

LWVCO Hydraulic Fracturing Study

GLOSSARY:

8/30/2012

Acre Foot---a measurement of an amount of water covering one acre to a depth of one foot. One acre foot equals 325,857 gallons. One acre foot will provide a family of up to 5 people for one year with water. A typical hydrofracture of 5 million gallons of water equals 15.3 acre feet.

Annulus—the space contained between the centre well bore and any external tubing. Sometimes used for separated gas flow.

APD Application for Permit-to-Drill—information through a form regulated by the COGCC Rule 303.

Basin Roundtables—to facilitate discussions on water management issues and encourage locally driven collaborative solutions, nine basin roundtables were established by the [Colorado Water for the 21st Century Act](#). These roundtables represent each of the state's seven major river basins and the Denver metropolitan area.

Bbl—Barrel—the normal measure for oil, also for water but the measures are different.

Best Management Practices (BMP)--best practice is a method, process, activity, incentive, or reward which conventional wisdom regards as more effective at delivering a particular outcome than any other technique, method, process, etc. when applied to a particular condition or circumstance.

Blowout—the uncontrolled release of crude oil and/or natural gas from an oil or gas well after pressure control systems have failed.

Borehole--generalized term for any narrow shaft bored in the ground, either vertically or horizontally.

Casing--large diameter pipe that is assembled and inserted into a recently drilled section of a borehole and typically held into place with cement. There may be additional casings within a larger casing each separated by cement. The casing and cement is to remove contact with the oil or gas from the surrounding soil, water, or rock into which the well is dug.

Casing Head—the top of the casing. Annulus pressure measurement would test the pressure on the casing head which provides a gastight connection.

CDPHE -- Colorado Department of Public Health and Environment—mission is protect and preserve the health and environment of the people of Colorado.

CWCB—Colorado Water Conservation Board--represents each major water basin, Denver and other state agencies in a joint effort to use water wisely and protect the state's water for future generations.

CDWR—Colorado Department of Water Resources—mission is to provide competent and dependable distribution of water in accordance with statutes, decrees and interstate compacts; to ensure public safety through safe dams and properly permitted and constructed water wells; to maintain and provide accurate and timely information concerning water; to promote stewardship of all human, fiscal and natural resources; to serve the public through the generation of creative solutions to problems; to help the public understand complex water issues; to promote stability in the use of the state's limited water resources; to apply modern technology to its greatest advantage.

CERCLA—Comprehensive Environmental Response, Compensation, and Liability Act or Superfund. The objective of CERCLA is to clean up uncontrolled releases of specified hazardous substances.

CGS—Colorado Geologic Survey—among other statutory requirements the CGS promotes responsible development of Colorado's vast mineral and energy resources. CGS produces reports and maps that compile information into useable formats that policy makers and the industry can use in making decisions.

Coal Bed Methane--is a form of natural gas extracted from coal beds. The methane is in a near-liquid state, lining the inside of pores within the coal (called the matrix). The open fractures in the coal (called the cleats) can also contain free gas or can be saturated with water.

COGCC -- Colorado Oil and Gas Conservation Commission—Colorado's regulatory agency for oil and gas development and extraction.

Designated Ground Water Basins--Designated Basins are eight areas in the eastern plains of Colorado with very little surface water where users rely primarily on ground water as their source of water supply.

Downhole--denoting any piece of equipment that is used in the well bore itself.

Drilling mud--is a fluid of various components used to aid the drilling of boreholes into the earth.

Drilling, Vertical, Horizontal-- www.knappap.com/content/impactfee.pdf this is a really interesting comparison.

DWR—Department of Water Resources—see CDWR

EIA—The U.S. Energy Information Administration collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment. It is a Federal Government agency <http://www.eia.gov/>

Electric Log—an oil and gas electric log is a weak electrical current that flows in the rock next to the wellbore and shows the thickness and boundaries of the rock layers. These logs help

determine the amount of salt water present and the permeability. It identifies the formations, determines the nature and amount of fluids they contain, and estimates their depth.

Endocrine Disrupters--chemicals that may interfere with the body's endocrine system and produce adverse developmental, reproductive, neurological, and immune effects in both humans and wildlife.

Field Inspectors—inspectors on the ground in Colorado. Currently there are 17 inspectors. In 2010 15 inspectors did over 17,000 inspections.

Flowback --the water based solution that flows back to the surface during and after the completion of hydraulic fracturing. It consists of the fluid used to fracture the shale. The fluid contains clays, chemical additives, dissolved metal ions and total dissolved solids (TDS). The water has a murky appearance from high levels of suspended particles. Most of the flowback occurs in the first seven to ten days while the rest can occur over a three to four week time period. The volume of recovery is anywhere between 20% and 40% of the volume that was initially injected into the well. The rest of the fluid remains absorbed in the shale formation.* See Produced Water

Fracking/Hydraulic Fracturing- Fracking involves high-pressure injections of water, chemicals and sand into rock formations, which opens cracks that enable trapped gas/oil to flow.

Groundwater—water that is located below the surface in pockets, aquifers, underground rivers, etc.

Induced Fractures—fractures in subsurface rock strata caused by stress from the drilling equipment or other pressures during the drilling process.

Injection Wells—a vertical pipe in the ground into which water, other liquids, or gases are pumped or allowed to flow. Deep wells used worldwide to dump contaminants, often suspended in water, so that they are more or less permanently sequestered below the aquifer. Injection wells are used by many industries.

LGD—Local Government Designee <http://cogcc.state.co.us/Infosys/lgd/list.cfm> this website lists all designees. The designee acts as a communication conduit between the COGCC and the local county government and its residents and is usually a local government staff person.

