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A Dictionary for the Oil and Gas Industry

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chemical absorption *n*: in removing contaminants, the liquid absorbent reacts chemically with the acid gases but not with the natural gas.

chemical barrel *n*: a container in which various chemicals are mixed prior to addition to drilling fluid.

chemical consolidation *n*: the procedure by which a quantity of resinous material is squeezed into a sandy formation to consolidate the sand and to prevent its flowing into the well. The resinous material hardens and creates a porous mass that permits oil to flow into the well but holds back the sand at the same time. See *sand consolidation*.

chemical cutoff *n*: a method of severing steel pipe in a well by applying high-pressure jets of a very corrosive substance against the wall of the pipe. The resulting cut is very smooth.

chemical cutter *n*: a fishing tool that uses high-pressure jets of chemicals to sever casing, tubing, or drill pipe stuck in the hole.

chemical fingerprinting *n*: the process of tracking down the source of an illegal waste discharge through sampling the waste and possible sources to determine which source matches the discharge best. Fingerprinting is expensive, but in large damage cases, it can help prove or disprove whether a substance was discharged from a particular source.

chemical flooding *n*: see *alkaline (caustic) flooding, micellar-polymer flooding*.

chemical inhibitor *n*: liquid chemical compounds that are injected into lines carrying fluids that contain H_2S. Most of these inhibitors are designed to coat equipment surfaces to physically isolate them from corrosive substances. Others react with sulfur compounds to form less-destructive compounds.

chemical injection valve (CIV) *n*: a valve on the wellhead of a producing well that is usually installed between the production master valve and production wing valves. A chemical injection line leading into the well exits from the valve and goes into the well. The chemical injection valve isolates the chemical injection line from the surface.

chemical inventory *n*: an inventory required by HAZCOM. Under HAZCOM, all employers must keep a complete list, or inventory, of all hazardous materials on site.

chemical protective clothing *n*: clothing that is designed to protect against a specific chemical hazard (i.e., suits or aprons made of or coated with chemical-resistant materials like butyl rubber, neoprene, or polyvinyl chloride).

chemical pump *n*: an injection pump used to introduce a chemical into a fluid stream or receptacle.

chemical reaction *n*: a change in which a substance or substances is changed into one or more substances.

chemicals *n pl*: in drilling-fluid terminology, a chemical is any material that produces changes in the viscosity, yield point, gel strength, fluid loss, and surface tension.

chemical treatment *n*: any of many processes in the oil industry that involve the use of a chemical to effect an operation. Some chemical treatments are acidizing, crude oil demulsification, corrosion inhibition, paraffin removal, scale removal, drilling fluid control, refinery and plant processes, cleaning and plugging operations, chemical flooding, and water purification.

chert *n*: a rock of precipitated silica whose crystalline structure is not easily discernible and that fractures conchoidally (like glass). Flint, jasper, and chat are forms of chert.

chicken hook *n*: a long steel pole with a hook on one end that allows one of the rotary helpers to release the safety latch on the drilling hook so that the bail of the swivel can be removed (as when the kelly is set back prior to making a trip). Also called a shepherd's stick, or hook.

Chiksan line *n*: a flexible coupling used in high-pressure lines. Sometimes called Chicksan.

chiller *n*: a heat exchanger that cools process fluids with a refrigerant.

chip *n*: 1. the shaped and processed semiconductor die that is mounted on a substrate to form a transistor, diode, or other semiconductor device. 2. an integrated microcircuit performing a significant number of functions and constituting a subsystem.

chip hold-down effect *n*: the holding of formation rock chips in place as a result of high differential pressure in the wellbore (i.e., pressure in the wellbore is greater than pressure in the formation). This effect limits the cutting action of the bit by retarding circulation of bit cuttings out of the hole.

chipping *n*: the removal of paint and surface contaminants from a substrate by means of impact from a sharpened tool.

chips *n pl*: see *cuttings*.

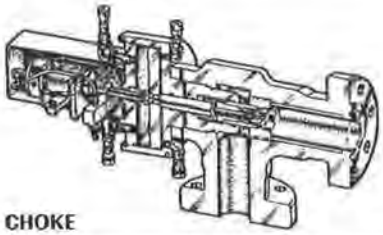
chk *abbr*: choke; used in drilling reports.

chlorine *n*: a greenish-yellow, acrid gas (Cl) that irritates the skin and mucous membranes and causes breathing difficulties.

chlorine log *n*: a record of the presence and concentration of chlorine in oil reservoirs. See *chlorine survey*.

chlorine survey *n*: a special type of radioactivity-logging survey used to measure the relative amount of chlorine in the formation. Rocks with low chlorine content are likely to contain gas or oil; rocks with high chlorine content usually contain salt water only.

choke (chk) 1. *n*: a device with an orifice installed in a line to restrict the flow of fluids. Surface chokes are part of the Christmas tree on a well and contain a choke nipple, or bean, with a small-diameter bore that serves to restrict the flow. Chokes are also used to control the rate of flow of the drilling mud out of the hole when the well is closed in with the blowout preventer and a kick is being circulated out of the hole. See *adjustable choke, bottomhole choke, positive choke*. 2. in electronics, an inductance used in a circuit to present high impedance to frequencies above a specified frequency range without appreciably limiting the flow of direct current.



CHOKE

choke and kill system *n*: an assembly of lines (pipes), valves, and operating devices (a system) on a subsea blowout preventer that provides a conduit for drilling mud to be pumped into the well through a kill line and a conduit for fluids exiting from the well to flow through a choke line to the surface. See *choke line, kill line*.

choke and kill valve *n*: a device that, when opened, allows drilling mud to be pumped into the well and drilling and other fluids returning from the well to be directed to the choke manifold on the surface. See *choke line, kill line*.

choke and separator loss *n*: the drop in pressure that occurs when fluid flows through the choke and separator on a drilling or workover rig. The drop is caused by friction as the fluid contacts the sides of the choke and the separator; also, friction within the flowing fluid itself causes a pressure loss.

line, or rail, holds fuel at a certain pressure and feed lines run from it to each fuel injector.

community property *n*: property, usually acquired after marriage, held jointly by husband and wife.

Community Right to Know *n*: see *SARA Title III*.

commutator *n*: a series of bars connected to the armature coils of an electric motor or generator. As the commutator rotates in contact with fixed brushes, the direction of flow of current to or from the armature is in one direction only.

comp *abbr*: completed or completion; used in drilling reports.

compact *n*: see *insert*.

compaction *n*: a decrease in the volume of a stratum due to pressure exerted by overlying strata, evaporation of water, or other causes.

compaction anticline *n*: see *draped anticline*.

company hand *n*: see *company representative*.

company man *n*: see *company representative*.

company representative *n*: an employee of an operating company who supervises the operations at a drilling site or well site and coordinates the hiring of logging, testing, service, and workover companies. Also called company hand, company man.

compartment *n*: a subdivision of space on a floating offshore drilling rig, a ship, or a barge.

compensated neutron log *n*: a measure and record of limestone porosity. The log is produced using one source and two detectors instead of just one detector, as an uncompensated neutron log does. A compensated neutron log is less influenced by borehole effects than an uncompensated neutron log. See *borehole effect*.

compensating index *n*: a meter index that has a pressure correction factor built into the gear ratio of the dial.

compensation *n*: provision of a supplemental device, circuit, or special materials to counteract known sources of error.

compensator governor *n*: a type of engine governor that prevents hunting (an engine's speeding up and slowing down as it seeks to run at the speed dictated by the engine governor). A compensator on the governor anticipates the engine's return to its set speed. When an engine's speed goes faster than the set speed, the compensator drops the engine's rpm; when engine speed drops below set speed, the compensator increases the engine's rpm. Normally, engine operators set the compensator to keep the drop small. With a small speed drop, the governor and compensator quickly make the engine go back to control speed. See *governor, hunting*.

compensatory royalty *n*: payments to royalty owners as compensation for losses in income that they may be suffering because of failure to develop a lease adequately.

competitive field *n*: an oil or gas field comprising wells operated by various operators.

competitive leasing *n*: a procedure, based on competitive bidding, used to acquire oil and gas leases to federal lands within areas designated by USGS as known geologic structures (KGS) or on offshore federal lands.

complete a well *v*: to finish work on a well and bring it to productive status. See *well completion*.

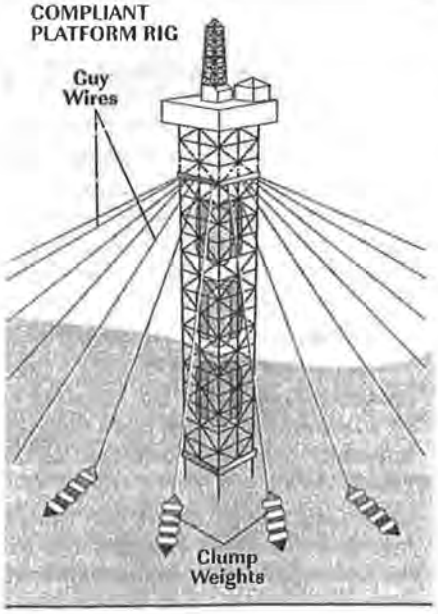
completion *n*: to finish work on a well and bring it to productive status. See *well completion*.

completion fluid *n*: low-solids fluid or drilling mud used when a well is being completed. It is selected not only for its ability to control formation pressure, but also for the properties that minimize formation damage.

compliant piled tower *n*: an offshore platform jacket that flexes with wind, wave, and current forces and is supported by piles driven through guides attached to outside legs of the jacket.

compliant platform rig *n*: an offshore platform jacket that flexes with the wind, wave, and current forces. Two types are the guyed-tower platform rig and the compliant piled tower.

