Fourth Edition

A Primer of OIL-WELL DRILLING

by

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GLOSSARY

A

abandon *v*: to cease producing oil and gas from a well when it becomes unprofitable. A wildcat well may also be abandoned after it has proven nonproductive. Several steps are involved in abandoning a well: part of the casing is removed and salvaged; one or more cement plugs are placed in the borehole to prevent migration of fluids between the different formations penetrated by the borehole; and the well is abandoned. In many states, it is necessary to secure permission from official agencies before a well may be abandoned.

acid fracture *n*: to part or open fractures in productive, hard-limestone formations by using a combination of oil and acid or water and acid under high pressure. (See *formation fracturing*.)

acidize *n*: to treat oil-bearing limestone or dolomite formations, using a chemical reaction with acid, to increase production. Hydrochloric or other acid is injected into the formation under pressure, bringing about an enlargement of the pore spaces and passages through which the reservoir fluids flow. The acid is held under pressure for a period of time and then removed; finally, the well is put into production. Chemical inhibitors combined with the acid prevent corrosion of the pipe.

adjustable choke *n*: a special valve in which a conical needle and seat vary the rate of flow.

air-actuated *adj*: powered by compressed air, as the clutch and brake system in drilling equipment.

air drilling *n*: a method of rotary drilling that uses compressed air as the circulation medium. The conventional method of removing cu[illegible]s from the wellbore is to use a flow of w[illegible] drilling mud. Compressed air removes t[illegible] tings with equal or greater efficiency. Th[illegible] of penetration is usually increased co[illegible] ably when air drilling is used.

American Petroleum Institute: founded in 1920; national oil trade association which maintains a production department with offices in Dallas, Texas. The API is the leading standardizing organization on oil-field drilling and producing equipment, having published a great many codes covering such matters. It also has departments of transportation, refining, and marketing in Washington, D.C.

analysis, core *n*: (See *core analysis*.)

analysis, mud *n*: (See *mud analysis*.)

anchor, deadline tie-down *n*: (See *deadline tie-down anchor*.)

[illegible] *n*: in directional drilling, the angle, expressed in degrees, at which a well is deflected from the vertical by a deflecting tool.

[illegible] *n*: a large valve, usually installed above the ram preventers, which forms a seal in the annular space between the pipe and wellbore or, if no pipe is present, on the wellbore itself.

annular space *n*: 1. the space surrounding a cylindrical object within a cylinder. 2. the space around a pipe suspended in a wellbore, the outer wall of which may be the wall of either the borehole or the casing; sometimes termed the annulus.

anticline *n*: an arched, inverted-trough configuration of folded and stratified rock layers.

API *abbr*: the American Petroleum Institute.

B

back off *v*: to unscrew one threaded section of pipe from another.

back up *v*: to hold one section of pipe while another is being screwed into or out of it.

bail *n*: a cylindrical steel bar (similar to the handle or bail of a bucket only much larger) that supports the swivel and connects it to the hook. Sometimes, the two cylindrical bars that support the elevators and attach them to the hook are called bails.

bail *v*: to recover bottom-hole fluids, samples, or drill cuttings by lowering a cylindrical vessel, called a bailer, to the bottom of a well, filling it, and retrieving it.

bailer *n*: a long cylindrical container, fitted with a valve at its lower end, used to remove water, sand, mud, or oil from a well.

bailing line *n*: cable attached to the bailer, passed over a sheave at the top of the derrick, and spooled on the reel.

barge *n*: any one of many types of flat-decked, shallow-draft vessels, usually towed by a boat. A complete drilling rig may be assembled on a drilling barge, which usually is submersible; that is, it has a submersible hull or base that is flooded with water at the drilling site. Drilling equipment, crew quarters, etc., are mounted on a superstructure above the water level.

barite *n*: barium sulfate, $BaSO_4$; a mineral used to increase the weight of drilling mud. Its specific gravity is 4.2 (i.e., it is 4.2 times heavier than water).

barrel (bbl) *n*: a measure of volume for petroleum products. One barrel (1 bbl) is the equivalent of 42 U.S. gal or approximately 35 imperial gal, or 158.97 liters. One cubic meter (1 m^3) equals 6.2897 bbl.

basket sub *n*: a fishing accessory run above a bit or mill to recover small pieces of metal or junk in a well.

bed *n*: a specific layer of earth or rock in contrast to other layers of different material lying above, below, or adjacent to it.

belt *n*: a flexible band or cord connecting and passing about each of two or more pulleys to transmit power or impart motion.

bit *n*: the cutting or boring element used in drilling oil and gas wells. Most bits used in rotary drilling are roller-cone bits. The bit consists of the cutting element and the circulating element. The circulating element permits the passage of drilling fluid and utilizes the hydraulic force of the fluid stream to improve drilling rates. In rotary drilling several drill collars are joined to the bottom end of the drill-pipe column. The bit is attached to the end of the drill collar.

bit breaker *n*: a heavy plate which fits in the rotary table and holds the drill bit while it is being unscrewed from the drill stem.

bit record *n*: a report on each bit used in an operation listing its type, the amount of footage it has drilled, and the nature of the formation penetrated.

blind ram *n*: an integral part of a blowout preventer serving as the closing element. Its ends do not fit around the drill pipe but seal against each other and completely shut the space below.

block *n*: any assembly of pulleys on a common framework; in mechanics, one or more pulleys, or sheaves, mounted to rotate on a common axis. The crown block is an assembly of sheaves mounted on beams at the top of the derrick. The drilling line is reeved over the sheaves of the crown block alternately with the sheaves of the traveling block, which is hoisted and lowered in the derrick by the drilling line. When elevators are attached to a hook on the traveling block, and when drill pipe is latched in the elevators, the pipe can be raised or lowered in the derrick or mast.

blooey line *n*: the discharge pipe from a well being drilled by air that conducts the air and drilled cuttings away from the rig.

blowout *n*: an uncontrolled flow of gas, oil, or other well fluids into the atmosphere. A blowout, or gusher, can occur when formation fluids enter the wellbore and steps are not taken to stop the entry of fluids. A kick warns of an impending blowout.

