
Glossary

A. (1) ampere and (2) area.

AA. (1) after acidizing and (2) as above.

A/. acidized with.

a. acres.

aa. as above.

AADE. American Association of Drilling Engineers (www.aade.org).

AAPG. American Association of Petroleum Geologists (www.aapg.org).

AAPL. (1) American Association of Petroleum Landmen (www.aapl.org).

(2) American Association of Professional Landmen (www.landman.org).

ab. above.

abandonment pressure. The gas pressure at which a gas well must be abandoned as the produced gas pressure decreases. It is often pipeline pressure at 1,000 psi.

abd. (1) abandon, (2) abandoned, and (3) abundant.

abd-gw. abandoned gas well.

abd-loc. abandoned location.

abdogw. abandoned oil and gas well.

abd-ow. abandoned oil well.

abdt or **abnd.** abundant.

- abnormal high pressure.** Pressure in a subsurface reservoir that is higher than expected from normal hydrostatic pressure at that depth; cf. normal pressure. (geopressure and overpressure)
- absolute open flow.** The maximum rate that a gas well can produce at zero bottom-hole pressure. (maximum potential flow) (AOF)
- absorption tower.** A vertical, steel vessel where natural gas bubbles up through a light-hydrocarbon liquid that removes natural gas liquids.
- abst** or **abstr.** abstract.
- abstract** or **abstract of title.** A record of the ownership and all the transfers of ownership of a tract of land. It is used in the title examination for a parcel of land and is made by a landman (abstractor) or abstract company to establish a clear title to that tract of land. (abst or abstr)
- abt.** about.
- abun.** abundant.
- abv.** above.
- AC.** alternating current.
- ac.** (1) acid, (2) acidizing, (3) acre, and (4) acreage.
- accelerator.** An additive that increases the rate of a process such as cement setting; cf. retarder.
- accum.** accumulative.
- accumulator.** Skid-mounted steel cylinders that contain hydraulic fluid under pressure. They are located next to a drilling rig and are used to operate the rams on the blowout preventers.
- acd** or **acdz.** (1) acidize and (2) acidized.
- ac-ft.** acre-feet.
- acid gas.** A gas such as hydrogen sulfide or carbon dioxide that forms an acid with water. It can cause corrosion of metal equipment.
- acidizing** or **acid job.** A well stimulation technique used primarily on limestone reservoirs. Acid is poured or pumped down the well to dissolve the limestone and increase fluid flow. Hydrochloric acid or mud acid, a mixture of hydrochloric and hydrofluoric acids, is commonly used. During matrix acidizing, the acid dissolves the reservoir. During acid fracturing, acid is pumped down the well under pressure to fracture the reservoir.
- acoustic impedance.** Sound velocity times density of a rock layer.
- acoustic velocity log.** A wireline well log that measures sound velocity through the rocks in microseconds per foot ($\mu\text{sec}/\text{ft}$). The porosity of

the rock can be calculated from the sound velocity of the rock. (sonic log) (AVL)

- acre.** An area of 43,560 square ft. There are 640 acres in a square mile (section). A square that is 209 ft on a side is an acre. (a or ac)
- acreage.** Leased land.
- acreage contribution agreement.** A type of well support agreement in which a nondrilling party will transfer a lease or leases to a drilling party that drills a well at a specific location. Information from that well will be shared with the nondrilling party; cf. bottom-hole and dry-hole contribution agreements.
- acre-foot.** The volume formed by a surface area of 1 acre that is 1 foot deep. It can hold 7,758 barrels of oil. Acre-feet are used to describe oil reservoir volume and to calculate reserves. (ac-ft)
- acrg.** acreage.
- ACS.** American Chemical Society (www.acs.org).
- ACT.** automatic custody transfer.
- AD.** authorized depth.
- add.** additive.
- ADDC.** Association of Desk and Derrick Clubs (www.addc.org).
- additive.** A substance that is added to a fluid to cause an effect. Drilling mud additives include (a) thinners and thickeners, (b) weighting material, (c) friction reducers, and (d) clay stabilizers. A common cement additive is an accelerator. (add)
- addn.** addition.
- adj.** adjustable.
- adpt.** adapter.
- adspn.** adsorption.
- AE.** asphalt emulsion.
- aeromagnetic.** An exploration method that uses a magnetometer mounted in a stinger that protrudes out the back of an airplane to measure the strength of the earth's magnetic field. The plane is flown at a constant height. Over rugged terrain, a helicopter can be used.
- AESC.** Association of Energy Service Companies (www.aesc.net).
- AF.** after fracturing (hydraulic).
- AFE.** authority or authorization for expenditure.
- AFP.** average flowing pressure.
- AGA.** American Gas Association (www.aga.org).

age. A time subdivision of epochs (e.g., Maastrichtian age); cf. era and period.

AICHE. American Institute of Chemical Engineers (www.aiche.org).

AIME. American Institute of Mining, Metallurgical and Petroleum Engineers (www.aime.org).

AIR. average injection rate.

air-balanced beam-pumping unit. An oil well beam-pumping unit that uses a piston that moves up and down in a compressed air cylinder to offset the weight of the sucker-rod string.

air drilling. Rotary drilling with air pumped down the drillstring instead of circulating drilling mud. (pneumatic drilling)

air gun. A common seismic source used in the ocean. It is a metal cylinder that is towed in the water behind a ship. The air gun is continuously filled with high-pressure air from the ship. A high-pressure air bubble is periodically released into the water from the air gun for the energy impulse. Several air guns of different sizes are often used at the same time in an air gun array.

Albian. An age of geological time from 112 to 99.6 million years ago. It is part of the Cretaceous period.

algorithm. The precise procedure for a numerical or algebraic procedure. Algorithms are used to program computers for seismic data processing.

alk. alkalinity.

alkaline flood. An improved oil recovery method that uses alkaline chemicals in the injection water to increase oil recovery. (caustic flood)

allow. Allowable.

allowable. The amount of gas or oil that a regulatory agency permits a well, lease, or field to produce during a period of time such as a month. (allow)

alt. Alternate.

alternating current. An electric current that periodically reverses its direction. In the United States, alternating current makes 60 complete cycles per second (Hertz). Alternating current is made by an electrical generator and is used in homes and offices for lighting and appliances; cf. direct current. (AC)

amb. Ambient.

ambient. The temperature and pressure of the surrounding environment. (amb)

American Petroleum Institute. A national trade organization for the US oil and natural gas industry located in Washington, DC. Its mission is to influence public policy for a strong, viable US oil and natural gas industry. The API conducts and sponsors petroleum industry

research and maintains and publishes over 500 equipment, operating, and safety standards. It collects, maintains, and furnishes statistical information on drilling activity, drilling results, and well completions (www.api.org). (API)

amine unit. Natural gas processing equipment that uses organic bases (amines) to absorb and remove hydrogen sulfide and carbon dioxide.

amor. amorphous.

amorphous. Structureless, without crystals. (amor)

amplitude anomaly. A brightening (bright spot) or dimming (dim spot) of a seismic reflector over a local area.

amp. ampere.

amplitude-versus-offset analysis. A seismic method in which the amplitude of a reflector is compared at different offsets (source to detector distances). It is used to locate gas reservoirs and identify carbonate rocks. (AVO analysis)

amt. amount.

AN. anhydrite.

anchor hole. The lowest portion of a well. It is located below the pay zone and is used to accommodate equipment such as a logging tool. (rat hole)

ang. angular.

angular unconformity. An ancient erosional surface with the sedimentary rock layers below the unconformity tilted at an angle to those above.

anhy. anhydrite.

anhydrite. A salt mineral composed of CaSO_4 ; cf. gypsum. (anhy) (AN)

ann. annulus.

annular preventer. A cylinder at the top of a blowout-preventer stack containing rubber with steel ribs. Pistons compress the rubber to close around any size or shape of pipe in the well.

annulus. The space between two concentric cylinders such as between the tubing and casing strings. (ann)

anoxic basin. A basin in which the bottom waters lack oxygen, and organic matter can be preserved.

Ant. antonym. (opposite)

anticline. A large, long, upward fold of sedimentary rocks. A circular uplift is a dome. An anticline can trap petroleum; cf. syncline.

antifoam. An additive used to reduce foam.

anti-whirl drilling bit. See walk to the right.

AOF. absolute open flow. (gas well)

AOFP. absolute open flow potential.

API. American Petroleum Institute. (www.api.org)

API gravity. See °API gravity.

API unit. A unit of radioactivity used with natural gamma ray logs.

API well number. A 10- or 12-digit number assigned to every well drilled in the United States. Digits 1 and 2 are state codes, digits 3 through 5 are for county, parish, or offshore, digits 6 through 10 identify the well, and digits 11 and 12 record a well property such as sidetracking.

app. appears.

appraisal well. A well drilled out from a discovery well to determine the extent of a new field. (step out or delineation well)

appx. (1) approximate and (2) approximately.

Aptian. An age of geological time from 121 to 112 million years ago. It is part of the Cretaceous period.

aquifer. (1) A water-bearing rock and (2) a permeable rock.

aquitard. A rock through which fluids cannot pass. (impermeable rock); cf. reservoir rock.

arch. A long uplift in rocks.

aren. arenaceous.

arenaceous. sandy; cf. argillaceous. (aren)

arg. argillaceous.

argillaceous. shaly; cf. arenaceous. (arg)

Ark or ark. (1) arkose and (2) arkosic.

arkose and arkosic sandstone. Sandstone derived from the weathering of granite. (granite wash) (Ark and ark)

arnd. around.

ARO. at rate of.

array. Several geophones connected to a single channel to record as a unit. Arrays are described by their geometry such as in-line, perpendicular, cross, and diamond. Several arrays make a spread. A source array is several seismic sources fired at the same time.

artesian well. A well in which water flows to the surface under its own pressure.

artificial lift. A system used to lift crude oil and water up the tubing string in a well that will not flow by itself (e.g., sucker-rod pump, electric submersible pump, gas lift, and hydraulic pump).

AS. after shot.

ASAP. as soon as possible.

ASD. abandoned well, salvage deferred.

ASGMT. assignment.

ASP. abandoned well, salvaged and plugged.

Asph or asph. asphalt.

asphalt. A brown to black, solid composed of high-molecular weight, hydrocarbon molecules. (Asph, asph, and aspt)

asphalt-based crude oil. A refiner's term for crude oil that contains little paraffin wax and has a residue of asphalt. It will yield a relatively high percentage of high-grade gasoline and asphalt when refined; cf. mixed-based crude oil and paraffin-based crude oil.

aspt. asphalt.

assgd. assigned.

assgmt. assignment.

assoc. associated.

associated gas. Natural gas that is either dissolved in crude oil or is in contact with crude oil in the reservoir. It is produced during crude oil production; cf. nonassociated gas.

assy. assembly.

ASTM. American Society for Testing and Materials. (www.astm.org)

astn. asphaltic stain.

AT. after treatment.

Athabaska oil or tar sands. A very large deposit of very heavy oil, water, and sand that crops out on the surface of northern Alberta in Canada. It is mined by large steam shovels and heated to separate the heavy oil, sand, and water. The heavy oil is treated by a refinery process called cracking to produce synthetic crude oil that is similar to diesel oil.

at wt. atomic weight.

atm. (1) atmosphere and (2) atmospheric.

atoll. A circular or elliptical reef with a central lagoon.

att. (1) attempt and (2) attempted.

aulacogen. A long, narrow rift in a continent, often filled with thick sediments.

auth. authorized.

authigenic. A mineral that was formed by a chemical reaction in the subsurface; cf. detrital. (AUTHG)

authority or **authorization for expenditure.** A cost estimate of doing something. The AFE of drilling a well is estimated both as a dry hole and as a completed well. (AFE)

auto. automatic.

autotracking. A computer process that traces an individual seismic reflector through a cube of 3-D seismic data to make a horizon slice of that seismic horizon.

av and **avg.** average.

AVC. automatic volume control.

AVL. acoustic velocity log.

AVO. amplitude versus offset.

AVT. apparent vertical thickness.

AW. acid water.

awtg. awaiting.

aux. auxiliary.

avail. available.

avg. average.

axis. The center of a fold.

az. azimuth.

azimuth. The direction of a horizontal line usually measured in degrees clockwise from true or magnetic north; e.g., North 70° East; cf. dip. (az)

B and **b.** barrel.

B. formation volume factor.

B/. (1) base and (2) base of.

BA. barrels of acid.

backflush. To pump an injected fluid back out of a well. The frac fluid is backflushed after a frac job.

back-in interest. A working interest in a well that becomes effective at a future time.

back-in unit. A service unit used for well workover that must be backed up to the well.

back off. To unscrew threaded pipe.

back off operation. A method used to remove stuck pipe from a well. A string shot located above the stuck point on the drillstring is exploded

as torque is applied to unscrew the pipe. A fishing tool is then used to retrieve the pipe left in the well.

backpressure test. A gas well test that measures pressures at different flow rates to calculate well deliverability.

bacterial degradation. The removal of lighter, shorter, hydrocarbon molecules from crude oil by bacteria. It leaves tar and asphalt.

bail. To remove liquid from a well. (blg)

bald-headed anticline or **structure.** A buried anticline with production along the flanks but no production on the crest. Erosion removed all the potential reservoir rocks from the crest. (scalped anticline)

barefoot completion. A well with casing run and cemented down to the top of the reservoir rock. The reservoir rock is left uncased; cf. set-through completion. (open-hole and top-set completion)

bar finger sand. A long, narrow sand body deposited as a distributary mouth bar on a prograding delta.

barite. A mineral composed of BaSO₄. It is used as an additive to make drilling mud heavier.

barrel. The English system measure of crude oil volume. A barrel contains 42 U.S. gallons and is equivalent to 0.159 cubic meter; 7.5 barrels of average weight oil weighs about one metric ton. (B, b, and bbl)

barrels-of-oil equivalent. The amount of natural gas that has the same heat content as an average barrel of oil. It is about 6,000; cf of gas. (oil equivalent gas or energy equivalent barrels) (BOE)

Bas and **bas.** basalt.

basal conglomerate. A soil zone located on an unconformity.

basalt. The most common volcanic rock. It is very fine-grained and dark in color. Basalt is called scoria when it contains gas bubbles. (Bas and bas)

base map. A map that shows the location of (1) wells that have been drilled or (2) seismic lines and shot points.

basement rock. Unproductive rocks for petroleum that underlie sedimentary rocks. Basement rock is usually igneous and/or metamorphic rock. Granite is a common basement rock. (Bm and bsmt)

base plate. See pad.

basic sediment and water. The solid and water impurities in crude oil. (BS&W)

basin. A large area with a relatively thick accumulation of sedimentary rocks (10,000 to 50,000 ft). The deep part of the basin where the crude oil and natural gas forms is called the kitchen. The shallow area

surrounding the deep basin is called the shelf. A basin can be partially filled with sediments, such as the Gulf of Mexico, or completely filled with sediments, such as the Anadarko basin of Oklahoma.

BAT. before acid treatment.

bat. battery.

batch. A single treatment in contrast to continuous.

batholith. A large irregular subsurface intrusion of igneous rock.

battery. See tank battery.

BAW. barrels of acid water.

BB. bridged back.

bb. barrel.

bb/D. barrels per day.

bb/min. barrels per minute.

BC. (1) barrels of condensate and (2) bottom choke.

Bcf. billion cubic feet.

Bcf/D. billion cubic feet per day.

BCPMM. barrels of condensate per million cubic feet of gas.

BD or B/D. barrels per day.

bd. bed.

bdd. bedded.

BDA. breakdown acid.

BDF. below derrick floor.

bdg. bedding.

BDO. barrels of diesel oil.

BDP. breakdown pressure.

Bdst. boundstone.

BDT. blow-down test.

beam-pumping unit. An oil well rod pumping unit with a walking beam that pivots on a Samson post. A sucker-rod string connects the walking beam to a downhole pump on the bottom of the tubing string. The prime mover is commonly an electrical motor. See also rod pumping system.

bedding. layers in sedimentary rocks. (bdg)

behind the pipe. Crude oil or natural gas located in the rock behind the casing in a well. It is not currently being produced.

benchmark crude oil. A crude oil used as a standard for comparing the properties of other crude oils and to set prices. West Texas Intermediate is the benchmark for the United States. Brent is used internationally. Dubai is used in the Middle East.

bent. (1) bentonite and (2) bentonitic.

bentonite. The commercial name for clay used to make common water-based drilling mud. Bentonite swells and forms a gel when exposed to freshwater. It comes in dry sacks. (bent)

bent housing a metal housing for a downhole mud or turbine motor. It has a fixed or adjustable bend of 1° to 3° behind the motor that serves as a bent sub.

bent sub. A short section of pipe with a small angle machined into it. The angle on some bent subs can be adjusted from the surface. It is used on a steerable downhole assembly.

BF. barrels of fluid.

BFH. barrels of fluid per hour.

BFMW. barrels of formation water.

BFO. barrels of frac oil.

BFPD. barrels of fluid per day.

BFW. barrels of formation water.

BFWTR. barrels of freshwater.

BG. background gas.

BGC. barrels of gas condensate.

BHA. bottom-hole assembly.

BHC. bottom-hole choke.

BHCP. bottom-hole circulating pressure.

BHCS. borehole compensated.

BHCT. bottom-hole circulating temperature.

BHFP. bottom-hole flowing pressure.

BHFT. bottom-hole flowing temperature.

BHL. bottom-hole location.

BHP. bottom-hole pressure.

bhp. brake horsepower.

BHSIP. bottom-hole shut-in pressure.

BHSP. bottom-hole static pressure.

BHST. bottom-hole static temperature.

BHT. bottom-hole temperature.

bid round. *See* license round.

bicenter and **bi-center bit.** A drilling bit with both a pilot bit on the bottom and a reamer on one side. It is designed to drill and ream a larger diameter hole than the inner diameter of the casing through which it passes.

billing interest. *See* working interest.

bin. The area (square or rectangular) in which all seismic reflection midpoints that fall within it are used to make a common midpoint gather for a 3-D seismic survey.

bio. biotite.

bioclastic. composed of shell fragments. (biocl)

biofacies. *See* facies.

biogenic gas. Methane gas produced by bacterial on organic matter at relatively shallow depths; cf. thermogenic gas. (microbial gas)

biostratigraphy. The use of microfossils to study and identify sedimentary rocks.

Biot. biotite.

biotite. A common mineral formed of thin black sheets; cf. muscovite. (black mica) (bio and biot)

bioturbation. The disturbance and mixing of sediments by burrowing animals and plant roots.

birdfoot delta. A delta with several lobes protruding out into a basin.

Bit and **bit.** bitumen.

bit. The cutting tool used on the end of a drillstring during drilling. A tricone bit is commonly used in rotary drilling. *See also* tricone bit, diamond bit, and polycrystalline diamond compact bit.

bit breaker. A plate placed in the rotary table to grip the bit. It enables the rotary table to screw or unscrew the bit from the drillstring as the bit is held stationary.

bitumen. Solid hydrocarbons such as tar in sedimentary rocks. It is soluble in organic solvents and is less than 10 °API gravity; cf. kerogen. (Bit and bit)

BL. barrels of load.

bl. black.

black mica. *See* biotite.

black oil. An oil that contains a relatively high percentage of long heavy nonvolatile hydrocarbon molecules; cf. volatile oil. (low-shrinkage oil)

Bld. boulder.

bld. bailed.

bldg. building.

bledg. bleeding.

bleed. (1) To slowly drain off a gas or liquid. (2) Oil bubbling out from a fresh core.

blg. bailing.

blind rams. Two large metal blocks with flat surfaces that are closed across the top of well to shut it in. They are used in a blowout-preventer stack; cf. pipe rams.

blk. (1) black and (2) block.

blkt. blanket.

blnd. blend.

BLO. barrels of load oil.

blo. blow.

block. A pulley on a drilling rig. (blk)

BLOTBR. Barrels of load oil to be recovered.

blowout. An uncontrolled flow of fluid from a well.

blowout preventer and **blowout-preventer stack.** A series of rams and spools mounted vertically on top of a well below the drill floor. They are bolted to the top of the well and are designed to close the well when drilling. The rams are operated by pneumatic pressure. (BOP stack)

BLPD. barrels of liquid per day.

blr. bailer.

BLS. below land surface.

BLW. barrels of load water.

Bm. basement.

bn. brown.

bnd. banded.

BNO. barrels of new oil.

BNW. barrels of new water.

BO. (1) barrels of oil and (2) backed out.

BOE. (1) barrels of oil equivalent and (2) blowout equipment.

BOEMRE. Bureau of Ocean Energy Management, Regulation and Enforcement (www.boemre.gov).

BOL. barrels of oil load.

boll weevil. An inexperienced oilfield worker.

bonus. money paid to a mineral rights owner for signing a lease.

book reserves. To calculate reserves that have been located by drilling and add them to a company's assets. Reserves are often confirmed by several levels of management and an independent consultant before they are booked. *See also* reserves.

boot sub. A fishing tool. Drilling mud is circulated down the inside of the tool to flow out the bottom and pick up small pieces of junk on the bottom of the well. The mud then circulates up along the outside of the tool where the junk falls into a basket; cf. junk basket.

BOP. blowout preventer.

BOPD. barrels of oil per day.

BOPH. barrels of oil per hour.

BOS. brown oil stain.

bot. bottom.

bottom-hole assembly. The drill collars, subs, and bit on the bottom of the drillstring. (BHA)

bottom-hole contribution agreement. A type of well support agreement in which a nondrilling party will pay monies to a drilling party that drills a well at a specific location. Information from that well will be shared with the nondrilling party; cf. dry hole contribution and acreage contribution agreements.

bottom-hole pressure. Fluid pressure on the bottom of a well. It can be either static or flowing.

bottomwater. Water located in the reservoir below the crude oil; cf. edgewater.

boundstone. A type of limestone formed by organisms still in their original positions such as reef rock. (Bdst)

box. A female-threaded connection that mates with a pin (a male connection); cf. pin.

BP. (1) bridge plug, (2) back pressure, and (3) bull plug.

BPD. barrels per day.

BPH. barrels per hour.

BPV. backpressure valve.

BR. (1) building rig and (2) building road.

br. brown.

brackish water. A mixture of freshwater and brine. (brak or brksh)

braided stream. A stream with numerous intertwining channels separated by gravel bars.

brak. brackish.

break. To separate an emulsion such as oil-in-water.

break out. To unscrew tubulars such as drillpipe; cf. make up.

breakthrough. To have injected water flow through a reservoir and reach a producing well.

breccia. A conglomerate with angular particles. (Brec or brec)

Brent or Brent Blend. An internationally recognized benchmark crude oil. It has 38 °API gravity and 0.3% sulfur. Brent is a mixture of oils from 15 oil fields in the North Sea.

brg. bearings.

bridge plug. An expandable tool that is run in a cased well to seal the well at that depth. Bridge plugs are (1) permanent, (2) drillable, or (3) retrievable. (BP)

bridging material. *See* lost circulation material.

bright spot. A relatively intense seismic reflection. It can be off the top of a gas-filled sandstone reservoir.

brine. Water that has more salt than seawater that has 35 parts per thousand salinity; cf. freshwater.

brit. brittle.

British thermal unit. The English system unit used to measure the heat content of natural gas. Natural gas has about 1,000 British thermal units of heat per cubic foot. It is equal to about one kilojoule in the metric system. (Btu)

brk. (1) break and (2) broke.

brkn. broken.

brksh. brackish.

brn. brown.

brownfield. An oil or gas field that is known and has been developed to some stage; cf. greenfield.

BRPG. bridge plug.

BRT. below rotary table.

brt. bright.

BS. (1) basic sediment and (2) bit size.

BS&W. basic sediment and water.

bsg. bushing.

bsmt. basement.

BSW. barrels of saltwater.

BTM or **btm.** bottom.

btm chk. bottom choke.

btmd. bottomed.

btry. battery.

Btu. British thermal unit.

btw. between.

BU. build up.

bu. buff.

bug. A microfossil.

bug picker. *See* micropaleontologist.

build angle. To increase the inclination of a deviated well; cf. drop angle and maintain angle.

buildup test. A type of pressure transient test that measures the flowing bottom-hole pressure; then the pressure change as a well is shut in, and the pressure rises to a stable shut-in pressure.

bullheading. (1) A method used to pump treating fluids into a formation. The formation is isolated with a packer and the treating fluids are pumped down the tubing string. If no packer is used, it is called bradenheading. (2) a method used to kill a well by pumping kill mud into the kill line and well annulus.

bull wheel. A spool of drilling line on a cable tool rig.

Bur or **bur.** burrow.

BUT. butane.

butane. A hydrocarbon composed of C_4H_{10} . It is a gas under surface conditions and is found in natural gas. Butane has two isomers: isobutane and n-butane. (BUT and C_4)

button tricone bit or **insert tricone bit.** A tricone bit in which holes have been drilled into the steel cones and buttons of hard tungsten-steel carbide have been inserted. It is used to drill hard rocks; cf. milled-teeth tricone bit.

buttress sand. Sand deposited on top of an unconformity.

BW. barrels of water.

BWL. barrels of water load.

BWPD. barrels of water per day.

bypassing. Water flow around relatively impermeable rocks containing oil and gas in the reservoir during production or a waterflood.

C. (1) concentration, (2) coal, (3) Celsius, and (4) centigrade.

c. core.

C/. contractor.

cable tool rig. An older type of drilling rig, often constructed of wood, that pounds a hole in the ground by raising and lowering a bit on a cable. It was replaced by rotary drilling rigs during 1900–1930. (standard tools) (CTR) cf. rotary drilling rig

CaCO₃. calcium carbonate. It is the chemical composition of the mineral calcite and the rock limestone.

cal. (1) calories, (2) calcite, (3) calcitic, and (4) caliper survey.

calcareous. A rock containing calcium carbonate ($CaCO_3$). (calc)

calcite. A common mineral composed of $CaCO_3$. Limestones and most seashells are composed of calcite. (Ca, cal, Calc, and calc)

caliper log. A wireline well log that measures the diameter of the wellbore. (CL, CAP, CAL, cal, and CALP)

calorific value. The heat content per unit volume of natural gas. It is measured in Btu per cubic feet.

Cambrian. A period of geological time from 542 to 488 million years ago. It is part of the Paleozoic era. (Camb)

Campanian. An age of geological time from 83.5 to 71.3 million years ago. It is part of the Cretaceous period.

C&A. compression and adsorption.

C&C. circulation and conditioning.

cantilevered jackup. A jackup with the derrick mounted on steel beams over one side of the deck. This is in contrast to a derrick located over a drilling slot (keyway) indented into the deck.

cantilevered mast. A mast that is assembled horizontally and then pivoted vertically into place by the drawworks and traveling block on the drilling rig.

CAOF. calculated absolute open flow.

CAP and **cap.** capacity.

caprock. (1) an impermeable rock layer that forms the seal on top of an oil or gas reservoir. (seal) (2) the insoluble rock on the top of a salt plug. (CR)

carb. carbonaceous.

carbonaceous. containing carbon (C). (carb)

carbon dioxide. A colorless, odorless gas composed of CO_2 . It can occur as an impurity (inert) in natural gas and is used for enhanced oil recovery.

carbon dioxide flood. An enhanced oil recovery method. Carbon dioxide (CO_2) is injected into a depleted oil reservoir to mix with the remaining oil and push it toward producing wells.

Carboniferous. A time period from 359 to 299 million years ago that is used in Europe. In North America, the Mississippian period is equivalent to the Lower Carboniferous, and the Pennsylvanian period is equivalent to the Upper Carboniferous. It is part of the Paleozoic era. (Carb)

carried interest. A partial ownership in a well that does not bear any expenses up to a point such as to the casing or through the tanks; cf. working interest.

carrier bed. A permeable rock layer along which fluids can flow.

carrier unit. A self-propelled, well-servicing rig.

carve out. To take out of (e.g., an overriding royalty is carved out of a working interest).

CASD. cased off.

cased-hole log. A wireline well log that can be run in a well that has been cased. e.g., natural gamma ray log and neutron porosity log; cf. open-hole log.

casing. Relatively thin-walled, large-diameter (commonly 5½ to 13¾ in.), steel pipe that has threaded connections on each end. Different API classes of casing range from 16 to over 42 ft long. Each section is called a joint. Joints of casing are screwed together to form a casing string. (CSG and csg) *See also* casing string.

casing drilling. To drill a well by rotating a casing string and bit. Drillpipe is not used. The casing is left in the well, and the drilling assembly is retrieved up the casing on a wireline.

casing-free pump. A hydraulic pump that uses only one tubing string. The power oil goes down the tubing string, and the produced fluids come up the tubing-casing annulus; cf. parallel-free pump. *See also* hydraulic pump.

casinghead. A forged or cast steel fitting on the lower part of the wellhead. It seals the annulus between two casing strings. The casing hanger

that suspends a casing string is located in the casinghead. Each casing string has a casinghead; cf. tubinghead. (CH and csg hd)

casinghead gas. Natural gas that bubbles out of oil on the surface at the well. (CHG)

casinghead gasoline. *See* condensate.

casing point. (1) The depth to which a casing string has been set in a well. (CP or csg pt) (2) The time after drilling and testing a well that a decision has to be made to either complete (case) or plug and abandon the well.

casing pressure. Pressure on the fluid in the casing-tubing annulus. It can be either flowing or static; cf. tubing pressure. (CP and csg prss)

casing program. The lengths, diameters, and other specifications of different casing strings that are to be used in a well.

casing pump. A large sucker-rod pump held in position on the bottom of a well by a packer.

casing roller. A long tapered tool with rollers on the sides that is run on a drillstring to roll out collapsed casing in a well.

casing string. A long length of many casing joints screwed together. A casing string is run in a well and cemented to the sides of the well during a cement job. Some types of casing strings are surface, intermediate, and production. All casing strings run back up to the casinghead on the surface; cf. liner string.

catch a log. To receive a hard copy or electronic copy of a well log that has just been recorded.

cathead. A hub on a shaft (catshaft) on the drawworks of a drilling rig that is used to pull a line (catline) to lift or pull equipment.

cathodic protection. A method that applies an electrical charge to a metal structure such as a pipeline or offshore platform to prevent corrosion.

catwalk. A flat, steel walkway that is elevated and connects stock tanks or instillations.

caustic flood. *See* alkaline flood.

Cav and cav. cavern.

cave. The collapse of well walls into the hole. (sluff)

cavings. Small rock particles that have fallen off the well walls and down the well. (cvsg)

CB. (1) core barrel, (2) core bit, (3) changing bit, and (4) changed bit.

CC. (1) casing collar, (2) casing cemented (depth), and (3) cumulative cost.

CCL. casing collar locator.

- CCM.** circulate and condition mud.
- CD.** contract depth.
- CDP.** common-depth-point.
- cdsr.** condenser.
- CEC.** cation exchange capacity.
- cell.** cellar.
- cellar.** A rectangular pit dug below the floor of a large drilling rig to hold the blowout preventers. It is usually lined with boards or cement. (cell)
- Celsius.** The temperature scale that has replaced centigrade. It is based on a 0° freezing point and a boiling point of 100° for freshwater. To convert Celsius temperature to Fahrenheit temperature, multiply by $\frac{9}{5}$ and add 32°. (C)
- cem.** cement.
- cement.** (1) Minerals that naturally grow between clastic grains and solidify a sedimentary rock. (2) Portland cement used to bind the casing strings to the well walls. (Cmt, cmt, and cem)
- cement bond log.** A type of sonic log that determines where and how well cement has set behind casing. (CBL) *See also* holiday.
- cementing head.** An L-shaped fitting that is attached to a wellhead for a cement job. It conducts the wet cement (slurry) from the cement pumps down the well.
- cement job.** To cement casing into a well. Primary cementing is done when the casing is originally run in the well. Secondary cementing is done later during a workover on a well.
- Cenomanian.** An age of geological time from 99.6 to 93.5 million years ago. It is part of the Cretaceous period.
- Cenozoic.** An era of time from 65.5 million years ago until today. The Cenozoic is divided into the Tertiary and Quaternary periods. It is known as the age of mammals.
- centi.** $\frac{1}{100}$.
- centigrade.** The metric temperature scale that has been replaced by Celsius. Degrees centigrade is the same as degrees Celsius. *See also* Celsius.
- centimeter.** A metric unit of measurement equal to $\frac{1}{100}$ meter and 0.3937 inch. (cm)
- centipoise.** A unit of viscosity equal to $\frac{1}{100}$ poise. *See also* poise. (cp)
- centralizer.** An attachment to the outside of a casing string that uses bowed steel bands to keep the string centered in the well.

- central processing unit.** (1) a common separator and tank battery for several oil wells. (2) gas-conditioning equipment that services several gas wells. (CPU)
- CF.** (1) casing flange and (2) cubic feet.
- cf.** compare.
- cf.** cubic feet.
- CFG.** cubic feet of gas.
- CFGPD.** cubic feet of gas per day.
- CFGPH.** cubic feet of gas per hour.
- C₅.** pentane.
- C₄.** butane.
- CG.** (1) corrected gravity and (2) connection gas.
- cg.** (1) coring and (2) coarse grained.
- Cgl, cgl, or cgl.** conglomerate.
- c-gr.** coarse-grained.
- CH.** choke.
- CH.** (1) casinghead and (2) chat.
- ch.** (1) chert, (2) choke, and (3) chain.
- C/H.** cased-hole.
- chain tongs.** A hand tool used to tighten or loosen pipe.
- chalk.** An extremely fine-grained limestone composed of calcareous microfossils such as coccoliths. It naturally has high porosity but very low permeability. (Chk, chk, and CK)
- chance of success.** *See* success rate.
- channel.** (1) A single seismic-recording unit. The geophones in an array are recorded together on one channel. (2) A cavity in the cement behind casing in a well.
- charcoal test.** A test used to measure the amount of condensate in natural gas. Activated charcoal is used to absorb the condensate from a volume of natural gas.
- charthouse.** A gas meter shelter. (meterhouse)
- chat.** A driller's term for conglomerate. (CH)
- check shot.** A method used to determine the seismic velocities of rock layers in a well. The seismic source is located on the surface next to the well. A geophone is raised in the well to measure seismic velocities

at various depths. It is similar to a vertical seismic survey, but the geophone stations are located further apart.

chemical cutter. A tool used to cut pipe in a well with jets of hot caustic chemicals under high pressure.

chemical flood. An enhanced oil recovery method in which batches of chemicals are injected into a depleted oil reservoir (e.g., micellar-polymer flood).

chert. A sedimentary rock composed of amorphous quartz. (flint) (ch and cht)

CHG. casinghead gas.

chiller. A heat-exchanger vessel that uses cooling to remove natural gas liquids from natural gas.