COMPLIANT PLATFORM RIG



composite sample *n*: a sample of a substance that is made up of equal portions of two or more spot samples obtained from a tank or pipeline. In a crude oil storage tank, one type of composite sample is taken at the top, at the bottom, and in the middle.

composite spot sample *n*: in tank sampling, a blend of spot samples mixed in equal proportions for testing.

composite stream *n*: 1. a flow of oil and gas in one stream. 2. a flow of two or more different liquid hydrocarbons in one stream.

composition *n*: a special material made of conductive and nonconductive substances, which, when blended and formed into a resistor, give the resistor a specific resistance.

composition resistor *n*: a resistor made of conductive and nonconductive materials, which are combined and formed into a relatively small cylinder. Axial or radial leads in the resistor provide a way to connect the resistor to a circuit.

COMPOSITION RESISTOR

compound *n*: 1. a mechanism used to transmit power from the engines to the pump, the drawworks, and other machinery on a drilling rig. It is composed of clutches, chains and sprockets, belts and pulleys, and a number of shafts, both driven and driving. 2. a substance formed by the chemical union of two or more elements in definite proportions; the smallest particle of a chemical compound is a molecule. *v*: to connect two or more power-producing devices, such as engines, to run driven equipment, such as the drawworks.

compounding *n*: 1. the act of connecting two or more power-producing devices to run driven equipment. 2. the act of paying an amount on the accrued interest and the principal. Compare *discounting*.

compounding transmission *n*: on a mechanical-drive rig, the type of transmission that sends power from the engines to the drawworks and the rotary table, and sometimes to the mud pumps. See also *transmission*.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) *n*: a congressional act that gives the government the authority to clean up any site where there is an unremedied release of a hazardous substance. Frequently, these sites, which are referred to as "Superfund" sites, are areas where hazardous waste has been disposed of improperly.

formate fluid *n*: a special drilling fluid that contains a salt or an ester of formic acid (formate), which is chemically combined with another element such as potassium or cesium. Formate fluids are very stable at high temperatures and can be made very dense (heavy) without adding weighting materials such as barite. Formate fluids are used as completion fluids because they minimize formation damage. See *completion fluid, formation damage.*

formation *n*: a bed or deposit composed throughout of substantially the same kind of rock; often a lithologic unit. Each formation is given a name, frequently as a result of the study of the formation outcrop at the surface and sometimes based on fossils found in the formation.

formation boundary *n*: the horizontal limits of a formation.

formation breakdown *n*: the fracturing of a formation from excessive borehole pressure.

formation breakdown pressure *n*: the pressure at which a formation will fracture.

formation competency *n*: the ability of the formation to withstand applied pressure. Also called formation integrity.

formation competency test *n*: a test used to determine the amount of pressure required to cause a formation to fracture.

formation damage *n*: the reduction of permeability in a reservoir rock caused by the invasion of drilling fluid and treating fluids to the section adjacent to the wellbore. It is often called skin damage.

Formation Density Log™ *n*: trade name for a density log.

formation dip *n*: the angle at which a formation bed inclines away from the horizontal. Dip is also used to describe the orientation of a fault.

formation evaluation *n*: the analysis of subsurface formation characteristics, such as lithology, porosity, permeability, and saturation, by indirect methods such as wireline well logging or by direct methods such as mud logging and core analysis.

formation face *n*: that part of a formation exposed to the wellbore.

formation fluid *n*: fluid (such as gas, oil, or water) that exists in a subsurface rock formation.

formation fracture gradient *n*: a plot of pressure versus depth that reveals the pressure at which a formation will fracture at a given depth.

formation fracture pressure *n*: the point at which a formation will crack from pressure in the wellbore.

formation fracturing *n*: a method of stimulating production by opening new flow channels in the rock surrounding a production well. Often called a frac job. Under extremely high hydraulic pressure, a fluid (such as distillate, diesel fuel, crude oil, dilute hydrochloric acid, water, or kerosene) is pumped downward through production tubing or drill pipe and forced out below a packer or between two packers. The pressure causes cracks to open in the formation, and the fluid penetrates the formation through the cracks. Sand grains, aluminum pellets, walnut shells, or similar materials (propping agents) are carried in suspension by the fluid into the cracks. When the pressure is released at the surface, the fracturing fluid returns to the well. The cracks partially close on the pellets, leaving channels for oil to flow around them to the well. See *explosive fracturing, hydraulic fracturing.*

formation gas *n*: gas initially produced from an underground reservoir.

formation integrity *n*: see *formation competency.*

formation pressure *n*: the force exerted by fluids in a formation, recorded in the hole at the level of the formation with the well shut in. Also called reservoir pressure or shut-in bottomhole pressure.

formation resistivity *n*: a measure of the electrical resistance of fluids in a formation.

formation sensitivity *n*: the tendency of certain producing formations to react adversely to invading filtrates.

formation strength *n*: the ability of a formation to resist fracture from pressures created by fluids in a borehole.

formation strike *n*: see *strike.*

formation tester *n*: see *wireline formation tester.*

formation testing *n*: the gathering of pressure data and fluid samples from a formation to determine its production potential before choosing a completion method. Formation testing tools include formation testers and drill stem test tools.

formation thickness *n*: the dimension between two surfaces of a rock formation, the surfaces being the top of the formation and the bottom of the formation; in well testing, formation thickness may be abbreviated as *h*.

formation volume factor *n*: the factor that is used to convert stock tank barrels of oil to reservoir barrels. It is the ratio between the space occupied by a barrel of oil containing solution gas at reservoir conditions and a barrel of dead oil at surface conditions. Also called reservoir volume factor.

formation water *n*: 1. the water originally in place in a formation. See *connate water.* 2. any water that resides in the pore spaces of a formation.

formic acid *n*: a simple organic acid, HCOOH, used for acidizing oilwells. It is stronger than acetic acid but much less corrosive than hydrofluoric or hydrochloric acid and is usually used for high-temperature wells.

formonitrile *n*: see *hydrogen cyanide.*

forward *adv*: in the direction of the bow on a ship or an offshore drilling rig.

forward bias *n*: where a p-type and n-type semiconductor are joined, the condition that occurs when the positive terminal of a battery is connected to the lead on the p-type semiconductor and the negative terminal of the battery is connected to the lead on the n-type semiconductor. Forward biasing attracts free electrons in the n-type material across the junction toward the positive terminal, and attracts holes in the p-type across the junction toward the negative terminal. A forward-biased p-n junction offers low resistance and current flows freely across it. Compare *reverse bias.* See *n-type semiconductor, p-type semiconductor.*

forward combustion *n*: a common type of in situ combustion in which the combustion front moves in the same direction as the injected air. Burning is started at an injection well and moves toward production wells as air is continuously injected into the injection well. Compare *reverse combustion.*

forward voltage drop *n*: the voltage across a semiconducting diode or special transistor that carries current in a forward direction.

FoR$_{xo}$ Log™ *n*: trade name for focused electric log that investigates the flushed zone.

fossil *n*: the remains or impressions of a plant or animal of past geological ages that have been preserved in or as rock.

fossiliferous *adj*: containing fossils.

fossilize *v*: to become changed into a fossil.

fouling factor *n*: a factor used in heat-transfer calculations to represent the resistance to the flow of heat caused by dirt, scale, or other contaminants in the flowing fluids.

foundation pile *n*: the first casing or conductor string (generally with a diameter of 30 to 36 inches—76 to 91 centimetres)

set when drilling a well from a floating offshore drilling rig. It prevents sloughing of the ocean-floor formations and is a structural support for the permanent guide base and the blowout preventers.

fourble *n*: a section of drill pipe, casing, or tubing consisting of four joints screwed together. Compare *double, single, thribble*.

fourble board *n*: the name used for the working platform of the derrickman, or the monkeyboard, when it is located at a height in the derrick equal to approximately four lengths of pipe joined together. Compare *double board, thribble board*.

four corner rule *n*: a rule of interpretation holding that an instrument such as an oil and gas lease must be interpreted from within the four corners of the instrument. Interpretation is made without any aid from knowledge of the circumstances under which the instrument came into being; the instrument is construed as a whole, without reference to any one part more than another.

four-pin kelly bushing *n*: a kelly bushing that has four steel dowels, or pins, that fit into corresponding holes in the master bushing. When the pins are engaged with the holes, the rotating master bushing also turns the kelly bushing, which then turns the kelly and the drill stem. See *kelly, kelly bushing, master bushing*.

four-pin master bushing *n*: a master bushing that has four holes symmetrically positioned on its outside perimeter and into which fit four corresponding steel dowels, or pins, on the kelly bushing. When the pins are engaged into the holes and the master bushing turns, the kelly bushing also turns. See *kelly bushing, master bushing*.

four-stroke/cycle engine *n*: an engine in which the piston moves from top dead center to bottom dead center two times to complete a cycle of events. The crankshaft must make two complete revolutions, or 720°.

four-way drag bit *n*: a drag bit with four blades. See *bit, fishtail bit*.

four-wire voltage transmitter *n*: a device that sends (transmits) signals to various components in an electronic process control system. Such a transmitter gets its name from the number of electrical wires used to power and operate it. Two of the wires to the transmitter provide the direct current for operation (typically 24 volts) and the other two wires transmit the signal or voltage.

FP *abbr*: flowing pressure; used in drilling reports.

FPDSO *abbr*: floating production, drilling, and system offloader.