blowout preventer (BOP) *n*: equipment installed at the wellhead at surface level on land rigs and on the seafloor of floating offshore rigs to prevent the escape of pressure either in the annular space between the casing and drill pipe or in an open hole during drilling and completion operations. (See *annular blowout preventer* and *ram blowout preventer*.)

boll weevil *n*: (slang) an inexperienced rig or oilfield worker, sometimes shortened to "weevil."

bond *n*: the state of one material adhering or being joined to another material (as cement to formation). *v*: to adhere or be joined to another material.

borehole *n*: the wellbore; the hole made by drilling or boring.

bottom-hole *adj*: pertaining to the lowest or deepest part of a well.

bottom-hole pressure *n*: the pressure in a well measured at or near the bottom of the hole.

box and pin *n*: (See *tool joint*.)

brake, hydramatic *n*: (See *hydramatic brake*.)

brake, magnetic *n*: (See *magnetic brake*.)

break out *v*: to unscrew one section from another section of pipe, especially drill pipe while it is being withdrawn from the wellbore. During this operation, the breakout tongs are used to start the unscrewing operation.

breakout cathead *n*: (See *cathead*.)

breakout tongs *n*: (See *tongs* and *break out*.)

bring in a well *v*: to complete a well and put it in producing status.

buck up *v*: to tighten up a threaded connection (as two joints of drill pipe).

C

cable *n*: a rope of wire, hemp, or other strong fibers. (See *wire rope*.)

cable-tool drilling *n*: a drilling method in which the hole is drilled by dropping a sharply pointed bit on the bottom of the hole. The bit is attached to a cable, and the cable is picked up and dropped, picked up and dropped, over and over, as the hole is drilled.

cap rock *n*: impermeable rock overlying an oil or gas reservoir that tends to prevent migration of oil or gas out of the reservoir.

cased hole *n*: a wellbore in which casing has been run.

casing coupling *n*: a tubular section of pipe that is threaded inside and used to connect two joints of casing.

casing elevator *n*: (See *elevator*.)

casinghead *n*: a heavy, flanged steel fitting that connects to the first string of casing and provides a housing for the slips and packing assemblies by which intermediate strings of casing are suspended and the annulus sealed off. It is also called a spool.

casing *n*: steel pipe placed in an oil or gas well as drilling progresses to prevent the wall of the hole from caving during drilling and to provide a means of extracting petroleum if the well is productive.

casing centralizer *n*: a device secured around the casing at regular intervals to center it in the hole. Casing that is centralized allows a more uniform cement sheath to form around the pipe.

casing shoe *n*: a short, heavy, hollow, cylindrical steel section with a rounded bottom, which is placed on the end of the casing string to serve as a reinforcing shoe and to aid in cutting off minor projections from the borehole wall as the casing is being lowered; also called a guide shoe.

casing string: Casing is manufactured in lengths of about 30 ft, each length or joint being joined to another as casing is run in a well. The entire length of all the joints of casing is called the casing string.

catch samples *v*: to obtain cuttings made by the bit as formations are penetrated for study by geologists. The samples are obtained from the drilling fluid as it emerges from the wellbore. Cuttings are carefully washed until they are free of foreign matter, dried, and labeled to indicate the depth at which they were obtained.

cathead *n*: a spool-shaped attachment on a winch around which rope for hoisting and pulling is wound. The breakout cathead, a rotating spool located on the driller's side of the drawworks, is used as a power source for unscrewing drill pipe. The makeup cathead is a power source for screwing together joints of pipe.

catline *n*: a hoisting or pulling line powered by the cathead, used to lift heavy equipment on the rig.

caving *n*: collapse of the walls of the wellbore, also called sloughing.

cellar *n*: a pit in the ground to provide additional height between the rig floor and the wellhead to accommodate the installation of blowout preventers, rathole, mousehole, etc. It also collects drainage water and other fluids for subsequent disposal.

cement casing *v*: to fill the annulus between the casing and hole with cement to support the casing and prevent fluid migration between permeable zones.

cement channeling *n*: during a cementing operation, the rising of cement between the casing and borehole wall when the slurry fails to rise uniformly throughout the annulus.

cementing *n*: the application of a liquid slurry of cement and water to various points inside or outside the casing. (See *primary cementing*, *secondary cementing*, and *squeeze cementing*.)

chain drive *n*: a drive system using a chain and chain gears to transmit power. Power transmissions use a roller chain in which each link is made of side bars, transverse pins, and rollers on the pins. A double roller chain is made of two connected rows of links, a triple roller chain of three, and so forth.

choke manifold *n*: the arrangement of piping and special valves called chokes through which drilling mud is circulated when the blowout preventers are closed to control the pressures encountered during a kick.

choke line *n*: an extension of pipe from the blowout-preventer assembly, used to direct well fluids from the annulus to the choke manifold.

Christmas tree *n*: [illegible] of oil and gas after the well has been drilled and completed.

circulate *v*: to pass from one point throughout a system and back to the starting point. Drilling fluid circulates from the suction pit through the drill pipe to the bottom of the well and returns through the annulus.

circulation *n*: the movement of drilling fluid out of the mud pits, down the drill stem, up the annulus, and back to the mud pits.

combination string *n*: a casing string that has joints of various collapse resistance, internal yield strength, and tensile strength designed for various depths in a specific well to best withstand the conditions of that well. In deep wells, high tensile strength is required in the top casing joints to carry the load, whereas high collapse resistance and internal yield strength are needed for the bottom joints. In the middle of the casing, average qualities are usually sufficient. The most suitable combination of types and weights of pipe helps to ensure efficient production at a minimum cost.

come out of the hole *v*: to pull the drill stem out of the wellbore. This withdrawal is necessary to change the bit, change from a core barrel to the bit, run electric logs, prepare for a drill-stem test, run casing, and so on.

company man *n*: (See *company representative*.)

company representative *n*: an employee of an operating company whose job is to represent the company's interests at the drilling location.

