is estimated by EIA to be 32 tcf.

Flaring: The controlled burning of natural gas that can’t be processed for sale or used because of technical or economic reasons.

Flowback Water: After the hydraulic fracturing procedure is completed and pressure is released, the direction of fluid flow reverses, and water and excess proppant flow up through the wellbore to the surface. Both the process and the returned water are commonly referred to as “flowback.”



Floyd Shale: A shale deposit from the Mississippian geologic age located in the resource-rich Black Warrior Basin of Mississippi and Alabama.

Fluid Leakoff: The process by which injected fracturing fluid can migrate from the created fractures to other areas within the hydrocarbon-containing formation.

The Fracturing Responsibility and Awareness of Chemicals Act: Also known as The Frack Act, a legislative proposal in the United States Congress to define hydraulic fracturing as a federally regulated activity under the Safe Drinking Water Act. The proposed act would require the energy industry to disclose the chemical additives used in the hydraulic fracturing fluid. The gas industry opposes the legislation.

FracFocus: A joint effort by the Ground Water Protection Council (GWPC) and the Interstate Oil and Gas Compact Commission (IOGCC) that is an online registry for companies to publicly disclose the chemicals used in their hydraulic fracturing operations.

Fracturing Fluid: The fluid used to fracture shale. It is composed primarily of water, with the remainder consisting of sand and various chemical additives. Fracturing fluid is pumped into wells at very high pressure to break up and hold open underground rock formations, which in turn releases natural gas.

Frack water recycling: The reuse of water or brine that comes up out of the well after the shale has been fractured. Companies treat the used fluid and dilute it with new fresh water.

Friction Reducer: An additive that reduces the friction of a fluid as it flows through small spaces.

Future fund: A 'permanent' fund of monies set aside for long-term projects, continued funding sources, and development that can create sustainable revenue for a community. Frequently, in natural resource-producing areas, these are developed from severance taxes at the state level.

Fugitive Emissions: Emissions of gases or vapors from pressurized equipment due to leaks and other unintended or irregular releases of gases, mostly from industrial activities.

Geological Formation: A body of earth material with distinctive and characteristic properties and a degree of homogeneity in its physical properties.

Gothic Shale: A newly exploited shale formation located in the Paradox Basin of Colorado. Only a few wells have been drilled, one testing to 5,700 mcf (million cubic feet) per day.

Ground water: The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs. It provides a major source of drinking water.

Haynesville Shale: Along with the Marcellus and Barnett, this is one of the major shale plays. Located in Northwestern Louisiana, Haynesville is a Jurassic Age formation where vertical wells were drilled as far back as 1905; but it was not considered a major natural gas source until the advent of directional drilling.

Impact Fee: A fee that is imposed by the local government in regards to a proposed development project (i.e. HVHF). This fee is intended to cover all or some of the costs associated with providing new



services (roads, sewer, water, etc.) to the developed area, and in regards to drilling should be levied when drilling permits are issued.

Intermediate Casing: Used on longer drilling intervals. Set after the surface casing and before the production casing. Prevents caving of weak or abnormally pressured formations.

IOGCC (Interstate Oil and Gas Commission): A United States organization that represents the governors of 30 member and eight associate states, and works to ensure the nation's oil and natural gas resources are conserved and utilized to their maximum potential while protecting health, safety and the environment.

Lease rates: How much a company pays for land or mineral rights. These are typically executed in five-year increments.

Liquefied Natural Gas (LNG): Natural gas (often ethane or methane) converted to a liquid (via cryogenic processing) for transport or storage.

Man Camps (Crew Camps): Non-traditional housing (RV camps, modular homes, etc.) provided for the temporary workforce usually associated with the labor-intensive drilling phase of HVHF. Generally man camps seek to provide their residents with all necessary aspects of life, such as dining, laundry and recreation.