FPSO *abbr*: floating production and system offloader.

frac *abbr*: fractured or fracturing; used in drilling reports.

frac fluid *n*: a fluid used in the fracturing process (i.e., a method of stimulating production by opening new flow channels in the rock surrounding a production well). Under extremely high hydraulic pressure, frac fluids (such as distillate, diesel fuel, crude oil, dilute hydrochloric acid, water, or kerosene) are pumped downward through production tubing or drill pipe and forced out below a packer or between two packers. The pressure causes cracks to open in the formation, and the fluid penetrates the formation through the cracks. Sand grains, aluminum pellets, walnut shells, or similar materials (propping agents) are carried in suspension by the fluid into the cracks. When the pressure is released at the surface, the fracturing fluid returns to the well but leaves behind the propping agents to hold open the formation cracks.

frac gradient *n*: see *fracture gradient*.

frac job *n*: see *formation fracturing*.

fraction *n*: a part of a mixture of hydrocarbons, usually defined by boiling range—for example, naphtha, gas oil, or kerosene.

fractional analysis *n*: a test for the composition of gas or two-phase gas-condensate streams. The analysis generally shows not only the composition in percentage of each hydrocarbon present through hexanes or heptanes but also the gallons per thousand cubic feet of liquids by component and the heating value of the gas.

fractional distillation *n*: the separation of crude oil into different cuts of fractions by distillation.

fractionate *v*: to separate single fractions from a mixture of hydrocarbon fluids, usually by distillation.

fractionating column *n*: the vessel or tower in a gas plant in which fractionation occurs. See *fractionate*.

fractionating tower *n*: see *fractionating column*.

fractionation *n*: see *fractional distillation*.

fracture *n*: a crack or crevice in a formation, either natural or induced. See *explosive fracturing, hydraulic fracturing*.

fracture acidizing *n*: a procedure by which acid is forced into a formation under pressure high enough to cause the formation to crack. The acid acts on certain kinds of rocks, usually carbonates, to increase the permeability of the formation. Also called acid fracturing. Compare *matrix acidizing*.

fracture gradient *n*: the pressure gradient (psi/foot) at which a formation accepts whole fluid from the wellbore. Also called frac gradient.

fracture pressure *n*: the pressure at which a formation will break down, or fracture.

fracture zone *n*: zone of naturally occurring fissures or fractures that can pose problems with lost circulation.

fracturing *n*: shortened form of formation fracturing. See *formation fracturing*.

fracturing fluid *n*: a fluid, such as water, oil, or acid, used in hydraulic fracturing. The fluid carries propping agents that hold open the formation cracks after hydraulic pressure dissipates. See *acid fracturing, hydraulic fracturing, propping agents*.

fractus *n*: a cloud that has a ragged appearance, as if torn. Such clouds are torn from a main cloud bank by strong winds. Also called scud.

free air space *n*: any of the cavities in the human body that contain air and are normally connected to the atmosphere, including lungs, sinuses, and middle ear.

freeboard *n*: the vertical distance between the waterline and the freeboard deck on a ship, boat, or floating offshore drilling rig. Draft plus freeboard equal total height of vessel.

freeboard deck *n*: the uppermost continuous deck on a ship or floating rig that has a permanent means of closing all openings to the sea.

free butane *n*: see *butanes required*.

free electron *n*: an electron on the outer shell of an atom that moves readily from one atom to another.

free gas *n*: a hydrocarbon that exists in the gaseous phase at reservoir pressure and temperature and remains a gas when produced under normal conditions.

free hole *n*: a space (hole) in an atom that is not bound to an impurity in a semiconductor. A free hole is the opposite of a free electron and is a positive charge. See *free electron*.

free on board (FOB) price *n*: the price actually charged at the producing country's port of loading.

free oxygen *n*: oxygen that exists in molecular form (O_2) without being bound in a compound.

hybrid bits *n pl*: combine natural and synthetic diamonds and sometimes tungsten carbide inserts on a fixed-head bit.

Hydrafrac© *n*: the copyrighted name of a method of hydraulic fracturing for increasing productivity.

hydrate *n*: a hydrocarbon and water compound that is formed under reduced temperature and pressure in places where gas that contains water vapor occurs. For example, hydrates can form in gathering, compression, and transmission facilities for gas. They can also form in deepwater drilling where low temperatures occur on or near the seafloor and where gas containing water vapor may be encountered by the borehole. Hydrates can accumulate in troublesome amounts and impede fluid flow. They resemble snow or ice and decompose at atmospheric pressure. *v*: to enlarge by taking water on or in.

hydrated lime *n*: calcium hydroxide, $Ca(OH)_2$, a dry powder obtained by treating quicklime with enough water to satisfy its chemical affinity for water.

hydrate seal *n*: in drilling from floating rigs that use a subsea blowout preventer stack and marine riser system, a groove in the lower body of a hydraulic connector that forms a seal with the outside of the wellhead.

hydration *n*: 1. a chemical reaction in which molecular water is added to the molecule of another compound without breaking it down. 2. reaction of powdered cement with water. The cement gradually sets to a solid as hydration continues.

hydraulic *adj*: 1. of or relating to water or other liquid in motion. 2. operated, moved, or effected by water or liquid.

hydraulic actuator *n*: a cylinder or fluid motor that converts hydraulic power into useful mechanical work; mechanical motion produced may be linear, rotary, or oscillatory.

hydraulic area *n*: the area available for flow at a restriction.

hydraulic balancing *n*: booster stations located along the trunkline assure that the work load for each station is approximately equal.

hydraulic bond *n*: a bonding of cement to the casing or to the formation that blocks the migration of fluids. It is usually determined by applying increasing amounts of liquid pressure at the pipe-cement or formation-cement interface until leakage occurs.

hydraulic bonnet operating system *n*: in a ram preventer, the devices in the ram housing (the bonnet) that open or close the rams when activated with hydraulic pressure from the blowout preventer operating unit (accumulator).

hydraulic brake *n*: also called hydrodynamic brake or Hydromatic® brake. See *hydrodynamic brake*.

hydraulic connector *n*: in drilling from offshore floating rigs, a device that attaches (connects) the blowout preventer stack to the wellhead and to the lower marine riser package. It is controlled from the surface. Hydraulic connectors consist of a lower body, an upper body, a cam ring, locking dogs (or segments), a seal groove, and a hydraulic system. See *lower marine riser package*.

hydraulic control pod *n*: a device used on floating offshore drilling rigs to provide a way to actuate and control subsea blowout preventers from the rig on the surface. Hydraulic and electrical lines from the rig enter the pods, through which fluid and electrical signals are sent to the preventer. Usually two pods, one yellow and one blue, are used, each to safeguard and back up the other. Also called blue pod, yellow pod.

hydraulic coupling *n*: a fluid connection between a prime mover and the machine it drives; it uses the action of liquid moving against blades to drive the machine. Also called fluid coupling.

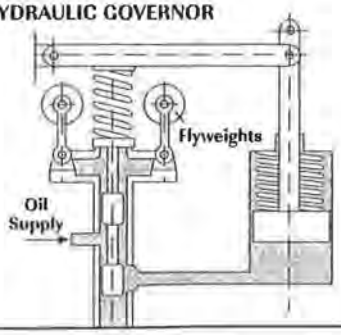
hydraulic fluid *n*: a liquid of low viscosity (such as light oil) that is used in systems actuated by liquid (such as the brake system in a modern passenger car).

hydraulic force *n*: force resulting from pressure on water or other hydraulic fluid.

hydraulic fracturing *n*: an operation in which a specially blended liquid is pumped down a well and into a formation under pressure high enough to cause the formation to crack open, forming passages through which oil can flow into the wellbore. Sand grains, aluminum pellets, glass beads, or similar materials are carried in suspension into the fractures. When the pressure is released at the surface, the fractures partially close on the proppants, leaving channels for oil to flow through to the well. Compare *explosive fracturing*.

hydraulic governor *n*: a governor on an engine that operates by means of oil inside its housing. Unlike a mechanical governor, which is mechanically linked to the engine's speed control, a hydraulic governor operates the speed control with oil pressure inside the governor. See *governor*. Compare *mechanical governor*.

HYDRAULIC GOVERNOR



hydraulic hammer effect *n*: see *fluid knock, water hammer*.

hydraulic head *n*: the force exerted by a column of liquid expressed by the height of the liquid above the point at which the pressure is measured. Although "head" refers to distance or height, it is used to express pressure, since the force of the liquid column is directly proportional to its height. Also called head or hydrostatic head. Compare *hydrostatic pressure*.

hydraulic heat-exchanger module *n*: equipment associated with a high-pressure rotating head that circulates hydraulic fluid to cool and lubricate the bearings on which the rotating head's stripper rubber rotates. The hydraulic heat-exchanger system transfers heat generated by the load on the rotating head and cools the bearing pack.

hydraulic holddown *n*: an accessory or integral part of a packer used to limit the packer's upward movement under pressure.

hydraulic horsepower (hhp) *n*: a measure of the power of a fluid under pressure.

hydraulic jar *n*: a type of mechanical jar in which a fluid moving through a small opening slows the piston stroke while the crew stretches the work string. After the hydraulic delay, a release mechanism in the jar trips to allow a mandrel to spring up and deliver a sharp blow. Compare *mechanical jar, rotary jar*.

hydraulic jet perforating *n*: the use of sand pumped through horizontally positioned orifices installed in the tubing string to jet holes in the casing and cement sheath into the formation.

hydraulic jet pump *n*: a specialized form of hydraulic pump, used in artificial lift, whose main working parts are nozzle, throat, and diffuser. The nozzle converts the high-pressure, low-velocity energy of the power fluid to high-velocity, low-pressure energy. The power fluid is then mixed with the low-pressure pump intake fluid in the throat to produce a low-pressure stream with a velocity less than that of the nozzle exit, but a high velocity, nevertheless. The velocity energy of this mixed stream is then converted to static pressure in the diffuser to provide the pressure necessary to lift fluid from the well. The power fluid may be either oil or water.

hydraulic junction box *n*: on a blowout preventer control unit (accumulator), a housing (box) with several inlet and outlet ports. The inlet ports receive the

ship-shaped barge *n*: a floating offshore drilling structure that is towed to and from the drilling site. The unit has a streamlined bow and squared-off stern, a drilling derrick usually located near the middle of the barge, and a moon pool below the derrick through which drilling tools pass to the seafloor. It is identical in appearance to a drill ship, but is not self-propelled. It must therefore be towed to the drill site. Ship-shaped barges are most often used for drilling wells in deep, remote waters. See *floating offshore drilling rig*.

ship-shaped drilling rig *n*: drill ship.

shirttail *n*: the part of a drilling bit on which the cone is anchored. Shirttails extend below the threaded pin of the bit and are usually rounded on bottom, thus acquiring the name.