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

compound *n*: one of the mechanisms used for transmitting the power developed by the rig's engines to the drawworks, pumps, rotary, and other machinery on the rig. A compound is composed of chains, sprockets, pulleys, belts, and shafts.

conductor pipe *n*: a short string of large-diameter casing used to keep the top of the wellbore open and to provide means of conveying the upflowing drilling fluid from the wellbore to the mud pit.

contract depth *n*: the depth of the wellbore at which the drilling contract is fulfilled.

core *n*: a cylindrical sample taken from a formation for geological analysis. Usually a conventional core barrel is substituted for the bit and procures a sample as it penetrates the formation. *v*: to obtain a formation sample for analysis.

core analysis *n*: laboratory analysis of a core sample to determine porosity, permeability, type of rock, fluid content, angle of dip, geological age, and probable productivity of the formation.

core barrel *n*: a tubular device from 25 to 60 ft long run at the bottom of the drill pipe in place of a bit to cut a core sample.

core catcher *n*: the part of the core barrel that holds the formation sample.

core cutterhead *n*: the cutting element of the core-barrel assembly.

crooked hole *n*: a wellbore that has deviated from the vertical. It usually occurs in areas where the subsurface formations are difficult to drill, such as a section of alternating hard and soft strata steeply inclined from the horizontal.

crown block *n*: an assembly of sheaves mounted on beams at the top of the derrick over which the drilling line is reeved. (See *block*.)

cuttings *n pl*: fragments of rock dislodged by the bit and brought to the surface in the drilling mud. Washed and dried cuttings are analyzed by geologists to obtain information about the formations drilled.

D

day tour *n*: (pronounced "day tower") a period of 8 to 12 daylight hours worked by a drilling crew.

deadline *n*: the drilling line from the crown-block sheave to the anchor, so called because it does not move. Compare *fast line*.

deadline tie-down anchor *n*: a device located in the rig's substructure to which the deadline is secured.

degasser *n*: the equipment used to remove undesired gas from a drilling fluid.

density *n*: the weight of a substance per unit of volume. For instance, the density of a drilling mud may be 10 ppg, 74.8 lb/ft^3, or 1.2 kg/liter. Specific gravity is also a measure of density.

derrick *n*: a large load-bearing structure, usually of bolted construction. In drilling, the standard derrick has four legs standing at the corners of the substructure and reaching to the crown block. The substructure is an assembly of heavy beams used to elevate the derrick and provide space to install blowout preventers, casingheads, and so forth. Because the standard derrick must be assembled piece by piece, it has largely been replaced by the mast, which can be lowered and raised without disassembly.

derrickman *n*: the crew member who handles the upper end of the drill stem as it is being hoisted out of or lowered into the hole. He is also responsible for the conditioning of the drilling fluid and the circulating machinery.

desander *n*: a centrifugal device used to remove fine particles of sand from drilling fluid to prevent abrasion of the pumps. A desander usually operates on the principle of a fast-moving stream of fluid being put into a whirling motion inside a cone-shaped vessel.

desilter *n*: a centrifugal device for removing very fine particles from drilling mud. Its principle of operation is very similar to a desander.

development well *n*: 1. a well drilled in proven territory to complete a desired pattern of production. 2. an exploitation well.

deviation *n*: the inclination of the wellbore from the vertical. The angle of deviation, angle of drift, or drift angle is the angle in degrees that the wellbore deviates from the vertical.

deviation survey *n*: an operation to determine the angle from which a bit has deviated from the vertical during drilling. There are two basic deviation survey or drift survey instruments: **one reveals the angle of deviation only; the other indicates both the angle and direction of deviation.**

diamond bit *n*: a drilling bit that has a steel body surfaced with industrial diamonds. Cutting is performed by the rotation of the very hard diamonds over the rock surface.

diesel-electric power *n*: the power supplied to a drilling rig by diesel engines driving electric generators, used widely on all modern rigs.

diesel engine *n*: a high-compression, internal-combustion engine used extensively for powering drilling rigs. In a diesel engine air is drawn into the cylinders and compressed to very high pressures; ignition occurs as fuel is injected into the compressed and heated air. Combustion takes place within the cylinder above the piston, and expansion of the combustion products imparts power to the piston.

directional drilling *n*: intentional deviation of a wellbore from the vertical. Although wellbores are normally drilled as vertically as possible, it is sometimes necessary or advantageous to drill at an angle from the vertical. Controlled directional drilling makes it possible to reach subsurface areas laterally remote from the point where the bit enters the earth.

discovery well *n*: the first oil or gas well drilled in a new field; the well that reveals the presence of a petroleum-bearing reservoir. Subsequent wells are development wells.

displacement fluid *n*: in oil-well cementing, the fluid, usually drilling mud or salt water, that **is pumped into the well after the cement to force the cement out of the casing and into the annulus.**

doghouse *n*: 1. a small enclosure on the rig floor used as an office for the driller or as a storehouse for small items. 2. any small building used as an office or for storage.

double *n*: a length of drill pipe, casing, or tubing, consisting of two joints screwed together. Compare *thribble* and *fourble*.

double board *n*: the derrickman's working platform, or monkeyboard, when located at a height in the derrick or mast equal to two

lengths of pipe joined together. (See *thribble board* and *fourble board*.)

drawworks *n*: the hoisting mechanism on a drilling rig. It is essentially a large winch that spools off or takes in the drilling line and thus raises or lowers the drill stem and bit.

drill bit *n*: (See *bit*.)

drill collar *n*: a heavy thick-walled tube, usually steel, used between the drill pipe and the bit in the drill stem to put weight on the bit so that the bit can drill.

driller *n*: the employee directly in charge of a drilling rig and crew. His main duty is operation of the drilling and hoisting equipment, but he is also responsible for the downhole condition of the well, operation of downhole tools, and pipe measurements.

drilling contractor *n*: a person or company whose business is to drill oil wells.

drilling crew *n*: a driller, a derrickman, and two or more helpers who operate a drilling rig for one tour each day.

drilling fluid *n*: the circulating fluid, one function of which is to force cuttings out of the wellbore to the surface. (See *mud*.)

drilling line *n*: a wire rope used to support the drilling tools.

drilling rate *n*: the speed with which the bit drills the formation; the rate of penetration.

drilling rig *n*: (See *rig*.)

drill pipe *n*: the heavy, seamless tubing used to rotate the bit and circulate the drilling fluid. Joints of pipe 30 ft long are coupled together by means of tool joints.

drill ship *n*: an offshore drilling rig that is essentially an ocean-going ship but which is specially modified or constructed to drill wells in deep water.

drill stem *n*: the entire length of tubular pipes composed of the kelly, drill pipe, and drill collars that make up the drilling assembly from the surface to the bottom of the hole.

drill-stem test *n*: (See *formation testing*.)

drill string *n*: the column, or string, of drill pipe, not including the drill collars or kelly. Often, however, the term is loosely applied to include both the drill pipe and drill collars.

drum *n*: a cylinder around which wire rope is wound in the drawworks.