Marcellus Shale: A large play that underlies most of the U.S. Northeast, the Marcellus is a Devonian-age shale that is estimated by the Energy Information Administration to contain at least 410 tcf of unproved, technically recoverable gas. Most of the play is at the 5,000-to-8,000 foot level below the surface and was long considered too expensive to access until advances in drilling and fracturing technology.

Measurements:

MMBTU or MBTU: These can both mean 1 million BTUs. (MBTU can also stand for 1000 BTUs, so context is important.) A BTU is the British Thermal Unit. It is the amount of heat needed to increase the temperature of a pint of water by one degree Fahrenheit. An MMBTU is roughly comparable to 1000 cubic feet of natural gas.

CCF = One hundred (100) cubic feet.

MCF = One thousand (1000) cubic feet.

MMCF = One million cubic feet.

TCF = One trillion cubic feet.

BCF = One billion cubic feet.

Mechanical integrity: An injection well has mechanical integrity if: (1) there is no significant leak in the casing, tubing, or packer (internal mechanical integrity) and (2) there is no significant fluid movement into an underground source of drinking water through vertical channels adjacent to the injection wellbore (external mechanical integrity).

Midstream Facility: Any facility involved with the processing, transporting or marketing of oil, natural gas, and natural gas liquids (ex: pipelines and compressor stations).

Mineral rights: Legal rights that allow for search and removal of minerals on a particular parcel of land. Sometimes the mineral rights are severed from the surface rights to the land, which can be called a split estate.



Mud or Drilling Mud: Also referred to as drilling fluid, drilling mud is the oil- or water-based liquid compound used to lubricate and cool working drills. The specific ingredients vary according to company and drill site. As with fracking fluids, exploration and production companies are not required to publish the ingredients or their specific formulas.

Natural Gas: A naturally occurring mixture of hydrocarbon and non-hydrocarbon gases in porous formations beneath the Earth's surface, often in association with petroleum. The principal constituent is methane.

Natural gas liquids (NGL): Components of natural gas, such as propane, butane, pentane, hexane and heptane, that are liquid at surface temperatures and pressures (unlike other components of the natural gas, such as methane and ethane, that need to be cooled before they liquefy). Natural gas liquids are considered valuable by-products of natural gas processing. When natural gas contains NGL, it is called "wet gas;" without these compounds, it is called "dry gas."

Naturally occurring radioactive materials (NORMs): All radioactive elements found in the environment, including long-lived radioactive elements such as uranium, thorium, and potassium and any of their decay products, such as radium and radon.

New Albany Shale: This Devonian to Mississippian age shale deposit is located in the Illinois Basin and has been a producer of natural gas for over 100 years. Most wells are shallow, between 120 and 2,100 feet; new drilling and completion technologies and competitive prices have resulted in energy companies revisiting old leases and drilling new wells. Estimated by EIA to contain 11 tcf of technically recoverable resources.

National Ground Water Association (NGWA): Headquartered in Westerville, Ohio. The NGWA is a membership-based nonprofit organization which is composed of [U.S.](#) and international groundwater professionals in four membership divisions: water well contractors, scientists and engineers, manufacturers, and suppliers.

On-Site Water Treatment: A practice employed by many shale gas producers to facilitate reuse of flowback fluids. In this instance, mobile and fixed treatment units are employed using processes such as evaporation, distillation, oxidation, and membrane filtration for recycling and reuse. On-site treatment technologies may be capable of returning 70-80 percent of the initial water to potable water standards, making it immediately available for reuse.

Pearsall Shale: Located in the Maverick Basin of southwestern Texas. Located about 2,500 feet below the Eagle Ford Shale and is approximately 500-600 feet in thickness.

Permeability: A measure of the ability of a material to allow fluids to pass through it.

Philanthropy: The desire to promote the welfare of others, especially through the donation of money to charitable causes.

Pipeline: Underground or surface tubing or piping that is installed across states, countries and continents to deliver fuel.