SHIRTTAIL

shock hose *n*: see *vibrator hose*.

shock loading *n*: the sudden application of force by a moving body on a resisting body so that a great deal of stress is produced in the resisting body.

Shock Sub *n*: a vibration dampener.

shoe *n*: a device placed at the end of or beneath an object for various purposes (e.g., casing shoe, guide shoe).

shoestring sand *n*: a narrow, often sinuous, sand deposit, usually a buried sandbar or filled channel.

shoofly *n*: a special access road constructed to link a right-of-way with existing roads. Shooflies are necessary only in remote areas.

shoot *v*: 1. to explode nitroglycerine or other high explosives in a hole to shatter the rock and increase the flow of oil; now largely replaced by formation fracturing. 2. in seismographic work, to discharge explosives to create vibrations in the earth's crust. See *seismograph*.

shooting rock *n*: the process of using explosives to clear rock from a pipeline right-of-way or from the ditch line. Also called blasting.

shoreface *n*: that part of the seashore seaward of the low-tide mark that is affected by wave action.

Shore Protection Act *n*: a congressional act that requires ships transporting garbage and refuse to assure that the garbage and refuse are properly contained on board so that it will not be lost in the water as a result of inclement wind or water conditions.

short *n*: see *short circuit*.

short circuit *n*: a phenomenon that occurs in electrical circuits wherein two components carrying current inadvertently come into contact and interrupt the current path. For example, if two bare wires in a circuit accidentally touch, current flows directly back to the source of electricity without traveling its normal path. Often, because so little resistance exists, current flow is high enough to melt wires and other components.

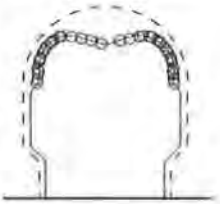
short-coupled installation *n*: a full-sized ell or tee upstream and downstream of a meter.

short full-pitch crossover *n*: angled grooves on a drum.

short normal curve *n*: in conventional electric logging, measures resistivity in the formation only a short distance from the borehole. Used for shallow investigation of the formation.

short parabolic profile *n*: the shape of a PDC bit's head in which the head resembles a short parabolic arc. A parabolic arc is an arch-shaped curve that looks similar to the arch over a doorway or other structure. Compare *parabolic profile, shallow-cone profile*.

SHORT PARABOLIC PROFILE



short-range forecast *n*: a weather forecast covering 48 hours or less.

short string *n*: in a dual well, the tubing string for the shallower zone.

short ton *n*: a unit of measure of mass (weight) that is equal to 2,000 pounds (907.2 kilograms). Compare *long ton*.

shortwave energy *n*: see *shortwave radiation*.

shortwave radiation *n*: radiation that is visible as light.

short way *n*: the displacing of wellbore fluids from the annulus up the tubing. Compare *long way*.

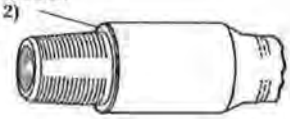
shot *n*: 1. a charge of high explosive, usually nitroglycerine, detonated in a well to shatter the formation and expedite the recovery of oil. Shooting has been almost completely replaced by formation fracturing and acid treatments. 2. a point at which a photograph is made in a single-shot survey. See *directional survey*.

shot blasting *n*: the use of steel shot (ball bearings) in the drilling mud to hit the bottom of the hole as the shot leaves the bit jet with the mud. Experiments have shown that the rate of penetration is improved in some circumstances, but difficulties with handling the shot in the mud system have precluded wide use.

shot-hole drilling *n*: the drilling of relatively small holes into the earth, the purpose of which is to provide a means for lowering an explosive shot in order to create shock waves for seismic analysis.

shoulder *n*: 1. the flat portion machined on the base of the bit shank that meets the shoulder of the drill collar and serves to form a pressure-tight seal between the bit and the drill collar. 2. the flat portion of the box end or the pin end of a tool joint; the two shoulders meet when the tool joint is connected and form a pressure-tight seal.

SHOULDER (def. 2)



show *n*: the appearance of oil or gas in drilling fluids, cuttings, samples, or cores from a drilling well.

shrinkage *n*: 1. a decrease in oil volume caused by evaporation of solution gas or by lowered temperature. 2. the reduction in volume or heating value of a gas stream due to removal of some of its constituents. 3. the unaccounted loss of products from storage tanks.

shrink-on tool joint *n*: a tool joint made to fit the pipe by the process of shrinking on, that is, by heating the outer member to expand the bore for easy assembly and then cooling it so that it contracts around the inner member.

shrouded jet nozzle *n*: a special type of jet nozzle that is manufactured with a projection (the shroud), which serves to minimize the erosion of the nozzle by the high-velocity jet of drilling fluid being forced through it.

shunt *n*: a conductor joining two points in an electrical circuit to form a parallel or alternate path through which a portion of the current may pass.

shunt winding *n*: a winding that is connected in parallel with another winding or device in the same circuit, as in a shunt-wound DC motor. See *parallel circuit*.

shut down *v*: to stop work temporarily or to stop a machine or operation.

shutdown *n*: the act of stopping a machine or device from running. For example, engine operators perform a shutdown when they stop an engine.

shutdown rate *n*: a rate provision that is usually contained in a drilling contract and that specifies the compensation to the independent drilling contractor when drilling is suspended at the request of the operator.

weevil *n*: shortened form of boll weevil. See *boll weevil*.

weigh scale *n*: a device for determining either the mass or the weight of a body, depending on the apparatus and procedure employed.

weight *n*: 1. in mud terminology, refers to the density of a drilling fluid. 2. of a measurement, expresses degree of confidence in result of measurement of a certain quantity compared with result of another measurement of the same quantity. 3. the force with which a body is attracted to the earth or to another celestial body equal to the product of the object's mass and the acceleration of gravity.

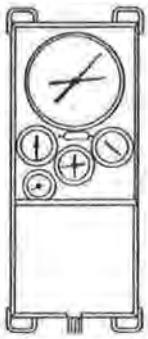
weigh tank *n*: a tank used with a weigh scale for measurement of the liquid contents of the tank.

weight bar *n*: see *sinker bar*. Also called stem.

weight cut *n*: the amount by which drilling fluid density is reduced by entrained formation fluids or air.

weighted average cost of gas (WACOG) *n*: cost calculated as the total cost of all gas purchased during a base period divided by either the total quantity purchased (unit of production) or the system throughput (unit of sales) during the same period. This rate, plus any application of any pending surcharge adjustments, serves as the basis on which system tariff rates are computed and made effective.

weight indicator *n*: an instrument near the driller's position on a drilling rig that shows both the weight of the drill stem that is hanging from the hook (hook load) and the weight that is placed on the bit by the drill collars (weight on bit).



WEIGHT INDICATOR

weighting material *n*: a material that has a high specific gravity and is used to increase the density of drilling fluids or cement slurries.

weight-loaded regulator *n*: in process control, a valve containing a weight that controls the valve's opening and closing to control (regulate) the pressure in a vessel.

weight on bit (WOB) *n*: the amount of downward force placed on the bit by the weight of the drill collars.

weight-set packer *n*: a packer whose packing elements are activated when weight from the tubing string is applied. To set some packers, rotation as well as weight is required. See *packer*.

weight up *v*: to increase the weight or density of drilling fluid by adding weighting material.

weir *n*: a metal plate installed in a separator, treater, or mud tank and used to regulate liquid level or, in the case of a metering separator, to measure flow.

welded tuff *n*: a pyroclastic deposit hardened by the action of heat, pressure from overlying material, and hot gases.

well *n*: the hole made by the drilling bit, which can be open, cased, or both. Also called borehole, hole, or wellbore.

wellbore *n*: a borehole; the hole drilled by the bit. A wellbore may have casing in it or it may be open (uncased); or part of it may be cased, and part of it may be open. Also called a borehole or hole.

wellbore cleanup *n*: see *wellbore soak*.

wellbore pressure *n*: 1. bottomhole pressure. 2. casing pressure.

wellbore soak *n*: an acidizing treatment in which the acid is placed in the wellbore and allowed to react by merely soaking. It is a relatively slow process, because very little of the acid actually comes in contact with the formation. Also called wellbore cleanup. See *matrix acidizing*. Compare *acid fracture*.

well completion *n*: 1. the activities and methods of preparing a well for the production of oil and gas or for other purposes, such as injection; the method by which one or more flow paths for hydrocarbons are established between the reservoir and the surface. 2. the system of tubulars, packers, and other tools installed beneath the wellhead in the production casing; that is, the tool assembly that provides the hydrocarbon flow path or paths.

well control *n*: the methods used to control a kick and prevent a well from blowing out. Such techniques include, but are not limited to, keeping the borehole completely filled with drilling mud of the proper weight or density during all operations, exercising reasonable care when tripping pipe out of the hole to prevent swabbing, and keeping careful track of the amount of mud put into the hole to replace the volume of pipe removed from the hole during a trip.

well-control equipment *n*: an assembly of several components, such as ram preventers, annular preventers, a choke and kill system, trip tanks, and mud-gas separators. On offshore floating rigs, well-control equipment also includes a marine riser system and a diverter system.

well density *n*: the ratio between the number of wells drilled in a field and the acreage. Under a 40-acre spacing pattern, the well density is one well per 40 acres.

well fluid *n*: the fluid, usually a combination of gas, oil, water, and suspended sediment, that comes out of a reservoir. Also called well stream.

wellhead *n*: the equipment installed at the top of the wellbore. A wellhead includes such equipment as the casinghead and tubing head. *adj*: pertaining to the wellhead (e.g., wellhead pressure).