Chk and chk. chalk.

chk. choke.

chkbd. checkerboard.

chkd. checked.

chky. chalky.

chl. channel.

chng. (1) change and (2) changed.

choke. A constriction or orifice that restricts flow in a line. It is described by its diameter in $\frac{1}{64}$ inch. (ch, CK, and chk)

choke manifold. A series of pipes and valves located next to a drilling rig. It is designed to guide fluids from the well to the mud tanks, reserve pit and other areas, and direct kill mud to the well.

CHP. casinghead pressure.

Christmas tree. The vertical structure of pipes, fittings, valves, chokes, and gauges that are bolted to the wellhead of a gas well or flowing oil well to control the flow from the well. (production tree and tree) (Xtree)

cht. chert.

chty. cherty.

CI and C.I. contour interval.

CIBP. cast iron bridge plug.

CIP. cement in place.

CIRC and circ. (1) circulate and (2) circulating.

circulate. To pump drilling fluid down the drillstring and back up along the outside of the drillstring. (CIRC or circ)

circulate out. To pump drilling fluid down a well while not drilling to remove well cuttings or gas.

circulation. The movement of drilling mud down through the drillstring and back up through the drillstring-casing annulus.

CJPF. casing jets per foot.

CK. (1) choke, (2) chalk, and (3) filter cake.

ck. check.

CKF check for flow.

CL. center line.

Cl and cl. clay.

Cl. (1) chlorides and (2) salinity.

cl. chlorine.

clastic. A sedimentary grain that has been transported and deposited as a whole particle such as a sand grain. (detrital) (clas)

clastic ratio map. A map that uses contours to show the ratio of (1) conglomerates, sandstones, and shales to (2) limestones, dolomites, and salts in a formation.

clay. A fine-grained particle less than $\frac{1}{256}$ mm in diameter; cf. silt and sand. (Cl and cl)

clay mineral. A very-fine-grained mineral formed by a layered molecular structure of aluminum, silicon, and oxygen atoms. Bentonite is a clay mineral used to make drilling mud.

clean oil. Crude oil that is below a maximum basic sediment and water content and meets pipeline specifications. (pipeline oil)

clean sands. Well-sorted sands; cf. dirty sands.

cleat. An open, natural fracture in a coal bed. Usually there are two sets of clints that are perpendicular to the coal bed and each other. Face cleats are continuous, whereas butt cleats are not.

cleavage. A flat surface formed by a mineral breaking along a crystal plane. It is described by the quality and number of cleavage planes (i.e., mica has one excellent cleavage).

cln. clean.

closure. The vertical distance in a petroleum trap between the top of a reservoir rock down to the spill point.

clsd. closed.

cm. centimeter.

CMP. common-mid-point.

Cmt and **cmt.** (1) cement, (2) cemented, and (3) cementing.

cmtd. cemented.

cmtg. cementing.

CN. conglomerate.

CNL. compensated neutron log.

cntr. (1) centered and (2) container.

cntrt. contorted.

CO. (1) clean out, (2) cleaned out, (3) cleaning out, (4) circulate out, (5) crude oil, and (6) coal.

co. change out.

coal. A sedimentary rock composed primarily of carbonaceous material formed by woody plant remains transformed by heat and time. Lignite, bituminous, and anthracite are types of coals. (c and CO)

coal bed and **coal seam gas.** Methane gas generated during coal formation. It is adsorbed to the surface of the coal in pores and along natural fracture (clint) surfaces. The coal must be dewatered to decrease the pressure before the gas can be produced.

coastal plain. A plain with underlying thick sediments deposited along an ocean margin.

coccolith. A calcium carbonate plate from a small, single-cell animal (coccolithophore) that lives floating in the ocean. It is so small that it can only be identified by a scanning electron microscope. A relatively pure deposit of coccoliths is called chalk.

COF. calculated open flow.

COFCAW. combination of forward combustion and waterflooding.

COH. coming out of hole.

coiled tubing. High-strength flexible steel tubing that is usually 1¼ inches in diameter. It comes in a continuous length wrapped around a reel. (CT)

coiled tubing unit. A well service unit with a reel of continuous coiled tubing on the back. It is used for running equipment down a well during a workover or for drilling a well. Before the coiled tubing goes down or comes out of the well, it goes through a pipe straightener on top of the well.

collar. A short steel cylinder with female threads. It is used to join pipe joints with male threads. (coupling and tool joint) (colr)

collar log. A production log that records the depth of each casing collar in a well.

colr. collar.

com. common.

combination of forward combustion and waterflooding. A fireflood in which air and water are alternately injected into the reservoir. The steam generated from the water helps drive the oil toward producing wells. (wet combustion) (COFCAW)

comm. (1) communicate and (2) communicated.

commingle. To mix production from (1) two or more zones in a well (subsurface commingling) or from (2) two or more wells (surface commingling).

common-depth-point stacking or **common-mid-point stacking.** A seismic acquisition and processing method in which numerous different reflections off the same subsurface point within a bin are assigned a common depth or midpoint and combined to reduce noise and reinforce the reflector. (CDP and CMP stacking)

comp. (1) complete and (2) completion.

compaction. The volume decrease of sediments by pressure during burial.

compaction anticline. An anticline formed by compaction of softer sedimentary rocks over and along a harder reef or bedrock hill.

company person or **representative.** An employee of the operator who works with the tool pusher to make sure a well is being drilled to specifications. (coordinator)

compensated log. A wireline well log that has been adjusted to irregularities in wellbore size and roughness.

compensated neutron log. *See* neutron log. (CNL)

compl. (1) complete and (2) completed.

completion. To install equipment to prepare for producing gas and/or oil from a well.

completion card. A form published by a commercial firm containing information on the drilling and testing history and the geological and producing characteristics of a specific well.

completion fluid. An inert fluid, usually treated water or diesel oil. It is used (1) in the casing-tubing annulus of a producing well to prevent casing corrosion or (2) in a well to replace drilling mud during well completion to prevent formation damage and still maintain pressure control.

completion packer. A packer run on the bottom of the tubing string to seal the space (annulus) between the tubing and casing. (tubing packer)

completion report. *See* well completion report.

completion rig or unit. A derrick and hoisting unit used after the drilling rig has been released to run the final string of casing in a well. It is smaller and less expensive than the drilling rig.

compliant platform or tower. An offshore production facility that is anchored on the bottom. The upper part is free to move within a restricted radius (e.g., spar and tension-leg platform)

comp nat. completed natural.

compounder. A system of pulleys, belts, shafts, chains, and gears that transmit power from the prime movers to the drilling rig.

compr. compressor.

compressibility factor. *See* Z factor.

compression. forces that push together; cf. tension.

compression and compressional fault. A fault formed by compressional stress (e.g., reverse and thrust fault); cf. tensional fault.

compressional wave. A wave that causes particles to move back and forth as the wave passes through. It is similar to sound waves in air. Compressional waves are recorded during normal seismic and along with shear waves during multicomponent seismic; cf. shear wave (primary and pressure wave) (P wave)

compression ratio. A ratio of the volume of uncompressed gas divided by the volume of the same gas compressed by a compressor (e.g., 10:1).

compression test. A test used to determine the condensate content of natural gas. A gas sample is compressed and then allowed to expand to cool it. Condensate separates from the cooling gas.

compressor. A device that increases the pressure of gas and can cause the gas to flow. Compressors use pistons in cylinders, rotating vanes on a shaft, and other methods. (compr) *See also* compression ratio.

compr sta. compressor station.

compt. completed.

computer-generated log. A log made by a computer from two or more logging measurements. It can be generated at the wellsite (quick-look log) or in a computing center. (computer center log)

conc. concentrate.

concentric tubing workover. A workover that uses smaller than normal equipment that can be run down a tubing string.

concession. (1) The contract between a host country and a company to explore and drill. (2) The land or ocean bottom covered by that contract.

concession agreement. *See* tax royalty participation contract.

concrete gravity production platform. *See* gravity storage production platform.

COND or cond. condensate.

cond. (1) condition, (2) conditioned, (3) conditioning, and (4) conduct.

condensate. A light-hydrocarbon mixture that is a liquid under surface conditions but is a gas mixed with natural gas under subsurface reservoir conditions of high temperature. It is composed of pentane (C₅), hexane (C₆), heptane (C₇), octane (C₈), nonane (C₉), and decane (C₁₀) and is almost pure gasoline in composition. Condensate is very light in density and is transparent to yellowish in color. It is produced during the production and transportation of natural gas. Wet gas contains condensate. It is classified as crude oil by government regulatory agencies. (casinghead gasoline, drip, drip gasoline, drips, natural gasoline, distillate, and white oil) (COND, cond, and COND)

conditioning. (1) Preparing and altering drilling mud. (2) Circulating drilling mud in a well for a period of time to prepare the well for logging or another process.

condr. conductor (pipe).

COND. condensate.

condt. conductivity.

conductivity. The ability of a material to conduct electrical current. It is the inverse of resistivity. Conductivity is recorded on well logs in units of mho per meter. (condt)

conductor casing. A length of large-diameter steel pipe that is pile-driven or drilled into the land surface or ocean floor before drilling. It is used to stabilize the soil as a well is being drilled and to attach the blowout preventers. (conductor pipe and structural casing)

conductor hole. A large-diameter shallow hole drilled to hold the conductor pipe.

conductor pipe. *See* conductor casing.

C₁. methane.

conf. (1) confirm, (2) confirmed, and (3) confirming.

confirmation well. A well drilled after the discovery well to prove the extent of a new petroleum reservoir.

cong. conglomerate.

conglomerate. A poorly sorted sedimentary rock with rounded, pebble- to clay-sized grains; cf. breccia. (Cgl, cgl, cgl, and cong) (CG)

Coniacian. An age of geological time from 89 to 85.8 million years ago. It is part of the Cretaceous period.

coning. The drawing of (1) the oil-water contact up or (2) the gas-oil contact down into an oil reservoir. The contact has the shape of a cone around the well and is caused by too rapid oil production.

conn. connection.

connate water. Saline subsurface water.

cons. considerable.

consol. consolidated.

consolidated sediments. Sediments bound together into a relatively hard sedimentary rock. (indurated sediments) (consol) *See also* unconsolidated sediments.

cont. continue.

contact. The boundary between two rock layers. (Ctc or ctc)

contactor. A metal vessel that causes a gas passing through it to come in contact with a chemical on a bed. A contactor can use a solid desiccant to remove water from natural gas.

Contam and contam. (1) contamination and (2) contaminated.

contribution agreement. *See* support agreement.

continental drift. A relatively old theory that the continents were all joined in one supercontinent (Pangaea) that broke up during the Mesozoic era with the fragments drifting across the earth. *See also* seafloor spreading and plate tectonics.

continental rise. A large wedge of sediments at the base of a continent slope in water depths of 5,000 to 13,000 ft.

continental shelf. A shallow platform that surrounds the continents. It extends from the beach and slopes out at less than 1° to an ocean depth of about 450 feet where the shelf break (an abrupt change of slope) is located. Offshore drilling and production occurs on the continental shelf; cf. continental slope.

continental slope. The slope (3° to 4°) leading down from the shelf break on the continental shelf to the deep ocean bottom. Deep-water drilling and production occurs on the continental slope; cf. continental shelf.

continuous flowmeter. An instrument that measures fluid flow versus depth in a well.

contour. A line of equal value such as elevation or thickness on a map.

contour interval. The difference in value between two adjacent contours. (CI or C.I.)

contract depth. The depth to which a well is to be drilled in a drilling contract.

converted wave. A seismic wave that has reflected off a seismic reflector and been transformed into another type of wave. A P wave that was converted to an S wave (SP wave) is an example.

coord. coordinates.

coordinator. *See* company person and representative.

COPAS. Council of Petroleum Accountants Societies (www.copas.org).

coquina. A sedimentary rock composed of broken shells. (coq)

Cor. coral.

cor. corner.

core. (1) A cylinder of rock drilled from a well that can be either (a) a full-diameter core (3½ to 5 in. in diameter) or (b) a sidewall core. (1 in. in diameter) (c or cr). (2) To drill and obtain a core.

core barrel. A tubular run above a rotary coring bit. It has both (1) an outer core barrel to rotate and cut the core and (2) an inner barrel to remain stationary and receive the core. The barrels are separated by ball bearings. (CB)

corr. (1) correct, (2) correction, and (3) corrosion.

correlation. The matching of rock layers.

correlation log. A wireline well log with a 1-in. to 100-ft scale; cf. detail log.

corro. corrosion.

corrosion. The chemical and biological degradation or abrasive wearing away of metal. Sweet corrosion is due to CO₂. Sour corrosion is due to H₂S. (corr and corro)

corrosion inhibitor. A chemical applied either in batches or continuously to prevent corrosion in a well. It usually forms a coating on metal.

cost oil. Produced oil that is available to a multinational company for sale to reimburse previous expenditures. *See also* production sharing contract.

COTD. cleaned out to total depth.

CO₂. carbon dioxide.

coupling. A short steel cylinder with female threads. It is used to connect pipe joints with male threads. (collar and tool joint) (cplg)

CP. (1) casing point and (2) casing pressure.

cp. centipoises.

cplg. coupling.

CPM. cycles per minute.

CPU. central processing unit.

CPS. (1) counts per second and (2) cycles per second.

CR. cap rock.

cr. (1) core and (2) creek.

crack a valve. To slightly open a valve to start flow.

cracking. A refining process that breaks long-chained hydrocarbons into more valuable, short-chained hydrocarbons.

craton. Land covered by sedimentary rocks that surrounds a shield.

crd. cored.

crest. The top of a structure such as an anticline.

Cretaceous. A period of geological time from 145.5 to 65.5 million years ago. It is part of the Mesozoic era. (Cret)

crevasse splay. Sediments deposited to the side of a delta through a break in the levee.

crg. coring.

crit. critical.

crk. creek.

crn blk. crown block.

crooked hole. A well with a large deviation along the wellbore that was not made on purpose; cf. deviated well and straight hole.

crooked hole country. An area with dipping hard rock layers that cause crooked holes when drilling wells.

crossbedded. A sedimentary rock that displays crossbeds. (x-bd, x-bdd, X-bdd, and XBD)

crossbeds. Sedimentary rock layers, usually in sandstone, deposited at an angle up to 36° from horizontal in dunes or ripples by air or water currents.

crossover sub. A short section of pipe used in a downhole assembly to connect pipes of different sizes or thread types.

crown block. A fixed steel frame with steel wheels on a horizontal shaft. It is located at the top of a derrick or mast. The hoisting line goes through the crown block; cf. traveling block. (crn blk)

crown land. Land owned by the federal or provincial government in Canada.

crude oil. A naturally occurring liquid composed of thousands of different chemical compounds, primarily hydrocarbons. The molecules range from 5 to more than 60 carbon atoms in length. Crude oil color is

commonly black to greenish-black but can also be yellowish to transparent. Crude oil is described by density (°API gravity) and percent sulfur content (sweet and sour). It is measured in barrels (bbl) in the English system and metric tons or cubic meters in the metric system. (CO) *See also* petroleum.

crude stream. Crude oil from a single field or a mixture from fields that is offered for sale by an exporting country.

cryogenic plant. An installation that uses a natural gas-driven turbine to cool the gas to a very low temperature and remove natural gas liquids. (expander plant)

CSA. casing set at.

cse gr. coarse grained.

C₇. heptane.

CSG and csg. casing.

csg hd. casinghead.

csg press. casing pressure.

csg pt. casing point.

C₆. hexane.

CSPG. casing packer.

CT. carbide test.

Ctc or ctc. contact.

CTD. corrected total depth.

ctd. coated.

Ctgs. cuttings.

C₃. propane.

CTR. cable tool rig.

ctr. center.

C₂. ethane.

CU. clean up.

cubic foot. The English system unit of natural gas volume measurement. It is the volume of a cube, one foot on a side. One thousand cubic feet (Mcf) is commonly used. (cf or c³)

cubic meter. The metric system unit of natural gas and crude oil volume measurement. It is the volume of a cube, 1 meter on a side; 1 cubic meter is equal to 6.29 barrels of oil or 35.3 cubic feet of gas. (m³)

cu ft/bbl. cubic feet per barrel.

CUM. cumulative.

cumulative. The total gas, oil, and/or water production from a well or wells. (CUM)

CUSH and **cush.** cushion.

cushion. Water or oil filling a tubular or well. It is used to control pressure. (CUSH and cush)

cut. To dilute something.

cuttings. Rock flakes made by the drill bit. (well cuttings) (Ctgs)

CV. control valve.

Cvg. caving.

cvgs. cavings.

C/W. completed with.

c-wave. mode-conversion wave.

cx. coarse.

cycle time. The time elapsed from the beginning to the end of a project.

cyclic steam injection. An enhanced oil recovery method used for heavy, viscous oil. A well is used to first pump steam into the subsurface reservoir to heat the oil and make it more fluid. The same well is then used to pump the heated, heavy oil. (huff 'n puff)

cycling. The injection of produced gas back into a retrograde condensate reservoir to slow the drop of reservoir pressure and the separation of condensate in the reservoir.

cyclothem. Alternating marine and nonmarine sedimentary rocks.

cyl. cylinder.

D. (1) depth and (2) dome.

d. (1) darcy, (2) diameter, and (3) day.

DA. daily allowable.

daily drilling report. A report made by the tool pusher or company person covering the last 24 hours of activities on a drilling rig. It usually includes total depth at report time, footage drilled during last 24 hours, activities such as tripping and repairs, formations drilled, mud measurements, and supplies used. The report is made from the tour reports. The International Association of Drilling Contractors has published a standard report. (morning report) (DDR)

daily mud cost. The amount of money spent on drilling fluids during the past 24 hours of rig operation. (DMC)

daily well cost. The amount of money on drilling operations during the past 24 hours of rig operation. (DWC)

D&A. (1) dry and abandoned and (2) drilled and abandoned.

D&C. drill and complete.

D&D. (Association of) Desk and Derrick (Clubs) (www.addc.org).

Danian. An age of geological time from 65 to 61 million years ago, part of the Paleocene epoch.

darcy. The unit of permeability. 1 darcy permeability in a porous medium allows 1 cubic centimeter of fluid with 1 centipoise viscosity to flow in 1 second through a cross section of 1 square centimeter along a length of 1 centimeter with a pressure differential of 1 atmosphere. The plural is darcys. A millidarcy (md) is $\frac{1}{1,000}$ darcy. (d)

dat. datum.

datum. A level surface to which contours are referred, such as sea level. (dat and DM)

days from spud of well. How many days a rig has been drilling.

days left on location. How many more days the rig will be drilling down to total depth.

daywork drilling contract. A drilling contract based on a cost per day during drilling to contract depth. It is commonly used offshore; cf. footage contract and turnkey drilling contract.

DB. (1) diamond bit and (2) drill break.

DBOS. dark brown oil stains.

DC. (1) direct current, (2) drill collar, (3) depth correction, (4) dual completion, and (5) daily cost.

DD. (1) drilling deeper and (2) drilled deeper.

dd. dead.

DDR. daily drilling report.

dead oil. Crude oil that (1) will not flow from a rock or (2) has no dissolved gas.

dec. (1) decide and (2) decision.

decatherm. A unit of heat equal to 1 million British thermal units (Btu).

decline curve. A plot of oil or gas production rate from a well versus time.

deconvolution. A computer process that restores the seismic echoes to their original seismic-source form to make subsurface reflections sharper and reduce noise.

decr. decrease.

deep water. Water depth greater than 1,000 ft. Ultra-deep water is greater than 5,000 ft. deep.

deg. degree.

°API gravity (degrees API gravity). A measure of the density of a liquid or a gas. Freshwater is 10. Average weight oil is 25 to 35, heavy oil is below 25, light oil is 35 to 45, and condensate is above 45 °API gravity. (API gravity) (gr API)

dehydrator. A vessel that uses either a solid or liquid desiccant to remove water from natural gas.

delay rental lease. A type of lease in which a delay rental payment must be made each year during the primary term to the lessor if drilling has not commenced; cf. paid-up lease.

delineation well. A well drilled to the side of a discovery well to determine the extent of the new field. (step out and appraisal well)

deliverability. (1) The normal flow rate of a gas well. (2) The ability of a reservoir to move fluids into a well at a given flowing bottom-hole pressure. (delv)

delr. deliver.

delta. Sediments deposited by a river emptying into an ocean.

delta switching. A process in which a river abandons an old delta for a shorter route to the ocean and builds a new delta.

Δt (delta T). The sound velocity through a rock measured by a sonic log. The units are in microseconds per foot. (interval transit time)

delv. deliverability.

demulsifier. A chemical used to break an emulsion.

DENL. density log.

dense limestone. Limestone with no permeability.

density. (1) Weight of a substance per unit volume such as gm/cm³ or lbm/gal. (r) (2) perforations per foot.

density log. See formation density log. (DENL, D/L, and DL)

depl. depletion.

depletion drive. See dissolved gas drive.

depth of investigation. A measure of how far back in the rock from the wellbore a well log measurement is made. It is usually the distance that causes 50% of the log measurement response.

derrick. A steel tower with four legs that sits on the drill floor of a drilling rig. It must be raised vertically in sections in contrast to a mast.

Derricks are used for hoisting on offshore drilling rigs. The term *derrick* is sometimes incorrectly used for mast; cf. mast. (drk)

derrick floor. See drill floor. (DF)

derrick operator. A member of the drilling crew who is second in charge. The derrick operator stands on the monkeyboard when making a trip to rack drillpipe. The derrick operator is also in charge of the circulating system. (monkeyman)

desander and desilter. Metal cones used on a drilling rig to centrifuge drilling mud from a well to remove fine-grained well cuttings. Drilling mud flows through the desanders and desilters after flowing across the shale shaker.

designer well. A high-angle deviated well or horizontal well with more than one intended target.

det. detector.

detail log. A wireline well log hard copy with a 5-in. to 100-ft scale; cf. correlation log.

deterministic. A process or method in which there is an exact relationship between the variables and the outcome can be predicted with certainty; cf. stochastic.

detr. detrital.

detrital. A sediment grain that has been transported and deposited as a whole particle such as a sand grain; cf. authigenic. (clastic) (detr)

dev. (1) deviate, (2) deviated, and (3) deviation.

developmental geologist. A geologist who specializes in the exploitation of discovered petroleum fields; cf. exploration geologist.

developmental well. A well drilled in the known extent of a field; cf. wildcat well.

deviated well. A well drilled out at an angle from a straight hole; cf. crooked hole and straight hole.

deviation. The angle of a wellbore from vertical. (drift angle)

deviation drilling. See directional drilling.

Devonian. A period of geological time between 416 and 359 million years ago. It is part of the Paleozoic era and is known as the age of fish. (Dev)

dew point. The temperature at which a liquid starts to separate out of a gas as it is being cooled. (DP)

DF. (1) derrick floor, (2) drill floor, and (3) drilling fluid.

DFE. derrick floor elevation.

DFP. date of first production.

DG. (1) dry gas and (2) developmental gas well.

DHC. dry hole contribution.

dia. diameter.

Diag and diag. diagenesis.

diagenesis. The processes that form sedimentary rock from loose sediments (e.g., cementation and compaction). (Diag or diag)

diamond bit. See natural diamond bit.

diatom. A tiny single-cell plant that floats in water. It has a round, pill-box-shaped shell composed of silicon dioxide.

diatomaceous earth and diatomite. A sedimentary rock composed primarily of siliceous, diatom shells. It is a reservoir rock for heavy oil in California.

diesel-electric rig. A modern rotary drilling rig that uses diesel engines to drive electrical generators that make alternating current. The alternating current is changed into direct current by a silicon controlled rectifier (SCF). Equipment on the rig floor, such as the drawworks, is driven by AC or DC electric motors that are more efficient; cf. mechanical rig, (electric rig, electric-drive rig, and motor-generator rig)

diesel engine. An engine that uses diesel oil as a fuel. Unlike a gasoline engine that uses spark plugs, a diesel engine uses the heat generated by the compression of the diesel fuel-air mixture in the cylinder for ignition. Diesel engines are used as prime movers on drilling rigs.

diff. difference.

differential wall pipe sticking. The adherence of a drillstring to the sides of a well due to suction.

digital. Data that have been converted into numbers. Seismic data are digitized in a binary number system in which the seismic reflections are represented either by the number 0 or 1. This allows the data to be recorded and stored on magnetic tapes and processed by computers. Seismic data used to be recorded by analog on a sheet of paper; cf. analog.

dike. A layer of igneous intrusion that cuts preexisting layers; cf. sill.

DIL. dual induction log.

dilut. diluted.

dim spot. A portion of a seismic reflector with a less intense reflection amplitude. A porous or gas-saturated reef overlain by shale can cause a dim spot; cf. bright spot.

dip. The angle and direction in which a plane such as a sedimentary rock layer or fault goes down in the ground. It is measured at right angles to the strike; cf. strike.

dipmeter and dip log. A wireline well log that measures the dip of each rock layer in a well. The data are plotted on a tadpole or stick plot. (DM and DIP)

dip-slip fault. A fault with predominately vertical displacement. It can be either a normal or reverse dip-slip fault; cf. strike-slip fault.

dir and direc. direction.

direct current. Electrical current that flows only in one direction. It is made by batteries and used in flash lights and to start engines; cf. alternating current. (DC)

direct hydrocarbon indicator. A bright spot, flat spot, or other evidence of a petroleum deposit on a seismic record. (DHI)

directional drilling. Drilling a well (deviated well) out at an angle on purpose. The well is drilled with either a steerable downhole assembly or a rotary steerable motor. (deviation drilling)

directional survey. A well survey that measures the angle and orientation of the wellbore using a magnetic compass or gyroscope. (dir sur and DS)

dir sur. directional survey.

dirty sands. Poorly sorted sands; cf. clean sands.

disc. discovery.

disch. discharge.

disconformity. An ancient, erosional channel. The sedimentary rock layers above and below the disconformity are parallel. It is a type of unconformity.

discovery well. A well that locates a new petroleum deposit, either (1) a new field or (2) a new reservoir.

disman. dismantled.

displ. (1) displace and (2) displaced.

displacement efficiency. The ratio of the volume of oil sweep divided by the volume of oil in place in a reservoir during waterflood or enhanced oil recovery.

disposal well. A well used to inject an unwanted fluid, usually oilfield brine, into the subsurface; cf. injection well.

dissolved-gas drive. A reservoir drive in which the drop in reservoir pressure during production causes dissolved gas to bubble out of the

oil and force the oil through the reservoir rock. It has a relatively low oil recovery efficiency. (solution gas and depletion drive)

dissolved-gas/oil ratio. The standard cubic feet of natural gas dissolved in one barrel of oil in the reservoir. (formation and solution gas/oil ratio)

DIST. distillate.

distillate. See condensate.

distributary. A river channel outlet on a delta.

distributary mouth bar. A sand bar deposited in front of a distributary on a delta.

disturbed belt. A zone of thrust faults that moved during the formation of a mountain range. (overthrust belt)

division order. A form that establishes the distribution of production revenues and the assessment of costs to working interest owners on a well or lease on fee land. (D.O.)

division order analyst. A person responsible for the distribution of oil and gas production revenues and maintenance of division orders.

dk. dark.

D/L. density log.

DM. (1) drilling mud and (2) datum.

DMC. daily mud cost.

dn. down.

dns. dense.

DO. (1) drill out, (2) drilled out, (3) dolomite, (4) drilling obligation, and (5) developmental oil well.

D.O. division orders.

DOC. drilled out cement.

DOD. drilled out depth.

DOE. Department of Energy (www.doe.gov).

doghouse. The enclosure that houses the seismic recording equipment on a recording truck or seismic ship.

dogleg. A relatively sharp turn ($>3^\circ$ per 100 ft) in a well.

Dol, dol, and **dolo.** dolomite.

dolomite. A mineral composed of $\text{CaMg}(\text{CO}_3)_2$. It is formed by the natural alteration of calcite. A rock composed of dolomite is called dolostone. (DO, Dol, dol, and dolo)

dolostone. A sedimentary rock composed primarily of dolomite mineral grains. It forms from the natural chemical alteration of limestone and is often a reservoir rock.

dom. dominate.

dome. A circular or elliptical uplift in sedimentary rocks. It can form a petroleum trap. (D)

DOP. drilled out plug.

double. Two tubular joints; cf. single, treble, and fourble.

double-barrel separator. A separator with two horizontal steel cylinders mounted vertically. The upper cylinder receives the produced fluids and makes an initial gas-liquid separation. The lower cylinder completes the oil-water separation. (double-tube separator)

double-pole unit. A well-servicing unit with two steel, telescoping tubes that are braced together for a mast. It is more efficient than a single-pole unit because the rods can be hung in the mast in doubles and the tubing in singles. The unit can have either one or two drums and is operated by a three- or four-person crew; cf. single-pole unit.

double section. The same section of rock encountered twice by drilling through a reverse fault; cf. lost section. (repeated section)

double-tube separator. See double-barrel separator.

downdip. In a direction located down the angle of a plane such as a sedimentary rock layer or fault; cf. updip.

downdraw. The difference between static and flowing pressure in a well.

downhole mud and **turbine motor.** A motor that is driven by drilling mud pumped down the drillstring. It rotates the bit located below it.

downthrown. The side of a dip-slip fault that moved down; cf. upthrown.

down-to-the-basin fault. A dip-slip fault that moves down on the basin side. See also growth fault.

DP. (1) drillpipe and (2) dew point.

D/P. drilled plug.

dpg. deepening.

dpn. deepen.

DPT. deep pool test.

dpt. depth.

DPU. drillpipe unloaded.

dr. (1) drive and (2) drum.

- drag fold.** A fold formed along a fault plane. It is caused by friction of one side of the fault against the other side when the fault moved.
- drawdown test.** A type of pressure transient test that measures the shut-in bottom-hole pressure; then the pressure change as a well is put on production, and the pressure drops to a stable, flowing pressure.
- drawworks.** A drum in a steel frame used on the floor of a drilling rig to raise and lower equipment in a well. It is driven by the prime movers. Hoisting line is wound around the reel. (drwks)
- dress.** (1) To mill a fish to prepare the surface for a fishing tool. (2) To sharpen a drag bit.
- drift angle.** The angle of a wellbore from vertical. (deviation)
- drillable.** An object made of a substance that is designed to be run into a well and then removed by drilling it into particles and retrieving the particles.
- drill bit.** The tool on the end of a drillstring that cuts the well. Two types of drill bits are rotary-cone and fixed cutter. The most common of the rotary-cone bits is the tricone bit, and the most common fixed cutter bit is the polycrystalline diamond compact (PDC) bit.
- drill break.** A change in drill penetration rate recorded on the rate of penetration curve on a mud log or drilling time log. It is usually the result of drilling into a different rock such as from shale into limestone. (drilling break) (DB)
- drill collar.** A relatively heavy, thick-walled, large-diameter pipe run on the bottom of a drillstring above the bit. It comes in 31-ft sections with both a male-threaded and female-threaded end. (DC)
- driller.** The person in charge of the drilling rig crew on that tour. The driller operates the machinery. (drlr)
- driller's cabin.** A climate-controlled enclosure on the drill floor where the driller sits in a special chair and overlooks the drill floor through glass. Computer and touch screens and joy sticks allow the driller to monitor and control drilling and the iron roughnecks from the cabin.
- driller's depth.** *See* driller's total depth.
- driller's method.** A technique used to control a well that has a kick. After the blowout preventers have been thrown, the kick-diluted mud is replaced with original mud under pressure during the first circulation. The original mud under pressure is then replaced with kill mud during the second circulation; cf. wait-and-weigh method.
- driller's total depth.** The depth of a well to the bottom measured from the rotary table by driller's counting the drillpipe joints in the well. (rotary total depth)

- driller's report.** *See* tour report.
- drill floor.** The elevated, flat, steel surface on which the derrick or mast sits and most of the drilling activity occurs. It is supported by the substructure. (derrick or rig floor) (DF)
- drill-in fluid.** A liquid that replaces drilling mud when the well is being drilled into the gas or oil pay zone. It prevents formation damage but retains pressure control.
- drilling and spacing unit.** The area, such as 40 acres, upon which only one producing well can be located. It is declared by a government regulatory agency. (DSU)
- drilling barge.** A barge with a drilling rig mounted on it. It is used for exploratory drilling in shallow, protected waters.
- drilling break.** *See* drill break.
- drilling console.** A panel on the drill floor. It contains the weight indicator, mud pump pressure, rotary table torque, pump strokes, rate of penetration, and other indicators.
- drilling contract.** The legal agreement between the operator and the drilling contractor to drill a well. Three types are footage, day rate, and turnkey contracts. The International Association of Drilling Contractors has published standard contracts.
- drilling contractor.** A company that owns and operates drilling rigs.
- drilling fluid.** The fluid that is circulated down the well during drilling. It is either drilling mud or a gas such as foam. *See also* drilling mud.
- drilling fluids engineer.** A service or oil company employee who monitors the properties of drilling mud being used on a well. The engineer is responsible for making changes in the mud properties (conditioning) when necessary. (mud man)
- drilling line.** Wireline made of several strands of braided steel cable wound around a fiber or steel core. It is commonly between 1 and 1 5/8 in. in diameter. The line is spooled around a reel in the drawworks on a drilling rig and is used to raise and lower equipment. (hoisting line)
- drilling liner.** A liner string run in a well as the well is being drilled. It serves the same purpose as a casing string but does not run up to the surface and saves money.
- drilling mud.** A viscous mixture of clay (usually bentonite) and additives (chemicals) with either (1) freshwater (water-based drilling mud), (2) diesel oil (oil-based drilling mud), (3) synthetic oil (synthetic-based drilling mud), or (4) an emulsion of water with droplets of oil. Mud is circulated on a rotary drilling rig to cool the bit, remove rock chips,

and control subsurface fluids. Water-based drilling mud is commonly used on land and synthetic-based drilling mud is used offshore. (DM)

drilling pad. A rectangular area, typically 4 to 6 acres in area, that is bulldozed flat and sometimes covered with gravel to receive a drilling rig. Four to eight horizontal drain holes can be drilled from one pad using deviation drilling; cf. well pad.

drilling recorder. *See* geolograph.

drilling rig. The machinery used to drill a well. Modern drilling rig are rotary drilling rigs. The four major systems on a drilling rig are (1) power, (2) hoisting, (3) rotary, and (4) circulating. Drilling rigs are either mechanical or diesel-electric depending on which power system they use.

drilling spool. A steel cylinder located between the rams on a blowout-preventer stack. The kill and choke lines are attached to it.

drilling-time log. A log showing the rate of drill bit penetration with depth, usually in minutes per foot or meter.

drillpipe. A steel tubular that is 30 ft long and is threaded on both ends. Each section is called a joint. (DP)

drillship. A ship with drilling rig aboard that drills through a hole (moon pool) in its hull. It is kept on position by dynamic positioning. Drillships are used to drill wells in very deep water.

drillsite. The location for a drilling rig.

drillstem test. A test made by running a drillstem made of drillpipe with packers in a well. The packers isolate the zone to be tested. A valve is opened in the drillstem and fluids from the zone can flow into the drillstem. It is a temporary completion of the well. (DST)

drillstring. The kelly, drillpipe, drill collars, subs, and bit that are rotated in the well.

drill to earn. A type of joint operating agreement in which one party is obliged to pay for a certain percentage of the drilling costs to earn a working interest in another party's acreage.

drip, drip gasoline, or drips. A common term for condensate that is produced by production and transportation of natural gas. *See* condensate.

drk. derrick.