DST *abbr*: drill-stem test. (See *formation testing*.)

E

electric well log *n*: a record of certain electrical characteristics of formations traversed by the borehole, made to identify the formations, determine the nature and amount of fluids they contain, and estimate their depth. It is also called an electric log or electric survey.

elevators *n pl*: clamps that grip a stand, or column, of casing, tubing, or drill pipe so that the stand can be raised or lowered into the hole.

exploitation well *n*: a well drilled to permit more effective extraction of oil from a reservoir. It is sometimes called a development well.

exploration well *n*: a wildcat.

F

fast line *n*: the end of the drilling line that is affixed to the drum of the drawworks, so called because it travels with greater velocity than any other portion of the line.

fault *n*: a crack in the subsurface strata. Often strata on one side of the fault line have been displaced (upward, downward, or laterally) relative to their original positions.

field *n*: a geographical area in which a number of oil or gas wells produce from a continuous reservoir; may refer to surface area only or to underground productive formations as well. In a single field, there may be several separate reservoirs at varying depth.

fill the hole *v*: to pump drilling fluid into the wellbore while the pipe is being withdrawn in order to ensure that the wellbore remains full of fluid even though the pipe is withdrawn. Filling the hole lessens the danger of blowout or of caving of the wall of the wellbore.

fingerboard *n*: a rack that supports stands of pipe being stacked in the derrick or mast.

fish *n*: an object left in the wellbore during drilling operations that must be recovered before work can proceed. It can be anything from a piece of scrap metal to a part of the drill stem. *v*: to recover from a well any equipment left there during drilling operations, such as a lost bit or drill collar or part of the drill string.

fishing tool *n*: a tool designed to recover equipment lost in the well.

float collar *n*: a special coupling device, inserted one or two joints above the bottom of the casing string, that contains a check valve to permit fluid to pass downward but not upward through the casing. The float collar prevents drilling mud from entering the casing while it is being lowered, allowing the casing to float during its descent, thus decreasing the load on the derrick. The float collar also prevents a backflow of cement during the cementing operation.

floorman *n*: a drilling crew member whose work station is on the derrick floor. On rotary drilling rigs, there are at least two floormen on each crew, and sometimes three or more are employed.

fluid *n*: a substance that flows and yields to any force tending to change its shape. Liquids and gases are fluids.

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

formation fracturing *n*: a method of stimulating production by increasing the permeability of the producing formation. Under extremely high hydraulic pressure, a fluid (as water, oil, alcohol, dilute hydrochloric acid, liquefied petroleum gas, or foam) is pumped downward through tubing or drill pipe and forced into the perforations in the casing. The fluid enters the formation and parts or fractures it. Sand grains, aluminum pellets, glass beads, or similar materials are carried in suspension by the fluid into the fractures. These are called propping agents or proppants. When the pressure is released at the surface, the fracturing fluid returns to the well, and the fractures partially close on the proppants, leaving channels for oil to flow through them to the well. This process is often called a frac job.

formation pressure *n*: the pressure exerted by fluids in a formation, recorded in the hole at the level of the formation with the well shut in.

formation testing *n*: the gathering of data on a formation to determine its potential productivity before installing casing in a well. The conventional method is the drill-stem test. Incorporated in the drill-stem testing tool are a packer, valves, or ports that may be opened and closed from the surface, and a pressure recording device. The tool is lowered to bottom on a string of drill pipe and the packer set, isolating the formation to be tested from the formations above and supporting the fluid column above the packer. A port on the tool is opened to allow the trapped pressure below the packer to bleed off into the drill pipe, gradually exposing the formation to atmospheric pressure and allowing the well to produce to the surface where the well fluids may be sampled and inspected. From a record of the pressure readings, a number of facts about the formation may be inferred.

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

fourble board *n*: the working platform of the derrickman (the monkeyboard) when it is located at a height on the derrick approximately equal to four lengths of pipe joined together. (See *double board* and *thribble board*.)

fracturing *n*: (See *formation fracturing*.)

fracturing, hydraulic *n*: (See *hydraulic fracturing*.)

G

gas-cut mud *n*: a drilling mud that has entrained formation gas giving the mud a characteristically fluffy texture. When entrained gas is not released before the fluid returns to the well, the weight or density of the fluid column is reduced. Because a large amount of gas in mud lowers its density, gas-cut mud must often be treated to lessen the chance of a blowout.

gas sand *n*: a stratum of sand or porous sandstone from which natural gas is obtained.

gas show *n*: the gas that appears in drilling fluid returns, indicating the presence of a gas zone.

geologist *n*: a scientist who procures and interprets data pertaining to the strata of the earth's crust.

geology *n*: the science that relates to the study of the structure, origin, history, and development of the earth and its inhabitants as revealed in rocks, formations, and fossils.

graveyard tour *n*: (pronounced "tower") the shift of duty on a drilling rig that starts at or about midnight. (See *tour*.)

guide shoe *n*: a short, heavy, cylindrical steel section, filled with concrete and rounded at the bottom, and placed at the end of the casing string. It prevents the casing from snagging on irregularities in the borehole as it is lowered. A hole in the center of the shoe allows the drilling fluid to pass up into the casing while the casing is being lowered and permits the cement to pass out during cementing operations.