WELLHEAD

wellhead connector *n*: on a floating drilling rig using a subsea blowout preventer stack, a tool that attaches the blowout preventer (BOP) stack to the wellhead. It is hydraulically operated from the surface and, when actuated, connects the BOP to the wellhead.

wellhead housing *n*: in offshore drilling, a tool that seats in a housing at the top of the conductor casing to support subsea equipment and subsequent casing strings and tubing hangers.

wellhead price *n*: the price received by the producer for sales at the well. See *crude oil average domestic first purchase price*.

well kick *n*: see *kick*.

well log *n*: see *log*.

well logging *n*: the recording of information about subsurface geologic formations, including records kept by the driller and records of mud and cutting analyses, core analysis, drill stem tests, and electric, acoustic, and radioactivity procedures. See *acoustic log*, *core analysis*, *driller's log*, *drill stem test*, *electric well log*, *mud analysis*, and *radioactivity log*.

well log library *n*: a private, or sometimes public, organization that maintains collections of oilfield data, particularly well logs. Users gain access to the information by paying membership dues or a user's fee.

well permit *n*: authorization, usually granted by a governmental conservation agency, to drill a well. A permit is sometimes also required for deepening or remedial work.

well platform *n*: an offshore structure with a platform above the surface of the water that supports the producing well's surface controls and flow piping.

Williams & Meyers
OIL AND GAS LAW

VOLUME 8

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MATTHEW BENDER

(Rel. 48-12/2013 Pub.820)

See Williams v. Continental Oil Co., 215 F.2d 4, 3 O.&G.R. 2080 (10th Cir. 1954), *cert. denied*, 348 U.S. 928 (1955).

See also DEVIATIONAL SURVEY.

Acid dip survey

A method of determining the inclination of a well bore by lowering a glass container of hydrofluoric acid into a borehole. In a brief period of time, the glass is etched by the acid, permitting the determination of the inclination of the borehole.

Acid fracturing

The process of opening cracks in hard carbonate productive formations by using a combination of oil and acid under high pressure.

See also FRACTURING.

Acid gas

Syn.: for SOUR GAS (*q.v.*).

Acidizing of well

A technique for increasing the flow of oil from a well. Hydrochloric acid is introduced into the well

(Text continued on page 13)

to enlarge and reopen pores in oil-bearing limestone formations. An inhibited acid is used to prevent corrosion of the tubing. Pressure is applied to force the acid into the rock channels and pores, which causes their softer parts to become soluble. After a predetermined time, the acid is flowed or pumped out, leaving enlarged pores in the oil-bearing stratum. The acid attacks the limestone formation in all directions, and, amenable to the law of gravity, the downward pressure is greater than the lateral pressure, assuming equal density of strata. A blanket of calcium chloride or some other heavy inert liquid may be required at the bottom of the well to arrest the penetration of the acid downward to the salt water level. *See* Empire Oil & Refining Co. v. Hoyt, 112 F.2d 356 (6th Cir. 1940).

The definition in the MANUAL OF TERMS was cited in Kristianson v. Flying J Oil & Gas, Inc., 553 N.W.2d 186, 187 (N.D. 1996).

See also WORK OVERS.

Acknowledgment

(1) In Louisiana, a method by which the PRESCRIPTION (*q.v.*) of a mineral servitude or a mineral royalty may be interrupted. *See* Articles 54–55, 93–96 of the Louisiana Mineral Code [(R.S. 31:54–55, 93–96 (1975)]; TREATISE § 216.3(c). *See also* PRESCRIPTION.

(2) A declaration or avowal of an act or a fact to give it legal effect.

ACMA

The ALASKA COASTAL MANAGEMENT ACT (*q.v.*).

Acoustical well logging

Determination of properties or dimensions of a borehole by acoustical means. *See* WELL LOG.

See also Hilchie, "Well Logging," in *Rocky Mt. Min. L. Fdn. Basic Oil and Gas Technology for Lawyers and Landmen* (1979).

Acquired federal lands

Those lands in federal ownership which have never been "public domain" and those lands in federal ownership which have once been public lands but have been disposed of as such and which the United States has subsequently reacquired by purchase, condemnation, or donation. Certain of the special problems of disposition of minerals in acquired lands are discussed in Fritz, "Mineral Problems Relating to Acquired Federal Lands," 3 *Rocky Mt. Min. L. Inst.* 379 (1957); Law of Federal Oil and Gas Leases Chs. 9–10 (LexisNexis Matthew Bender).

The distinction between acquired lands and public domain lands is discussed in Bobby Lee Moore, A-30433 (Mimeo Dec., Dep't of the Interior,Nov. 1, 1965), holding that public land which has been patented and has passed into private ownership does not regain the status of public land upon being acquired subsequently by the United States through purchase or condemnation.

See also PUBLIC LANDS.

Acquired Lands Leasing Act of 1947

61 Stat. 913, 30 U.S.C. §§ 351–359.

Acquisition costs

See LEASE ACQUISITION COSTS.

Acquisition fund

See LEASE ACQUISITION FUND.

Acquisition Premium

A term employed by the FEDERAL ENERGY REGULATORY COMMISSION (*q.v.*) to deal with proposed rates that follow the acquisition of a pipeline. It has been defined as:

Under these principles, when a facility is acquired by one regulated entity from another, the seller's depreciated original cost is included in the cost-of-service computations, even though the price paid by

miles long. Each such parcel must be separated from any adjacent section by at least one mile.

"Thus, it is the oil company that within the statutory time limits must decide when and what to lease, and which parcels to return to the government. As lease selection proceeds, the 50 per cent which is not selected reverts to the government as reserves, and, when the permit lapses, all unselected lands become reserves as well. These reserves are, by law, subject only to competitive bidding. If, at the time the reserves are established, oil company interest is very high, as indicated by requests to offer the reserves for sale, the government will ordinarily auction them immediately. In other cases, it may await the results of drilling which the original permit holder may be expected to undertake in the near future.

"Offering large parcels without bids, at low rentals, provides substantial incentive for exploration, yet the corridor requirement assures that parts of the acreage which are proven or semi-proven by the exploratory work will revert to the state for competitive leasing. The system provides a mechanism which leaves judgment and initiative with the individual oil operator and calls mainly for automatic responses from state administrators."

See also CORRIDOR ACREAGE.

Checkerboard relinquishment

A system of relinquishment of lands held under lease or under an agreement between a host government and a foreign oil company requiring the company, after discovery of oil or gas in commercial quantities, to yield certain acreage to the lessor or government, which would then be free to sell the relinquished area to the highest bidder. *See* Hossain, *Law and Policy in Petroleum Development* 217 (1979).

See also CONCESSION; RELINQUISHMENT CLAUSE.

Chemical treatment of well

See ACIDIZING OF WELL.

Cherrypicking

A term applied to "a discredited practice in the oil business" whereunder one party in an oil and gas venture transferred to the other participant(s) less promising interests while retaining more promising interests for himself." Samuels v. Wilder, 871 F.2d 1346, 1348 (7th Cir. 1989), *on subsequent appeal*, 906 F.2d 272, 111 O.&G.R. 38 (7th Cir. 1990).

Cherrystemming practice

A practice of the BUREAU OF LAND MANAGEMENT (*q.v.*) of designating certain lands occupied by roads or other intrusions as "nonwilderness corridors" in establishing wilderness study areas under the FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976 (FLPMA) (*q.v.*).

"These lands are occupied by roads or other intrusions which would seemingly disqualify a parcel from wilderness consideration. This practice is commonly employed when a road enters, but does not bisect an area otherwise possessing wilderness characteristics. In such a case, the area occupied by the road is designated a nonwilderness corridor. Such corridors frequently appear on inventory maps in the shape of a cherrystem. The boundaries of an inventory unit 'containing' a cherrystem are drawn around the intrusion so as to exclude it from the area being considered for wilderness values." National Outdoor Coalition, IBLA 80-274, GFS (MIN) 1982-6 (Oct. 30, 1981).

Chilling the bid

A term applied to an alleged practice of participants in a proposed joint venture of reducing a proposed bonus bid for Outer Continental Shelf Lands. *See* Energy Data Requirements of the Federal Government (Part III—Federal Offshore Oil and Gas Leasing Policies), Hearings before the Subcommittee on Activities of Regulatory Agencies of the Permanent Select Committee on Small Business, House of Representatives, 93d Cong., 2d Sess. (1974) at pp. 319, 339, 364, 395, 401, 418, 450, 470, 475, 484, 496.

See also BID; LEASE BIDDING SYSTEMS.

(2) A lease on state-owned lands (*e.g.*, in Alaska) issued on the basis of competitive bidding. *See* "BEST INTERESTS" FINDING.

(3) Once the BLM accepts a competitive lease bid, the bidder may not withdraw its bid and seek either a refund of the monies paid or relief from the monies it still owes under the terms of the bid. Fossil Energy Group, LLC, 174 IBLA 309 (2008). *See* 43 C.F.R. § 3120.5-3.

Competitive sale

The offering of federal oil and gas leases within a FAVORABLE PETROLEUM GEOLOGICAL PROVINCE (FGPG) (*q.v.*), a KNOWN GEOLOGICAL STRUCTURE (KGS) (q.v), surplus or drainage lands by competitive bids at not less than fair market value which usually require a minimum bonus bid per acre. 1 Law of Federal Oil & Gas Leases xxii (1995)

See also COMPETITIVE LEASE.

Complete preemption doctrine

A rarely invoked doctrine whereby a state law claim may be removed to federal court because the assertion of an affirmative defense raises a federal question. In Devon Energy Production Co. v. Mosaic Potash Carlsbard, Inc., 693 F.3d 1195 (10th Cir. 2012), the court rejected the application of the doctrine where the plaintiff's state law claims did not necessitate the application of federal laws and regulations relating to the Potash Area of New Mexico.

See also COMPETITIVE LEASE.

Completed well

A dry hole; or a well capable of producing oil or gas; or a well drilled to such depth that oil or gas is not likely to be encountered at greater depths; or a well drilled to that reasonable depth at which the existence of oil or gas is usually proved or disproved in the locality. Smith v. Hayward, 193 F.2d 198, 200 (C.C.P.A. 1951).