DRL and drl. drill.

drld. drilled.

drlg. drilling.

drlr. driller.

DROI. discounted return on investment.

drop angle. To decrease the deviation of a well; cf. build and maintain angle.

drpt. dropped.

drwks. drawworks.

dry gas. Pure methane (CH_4) gas. It is a gas under both subsurface reservoir and surface conditions; cf. lean gas, rich gas, and wet gas. (DG)

dry hole. A well that was drilled and did not encounter commercial amounts of petroleum; cf. producer. (duster)

dry hole agreement or contribution. A type of well support agreement in which a nondrilling party will pay monies to a drilling party that drills a well at a specific location and it is a dry hole. Information from that well is shared with the nondrilling party; cf. bottom-hole contribution and acreage contribution agreements. (DHC)

DS. (1) directional survey and (2) drillstem.

ds. dense.

DSI. drilling suspended indefinitely.

DSO. dead oil show.

DST. drillstem test.

DSU. drilling and spacing unit.

DT. (1) drilling time and (2) drilled tight.

DTD. driller's total depth.

dual completion. A system to keep the production from two zones in a well separate. Usually two tubing strings and two packers are used. There are two surface pumping units or a double-wing production tree on the well; cf. commingle. (DC)

dual gradient drilling. A method for drilling a well in deep water without excessive mud pressure in the well. The well is filled with seawater from the floater down to the mudline and circulating drilling mud from the mudline to the bottom of the well. The circulating drilling mud is pumped from the mudline up to the floater.

dual induction log. An wireline log that gives a medium- and deep-induction resistivity measurement. (DIL)

Dubai. A benchmark crude oil used in the Middle East. It has 31 °API gravity and 2% sulfur.

dune. A hill of sand shaped by blowing wind or flowing water.

duplex pump. A mud pump with two double-acting pistons in cylinders. The mud is pumped on both the forward and backward strokes of the pistons; cf. triplex pump.

duster. A well that did not encounter commercial amounts of petroleum. (dry hole)

DWA. drilling with air.

DWC. daily well cost.

DWM. drilling with mud.

DWT. (1) deadweight ton and (2) deadweight tester.

dynamic positioning. The use of navigational satellites and computers to continuously recalculate a drillship's location and keep the drillship on station with thrusters.

ea. earthy.

E&P. exploration and production.

earth pressure. The pressure on rocks at a specific depth. It is caused by the weight of the overlying rocks; cf. fluid pressure. (lithostatic pressure)

earth science. *See* geology.

ECD. equivalent circulating density.

economic limit. The time in the history of a well in which the revenue from production equals production costs. The well is either stimulated or plugged and abandoned.

edge water. Water located in the reservoir to the side of the oil; cf. bottomwater.

EEB. energy equivalent barrel.

eff. effective.

effective permeability. The permeability of a fluid when it shares the pore space with another fluid.

effective porosity. The percent porosity including only interconnecting pores; cf. total porosity.

EHP. effective horsepower.

EIA. Energy Information Administration (www.eia.gov).

elastomer. rubber-like material.

elec. electric.

electric line. *See* electric wireline.

electrical log. A wireline resistivity log. It is often run with a spontaneous potential or natural gamma ray log. (EL and E-log)

electric or electric-drive rig. *See* diesel-electric rig.

electric submersible pump. An electrical motor that drives a centrifugal pump with rotating blades on a shaft. It is located on the bottom of

a tubing string and is used for oil well artificial lift. (sub pump) (ESP)

electric wireline. Wire rope with insulated, electrical wires in the core. It is used to run logging and jet perforating tools in a well. (E-line or electric line)

electrostatic precipitator. A separator that uses charged electrode plates to separate an emulsion.

elephant. An oil field with over 1 billion barrels of recoverable oil.

ELEV and elev. elevation.

elevators. A set of metal clamps that are hung from the crown block. They are used to clamp onto tubulars such as drillpipe or casing to raise and lower them in the well.

el gr. elevation of ground.

E-line. *See* electric wireline.

E-log. electrical log. (SP and R)

El/T. electric log tops.

emul. emulsion.

emulsion. Droplets of one liquid suspended in a different liquid such as cream in milk. An oil-in-water emulsion is a common produced fluid from oil wells. (emul)

emulsion mud. Drilling mud made with water containing suspended droplets of oil. The oil improves the lubricating qualities of the mud.

energy equivalent barrel. *See* barrels of oil equivalent. (EEB)

eng. engine.

enhanced oil recovery. The injection of fluids that are not found naturally in a producing reservoir down injection wells into the depleted reservoir to recover more oil (e.g., inert gas injection and steamflood). (EOR) *See also* tertiary recovery.

Eocene. An epoch of geological time from 55.8 to 33.9 million years ago. It is part of the Tertiary period. (Eoc)

eolian. Formed by blowing wind.

EOR. enhanced oil recovery.

epoch. A geological time subdivision of periods such as Miocene epoch. It is subdivided into ages; cf. era.

equip. equipment.

equiv. equivalent.

equivalent circulating density. The density of the circulating drilling mud in a well at the level of a formation in the well. It is slightly above

the density of static drilling mud because of friction of the drilling mud in the well during circulation. (ECD)

era. A major time division of earth history such as Paleozoic era. It is subdivided into periods; cf. epoch and age.

ESP. electric submersible pump.

est. (1) estimate, (2) estimated, and (3) estate.

estab. (1) establish and (2) established.

ETH and **eth.** ethane.

ethane. A hydrocarbon composed of C_2H_6 . It is a gas under surface conditions and is found in natural gas. (C_2 , ETH, and eth)

EUR. estimated or expected ultimate recovery.

eval. (1) evaluate and (2) evaluated.

Evap and **evap.** evaporate.

EW. (1) electric weld and (2) exploratory well.

ex. excellent.

exist. existing.

exp. expense.

expandable casing. Casing made of special steel. It can be run into a well and then have its diameter expanded up to 30% by hydraulically pumping an expander plug through it. Expandable casing is used to make a monobore well.

expander plant. An installation that uses natural gas to drive a turbine to cool the gas and remove natural gas liquids. (cryogenic plant)

expansion-gas drive. A gas field reservoir drive in which the expanding gas produces the energy to force the gas through the reservoir rock. (volumetric drive)

expir. (1) expire, (2) expiring, and (3) expired.

expl. (1) exploration and (2) exploratory.

exploration geologist. A geologist who specialized in the search for petroleum; cf. developmental geologist.

exploratory well. A well drilled to locate new oil and gas reserves. It can be drilled in an area that has no production (new-field exploratory well), or drilled to test a new reservoir rock that has no current production in a producing area (new-pool exploratory well) that is either shallower (shallower pool test) or deeper (deeper pool test) than current production. An exploratory well can also be drilled to significantly extend the limits of a discovered field and to significantly extend the

limits of a discovered reservoir. (outpost or extension test, step-out well, wildcat well)

explosive fracturing. To explode nitroglycerin in a torpedo at reservoir depth in a well to fracture the reservoir and stimulate production. (well shooting)

exp plg. expendable plug.

exst. existing.

ext. (1) extended and (2) extension.

extended-reach well. A deviated well with a relatively large horizontal distance between the surface location of the well and the bottom of the well.

extender. An additive to a fluid that reduces its cost (e.g., bentonite in a cement slurry).

extension well. A well that significantly increases the productive area of a field. It is called an outpost well before it is successful.

extr. extremely.

F. (1) factor, (2) flowed, (3) flowing, (4) foam, (5) Fahrenheit, and (6) filtrate.

f. fine.

F/. (1) flowed, (2) flowing, and (4) fractured with.

FAB. faint air blow.

facies. A distinctive part of a rock layer such as a sandstone facies. A lithofacies is based on rock composition such as sandstone facies, whereas a biofacies is based on fossil content.

Fahrenheit. The English system temperature scale. Freshwater freezes at 32° and boils at 212° . To convert Fahrenheit temperature to centigrade or Celsius temperature, subtract 32° and multiply by $\frac{5}{9}$. (F)

fail. failure.

fairway. The area along which a petroleum play occurs. (trend)

farmer's gas. The produced gas that goes free to the lessor for use as part of the lease agreement. It is often used to drive irrigation pumps.

farmin. (1) A lease obtained from another company for drilling in return for a consideration such as a royalty. (2) To receive a farmin; cf. farmout. (FI)

farmout. (1) A lease given to another company for drilling in return for a consideration such as a royalty. (2) To give a farmout; cf. farmin. (FO and F/O)

FARO. flowed or flowing at rate of.

fault. A break in the rocks along which there has been movement of one side relative to the other side. Faults are either dip slip or strike slip; cf. joint. (Flt and flt)

FBH. flowing by heads.

FBHP. flowing bottom-hole pressure.

FBHPPF. final bottom-hole pressure flowing.

FBHPSI. final bottom-hole pressure shut-in.

FC. float collar.

FCP. flowing casing pressure.

FCV. flow control valve.

FDC. formation density compensated log.

FDL. formation density log.

fdn. foundation.

fed. federal.

feedstock. A chemical refined from hydrocarbons and used to produce petrochemicals.

fee land. Private land that has both a private surface and mineral rights owner.

FEL. (1) feet from east line and (2) from east line.

F/EL. from the east line.

feldspar. A common group of minerals that are potassium aluminum silicates (potassium feldspar or orthoclase) or sodium-calcium aluminum silicates (plagioclase feldspar). Feldspars are common in igneous and metamorphic rocks and immature sedimentary rocks. They can be white, gray, pink, or pale yellow and can decay to form clay minerals.

fence diagram. A three-dimensional representation of wells and the geological cross sections between them. Cross sections between the wells are called panels that close to form the fence.

FER. fluid energy rate.

FF. (1) fishing for, (2) frac finder (log), and (3) full of fluid.

FFP. final flowing pressure.

FG. full gauge.

FGIH. finish going in hole.

FGIW. finish going in with.

F/GOR. formation gas/oil ratio.

f-gr. fine grained.

FH. full hole.

FHH. final hydrostatic head.

FHP. final hydrostatic pressure.

FI. (1) farmin and (2) flow indicator.

FIC. flow indicating controller.

field. The surface area directly above one or more producing reservoirs on the same trap such as an anticline. (fld)

field print. The original copy of a wireline well log that is made in the logging truck; cf. final print.

field superintendent. An engineer who is in charge of production from a field. The field superintendent gives orders to the production foremen.

FIH. fluid in hole.

fill to spill. A petroleum trap that is filled to capacity. It is filled with oil and/or gas down to the spill point on the trap.

filt. filtrate.

filter cake. A cylinder of clay particles that were plastered against the sides of the well by the drilling mud during drilling. (mudcake)

filtrate. *See* mud filtrate. (F and filt)

fin. (1) final, (2) finish, and (3) finished.

final print. The last copy of a wireline well log that has been cleaned up, computer processed, and printed in the office; cf. field print.

fin drlg. finished drilling.

fireflood. An enhanced oil recovery process in which the subsurface oil is set afire. The heat makes the oil more fluid, and the gases generated by the fire drive the oil to producing wells as air is pumped down injection wells. (in-situ combustion)

fish. (1) A tool or broken pipe that has fallen to the bottom of a well. (junk) (FSH) (2) Fishing.

fishing. A process in which fishing tools are used to retrieve an object (fish) on the bottom of the well. (fish and fsg)

fishing string. A length of tubulars with subs that is run in a well with a fishing tool on the end.

fishing tools. Tools leased from a service company to fish for a fish in a well (e.g., spear, overshoot, and junk basket).

FIT. formation interval tester.

five-spot pattern. A common pattern of injector and producing wells used for a waterflood. Four injecting wells are located at the corners of a

square and the producing well is in the center; cf. line drive.

fixed cutter bit. A solid steel bit with no moving parts. Cutters or natural diamonds shear the rock. A PDC bit is a fixed cutter bit.

fixed production platform. A relatively permanent offshore platform with treaters for produced fluids. It has legs that sit on the ocean bottom. Two types are (1) steel jacket and (2) gravity storage; cf. tension leg platform and spar.

FL or fl. (1) fluid and (2) fluid level.

FL. (1) floor and (2) flowline.

fl/. (1) flowed and (2) flowing.

flange. A raised edge or projection on the end of a pipe or connection. It can be connected with another flange with bolts or threads or by welding.

flange up. To finish a job.

flare. (1) A flame of burning gas. (2) To burn unwanted natural gas.

flash gas. Wet gas that is separated from crude oil in a low-pressure separator. The separator can be located on a lease or pipeline.

flat spot. A flat seismic reflector in sedimentary rock layers that are not horizontal. It can be off a gas-liquid contact.

fld. (1) failed and (2) field.

flg. flowing.

flint. A very hard sedimentary rock composed of amorphous quartz. (chert)

flo. flow.

float collar. A short length of tubular that is run just above the bottom of a casing string. A one-way valve allows the casing string to float in the drilling mud as it is being run in the well. A constriction in the float collar stops the wiper plug as it is being pumped down the string during a cement job. (FC)

floaters. A floating, drilling platform such as a semisubmersible or drillship.

flow-after-flow test. *See* multipoint test.

flow assurance. Any well intervention or production operation that is done to ensure continuous and safe flow of production from the reservoir to the processing facilities.

flow back or flowback. The frac fluid and possibly some formation water that flows to the surface after hydraulically fracturing a well. It is treated and then reinjected or disposed.

flow or flowing by heads. Intermediate flow of fluids from a well. (FBH)

flowing pressure. Pressure on a fluid as the fluid is flowing; cf. static pressure. (FP)

flowline. A steel, plastic, or fiberglass pipe that conducts (1) produced fluids from the wellhead to the separators, (2) oil from the separators to the stock tanks, or (3) gas to the treaters. (FL)

Flt and ft. fault.

flu. fluid.

fluid pound. A problem caused by gas in a downhole, sucker-rod pump.

fluid pressure. The pressure on fluids in the pores of rock at a specific depth. Normal fluid pressure is due to the weight of the overlying waters. (reservoir and formation pressure); cf. earth pressure.

fluor. (1) fluorescence and (2) fluorescent.

fluorescence. The emission of light by a substance under ultraviolet light. Some minerals fluoresce. A mud logger uses the fluorescence of crude oil extracted with a solvent from well cutting to identify oil shows. (fluor)

flw. (1) flowed and (2) flowing.

Flwg. PR. flowing pressure.

Fm and fm. formation.

FMS. formation microscanner.

Fm W. formation water.

fn. fine.

FNL. (1) feet from north line and (2) from north line.

F/NL. from the north line.

fnly. finely.

FO and F/O. farmout.

FO. (1) faulted out, (2) fuel oil, and (3) full open.

foam drilling. Air drilling with a detergent to form a foam and lift water from the well.

focused log. *See* laterolog.

fold. (1) The number of reflections (traces) off the same subsurface point that are combined in common depth point stacking to form a single reflection. (trace) (2) A bend in sedimentary rock layers such as an anticline or syncline.

footage drilling contract. A drilling contract based on a cost per foot to drill to contract depth. It is commonly used on land; cf. daywork and turnkey drilling contract.

- footwall.** The side of the fault that protrudes under the other side; cf. hanging wall.
- foraminifera.** A small, one-cell animal that floats in the ocean or lives on the bottom of the ocean. Many have shells of calcium carbonate. It is a common microfossil. (forams) (Foram and foram)
- formation.** A mappable, sedimentary rock layer with a sharp top and bottom. The formation is given a two-part name such as Bartlesville Sandstone, Arbuckle Limestone, and Coffeyville Formation. Formations can be subdivided into members and adjacent formations can be combined to form a group. (Fm and fm)
- formation damage.** A decrease in the permeability of a reservoir rock adjacent to a wellbore. It can be caused by mud filtrate that is forced into the pores during drilling. (skin damage)
- formation density log.** A radioactive wireline well log used to determine the density and porosity of rocks. It bombards the rocks with high-speed neutrons and measures either the returning slow-speed neutrons or gamma rays. (gamma-gamma log) (FDL)
- formation gas/oil ratio.** *See* dissolved gas/oil ratio. (F/GOR)
- formation pressure.** *See* fluid pressure.
- formation volume factor.** The number of barrels of reservoir oil that shrinks to one stock-tank barrel of oil on the surface after the pressure has decreased and the gas has bubbled out. (FVF and B) *See also* reservoir barrel and stock-tank barrel of oil.
- foss.** fossiliferous.
- fossil.** The preserved remains of an ancient plant or animal. Fossils can be either macrofossils or microfossils, depending on their size. (Foss and foss)
- fossil assemblage.** A group of fossils that identifies a particular geologic time or a rock zone.
- fossil fuel.** A fuel formed by ancient organic matter (e.g., crude oil, natural gas, and coal).
- 4-C seismic.** A marine seismic survey that uses three vibration detectors and a hydrophone at each location to record both conventional compressional waves (P waves) and shear waves (S waves). It is used to better identify rock types and locate fractures.
- 4-D and 4D seismic.** The seismic reflection differences between several 3-D seismic surveys run at different times over the same reservoir during production from that oil field. Changes in seismic response such as amplitude from the reservoir can show the flow of fluids through the reservoir and locate undrained areas. (time lapse seismic)

- FOT.** flowing on test.
- fourble.** Four tubular joints; cf. single, double, and treble.
- FP.** (1) flowing pressure, (2) final pressure, and (3) free point.
- FPI.** free point indicator.
- FPSO.** floating, production, storage, and offloading.
- FPSO vessel.** A ship that is stationed above or near an offshore oil field. Produced fluids from subsea wells are brought by flowlines and a riser to the deck of the vessel where they are separated and treated. The purified oil is then transferred to a shuttle tanker.
- FR.** flow recorder.
- fr.** (1) fair, (2) from, and (3) front.
- Frac.** fracture.
- Frac and frac.** fracture.
- frac job or fracing.** *See* hydraulic fracturing.
- fracking.** The general public term used for hydraulic fracturing.
- frac pac and frac/pac.** A hydraulic fracturing technique that uses a viscous gel as the frac fluid with a relatively large amount of proppants. The fractures are relatively short but wide. It is used on high-permeability loose sand reservoirs; cf. slickwater frac.
- fractionating.** The separation of crude oil by heating and boiling off different components at different temperatures.
- frag.** fragment.
- free gas cap.** The uppermost portion of a saturated oil reservoir. The pores of the reservoir rock are occupied by natural gas.
- free gas-cap expansion drive.** A reservoir drive in which the expanding gas in the free gas cap drives the oil through the reservoir rock. It has a relatively moderate oil recovery efficiency; cf. dissolved gas and free gas cap drive.
- free point.** The depth in a well that is just above where tubulars are stuck in a well (stuck point). (FP)
- free water.** Water that readily separates from oil by gravity; cf. emulsion.
- free-water knockout.** A horizontal or vertical separator that uses gravity to separate gas, oil, and water. (FWKO)
- freq.** (1) frequent and (2) frequency.
- freshwater.** Water that contains less than one-part-per-thousand salt; cf. brine.
- friable.** A rock such as sandstone that easily crumbles or is broken apart.

FRR. final report for rig.
frs. fresh.
FRW. final report for well.
fsg. fishing.
FSH. fish.
FSIP. final shut-in pressure.
FSL. (1) feet from south line and (2) from south line.
F/SL. from the south line.
FSP. flowing surface pressure.
FT. formation test.
F/T. flowline temperature.
ftg. (1) fittings and (2) footage.
ft lb or **ft-lbf.** foot-pound.
ft/min. feet per minute.
FTP. (1) flowing tubing pressure and (2) final tubing pressure.
F Trap. fault trap.
ft/sec. feet per second.
fulcrum assembly. A downhole assembly that uses the sag caused by the weight of a drill collar between two stabilizers to lift the bit and increase the angle (make angle) in a deviated well. *See also* packed hole and pendulum assembly.
full-diameter core. A cylinder of rock that was drilled (cored) from a well. It is between 3½ and 5 in. in diameter; cf. sidewall core.
funnel viscosity. A measure of drilling mud viscosity. It is recorded as the number of seconds that the mud takes to flow through a Marsh funnel. (FV)
FV. funnel viscosity.
FVF. formation volume factor.
FW. freshwater.
FWC. field wildcat.
FWKO. freewater knockout.
FWL. (1) feet from west line and (2) from west line.
F/WL. from the west line.
fx. finely crystalline.
G. (1) gas, (2) gas lift, (3) gallons, and (4) billion.

g. (1) gram or (2) gravity force.
GA. gallons of acid.
ga. gauge.
GAF. gross acre feet.
gage. *See* gauge.
gal. gallons.
gal/min. gallons per minute.
gamma-gamma log. *See* formation density log.
gamma ray log. *See* natural gamma ray log. (GR and GRL)
G&MCO. gas and mud-cut oil.
G&O. gas and oil.
G&OCM. gas and oil-cut mud.
G&W. gas and water.
gas. *See* natural gas. (G)
gas cap. *See* free gas cap.
gas-cap drive. *See* free gas-cap expansion drive.
gas chromatograph. A chemical device used to quantitatively analyze the amount of individual hydrocarbon components in a sample. It is used in mud logging to determine the amount of methane, ethane, propane, butane, and pentane in natural gas from gas-cut mud samples.
gas compressibility factor. *See* Z factor.
gas conditioning. The removal of impurities such as water, acid gases, and solids from natural gas in the field to meet pipeline contract specifications.
gas cut. diluted with gas.
gas detector. An analytical device used in mud logging to separate natural gas from gas-cut mud during drilling a well. It measures the total amount of gas dissolved in the drilling mud.
gas deviation factor. *See* Z factor.
gas effect. A divergence of porosities calculated from the neutron porosity and formation density logs on the same rock. It is caused by gas in the reservoir rock.
gas injection. Injection of natural gas into an oil reservoir or free gas cap to maintain reservoir pressure and produce more oil.
gas in place. The amount of gas in the pores of a subsurface reservoir; cf. recoverable gas. (GIP)

gas jack. A compressor used to increase the pressure on natural gas from a gas well to pipeline pressure.

gas lift. An artificial-lift method for oil wells. An inert gas called lift gas (usually natural gas) is injected into the casing-tubing annulus, through gas-lift valves, and into the tubing to form bubbles that raise the produced liquids. (G and GL)

gas lift valve. A pressure-activated valve in the tubing string of a gas lift well. It allows lift gas, usually natural gas, to flow into the tubing.

gas lock. The failure of a downhole, sucker-rod pump because of gas filling the pump.

gas meter. An instrument used to measure the velocity of gas. Gas volume can be derived from the gas velocity. The most common type used for gas wells is an orifice meter. It measures the pressure drop caused by a change in gas velocity as the gas flows through a restriction (orifice) in the pipe.

gasoline. gasoline.

gas/oil contact. The boundary between oil and gas in a reservoir. (GOC)

gas/oil ratio. The number of standard cubic feet of natural gas produced with each barrel of oil. The amount of natural gas in standard cubic feet dissolved in a barrel of oil in the subsurface reservoir is the dissolved, reservoir, or solution gas/oil ratio. The amount of natural gas in standard cubic feet produced with each barrel of oil is the producing gas/oil ratio. A gas well has a producing gas/oil ratio of greater than 20,000, and an oil well has less than 5,000. (GOR)

gas and gasoline plant. An installation that removes natural gas liquids from natural gas by cooling or absorption. (natural gas processing plant) (GP)

gas sand. A driller's term for sandstone that contains gas.

gas shale. A black shale source rock that has generated natural gas and crude oil. Although much of the gas and oil has migrated out into overlying reservoirs or leaked onto the surface, the gas shale still contains some gas and sometimes condensate and oil. Wells into a gas shale must be hydraulically fractured with a slickwater frac; e.g., Barnett Shale.

gas show. Natural gas dissolved in drilling mud. It is detected by mud logging while drilling a well. (GS)

gas unit. A measure made by a mud logger of the amount of natural gas dissolved in drilling mud (gas-cut mud). (GU)

gathering line. A flowline that connects a gas well to the gas pipeline. (G/L)

gathering system. A system of flowlines that conducts produced fluids from wells to a central processing unit.

gauge. (1) To measure. (2) The diameter of a bit, wellbore, or tubular. (3) A measuring instrument; e.g., pressure gauge. (ga and gage) (GGE)

gauge hole. A wellbore with a specific minimum diameter.

gauger. A person responsible for measuring the amount and quality of oil in stock tanks.

gauge table. A chart that relates the height of crude oil in a stock tank to the volume of the oil. (tank table)

gauge tape. A metal tape on a reel with a brass weight on the end. It is marked in 1/8-in. increments and is used to measure the height of oil in a stock tank.

GB. (1) good blow and (2) gun barrel.

Gb. billion barrels.

GBDA. gallons of breakdown acid.

GC. gas cut.

GCDM. gas-cut drilling mud.

GCM. gas-cut mud.

GCMS. gas chromatography-mass spectrometry.

GCPD. gallons of condensate per day.

GCR. gas/condensate ratio.

GCSW. gas-cut saltwater.

GCW. gas-cut water.

gd. good.

GDR. gas-distillate ratio.

gel. A homogeneous fluid consisting of dispersed, fine-grained particles that have coalesced to some degree in a liquid such as water. Drilling mud that consists of clay particles and freshwater is a gel.

gel strength. The ability of a fluid such as drilling mud to suspend solids. It is measured on a viscometer or gelometer and reported in lb/100 sq ft.

gen. generally.

geochemist. A geologist who uses chemistry to study source rocks, natural gas, and crude oil. Geochemistry uses soil samples to analyze for traces of hydrocarbons and bacteria that thrive on hydrocarbons to detect surface microseeps.

geographic and geographical information system. A computer system of hardware, software, and a database used to display, manipulate,

and analyze geographical data at locations on the earth's surface. The information is organized in layers such as culture, topography and well locations. (GIS)

geol. (1) geological, (2) geologist, and (3) geology.

geologic map. A map showing where rock layers, usually formations of sedimentary rocks, crop out on the surface of the earth.

geologist. A scientist who identifies and studies rocks. A petroleum geologist searches for and helps to develop oil and gas deposits. (Geol)

geolograph. A recorder on the floor of a drilling rig that records drilling rate (rate of penetration) on a paper chart. (drilling recorder)

geology or geoscience. The study of the earth. It includes the matter that makes up the earth, the processes that act on that matter, and the history of the earth. (earth science)

Geop. (1) geophysical and (2) geophysicist.

geophone. A vibration detector used on land to detect subsurface echoes during a seismic survey. (jug)

geophysicist. A scientist who uses physics and mathematics to study the earth. A geophysicist uses surface methods such as seismic, magnetic, and gravity to image the subsurface and explore for petroleum. (Geop)

geopressure. *See* abnormal high pressure.

geopressured. A reservoir rock with abnormal high pressure.

geosteering. The use of a measurements-while-drilling system, a logging-while-drilling system, and a steerable downhole assembly to drill a horizontal drain well that stays in the pay zone.

geothermal gradient. The rate of temperature increase with depth in the earth.

GFLU. good fluorescence.

GGE. gauge.

GGW. gallons of gelled water.

GI. gas injection.

giant gas field. A gas field that has at least 3 Tcf of recoverable natural gas.

giant oil field. An oil field that has at least 500 million bbl of recoverable oil.

GIDP. gas in drillpipe.

GIH. going in hole.

GIP. gas in pipe.

GIS. geographic information system.

GL. (1) ground level and (2) gas lift.

gl. glassy.

G/L. gathering line.

Global Positioning System. A worldwide navigation method that uses radio signals of accurate time from satellites to obtain precise latitude, longitude, and altitude. It is especially useful in locating seismic lines. (GPS)

GLR. gas/liquid ratio.

gls. glass.

glycol absorber tower. A vertical, metal vessel that causes natural gas to bubble up through a liquid desiccant (glycol) to remove water.

GM. (1) gravity meter and (2) ground measurement (elevation).

GMA. gallons of mud acid.

gn. green.

gneiss. A metamorphic rock with light and dark bands of coarse-grained minerals. It is a basement rock.

GO. (1) gallons of oil and (2) gas odor.

goat pasture. Land that is not worth leasing.

GOC. gas/oil contact.

gone to water. A producing well that has started to produce large amounts of water.

GOR. gas/oil ratio.

gouge zone. The fractured mass of rocks along a fault plane.

GP. (1) gasoline plant and (2) gas pay.

G/P. gun perforate.

GPC. gas purchase contract.

GPM. gallons (natural gas liquids) per 1,000 standard cubic feet (Mcf) (natural gas).

GPS. Global Positioning System.

GR. (1) gamma ray and (2) granite.

Gr and gr. grain.

Gr. group.

gr. (1) grain and (2) ground.

GRA. gallons of regular acid.

graben. The down-dropped block between two normal faults; cf. horst.

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Gr and **gr.** grain.

Gr. group.

gr. (1) grain and (2) ground.

GRA. gallons of regular acid.

graben. The down-dropped block between two normal faults; cf. horst.

grad. (1) grading, (2) gradual, and (3) gradually.

graded bed. A clastic sedimentary rock layer that is coarse grained (sand) on the bottom and grades upward to fine grained (clay) on the top. Turbidity currents can deposit a graded bed.

grainstone. A type of limestone in which the large, sand-sized grains are in contact with each other and fine-grained material is absent. (Grst)

gram. The unit of weight in the metric system. There are 453.59 grams in a pound. (g)

Gran or **gran.** granule.

gran. granite.

granite. The most common igneous rock that crystallizes in the subsurface (plutonic). Granite is coarse grained with a light, speckled texture. It is a common basement rock. (GR and Grt)

granite wash. A sandstone composed of sand grains from weathered granite. It can be a reservoir rock. (gran, Gran W, GW, and G.W.)

Gran W. granite wash.

gr API. °API gravity.

grass hopper. A common term for a sucker-rod pump.

grav. gravity.

gravel pack completion. A well completion used for unconsolidated reservoirs. A large cavity is reamed out in the reservoir. It is then filled with very well sorted, loose sand (gravel pack). A slotted or screen liner is run in the gravel pack. (GVLPK)

gravimeter. See gravity meter.

gravity. See °API gravity.

gravity-base storage production platform. A fixed production platform that has a large mass of steel and concrete on the bottom to hold it in position. The concrete is hollow, and the cells can be used for storage; cf. steel jacket production platform.

gravity drainage pool. An oil field in which the reservoir drive is gravity pulling the oil down into the wells. It can be very effective over a long period of time; cf. dissolved gas, free gas-cap expansion, and water drives.

gravity meter. An instrument that measures the acceleration of gravity. It detects variations in the density of the earth's crust. Its units of measurement are milligals. (gravimeter) (GM)

greywacke or **graywacke.** A poorly sorted, dark-colored sandstone; cf. orthoquartzite. (gywk)

GRD and **grd.** ground.

grdg. grading.

grd loc. grading location.

greenfield. An oil or gas field that is know but has not been developed; cf. brownfield.

GR log. natural gamma ray log.

grn. green.

ground truthing. To compare surface observations with remote sensing measurements such as satellite photographs.

groundwater. Water that occurs in the subsurface pores of sedimentary rocks.

group. (1) Several geophones that are connected together to record as a single channel. (2) Several adjacent formations that are similar in lithologies and are given a formal name such as the Chase Group. (Gr.)

group shoot. A seismic survey paid for and shared by several different exploration companies; cf. spec survey.

growth fault. A fault that occurs on land where sediments have been rapidly deposited along the margin of a basin. It is parallel to the shoreline and has a curved fault plane that is steepest near the surface and flattens with depth toward the basin. (down-to-the-basin fault) See also rollover anticline.

Grst. grainstone.

Grt. (1) granite and (2) grant (land).

grt. grant (land).

Grv. gravel.

gr wt. gross weight.

gry. gray.

GS. gas show.

GSC. gas sales contract.

GSG. good show of gas.

GSI. gas well shut-in.

GSO. good show of oil.

GSW. gallons of saltwater.

GTI. Gas Technology Institute (www.gti.org).

GTS. gas to surface (time).

GTSTM. gas too small to measure.

GU. gas unit.

guard log. *See* laterolog.

guide fossil. A distinctive fossil that represents a particular geologic time.

guide shoe. A short, metal cylinder with a rounded nose having a hole in the end. It is run on the end of a casing string to guide the string into the well.

gun. *See* perforating gun.

gun barrel separator. A steel, settling tank that uses gravity to separate a loose emulsion. (wash tank)

GV. gas volume.

gvl. gravel.

GVLPK. gravel packed.

GVNM. gas volume not measured.

GW and **G.W.** granite wash.

GW. gas well.

GWC. (1) gas-water contact and (2) gas-well gas.

GWI. gross working interest.

Gwke. greywacke.

GY, Gyp, or **gyp.** gypsum.

gypsum. A common salt mineral composed of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$; cf. anhydrite. (GY, Gyp, and gyp)

gypy. gypsiferous.

gywk. graywacke.

h. thickness.

HA. salt.

ha. hectares.

halite. A common salt mineral composed of NaCl. (Hal and hal)

hang. To arrange well logs according to a common, level reference-surface such as sea level going as a straight line through the logs. *See also* structural cross section and stratigraphic cross section.

hanger. A circular device that suspends a casing, tubing, or liner string in a well. It is attached to the top of the tubular by threads or slips.

hanging wall. The side of the fault that protrudes over the opposite side; cf. footwall.

hang rods. To pull sucker-rods out of a well and hang them in the rod hanger of a mast or derrick.

hard rock. Igneous and metamorphic rock. A hard rock geologist explores for ore deposits; cf. soft rock.

HBP. held by production.

HC. hydrocarbons.

HCl. hydrochloric acid.

HCPV. hydrocarbon pore volume.

hd. hard.

hdns. hardness.

hdr. header.

hd sd. hard sand.

header. (1) A large pipe into which several, smaller flowlines feed. (2) The well information at the top of a well log. (3) The seismic information at the side of a seismic record.

heater treater. A separator that uses heat from a fire tube to separate emulsions. (ht)

heave. The horizontal displacement on a fault.

heavy oil. High-density crude oil. It is defined by the U.S. Department of Energy as between 10 and 22.3 °API gravity. Heavy oil is relatively viscous, high in asphalt content, and generally high in sulfur content; cf. light oil.

heavyweight additive. An additive such as galena that is used to increase the density of a fluid such as drilling mud; cf. lightweight additive.

heavyweight drillpipe. Drillpipe that is intermediate in strength and weight, located between drill collars and drillpipe. It has the same outer diameter as drillpipe but a smaller inner diameter and comes in 30½ ft. joints. It is run on the drillstring between the drill collars and drillpipe. (HWDPP)

hectare. A metric unit of land area equal to 10,000 sq meters and 2.47 acres. (ha)

held by production. A lease in effect during production on that lease. (HBP)

helirig. A drilling rig that can be broken down in modules and transported by helicopter.