H

hoist *n*: 1. an arrangement of pulleys and wire rope or chain used for lifting heavy objects. 2. a winch or similar device. 3. the drawworks.

hoisting drum *n*: the large, flanged spool in the drawworks on which the drilling line is wound.

hook *n*: a large, hook-shaped device from which the elevator bails and the swivel are suspended. It is designed to carry maximum loads ranging from 100 to 650 tons and turns on bearings in its supporting housing. A strong spring within

the assembly cushions the weight of a stand (90 ft) of drill pipe, permitting the pipe to be made up and broken out with less damage to the tool-joint threads.

hopper *n*: a large funnel through which solid materials may be passed and mixed with liquid injected through a connection at the bottom. A hopper is used to mix cement slurry, combine clay and oil or water to make a drilling fluid, and so on.

hydraulic fracturing *n*: the forcing into a formation of liquids under high pressure to open passages for oil and gas to flow into and through the wellbore. (See *formation fracturing*.)

hydrocarbons *n*: organic compounds of hydrogen and carbon, whose densities, boiling points, and freezing points increase as their molecular weights increase. Although composed only of two elements, hydrocarbons exist in a variety of compounds, because of the strong affinity of the carbon atom for other atoms and for itself. The smallest molecules of hydrocarbons are gaseous; the largest are solids.

I

impermeable *adj*: preventing the passage of fluid. A formation may be porous yet impermeable if there is an absence of connecting passages between the voids within it. (See *permeability*.)

inland barge rig *n*: a drilling structure consisting of a barge upon which the drilling equipment is constructed. When moved from one location to another, the barge floats, but when stationed on the drill site, the barge is submerged to rest on bottom.

instrumentation *n*: a device or assembly of devices designed for one or more of the following functions: to measure operating variables (as pressure, temperature, rate of flow, speed of rotation, etc.); to indicate these phenomena with visible or audible signals; to record them; to control them within a predetermined range; and to stop operations if the control fails. Simple instrumentation might consist of an indicating pressure gauge only. In a completely automatic system, the desired range of pressure, temperature, and so on is predetermined and preset.

intermediate casing string *n*: the string of casing set in a well after the surface casing to keep the hole from caving and to seal off troublesome formations. The string is sometimes called protective casing.

J

jack-up rig *n*: an offshore drilling structure with tubular or derrick legs. A jack-up is towed or propelled to a drilling location with the legs up so that the hull and drilling platform float. Once on the location, the legs are lowered to the seafloor and the hull is raised (jacked up) on the legs.

jet bit *n*: a drilling bit having nozzles through which drilling fluid is directed in a high-velocity stream toward the bottom of the bit cones to improve the drilling efficiency of the bit.

jet gun *n*: an assembly, including a carrier and shaped charges, that is used in jet perforating.

jet perforate *v*: to burn a hole through the casing with a shaped charge of high explosives. The loaded charges are lowered into the hole to the desired depth. Once detonated, the charges emit short, penetrating jets of high-pressure gases that cut holes in the casing and cement and some distance into the formation. Formation fluids then flow into the wellbore through the perforations.

junk *n*: metal debris lost in a hole. Junk may be a lost bit, pieces of a bit, milled pieces of pipe, wrenches, or any relatively small object that impedes drilling and must be fished out of the hole.

K

kelly *n*: the heavy steel member, four- or six-sided, suspended from the swivel through the rotary table and connected to the topmost joint of drill pipe; the kelly turns the drill stem as the rotary table turns. It has a bored passageway that permits fluid to be circulated into the drill stem and up the annulus, or vice versa.

kelly bushing *n*: a device fitted to the rotary table through which the kelly passes and by means of which the torque of the rotary table is transmitted to the kelly and to the drill stem.

kelly spinner *n*: a pneumatically operated device mounted on top of the kelly which, when actuated, causes the kelly to turn or spin. It is useful when the kelly or a joint of pipe attached to it must be spun up; i.e., rotated rapidly in order to make it up.

kick *n*: the entry of formation fluids into the wellbore. If steps are not taken to prevent further entry of fluids after a kick is detected, a blowout may occur.

L

latch on *v*: attach elevators to a section of pipe to pull it out of or run it into the hole.

lead tongs *n*: (pronounced "leed") the pipe tongs suspended in the derrick or mast and operated by a wireline connected to the breakout cathead. Also called breakout tongs.

lease *n*: 1. a legal document executed between a landowner, or lessor, and a company or individual as lessee that grants the right to exploit the premises for minerals or other products. 2. the area where production wells, stock tanks, separators, LACT units, and other production equipment are located.

location *n*: the place where a well is drilled.

log *n*: a systematic recording of data, as from the driller's log, electrical well log, radioactivity log or mud log. Many different logs are run in wells being produced or drilled to obtain various characteristics of downhole formations.

M

make a connection *v*: to attach a joint of drill pipe onto the drill stem suspended in the wellbore.

make a trip *v*: to hoist the drill stem out of the wellbore to perform one of a number of operations such as changing bits, taking a core, and so forth, and then to return the drill stem to the wellbore.

make up *v*: 1. to assemble and join parts to form a complete unit (as to make up a string of casing). 2. to screw together two threaded pieces. 3. to mix or prepare (as to make up a tank of mud). 4. to compensate for (as to make up for lost time).

make up a joint *v*: to screw a length of pipe into another length of pipe.

make hole *v*: to deepen the hole made by the bit; to drill ahead.

mast *n*: a portable derrick capable of being erected as a unit, as distinguished from a standard derrick, which cannot be raised to a working position as a unit.

master bushing *n*: a device that fits into the rotary table. It serves as a place for setting the slips and provides a means for engaging the kelly bushing so that the rotating motion of the rotary table can be transmitted to the kelly.

mill *n*: a downhole tool with rough, sharp, extremely hard cutting surfaces for removing metal by grinding or cutting. Mills are run on drill pipe or tubing to grind up debris in the hole, remove sections of casing for sidetracking or stuck portions of drill stem, or to ream out tight spots in the casing. They are also called junk mills, reaming mills, and so forth, depending on what use they have. *v*: to use a mill to cut or grind metal objects that must be removed from a well.

mix mud *v*: to prepare drilling fluids from a mixture of water or other liquids and one or more of the various dry mud-making materials (as clay, weighting material, chemicals, etc.).