Howard v. Hughes, 294 Mich. 533, 293 N.W. 740 (1940), approved the following definition: "(1) An oil well is completed when it has been drilled to the oil formation prevailing in that district and (2) such means have been employed to produce oil as are known to the industry in that community and (3) to the extent that a reasonably experienced driller would use and employ same in good faith effort to make a well an oil producer of a nonproducer (a dry hole)."

For purposes of cancellation of a bond required of drillers, Cal. Pub. Res. Code § 3208 (1984) (1997 Supp.) defines a properly completed well as one which "has been shown to the satisfaction of the supervisor that the manner of producing oil or gas or injecting fluids into the well is satisfactory and that the well has maintained production of oil or gas or injection from a continuous six-month period."

For purposes of required filing of a log, core record, and history with the supervisor, Cal. Pub. Res. Code § 3217 (1972) declared that a well is completed "thirty days after it has commenced to produce oil, water or gas, unless drilling operations are resumed before the end of the thirty-day period." Section 3217 was repealed in 1988.

For purposes of construing a lease provision requiring the commencement of operations on a second well within 3 months of the completion of the first well, the court in Siemon v. Lyon, 51 Cal. App. 2d 350, 124 P.2d 893 (1942), quoted the latter definition in concluding that a well had been completed within the meaning of this lease provision, declaring that "there is nothing in the lease itself, or in the law, which requires that for a well to be a completed well, it must be a well that produces in paying quantities."

In Niles v. Luttrell, 61 F. Supp. 778 (W.D. Ky. 1945), drilling of a well ceased on May 25. On June 4 the well was shot with nitroglycerin but without satisfactory results. In August or September the well was acidized. It still did not produce oil in paying quantities. The court concluded that the well was "completed" after it had been acidized without results.

For purposes of a shut-in royalty clause, there may be dispute as to the time of completion of a well. Thus in Bennett v. Sinclair Oil & Gas Co., 275 F. Supp. 886, 27 O.&G.R. 716 (W.D. La. 1967), *aff'd,*

405 F.2d 1005, 33 O.&G.R. 256 (5th Cir. 1968), one ground for the lessor's refusal of a tender of shut-in royalty payment was that the payment was premature in that it was designated for a period beginning May 29, 1965, when in fact the well was not completed until June 13, 1965. The argument was rejected by the court which observed: "Viewing the evidence as a whole and in a light most favorable to plaintiffs, we find the dispute over the completion date of the well involved a mere technicality based on whether the well should have been deemed 'completed' when the 'Christmas tree' was installed or when the liner was perforated. We fail to see the significance this distinction has in this case. In no event have petitioners been prejudiced by the payment with respect to Lease # 1 and they certainly have not been injured by a payment which represents more than they were due." 275 F. Supp. at 892, 27 O.&G.R. at 723.

In Seale v. Major Oil Co., 428 S.W.2d 867, 869, 29 O.&G.R. 292, 295 (Tex. Civ. App.—Eastland 1968), the court concluded that a contract reference to the completion of a well "does not as contended by appellant mean the completion of such well as an oil or gas producer but has a broader meaning and refers to completion of the required work on the well whether it became a producer or not."

Barrett v. Ferrell, 550 S.W.2d 138, 142, 57 O.&G.R. 590, 597 (Tex. Civ. App.—Tyler 1977, error ref'd n.r.e.), declared that "the term 'completing' a well as used in the oil and gas industry does not mean that the operator is required to install completion equipment on a dry hole."

See also Lerblance v. Continental Oil Co., 437 F. Supp. 223, 229, 59 O.&G.R. 50, 61 (E.D. Okla. 1976).

The definition in this MANUAL was cited in Canadian Superior Oil Ltd. v. Paddon-Hughes Development Co., 65 W.W.R. 461, 470 (Alberta Sup. Ct. 1968), *appeal dismissed,* 67 W.W.R. 525, 3 D.L.R.3d 10 (Alberta Sup. Ct. App. Div. 1969), *appeal dismissed,* [1970] S.C.R. 932, 12 D.L.R.3d 247, 74 W.W.R. 356 (1970).

Complete payout period

A term employed in the 1956 proposed Treas. Reg. § 1.612–4(a)(2), defined as the period of time it takes for the operating net income from a well, after payment of all costs of operations, to equal all expenditures for drilling and development, both tangible and intangible, less all such expenditures which are recoverable out of production payments, royalties and net profits interests. *See* Stroud, "Major Points of Impact of New Natural Resources Regulations on Oil and Gas," 8 *Sw. Legal Fdn. Oil & Gas Inst.* 393, 404 (1957).

See also PAYOUT; PAYOUT PERIOD.

Completion

Derman, "A Practitioner's Review of the 1990 Model Form International Operating Agreement" [1991] 2 *OGLTR* 46, 47, notes that "The definition of 'Completion' has been hotly debated. Depending on the definition, 'Completion' can occur when a well has been drilled and logged at one extreme, and at the other extreme when it has been drilled, cased, perforated, stimulated, tested and physically connected to a pipeline or outlet—so that production can be commenced with the turning of a valve or switch."

In Burns v. Louisiana Land & Exploration Co., 870 F.2d 1016, 106 O.&G.R. 547 (5th Cir. 1989), the court analyzed a number of the entries in this MANUAL OF TERMS and concluded as follows:

"In sum, the specialized industry definition of completion is primarily concerned with an event following drilling; no mention is made of the termination of reworking operations.

. . . .

". . . Our review of legal authority on the oil and gas industry shows that the meaning of 'completion' assumes that a hole has just been drilled, but the term is considered to be indefinite and is not explicitly restricted to drilling. The context of the specific use of the phrase 'completion of a dry hole' in this lease leads us to conclude that, in this sentence, completion of a dry hole happens after unsuccessful drilling *or reworking*. . . . Thus the lessees' unsuccessful reworking of the dry hole

within ninety days of the end of the primary term extended the lease beyond the date on which the lessees drilled the next hole, and there was no trespass."

See also DUAL COMPLETION; MULTIPLE COMPLETION; SINGLE COMPLETION WELL.

Completion clause

The name applied by D. Pierce, *Kansas Oil and Gas Handbook* § 11.15 (1986), to a DRILLING OPERATIONS CLAUSE (*q.v.*) or to a CONTINUOUS DRILLING OPERATIONS CLAUSE (*q.v.*).

Completion contract

A form of DRILLING CONTRACT (*q.v.*) between an operator and an independent drilling contractor. The contractor may be paid on a footage or day work basis but the operator's obligation to pay is postponed until the well is completed. *See* Bankoff v. Wycoff, 233 F.2d 476, 6 O.&G.R. 417 (10th Cir. 1956).

Completion funding

See COMPLETION PARTNERSHIP.

"Completion" lease

A lease under the terms of which a well must be completed, as opposed to commenced, during the primary term in order to keep the lease alive into the secondary term. State *ex rel.* Comm'rs of Land Office v. Carter Oil Co., 1958 OK 289, 336 P.2d 1086, 10 O.&G.R. 790; Moncrief v. Pasotex Petroleum Co., 280 F.2d 235, 12 O.&G.R. 1087 (10th Cir. 1960), *cert. denied,* 364 U.S. 912 (1960).

See also Steinkuehler v. Hawkins Oil & Gas Inc., 1986 OK CIV APP 9, 728 P.2d 520, 91 O.&G.R. 104 (finding that lease construed was a "commencement lease" rather than a "completion lease").

See also "COMMENCE" LEASE.

Completion location

This term is defined by Section 402 of the Natural Gas Policy Act of 1978 (Pub. L. No. 95-621), as the subsurface location from which crude oil or natural gas is or has been produced from a reservoir. *See* LOCATION.

Completion of a well

An indefinite term, meaning something more than mere completion of drilling. At the least it means the cleaning out of the well after reaching a specified depth, or the shooting of the well if there is doubt as to whether it is a producer or nonproducer. Totah Drilling Co. v. Abraham, 64 N.M. 380, 328 P.2d 1083, 9 O.&G.R. 682 (1958). Completion of a well involves those processes necessary before production occurs and after drillers have hit the pay sand, *viz.,* perforating the casing and washing out the drilling mud. In Edwards v. Hardwick, 1960 OK 38, 350 P.2d 495, 12 O.&G.R. 684, the court emphasized that the term "completed well" has different meanings in various contexts, *e.g.,* when used in drilling contracts or drilling clauses or when used to determine the commencement of a period of time in which an act is to be performed or a right is to be exercised.

Quoting from the first paragraph of this entry in this MANUAL, the court in Bledsoe Land Co. LLLP v. Forest Oil Corp., 2011 Colo. App. LEXIS 1051, *pet. for writ of cert. den., en banc,* found that the term "completion" is not ambiguous and ruled that a well in question was not completed until it was hydraulically fractured; therefore, only 176 days had passed before another well was commenced, thereby complying with a 180-day provision of the lease in dispute.

Discovery of oil or gas in paying quantities was distinguished from existence of a well physically capable of producing oil or gas in paying quantities by Jim's Water Service, Inc., 114 IBLA 1, GFS(O&G) 1990-21 (March 29, 1990) ("The statutory requirement of discovery simply means to find oil or gas 'in sufficient quantities for profitable production.' . . . In contrast, a well capable of production means a well which is actually physically capable of producing oil or gas in paying quantities at the particular time in question.")

This term was said in Modern Exploration, Inc. v. Maddison, 708 S.W.2d 872, 92 O.&G.R. 387 (Tex.

App.—Corpus Christi 1986, no writ), to mean the time production from a well actually began.