Henry Hub. The pricing location for natural gas futures contracts traded on the New York Mercantile Exchange. It is located in Erath, Louisiana, where 13 natural gas pipelines converge.

hertz. Cycles per second; seismic source frequencies and AC electricity are described in hertz. (Hz)

hetr. heterogeneous.

HEX. heat exchanger.

hex. hexane.

HF. hydrofluoric acid.

HFO. hole full of oil.

HFSW. hole full of saltwater.

HFW. hole full of water.

HGCM. heavily gas-cut mud.

HGCW. heavily gas-cut water.

hgt. height.

HH. hydrostatic head.

HHP. hydraulic horsepower.

hi. high.

high-shrinkage oil. *See* volatile oil.

high-temperature, high-pressure well. A well with a bottom-hole pressure greater than 10,000 psia and a bottom-hole temperature greater than 300°F. (HTHP well)

HO&GCM. heavily oil- and gas-cut mud.

HOCM. heavily oil-cut mud.

HOCW. heavily oil-cut water.

hoisting line. *See* drilling line.

hole opener. A sub that uses roller cones to enlarge a well.

holiday. An area behind casing with no cement.

Holocene. An epoch of geological time from 10,000 years ago until the present. It is part of the Quaternary period. (Recent)

hom. homogeneous.

homocline. Inclined sedimentary rock layers with a constant dip.

hook. A curved steel fastener located below the traveling block on a drilling rig. It is used to suspend the swivel and drillstring in the well.

hor and **horiz.** horizontal.

horizon. a surface.

horizontal drainhole. A relatively short horizontal lateral drilled with a relatively short radius from an existing vertical well.

horizontal well. A well with a highly deviated lateral (70° to 110°) drilled parallel to the pay zone in a reservoir. The well is described by its radius of curvature (short-radius, medium-radius, and long-radius) and

reach, the length of its horizontal section. It is drilled with a steerable downhole assembly or rotary steerable motor. The well is commonly completed open-hole or with a perforated liner.

horizontal section. The relatively flat portion of a horizontal drain well. The toe is the furthest point on the horizontal section and the heel is the closest. (lateral)

horizontal slice. A flat, seismic section made at a specific depth in time from 3-D seismic data. It shows where each seismic reflector intersects the slice. (time slice)

horizontal well. *See* horizontal drainhole.

horsehead. A steel plate used on the end of a walking beam to keep the pull on the sucker-rod string vertical.

horsehead pumper. A common term for a sucker-rod pump.

horsepower. A unit of power or rate of doing work that is applied to engines and motors. One horsepower is equal to 33,000 ft-lb/min. (HP and hp)

horst. A ridge between two normal faults; cf. graben.

host company. An oil company owned by a federal government. It operates only in that country.

hot oiler. A service company that removes wax from tubing in wells. A heated, tank truck is used to heat crude oil. The heated crude oil is pumped down the well to dissolve the wax and is then pumped out.

HP. (1) hydrostatic pressure, (2) high pressure, and (3) hydraulic pump.

HP and **hp.** horsepower.

HPF. holes per foot.

HPG. high-pressure gas.

hp-hr and **hp hr.** horsepower-hour.

hr. hours.

HRD. high-resolution dipmeter.

hrs. heirs.

HT and **ht.** high temperature.

ht. (1) heater treater and (2) heat treated.

HTHP. high-temperature, high-pressure.

H₂S. hydrogen sulfide.

huff 'n' puff. An enhanced oil recovery method used for heavy oil. A well is used to first pump steam into the subsurface reservoir to heat the oil and make it more fluid. The same well is then used to pump the heated, heavy oil. (cyclic steam injection)

hvly. heavily.

hvy. heavy.

HWDP. heavyweight drillpipe.

HX. heat exchanger.

HYD. hydraulic.

Hydc. hydrocarbons.

hydrate. A snow-like substance composed of methane gas locked in ice crystals. Hydrate occurs naturally in permafrost on land and below the seafloor in many areas. It can form from water in a flowline as the temperature of natural gas falls.

hydraulic fracturing. A well stimulation method in which a high-pressure frac liquid is pumped down a well to fracture the reservoir rock adjacent to the wellbore. Propping agents such as sand are suspended in the frac liquid and keep the fractures open after pumping has stopped. (frac job, fracing, hydrofrac, hydro-fracing, and sandfrac) *See also* fracpac and slickwater frac job.

hydraulic pump. An artificial lift system. A pump on the surface injects power oil into the well. The power oil drives a pump that is coupled to a sucker-rod pump on the bottom of the tubing string.

hydrocarbon recovery unit. A vessel that uses silica, activated charcoal, or molecular sieves to remove natural gas liquids from natural gas.

hydrocarbons. Molecules formed primarily by carbon and hydrogen atoms. Crude oil and natural gas are composed of hydrocarbon molecules. (Hydc and HC)

hydrochloric acid. A strong acid composed of hydrogen and chlorine. It is commonly used in acid jobs to stimulate a limestone reservoir. (HCl)

hydrofluoric acid. A strong acid composed of hydrogen and fluorine. It is used to dissolve silicate minerals in rocks. (HF) *See also* mud acid.

hydro-fracking. hydraulic fracturing.

hydrostatic head and pressure. The pressure due to the weight of the overlying water. It is about 45 psi/100 vertical ft of water. (HH and HP)

hydrofrac. *See* hydraulic fracturing.

hydrogen sulfide. A poisonous and corrosive gas composed of H₂S that can be found by itself or mixed with natural gas that is called sour gas.

hydrogen sulfide embrittlement. The weakening of steel by contact with H₂S.

hydrophone. A vibration detector used at sea to detect subsurface echoes during seismic exploration.

hydrostatic head and pressure. Fluid pressure in subsurface rocks due to the weight of the overlying fluids; cf. abnormal high pressure. (normal pressure) (HH and HP)

Hz. hertz.

IAB. initial air blow.

IADC. International Association of Drilling Contractors (www.iadc.org).

IAGC. International Association of Geophysical Contractors (www.iagc.org).

IB. impression block.

IBHP. initial bottom-hole pressure.

IBHFP. initial bottom-hole pressure flowing.

IBHPSI. initial bottom-hole pressure shut-in.

ice age. *See* Pleistocene.

ICV. inflow-control valve.

ID. inner diameter.

IF. internal flush.

IFP. initial flowing pressure.

IG. in gauge.

igneous rock. A rock formed by cooling and solidifying a hot, molten liquid. A volcanic igneous rock is formed by a liquid (lava) solidifying on the earth's surface whereas a plutonic igneous rock is formed by a liquid solidifying in the subsurface; e.g., granite and basalt (Ig and ig); cf. sedimentary and metamorphic rock.

IHH. initial hydrostatic head.

IHP. (1) indicated horsepower or (2) initial hydrostatic pressure.

ILD. deep induction.

ILM. medium induction.

image log. A well log that uses either conductivity or resistivity to image the rocks along a wellbore.

immature oil. Heavy oil generated at shallow depths in the oil window; cf. mature oil.

immed. immediate.

imp. impression.

impermeable. Rock that does not allow fluids to readily flow through it; cf. permeable. (aquitard)

imperv. impervious.

Imp gal. Imperial gallon.

impression block. A fishing tool used to determine the shape of a fish. It is a weight with wax or lead on the bottom that makes a cast of the fish. (IB)

improved oil recovery. The methods of waterflood and enhanced oil recovery that are used to produce more oil from a depleted reservoir.

inbd. interbedded.

incised valley fill. A long, sinuous body of sandstones and shales deposited during a cycle of sea level fall and rise. During sea level fall, a valley is incised (eroded) by a river. During sea level rise, the valley is filled with sediments from the river and from ocean tides and waves. It can be a petroleum reservoir.

incl. (1) inclusions, (2) include, (3) included, (4) including, and (5) inclusive.

incr. (1) increase and (2) increasing.

ind. indurated.

induction log. A wireline well log that measures the resistivity of the rocks and their fluids with an induced current created by coils in the logging tool. A dual induction log measures both medium and deep induction. (I, IL, and IEL)

indurated sediments. *See* consolidated sediments.

indr. indurated.

inert. A gas that does not burn (e.g., steam, carbon dioxide, and nitrogen).

inert gas injection. An enhanced oil recovery method in which an inert gas such as carbon dioxide or nitrogen is injected into a depleted reservoir to produce more oil.

infill drilling. Drilling between producing wells in a developed field to produce more petroleum at a faster rate.

inflow performance relationship. A plot of drawdown in a well versus production. (IPR)

ingr. intergranular.

inh. inhibit.

inh and **inhib.** inhibitor.

inhibitor. An additive to a fluid to retard a reaction. (inh and inhib); cf. accelerator.

init. initial.

initial potential. The maximum amount a well can potentially produce during the first 24 hours of production.

initial pressure. The original reservoir pressure before any production. (virgin and original pressure)

initial production. The first 24 hours of production from a well. (IP)

inj. (1) inject, (2) injection, and (3) injected.

injection well. A well used to pump fluids down into a producing reservoir for pressure maintenance, waterflood, or enhanced oil recovery; cf. disposal well. (IW)

Inj Pr. injection pressure.

ins. (1) insulate and (2) insulation.

in./sec. inches per second.

insert pump. A common type of oil well downhole pump driven by a sucker-rod string. It is run as a complete unit on the sucker-rod string through the tubing string. (rod pump)

insert tricone bit or **button tricone bit.** A tricone bit in which holes have been drilled into the steel cones and buttons of hard tungsten-steel carbide have been inserted. It is used to drill hard rocks; cf. milled-teeth tricone bit.

in-situ combustion. *See* fireflood.

insol. insoluble.

insp. (1) inspect, (2) inspecting, and (3) inspected.

inst. (1) install, (2) installing, and (3) installed.

instl. installation.

instr. (1) instrument and (2) instrumentation.

insul. insulate.

int. (1) interval, (2) interest, and (3) internal.

intangible drilling costs. Expenditures for drilling and completing a well that cannot be salvaged or recovered. They receive favorable tax consideration. (IDCs)

intbed. interbedded.

intelligent well. A well with downhole sensors for temperature, pressure, and flow velocity. A surface-controlled, downhole adjustable choke is used to regulate flow based on downhole conditions.

interbd. interbedded.

interfinger. A boundary between two rock types in which both form distinctive wedges protruding into each other.

intermediate casing. *See* protection casing.

interval transit time. The sound velocity through a rock measured by a sonic log. The units are in microseconds per foot. (Δt)

INTFP. intermediate flowing pressure.

intrusion or **intrusive body**. A plutonic igneous rock mass that was injected in a molten state into preexisting rock. (Intr or intr)

ints. intersect.

INTSIP. intermediate shut-in pressure.

intv and **intvl**. interval.

invaded zone. The area in a reservoir rock adjacent to the wellbore that has been flushed or diluted with mud filtrate.

I/O. input/output.

I.O.S.A. International Oil Scouts Association (www.oilscouts.com).

IP. (1) initial production, (2) initial potential, and (3) initial pressure.

I.P. in part.

IPAA. Independent Petroleum Association of America (www.ipaa.org).

IPF. intermediate potential flowing.

IPOF. initial production, open flow.

IPP. initial potential pumping.

IPPA. Independent Petroleum Producers of America (www.ippa.org).

IPR. inflow performance relationship.

IR. injection rate.

iron roughnecks. a mechanical device used on the drill floor to make up and break out drillpipe using the rotary table and spinning wrench. The pipe is fed mechanically to the iron roughnecks and is controlled by a driller from the driller's cabin.

irreducible water. Water in the pores of a reservoir rock that will not flow. (residual water)

irreg. irregular.

ISIP. (1) intermediate shut-in pressure (drillstem test) and (2) instantaneous shut-in pressure.

isochron map. A map that uses contours to show the thickness in time (milliseconds) between two seismic horizons. (isotime and time interval map)

isolith map. A map that uses contours to show the thickness of one rock type such as sandstone in a formation.

isomers. Organic compounds that have the same chemical formulas but have slightly different chemical and physical properties. Two isomers of butane (C_4H_{10}) are isobutane and n-butane.

isopach map. A map that uses contours to show the thickness of a subsurface rock layer.

isotime map. See isochron map.

ISO. International Organization for Standardization (www.iso.org).

ISP. initial shut-in pressure.

ITD. intention to drill.

IUE. internal upset ends.

IW. injection well.

J. productivity index.

jacket. The legs on an offshore production platform.

jackup rig. An exploratory offshore drilling system with a two hulls and at least three tall legs through the hulls. It is towed into position similar to a barge. The lower hull then rests on the bottom of the ocean and the upper hull is jacked up the legs. The drilling rig is mounted on the upper hull. See also cantilevered jackup.

J&A. junked and abandoned.

jar. A tubular run on a drillstring or fishing string that is designed to impart a sharp, upward or downward blow to the string on command.

JB. (1) junction box and (2) junk basket.

JC. job complete.

jct. junction.

jet. An orifice in a tricone drill bit between two cones. Drilling mud flows out the jet. (nozzle)

jet bit. A tricone drilling bit with one large and two small nozzles. The jetting action of the drilling mud from the large nozzle is used to start drilling the well out at an angle.

JINO. joint interest nonoperating (property).

JK. junk.

JKB. junk basket.

jmb. jammed.

jnk. junk.

JOA. joint operating agreement.

joint. (1) A natural fracture in rock along which there has been no movement; cf. fault. (2) A section of a tubular such as drillpipe. (JT, Jt, and jt)

joint interest billing. An accounting procedure that bills each working interest owner for their proportionate share of drilling and lease expenses. (JIB)

joint operating agreement. An agreement between several companies to explore, drill, and develop a common area called the working interest area. The agreement defines how the costs and revenues are to be shared among the parties and which party is the operator. (JOA)

joint venture. A partnership among companies for a common purpose such as exploring and drilling an area. One partner will be the operator. (JV)

JOP. joint operating provisions.

JP. jet perforated.

JP/ft. jet perforations per foot.

JSPF. jet shots per foot.

JT, Jt, and jt. joint.

jts. joints.

jug. A vibration detector used on land to detect subsurface echoes during a seismic survey. (geophone)

jug hustler. A seismic crew member who lays cable and plants geophones.

junk. A tool or broken pipe that has fallen to the bottom of a well. (fish) (JK and jnk)

junk basket. A fishing tool. Drilling mud is circulated down along the outside of the tool to pick up pieces of junk on the bottom of the well. The mud then circulates up along the inside of the tool where the junk is caught in a basket; cf. boot sub. (JB and JKB)

junk mill. A fishing tool that is rotated to (1) dress a fish in preparation for another fishing tool or (2) reduce the fish to metal flakes.

Jurassic. A period of geological time from 201.6 to 145.5 million years ago. It is part of the Mesozoic era. (Jur)

JV. joint venture.

K. coefficient.

k. permeability.

karst. A highly dissolved limestone that is or was exposed on the surface of the earth. It exhibits solution features that range from vugs to caverns.

KB. kelly bushing.

KBM. kelly bushing measurement.

KCl. potassium chloride.

kelly. A strong, four- or six-sided, steel pipe that is located at the top of the drillstring. It runs through the kelly bushing. (KB)

kelly bushing. A device that is fitted on the master bushing and rotating table. The kelly runs through the kelly bushing. (KB)

kelly cock. A valve run on a drillstring just above or below the kelly. A wrench is used to open and close it. It is used to stop fluids from flowing up the drillstring.

kerogen. Insoluble organic matter in sedimentary rocks. It is the part of organic matter in source rock that can be changed into petroleum; cf. bitumen.

keyseat. A section in a well being drilled that has a cross section similar to a key hole. The smaller diameter portion was abraded by the drillpipe and the larger portion by the bit. Drill collars can become stuck in the smaller portion of the keyseat.

kg. kilograms.

kh. permeability thickness.

kHz. kilohertz.

kick. (1) The flow of subsurface fluids into a well. (2) A distinctive deflection on a well-log curve.

kick off. To start drilling a well out at an angle. (KO)

kickoff point. The location in a well where it begins to deviate. (KOP)

kill a well. To stop the flow from a well. Two common methods used to kill a well when drilling are (1) driller's method and (2) wait-and-weigh method. A producing well is killed for a workover by filling the well with a kill fluid.

kill fluid. A liquid used in a well to stop reservoir fluids from flowing into the well in preparation for a workover. Diesel oil or brine is often used.

kill mud. Heavy drilling mud used to stop a kick and control a well.

kilo. thousand.

kilogram. A unit of weight in the metric system. It is equal to 1,000 grams or 2.2 pounds.

kilojoule. The metric system unit of heat used to measure the heat content of natural gas. It is 1,000 joules and is equal to about one British thermal unit in the English system. (kJ)

kilometer. A metric system of length. One kilometer is equal to 1,000 meter or 0.62 miles. (km)

kilopascal. The metric unit for pressure. It is equal to 6.895 psi. (kPa)

Kimmeridgian. An age of geological time from 154 to 151 million years ago. It is part of the Jurassic period.

kitchen. The deep part of a basin where gas and oil are formed. (oven)

kld. killed.

km. kilometers.

K-Monel. A nonmagnetic metal used in some drill collars. It is used on well surveys made with a magnetic compass.

knot. A velocity equal to one nautical mile per hour. It is equal to 1.151 miles per hour.

KO. (1) kick off and (2) kicked off.

KOP. kickoff point.

kPa. kilopascal.

kriging. A statistical method used to estimate a value at a location that has not been sampled. It is based on the variability of that value with distance from locations that have been sampled.

KV. kinematic viscosity.

kv. kilovolt.

KW. killed well.

kw. kilowatt.

L. (1) liter and (2) length.

l. lower.

L/. lower.

LA. load acid.

LACT. lease automatic custody transfer.

LACT unit. *See* lease automatic custody transfer unit.

lag time. The time that it takes the well cuttings to circulate from the bottom of the well, up the well to the screens on the shale shaker.

land. To transfer the weight of something in a well such as a casing string being run into a well to the casing hangers.

landed at. The depth to which a casing string was set in a well.

land farming. Spreading used, freshwater-based drilling mud out on agricultural land to improve the soil; cf. soil farming.

landman. An oil company employee or independent who identifies mineral rights owners and negotiates leases.

landowner royalty. The mineral rights owner's royalty.

Landsat. one of six uncrewed remote-sensing satellites operated by the United States. Landsat pictures of the earth are made in visible light and infrared and are transmitted back to earth.

large-scale map. A map that shows relatively more detail but covers less area than a small-scale map.

LAS file. *See* Log ASCII Standard file.

LAST. logged after short trip.

LAT. logged after trip.

lateral. A general term for a horizontal or near-horizontal wellbore that has been drilled out from an original (mother) well. It can be the horizontal section of a horizontal drainhole or several shorter branches. The toe is the furthest point on the lateral, and the heel is the closest.

laterolog. A wireline electrical log used in conductive muds to measure the true resistivity of the rocks. It uses guard electrodes in the logging tool to focus an electrical current into the rocks. A dual laterolog measures deep and medium resistivity. (focused or guard log) (LL)

lava. Molten rock on the surface of the earth; cf. plutonic rock. (volcanic rock) *See also* basalt.

lay down pipe. To pull drillpipe or tubing from a well and place it horizontally on a pipe rack.

lb and lbm. pounds.

lbm/cu ft. pounds per cubic foot.

lbm/gal. pounds per gallon.

LBOS. light brown oil stain.

LC. (1) lost circulation and (2) lease crude.

LCM. lost-circulation material.

LD. (1) land and (2) laid down.

Ld. land.

ld. load.

Ldd. landed.

LDDCs. laid down drill collars.

LDDP. laid down drillpipe.

leakoff test. A test in a well being drilled to determine the strength (fracture pressure) of a formation. The well is shut in and the fluid pressure in the well is increased until the fluid flows into the formation (leaks off). (LOT)

lean gas. (1) Natural gas containing a minor amount of liquid condensate. (2) Natural gas with less than 2.5 gallons of natural gas liquids per thousand standard cubic feet of natural gas; cf. rich gas and dry gas.

lease. (1) A legal document between an oil company (lessee) and a

mineral rights owner (lessor) for the purpose of obtaining drilling and production rights on the land under lease. (lse) *See also* primary and secondary term. (2) To obtain a lease for a specific parcel of land. (3) The land under lease.

lease automatic custody transfer unit. A system that uses equipment to measure, sample, test, and transfer oil in the field and to record that transaction. (LACT unit)

left-lateral strike-slip fault. A fault that moves horizontally, with the opposite side of the fault moving toward the left as you face the fault; cf. right-lateral strike-slip fault.

Len. lens.

lent. lenticular.

lessee. The recipient of a lease; cf. lessor.

lessor. The mineral rights owner who grants a lease. The lessor is granted a bonus for signing the lease and is guaranteed a royalty if oil and/or gas is produced; cf. lessee.

LFL. low fluid level.

lg and lge. large.

lg. length.

LI. level indicator.

li. lime.

license round. A method used by a country or national oil company to award a license to a company for the exploration of a specific area (license block) during a specific period of time. Competitive, closed bids are submitted. The block is awarded to (1) the highest cash, bonus bidder or (2) the largest financial commitment to explore and drill the block. (bid round)

lift gas. Inert gas, usually natural gas, used for gas lift in a well.

lifting costs. The cost to produce one barrel of oil in the field.

Lig and lig. lignite.

light oil. Low-density crude oil of more than 35 °API gravity. It is relatively fluid, has high in gasoline content, and is generally low in sulfur content; cf. heavy oil.

light-sand frac. A frac job using relatively little proppants. A slickwater frac is a light-sand frac.

lightweight additive. An additive used to decrease the density of a fluid; cf. heavyweight additive.

lignite. Soft coal. Bituminous and anthracite are harder coals. (Lig and lig)

LIH. left in hole.

lim. (1) lime and (2) limit.

limb. One side of a fold in sedimentary rocks.

lime. (1) A driller's term for limestone. (2) Calcium oxide. (CaO) (li or lim)

lime mudstone. A type of limestone with a very small percentage of large, sand-sized grains and a considerable amount of fine-grained material.

limestone. A common sedimentary rock composed of CaCO₃. It can range from fine- to coarse-grained and can be a reservoir rock. (LS, Ls, and ls)

limy. Containing CaCO₃. (lmy)

lin. liner.

linear spread. A geometric pattern of geophone groups that are arranged in a line.

line drive. A common pattern of injector and producing wells used for a waterflood. The injecting and producing wells are located on parallel lines; cf. five-spot pattern.

liner. Relatively thin-walled steel pipe that looks exactly like casing. *See also* liner string.

liner string. A string of tubulars (liners) similar to casing in a well. A liner string, however, does not run all the way up to the surface as a casing string does. A liner string is hung in the well by a liner hanger and may or may not be cemented into the well. A slotted liner has long, narrow, vertical openings (slots) to allow fluids to flow into the liner but exclude sand. A screened, slotted liner has screens wrapped around it to help exclude sand. A prepacked liner has a gravel pack between the liner and the tubing string. Some other types are drilling, production, and scab liner strings; cf. casing string. (lin, LNR, and lnr)

line shooting. A method used to acquire data for a 3-D seismic survey at sea. The seismic is acquired by running the seismic sources and hydrophone streamers in closely spaced, parallel lines. The ship tows at least two arrays of air guns or twin streamers.

liq. liquid.

liquefied natural gas. Methane gas (CH₄) that has been compressed and super cooled into a liquid; cf. liquefied petroleum gas. (LNG)

liquefied petroleum gas. Propane gas in liquid form in the United States. It can be a propane-butane mixture in Europe; cf. liquefied natural gas. (LPG and LP-gas)

liter. Unit of volume in the metric system. It is equal to 1,000 cm³ or 0.264 U.S. gallon in the English system. (L)

Lith and lith. lithology.

lithofacies. One particular rock type such as a sandstone in a rock layer.
See also facies.

lithofacies map. A subsurface map showing changes in the physical properties of a particular rock layer; e.g., isolith map.

lithologic log. A record of the physical properties of rocks in a well. It includes composition, texture, color, presence of pore spaces, and oil staining. (sample or strip log)

lithology. The composition of a rock such as sandstone or limestone. (Lith or lith)

lithostatic pressure. The pressure on rocks at a specific depth. It is caused by the weight of the overlying rocks; cf. fluid pressure. (earth pressure)

lk. leak.

LLC. liquid level controller.

LLG. liquid level gauge.

lm. lime.

lmy. limy.

Lmy sh. limy shale.

ln. line.

LNG. liquefied natural gas.

LNR and **lnr.** liner.

LO. load oil.

load oil or **water.** Oil or water filling a well to maintain pressure on the bottom of the well. (LO and LW)

load up. To have water fill the bottom of a gas well. It prevents gas from flowing into the well. The water must be removed (unload the well) to have the gas flow again.

loc. (1) locate and (2) location.

loc abnd. location abandoned.

loc gr. location graded.

log. A record or to make a record of rock properties in a well.

Log ASCII Standard file. A digital well log format. Each well log file has well header information and digital values for each well log curve recorded by depth. It is compatible with personal computers. (LAS file)

logged depth or **logger's depth** or **logger's total depth.** *See* measured depth.

logging tool. A metal cylinder, typically 30 to 40 ft long and 4 in. in diameter, that is filled with instruments. It is run in a well on a wireline

to make a well log. The instruments sense the electrical, radioactive, and sonic properties of the rocks and their fluids, and the diameter of the wellbore. The tool usually has arms to center it in the hole or against the wellbore. (sonde)

logging-while-drilling. A real-time well log of rock and formation fluid properties made by sensors in the drillstring above the bit. Measurements include gamma ray, resistivity, neutron porosity, formation density, and sonic. The measurements are digitized and transmitted to the surface by pressure pulses in the drilling mud; cf. measurements-while-drilling. (LWD)

long normal resistivity. A wireline resistivity measurement made with electrodes spaced far apart (64 in.); cf. short normal resistivity.

loose. An emulsion that readily separates; cf. tight.

lost circulation. A drilling problem in which relatively large quantities of drilling mud flow into a permeable rock layer (lost circulation zone) in the well. Very little, if any, drilling mud circulates back up the well. (LC)

lost-circulation additive, control agent, and material. An additive to drilling mud or cement slurry that clogs the pores of a lost-circulation zone. (bridging material) (LCM)

lost-circulation zone. A very permeable rock layer in a well. It takes large amounts of drilling mud during drilling. (thief zone)

lost section. The section of rock that is missing when drilling through a normal fault; cf. double section.

LOT. leakoff test.

low. lower.

low-shrinkage oil. *See* volatile oil.

low-resistivity, low-contrast pay. A commercial deposit of oil or gas that appears to be not commercial because it has relatively low resistivity on an induction log and/or low contrast to shale on a natural gamma ray log. It is caused by shale or clay in the pay.

low-temperature separator. An installation that passes natural gas through an expansion choke to cool the gas and separate out natural gas liquids. (LTX)

low-velocity zone. The layer of loose sediments that occurs near the surface of the earth and has a relatively low seismic velocity. Statics correct seismic data for the low-velocity zone. (weathering layer and zone)

LP. low pressure.

LPG and **LP-gas.** liquefied petroleum gas.

LPG drive. An enhanced oil recovery method in which liquefied petroleum gas is injected into a depleted oil reservoir. The LPG is miscible with the oil, which makes it more fluid.

LP sep. low-pressure separator.

LR. (1) level recorder and (2) long radius.

lrg. large.

LS, Ls, and Is. limestone.

lse. lease.

lss. leases.

LT. (1) lower and (2) light tubing.

lt. light.

LTD. logged total depth.

ltl and **ltl.** little.

LTS. long tubing string.

LTX. low-temperature separator.

LTX unit. low-temperature extraction unit.

LU. lease use (gas).

lub. (1) lubricant and (2) lubricate.

LV. liquid volume.

lv. leave.

LW. load water.

LWD. logging-while-drilling.

lwr. lower.

m. (1) slope, (2) medium, and (3) meters.

M/. middle.

MA. mud acid.

Ma. mega-annum (millions of years).

Maastrichtian. An age of geological time from 71.3 to 65 million years ago. It is part of the Cretaceous period.

mach. machine.

mag. (1) magnetic or (2) magnetometer.

magnetometer. An instrument that measures the earth's magnetic field intensity. It is able to detect variations in the magnetite content of the rocks. The units of measurement are gauss or nanoteslas. (mag)

maint. maintenance.

maintain angle. To drill a straight section in a deviated well; cf. build and drop angle.

maj. major.

make a connection. To screw a joint of drillpipe to the top of the drillstring below the kelly as the well is drilled deeper.

make up. (verb) (1) to screw together such as drillpipe; cf. break out; (2) to mix or prepare.

makeup. (noun or adjective) Something added to a system such as makeup water from another source added to waterflood injection water or drilling mud.

making a connection. Adding another joint of drillpipe to the drillstring.

making a trip. Pulling the drillstring from the well and running it back in.

making hole. Drilling a well.

man. (1) manual and (2) manifold.

M&F. male and female (joint).

M&FP. maximum and final pressure.

mandrel. A device such as a bar, shaft, spindle, or cone that is designed to hold something. A mandrel can be used to lower a tool into a well or be attached in a well to hold equipment such as a sidedoor or sidepocket mandrel used to hold a gas lift valve on a tubing string.

manifold. A tubular with at least one inlet and several outlets. A choke manifold is used on a drilling rig to circulate drilling mud when the blowout preventers are closed. (man and MF)

manometer. An instrument that measures fluid pressure in a well.

man op. manually operated.

mar. marine.

marble. metamorphosed limestone. (Mbl)

marg. marginal.

marginal well. An oil or gas well that due to declining production rate is barely profitable; cf. stripper well.

marine riser. A long length of flexible steel tubular used to connect the blowout-preventer stack on the bottom of the ocean to a floating drilling rig. The drillstring is run down the marine riser.

marker bed. A thin, distinctive, sedimentary rock layer such as volcanic ash used in correlation.

Mark II. An oil well beam-pumping unit that uses levers to balance the weight of the sucker-rod string.

marlstone. A loose term for a rock composed of calcium carbonate and clay. (mrlst)

marn. marine.

Marsh funnel. A funnel used on a drilling rig to measure the viscosity of drilling mud. The time in seconds that it takes the mud to drain through the funnel is related to the mud viscosity.

mass. massive.

massive frac job. A large hydraulic fracturing job on a well. It uses relatively large amounts of frac fluid and proppants and is commonly done on tight gas sands.

mast. (1) A portable steel tower that sits on the drill floor of a drilling or workover rig. (2) The portable steel tower on the bed of a service unit. A mast is assembled horizontally and pivoted vertical as a single unit in contrast to a derrick. Masts are used on land drilling rigs and workover rigs; cf. derrick.

master bushing. A device that attaches to the rotary table. The kelly bushing fits on the master bushing.

materials balance equation. An equation that relates the volume of produced fluids from a reservoir to the change of reservoir pressure to calculate the remaining oil and gas.

materials person. An employee of the operator who is responsible for calculating the amount and ordering the supplies and supervising their timely delivery to a drilling rig.

matl. material.

matrix. The fine-grained particles that bind a poorly sorted sedimentary rock. (Mtrx)

maturation. The chemical alteration of organic matter in sedimentary rocks with burial and increasing temperature and time. It can result in the generation of petroleum.

mature area. An area in which many wells have been drilled.

mature oil. Light oil generated at deep depths in the oil window; cf. immature oil.

MAW. mud acid wash.

max. maximum.

maximum efficient rate. A production rate for a field that balances the economics of rapid production against the waste caused by bypassing of subsurface oil during rapid production. (MER)

maximum potential flow. The maximum rate a well can produce with zero bottom-hole pressure. (absolute open flow)

Mb. member.

Mbl. marble.

Mbr and **mbr.** member.

MC. mud cut.

MCA. mud cleanout agent.

Mcf. 1,000 cubic feet.

mchsm. mechanism.

m³. cubic meters.

MD. measured depth.

md (or **md.**). millidarcy; millidarcys (pl).

mdl. middle.

MDRT. measured depth from rotary table.

Mdst. mudstone.

md wt. mud weight.

meander. A river channel bend.

meas. (1) measure and (2) measured.

measured depth or **measured total depth.** The depth of a well computed from the number of joints of drillpipe, drill collars, and other parts of the drillstring in the well. (logged depth or logger's depth or logger's total depth) (MD)

measurements-while-drilling. A real-time log of drilling parameters made by sensors in the drillstring above the bit. It measures bit orientation (azimuth and inclination) and downhole temperature and pressure. The measurements are digitized and transmitted to the surface by pressure pulses in the drilling mud. It is used on offshore and deviated wells; cf. logging while drilling. (MWD)

mech. mechanical.

mechanical integrity test. A test used to determine if casing in a well is leaking. A liquid is pumped down the well under pressure. The pumping is stopped, and the liquid pressure is monitored for a period of time. If the pressure drops, this indicates that the casing is leaking. (MIT)

mechanical rig. An older rotary drilling rig that uses just diesel engines as prime movers. The engines are mechanically connected to machinery on the drill floor by a transmission called a compounder; cf. diesel-electric rig.

med and **med.** medium.

med gr. medium grained.

member. A distinctive but local bed that occurs in a formation. It is given a formal, two-part name, similar to a formation name such as the Layton Sandstone Member of the Coffeyville Formation. (Mb., Mbr, and mbr)

MER. maximum efficient rate.

Mesozoic. An era of geological time from 251 to 65.5 million years ago. It is known as the age of reptiles and is divided into the Triassic, Jurassic, and Cretaceous periods. (Meso)

metamorphic rock. A rock that has been altered by heat and/or pressure; e.g., gneiss and marble; cf. sedimentary and igneous rock. (meta)

meteoric water. Fresh subsurface water; cf. connate water.

meter. (1) The unit of length in the metric system. It is equal to 39.37 inches and 3.28 feet. (m) (2) a measuring device. (mtr) *See also* gas meter.

meterhouse. A gas meter shelter. (charthouse)

meter prover. A device that calibrates a meter. It compares the amount of gas or liquid flowing through the meter prover to the meter reading on a meter as the same or equal amount of fluid flows through it. (prover)

METH and **meth.** methane.

methane. A hydrocarbon composed of CH_4 . It is a gas under surface conditions and is the most abundant component of natural gas. (C₁, METH, and meth)

metr. metric.

metric ton. The metric system unit for measurement of crude oil weight. A metric ton weighs 2,240 pounds and is the equivalent to 7.5 barrels of average weight oil.

MF. (1) manifold and (2) mud filtrate.

MFP. maximum flowing pressure.

MG. mud gas.

mgal. milligal.

m-gr. medium grained.