Local Government Liaison—this is a newly created position within the COGCC that will allow more communication between COGCC and local governments. It is still under development.

Location Assessment—a COGCC Rule 303d Form 2A which includes items such as equipment to be used, ground disturbances, structures on the property, well pad drawings, etc.

Lost Circulation Zones—one of the more serious problems that can arise during the drilling of an oil well or gas well. Circulation is said to be lost when the drilling fluid, known commonly as "mud", flows into one or more geological formations instead of returning up the annulus.

Methane—Biogenic—is formed through the transformation of organic matter by tiny microorganisms and is commonly found in areas near the surface of the earth.

Methane—Thermogenic—is formed from organic particles that are covered in mud and other sediment over many layers, deeper deposits, very far underground, usually contain primarily natural gas, and in many cases, pure methane.

Mineral Owner (Subsurface Owner) —owner of any or all of the minerals lying below the surface of a property with the right to exploit, mine, and/or produce any or all of the minerals lying below the surface of the property.

MSDS--Material Safety Data Sheet-- provides workers and emergency personnel with procedures for handling or working with that substance in a safe manner, and includes information such as physical data (melting point, boiling point, flash point etc), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures.

NEPA—the National Environmental Policy Act's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that could significantly affect the environment.

NETL—the National Energy Technology Laboratory is a science, technology, and energy laboratory owned and operated by the U.S. Department of Energy.

Nontributary aquifer—water geologically and hydrologically distinct from the state's surface streams, sometimes called deep aquifers. Ownership is based on who owns the overlying land so is not part of the state's priority system.

Produced Water—naturally occurring water found in shale formations that flows to the surface throughout the entire lifespan of the gas well. This water has high levels of TDS and leaches out minerals from the shale including barium, calcium, iron and magnesium. It also contains dissolved hydrocarbons such as methane, ethane and propane along with naturally occurring radioactive materials (NORM) such as radium isotopes. *See Flowback

Proppant—a chemical or very small particle like sand which will hold a fractured shale open for oil or gas to migrate to the well.

Proprietary—Information or a product that is owned exclusively by a single company that carefully guards knowledge about the technology or the product's inner workings or makeup. i.e.Trade Secret

Psig—(pound-force per square inch gauge) is a unit of pressure relative to atmospheric pressure at sea level.

Ppm—parts per million.

RCRA—the Resource Conservation and Recovery Act gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes.

Reasonable Use—Refers to the right of the mineral owner to make such use of the surface as is reasonably necessary to develop the minerals. Such use is limited by the "accommodation doctrine" which provides that the mineral owner must accommodate the surface owner's existing use of the land if the mineral owner has reasonable alternatives.

Road Use Agreement—an agreement between the O&G company and the surface owner on the use of roads to access the well pad. This may include private roads or even new roads needed for access.

Royalty Agreement—an agreement between the O&G company and the mineral rights owner as to the percentage of the value of the gas or oil extracted from the well. This is usually a common form which may be amended by either party, which amendment may or may not be agreed to by the other party. Includes a price and a time for expiration.

Shale, Shale Gas— Shale gas refers to natural gas that is trapped within shale formations. Shales are fine-grained sedimentary rocks that can be rich sources of petroleum and natural gas. Over the past decade, the combination of horizontal drilling and hydraulic fracturing has allowed access to large volumes of shale gas that were previously uneconomical to produce. The production of natural gas from shale formations has rejuvenated the natural gas industry in the United States. (EIA Energy in Brief)

Split Estate—a property which has separate surface owner and mineral rights owner. The mineral rights owner has priority to access the subsurface mineral over the surface owner's rights to the surface property. (See Reasonable Use)

STRONGER—State Review of Oil and Natural Gas Environmental Regulations. The state review process is a collaborative process by which review teams composed of stakeholders from the oil and gas industry, state environmental regulatory programs, and members of the environmental/public interest communities review state oil and gas waste management programs against a set of guidelines developed and agreed to by all the participating parties. It is a public, private, and governmental partnership.

Subsurface Owner (Mineral owner)—ownership of the subsurface property has priority over the surface ownership to access the property under the surface (could also be the surface owner).

Surface Owner—ownership of the surface of a property but not necessarily of the subsurface property.

Surface Use Agreement—an agreement between the developing company and the surface owner for use of the property where the well pad is to be placed. It may include road access, location, use of area of property, reclamation and more.

Target Formation—the location of the oil/gas formation that the well is aiming to hit to recover oil or gas.

TDS—Total Dissolved Solids is a measure of the combined content of all inorganic and organic substances contained in a liquid in: molecular, ionized or micro-granular (colloidal sol) suspended form. The principal application of TDS is in the study of water quality for streams, rivers and lakes. Although TDS is not generally considered a primary pollutant (e.g. it is not deemed to be associated with health effects), it is used as an indication of aesthetic characteristics of drinking water and as an aggregate indicator of the presence of a broad array of chemical contaminants.

Unconventional Gas/Oil/Drilling--unconventional natural gas/oil is gas/oil that is more difficult or less economical to extract, usually because the technology to reach it has not been developed fully, or is too expensive. Unconventional drilling is for unconventional oil/gas.

VOC—Volatile Organic Compound— organic chemicals that have a high vapor pressure at ordinary, room-temperature conditions. Their high vapor pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublime from the liquid or solid form of the compound and enter the surrounding air.

Well Pad--is the area that has been cleared for a drilling rig to work on a plot of land designated for natural gas or oil extraction.

WQCD—Water Quality Control Division –the state’s leading agency for monitoring and reporting on the quality of state waters, preventing water pollution, protecting, restoring and enhancing the quality of surface and groundwater, and assuring that safe drinking water is provided from all public water.