Pooling or Land Pooling: A legal process that allows exploration and production companies to compel unwilling land and mineral rights holders to lease or sell their land and/or mineral rights for exploration,



drilling, or pipeline installation if enough of their neighbors have already agreed. Government agencies require a minimum number of acres of land before granting a well permit; with pooling, companies can collect smaller tracts of land that will accumulate to this total minimum acreage. Pooling is not a law in all states.

Primary Term- The length of a lease in years.

Produced Water: After the drilling and fracturing of the well are completed, water is produced along with the natural gas. Some of this water is returned fracturing fluid and some is natural formation water. These produced waters move back through the wellhead with the gas.

Production Casing: The final interval in a well. The smallest casing, it forms the outer boundary of the annulus.

Proppant/Propping Agent: A granular substance (sand grains, aluminum pellets, or other material) that is carried in suspension by the fracturing fluid and that serves to keep the cracks open when fracturing fluid is withdrawn after a fracture treatment.

Pumping Station or Compression Station: These pump natural gas through pipelines at a rate of about 700 million cubic feet per day. They tend to be situated 50 to 100 miles apart.

Public Water System: A system for providing the public with water for human consumption (through pipes or other constructed conveyances) that has at least 15 service connections or regularly serves at least 25 individuals.

Reclamation: The clean up or restoring a well site to its pre-existing condition after drilling operations cease. Reclamation activities, which are governed by state, federal and local laws and regulations, can include soil replacement, compacting and re-seeding of natural vegetation.

Residential Well: A pumping well that serves one home or is maintained by a private owner.

Reservoir: An area that contains a resource. In hydraulic fracturing, well operators are seeking to tap into natural gas reservoirs deep underground.

Road Use Maintenance Agreements (RUMAs): A (generally) legally-binding agreement between a community (state, local, etc.) defining such things as a company's responsibility for repairs or upgrades to local roads in relation to excessive use/loads. RUMAs can also include acceptable haul routes, information regarding rail crossings, specific time restrictions in respect to important schedules (i.e. school bus times), etc. Generally a RUMA includes bond agreements and is preceded by a route assessment.

Route Assessment: The use of technologies (such as GIS) and community knowledge to ensure that rigs carrying heavy loads use the strongest roads in the community, while also taking into consideration sensitive areas of the community (residential, wetlands, etc.) and important schedules (school bus routes/times, etc.).

Royalties: A payment received by the lessor from the oil or gas company, based on the production of the well and market prices. Some states have laws governing the minimum percentage of royalties allowed to be paid.



Safe Drinking Water Act (SWDA): The principal federal law in the United States intended to ensure safe drinking water for the public. Pursuant to the act, the Environmental Protection Agency is required to set standards for drinking water quality and oversee all states, localities, and water suppliers who implement these standards. In the 2005 Energy Policy Act Congress amended the definition of “underground injection” under the SDWA to specifically exclude “the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities.”

Secondary Term: The length of a lease after a well is drilled.

Severance Tax: In some states, a tax imposed on the removal of non-renewable resources (such as shale gas). The amount of tax levied and the monies’ subsequent uses depend on the state the tax is paid in.

Severed Mineral Rights: When the mineral estate (ownership) of a property is separate from the surface estate. This is a more common occurrence in areas that have experienced previous natural resource activity.

Shale basin: An underground deposit of shale, often in a layer that extends along a plane at a certain depth under the surface. There are many different types of shale, each with certain defining characteristics.

Shale Gas: Natural gas produced from shale formations. Shale gas is widely distributed in the United States and is currently being produced in 16 states. Although data are being constantly revised, the Energy Information Administration currently estimates the recoverable U.S. shale gas resource is 482 trillion cubic feet; domestic shale gas production has increased 12-fold over the past decade in the United States.

Shale Gas Play: Also known as a ‘play.’ A set of discovered, undiscovered or possible natural gas accumulations that exhibit similar geological characteristics. Shale plays are located within basins, which are large-scale geologic depressions, often hundreds of miles across, which also may contain other oil and natural gas resources.

Shut-in Royalty: A payment to the lessor in lieu of a production royalty. This is received when a well cannot produce due to production problems.