MGS. mud-gas separator.

mho. A unit of conductivity recorded on a well log. It is the reciprocal of an ohm.

MHz. megahertz.

MI. (1) moving in and (2) mineral interest.

mi. mile.

MIC and **mic.** mica.

mic. micaceous.

mica. A common mineral that occurs as thin elastic flakes. Two types are white mica (muscovite) and black mica (biotite). (Mic and mic)

micellar-polymer flood. An enhanced oil recovery method in which a surfactant is injected into a depleted oil reservoir to form a microemulsion of the remaining oil. Polymer-thickened water is then injected to drive the oil to producing wells.

micrite. A very-fine-grained limestone. (Micr and micr)

microbial gas. *See* biogenic gas.

microemulsion. An emulsion in which oil occurs as very small droplets suspended in water.

microfossil. The preserved remains of a tiny plant or animal that needs a microscope for identification. They are commonly shells of CaCO_3 or SiO_2 . Some types of microfossils are foraminifera (forams), radiolaria, coccolithophores, diatoms, spores, and pollen; cf. macrofossil. (Microfos or microfos)

micropaleontologist. A person who studies and identifies microfossils. (bug picker)

microresistivity log. A wireline resistivity log that measures resistivity without much penetration into the side of the wellbore.

MICU. moving in completion unit.

Mid. middle.

MIDDU. moving in double drum unit.

MIE. move in equipment.

migration. (1) The vertical and horizontal flow of oil and gas from the source rock to the trap or its ultimate destination. (2) A computer process that moves dipping seismic reflections into more accurate positions on a seismic record.

mill. (1) To grind up or pulverize. (2) A fishing tool with diamond or tungsten-carbide cutting edges used to grind a fish or cut a hole in casing.

milled-teeth tricone bit. A tricone drill bit in which the teeth have been machined out of the steel cones. It is used to drill soft and medium hardness rocks; cf. insert bit. (steel-tooth tricone bit)

milli. $\frac{1}{1,000}$.

millidarcy. $\frac{1}{1,000}$ darcy, a unit of permeability. (md and md.) *See also* darcy.

milligal. The unit of gravity measurement. (mGal)

millisecond. $\frac{1}{1,000}$ second. It is a common depth measurement on a seismic record. (ms)

MIM. moving in materials.

min. (1) minimum and (2) minerals.

min. minute.

mineral. A naturally occurring, relatively pure chemical compound. It can occur as either a crystal or an amorphous grain. Rocks are composed of mineral grains (e.g., quartz and calcite). (Min, min, and mnrl)

mineral interest or rights. The legal ownership of oil and gas below land. The mineral rights owner can explore and drill for gas and oil on that land and can produce the gas and oil. The federal government of most countries owns the mineral rights on land and offshore. The mineral rights of fee land that occurs in the United States is privately owned and can be transferred with a lease; cf. surface rights. (MI)

min P. minimum pressure.

Miocene. An epoch of time from 23 to 5.3 million years ago. It is part of the Tertiary period. (Mio)

MIPU. moving in pulling unit.

MIR. moving in rig.

MIRT. moving in rotary tools.

MIRU. moving in and rigging up.

miscible. The complete mixture of one fluid in another; cf. insoluble.

miscible gas drive. An enhanced oil recovery method in which gases that mix with oil in reservoir, such as carbon dioxide or liquefied petroleum gas, are injected into a depleted reservoir to produce more oil.

MISR. moving in service rig.

Mississippian. A period of geological time from 359 to 318 million years ago. It is part of the Paleozoic era. (Miss)

mist extractor. Wire mesh or vanes that are used to separate liquid droplets from gas in a separator.

mis-tie. A problem in correlating seismic horizons between intersecting seismic lines.

MISU. moving in service unit.

MIT. (1) mechanical integrity test and (2) moving in tools.

mixed-based crude oil. A refiner's term for crude oil that contains both paraffin and asphalt; cf. asphalt-based and paraffin-based crude oil.

ML. mud logger.

ml. milliliter.

mld. milled.

MLT. measured log thickness.

MLU. mud-logging unit.

mly. marly.

mm. (1) millimeter and (2) million.

MMcf. 1,000,000 cubic feet.

MMS. Minerals Management Service (www.mms.gov).

MMscf. million standard cubic feet.

MN. midnight.

mnr. minor.

MO. (1) move and (2) moving out.

MOCU. moving out completion unit.

mod. (1) moderate and moderately.

mode-conversion wave. A wave that has been transformed from one type of wave to another when it was reflected (e.g., a PS wave is a P wave that was converted into an S wave). (c-wave)

MODU. mobile offshore drilling unit.

molecular sieve. A substance, such as the mineral zeolite, that can filter molecules based on size or structure.

Moll. mollusk.

mol wt. molecular weight.

monkeyboard. A small platform located near the top of a derrick or mast on a drilling rig. The derrick operator stands on the monkeyboard when drillpipe is being tripped.

monkeyman. See derrick operator.

monobore. A well with a relatively uniform inner casing diameter from the surface to total depth. Expandable casing is used.

moonpool. A reinforced hole in the bottom of a drillship through which the drillstring runs.

MOP. maximum operating pressure.

MOR. moving out rig.

morning report. See daily drilling report.

MORT. moving out rotary tools.

motherbore. The original vertical well from which laterals are drilled.

motor-generator rig. *See* diesel-electric rig.

motor operator. The person in charge of maintaining the prime movers on a drilling rig.

mott. mottled.

mottled. A sedimentary rock with spots of different colors. (mott)

mouse hole. A hole in the drill floor used to hold the next joint of drillpipe used to make a connection.

MP. maximum pressure.

MPT. male pipe thread.

MR. (1) marine rig and (2) meter run.

MRG. methane-rich gas.

mrlst. marlstone.

MS. measured depth.

ms. milliseconds.

Mscg/d. thousand standard cubic feet per day.

MSL. mean sea level.

MSP. maximum surface pressure.

MT. measured thickness.

Mt. middle tubing.

MTD. measured total depth.

mtl. material.

MTP. (1) maximum top pressure and (2) maximum tubing pressure.

mtr. meter.

Mtrx. matrix.

MTS. mud to surface.

μ . viscosity.

mud. *See* drilling mud.

mud acid. A mixture of hydrochloric and hydrofluoric acids. It is commonly used in acid jobs. (MA)

mudcake. A cylinder of clay particles that were plastered against the sides of the well by drilling mud during drilling. (filter cake)

mud filtrate. The liquid and fines from drilling mud that are forced into the pores of rocks adjacent to the wellbore (invaded zone) as a well is drilled. (MF)

mud/gas separator. A steel vessel mounted on the mud tanks that is used to separate any gas out of the drilling mud coming from the well. (MGS)

mud hogs. Mud pumps on a drilling rig. (slush pumps)

mud hose. The rubber hose that connects the mud pumps to the swivel on a drilling rig. (rotary hose)

mud-in sample. A drilling mud sample taken from the suction pit on the mud tanks before the mud goes the mud pumps and down the well; cf. mud-out sample. (suction pit sample)

mudline. The bottom of the ocean.

mud log. A record of any natural gas in the drilling mud (gas-cut mud) and any crude oil in the well cuttings (show of oil) made by a service company as a well is being drilled. Either a gas detector is used to determine the total amount of gas or a gas chromatograph is used to determine the amount of methane, ethane, propane, butane, and pentane dissolved in the drilling mud. A rate of penetration (ROP) curve, a gamma ray or spontaneous potential log, and a sample log are also recorded on the mud log.

mud logger. (1) One of two geologists that work 12-hour tours in a mud logging trailer at a drilling site to make a mud log. (2) A service company that makes mud logs. (ML)

mud man. *See* drilling fluids engineer.

mud motor. *See* downhole mud motor.

mud-out sample. A drilling mud sample taken after the drilling mud circulates out of the well and passes through the shale shaker screens; cf. mud-in sample. (shale shaker sample)

mud pit. An earthen excavation near the drilling rig where drilling mud is temporarily stored; cf. mud tanks.

mud report. A daily report of the physical and chemical properties of the drilling fluid used during drilling a well. A mud report is made daily by a drilling fluids engineer.

mudstone. A sedimentary rock composed of silt- and clay-sized particles. (mdst)

mud tanks. Several, rectangular, steel tanks, arranged end-on-end that hold drilling mud on a drilling rig. The tanks are open on the top and connected by pipes. The drilling mud from the shale shakers flows from the shaker tank to the reserve tank to the suction tank where it is pumped back down the well by the mud hogs.

mud up. To increase the density and viscosity of drilling mud by adding dry clay, usually bentonite; cf. water back.

mud weight. The density of drilling mud expressed in pounds per gallon (lbm/gal). Mud weight is commonly 9 to 10 lbm/gal. (md wt, mud wt, and MW)

mud wt. mud weight.

multicomponent seismic. The use of several receivers at each seismic receiver station to record both compressional waves (P) and shear (S) waves. It includes three-component (3-C), four-component (4-C), and nine-component (9-C) seismic. Conventional seismic records only compressional waves.

multilateral well. A well with several smaller branches (laterals) drilled out from the main (mother) well.

multinational. An oil company that operates in several countries.

multiple completion. One well that produces out of two (dual completion) or more reservoirs.

multiple rate flow, multiple rate, or multirate test. A producing well test that uses pressure recorded during time periods at different well flow rates to (1) evaluate well completion, (2) estimate reservoir parameters such as permeability, (3) satisfy government regulations, and (4) determine well deliverability.

multiple-stage compressors. Several, inline-compressors that increase gas pressure in increments.

multi-point test. A gas well test that measures several flow rates and their bottom-hole pressures to determine the open flow potential of the well. (flow-after-flow test)

multirate test. A type of pressure transient test, such as a four-point test, that measures the flowing bottom-hole pressure at different stabilized flow rates.

multistage cementing. A cement job in which several sections of a casing string are cemented in successive stages.

multistage hydraulic fracturing. The fracking of a lateral in several separate stages. There can be up to 40 stages starting with the toe and ending in the heel.

Musc or **musc.** muscovite.

muscovite. A common mineral formed by white to transparent, thin flakes; cf. biotite. (white mica) (Musc and musc)

mV. millivolts.

MW. mud weight.

MWD. measurements-while-drilling.

MWP. maximum working pressure.

mx. medium crystalline.

mxd. mixed.

m.y. million years.

MYA. millions of years ago.

N. (1) dimensionless number, (2) neutron log, and (3) nitrogen.

NA. (1) not applicable and (2) not available.

NACE. National Association of Corrosion Engineers (www.nace.org).

NaCl. sodium chloride (salt).

NADOA. National Association of Division Order Analysts (www.nadoa.org).

NAG. no appreciable gas.

NALTA. National Association of Lease and Title Analysts (www.nalta.org).

nanotesla. A unit of magnetic measurement. (nT)

NARO. National Association of Royalty Owners.

nat. natural.

national company. See host company.

natural diamond bit. A fixed cutter, steel bit with no moving parts. Hundreds of small industrial diamonds are attached to the bottom and sides of the bit in geometric patterns. Watercourses deliver drilling fluid to the face of the bit to remove well cuttings; cf. tricone bit and polycrystalline compact diamond bit. (DB)

natural gamma ray log. A wireline well log that measures the natural radioactivity of rocks. Shales are the only common radioactive rock. It can be run both open and cased hole. (gamma ray log) (GR Log)

natural gas. A naturally occurring gas that is colorless, odorless, and flammable. It is composed of a mixture of hydrocarbon molecules that have one-carbon (methane), two-carbon (ethane), three-carbon (propane), and four-carbon (butane) atoms. Natural gas is measured in thousands of cubic feet (Mcf) and by heat content in British thermal units (Btu) in the English system and thousands of cubic meters and kilojoules in the metric system. Dry gas is pure methane, whereas wet gas also contains ethane, propane, butane, and condensate. Before the gas is sold, an odorant is added to it. (NG)

natural gas liquids. Condensate, butane, propane and ethane that have been removed from natural gas in a natural gas processing plant. (NGL)

- natural gasoline.** *See* condensate.
- natural gas processing plant.** An installation that removes natural gas liquids from natural gas by cooling or absorption. (gas plant)
- naturally occurring radioactive material.** Radioactive material emitting more than 50 microrentgens per hour in oilfield equipment such as tubing. It is primarily from radium in scale that has precipitated out of oilfield brine. (NORM)
- nautical mile.** A unit of distance used at sea that is $\frac{1}{60}$ degree in latitude. It is equal to 6,080 ft, 1.1516 miles, and 1,852 m. (NMI and nmi)
- NB.** new bit.
- NC.** (1) no change and (2) normally closed.
- NCT.** noncontiguous tract.
- ND.** (1) not drilling or (2) nipple down.
- NDBOPs.** nipple, nipping, or nipped down blowout preventers.
- NE.** nonemulsifying (agent).
- NEA.** nonemulsion acid.
- neg.** (1) negative and (2) negligible.
- Neogene.** A period of geological time from 23 to 2.6 million years ago. It is part of the Cenozoic era and includes the Miocene and Pliocene epochs.
- NEP.** net effective pay.
- net revenue interest.** 100% minus all royalties on a well or property. (NRI)
- neut.** (1) neutral and (2) neutralization.
- neutron log or neutron porosity log.** A radioactive wireline well log that is used to measure porosity. It bombards each rock in the well with a certain number of high-speed neutrons. (N and NL)
- NF.** (1) natural flow, (2) no fluorescence, and (3) no fluid.
- NFD.** new field discovery.
- NFW.** new field wildcat.
- NG.** (1) no good and (2) natural gas.
- NGL.** natural gas liquids.
- NIC.** not in contact.
- nine-component seismic.** A land seismic survey that uses three vibrator sources and three geophones oriented at right angles to each other at each receiver location to record both conventional compressional waves (P waves) and also shear waves (S waves). It is used to better determine rock types and locate fractures. *See also* 4-C seismic.
- NIP and nip.** (1) nipple and (2) nipple up.
- NIPER.** National Institute for Petroleum and Energy Research (www.osti.gov/techtran/niper).
- nipple.** A short pipe with threads or welds on both ends. (NIP and nip)
- nipple up.** To connect equipment or fittings such as a blowout preventer; cf. nipple down. (NU and NIP)
- nipple down.** to disconnect equipment or fittings; cf. nipple up. (ND)
- NL.** neutron log.
- NMI and nmi.** nautical mile.
- NMR.** nuclear magnetic resonance.
- NO.** (1) new oil and (2) normally open.
- nodding donkey.** A beam pumping oil well in England.
- No Inc.** no increase.
- noise.** Unwanted seismic energy recorded with the signal. It is everything except direct (primary) reflections that represent the subsurface geology; cf. signal. (N)
- noise log.** A production log that records sounds with depth in a well.
- NOJV.** nonoperated joint venture.
- nom.** nominal.
- nominal weight.** Calculated weight rather than measured.
- nonassociated gas.** Natural gas that is not dissolved in or in contact with crude oil in the reservoir; cf. associated gas.
- nonexclusive.** Data shared by several parties; cf. proprietary.
- NOP.** nonoperating property.
- nor.** normal.
- no rec.** no recovery.
- no returns.** No well cuttings were obtained for that interval in the well. (NR)
- NORM.** naturally occurring radioactive material.
- normal fault.** A fault with predominantly vertical movement (dip slip), in which the hanging wall has been lowered in relation to the footwall. It creates a lost section; cf. reverse fault.
- normal pressure.** Fluid pressure in subsurface rocks due to the weight of the overlying fluids; cf. abnormal high pressure. (hydrostatic pressure)
- nose.** The lobate surface pattern of an eroded, plunging anticline.
- noz.** nozzle.

nozzle. An orifice in a tricone drill bit between two cones. Drilling mud jets out the nozzle. (jet) (noz)

NP. (1) no production, (2) not porous, and (3) not pumping.

NPD. new pool discovery.

NPS. nominal pipe size.

NPW. new pool wildcat.

NR. (1) no report, (2) no recovery, (3) no returns, and (4) not reported.

NRI. net revenue interest.

NS and **n/s.** no show.

n.s. no sample.

NSG. no show gas.

NSO. (1) nitrogen, sulfur, and oxygen organic compounds and (2) no show oil.

NSO&G. no show oil and gas.

NSR. no spacing rule.

nT. nanotesla.

NTD. new total depth.

NTS. not to scale.

N/tst. no test.

N₂. nitrogen.

NU. nipping up.

NUBOPs. nipple, nipping, or nipped up blowout preventers.

nuclear magnetic resonance log. A wireline well log that uses magnetism to measure porosity and pore sizes. It can be used to calculate permeability and determine types of fluids in the reservoir. (NMR log)

num. numerous.

NVP or **n.v.p.** no visible porosity.

NW. no water.

NYA. not yet available.

NYMEX. New York Mercantile Exchange (www.nymex.com).

O. oil.

OAH. overall height.

OAL. overall length.

O&G. oil and gas.

O&GCM. oil and gas-cut mud.

O&GCSW. oil and gas-cut saltwater.

O&GCW. oil and gas-cut water.

O&GL. oil and gas lease.

O&SW. oil and saltwater.

O&W. oil and water.

OAW. old abandoned well.

OB. off bottom.

OBM. oil-based mud.

OBOC. operated by other company.

observation well. A well drilled to map or monitor subsurface fluids.

obsol. obsolete.

OBW & RS. optimum bit weight and rotary speed.

OC. (1) oil cut, (2) on center, and (3) operations commenced.

occ. occasional.

OCM. oil-cut mud.

OCS. outer continental shelf.

OCSW. oil-cut saltwater.

OCW. oil-cut water.

OD. outer diameter.

od. odor.

OE. (1) open end and (2) oil emulsion.

OEG. oil-equivalent gas.

OEM. oil emulsion mud.

OF. open flow.

offset. (1) The horizontal distance from the seismic source to the receiver.
(2) A well location adjacent to a producing well. Each producing well has eight offset locations (four direct and four diagonal offsets).

offshore production platform. *See* production platform.

off structure. Located off the top of a trap; cf. on structure.

OFLU. oil fluorescence.

OFP. open-flow potential.

OH. open hole.

ohm. A unit of electrical resistivity. It is recorded on resistivity well logs as ohm-meter or ohm meter²/meter.

ohm-m. ohm-meter.

OIH. oil in hole.

oil. See crude oil. (O)

oil-base or **oil-based drilling mud.** Drilling mud made with diesel oil. It is designed to prevent formation damage; cf. synthetic-base and water-base drilling mud. (OBM)

oil cut. diluted with oil.

oil-equivalent gas. The number of barrels of oil that is equal in heat content (Btu) to a volume of natural gas. The ratio is about 1 barrel of oil to 6,000 cubic feet of natural gas. It varies slightly from company to company. (barrels-of-oil equivalent or energy-equivalent barrel) (OEG)

oilfield. (adjective) e.g., oilfield equipment.

oil field. A noun for the surface area directly above one or more reservoirs on the same trap; e.g., East Texas oil field.

oilfield brine. Very saline water that is produced with oil.

oil in place. The total amount of oil located in the pores of a subsurface reservoir in an oil field; cf. recoverable oil. (OIP)

oil-in-water emulsion. Droplets of oil suspended in water; cf. water-in-oil emulsion.

oil sand. A common term for sandstone containing crude oil.

oil shale. A fine-grained sedimentary rock containing organic matter called kerogen that, when heated, forms crude oil called shale oil. It is a source rock that is old enough but has never been buried deeply enough to have sufficient heat to generate oil.

oil show. The presence of crude oil in well cuttings. It is detected by mud logging while drilling the well.

oil string. The smallest diameter and longest casing string in a well. (production casing)

oil-water contact. The boundary between crude oil and water in a reservoir. (OWC)

oil wet. A reservoir rock in which water occurs in the center of the pores and oil coats the rock surfaces; cf. water wet.

oil window. The zone in the earth where crude oil is generated from organic matter in source rocks.

OIP. oil in place.

Oligocene. An epoch of time from 33.9 to 23 million years ago. It is part of the Tertiary period. (Olig)

ON. overnight.

on pump. An oil well that uses a sucker-rod pump.

ONRR. Office of Natural Resources Revenue (www.onnr.gov).

on structure. Located on top of a trap; cf. off structure.

OO. oil odor.

OOG. out of gauge.

OOIP. original oil in place.

Ool and **ool.** (1) oolite and (2) oolitic.

oolite. A sand- or silt-sized sphere of calcium carbonate that precipitated from water. (Ool and ool)

oolitic limestone. A limestone composed predominately of oolites.

OP. (1) oil pay and (2) overproduced.

op. opaque.

OPBD. old plug-back depth.

open hole. A wellbore with no casing or liner.

open-hole completion. A well with casing run and cemented down to the level of the reservoir rock, which is left uncased; cf. set-through completion. (barefoot and top-set completion)

open-hole log. A wireline well log such as an electrical log that can only be run in a well without casing. Most wireline logs are open-hole; cf. cased-hole log.

oper. (1) operator and (2) operations.

operator. The company that (1) contracts to drill a well, (2) is responsible for maintaining a producing lease, or (3) is in charge of operations in a working interest area. (oper and opr)

opn. open.

opp. opposite.

opr. operator.

optn to F/O. option to farmout.

Ordovician. A period of geological time from 488 to 444 million years ago. It is part of the Paleozoic era. (Ord)

orf. orifice.

org. organic.

orifice. A hole in a plate through which fluids can flow. An orifice is described by its diameter. (orf)

orifice gas meter. A meter that measures the volume of natural gas flowing through a line bypassing the gas through a specific size orifice. The drop in pressure through the orifice is related to the velocity of the gas.

orig. original.

original pressure. *See* initial pressure.

ORR. overriding royalty.

ORRI. overriding royalty interest.

orthoquartzite. A sandstone composed of well-sorted quartz sand grains. It can be an excellent reservoir rock; cf. graywacke.

OS. (1) oil show, (2) overshot, and (3) operating system.

O/S. out of service.

O, S & F. oil, stain, and fluorescence.

O sd. oil sand.

OSR. oil source rock.

OSTN or **ostn.** oil stain.

OSTOIP. original stock tank oil in place.

Ot. open tubing.

OTC. Offshore Technology Conference (www.otcnet.org).

OTD. old total depth.

otl. outlet.

OTS. oil to surface.

OU. oil unit.

outer continental shelf. The portion of the sea bottom where the federal government owns the mineral rights. It is from the state limit, usually 3 nautical miles from the shoreline, to 200 nautical miles from the shoreline. (OCS)

outpost well. A well drilled to significantly increase the area of a producing field. If the outpost well is successful, it is called an extension well.

OVC. other valuable consideration.

overbalance. The condition in a well in which the pressure of the drilling mud is more than the pressure of the fluids in the surrounding rocks; cf. underbalance. (fluid pressure)

overpull. The amount of upward force exerted on a tubular such as a drillstring in a well that is greater than that tubular's weight in the well. It is recorded in thousands of pounds.

overpressure. *See* abnormal high pressure.

override and **overriding royalty interest.** An interest in production created from a working interest that is free and clear of any costs. (ORRI)

overshot. A fishing tool that is run down and around a pipe (fish) on the bottom of the well. It grips the outside of the pipe to pull the fish out of the well; cf. spear. (OS)

overthrust belt. A zone of thrust faults that moved during the formation of a mountain range. (disturbed belt)

overturned fold. A fold in sedimentary rocks in which the axis is not vertical and the limbs are not symmetrical.

OWC. oil-water contact.

OWDD. oil well drilled deeper.

OWF. oil well flowing.

OWG. oil well gas.

OWPB. oil or old well plugged back.

OWR. oil/water ratio.

OWSI. oil well shut-in.

OWWO. oil or old well worked over.

ox. oxidized.

Oxfordian. An age of geological time from 159 to 154 million years ago. It is part of the Jurassic period.

oz. ounce.

P. (1) compressional wave, (2) pumped, and (3) pumping.

p. pressure.

PA. (1) pooling agreement and (2) pressure alarm.

PAB. (1) per acre bonus and (2) per acre basis.

packed hole assembly. A downhole assembly that uses several stabilizers to make the well to be drilled out straight. *See also* fulcrum and pendulum assembly.

packer. A cylinder of rubber-like material that is run on a tubular string or drillstring and compressed to expand and seal the well at that level. Packers are permanent (nonretrievable) or retrievable. (PRK and pkr)

packer flowmeter. An instrument used to force fluid to flow up the well through an orifice in a packer to measure the flow.

packoff. A sealing tool.

pack off. To seal a space such as the tubing-casing annulus.

packstone. A type of limestone with large, sand-sized grains touching each other and having fine-grained material in between. (Pkst)

pad. (1) The steel plate below the middle of a vibrator truck. During travel, the pad is raised. At the shot point it is lowered onto the ground and used to raise the back wheels of the vibrator truck off the ground. (base plate) (2) *See* drilling pad. (3) *See* well pad.

paid-up lease. A type of lease that does not require delay rental payments to maintain the lease during the primary term; cf. delay rental lease.

paleo. paleontology.

Paleocene. A period of geological time from 65.5 to 55.8 million years ago. It is part of the Tertiary period.

Paleogene. Geological time from 65.5 to 23 million years ago. It is part of the Cenozoic era and includes the Paleocene, Eocene, and Oligocene epochs.

paleogeographic map. An interpretation of the land surface during a certain time of earth's history.

paleontologist. A geologist who studies fossils.

paleontology. A branch of geology that studies of fossils. (paleo)

paleo pick. A horizon in sedimentary rocks defined by fossils.

Paleozoic. An era of geological time from 542 to 251 million years ago. It is divided into the Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, and Permian periods. (Paleo)

palynologist. A person who studies fossil spores and pollen. (weed and seed person)

P&A. plug and abandoned.

P&F. pump and flow.

P&P. (1) Porosity and permeability and (2) porous and permeable.

PAR. Per-acre rental.

Par and **par.** particle.

par. paraffin.

paraffin. A member of the hydrocarbon series of molecules that are straight chains with single bonds. All hydrocarbon molecules in natural gas and some in crude oil are paraffins. Long paraffin molecules are waxes that are solid at low temperatures. (par)

paraffin-based crude oil. A refiner's term for crude oil with little or no asphalt. It will yield a relatively high percentage of paraffin wax, high-quality lubricating oil, and kerosene when refined; cf. asphalt-based and mixed-base crude oil.

paraffin inhibitor. An additive to crude oil that prevents formation of waxes during production.

paraffin knife or **scratcher.** A tool that use sharp edges to scrape wax (paraffin) out of a tubing string.

parallel-free pump. An oil well hydraulic pump system that uses two tubing strings. One is for the power oil that drives the pump and the other is for the produced fluids; cf. casing-free pump.

patch reef. A small detached reef.

pay. (1) The zone producing gas and/or oil in a well. (2) The vertical thickness of the producing zone. Pay can be measured as either (a) gross pay, including nonproductive zones, or (b) net pay, including only productive zones.

payout. A criterion used to evaluate an investment in an oil or gas well. It is the time necessary for the net production revenues (minus royalties) to equal the costs of drilling, completing, and operating the well up to that time. (PO) *See also* return on investment.

pay sand. A sandstone that produces gas and/or oil.

payt. payment.

pay zone. The vertical portion of a reservoir in a well that produces gas and/or oil.

PB. (1) plug back and (2) plugged back.

PBD. plugged back depth.

PBHL. proposed bottom-hole location.

Pbl and **pbl.** pebble.

PBTD. plugged back total depth.

P_c. capillary pressure.

pct. percent.

PCV. pressure control valve.

PD. (1) proposed depth and (2) per day.

PDC. pressure differential controller.

PDC bit. polycrystalline diamond compact bit.

PDR. pressure differential recorder.

PE. (1) plain end and (2) pumping equipment.

peak oil. A concept that world crude oil production will peak and then decrease at a specific time. It is thought that this will occur when the amount of increased oil production from new, discovered oil fields and

new, improved oil recovery applications in older fields is exceeded by the natural decrease in oil production from existing fields.

pen. (1) penetration and (2) penetration test.

pendulum assembly. A downhole assembly that uses the weight of a drill collar below a stabilizer to cause the bit to drop and decrease the angle (drop angle) of a deviated well. *See also* fulcrum and packed hole assembly.

Pennsylvanian. A period of geological time from 318 to 299 million years ago. It is part of the Paleozoic era. (Penn)

percentage map. A map that uses contours to show the percentage of a specific rock type such as sandstone in a formation.

perco. percolation.

PERF. perforated.

perf. (1) perforate, (2) perforated, and (3) perforator.

perf csg. perforated casing.

perforate. To blow holes (perforations) into the casing or lining, cement, and reservoir rock in a well with a perforating gun. (perf)

perforating gun. A tool run on a wireline or tubing string that shoots perforations (holes) in the casing or liner. It uses either steel bullets or, more commonly, shaped-explosive charges (jet perforation). The gun is either expendable or retrievable. (gun)

perforation. A hole (tunnel) shot in casing or liner, cement, and reservoir rock to allow oil and/or gas to flow into the well. Perforations are described by shots per foot (spf) and their angular separation, which is called phase.

period. A subdivision of an era of geological time (e.g., Pennsylvanian period). Periods are subdivided into epochs.

Perm and perm. permeability.

perm. (1) permeable and (2) permanent.

permeability. A measure of the ease with which a fluid flows through a rock. The units are millidarcys or darcys. Absolute permeability is the permeability of the rock when only one fluid is in the pores. Effective permeability is the permeability of one fluid in a rock when another fluid also shares the pores. Relative permeability is the ratio of effective permeability to absolute permeability; cf. porosity. (Perm, perm, and k) *See also* darcy.

permeameter. An instrument used to measure the permeability of a rock sample.

Permian. A period of geological time from 299 to 251 million years ago. It is the last period of the Paleozoic era and was characterized by a desert climate. (Perm)

Permian basins. Three tropical-water basins (Midland, Marfa, and Delaware) that were located in west Texas and eastern New Mexico. They are filled with sedimentary rocks and are very productive for gas and oil.

permit person. An employee of a seismic contractor who obtains permission from surface landowners to run seismic exploration across their land.

perp. perpendicular.

Pet and pet. petroleum.

petrf. petroliferous.

petrochemicals. Products made from petroleum feedstocks.

petroleum. The strict definition of petroleum includes only crude oil, but by general usage, it also includes natural gas. Petroleum is derived from the Latin words petro (rock) and oleum (oil). (Pet and pet)

petroleum engineer. An engineer who is trained to drill and complete wells and produce petroleum.

petroleum geologist. A geologist who specializes in the search for (exploration geologist) and exploitation (developmental geologist) of petroleum deposits.

petrophysics. The study of the physical and chemical properties of rocks in relation to the pore systems in the rocks and the fluids in the pores.

pf. per foot.

PFT. pumping for test.

PGW. producing gas well.

pH. A scale from 0 to 14 that measures the acidity or alkalinity of a liquid; 7 is neutral, below 7 is acidic, and above 7 is alkaline.

ph. phase.

phase. The angular separation of perforations. e.g., 60°. (ph)

Ø. porosity.

Phos or phos. (1) phosphate and (2) phosphatic.

PI. (1) productivity index, (2) production index, and (3) pressure indicator.

pick. (1) An interpretation of where the top or bottom of a subsurface rock layer occurs on a well log. (2) The location of an event such as a seismic horizon of a seismic record.

piercement salt dome. A salt dome that has risen to break through overlying sedimentary rocks.

pill. A batch of a substance or additive such as lost circulation material.

pilot hole. A small-diameter wellbore drilled out from a straight well to kick off the well at an angle.

pin. A male-threaded connection that mates with a box (a female connection); cf. box.

pinch out. (verb) To have a rock progressively narrow to zero thickness in a horizontal direction. (wedge out)

pinch-out. (noun) The termination of a rock as it progressively narrows to zero thickness in a horizontal direction; cf. shale-out. *See also* wedge-out.

pinnacle reef. A small cone-shaped reef.

pipe elevators. Clamplike devices that are attached to the bottom of the traveling block of a drilling rig. They are designed to attach onto the drillpipe.

pipeline oil. Crude oil that is below a maximum basic sediment and water content and meets pipeline transportation specifications. (sales-quality oil)

pipeline-quality gas. Natural gas that has been treated to meet pipeline pressure and chemical standards with a minimum of impurities. (sales-quality gas)

pipe rack. A steel framework on the ground next to a drilling rig. It is used to store horizontal joints of drillpipe.

pipe ramp. A flat, steel incline in the front of a drilling rig. It is used to drag drillpipe and casing up through the V-door and onto the drill floor.

pipe rams. Two large blocks of metal with inserts in a blowout-preventer stack. They are designed to close around drillpipe in a well to close the well; cf. blind rams.

PIT. Pressure integrity test.

pit level. The height of drilling fluid in the mud tanks.

pitman. The steel beam that connects the rotary counterbalance with the walking beam on a beam-pumping unit.

pit volume totalizer. A series of floats in the mud tanks of a drilling rig. They record the volume of mud in the tanks and send an alarm when the volume is decreasing or increasing.

PJ. (1) pump jack and (2) pump job.

pkd. packed.

pkg. packing.

PKR and pkr. packer.

Pkst. packstone.

PL. (1) pipeline and (2) property line.

plant. To position a geophone for a seismic survey.

plat. (1) a map. (2) to map.

plate tectonics. A theory in which the crust of the earth is composed of large, moving plates. Each plate originates at a mid-ocean ridge and ends in a subduction zone; cf. seafloor spreading.

play. A proven combination of reservoir rock, caprock, and trap type that contains commercial amounts of petroleum in an area.

pld. pulled.

Pleistocene. An epoch of time, from about 2.6 million years ago to 10,000 years ago, during which glaciers periodically occupied much of the land area. It is part of the Quaternary period. (ice age) (Pleist)

plg. pulling.

plgd. plugged.

Pliocene. An epoch of geological time from 5.3 to 2.6 million years ago. It is part of the Tertiary period. (Plio)

PLO. (1) pipeline oil and (2) pumping load oil.

PLUG. plugged off.

plug. (1) A small cylinder (1 in. diameter) of rock drilled from a core that is used to measure porosity and permeability. (2) To place cement in a well in order to abandon the well or seal off a depleted zone in the well.

plug and abandon and **plug & abandon.** The final stage in any well. Permission to plug and abandon is granted by a government agency and done to specific requirements. A surface cement plug is placed at the surface, and cement plugs are placed at specified depths in the well to prevent any pollution. A steel plate is welded to the top of the casing and covered with dirt. (P&A)

plugback. To plug and abandon one zone and complete in another zone higher in the well. (PB)

plunging anticline. An anticline with an axis oriented at an angle to horizontal.

plutonic rock. An igneous rock that crystallized from a hot, molten liquid below the surface of the earth; e.g., granite; cf. lava. *See also* intrusion.

pm or **pmp.** (1) pump, (2) pumping, or (3) pumped.

pneu. pneumatic.

pneumatic drilling. Drilling with either air or air and water (mist) as the circulating fluid.

pnl. panel.