monkeyboard *n*: the derrickman's working platform. As pipe or tubing is run into or out of the hole, the derrickman must handle the top end of the pipe, which may be as high as 90 ft in the derrick or mast. The monkeyboard provides a small platform to raise him to the proper height to be able to handle the top of the pipe. (See *double board*, *thribble board*, and *fourble board*.)

morning tour *n*: (See *tour*.)

motorman *n*: the crew member on a rotary drilling rig responsible for the care and operation of drilling engines.

mousehole *n*: an opening through the rig floor, usually lined with pipe, into which a length of drill pipe is placed temporarily for later connection to the drill string.

mousehole connection *n*: the addition of a length of drill pipe to the active string. The length to be added is placed in the mousehole, made up to the kelly, pulled out of the mousehole, and subsequently made up into the string.

mud *n*: the liquid circulated through the wellbore during rotary drilling. In addition to its function of bringing cuttings to the surface, drilling mud cools and lubricates the bit and drill stem, protects against blowouts by holding back subsurface pressures, and deposits a mud cake on the wall of the borehole to prevent loss of fluids to the formation. Although it originally was a suspension of earth solids (especially clays) in water, the mud used in modern drilling operations is a more complex, three-phase mixture consisting of liquids, reactive solids, and inert solids. The liquid phase may be fresh water, diesel oil, or crude oil and may contain one or more conditioners.

mud analysis *n*: examination and testing of drilling mud to determine its physical and chemical properties.

mud cake *n*: the sheath of mud solids that forms on the wall of the hole when the liquid from the mud filters into the formation; also called wall cake or filter cake.

mud circulation *n*: the act of pumping mud downward to the bit and back up to the surface by normal circulation or reverse circulation.

mud conditioning *n*: the treatment and control of drilling mud to ensure that it has the correct properties. Conditioning may include the use of additives, the removal of sand or other solids, the removal of gas, the addition of water, and other measures to prepare the mud for conditions encountered in a specific well.

mud engineer *n*: a person whose duty is to test and maintain the properties of the drilling mud that are specified by the operator.

mud gun *n*: a pipe that shoots a jet of drilling mud under high pressure into the mud pit to mix additives with the mud.

mud logging *n*: the recording of information derived from examination and analysis of formation cuttings made by the bit and mud circulated out of the hole. Mud logging is often carried out in a portable laboratory set up at the well.

mud man *n*: (See *mud engineer.*)

mud pit *n*: a reservoir or tank usually made of steel plates, through which the drilling mud is cycled to allow sand and fine sediments to settle out. Additives are mixed with mud in the pit, and the fluid is temporarily stored there before being pumped back into the well. Mud pits are also called shaker pits, settling pits, and suction pits, depending on their main purpose.

mud pump *n*: a large reciprocating pump used to circulate the mud on a drilling rig. A typical mud pump is a piston pump whose pistons travel in replaceable liners and are driven by a crankshaft actuated by an engine or motor. Also called a slush pump.

mud return line *n*: a trough or pipe placed between the surface connections at the wellbore and the shale shaker through which drilling mud flows upon its return to the surface from down the hole.

mud screen *n*: (See *shale shaker.*)

N

natural gas *n*: a highly compressible, highly expansible mixture of hydrocarbons having a low specific gravity and occurring naturally in a gaseous form. Besides hydrocarbon gases, natural gas may also contain appreciable quantities of nitrogen, helium, carbon dioxide, and contaminants (as hydrogen sulfide and water vapor). Although gaseous at normal temperatures and pressures, certain of the gases comprising the mixture that is natural gas are variable in form and may be found either as gases or as liquids under suitable conditions of temperature and pressure.

nipple up *v*: in drilling, to assemble the blowout preventer stack on the wellhead at the surface.

normal circulation *n*: the smooth, uninterrupted circulation of drilling fluid down the drill stem, out the bit, and up the annular space between the pipe and the hole back to the surface. (See *mud circulation* and *reverse circulation.*)

O

offshore drilling *n*: drilling for oil in an ocean or large lake. A drilling unit for offshore operations may be a mobile, floating unit with a ship or barge hull or with a submersible or semisubmersible base; or it may be a self-propelled or towed structure with jacking legs (jack-up drilling rig); or it may be a permanent structure used as a production platform when drilling is completed. In general, wildcat wells are drilled from mobile floating vessels (as semisubmersible rigs and drill ships) or from jack-ups, whereas development wells are drilled from platforms.

oil field *n*: the surface area overlying an oil reservoir or reservoirs. Commonly, the term includes not only the surface area but may include the wells and production equipment as well.

oil sand *n*: 1. a sandstone that yields oil. 2. (by extension) any reservoir that yields oil, whether or not it is sandstone.

oil zone *n*: a formation or horizon of a well from which oil may be produced. The oil zone is usually immediately under the gas zone and on top of the water zone if all three fluids are present and segregated.

open hole *n*: any wellbore in which casing has not been set.

operator *n*: the person, or company, either proprietor or lessee, actually operating an oil well or lease.

overshot *n*: a fishing tool attached to tubing or drill pipe and lowered over the outside wall of pipe that is lost or stuck in the wellbore. A friction device in the overshot, usually either a basket or a spiral grapple, firmly grips the pipe allowing the fish to be pulled from the hole.

P

pay sand *n*: the producing formation, often one that is not even sandstone. Also called pay zone and producing zone.

penetration, rate of *n*: (See *rate of penetration.*)

perforate *v*: to pierce the casing wall and cement to provide holes through which formation fluids may enter, or to provide holes in the casing so that materials may be introduced into the annulus between the casing and the wall of the borehole. Perforating is accomplished by lowering into the well a perforating gun, or perforator, that fires electrically detonated bullets or shaped charges from the surface.

permeability *n*: 1. a measure of the ease with which fluids can flow through a porous rock. 2. the fluid conductivity of a porous medium. 3. the ability of a fluid to flow within the interconnected pore network of a porous medium.

petroleum *n*: oil or gas obtained from the rocks of the earth.

plug and abandon (P&A) *v*: to place cement plugs into a dry hole and abandon it.

pore *n*: an opening or space within a rock or mass of rock, usually small and often filled with fluid (as water, gas, oil, or all three).

porosity *n*: a state of voids or open spaces existing in rock.