Social Impact Bonds (SIBs): A newer form of funding social programs where the government of an area determines a desired outcome and creates a partnership with external organizations (philanthropic, private business, etc.) in order to achieve that outcome. If the goals are met, the government institution pays a previously-agreed-upon sum of money toward the overall expenses. SIBs can work well in areas such as homelessness, preventative healthcare, etc.

Subsurface: Earth material (as rock) near but not exposed at the surface of the ground.

Surface water: All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.).

Surfactant: Compounds that lower the surface tension of a liquid.



Susquehanna River Basin Commission (SRBC): Regulatory body that governs water withdrawals from the Susquehanna River, but it does not have regulatory control over what flows into the river.

Sustainable Planning: Community planning with the intent of meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Tight gas: Natural gas found in reservoirs with low porosity and low permeability. It can be compared to drilling a hole into a concrete driveway—the rock layers that hold the natural gas are very dense, therefore the gas doesn't flow easily.

Tight sands: A geological formation consisting of a matrix of typically impermeable, non-porous tight sands.

Total Dissolved Solids (TDS): The amount of salt and minerals that are suspended in water. TDS occur naturally in groundwater, but at high concentrations, TDS can be corrosive, and can cause ground (drinking) water to be classified as contaminated.

Toxics Release Inventory (TRI): A publicly available database containing information on toxic chemical releases and other waste management activities in the United States.

Turbidity: A cloudy condition in water due to suspended silt or organic matter.

Unconventional gas: Natural gas resources which require greater than industry-standard levels of technology or investment to harvest. The three most common types of unconventional gas resources are tight sands, coalbed methane (CBM), and shale gas.

Unconventional Natural Gas Reservoir: Coal bed methane, shale or tight gas, where the natural gas does not flow naturally to the well, but instead requires some form of extensive stimulation to generate economic flow rates.

Underground Injection Well: A steel and concrete-encased shaft into which hazardous waste is deposited by force and under pressure. The Environmental Protection Agency's (EPA's) Underground Injection Control Program (UIC) is responsible for regulating the construction, operation, permitting and closure of injection wells that place fluids underground for storage or disposal.

Underground source of drinking water (USDW): An aquifers currently being used as a source of drinking water or capable of supplying a public water system. USDWs have a TDS content of 10,000 milligrams per liter or less, and are not "exempted aquifers."

Unsaturated Zone: A zone where the soil and the rock contains air as well as water in its pores. It's above the groundwater table. The unsaturated zone doesn't contain readily available water, but it does provide water and nutrients to the biosphere.

Utica Shale: An Ordovician age natural gas-containing rock formation located below the Marcellus Shale. The formation (also called the Utica-Point Pleasant in some areas) extends from eastern Ohio through much of Pennsylvania to western New York. It is currently being actively developed in eastern Ohio.



Vadose Zone: The zone between land surface and the water table within which the moisture content is less than saturation (except in the capillary fringe) and pressure is less than atmospheric. Soil pore space also typically contains air or other gases. The capillary fringe is included in the vadose zone.

Vertical Wells: Traditional gas and oil well technique that bores straight down into a reserve.

Watershed: An area of land with a common drainage point.

Water table: The level of ground water.

Wellbore: A hole drilled for the purpose of exploration or extraction of natural resources such as water, gas or oil where a well may be produced and a resource extracted for a protracted period. It is integral to the overall structural integrity of the well.

Well casing: Steel or cement containment that is installed on the inside of the well bore intended to keep gas or oil from seeping out of the wells into the surrounding ground.

Well Pad: The location where drilling occurs. With the HVHF process well pads are generally larger and can accommodate more wells per pad.

Wet gas: Natural gas that contains natural gas liquids, which are heavier than gaseous methane. Some of these, such as propane, butane, pentane, hexane, and heptane, may come out of the well in liquid form or may need to be processed. Natural gas liquids are considered valuable by-products of natural gas processing.