PO. (1) pay out, (2) pulled out, (3) pumps off, (4) purchase order, and (5) present operation.

POB. (1) plug on bottom and (2) pump on beam.

POE. point of entry.

POGW. producing oil and gas well.

POH. pulled out of hole.

point bar. A sand bar deposited on the inside bend of a river meander.

point of entry. The location where a deviated or horizontal well enters the target formation. (POE)

polished rod. The polished, brass or steel rod that oscillates up and down through the stuffing box of an oil well rod-pumping unit. It is located at the top of the sucker-rod string. (PR)

polycrystalline diamond compact bit. A fixed cutter, steel bit with no moving parts. Synthetic diamonds on blanks on the face of the steel cutters that project out the bottom are designed to shear the rock. Watercourses deliver drilling fluid to the face of the bit to remove well cuttings. PDC bits are known for long life; cf. natural diamond and tricone bit. (PDCB)

polymer. A long-chain, high-weight molecule. When mixed with water, polymers form a thick, viscous fluid called a gel.

pony rod. A shorter than standard sucker rod.

POOH. pull, pulled, or pulling out of hole.

pool or **pooling.** To combine several smaller leases to make a drilling and spacing unit for the purpose of drilling a well.

poorly sorted. A rock or sediments with elastic grains having a large range of sizes; e.g., dirty sands; cf. well sorted.

POP. put or putting on pump.

Por and **por.** porosity.

por. porous.

pore. The space between solid particles in a rock. A primary pore is formed as the sediments are being deposited on the surface such as between grains. A secondary pore forms after the sedimentary rock is buried in the subsurface by solution or fracturing. *See also* porosity.

pore throat. The narrow connection between two pores in a rock.

pore volume. The volume of pores in a rock. (PV and P.V.)

porosimeter. An instrument used to measure porosity in a rock.

porosity. The percent volume of a rock that is pore space. Absolute or total porosity includes all pore spaces in the rock. Effective porosity includes only the interconnected pores; cf. permeability. (Ø, Por, por, and PR) *See also* pore.

porosity cutoff. A minimum porosity value such as 8% for reservoir rock that is used as a guideline in (1) deciding whether to complete a well or (2) making reserve computations.

pos. (1) position and (2) positive.

positive-displacement meter. A meter that measures the volume of a fluid in specific increments of a volume, one at a time.

poss. possible.

possum belly. A closed metal trough at the top of the shale shakers on a drilling rig. It receives the mud and well cuttings from the mud return line and slows them down before they flow onto the shale shaker screens. Mud and well cuttings samples are obtained from the possum belly.

possible reserves. Reserves that exist with at least 10% certainty; cf. proved and probable reserves.

pot. potential.

pot diff. potential difference.

potential test. A test that measures the maximum amount of fluids that a well can produce in 24 hours. (PT)

pound. The English unit of weight. It is equal to 453.59 grams. (pound avoirdupois) (lb and lbm)

pour point. The lowest temperature at which a particular crude oil will still flow. It is an indication of the wax content of the oil.

POW. producing oil well.

power swivel. *See* top drive.

POWF. producing oil well flowing.

POWP. producing oil well pumping.

PP. (1) pulled pipe and (2) production.

PPA. per power of attorney.

PPB and **ppb.** parts per billion.

PPG and **ppg.** pounds per gallon.

PPM and **ppm.** parts per million.

P PRESS. pump pressure.

PPT and **ppt.** parts per thousand.

ppt. precipitate.

PR. (1) poor returns, (2) polished rod, (3) porosity, and (4) pressure recorder.

PR&T. pulled rods and tubing.

prd. period.

Precambrian. An era of geological time from the beginning of the earth (4.5 billion years ago) until 542 million years ago. (Pre Camb)

precipitated. Crystallized from dissolved salts.

pred. predominant.

prelim. preliminary.

Prep and **prep.** (1) prepare and (2) preparing.

prepacked. Production liner or casing that is concentric and double-walled, with the annulus between the walls filled with loose or resin-coated sand. It is used for sand control.

pres. preserved.

present operation. What is currently happening on a well, such as flowing to sales. (PO)

press. pressure.

pressure. Force per unit area such as pounds per square inch (psi). Gauge (or gage) pressure is pressure above atmospheric pressure. Absolute pressure is gauge plus atmospheric pressure. (press)

pressure bomb. An instrument run on a wireline in a well to record pressures. It consists of a pressure sensor, recorder, and clock drive.

pressure buildup curve. A plot of pressure increase after a gas well has been shut in.

pressure integrity test. A test to determine if there is a leak in a tubular, vessel, or cased portion of a well. High pressure is applied, usually with water, and the tubular, vessel, or cased portion of the well is shut in. The pressure is then monitored for a period of time. If there is no pressure decrease, there is no leak. If there is a leak, the pressure decreases. (PIT)

pressure maintenance. A oilfield system in which produced gas is injected into the free gas cap and produced water is injected into the reservoir below the oil-water contact. It is used during primary production to maintain pressure on the remaining oil and increase ultimate production.

pressure transient test. A test that measures changes in pressures with different flow rates in a well. Three types are drawdown, buildup, and falloff tests.

pressure wave. *See* compressional wave.

prestack migration. The migration of seismic data before the data are stacked. *See also* migration.

prev. (1) prevent and (2) preventive.

prim. primary.

primacord. An explosive cord used as a seismic source on land and for a back-off operation on stuck pipe in a well.

primary cementing. A cement job done as the casing is being run; cf. secondary cementing.

primary drive. The original force that causes oil or gas to flow through the reservoir rock and into a well; e.g., water drive and expansion-gas drive.

primary production. The oil or gas that naturally flows into the well due to the reservoir drive. It does not include oil produced during waterflood or enhanced oil recovery.

primary recovery. The amount of oil and gas that is produced from a well or reservoir by its own pressure.

primary stratigraphic trap. A petroleum trap formed by the deposition of a reservoir rock such as a reef that is encased in shale; e.g., a reef and river channel sandstone; cf. secondary stratigraphic trap.

primary term. The time granted in a lease for exploration and drilling; cf. secondary term.

primary wave. *See* compressional wave.

prime movers. The main engines or motors that supply the power to machinery. On a drilling rig, the prime movers are diesel engines, and on a sucker-rod pumping unit, they are electric motors.

prmt. permit.

prncpl lss. principal lessee.

pro. prorated.

prob. (1) probable and (2) problem.

probable reserves. Reserves that exist with at least 50% certainty; cf. proved and possible reserves.

proc. (1) procedure and (2) process.

Prod. production casing.

Prod and **prod.** production.

prod. (1) produce and (2) produced.

prodg. producing.

produced water. Oilfield brine produced from an oil or gas well.

producer. A well that can produce commercial amounts of petroleum; cf. dry hole.

producing gas/oil ratio. The number of standard cubic feet of natural gas that a well produces per barrel of oil.

production casing. The smallest diameter and longest casing string in a well. (oil string)

production foreperson. An employee of the operator of a field who receives orders from the field superintendent and gives orders to the pumpers and work crews.

production index. The downhole pressure drawdown in psi divided by the production in barrels per day from a well. (PI)

production liner. A liner string run on the bottom of a well adjacent to the producing zone. It can be perforated, slotted, or prepacked.

production log. A log run in a producing well to evaluate a problem. Types of logs include the flowmeter, temperature log, manometer, watercut meter, and collar log.

production pad. *See* well pad.

production platform. An offshore platform that treats and separates produced fluids from offshore wells on the deck of the platform. It can have the wellheads on the platform or receive the produced fluids through flowlines from satellite wells or a wellhead platform in deeper water. The oil or gas goes ashore through a submarine pipeline. Two fixed-type platforms that sit on the ocean bottom are steel jacket and gravity storage production platforms. Floating production platforms include tension leg and spar platforms and FPSOs.

production profile. A plot of flow rate per day versus time for a well.

production rig. A mobile well service or workover hoisting unit used for a workover on a well. Two types are workover rig and service unit.

production-sharing contract. A contract between a foreign government and a multinational company (contractor). The company is granted an area of land or ocean bottom (concession) to explore and drill for a specific time (contract time). The company bears the entire cost of exploration and drilling. If no gas or oil is discovered, the contract expires and the cost of exploration and drilling is lost. If gas or oil is discovered, the company is allowed to produce and sell the petroleum. It is reimbursed for exploration and drilling expenditures from the sales of that production

(cost oil). After reimbursement, further production is sold (profit oil), and the profit is split by an agreed formula in the contract with the foreign government and the company; cf. tax royalty participation contract.

production tax. State tax on oil and gas produced. (severance tax)

production test. A test that measures the amount of gas, oil, and water that a well contributes to a central processing unit.

production tree. *See* Christmas tree.

productivity index. The flow rate that a well can produce per psi difference between reservoir and bottom-hole pressures. It is an indicator of that well's ability to produce oil. (J and PI)

productivity test. A well test made with portable well test equipment that determines the effect of different flow rates on the reservoir. Fluid pressure is measured with the well shut in and at different stabilized rates. It is used to calculate absolute open flow rate and maximum production rate without reservoir damage.

profit oil. Produced oil that is split between a host company and a multinational company by an agreed formula after the multinational company has been reimbursed for expenditures; cf. cost oil.

prog. progress.

prograde. To deposit sediments out into a basin.

proj. project.

prom. prominent.

PROP. propane.

prop. (1) proposed and (2) proportional.

propane. A hydrocarbon composed of C_3H_8 . It is a gas under surface conditions and is found in natural gas. (C_3 and PROP)

proppants and propping agents. Small spheres such as well-sorted sands that are suspended in the frac fluid pumped down a well during a frac job. They hold the fractures open. Proppants are described by the screen sizes on which they are caught, such as 20/40 mesh. Ceramic and sintered aluminum pellets are used for high-temperature, high-pressure wells.

proprietary. Kept secret; cf. nonexclusive.

prospect. A location where both geological and economic conditions favor drilling a well.

prot. protection.

protection casing. A casing string with an intermediate length and diameter. It is used to isolate a problem zone such as a lost circulation in the well as the well is being drilled. (intermediate casing)

proved reserves. Oil and gas reserves that exist with at least 90% certainty; cf. probable and possible reserves. (proven reserves)

proven reserves. See proved reserves.

prover. See meter prover.

PRPT. preparing to run potential test.

prtgs. partings.

prtn. partition (land).

PS. pressure switch.

ps. pseudo-.

PSA. packer set at.

PSI and **psi.** pounds per square inch.

PSIA and **psia.** pounds per square inch absolute.

PSIG and **psig.** pounds per square inch gauge.

PSL. public school land.

PT. potential test.

Pt and **pt.** part.

pt. point.

P₁₀ and **P10.** At least 90% probability that it exists.

PTG. pulling tubing.

PTR. pulled tubing and rods.

PTTC. Petroleum Technology Transfer Council (www.pttc.org).

PTTF. potential test to follow.

PU. (1) pulling unit, (2) picked up, (3) pulled up., and (4) pumping unit

pull casing. To remove and salvage casing from a well.

pulling unit. A truck-mounted service unit with a winch and mast. It is used to pull and run tubing and sucker rods in a well. The crew usually consists of an operator, derrick operator, and floor person. (PU)

pull rods. To remove the sucker-rod string from a well during a workover.

pulsed neutron log. A type of neutron log that can be used to distinguish gas and oil from water behind casing in a well. It bombards the formation with neutrons and measures the returning gamma rays.

pumpability time. The time a cement slurry remains fluid enough to be pumped. (thickening time)

pumpdown. To pump equipment down a producing well to service the well.

pumper. (1) A well that requires a pump to bring the oil to the surface. (2) The mechanic who is responsible for maintaining producing equipment in the field and receives orders from a production foreman.

pump stroke counter. A device used on a drilling rig to record the number of mud pump strokes per minute (SPM). It is recorded on a mud log and used to estimate lag time.

pump jack. A common term for a sucker-rod pump. (PJ)

push-the bit. A rotary steerable system that uses hydraulically activated steering pads on the drilling unit that expand and contract in the to push the bit of center and drill-deviated wells.

putting the well on pump. Replacing the production tree on a well that has lost pressure and will no longer flow to the surface with a sucker-rod pumping unit.

PV or **P.V.** pore volume.

PV. plastic viscosity.

pvmnt. pavement.

PVT. pressure-volume-temperature.

P wave. compressional wave.

PWR. power.

pyls. pyrolysis.

pyr. pyrite.

pyrobit. pyrobitumen.

pyrobitumen. A naturally occurring, dark, hard hydrocarbon. (pyrobit)

pyrolysis. A method of analyzing the composition of a substance by heating the sample in the absence of oxygen. The compositions and temperatures of the gases that are given off as the sample is heated are measured. Source rocks are analyzed by pyrolysis for maturity and organic matter type. (probit)

pyrite. A common, heavy, brassy or bronze-yellow mineral composed of FeS₂. It is commonly called fool's gold. (pyr)

q. rate.

QA. quality assurance.

qty. quantity.

Qtz or **qtz.** quartz.

Qtzt or **qtzt**. quartzite.

quad. quadrangle.

quadrangle. A four-sided tract of land or a map of that land that is bounded by parallels of latitude and meridians of longitude that are 1° apart. (quad)

qual. quality.

quan. quantity.

quartz. A very common and hard mineral composed of SiO₂. Impurities in quartz result in various colors such as milky, rose, and cloudy. Sandstones are composed primarily of quartz sand grains. (Qtz and qtz)

quartzarenite. A sandstone composed of more than 95% quartz sand grains. It can be an excellent reservoir rock.

quartzite. A very hard sandstone composed primarily of quartz sand grains. (Qtzt and qtzt)

Quaternary. A period of geological time from 2.6 million years ago to the present. It is part of the Cenozoic era.

quick-look log. A wellsite, computer-generated log that uses two or more logging measurements to calculate water saturation, porosity, percentages of sandstone, limestone, and shale, and fractures location.

R. (1) resistivity, (2) recovery factor, (3) radioactivity, and (4) range.

r. (1) radius and (2) rare.

RA. radioactive.

R/A. regular acid.

RAD. radius.

radioactivity log. A wireline log that uses a radioactive source in the logging tool to bombard the rocks with either atomic particles or energy to measure porosity; e.g., neutron porosity log and formation density log.

radiolaria. A single-cell animal that floats in the ocean and has a silicon dioxide shell. It is a type of microfossil.

RALOG. running radioactive log.

ramp down and **ramp up**. To gradually and steadily decrease or increase a process or operation.

R&L. road and location.

R&LC. road and location complete.

R&O. rust and oxidation.

R&P. rods and pump.

R&T. rods and tubing.

range. (1) A system of north-south strips six miles wide that are used in land subdivision. (2) The geological time extent that a fossil species existed. (RGE or rng)

rank wildcat. An exploratory well drilled at least two miles away from the nearest production.

raster. Scanned. Raster well logs have been scanned into a computer database.

rate of penetration. The speed with which a drill bit penetrates the rocks at the bottom of a well. It is recorded in minutes per foot (min/ft) on a mud log. (ROP)

rat hole. (1) A hole in the drill floor used to hold the swivel and kelly when tripping out. (2) The lowest portion of the well below the pay zone that is used to accommodate equipment such as a sonde. (anchor hole) (RH)

RB. (1) rock bit and (2) rotary bushing.

RB/D. reservoir barrels per day.

rbds. red beds.

RBM. rotary bushing measurement.

RBP. retrievable bridge plug.

rbr. rubber.

RBSO. rainbow show of oil.

RC. (1) running casing, (2) remote control, and (3) reversed circulation.

RD. (1) rig down, (2) rigged down, (3) rigging down, (4) recorded depth, (5) rotary depth, and (6) random drilling.

R/D. redrilled.

rd. (1) red, (2) road and (3) round.

RDB. rotary drive bushing.

Rd Bds. red beds.

rdd. rounded.

RDRT. rig or rigging down rotary tools.

RDSR. rig or rigging down service rig.

RDSU. rig or rigging down swabbing unit.

RDТ. rig or rigging down tools.

rdtr. round trip.

reacd. reacidize.

ream. To mechanically enlarge or straighten a well or casing string. (RM)

reamer. A sub that uses blades or wheels to ream a wellbore or casing string.

rebar. reinforcing bar.

reboiler. A distillation vessel that heats wet glycol to separate glycol and water.

Rec or **rec.** (1) recover and (2) recovered.

rec. (1) recorder, (2) recovery, and (3) recommended.

Recent. See Holocene.

recharge area. An aquifer outcrop where freshwater enters.

recmd. recommend.

recomp. recomplete.

recomplete. To plug and abandon one zone in a well and complete in another. It is done during a workover by either plugging back or drilling deeper. (recomp)

recond. recondition.

recoverable gas or **oil.** The amount of gas or oil that can be produced from a reservoir under current economic conditions. It is a percent of the gas or oil in place; cf. oil in place. See also recovery factor.

recovery factor. The percentage of oil and/or gas in place that can be produced from a reservoir. (R)

rcv. receive.

red. (1) reducer and (2) reducing.

red bed. Red-colored sedimentary rocks with an iron oxide coating usually deposited in a desert environment. (rbds and RD Bds)

redrid. redrilled.

reef. A ridge or moundlike structure of wave-resistant, framework-building organisms such as corals. (Rf and rf)

referg. refrigerant.

reflection coefficient. The percentage of seismic energy reflected off a surface.

reg. (1) regular and (2) regulator.

regression. A retreat of the sea from the land; cf. transgression.

regular acid. hydrochloric acid. (R/A)

reinf. reinforce.

reinf conc. reinforced concrete.

rej. reject.

REL. running electric log.

rel. (1) release and (2) released.

relative permeability. The ratio between effective permeability of a fluid at partial saturation to the permeability of that fluid had it been at 100% saturation.

relief well. A well drilled close to a blowout well in order to decrease the pressure on the abnormal high-pressure zone that is causing the blowout. Heavy drilling mud (kill mud) is then pumped into the uncontrolled well to kill the well.

reloc. relocate.

Rem. remains.

rem. (1) remedial and (2) remove.

remotely operated vehicle. An uncrewed submarine propelled by an electrical motor and thruster propellers. It is manipulated from a mother ship through an umbilical that connects the two. The submarine is used to do deep-sea work. (ROV)

rep. (1) replace and (2) report.

repeated section. See double section.

repeat formation tester. A wireline tool that samples reservoir fluids and measures reservoir pressures at several levels in a well. (RFT)

reperf. reperforate.

repl and **Repl.** (1) replace and (2) replaced.

repr. repair.

reprocess. The application of new computer-processing methods to older seismic data that was recorded digitally.

req. request.

reqd. required.

reqmt. requirement.

Res and **res.** residue.

res. (1) reservoir, (2) resistance, (3) resistivity, and (4) resistor.

res bbl. reservoir barrels.

reserve pit. An earthen pit, often lined with plastic, located next to a drilling rig. It holds drilling mud that is not being used and well cuttings that flow off the shale shaker.

reserves. The calculated amount of gas and/or oil that is expected to be produced from a well or a field in the future under current economic and technical conditions. Types of reserves are based on the probability that they exist. Proved or proven reserves have at least 90% probability that they exist. Probable reserves have at least 50% and possible reserves

have at least 10% probability that they exist. Developed reserves can be produced from existing wells, whereas undeveloped reserves cannot be presently produced without either drilling or recompleting a well. *See also* book reserves.

reservoir. The subsurface deposit of oil and/or gas located in the pores of a reservoir rock. Fluids cannot flow from one reservoir to another. (res)

reservoir barrel. One liquid barrel of crude oil in the subsurface reservoir. When the barrel of oil brought to the surface and gas bubbles out, the volume of oil will shrink. (res bbl) *See also* formation volume factor and stock barrel of oil.

reservoir characterization. The quantification of reservoir properties such as porosity and permeability in an oil and gas reservoir. It is used to make a computer model of the reservoir.

reservoir drive. The source of pressure on subsurface fluids that forces them through the reservoir rock and into the well. It comes from fluid expansion, rock expansion, and gravity. Some types of reservoir drives are solution gas, free gas cap, water, gravity, and expansion gas.

reservoir pressure. The pressure on fluids in the pores of rock at a specific depth. Normal reservoir pressure is due to the weight of the overlying waters. (fluid pressure and formation pressure) *See also* abnormal high pressure.

reservoir rock. A rock that has porosity and permeability. It can hold and transmit fluids. The most common reservoir rocks are sandstones, limestones, and dolomites.

reservoir simulation. The computer modeling of an oil and gas reservoir. The reservoir is divided into a large number of geocells, each with characteristic properties such as porosity and permeability. The flow between each geocell is calculated.

resid. (1) residual and (2) residue.

residual gas. The gas, primarily methane, that exits a natural gas processing plant after the natural gas liquids have been separated. (tail gas)

residual water. Water in the pores of a reservoir rock that will not flow. (irreducible water)

resistivity. The opposition of a substance to the flow of an electrical current through it. Resistivity is a measurement made on an electric and induction wireline log in units of ohm-meter or ohm meter²/meter. It is used to determine the fluid composition in the pores of rocks and oil and water saturation. The inverse of resistivity is conductivity. (R)

resolution. The minimum distance of separation between two features that allows the two features to be distinguished individually. It can be either vertical or horizontal resolution.

resource. A general term for deposits of a valuable gas, liquid, or solid that occur in the world or a geographical areas such as a country. Unlike reserves, resources can also include undiscovered deposits and deposits that cannot be developed with present-day technologies and/or under present-day economics (e.g. crude oil, natural gas, and coal).

restricted basin. A body of water that is separated from the ocean by a shallow sill or bar at the entrance and has limited water circulation.

ret. (1) retain and (2) return.

retained interest. The ownership portion an owner keeps when transferring the remaining ownership.

retarder. An additive that slows a process such as cement setting; cf. accelerator.

retd. returned.

retention time. The time that the produced fluids spend in a separator.

retr. retrieve.

retrograde condensate. The condensate that forms when pressure is dropped on wet gas during production.

retrograde condensate or **retrograde-gas condensate reservoir.** A natural gas reservoir in which condensate forms both in the subsurface reservoir and on the surface during production; cf. dry gas and wet gas reservoir.

retr ret. retrievable retainer.

return on investment. A criterion used to evaluate an investment in an oil or gas well. It is the estimated net production revenue during the life of the well divided by the drilling and completion costs. Discounted return of investment (DROI) uses costs and revenues that have been discounted for the time value of money. (ROI) *See also* payout.

returns. Drilling mud and well cuttings that flow up a well as it is being drilled.

rev. (1) reverse, (2) revise, and (3) revolutions.

reverse circulation. To pump drilling mud down the annulus and back up the tubing string. This method is used to clean out a well. (RC)

reverse fault. A fault with predominantly vertical movement (dip-slip) in which the hanging wall has moved up in relation to the footwall. It creates a double or repeated section; cf. normal fault.

reversionary interest. A well or property interest that becomes effective at a specific time or event in the future.

rev/O. reversed out.

rexlzd. recrystallized.

RF. rig floor.

Rf and **rf.** reef.

rfl. reflection seismograph.

RFT. repeat formation tester.

RGE and **rge.** range.

rgh. rough.

RH. rat hole.

R/H. ran in hole.

ρ . density.

RI. royalty interest.

rich gas. (1) Natural gas that contains a significant amount of condensate.
(2) Moderately rich gas that contains between 2.5 and 5 GPM and very rich gas that contains more than 5 GPM cf. lean gas and dry gas.

rift. A large fault with predominantly horizontal movement.

rift valley. A deep, wide fracture.

rig down. To disassemble a drilling rig after drilling; ant. rig up. (RD)

rig floor. The elevated flat steel surface on which the derrick or mast sits and most of the drilling activity occurs. It is supported by the substructure. (derrick or drill floor) (DF)

right-lateral strike-slip fault. A fault that moves horizontally, with the opposite side of the fault moving toward the right as you face the fault; cf. left-lateral strike-slip fault.

rig rel. rig released.

rig up. To assemble a drilling rig to spud a well; ant. rig down. (RU)

RIH. (1) running in hole and (2) ran in hole.

risk. See success rate.

rk. rock.

RKB. referenced to kelly bushing (depth measurement).

rky. rocky.

RLN. long normal resistivity.

RM. ream.

rmd. reamed.

rmg. reaming.

rmv. remove.

rnd. rounded.

rng. (1) range and (2) running.

RO. reversed out.

rock. A naturally occurring aggregate of mineral grains. Rocks are classified as igneous, metamorphic, and sedimentary (e.g., granite and shale). (rk)

rod basket. A steel platform with sides that is located near the top of the mast on a well service unit. The derrick operator stands in the rod basket to place the sucker rods in the rod fingers as the rods are pulled from the well.

rod pump. A common type of oil well downhole pump driven by a sucker-rod string. It is run as a complete unit on the sucker-rod string through the tubing string; cf. tubing pump. (insert pump)

rod pumping system. A common artificial lift system for an oil well. A surface beam-pumping unit drives a sucker-rod pump on the bottom of the tubing string. A sucker-rod string that runs down the center of the tubing string connects the walking beam on the surface with the sucker-rod pump.

ROI. return on investment.

ROL. rig on location.

roller-cone bit. A rotary drilling bit that has rotating cones mounted on bearings. A tricone bit with three cones is very common type of roller-cone bit.

rollover anticline. A large fold formed in sedimentary rocks on the basin side of a growth fault. It can be a petroleum trap.

ROP. rate of penetration.

ROS. residual oil saturation.

rot. (1) rotary and (2) rotate.

rotary depth. See driller's total depth.

rotary drilling rig. A very common type of drilling rig that rotates a long length of steel pipe with a bit on the bottom to cut the well. Four major systems on the rig are power, hoisting, rotating, and circulating. Rotary drilling rigs are either mechanical or diesel electric depending on the power system used; cf. cable tool rig. (RR)

rotary helper. See roughneck.

rotary hose. See mud hose.

rotary steerable system. A deviated well drilling system that uses a downhole motor with steering pads on the sides that can be hydraulically expanded and contracted from the surface. The pads push the bit off center in a method called push-the-bit. (RSS)

rotary table. A revolving plate on the drill floor that is driven by the prime movers. The master and kelly bushings are attached to the top of it. It turns the drillstring that runs down through the center of the rotary table. (RT)

rotary total depth. See driller's total depth.

roughneck. A drilling crew member who operates and maintains the equipment on the floor of a drilling rig under orders from the driller. (rotary helper)

round trip. A cycle of running a drillstring into the well (tripping in), touching bottom, and putting it back out; cf. short trip. (tripping out).

roustabout. (1) A general helper on producing wells and well service units. (2) A member of the offshore drilling crew who helps bring supplies and equipment aboard under orders from the head roustabout.

ROV. remotely operated vehicle.

roy. royalty.

royalty. A percentage or fraction of the revenue from oil and gas production that is free and clear of production costs. It is paid to the mineral rights owner on fee land and any other royalty owner. Royalty in kind is a share of the production instead of revenue. (roy)

royalty interest. An ownership in production that bears no cost of production. Royalty interest owners receive their share of production revenue before working interest owners; cf. working interest. (RI)

RPM and rpm. revolutions per minute.

RPS and rps. revolutions per second.

rpt. report.

RR. (1) rotary rig and (2) rig released.

rr. rare.

RR&T. running rods and tubing.

RRB. rerun bit.

RS. rig skidded.

RSN. short normal resistivity.

rsns. resinous.

RSS. rotary steerable system.

RT. rotary table.

Rt. true resistivity.

RTG. running tubing.

rtg. rating.

rthy. earthy.

RTLTM. rate too low to measure.

rtnr. retainer.

RU. (1) rig, rigged, or rigging up and (2) rotary unit.

rub. rubber.

RUM. rig or rigging up machine.

run. (1) The amount of crude oil sold and transferred to a pipeline or tanker truck. (2) To run tubulars or tools into a well. (3) The cycle of lowering (inrun) and raising (outrun) equipment in a well (e.g., a logging run).

run casing or pipe. To run and cement casing to complete a well. (set pipe)

run ticket. A form filled out when oil is transferred from stock tanks to a tank truck or pipeline. It lists the quality and quantity of the oil and is used to pay the operator of the wells.

RUP. rig or rigging up pump.

rupt. rupture.

RUR. rig or rigging up rotary (rig).

RURT. rig or rigging up rotary tools.

RUST. rig or rigging up service tools.

RUSU. rig or rigging up service unit.

RUT. rig or rigging up tools.

RVP. Reid vapor pressure.

rvsd. reversed.

RW. reworked.

Rw. resistivity of water.

rwk. rework.

RWTP. returned well to production.

S. (1) saturation, (2) swabbing, (3) sulfur, and (4) signal.

S/. (1) swabbed and (2) show with.

Sa and sa. salt.

SAB. strong air blow.

sack. A container for (1) dry cement (94 lb), (2) bentonite clay (100 lb), (3) barite (100 lb), and (4) other dry supplies. (sk or sx)

SAGD. steam-assisted gravity drainage.

sal. salinity.

sales-quality gas. *See* pipeline-quality gas.

sales-quality oil. *See* pipeline oil.

salinity. The weight of all dissolved salts per unit volume in a solution such as oilfield brine. It is often expressed in parts per thousand (ppt), parts per million (ppm), or milligrams per liter (mg/l). (sal)

salt dome. A large mass of salt (salt plug) that is or has been flowing upward through the overlying sedimentary rocks. The salt dome also includes the surrounding and overlying sedimentary rocks that have been deformed.

samp. sample.

sample log. A record of the physical properties of rocks in a well. It includes composition, texture, color, presence of pore spaces, and oil staining. (lithologic or strip log)

Samson post. The steel-beam assembly on which the walking beam pivots on an oil well beam-pumping unit.

sand. A clastic particle between 2 and $\frac{1}{16}$ mm in diameter; cf. silt and clay. (sd)

sand cleanout. A workover in which saltwater or drilling mud is circulated to remove loose sand from the bottom of a well.

sand control problem. Loose sand clogging the bottom of a well.

S&F. swab and flow.

sandface. The surface of the oil or gas reservoir in the wellbore.

sandfrac. *See* hydraulic fracturing.

S&O. stain and odor.

sand/shale ratio map. A map that uses contours to show the ratio of sandstone to shale in a formation.

sandstone. A common sedimentary rock composed primarily of sand grains. It can be a reservoir rock. (SS, ss, and Sst)

Santonian. An age of geological time from 85.8 to 83.5 million years ago. It is part of the Cretaceous period.

sat. (1) saturate, (2) saturation, and (3) saturated.

satellite well. A subsea well in a remote part of an offshore field or in a marginal field with a flowline that conducts produced fluids from the well to a production platform for treating. The well was not drilled from the platform. It was drilled from a jackup rig or floater.

saturated. The condition in which a liquid has dissolved all the gas or salt that it can hold; cf. undersaturated. (Sat and sat)

saturated pool. An oil reservoir with a free gas cap. The crude oil in the reservoir has dissolved all the natural gas that it can hold and is saturated; cf. undersaturated pool.

saturation. The percentage of different fluids such as gas (S_g), oil (S_o), and water (S_w) in the pore space of a rock. (S)

SB. stuffing box.

sb. sub.

SBHP. static bottom-hole pressure.

SC. show of condensate.

scab liner. A liner string run in a well to repair casing.

scale. Salts that have precipitated out of water. Calcium carbonate, barium sulfate, and calcium sulfate are common from oilfield brines.

scale inhibitors. A chemical used to prevent salt formation in a well.

scalped anticline. *See* bald-headed anticline.

scat. scattered.

SCF and scf. standard cubic feet.

SCFD and scf/D. standard cubic feet per day.

SCO. synthetic crude oil.

scout. An oil company or commercial scouting company employee who gathers information on petroleum-related activities of other companies in a regional area.

scout card and ticket. A paper or computer file form completed by an scout on engineering and geological information gathered on a specific well being drilled. It includes well name, location, depth, date completed, major formation tops encountered, well treatments, and initial oil and gas production.

SCR. silicon-controlled rectifier.

scr. (1) scratcher, (2) screen, and (3) screw.

scratchers. Wires on a collar that is attached to the lower part of a casing string being run into a well. It is used to remove mud cake from the well walls.

scrd. screwed.

screened, slotted liner. *See* liner string.

scrub. scrubber.

scrubber. Equipment used to remove liquid from gas. (scrub)

scs. scarce.

SD and S.D. shut down.

sd. (1) sand and (2) sandstone.

SDA. shut down for acid.

sd & sh. sand and shale.

SDF. shut down for frac.

SDL. shut down for logging.

SDO. (1) shut down for orders and (2) show of dead oil.

sdoilfrac. sand oil frac.

SDON. shut down overnight.

SDP&A. shut down for plug and abandon.

SDPL. shut down for pipeline.

SDR. shut down for repairs.

Sd SG. sand showing gas.

Sd SO. sand showing oil.

sdtrk. sidetrack.

SDW. shut down for weather.

SDWO. shut down, waiting for orders.

sdv. sandy.

sdv li. sandy lime.

sdv sh. sandy shale.

S/E. screwed end.

seafloor seismic method. Seismic exploration in the ocean with hydrophone streamers positioned on the seabed.

seafloor spreading. A theory in which the earth's crust (seafloor) is formed by basalt volcanoes along the crest of the mid-ocean ridge. The crust is split and spreads to either side of the ridge because of convection currents in the molten interior of the earth. The crust is destroyed in subduction zones. *See also* plate tectonics.

seal. An impermeable rock layer that forms the cap on top of an oil or gas reservoir; e.g., shale. (caprock)

sealing fault. A fault that does not allow fluid flow along or across the fault.

seating nipple. A short pipe that is run on the bottom of a tubing string. It has a constricted inner diameter that stops any tool that falls down the tubing string. It is also used to attach a downhole pump, safety valve, choke, or regulator. (SN)

sec. (1) secondary, (2) section and (3) second.

secondary cementing. A workover cement job on a producing well; cf. primary cementing.

secondary fault. A relatively minor fault oriented parallel to a major fault.

secondary gas cap. A free gas cap that forms from the solution gas that bubbles out of the oil as reservoir pressure drops during production.

secondary recovery. A process of injecting gas or water into an oil reservoir to restore production when the primary drive has been depleted; cf. tertiary recovery.

secondary stratigraphic trap. A petroleum trap formed by an angular unconformity; cf. primary stratigraphic trap.

secondary term. The time granted in a lease for production. It occurs after the primary term and continues as long as commercial amounts of petroleum are being produced; cf. primary term.

section. A surveyed square of land that is one mile on a side; 36 sections make a township. There are 640 acres in a section. (sec)

Sed and sed. sediment.

sediment. Loose (unconsolidated), solid particles or salt. Sediments are deposited out of water, air, or ice; e.g., sand grains and mud particles. (Sed or sed)

sedimentary rock. A layered rock composed of sediments that have been solidified (consolidated or lithified). A clastic sedimentary rock is composed of particles formed by weathered rock such as sand grains. A chemical sedimentary rock is composed of salts that have precipitated out of water. An organic sedimentary rock is composed of organic particles such as plant remains. The most common sedimentary rocks are shale, sandstone, and limestone. Sedimentary rocks are drilled to find and produce gas and oil; cf. igneous rock and metamorphic rock.

seep and seepage. A natural occurrence of oil and/or gas that has leaked onto the surface.