Completion of drilling

A term often used interchangeably with the term COMPLETION OF A WELL (*q.v.*). Modern Exploration, Inc. v. Maddison, 708 S.W.2d 872, 92 O.&G.R. 387 (Tex. App.—Corpus Christi 1986, no writ), construed the term "completion of drilling" as meaning "the time when no further drilling is needed, when oil or gas has been reached and the well is capable of producing—in short, when the well's total depth is reached, not when the operator chooses to perforate the cement plug that he chose to insert into the well." This court viewed the term "completion of a well" as meaning the time production actually began.

See also FINISHED DRILLING DATE; TOTAL DEPTH.

Completion operations

This term is defined by Ariz. R.S. § 27–551 as "work performed in an oil or gas well after the well has been drilled to the point where the production string of casing is to be set, including setting the casing, perforating, artificial stimulation, production testing and equipping the well for production, all prior to the commencement of the actual production of oil or gas in paying quantities, or in the case of an injection or service well, prior to when the well is ready for use, or in the case of a dry hole, prior to when the well is plugged and abandoned."

Completion partnership

A partnership organized to obtain financing of the obligation of a general partner in a drilling program to contribute completion and other capital costs. *See* Mann, "Financing Oil and Gas Operations—Recent Developments," 33 *Sw. Legal Fdn. Oil & Gas Inst.* 407, 421 (1982):

"If conventional financing from banks or other financial institutions is unavailable or considered too expensive or restrictive, additional funding from a 'completion partner' may be sought. The function of the completion partner is to provide funds for completion and other capital costs of successful wells. Because the well is known to be successful, the risk may be low to the completion partner."

See also DRILLING FUND.

Completion program

A program to provide funds for the acquisition of leases and prospects and/or to pay all capital costs incurred in completing wells. Baggett, Dole, and Short, *Coopers & Lybrand Anatomy of a Drilling Fund* 7 (1980).

See also DRILLING FUND.

Completion report

A report required by the conservation regulations of many states to be filed with the conservation commission after the completion of a well. Such reports are to contain some or all of the following information: name and/or number of the well; location; lease name; date of completion; date of first production, if any; name and depth of reservoir being produced from; initial production test data; casing and cementing records; perforation data; shooting or chemical treatment record; the well log. Some states also require filing of copies of the electrical well logs.

Compliance and authorization to transport oil or gas from land, certificate of

See CERTIFICATE OF COMPLIANCE AND AUTHORIZATION TO TRANSPORT OIL OR GAS FROM LAND.

Compliance certificate

See CERTIFICATE OF COMPLIANCE.

Compliance with laws clause

A clause in the Alberta Crown Petroleum and Natural Gas pro forma lease obligating the lessee to comply with all provincial statutes and regulations in force from time to time.

See also REFERENTIAL INCORPORATION.

Crude Oil Contracts in the Service Economy," 24 *Tex. Int'l L.J.* 399, 401, 416–420 (1989).

Hybrid platform

A GRAVITY STRUCTURE (*q.v.*) for deep water operations in which steel and concrete are used in its construction in roughly equal proportions. *See also* PLATFORM.

Hybrid working interest

A term that has been applied to an interest in minerals that is burdened by a share of operating costs and royalty but does not bear costs of drilling and completing an offshore platform or platforms or of a well or wells.

Hydrafrac treatment

A method of inducing fractures in reservoir rock about producing wells by means of high pressures and the introduction of sand into the fractures, preventing their closing after the pressure is released. The purpose of the treatment is to improve the flow of oil into the well.

See also FRACTURING.

Hydraulic fracturing

A mechanical method of increasing the permeability of rock, and thus increasing the amount of oil or gas produced from it. The method employs hydraulic pressure to fracture the rock. It is extensively employed on limestone formations.

The Texas Supreme Court describes fracking as follows:

"[Fracking] is done by pumping fluid down a well at high pressure so that it is forced out into the formation. The pressure creates cracks in the rock that propagate along the azimuth of natural fault lines in an elongated elliptical pattern in opposite directions from the well. Behind the fluid comes a slurry containing small granules called proppants-sand, ceramic beads, or bauxite are used-that lodge themselves in the cracks, propping them open against the enormous subsurface pressure that would force them shut as soon as the fluid was gone. The fluid is then drained, leaving the cracks open for gas or oil to flow to the wellbore." Coastal Oil & Gas Corp. v. Garza Energy Trust, 268 S. W. 3d 1, 6–7 (2008).

See also FPL Farming Ltd. v. Environmental Processing Systems, L.C., 54 Tex. Sup. Ct. J. 1744, 351 S. W. 3d 306, 314 n.8 (2011) (paraphrases the definition provided in the MANUAL OF TERMS), on remand, FPL Farming Ltd. v. Environmental Processing Systems, L.C., 383 S.W.3d 274 (Tex. App.—Beaumont 2012).

Tbe hydraulic fracturing process has been described as:

> Fracking is the artifical propagation of fractures in a rock layer by injecting large quantities of water and fracturing fluids at high volume and pressure. This fractures the geological formation, creating passages through which gas and liquids can flow and an overall increased permeability. Fracking ty pically uses "slick water," which is a mixture of water, sand, and a cocktail of chemcial ingredients with a number of purposes, including increasing viscosity of the fluid and impeding bacterial growth or mineral deposition.. . . Modern fracking involves drilling vertically into shale formations up to hundreds of thousands of feet deep, and horizontally from 1000 to 6000 feet away from the well. Center for Biological Diversity v. Bureau of Land Management, 2013 U.S. Dist. LEXIS 52432 (N.D.Cal. March 31, 2013).

A further explanation of the hydraulic fracturing process is:

> Hydraulic fracturing is a commonly used technology in modern oil and gas drilling operations, particularly with deep shale formations where its use is essential. Hydraulic fracturing involves injecting fluid at high pressure into an oil and gas well. The force of the fluid fractures, or cracks, the rock thereby producing fissures throughout the rock strata. Into these fissures is further injected small proppants, usuall sand, which remain behind to ensure that the fissures remain open. As a result of this procedure, oil and gas are more easily liberated from the rock allowing to to flow towards the well head, thus increasing the rate of extraction.

Stone v. Chesapeake Appalachia, LLC, 2013 U.S.Dist. LEXIS 71121 (N.D. W.Va. Apr. 10, 2013), citing Travis Zeik, *Hydraulic Fracturing Goes to Court: How Texas Jurisprudence on Subsurface Trespass Will Influence West Virginia Oil and Gas Law*, 112 W. Va. L. Rev. 599 (2010).

In conjunction with the production of COALBED METHANE (*q.v.*), the process of hydraulic fracturing has been described as "the injection of fluids and a propping agent (usually sand) into a coal bed. The application of pressure injects fluids into the coal bed thereby widening natural fractures and inducing new ones that are held open by the propping agent after the pressure is released. As a result, these fractures provide paths for gas to migrate to the wellbore, thus stimulating gas flow." Legal Environmental Assistance Foundation, Inc. v. U.S. Environmental Protection Agency, 118 F.3d 1467, 1470, 139 O.&G.R. 174 (11th Cir. 1997), quoting Thomas E. Sexton & Frank Hinkle, State Oil and Gas Board, Oil and Gas Report 8B: Alabama's Coalbed Gas Industry (1985).

The LEAF litigation and the techniques of hydraulic fracturing are discussed in Markus G. Puder, *Did the Eleventh Circuit Crack "Frac"?—Hydraulic Fracturing after the Court's Landmark LEAF Decision*, 18 Va. Envtl. L.J. 507 (1999).

The EPA defines hydraulic fracturing for purposes of SAFE DRINKING WATER ACT (*q.v.*) regulation as a "temporary and intermittent process in which fluids are injected underground at high pressures to create fractures in the coals seam that enhance the recovery of methane gas by creating pathways for the gas to flow to the surface." 65 Fed. Reg. 2889, 2892 (2000), as reported in Legal Environmental Assistance Foundation, Inc. v. U.S. Environmental Protection Agency, 276 F.3d 1253, 1256 n.3, 154 O.&G.R. 318 (11th Cir. 2001), *reh'g en banc denied*, 34 Fed. Appx. 392 (11th Cir.), *cert. denied*, 537 U.S. 989 (2002).

The experience in one state with hydraulic fracturing is summarized in Lytle, "Results of Stimulating the Oil and Gas Sands by Hydraulic Fracturing in Pennsylvania," 7 *IOCC Comm. Bull.* 17 (June 1965).

See also American Petroleum Institute, Hydraulic Fracturing at a Glance (API 2008); Norman Hyne, Dictionary of Petroleum Exploration, Drilling & Production 249 (PennWell 2001); Owen L. Anderson, *Coastal v. Garza and Its Impact on Subsurface Trespass Issues*, 60 Inst. on Oil & Gas L. & Tax'n 65 (2009); Markus K. Puder, *Did the Eleventh Circuit Crack "Frac?"—Hydraulic Fracturing After the Court's Landmark LEAF Decision*, 18 Va. Envt'l L.J. 507 (1999); Ragsdale, *Hydraulic Fracturing: The Stealthy Subsurface Trespass*, 28 Tulsa L.J. 311 (1993).

See also ACID FRACTURING; EFFECTIVE LENGTH; FRAC OIL; FRAC TANK; FRACING; FRACKING; FRACTURING; HIGH-ENERGY GAS FRACTURING; HYDRAULIC LENGTH; PETROFRACTURING; PROPPANTS; PROPPED LENGTH; SANDFRACING; SLICK WATER; TIGHT FORMATION.

Hydraulic length

The designed distance the fracing fluids will travel in a HYDRAULIC FRACTURING *(q.v.)* operation. Coastal Oil & Gas Corp. v. Garza Energy Trust, 268 S.W.3d 1, 6–7 (Tex. 2008).

See also: EFFECTIVE LENGTH; HYDRAULIC FRACTURING; PROPPANTS; PROPPED LENGTH.