positive choke *n*: a choke in which the orifice size must be changed to change the rate of flow through the choke.

pressure *n*: the force that a fluid (liquid or gas) exerts when it is in some way confined within a vessel, pipe, hole in the ground, and so forth, such as that exerted against the inner wall of a tank, or that exerted on the bottom of the wellbore by drilling mud. Pressure is often expressed in terms of force per unit of area, as pounds per square inch (psi).

pressure gauge *n*: an instrument for measuring fluid pressures that usually registers the difference between atmospheric pressure and the pressure of the fluid being measured by indicating the effect of such pressures upon a measuring element (as a column of liquid, a Bourdon tube, a weighted piston, a diaphragm, or other pressure-sensitive device).

pressure gradient *n*: a scale of pressure differences in which there is a uniform variation of pressure from point to point. For example, the pressure gradient of a column of water is about 0.433 psi/ft of vertical elevation (9.79 kPa/m). The normal pressure gradient in a well is equivalent to the pressure exerted at any given depth by a column of 10 percent salt water extending from that depth to the surface (i.e., 0.465 psi/ft or 10.51 kPa/m).

preventer *n*: (See *blowout preventer*.)

primary cementing *n*: the cementing operation that takes place immediately after the casing has been run into the hole; used to provide a protective sheath around the casing, to segregate the producing formation, and to prevent the migration of undesirable fluids. (See *secondary cementing* and *squeeze cementing*.)

prime mover *n*: an internal-combustion engine that is the source of power for the drilling rig in oilwell drilling.

production *n*: 1. the phase of the petroleum industry that deals with bringing the well fluids to the surface and separating them, and with storing, gauging, and otherwise preparing the product for the pipeline. 2. the amount of oil or gas produced in a given period.

proppant *n*: a granular substance (as sand grains, glass beads, or other material) carried in suspension by the fracturing fluid that serves to keep the fracture open when the fracturing fluid is withdrawn after a fracture treatment.

propping agent *n*: (See *proppant*.)

psi *abbr*: pounds per square inch. (See *pressure*.)

pump *n*: a device that increases the pressure on a fluid or raises it to a higher level. In drilling, the mud pump picks up mud from one of the mud pits, forces it out the pump discharge line, up the standpipe, down the rotary hose, kelly, and drill stem, out of the bit, and back up the annulus to the mud pits.

pump pressure *n*: fluid pressure arising from the action of the pump.

R

radioactivity well logging *n*: the recording of the natural or induced radioactive characteristics of subsurface formations by slowly pulling a special tool out of a hole drilled through the formations.

ram *n*: the closing and sealing component on a blowout preventer. One of three types—blind, pipe, or shear—may be installed in several preventers mounted in a stack on top of the wellbore. Blind rams, when closed, form a seal on a hole that has no drill pipe in it; pipe rams, when closed, seal around the pipe; shear rams cut through drill pipe and then form a seal.

ram blowout preventer *n*: a blowout preventer that uses rams to seal off pressure on a hole with or without pipe. It is also called a ram preventer.

rathole *n*: a hole in the rig floor from 30 to 35 ft deep, lined with casing that projects above the floor, into which the kelly and swivel are placed when hoisting operations are in progress.

reeve the line *v*: to string a wire-rope drilling line through the sheaves of the traveling and crown blocks to the hoisting drum.

reserve pit *n*: 1. (obsolete) a pit in which a supply of drilling fluid is stored. 2. a waste pit, usually an excavated earthen-walled pit that may be lined with plastic to prevent contamination of the soil.

reservoir *n*: a subsurface, porous, permeable rock body in which oil and/or gas is stored. Most reservoir rocks are limestones, dolomites, sandstones, or a combination of these. The three basic types of hydrocarbon reservoirs are oil, gas, and condensate. An oil reservoir generally contains three fluids, gas, oil and water, with oil the dominant product. In the typical oil reservoir, these fluids occur in different phases because of the variance in their gravities. Gas, the lightest, occupies the upper part of the reservoir rocks; water, the lower part; and oil, the intermediate section. In addition to occurring as a cap or in solution, gas may accumulate independently of the oil; if so, the reservoir is called a gas reservoir. Associated with the gas, in most instances, are salt water and some oil. In a condensate reservoir, the hydrocarbons may exist as a gas, but, when brought to the surface, some of the heavier ones condense to a liquid or condensate.

reverse circulation *n*: the return of drilling fluid through the drill stem. The normal course of drilling fluid circulation is downward through the drill stem and upward through the annular space surrounding the drill stem. For special problems, normal circulation is sometimes reversed, and the fluid returns to the surface through the drill stem, or tubing, after being pumped down the annulus.

rig *n*: the derrick, drawworks, and attendant surface equipment of a drilling unit.

rig down *v*: to dismantle the drilling rig and auxiliary equipment following the completion of drilling operations; to tear down.

rig up *v*: to prepare the drilling rig for making hole; to install tools and machinery before drilling is started but after the derrick has been built or the mast raised.

rotary bushing *n*: (See *master bushing*.)

rotary drilling *n*: a drilling method in which a hole is drilled by a rotating bit to which downward force is applied. The bit is fastened to and rotated by the drill stem, which also provides a passageway through which the drilling fluid is circulated. Additional joints of drill pipe are added as drilling progresses.

rotary helper *n*: (See *floorman*.)

rotary hose *n*: the hose on a rotary drilling rig that conducts the drilling fluid from the mud pump and standpipe to the swivel and kelly; also called the mud hose or the kelly hose.

roughneck *n*: a worker on a drilling rig, subordinate to the driller; sometimes called a rotary helper, floorman, or rig crewman.

round trip *n*: to pull out and subsequently run back into the hole a string of drill pipe or tubing; also called tripping the pipe.

roustabout *n*: a worker on an offshore rig who handles the equipment and supplies that are sent to the rig from the shore base.

run in *v*: to go into the hole with tubing, drill pipe, and so forth.