SEG. Society of Exploration Geophysicists (www.seg.org).

seis. (1) seismic and (2) seismograph.

seismic contractor. A company that maintains and operates seismic equipment.

seismic horizon. A reflection that can be traced on a seismic record.

seismic method. The acquisition, computer processing and display of echoes from subsurface rock layers that are used to image the shape of the rock layers. Seismic energy is put into the earth with a source such as dynamite, vibrator truck, or air gun. The sound energy reflects off subsurface, sedimentary rock layers and is recorded by detectors called geophones or hydrophones on the surface. The data are recorded digitally and processed by computers to make the image. Seismic is 2- or 3-dimensional (2-D and 3-D).

seismic option. A type of mineral rights acquisition. The lessee pays the lessor a bonus for the right to run seismic exploration on the land and to have the option of leasing the land after reviewing the seismic data.

seismic processing. The application of mathematical equations to seismic data by computer to improve the signal/noise ration and increase accuracy and resolution.

seismic record or **section.** A display of seismic reflections recorded off subsurface rock layers similar to a vertical cross section of the earth. Shot points are located along the top of the section. Timelines run horizontally across the section. Zero seconds is always at or near the surface of the earth or at the surface of the ocean. A header with seismic information is located on the record.

seismic stratigraphy. The recognition and use of unconformities on seismic records to correlate and map sedimentary rock packets called sequences. Each sequence was deposited during a major cycle of sea level fall, rise, and fall. Seismic facies (seismic reflection characteristics) are used to identify the depositional environments in each sequence. *See also* sequence stratigraphy.

seismic structure map. A map contoured in units of seismic time (milliseconds) to a specific reflector; cf. structure map.

seismic time-lapse map. A map contoured in milliseconds of vertical distance between two seismic reflectors; cf. isopach map.

seismic tomography. The use of seismic data slices to image subsurface geology.

seismic trace. The response of one seismic recorder to one seismic shot.

seismic wipeout. An area on a seismic record where there are no seismic reflections in contrast to adjacent areas. It is often caused by natural gas in the sedimentary rocks.

selenite. *See* gypsum.

self potential. *See* spontaneous potential.

SEM. scanning electron microscope.

semi and **semisubmersible.** A type of floating, offshore, exploratory drilling rig system anchored above the drillsite. It has large, submerged flotation chambers (pontoons) located on short columns below the drilling platform.

sep. separator.

separator. A long steel tank used to separate produced fluids from oil wells. Separators use gravity, impingement, centrifugal force, filters, and other methods. They can be either horizontal or vertical. (sep)

seq. sequence.

sequence stratigraphy. The use of timelines such as unconformities on well logs, cores, and rock outcrops to map and correlate packets of sedimentary rocks called sequences. A sequence was deposited during an interval of geologic time and can be subdivided in parasequence sets and further into parasequences. *See also* seismic stratigraphy.

sequestering agent. An additive used during acidizing a well to prevent the formation of an iron gel or precipitate.

ser. (1) serial and (2) series.

series. A time-rock division of rocks deposited during an epoch.

service company. A company that supplies services such as logging, mud engineering, or cementing; e.g., Schlumberger and Halliburton.

service unit. A truck with equipment, usually a mast and drawworks with wireline, mounted on it to workover a producing well. A pulling unit is a common type of service unit. (svcu)

set. (1) To position such as set pipe in a well. (2) To harden such as set cement.

set in the dark. To run and cement a string of casing to the top of the reservoir rock in a well without first drilling and testing the reservoir rock.

set pipe. To run and cement casing to complete a well. (run pipe)

set-through drilling. An older drilling method in which the well was drilled into only a short interval on top of the producing reservoir and completed open-hole.

set-through completion. A well completion in which the casing or liner has been cemented into the reservoir. The casing or liner is then perforated; cf. open-hole completion.

severance tax. State tax on oil and gas produced. (production tax)

SF. sand frac.

sfc. surface.

SFL. starting fluid level.

SFLU. slight fluorescence.

SFO. show of free oil.

SFP. surface flowing pressure.

sft. soft.

SG. (1) show of gas, (2) specific gravity, (3) survey gas, and (4) surface geology.

s.g. specific gravity.

S_g. gas saturation.

SG&C. show of gas and condensate.

SG&O. show of gas and oil.

SG&W. show of gas and water.

SGCM. slightly gas-cut mud.

SGCW. slightly gas-cut water.

SH, Sh, and sh. shale.

Sh. share (of land).

shake-out test. A method used to determine the basic sediment and water content of oil by centrifuging a crude oil sample.

shaker. *See* shale shaker.

shale. A very common sedimentary rock composed of clay-sized particles. Most mineral grains in shale are clay minerals. Shales are typically well layered. Black shales are source rocks for petroleum. (SH, Sh, and sh)

shale gas. Natural gas produced from a gas shale. It occurs adsorbed to organic matter (kerogen) and in intergranular micropores.

shale oil. Crude oil obtained by heating (660°F) oil shale.

shale-out. A stratigraphic trap formed by the lateral change (facies change) of a permeable sandstone or limestone into impermeable shale; cf. pinch-out.

shale shaker. A set of vibrating screens in a steel frame on the mud tanks of a drilling rig. Shale shakers are used to separate well cuttings from drilling mud coming from the well. Modern drilling rigs have four or more shale shakers.

shear rams. Two large blocks of metal with chisel edges. They are designed to shear across any drillpipe in the well and close the well. Shear rams are used in a blowout-preventer stack.

shear wave. A wave that causes particles to move up and down as the wave passes through. It is similar to a wave on the ocean. It travels at about half the speed of a compressional wave through rocks and

cannot travel across fractures or through a liquid or gas. It is recorded along with compressional waves during multicomponent seismic; cf. compressional wave. (secondary wave) (S wave)

shield. A low-lying, stable area of basement rocks on the surface of the earth.

shld. shoulder.

shls. shells.

shly. shaly.

shock sub. *See* vibration dampener.

shoestring sandstone. A long, narrow, lens-shaped sandstone usually encased in shale and originally deposited as a barrier island, river channel, bar finger, or valley fill.

short normal resistivity. A wireline resistivity measurement made with electrodes spaced close together; cf. long normal resistivity. (16 in.)

short trip. A cycle of running a drillstring in the well (tripping in) without going all the way to the bottom (touching bottom) and putting it back out (tripping out); cf. round trip. (ST)

shot. (1) An explosion used to artificially fracture reservoir rocks in a well to stimulate production. (2) An explosion used as a seismic exploration source to put sound energy into the ground.

shot hole. A shallow hole drilled for an explosive source used for seismic exploration on land. The shot hole directs the explosive energy downward.

shotpoint. The location where a seismic source such as dynamite, vibrator truck, or air gun was activated. (SP)

shotpoint array. The pattern of several seismic sources used simultaneously at a shot point to reduce source noise.

show. Hydrocarbons in an amount above background. (Shw)

show evaluation. A detailed analysis of the composition of hydrocarbons in a show.

shr. shear.

shrinkage factor. The decimal amount to which a barrel of reservoir oil shrinks to on the surface of the ground after the pressure has dropped and the gas has bubbled out of the oil. *See also* stock-tank barrels of oil.

SHT. straight hole test.

shut in. To cease production from a well. The noun and adjective form is shut-in. (SI)

shut-in pressure. Pressure on a fluid that is not moving. (static pressure)

Shw. show.

SI. shut in.

SIBHP or **SIBP.** shut-in bottom-hole pressure.

SICP. shut-in casing pressure.

sidetrack. (1) A new wellbore branch drilled out from an existing well (often the deviated portion of a well drilled around a fish). (2) To drill a sidetrack. (sdtrk and ST)

sidewall core. A 1-in. diameter core from the sides of a well. It is obtained by (1) an explosive-propelled tube (percussion sidewall coring) or (2) drilling (rotary sidewall coring); cf. full-diameter core. (SWC and S.W.C.)

sieve. (1) A screen used to sort particles by size. (2) To use sieves to sort particles by size.

signal. The desired seismic energy (direct or primary reflections) received from the subsurface; cf. noise. (S)

SIGW. shut-in gas well.

Sil, sil, and **silic.** siliceous.

siliceous. A rock containing silica. (Sil, sil, and silic)

silicon-controlled rectifier. A device that converts alternating electric current to direct electric current. It is used on a diesel-electrical drilling rig to convert the AC electric current from the prime movers to DC electric current used by the motors on the drill floor. (SCR)

sill. An igneous rock that was injected as a molten liquid between sedimentary rock layers; cf. dike.

silt. A clastic particle between $\frac{1}{16}$ and $\frac{1}{256}$ mm in diameter. (Slt or slt)

silt. siltstone.

siltstone. A sedimentary rock composed primarily of silt-sized particles that are intermediate between sand- and clay-sized particles. (silt, Sltst, and sltst)

Silurian. A period of geological time that occurred from 444 to 416 million years ago. It is part of the Paleozoic era. (Sil)

sim. similar.

simulfrac, simultaneous frac job, or **simultaneous hydraulic fracturing.** The hydraulic fracturing of two or more, closely spaced (500 to 1,000 ft), parallel horizontal drainholes at the same time. It intensifies the reservoir fracturing between the well. It is used in gas shales.

single. One tubular joint; cf. double, treble, and fourble.

single-pole unit. A well-servicing unit used for shallow wells that has only one telescoping steel tube for a mast that can be set to several different

heights. It has one or two drums and can be run by an operator and floor person; cf. double-pole mast.

SIO. shut-in oil.

SIOW. shut-in oil well.

SIP. shut-in pressure.

SITP. shut-in tubing pressure.

SIWHP. shut-in working head pressure.

SIWOP. shut-in, waiting on potential.

SK. skimming plant.

sk. sacks.

skeletal sands. Sands formed by fragments of shells.

skim. skimmer.

skin damage. See formation damage

skt. socket.

SL. (1) sea level, (2) section line, and (3) south line.

sl. (1) sleeve and (2) slight.

slab. (1) a core that has been cut lengthwise with a diamond saw to better view the rocks. (2) to cut a slab.

slant rig. A drilling rig with a mast or derrick that is or can be adjusted to be at an angle (usually 30 to 45°) to vertical. The well is spudded at an angle to drill a deviated or horizontal drainhole to a relatively shallow drilling target.

SLAR. side-looking airborne radar.

sli. (1) slight and (2) slightly.

slick assembly. A downhole assembly that has no stabilizers. It is used to drill a straight hole.

slick line. A single strand of wire that is used to raise and lower equipment in a well; cf. wireline.

slickwater or **slickwater frac.** A hydraulic frac job that uses freshwater with a friction reducer additive and relatively little proppants. It produces relatively long, narrow fractures and is used in tight reservoirs and gas shales. A slickwater frac is less expensive than a normal frac job; cf. frac pac. (waterfrac)

slim hole. A well with a small-diameter wellbore ($6\frac{3}{4}$ to $4\frac{3}{4}$ in.). Slim holes are less expensive to drill and are used for exploration.

slip logs. To move the well log from one well up and down vertically to correlate the formations in that well with the formations on another well log from another well that is held stationary.

slips. A steel wedge with teeth used in the bowl of a rotary table to grip and prevent the drillstring from falling down the well.

sli SO. slight show of oil.

SLM. steel line measurement.

sln. solenoid.

slotted liner. See liner string.

sloughing shale. Shale along the walls of a well that absorbs water and expands.

Slt and **slt.** silt.

Slst or **sltst.** siltstone.

SLT WT. saltwater.

sly. (1) silty and (2) salty.

sluff. The collapse of well walls into the hole. (cave)

slug. A batch of water and/or chemicals that is injected into a well or reservoir.

slur. slurry.

slurry. A mixture of a liquid and suspended, fine-grained, insoluble particles. Cement is a slurry as it is being pumped into a well during a cement job; cf. solution. (slur)

slush pumps. See mud hogs.

sly. slightly.

SM. surface measurement.

sm and **sml.** small.

small scale. A map that shows relatively less detail but covers more area than a large-scale map.

smls. seamless.

smth. smooth.

smwt. somewhat.

SN. seating nipple.

S/N. signal-to-noise ratio.

sneiffers. A chemical device towed behind a ship to detect hydrocarbons in ocean water.

snub. to run tools or pipe into a high-pressure well that is still flowing.

snubbing unit. A production rig designed to workover wells under high pressure.

SO. (1) show of oil, (2) shake out, and (3) side opening.

S_o. oil saturation.

SO&G. show of oil and gas.

SO&GCM. slightly oil and gas-cut mud.

SO&W. show of oil and water.

SOCM. slightly oil-cut mud.

SOCW. slightly oil-cut water.

soft rock. sedimentary rock; cf. hard rock.

soil. A surface layer of weathered rock particles containing organic matter.

soil farming. The mixing of drilling fluid and cuttings with soil for disposal; cf. land farming.

soil investigation. See subsea site investigation.

SOL. percent solids.

sol. (1) solenoid and (2) solids.

solids control system. The shale shakers, desanders, desilters, and settling tanks on a drilling rig that remove the well cuttings from the drilling mud circulation out of a well being drilled.

soln. solution.

solution. A homogeneous liquid formed by dissolving a gas or solid in the liquid; cf. slurry.

solution gas. The dissolved natural gas that bubbles out of crude oil on the surface when the pressure drops during production.

solution gas drive. A reservoir drive in which the drop in reservoir pressure during production causes dissolved gas to bubble out of the oil and force the oil through the reservoir rock. It has a relatively low oil recovery efficiency. (dissolved gas and depletion drive)

solution gas/oil ratio. The standard cubic feet of natural gas dissolved in one barrel of oil in the reservoir. (formation and dissolved gas/oil ratio)

solv. solvent.

sonde. See logging tool.

sonic amplitude log. A wireline well log that measures the attenuation of sound through rocks to detect fractures.

sonic log. A wireline well log that measures sound velocity through the rocks in microseconds per foot ($\mu\text{sec}/\text{ft}$). The porosity of the rock can

be calculated from the sound velocity of the rock. (acoustic velocity log) (SL and SONL)

SOP. standard operating procedure.

sorting. A measure of the range of different sized particles in a clastic rock. Sedimentary rocks can be well (narrow range) or poorly (wide range) sorted.

sour. Gas or oil with a high sulfur content. Sour oil generally contains more than 1% sulfur; cf. sweet.

source rock. A sedimentary rock rich in organic matter that can or has been transformed under certain geological conditions into natural gas and/or crude oil. Black shales are common source rocks.

SP. (1) spontaneous or self potential, (2) shotpoint, (3) set plug, (4) slightly porous, and (5) surface pressure.

sp. spare.

spacing. See drilling and spacing unit.

spar. A type of offshore floating production platform. The above-water production equipment is located on decks on top of a long, vertical, closed, floating cylinder or cylinders held in position by a mooring system to anchors. Flowlines from subsea completion wells bring produced fluids to the spar where they are separated and treated.

spcl. special.

spcr. spacer.

SPD and spd. spud.

SP-DST. straddle packer, drillstem test.

SPE. Society of Petroleum Engineers (www.spe.org).

spear. A fishing tool that is run into pipe (fish) on the bottom of the well. It grips the inside of the pipe as the fish is being pulled out of the well.

specific gravity. The ratio between the weight of a solid or liquid and the weight of an equal volume of water. Quartz, a common mineral, has a specific gravity of 2.65. (SG, s.g., and sp gr)

speck. speckled.

spec survey. A seismic survey paid for and run by a seismic contractor. Various exploration companies can pay to view the nonexclusive data; cf. group shoot.

spf. shots (perforations) per foot.

sp gr. specific gravity.

spiking. To add condensate to crude oil in the field to lighten the density of the oil and make the oil more valuable.

spill point. The lowest elevation down to which a trap can be filled with gas and oil. If the structure is filled down to the spill point (fill to spill), the addition of more gas or oil will cause the oil to flow out at this point.

spinning chain. A chain used on the floor of a drilling rig to wrap around drillpipe to start screwing together or finish unscrewing the pipe.

spinning wrench. A pneumatic- or hydraulic-operated wrench that is suspended above the drill floor by a cable. It is used to grip and turn the drillpipe when screwing together and unscrewing the pipe.

spiral-grooved drill collar. A drill collar with three spiraling grooves cut into the outer wall. It is used to reduce the drill collar's surface area in contact with the well walls to prevent stuck pipe.

spkt. sprocket.

Spl and spl. sample.

SPM or spm. strokes per minute (mud pumps).

spontaneous potential. A wireline measurement of the electrical current caused by the contact of mud filtrate in the pores of a reservoir rock with the natural waters in the rock. It is plotted in track 1 and used to identify reservoir rocks. (self potential) (SP)

SPOT. One of two uncrewed, remote-sensing satellites operated by France. They take pictures of the earth in visible light and infrared.

spot. To place.

spot a well. To locate and put a well on a base map.

spot price. The short-term delivery price for a barrel of oil or 1,000 cubic feet of natural gas traded on the spot market. The spot market is a commodities market that is very sensitive to supply and demand. The prices are constantly changing.

spotting fluid. A liquid lubricant such as diesel or mineral oil that is put in a well (spotted) at the stuck point to loosen stuck pipe.

spread. The geometric pattern of geophone groups in relation to the seismic source. It is described by names such as split spread, cross, end-on, and in-line offset.

sps. sparse.

spsly. sparsely.

SPT. shallower pool test.

spt. spot.

spud and **spud in**. Starting to drill a well. It can be done either (1) when any work is done on preparing the site such as digging the cellar or (2) when the rig that is capable of drilling down to contract depth starts drilling. (SPD and spd)

spud date. The day a well is started.

squeeze cementing. To pump cement under pressure down a cased well to force the cement through casing perforations.

SPWLA. Society of Petrophysicists and Well Log Analysts (www.spwla.org).

sq. (1) square and (2) squeezed.

sq pkr. squeeze packer.

sqz. squeeze.

SQZD. squeezed.

SR. short radius.

srt. sorted.

srtg. sorting.

SS. (1) subsea, (2) slow set (cement), (3) small show, (4) stainless steel, (5) string shot, and (6) subsurface.

SS and **ss**. sandstone.

SSG. slight show of gas.

SSO. slight show of oil.

SSO&G. slight show of oil and gas.

Sst. sandstone.

SSU. Saybolt seconds universal.

ST. (1) sidetrack and (2) short trip.

S/T. (1) sample top and (2) suction temperature.

st. (1) state and (2) stand.

stab. To guide the end of a pipe such as casing into a coupling or tool joint to make a connection.

stab. (1) stabilizer and (2) stabilized.

stabilized. steady and unchanging. (stab)

stabilizer. A sub with blades running along the length of it. It is designed to keep the downhole assembly in the center of the well. (stab)

stack. (1) The number of seismic reflections used in stacking to make a common-mid-point stack. It can be expressed either as a number or a percentage with 100% equal to one reflection. (2) To deactivate and store a drilling rig.

stacking. The combining of several different seismic reflections off the same point in the subsurface. It reduces noise and amplifies weak reflections.

stage. (1) A time-rock subdivision of rocks deposited during an age. (2) A portion of the horizontal section (lateral) in a horizontal drainhole that is pressure isolated and hydraulically fractured. Horizontal drainholes are fracked in several stages starting with the toe and ending with the heel.

stage separation. The use of two or more decreasing-pressure separators in line to treat oil and retain more of the lighter fractions in the liquid.

stake a well. To survey the exact location and elevation of a proposed well and make a map (plat) of the site.

stand. (1) Several connected lengths of tubulars such as drillpipe that are raised, stacked, and/or run as a unit. They can be doubles (2), trebles (3), or fourbles (4). (St, STD, or std) (2) To set a tubular such as tubing on end.

standard cubic foot. The English system unit of natural gas volume measurement under standard temperature and pressure (STP) that is defined by law. It is often a surface temperature of 60°F and a surface pressure of 14.65 psia (1 atmosphere). (SCF and scf)

standard tools. A cable tool drilling rig.

standing valve. One of two valves in a downhole pump on the bottom of a tubing string driven by a sucker-rod string. The standing valve does not move up and down; cf. traveling valve.

stat. stationary.

static pressure. Pressure on a fluid that is not moving; cf. pressure. (shut-in pressure)

statics. Corrections applied to seismic data for elevation and the thickness and velocity of the loose sediments near the surface in the low-velocity zone.

STB. stock-tank barrels.

STB/D. stock-tank barrels per day.

STBOIP. stock-tank barrels of oil in place.

STD. (1) salinity-temperature-depth and (2) stand.

std. (1) standard and (2) stand.

stds. stands.

stdy. steady.

steam-assisted gravity drainage. A method used to produce heavy oil. Two parallel horizontal laterals are drilled, one on top of the other.

Steam is pumped into the upper lateral to heat the heavy oil that drains to the lower lateral where it is produced. (SAGD)

steamdrive or **steamflood**. An enhanced oil recovery method used on heavy oil reservoirs. Very hot steam is pumped down injection wells to heat the heavy oil and make it more fluid. The steam condenses into hot water that drives the heated, heavy oil to producing wells.

steam injection. See cyclic steam injection.

steel jacket. The legs on an offshore fixed production platform.

steel-jacket production platform. An offshore production platform that is held in place by piles driven into the ocean bottom. They are bolted, welded, or cemented to the legs that are called the steel jacket. The production equipment is located on a deck(s) on the jacket; cf. gravity storage production platform.

steel-tooth tricone bit. A tricone drill bit in which the teeth have been machined out of the steel cones. It is used to drill soft and medium hardness rocks; cf. insert tricone bit. (milled-teeth tricone bit)

steerable downhole assembly. Made up of a bent sub, stabilizers, a downhole turbine motor, and a diamond bit and run on the bottom of a drillstring. It is used in the rotating mode to maintain angle and in the sliding mode to drop or build angle in deviated wells.

step out well. A well drilled to the side of a discovery well to determine the extent of the new field. (appraisal and delineation well)

stepping out. Drilling to the sides of a discovery well to determine the limits of the reservoir.

STH. side tracked hole.

stg. sidetracking.

stging. straightening.

stk. (1) staked, (2) streaks, (3) streaked, and (4) stuck.

stl. steel.

STM. steel tape measurement.

Stn and **stn**. stain.

stochastic. A process or method in which the outcome cannot be predicted with certainty. The variables are random. Statistics and probabilities are used to estimate the outcome; cf. deterministic.

stock tank. A large bolted or welded steel tank that holds oil in the field. It has a thief hatch on the top for sampling and an oil sales outlet near the bottom for transferring the oil. Several stock tanks are connected together to form a tank battery.

stock-tank barrel. One stabilized barrel of oil on the surface after the gas has bubbled out. (STB) See also reservoir barrel.

STOIP. stock tank oil in place.

stor. storage.

STP. (1) standard temperature and pressure and (2) shut-in tubing pressure.

stp. stopper.

stpd. stopped.

straddle packer. One of two packers on a drillstem. They are expanded above and below a zone to be tested to isolate that zone. (SP and STRD)

straddle plant. An installation on a gas pipeline that removes condensate from natural gas.

straight hole. See vertical well.

strain. The deformation of an object by stress.

strapping. To measure the height and volume of oil in a specific tank to prepare a tank table.

strat. stratigraphic.

strata. layers of rocks. (Strat and strat)

stratigraphic column. A column showing the vertical succession of rock layers in an area. It is drawn as a cliff with rocks shown as they would weather. Weaker rocks (shales) are indented and stronger rocks (limestones and sandstones) protrude out.

stratigraphic cross section. A cross section made by correlating well logs that have been hung from a common marker bed or horizon in each well; cf. structural cross section.

stratigraphic test well. A well drilled primarily to determine the characteristics of the subsurface rocks. (strat test)

stratigraphic trap. A petroleum trap formed during the deposition of the reservoir rock such as a limestone reef (primary stratigraphic trap) or by erosion of the reservoir rock such as an angular unconformity (secondary stratigraphic trap); cf. structural trap. (Strat Trap)

strat test. See stratigraphic test well.

Strat Trap. stratigraphic trap.

STRD. straddle packer.

strd. straddle.

streamer. A long plastic tube containing hydrophones and a cable connecting them. It is towed behind a boat or left on the ocean bottom for seismic exploration at sea.

stress. Force acting on an object, cf. strain.

strg. (1) storage, (2) stringer, and (3) strong.

strike. The horizontal, compass direction of a plane such as a sedimentary rock layer or fault; e.g., North 10° East; cf. dip.

strike-slip fault. A break in the rocks accompanied with horizontal movement of one side with respect to the other. It can be either a right or left lateral strike-slip fault; cf. dip-slip fault.

string. A long length of tubulars such as casing (casing string), tubing (tubing string), or drillpipe (drillstring) made by screwing together joints.

strip. To remove a liquid from a gas.

strip log. See sample log.

stripper well. A well that is barely profitable. In the United States a stripper well produces less than 10 bbl of oil or 60 Mcf of gas per day.

Strk and strk. (1) streak and (2) streaking.

strt. straight.

structural casing. See conductor casing.

structural cross section. A cross section made by correlating well logs that have been hung by modern sea level in each well; cf. stratigraphic cross section.

structural map. A map that uses contours called structural contours to show the elevation of the top of a subsurface rock layer. It is made from well data. (structure-contour map)

structural trap. A petroleum trap formed by the deformation of the reservoir rock such as a fold or fault; cf. stratigraphic trap.

structure-contour map. See structural map.

STS. short tubing string.

STTD. sidetracked total depth.

stuck pipe. A drillstring stuck along the sides of a well. It is caused by either differential wall pipe sticking or a keyseat and can be loosened with a jar or treated with a spotting fluid.

stuck point. The depth in a well at the top of a section of stuck pipe. The free point is just above it.

stuffing box. The steel container on the wellhead of a rod pumping unit on an oil well. It contains packing that seals around the polished rod which oscillates up and down through it. (SB)

stwy. stairway.

Su and su. sulfur.

sub. A short section of pipe run on the drillstring between or below the drill collars; e.g., stabilizer sub and bumper sub. (sb)

subcrop map. A geologic map of rock layers cropping out under an angular unconformity.

subduction zone. An area described in the seafloor-spreading theory as the place two opposite-moving seafloors collide. It is seen as a deep ocean trench and/or a mountain range. See also seafloor spreading.

submarine fan. A large wedge of sediments deposited in deep water at the base of a submarine canyon.

submersible electrical pump. See electric submersible pump.

sub pump. See electric submersible pump.

subsalt. Sedimentary rock structures located below a layer of salt.

subsea. Measured from the bottom of the ocean. (ss)

subsea completion or well. A well with the wellhead equipment such as the production tree or gas lift located on the bottom of the ocean. It can be either wet or dry. It is drilled from a jackup or floater rig and is tied to a production platform, semi, or FPSO vessel by flowline.

subsea site investigation. A survey of the ocean bottom to determine slope, composition, and load-bearing capacity for a drilling rig or platform. (soil investigation)

substructure. The steel framework on a rotary drilling rig used to elevate the drill floor above the ground.

subsurface safety valve. A valve run in a tubing string in a well located in the ocean. The valve closes when pressure drops below a specific level.

subsurface trespass. To illegally drill a well under land without permission from the mineral rights owner.

success rate. The number of wells completed as producers divided by the number of wells drilled. It is expressed as a decimal or percent. (chance of success or risk)

sucker rod. A narrow-diameter solid-steel rod (usually 25 ft long) with threaded ends. A sucker-rod string is run in a well down the tubing to connect a walking beam on a surface, rod pumping unit with a downhole pump on the bottom of the tubing. Sucker rods in 37½-ft lengths are also made with fiberglass that is lighter than steel.

sucker-rod pumping system. See rod pumping system.

suct. suction.

suction pit sample. See mud-in sample.

sul. sulfur.

SULW and **sul wtr.** sulfur water.

supercompressibility factor. *See* Z factor.

supply company. A company that provides materials such as casing.

support agreement. An agreement between parties to encourage and support drilling a well. Three types are dry hole agreement, bottom-hole agreement, and acreage contribution agreement. (contribution agreement)

sur. survey.

Surf. surface casing.

surf. surface.

surface casing. The largest diameter and shortest casing string in a well. It is used to protect freshwater aquifers and prevent the sides of the well from caving.

surface rights. The legal ownership of the surface of fee land. The surface rights owner can build, ranch, or farm on that land; cf. mineral rights.

surfactant. A detergent-like chemical used in enhanced oil recovery to reduce the surface tension of oil and wash it from the rock surfaces and out of small pores.

surp. (1) suspended and (2) surplus.

suspended well. A well that has been producing but is shut-in. It eventually will have to be put on production again or plugged and abandoned.

SURV and **surv.** survey.

SUS. Saybolt universal seconds.

susp. suspended.

svcu. service unit.

SVG. survey gas.

SW or **S.W.** saltwater.

S_w . water saturation. Gas or oil saturation is equal to 100% minus S_w .

swab. To remove liquids from a well with a swabbing tool. (swb)

swage. A tapered tool that is run on a workstring to reopen collapsed casing in a well. (swg)

swath shooting. A method used to acquire data for 3-D seismic exploration on land. The receiver cables are laid out in parallel lines. The shot points are run perpendicular to the receiver lines.

S wave. shear wave.

swb. (1) swab, (2) swabbing, and (3) swabbed.

swbd. swabbed.

swbg. swabbing.

SWC and **S.W.C.** sidewall core.

SWCM. saltwater-cut mud.

SWD. saltwater disposal.

SWDS. saltwater disposal system.

SWDW. saltwater disposal well.

sweep. The frequency range that is injected into the subsurface by a vibrator truck at a shot point for seismic exploration.

sweep efficiency. The ratio of pore volume contacted by an injected fluid to total pore volume in a reservoir during waterflood or enhanced oil recovery.

sweep length. The time during which a vibrator truck shakes the ground at a shot point for seismic exploration.

sweet. Gas or oil with a low sulfur content. Sweet oil generally has less than 1% sulfur; cf. sour.

sweetening. Removal of acid gases such as hydrogen sulfide and carbon dioxide from natural gas.

sweet spot. An area in a reservoir that has relatively high permeability and produces gas and oil at a high rate. It is often an area where natural fractures are concentrated.

swet. sweetening.

swg. (1) swage and (2) swaged.

SWI. saltwater injection.

swivel. A device on a drilling rig which allows the drillstring to rotate while being suspended from the derrick. It is located at the top of the kelly and hangs from the hook on the traveling block.

SWS. side wall sample.

SWTR. saltwater.

SWTS. saltwater to surface.

SWU. swabbing unit.

sx. sacks.

syn. (1) synthetic and (2) synchronous.

syncline. A large, long fold of sedimentary rocks that are bent downward; cf. anticline.

Syncrude. A company (Syncrude Canada, Ltd.) in Alberta, Canada, that makes synthetic crude oil from the Athabaska tar sands.

synthetic-base and **synthetic-based drilling mud.** Drilling mud made with a synthetic oil. It is commonly used offshore; cf. oil-base and water-base drilling mud.

synthetic crude oil. A combination of naphtha, distillate, and gas oil produced from upgrading bitumen extracted from tar sands. It is generally 32 °API gravity with less than 0.2% sulfur. It is unlike natural crude oil in that synthetic crude oil contains no residuum. About 1.16 barrels of bitumen are processed to make 1 barrel of synthetic crude oil. Syncrude Sweet Blend (SSB) is the name for a light, sweet, synthetic crude oil that has no residual bottoms and is gold-colored. (SCO)

synthetic seismogram. An artificial, computer-generated seismic record made from the acoustical impedance differences of subsurface rock layer contacts.

sys. system.

system. A time-rock division of rocks deposited during a period of geological time.

sz. size

T. (1) temperature, (2) ton, and (3) township.

t. time.

T/. top of.

TA. (1) temporarily abandoned and (2) turn around.

tab. tabular.

tadpole plot. A diagram which shows the dip of subsurface rock layers in a well as determined by a dipmeter.

TAI. Thermal alteration index.

tail gas. The gas, primarily methane, that exits a natural gas processing plant after the natural gas liquids have been separated. (residual gas)

tally. (1) A record of a repetitive event count such as a pipe tally that shows the number of drillpipe joints used in a drillstring. (2) To measure and record the length of tubulars such as casing or pipe. A drilling tally sheet is a record of drillstring components measured in $\frac{1}{100}$ foot.

T&B. top and bottom.

T&BC. top and bottom chokes.

T&G. tongue and groove (joint).

T&R. tubing and rods.

tank battery. Two or more stock tanks connected by a flowline. The tank battery is connected by flowline to a separator. First one stock tank and then another is filled with oil. (TB)

tank table. A table that relates the height of oil in a stock tank to the volume of the oil. (gauge table)

tar. A viscous material composed of very heavy, high-molecular weight hydrocarbons.

target. (1) The potential reservoir rock to which a well is drilled. (2) The proposed bottom-hole location for a deviated well.

tar sands. Very thick, heavy crude oil bitumen mixed with sand and water. *See also* Athabaska tar sands.

tax royalty participation contract. A contract between a foreign government and a multinational company. The multinational company receives an exclusive concession and bears the entire cost and risk of exploration, drilling, and production. The host government is paid bonuses, taxes, and royalties from production; cf. production sharing contract. (concession agreement)

TB. (1) tank battery and (2) thin bedded.

tb. tube.

t.b. thin-bedded.

tbg. tubing.

tbg ch or **tbg chk.** tubing choke.

tbg press. tubing pressure.

TC. (1) temperature controller, (2) tool closed, (3) top choke, and (4) tubing choke.

Tcf. trillion cubic feet.

TCV. temperature control valve.

TD. total depth.

TDed. To drill a well to (1) total depth (TD), (2) contract depth, or (3) the drilling target.

TDI. temperature differential indicator.

TDS. total dissolved solids.

tech. (1) technical and (2) technician.

Temp and **temp.** temperature.

temp. temporary.

temperature log. A production log that records fluid temperatures at various levels in a well. It can detect gas flowing into the well and where cement is setting behind casing. (TL)

temporarily abandoned. A producing well that has been shut in. Eventually the well is either put back on production or plugged and abandoned. (TA)

tendons. Long steel tubes about 2 ft in diameter that connect a tension-leg platform to the anchor weights on the bottom of the ocean.

tension. Forces that pull apart; cf. compression.

tension fault. A fault formed by tension; e.g., normal fault; cf. compressional fault.

tension-leg platform. A floating wellhead and production platform held in place by large weights on the bottom of the ocean; cf. tension-leg well platform. (TLP)

tension-leg well platform. A floating wellhead platform. It is similar to a tension-leg platform except that production is sent by submarine pipeline to a processing platform in shallow water for treating; cf. tension leg platform. (TLWP)

tent. tentative.

ter. terrigenous.

term. terminal.

termin. terminate.