Hydrocarbon

An organic chemical compound of hydrogen and carbon, called petroleum. The molecular structure of hydrocarbon compounds varies from the simplest, methane (CH_4), a constituent of natural gas, to the very heavy and very complex. Octane, a constituent of crude oil, is one of the heavier, more

Shipper must have title rule

A FERC rule adopted through an adjudicatory proceeding, Texas East Transmission Corp., 37 FERC para. 61,260 at 61,685 (1986), that requires a shipper of natural gas to hold title to the gas that it is shipping. "The aim of the rule is to prevent big natural gas distributors from buying up pipeline capacity that they do not need for shipment of their own gas and leveraging their market power by selling the capacity to third parties at excessive prices. Bangor Gas Co., LLC v. H.Q. Energy Services (U.S.), Inc., 695 F.3d 181, 184 (1st Cir. 2012). The genesis of the rule is explored at William Demarest, *Gas Marketing by the Operator Under the HOA-Unrecognized REgulatory Risks and a Practical Solution*, 64 Okla. L.Rev. 135, 136-38 (2012).

Shipping line

A pipeline used to transport oil and gas from the site of original production to a storage facility. Coates v. Shell Western E & P, Inc., 5 Cal. App. 4th 904, 7 Cal. Rptr. 2d 187 (1992).

Shipping papers

"[B]ills of lading covering oil or products transported by railway; manifest covering oil or products transported by truck or motor vehicle, and any written documents covering oil or products transported by pipe line, boat or barge." Tex. Rev. Civ. Stat. Ann. Art. 6066a, § 1(j) (1962).

Shoestringer

A cash-short operator who "would 'poor boy' a well by splitting his interest with his crew, the landowner, his supply house, his boardinghouse owner, his favorite saloon keeper and, if need be, his most cherished madam, as well." D. Yergin, *The Prize* 87 (1991).

Shoestring sands

A type of lenticular formation (see LENTICULAR RESERVOIR) in which a porous, permeable sandstone lens or streak is surrounded by impervious rock, frequently shale. Such a STRATIGRAPHIC TRAP (*q.v.*) is difficult to locate because of the absence of significant structural relief.

Shooting a well

Exploding nitroglycerine or other high explosive in a hole, to shatter the rock and increase the flow of oil or gas. *See* GEOPHYSICAL EXPLORATION; GROUP SHOOT; SPEC SHOOT.

Shooting by seismograph

The making of a SEISMOGRAPHIC SURVEY (*q.v.*). The term "shooting" derives from the setting off of explosions in the ground. The shock waves from these explosions are recorded by a SEISMOGRAPH (*q.v.*), and from these records a contour map can be made.

The definition in this MANUAL was quoted in United Geophysical Corp. v. Culver, 394 P.2d 393 (Alaska 1964).

Shooting lease

An instrument granting permission to conduct a geophysical survey; it may or may not give the right to take an oil and gas lease on all or part of the lands. *See* Fiske, *Federal Taxation of Oil and Gas Transactions* §§ 1.04, 2.11 (1983 Revision).

Shooting option

A contract for exploration rights which contains an ACREAGE SELECTION CLAUSE (*q.v.*). SHOOTING RIGHTS (*q.v.*) do not include the latter clause.

For tax purposes, the consideration paid the landowner for the shooting option is treated as ordinary income if the selection option is not exercised and as lease bonus if the selection option is exercised; the grantee treats the consideration as geological and geophysical costs in the former case and as a capital investment in the lease or leases in the latter case. *See* Burke and Bowhay, *Income Taxation of Natural Resources* ¶ 15.04 (1981).

In Bayou Verret Land Co. v. Commissioner, 450 F.2d 850, 856, 40 O.&G.R. 421, 429 (5th Cir. 1971), the court concluded that the "Tax Court's holding that the advance lump sums received on the

The deferral of an oil payment. *See* DEFERRED OIL PAYMENT.

Step-out well

A well drilled adjacent to a proven well but located in an unproven area; a well drilled as a "step-out" from proven territory in an effort to ascertain the extent and boundaries of a producing formation.

Step-price increase clause

See ESCALATOR CLAUSE.

Step scale royalty

A royalty rate which increases by steps as the average production increases, *e.g.*, 12½% for the first 20 barrels per well per day, 16⅔% on the next 30 barrels, etc. A SLIDING SCALE ROYALTY (*q.v.*), on the other hand, is based on average production and is applicable to all production. *See* Schwabrow, "Supervision of Operations Under Federal and Indian Oil and Gas Leases by the United States Geological Survey," 8 *Rocky Mt. Min. L. Inst.* 241, 258 (1963).

Step up clause

A periodic or step-price increase clause. *See* ESCALATOR CLAUSE.

STH

A map symbol said to mean "slant hole" or "side-tracked hole." First Nat'l Bank of Boston v. Champlin Petroleum Co., 709 S.W.2d 4, 91 O.&G.R. 598 (Tex. App.—Corpus Christi 1986, error ref'd n.r.e.).

Still gas

Any form or mixture of gas produced in refineries by cracking, reforming, and other processes, the principal constituents of which are methane and ethane.

See also REFINERY GAS.

Stimulate

This term is defined by W. Va. Code § 22-4-1(u) (Cum. Supp. 1980) as "any action taken by well operator to increase the inherent productivity of an oil or gas well including, but not limited to, fracturing, shooting or acidizing, but excluding cleaning out, bailing or workover operations."

See also SECONDARY RECOVERY.

Stipulation

"Specific measure[] imposed upon a lessee that apply to a lease. Stipulations are attached as a provision of a lease; they may apply to some or all tracts in a sale. For example, a stipulation might limit drilling to a certain time period of the year." U.S. Minerals Management Service, *Proposed Final Comprehensive Outer Continental Shelf (OCS) Natural Gas and Oil Resource Management Program 1992-1997*, Appendix 17 (1992).

See also CONTINGENT RIGHT STIPULATION; CONTROLLED SURFACE USE STIPULATION; NONCONVENTIONAL OIL RECOVERY STIPULATION; NO SURFACE OCCUPANCY (NSO) STIPULATIONS; OPEN LEASE AREA SUBJECT TO NO SURFACE OCCUPANCY; OPEN LEASE AREA SUBJECT TO SPECIAL STIPULATIONS; SEASONAL STIPULATION; TIMING STIPULATION; WILDERNESS PROTECTION STIPULATION.

Stipulation of interest

(1) An instrument amounting to certification of legal title and authorization for payment on royalty interests in accordance with the terms of an oil or gas purchase contract. Greenshields v. Warren Petroleum Corp., 248 F.2d 61, 8 O.&G.R. 937 (10th Cir. 1957), *cert. denied*, 355 U.S. 907 (1957); Hafeman v. Gem Oil Co., 163 Neb. 438, 80 N.W.2d 139, 7 O.&G.R. 41 (1956).

(2) A DIVISION ORDER (*q.v.*). Bounds, "Division Orders," 5 *Sw. Legal Fdn. Oil & Gas Inst.* 91, 92 (1954).

Stipulation *pour autrui*

For Release: Wednesday, December 17, 2014

New York State Department of Health Completes Review of High-volume Hydraulic Fracturing

Acting DOH Commissioner Zucker Recommends Activity Should Not Move Forward in New York State

DEC Commissioner Martens Will Issue a Findings Statement Early Next Year to Prohibit High-Volume Hydraulic Fracturing

The state Department of Health has completed its public health review of high-volume hydraulic fracturing (HVHF) and Acting DOH Commissioner Dr. Howard Zucker recommended that high-volume hydraulic fracturing should not move forward in New York State. Dr. Zucker announced his findings and recommendations today at a Cabinet Meeting in Albany.

"I have considered all of the data and find significant questions and risks to public health which as of yet are unanswered," said Dr. Zucker. "I think it would be reckless to proceed in New York until more authoritative research is done. I asked myself, 'would I let my family live in a community with fracking?' The answer is no. I therefore cannot recommend anyone else's family to live in such a community either."

In 2012, Department of Environmental Conservation (DEC) Commissioner Joe Martens asked the DOH Commissioner to conduct a review of the draft Supplemental Generic Environmental Impact Statement for High-Volume Hydraulic Fracturing (SGEIS). Dr. Zucker's report fulfills that request.

As a result of Dr. Zucker's report, Commissioner Martens stated at the Cabinet Meeting today that he will issue a legally binding findings statement that will prohibit HVHF in New York State at this time.

"For the past six years, DEC has examined the significant environmental impacts that could result from high-volume hydraulic fracturing," DEC Commissioner Joe Martens said. "DEC's

own review identified dozens of potential significant adverse impacts of HVHF. Further, with the exclusion of sensitive natural, cultural and historic resources and the increasing number of towns that have enacted bans and moratoria, the risks substantially outweigh any potential economic benefits of HVHF. Considering the research, public comments, relevant studies, Dr. Zucker's report and the enormous record DEC has amassed on this issue, I have directed my staff to complete the final SGEIS. Once that is complete, I will prohibit high-volume hydraulic fracturing in New York State at this time."

DEC will incorporate the findings of the public health review into the Final SGEIS, which will be released with a response to public comments early next year. A minimum of 10 days later, Commissioner Martens will issue the findings statement prohibiting HVHF. This action will conclude the State Environmental Quality Review Act process for HVHF.

DOH's review found significant uncertainties about: the adverse health outcomes that may be associated with HVHF; the likelihood of occurrence of adverse health outcomes; and the adequacy of mitigation measures to protect public health. DOH's report concludes that it will be years until science and research provide sufficient information to determine the level of risk HVHF poses to public health and whether those risks can be adequately mitigated. Given the red flags raised by current studies, absent conclusive studies that disprove health concerns, the report states the activity should not proceed in New York State.

In conducting its public health review, DOH reviewed and evaluated scientific literature, sought input from outside public health experts, engaged in field visits and discussions with health and environmental authorities in nearly all states where HVHF activity is taking place, and communicated with local, state, federal, international, academic, environmental and public health stakeholders. DOH's review can be found at: http://www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf (1.54 MB)

At the Cabinet meeting, Governor Cuomo thanked the Commissioners and their respective departments for their work.