Tertiary. A period of geological time from 65.5 to 2.6 million years ago. It is part of the Cenozoic era. (Ter)

tertiary recovery. A process used after the primary drive mechanism has been depleted and secondary recovery has been completed on an oil reservoir. Either (1) chemicals or steam is injected into a reservoir or (2) the subsurface oil is set afire; cf. secondary recovery. *See also* enhanced oil recovery.

Tex and **tex.** texture.

TG. trip gas.

tgh. tough.

TH. tight hole.

thd. thread.

thermogenic gas. Natural gas formed by subsurface heat on organic matter or by the thermal cracking of oil. It can be either dry or wet gas; cf. biogenic gas.

therst. thermostat.

THF. tubinghead flange.

THFP. top hole flow pressure.

thickening time. The time a cement slurry remains fluid enough to be pumped. (pumpability time)

thief. (1) A brass or glass container that is used to obtain an oil sample from a stock tank. (2) To obtain an oil sample.

thief hatch. The hatch on the roof of a stock tank. It is used to gain access to the tank to measure the height of the oil and obtain a sample.

thief zone. (1) A highly permeable zone in reservoir rock through which waterflood or enhanced oil recovery fluids flow, bypassing oil in other parts of the reservoir. (2) A very permeable rock layer in a well that takes large amounts of drilling mud during drilling. (lost-circulation zone)

thin-section. A paper-thin slice of rock mounted on a glass slide.

thk. (1) thick and (2) thickness.

thn. thin.

thread protector. A plastic or metal cap screwed to the ends of tubulars such as casing and drillpipe to prevent damage to the threads.

3-C seismic. Land seismic acquisition using three geophones at right angles to each other at each receiver station to record both compressional and shear waves.

3-D and 3D seismic method. The acquisition and computer processing of seismic data to make a three-dimensional image of the subsurface rock layers. The data are often shown on a cube display along with slices of the subsurface. A slice (1) at a specific depth is a time or horizontal slice, (2) along a vertical plane is a vertical slice, (3) along a seismic reflector is a horizon slice, and (4) along a fault is a fault slice. *See also* visualization center.

thribble. *See* treble.

thrling. throttling.

thrm. thermal.

throw. The vertical displacement on a fault.

thru. (1) through and (2) throughout.

thrust fault. A reverse fault with a dip of less than 45° from horizontal. The hanging wall has been thrust over the footwall.

TI. temperature indicator.

ti. tight.

tie back and tie in. (1) To connect something such as a subsea well by flowline to a production platform. (2) To run seismic lines together. (3) To run a seismic line through a well.

tight. (1) An emulsion that resists separation; cf. loose. (2) A rock with very low (<0.1 md) permeability. (ti)

tight hole. A well being drilled in which the results are being kept secret. (TH)

tightness. The degree to which an emulsion resists separation.

tight gas sand. A natural gas sandstone reservoir with less than 0.1 md permeability. A tight gas sand well is usually stimulated by hydraulic fracturing.

tight sands. A general term for any reservoir rock with very low permeability.

TIH. trip in hole.

time interval map. A map that uses contours to show the span in time (milliseconds) between two seismic horizons. (isotime and isochron map)

time-lapse seismic. The seismic differences between several 3-D seismic surveys run at different times over the same reservoir during production from that oil field. Changes in seismic responses from the reservoir such as amplitude can show the flow of fluids through the reservoir. (4-D seismic)

time slice. A flat horizontal section made at a specific depth in time from 3-D seismic data. It shows where each seismic reflector intersects the slice. (horizontal slice)

time structure map. A contoured map that shows depth in time (milliseconds) to a seismic horizon.

time-to-depth conversion. A seismic process in which the vertical scale on a seismic record is converted from time in milliseconds to depth in feet or meters.

title opinion. A legal history of mineral rights ownerships on a parcel of land.

TJPF. tubing jets per foot.

tk. tank.

tkg. tankage.

tl. (1) tool and (2) tools.

TLH. top of liner hanger.

TMC. total mud cost.

tn. tan.

TNS. tight no show.

TO. tool open.

T.O. tool open.

TOC. (1) top of cement and (2) total organic carbon.

TOCP. top of cement plug.

TOF. top of fish.

TOH. trip out of hole.

TOL. top of liner.

tol. tolerance.

ton. A weight in the English system equal to 2,240 pounds or 1.016 tonnes in the metric system; cf. tonne. (long ton)

tongs. A wrench-like device that is suspended by a cable above the drill floor on a drilling rig. It is used to grip and hold the drillpipe as it is being screwed together and unscrewed by the spinning wrench.

tonne. A weight in the metric system equal to 1,000 kg or 0.9842 long tons in the English system; cf. ton. (short ton)

TOOH. trip out of hole.

tool face. The direction the drill bit is facing.

tool joint. A short steel cylinder with female-threads. It is used to connect joints of pipe. (collar and coupling)

tool pusher. A drilling company employee at the drillsite who is ultimate in charge of the drilling crews and the drilling rig. (TP)

TOP. testing on pump.

top. The depth to the top of a formation or zone in a well.

top drive. (1) an AC or DC electrical motor that rotates the drillstring from the swivel. It replaces the rotary table and kelly bushing. (power swivel) (2) a drilling rig with a top drive motor.

topo. (1) topographic and (2) topography.

topographic map. A map that uses contours to show the elevation of the surface of the ground.

tops. See top.

top-set completion. See open-hole completion.

torque. A twisting force that can cause rotation.

TORT. tearing out rotary tools.

tot. total.

total acid number. A measure of the acidity and corrosiveness of a crude oil. It is reported in units of mg KOH/g. Higher numbers are more corrosive.

total depth. The depth of a well to the bottom measured by number of drillpipe joints in the well (driller's or rotary depth) or by a wireline (logged or measured depth); cf. true vertical depth. (TD)

total mud cost. The cumulative cost of drilling fluids on a rig up to the date of the daily drilling report. (TMC)

total organic carbon. The percent by weight of organic carbon in a sample. It is a measure of a source rock's ability to generate and expel hydrocarbons. Organic carbon values below 0.5 to 1.0% are considered too low to generate hydrocarbons.

total well cost. The cumulative drilling expenses until to date of the daily drilling report. (TWC)

to the right. Clockwise; the rotary table on a drilling rig turns to the right.

touch bottom. The contact of a tool or drillstring with the bottom of a well.

tour. A crew shift on a drilling rig. There are usually three 8-hour tours on a land rig and two 12-hour tours on an offshore rig. On a land rig the graveyard or morning tour is from midnight to 8 a.m., the day tour is from 8 a.m. to 4 p.m., and the evening tour is from 4 p.m. to midnight.

tour pusher. An assistant tool pusher. The tour pusher can relieve the tool pusher, often during a night tour.

tour sheet or **report.** A report made by the driller on the drilling activities during that tour. It is used to make the daily drilling report. (driller's report)

township. A surveyed square of land 6 miles on a side. Townships are divided into 36 sections. (T and twp)

TP. (1) tubing pressure and (2) tool pusher.

Tp. top.

T/pay. top of pay.

TPC. tubing pressure closed.

TPF. tubing pressure flowing.

TPSI. tubing pressure shut in.

TR and **tr.** trace.

TR. temperature recorder.

tr. tract.

trace. The response of a single seismic detector to a single seismic shot. It is recorded as a vertical line with peaks and troughs to the right and left sides that represent recorded seismic energy. (wiggle trace)

trace fossil. Indirect remains of a plant or animal in a sedimentary rock. Tracks, burrows, root casts, and trails are examples.

tracer log. A log that uses a radioactive tracer and detectors to measure fluid flow characteristics in a well.

tractor. A device used to pull tools down highly deviated and horizontal wells. It is run down the well on an electric line. When electronically activated, hydraulic-driven wells are deployed from the tractor body. It is controlled electronically.

trans. (1) transformer and (2) transmission.

transgression. The advance of seas onto the land; cf. regression.

transp. transparent.

transportable gas. Natural gas that has had minimal field processing so that it can be transported to a final processing plant. *See also* pipeline-quality gas.

trap. A high area on the subsurface reservoir rock such as a dome or reef where oil and/or gas can accumulate. It is overlain by a caprock that is a seal. *See also* structural trap and stratigraphic trap.

traveling block. A steel frame with steel wheels on a horizontal shaft. It is suspended in the derrick or mast of a drilling or workover rig by the hoisting line. A hook is attached to the bottom of the block. It travels up and down in the derrick or mast as equipment and tools are raised and lowered in the well.

traveling valve. One of two valves in a downhole pump on the bottom of a tubing string driven by a sucker-rod string. The traveling valve moves up and down with the sucker-rod string; cf. standing valve.

treater. A vessel used to separate an emulsion. A heater treater uses heat, and an electrostatic treater uses high-voltage electric grids. Chemicals, called emulsion breakers, can also be used.

treble. Three tubular joints; cf. single, double, and fourble. (thribble)

tree. *See* production tree.

trend. The area along which a petroleum play occurs. (fairway)

Triassic. A period of geological time from 251 to 201.6 million years ago. It is part of the Mesozoic era. (Tri)

tribble. *See* treble.

tricone bit. A common type of roller cone drill bit with three rotating cones on the bottom. Two types are milled-teeth and insert tricone bits. The bit is designed to chip or crush the rocks on the bottom of the well to produce well cuttings; cf. diamond bit.

trip. A cycle of pulling (tripping out) and running (tripping in) a drillstring in a well. A round trip involves tripping in, touching bottom with the drillstring, and tripping out. A short trip does not touch bottom. A wiper trip uses the drill bit on the drillstring to ream out the wellbore.

trip. (1) tripped and (2) tripping.

triplex pump. A mud pump with three single-acting pistons in cylinders. The mud is pumped only on the forward stroke of the pistons; cf. duplex pump.

tripping in. Running the drillstring into the hole; cf. tripping out.

tripping out. Pulling the drillstring out of the hole; cf. tripping in.

trip tank. A small tank, usually on the floor of a drilling rig, that holds drilling mud that is added to a well during tripping out.

trmt. treatment.

transl. translucent.

trnsp. transparent.

TRRC. Texas Railroad Commission.

trt. treat.

trtd. treated.

trtg. treating.

trtr. treater.

true vertical depth. The depth of a well measured straight down; cf. total depth. (TVD)

truncated. The lateral termination of rocks, usually either by erosion or faulting.

TS. tensile strength.

T/S. top of salt.

TSD. temporarily shut down.

T/sd. top of sand.

TSI. temporarily shut in.

TSITC. temperature survey indicated top of cement.

TST. true stratigraphic thickness.

tst. test.

tstd. tested.

tste. taste.

tstg. testing.

TSTM. too small to measure.

tstr. tester.

TT. through tubing.

TTF. test to follow.

TTL. total time lost.

tubing. A small-diameter ($\frac{3}{4}$ to $4\frac{1}{2}$ in.) steel tubular string that runs down the center of a well to conduct the produced fluids up the well. (tbg)

tubing anchor. A device that grips the casing to secure the bottom of the tubing string.

tubinghead. The forged- or cast-steel fitting on the top part of the wellhead. It contains the tubing hangers that suspend the tubing string in the well; cf. casinghead.

tubingless completion. An oil well completion in which the production is brought up the casing without using a tubing string. It is used in a very high-capacity oil well.

tubing packer. A packer run on the bottom of the tubing string to seal the space (annulus) between the tubing and casing. (completion packer)

tubing pressure. Pressure on the fluid in the tubing string. It can be either flowing or static; cf. casing pressure.

tubing pump. A sucker-rod pump that is run on the tubing string; cf. rod pump.

tubing swage. A tool with a cylindrical body that tapers toward the bottom. It is run on a wireline to open collapsed tubing.

tubular. A general term for any long steel cylinder such as a joint of drillpipe, casing, tubing, or drill collar.

tungsten carbide. An extremely hard alloy (W_2C) used in granular form to hard-face drilling tools.

turbidite. A layer of sedimentary rocks deposited by a turbidity current coming to rest on the ocean bottom. It can be graded with the coarsest grains such as sand on the bottom and the finest on the top or it can be relatively uniform sand deposited by several turbidity currents.

turbidity current. A dense mixture of water and sediment flowing down a submarine slope. *See also* turbidite.

turbine. A motor driven by fluid flowing through revolving vanes on a shaft.

turbine meter. A gas or liquid meter that measures the volume by the turns per unit time on the turbine shaft.

turbine motor. *See* downhole turbine motor.

turnkey drilling contract. A drilling contract based on a fixed fee to drill to contract depth. It can also have the obligation to complete and equip the well based on well tests; cf. daywork and footage drilling contract.

turning to the right. To drill a well.

Turonian. An age of geological time from 93.5 to 89 million years ago. It is part of the Cretaceous period.

TVD. true vertical depth.

TVT. true vertical thickness.

TWC. total well cost.

twin. To drill a well adjacent to an existing well.

two-way travel time. The recorded time in milliseconds from the seismic source to the reflector and back to the surface detector.

twp. township.

twst off. twist off.

TWTM. too weak to measure.

typ. typical.

u. (1) upper and (2) unit.

U/. upper.

UC. unconformity.

U/C. under construction.

UG. (1) under gauge and (2) underground.

U/L. upper and lower.

ult. ultimate.

ultimate oil production and recovery. The oil in a reservoir can be commercially recovered by primary production, waterflood, and enhanced oil recovery.

ultrasonic testing. The use of very high frequency (0.1 to 25 MHz) sonic waves to test tubulars such as joints of tubing and drillpipe for wear and defects.

un. unit.

Unconf and **unconf.** unconformity.

unconformity. An ancient erosional surface. (UC, Unconf, and unconf) *See also* disconformity and angular unconformity.

uncons. unconsolidated.

unconsolidated sediments. Loose sediments; cf. consolidated sediments. (uncons)

unconventional resources. Crude oil and natural gas that occur in a reservoir that is not a conventional porous and permeable sandstone or carbonate; e.g., gas shale, tar sand, tight gas sand, and oil shale.

underbalance. The condition in a well in which the pressure on the drilling mud is less than the pressure on fluids in the surrounding rocks; cf. overbalance.

underbalanced drilling. Drilling a well while circulating relatively lightweight drilling fluid. This prevents formation damage and lost circulation and increases the rate of drilling. It does not have pressure control and fluids will flow out of the rocks and up the well. A rotating head on top of the well acts as a seal and diverts the produced fluid to a separator.

undercompacted. Sediments that have not compressed as much as would be expected at that depth.

underream. To enlarge the diameter of a wellbore to a diameter larger than that of the last string of casing in the well. An underreamer is used.

underreamer. A tool run on a drillstring and rotated to enlarge the bottom of a well using cones on arms that expand.

undersaturated. A liquid that can dissolve more of a gas or a salt; cf. saturated.

undersaturated pool. An oil reservoir without a free gas cap. There is some natural gas dissolved in the oil but it can hold more and is unsaturated; cf. saturated pool.

undershoot. To acquire a 3-D image of the subsurface of an area without the seismic equipment ever being on that land. The geophones are positioned on one side and the source(s) on the other side of the land.

undiff. undifferentiated.

undly. underlying.

unf. unfinished.

uni. uniform.

unitize. The coordination of all operators in a unit or field to increase ultimate oil production with a common pressure maintenance, waterflood, or enhanced oil recovery project. A unit operator is declared to manage the project. The costs and additional production are shared proportionally to each participant's acreage or reserves in the unit. Unitization can be either voluntary or compulsory (mandated by a government agency).

unit operator. The company in charge of drilling and production on a unitized field.

unload. To remove liquid from a well. Gas wells are unloaded when water on the bottom of the well prevents gas from flowing into the well (load up).

updip. A direction or location up the slope or angle (dip) of a plane such as the top of a rock layer or fault; cf. downdip.

uplift. An area of the earth that has been forced upward.

upset. A thicker wall section on a tubular such as drillpipe. It is used to strengthen the pipe where it has been threaded on each end.

upstream. Petroleum exploration, drilling, and production. Downstream involves transportation, refining, chemicals, and marketing.

upthrown. The side of a dip-slip fault that moved up. cf. downthrown

UR. (1) underreaming and (2) ultimate recovery.

USDOE. United States Department of Energy (www.doe.gov).

USGS. United States Geological Survey (www.usgs.gov).

UT. upper tubing.

U/W. used with.

V. (1) volt, (2) volume, and (3) mud viscosity in API seconds.

v. velocity, volt, very.

VA. volt-ampere

vac. (1) vacuum and (2) vacant

valve. A gate used to open, close, and regulate flow. (vlv)

vap. vapor.

var. (1) variable or (2) various.

vari. variegated.

variable area wiggle trace. A method of displaying seismic data using vertical lines with wiggles to the left and right. Wiggles to the right are reflections and are often colored black; cf. variable density display.

variable-bore rams. Two large blocks of steel with inserts cut into them. They are designed to fit around a range of different-sized drillpipes and drill collars to close a well. Variable bore rams are used in a blowout-preventer stack.

variable density display. A method of showing seismic data using shade of gray to show reflections. Darker colors are stronger reflections; cf. variable area wiggle trace.

variegated. A pattern of irregular spots and patches in a sedimentary rock. (vari and vgt)

v.c. very common.

VD. variable density.

V-door. An inverted, V-shaped opening in the front of a mast or derrick. It allows the joints of drillpipe and casing to be run up the ramp onto the drill floor.

vel. velocity.

vent. ventilator.

vert. vertical.

vertical seismic profiling. A method used to measure seismic velocities of rock layers in a well. The seismic source is located on the surface next to the well. A borehole geophone is raised in the well to measure seismic velocities at various depths. It is similar to a check shot, but the geophone stations are closer together. (VSP)

vertical well. A well drilled almost straight down with a maximum tolerance in degrees per 100 ft for any well section and within a cone of specific degrees as defined in the drilling contract. (straight hole) cf. crooked hole and deviated well.

v-f-gr. very fine grained.

vgt. variegated.

VHF. very high frequency.

v-HOCM. very heavily oil-cut mud.

VI. viscosity index.

vibration dampener. A sub used in a downhole assembly to reduce vibrations. (shock sub)

vibrator. A truck with hydraulic motors on the bed of the truck and a steel plate (base plate or pad) below the motors. It is used as a seismic source to shake the ground by vibroseis.

vibroseis. A seismic method in which the source energy is put into the ground with a vibrator truck or trucks that shake the ground.

virgin pressure. The original reservoir pressure before any production. (initial or original pressure)

vis. (1) viscosity and (2) visible.

viscometer. A laboratory instrument used to measure the viscosity and gel strength of drilling mud.

viscosity. The resistance of a fluid or slurry such as drilling mud to flow. The units of dynamic viscosity are centipoises (cp). Kinematic viscosity is viscosity divided by fluid density and is measured in centistokes (cs). (μ , V , and vis)

vis room. See visualization center.

visualization center or **station.** A room used to project and display 3-D seismic data on the walls and the floor. It is also called a visionarium or decisionarium. (*vis room*)

vitritinite reflectance. A method that uses a microscope to measure the amount of light reflected off a type of plant organic matter (vitritinite) in shale to determine if the shale has generated crude oil or natural gas.

V/L. vapor to liquid ratio.

VLAC. very light amber cut.

vlv. valve.

v.n. very noticeable.

vol. volume.

volat. volatile.

volatile oil. Crude oil with relatively more intermediate-sized molecules and less longer-sized molecules than black oil; cf. black oil.

Volc and **volc.** (1) volcanic and (2) volcanic rock.

volcanic rock. See lava.

vol %. volume percent.

volumetric drive. A gas field reservoir drive in which the expanding gas produces the energy to force the gas through the reservoir rock. (gas-expansion drive)

VP. vapor pressure.

VPS and **V.P.S.** very poor sample.

v.r. very rare.

vrtil. vertical.

vs. versus.

V/S. velocity survey.

VSGCM. very slightly gas-cut mud.

v-sli. very slightly.

VSP. (1) vertical seismic profile or profiling and (2) very slightly porous.

VSSG. very slight show of gas.

VSSO. very slight show of oil.

vug. A roughly spherical, relatively small solution pore in limestone.

vug. (1) vuggy and (2) vugular.

vuggy. A limestone or dolomite containing vug pores. (*vug*)

W. (1) watt, (2) water, (3) weight, and (4) mud weight in ppg.

w. watt.

w/. with.

WAB. weak air blow.

wackestone. A type of limestone with significant amounts of large, sand-sized particles supported in fine-grained material. (*Wkst*)

WAG. water-alternating-gas.

wait-and-weigh method. A method used to control a well with a kick. After the blowout preventers have been thrown, kill mud is prepared, and the kick-diluted mud is replaced by kill mud during one circulation; cf. driller's method.

waiting on cement. The time that operations on a well are shut down as the cement sets behind a casing string. It can be hours to several days. (*WOC*)

walking beam. The steel beam that pivots up and down on the Samson post of an oil well beam-pumping unit.

walk to the right. The tendency of a bit to whirl clockwise and the well to be drilled down in a clockwise, corkscrew pattern because the bit is being turned clockwise (to the right). Anti-whirl bits are designed to counter this effect.

wall scraper and **scratcher.** A ring with protruding, metal wires that is attached to the outside of a casing string. It is rotated or reciprocated to scratch the mud cake off the well walls.

wash job. Acidizing a well to remedy skin damage on the wellbore.

washout. (1) Excessive erosion and enlargement of the wellbore by drilling mud. (2) Damage on a drillstring caused by fluids flowing through the walls of a tubular.

washover pipe and **washpipe.** A fishing tool that consists of a section of casing. It is run onto the fish. Drilling mud is pumped out the bottom of the washover pipe to clear debris from around the fish. Another tool is then used to retrieve the fish. (*WP*)

wash tank. A settling tank that uses gravity to separate a loose emulsion. (gun barrel separator)

water-alternating-gas. An enhanced oil recovery method in which slugs of inert gas and water are alternately injected into a depleted oil reservoir. The water helps prevent fingering of the gas and early breakthrough. (*WAG*)

water back. To dilute water-based drilling mud with water to make it less viscous and dense; cf. mud up.

water-base or **water-based drilling mud.** Drilling mud made with freshwater. It is commonly used on land; cf. oil-base and synthetic-base drilling mud. (WBM)

water cushion. *See* cushion. (WC)

water cut. The percentage of water that an oil well produces.

water-cut. Adjective for diluted with water.

water-cut meter. An instrument used to measure the water content of fluids in a well.

water drive. A reservoir drive in which the expansion of water beneath or beside an oil or gas reservoir forces the oil or gas through the rocks. It has a high oil recovery efficiency but only a moderate gas recovery efficiency.

water encroachment. Water flowing into the oil-producing part of a reservoir.

waterflood. A method used to produce more oil from a depleted reservoir. Water is pumped down injection wells into the reservoir in order to force oil through the reservoir to producing wells. Waterfloods are described by their pattern of water injection and producing wells such as 5-spot and line drive. (WF)

waterfrac. A frac job using water with very little additives as the frac fluid. A slickwater frac is a type of waterfrac.

water hauler. A service company that uses a tank truck to pick up and take oilfield brine to a disposal well.

water-in-oil emulsion. Droplets of water suspended in oil. It is the most common emulsion produced from an oil well; cf. oil-in-water emulsion.

water table. The subsurface level below which the pores in the soil or rock are saturated (filled) with water.

water washing. A process in which water flowing by crude oil removes the lighter fractions by solution.

water wet. A reservoir rock in which oil or gas occupies the center of the pores, and water coats the rock surfaces; cf. oil wet.

WAX. wax plant.

waxy crude. Crude oil with a high wax (paraffin) content. It has a high pour point. A waxy crude is liquid under high temperature in the subsurface reservoir and solid under surface temperature.

WB. (1) water base and (2) water blanket.

WBIH. went back in hole.

WBM. water-based drilling mud.

WC. (1) water cushion (drillstem test), (2) wildcat, and (3) water cut.

WCM. water-cut mud.

WCO. water-cut oil.

WCTS. water cushion to surface.

WD. water depth.

WDW. water disposal well.

weathering. The physical and chemical breakdown of rock. Weathering produces sediments.

weathering layer and **zone.** *See* low-velocity zone. (WZ)

wedge out. To have a rock progressively narrow to zero thickness in a horizontal direction. (pinch out)

wedge-out. The line or edge of a rock that pinches out.

weed and seed person. *See* palynologist.

weighting agent and **material.** A drilling mud additive such as barite, siderite, or hematite used to increase the density of the mud.

well. A relatively narrow-diameter hole drilled through subsurface rocks to either produce fluids or inject fluids. Type of well drilled in the petroleum industry are (1) wildcat, (2) appraisal, (3) production, (4) injection, (5) disposal and (6) observation. The well can be either straight or deviated.

wellbore. The hole made by a drilling rig.

well completion report. A form required by a government agency after a well has been completed. It lists well, formation, and test information and is certified as accurate.

well control. The methods used to prevent a blowout on a well.

well cuttings. Rock flakes made by the drill bit. (cuttings)

wellhead. The forged or cast steel fitting on the top of a well. It consists of one or more casingheads located on the bottom and a tubinghead on the top. It is bolted or welded to the top of the surface casing. (WH)

wellhead equipment. Equipment attached to the top of the tubing and casing strings in a well. It includes the casingheads, tubinghead, Christmas tree, stuffing box, and pressure gauges.

well intervention. A general term for work on a producing well. It includes repairing, replacing, and installing equipment and well stimulation.

well log. A continuous record of rock properties measured in a well. Some types are sample, mud, and wireline logs.

well log library. A place where copies of well logs from a region are on file.

well pad. A drilling pad than now is the location for a wellhead on a producing well. It is often surrounded by a fence. There can be four to eight horizontal drainhole wellheads on the same pad; cf. drilling pad.

well production profile. A plot of flow rate per day versus time for a well.

well service unit. *See* well-servicing unit.

well servicing. Maintenance on a well to maintain or improve production rates. It includes swabbing, removal of scale or paraffin, and running or retrieving tools and equipment such as sucker rods, tubing, and downhole pump.

well-servicing unit. Truck-mounted equipment used to service a producing well. It has either a single- or double-pole telescoping mast, one or two drums, and is operated by a two- to four-person crew. (well service unit)

well shooting. To explode nitroglycerin in a torpedo at reservoir depth in a well to fracture the reservoir and stimulate production. (explosive fracturing)

wellsite geologist or **well sitter.** A geologist at the drillsite who is responsible for sampling and testing.

well sorted. A rock or sediments composed of clastic grains that are all about the same size. Clean sands are an example; cf. poorly sorted.

well spotting. To locate wells on a base map.

well stimulation. Any engineering method used to increase the permeability of a reservoir around the wellbore to increase production. It includes acidizing and hydraulic fracturing.

West Texas Intermediate. The benchmark crude oil for the United States. It has 38 to 40 °API gravity and 0.3% S. (WTI)

wet. (1) A reservoir that produces only water. (2) A well that encountered no commercial hydrocarbons.

wet combustion. A fireflood in which hot steam and water are alternately injected into the reservoir. The steam generated from the water helps drive the oil to producing wells. (combination of forward combustion and waterflooding)

wet gas. A hydrocarbon that occurs as a gas under both initial reservoir conditions and during production as the pressure decreases in the reservoir. A liquid condensate separates from the gas after production under surface conditions but not in the reservoir; cf. dry gas.

wetting fluid. The fluid such as oil or water that coats the rock surfaces of pores in a reservoir. A water-wet oil reservoir has water located on the outside of the pores and oil in the center.

WF. (1) waterflood and (2) wide flange.

WFD. wildcat field discovery.

wgt. weight.

WH. (1) wash and (2) wellhead.

wh. white.

whip. whipstock.

whipstock. A long metal wedge used in a well to bend the drillstring and kick off a deviated well. (whip and WS)

white gas. *See* condensate.

white mica. *See* muscovite.

white oil. *See* condensate.

WHOF. wellhead open flow.

WHP. wellhead pressure.

Wh Sd. white sand.

WI and W.I. working interest.

WI. water injection.

wiggle trace. *See* trace.

WIH. (1) went in hole and (2) water in hole.

wildcat well. *See* exploratory well.

wild well. A well that is blowing out of control.

WIN. water injection. (well)

wind gas. nitrogen.

window. A hole cut in casing to kick off a deviated well.

wing. The fittings and tubular on the side of a production tree used to direct the produced fluids to a flowline. It can be either a single- or double-wing tree.

wiper plug. A cylinder of aluminum and rubber used during a cement job. It is pumped down the casing to remove the cement slurry from the casing and to separate fluids in the casing. A top and a bottom plug are used.

wiper trip. The tripping in and out of a well with a drillstring to use the drill bit to ream the wellbore.

wireline. (1) Wire rope used to run tools in a well. It is made of strands of wire wrapped around a fiber or steel core. Each strand is made of steel wires wrapped in a helical pattern. The wireline used in logging has insulated, electrical wires in the core and is called electric wireline. (2) Slick line made of a single wire used to run tools in a well. (WL)

- wireline well log.** A record of rock properties and their fluids that are measured by an instrument (logging tool or sonde) raised up the well on a wireline. The diameter of the wellbore can also be measured. The properties are recorded as curves on a long strip of paper called a well log. Recent wireline well logs are also recorded digitally and transmitted by radio telemetry; e.g., electrical, gamma ray, and neutron porosity logs.
- wireline spear.** A fishing tool that uses barbs to engage and remove a wireline fish from a well.
- wire rope.** A general term for cable made with braided, steel wires forming several twisted strands wound around a steel core. Wireline is a type of wire rope.
- wk.** weak.
- wko.** workover.
- wkor.** workover rig.
- Wkst.** wackestone.
- WL.** (1) wireline and (2) water loss.
- WI and wl.** well.
- W/L.** water load.
- WLC.** wireline coring.
- wld.** (1) welded and (2) welding.
- WLT.** wireline test.
- WLTD.** wireline total depth.
- WNSO.** water not shut off.
- WO.** (1) waiting on, (2) workover, (3) wash over, and (4) workover or work over.
- w/o.** without.
- WOA.** waiting on acid.
- WOB and W.O.B.** weight on bit.
- WOB.** waiting on battery.
- WOC.** waiting on cement.
- WOCR.** waiting on completion rig.
- WOCT.** waiting on completion tools.
- WODP.** without drillpipe.
- WOG.** water, oil, or gas.
- WOO.** waiting on orders.
- WOP.** (1) waiting on pipe, (2) waiting on pipeline, (3) waiting on permit, and (4) waiting on pump.

- WOPE.** waiting on production equipment.
- WOPL.** waiting on pipeline.
- WOPT.** waiting on potential test.
- WOPU.** waiting on pumping unit.
- WOR.** (1) waiting on rig, (2) waiting on rotary, and (3) water/oil ratio.
- working interest.** An ownership in a well that bears 100% of the cost of production. Working interest owners receive their share of the production revenue after the royalty owners have taken their share and after expenses have been deducted; cf. royalty interest. (billing interest) (WI and W.I.)
- working pressure.** The maximum pressure that equipment is designed to operate under. (WP)
- work over.** A verb for to have a service company do work (a workover) such as pull rods or sand cleanout on a producing well. A production rig, either a workover rig or a smaller service or pulling unit, is used. (wko and WO)
- workover.** A noun or adjective for the methods used to maintain, restore, or improve production from a well. (wko and WO)
- workover rig.** A portable rig with a mast and hoisting system used in the workover of a well. A workover rig can drill and circulate. It is a type of production rig; cf. service unit. (wkor)
- workstring.** A tubing string used to convey a treatment or run tools in a well during a workover. It can be either coiled or jointed (straight) tubing.
- worm.** An inexperienced worker.
- WORT.** waiting on rotary tools.
- WOS.** washover string.
- WOSP.** waiting on state potential.
- WOST.** waiting on standard tools.
- WOT.** (1) waiting on test and (2) weighting on tools.
- WOT&C.** waiting on tank and connections.
- WOW.** waiting on weather.
- WP.** (1) working pressure and (2) wash pipe.
- WS.** (1) whipstock and (2) water supply.
- WSD.** whipstock depth.
- wshd.** washed.
- wshg.** washing.
- WSO.** water shut off.

WSONG. water shut off no good.

WSO OK. water shut off OK.

WSRT. well sorted.

W/SSO. water with slight show of oil.

W/sulf O. water with sulfur odor.

WSW. water supply well.

WT. wall thickness (pipe).

wt. weight.

wtg. waiting.

wthd. weathered.

wthr. weather.

WTI. West Texas Intermediate.

wt%. weight percent.

wtr. water.

WTS. water to surface.

W/2. west half.

WW. (1) wash water and (2) water well.

wxy. waxy.

WZ. weathered zone.

XBD, X-bd, X-bdd, and x-bdd. crossbedded.

X-hvy. extra heavy.

Xln and xln. crystalline.

X-R. x-ray.

X-ray diffraction. A method used to identify minerals such as clay minerals in rocks. A sample of the rock is bombarded with x-rays to measure the crystal structure of each mineral grain. (XRD)

XRD. x-ray diffraction.

X-stg. extra strong.

XTAL and xtal. crystal.

Xtree. Christmas tree.

yel and yell. yellow.

yield. (1) To permanently deform. (2) The volume of cement slurry with a specific density formed by the mixture of one sack of dry cement with water and additives. It is expressed as cubic feet per sack (cu ft/sk). (3) The

minimum yield strength of steel used to make tubulars. (4) The oil to gas ratio expressed in bbl/Mcf. It is the inverse of the gas-to-oil ratio.

yield point. The minimum stress that causes permanent deformation. (YP and yp)

yield stress. The stress (force) that must be applied to something to make it flow.

YP or yp. yield point.

yr. year.

YTD. year to date.

Z. (1) elevation, (2) Z factor, and (3) zone.

Z/A. The ratio of atomic number to atomic weight.

zeolite. A group of naturally occurring aluminum and silica minerals that can also be manufactured. These minerals are used for water softening and treating crude oil and natural gas. (zeol)

Z factor. A number, usually between 1.2 and 0.7, that compensates for natural gas not being an ideal gas under high pressure and temperature in the reservoir. It is used in gas reserve equations and can be found in tables of gas composition, temperature and pressure. (gas deviation factor, gas compressibility factor, and supercompressibility factor) (Z)

zip collar. A drill collar with a recess in the box end for the attachment of elevators.

ZN, Zn, and zn. zone.

zonal isolation. The use of packers to isolate a producing zone in a well. (zone isolation)

zone. (1) a rock layer identified by a specific lithology, age, or porosity. (Z, ZN, Zn, and zn) (2) a rock layer identified by a characteristic microfossil species or species such as the *Siphonia davisii* zone. (biostratigraphic zone) (3) See pay zone.

zone isolation. See zonal isolation.