S

samples *n pl*: 1. the well cuttings obtained at designated footage intervals during drilling. From an examination of these cuttings, the geologist determines the type of rock and formations being drilled and estimates oil and gas content. 2. small quantities of well fluids obtained for analysis.

sand *n*: 1. an abrasive material composed of small quartz grains formed from the disintegration of preexisting rocks. Sand consists of particles less than 2 mm and greater than $^1/_{16}$ mm in diameter. 2. sandstone.

scratcher *n*: a device fastened to the outside of casing that removes the mud cake from the wall of the hole to condition the hole for cementing. By rotating or moving the casing string up and down as it is being run into the hole, the scratcher, formed of stiff wire, removes the cake so that the cement can bond solidly to the formation.

secondary cementing *n*: any cementing operation after the primary-cementing operation. Secondary cementing includes a plug-back job, in which a plug of cement is positioned at a specific point in the well and allowed to set. Wells are plugged to shut off bottom water, or to reduce the depth of the well for other reasons. (See *squeeze cementing*.)

seismograph *n*: a device that detects vibrations in the earth, used in prospecting for probable oil-bearing structures. Vibrations are created by discharging explosives in shallow boreholes or by striking the surface with a heavy blow. The type and velocity of the vibrations (as recorded by the seismograph) indicate the general characteristics of the section of earth through which the vibrations pass.

semisubmersible rig *n*: a floating offshore drilling structure that has hulls. Large columns extend upward from the hulls. On top of the columns

rests a large deck or platform on which the drilling equipment is assembled. When moving to a drilling site, the hulls float on top of the water, but when the rig is in the drilling mode, the hulls are flooded so that the structure floats below the water's surface.

set casing *v*: to run and cement casing at a certain depth in the wellbore; to set pipe.

shaker *n*: (See *shale shaker*.)

shale *n*: a fine-grained sedimentary rock composed of consolidated silt, clay, or mud. Shale is the most frequently occurring sedimentary rock.

shale shaker *n*: a series of trays with sieves that vibrate to remove cuttings from the circulating fluid stream in rotary drilling operations. The size of the openings in the sieve is carefully selected to match the size of the solids in the drilling fluid and the anticipated size of cuttings. It is also called a shaker.

shaped charge *n*: a relatively small container of high explosive that is loaded into a perforating gun. Upon detonation, the charge releases a small, high-velocity stream of particles (a jet) that penetrates the casing and cement.

sheave *n*: (pronounced "shiv") a grooved pulley.

show *n*: the appearance of oil or gas in cuttings, samples, cores, or drilling mud.

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

sidewall coring *n*: a coring technique especially useful in soft rock areas in which core samples are obtained from a zone that has already been drilled. A hollow bullet is fired into the formation wall to capture the core and then retrieved on a flexible steel cable. Core samples of this type usually range from 3/4 to 1 1/16 in. in diameter and from 3/4 to 1 in. in length.

single *n*: a joint of drill pipe. Compare *double*, *thribble*, and *fourble*.

slips *n*: wedge-shaped pieces of metal with teeth or other gripping elements that are used to prevent pipe from slipping down into the hole or to hold pipe in place. Rotary slips fit around the drill pipe and wedge against the master bushing to support the pipe. Power slips are pneumatically or hydraulically actuated devices that allow the crew to dispense with the manual handling of slips when making a connection.

slurry *n*: a thin, watery mixture of cement and water that is pumped into a well to harden; after hardening, it supports the casing and provides a seal in the wellbore to prevent migration of underground fluids.

spear *n*: a fishing tool used to retrieve pipe lost in a well. The spear is lowered down the hole and into the lost pipe, and, when weight, torque, or both are applied to the string to which the spear is attached, slips in the spear expand and tightly grip the inside wall of the lost pipe. Then the string, spear, and lost pipe are pulled to the surface.

spinning cathead *n*: a spooling attachment on the makeup cathead to permit use of a spinning chain to spin up or make up drill pipe.

spinning chain *n*: a Y-shaped chain used to spin up (tighten) one joint of drill pipe into another. In use, one end of the chain is attached to the tongs, another end to the *spinning cathead*, and the third end is free. The free end is wrapped around the *tool joint* and the cathead pulls the chain off the joint, causing the joint to spin (turn) rapidly and tighten up. After the chain is pulled off the joint, the tongs are secured in the same spot, and continued pull on the chain (and thus on the tongs) by the cathead makes the joint up to final tightness.

spud *v*: to move the drill stem up and down in the hole over a short distance without rotating. Careless execution of this operation creates pressure surges that can cause a formation to break down, which results in lost circulation. (See *spud in*.)

spud in *v*: to begin drilling; to start the hole.

squeeze cementing *n*: the forcing of cement slurry by pressure to specified points in a well to cause seals at the points of squeeze. It is a secondary-cementing method, used to isolate a producing formation, seal off water, repair casing leaks, and so forth.

stab *v*: to guide the end of a pipe into a tool joint when making up a connection.

stabbing board *n*: a temporary platform erected in the derrick or mast some 20 to 40 ft above the derrick floor. The derrickman or another crew member works on the board while casing is being run in a well. The board may be wooden or fabricated of steel girders floored with antiskid material and powered electrically to raise or lower it to the desired level. A stabbing board serves the same purpose as a monkeyboard but is temporary instead of permanent.

stake a well *v*: to locate precisely on the surface of the ground the point at which a well is to be drilled. After exploration techniques have revealed the possibility of the existence of a subsurface hydrocarbon-bearing formation, a certified and registered land surveyor drives a stake into the ground to mark the spot where the well is to be drilled.

standpipe *n*: a vertical pipe rising along the side of the derrick or mast which joins the mud pump

to the rotary hose and through which mud is pumped.

stands *n pl*: the connected joints of pipe racked in the derrick or mast when making a trip. On a rig, the usual stand is 90 ft long (three joints of drill pipe screwed together). A stand consisting of three joints is sometimes called a thribble. Compare *double* and *fourble*.

stimulation *n*: any process undertaken to enlarge old channels or create new ones in the producing formation of a well (e.g., acidizing or formation fracturing).

stratification *n*: the natural layering or lamination characteristic of sediments and sedimentary rocks.

stratigraphic trap *n*: a petroleum trap that occurs when the top of the reservoir bed is terminated by other beds or by a change of porosity or permeability within the reservoir itself.

string *n*: the entire length of casing, tubing, or drill pipe run into a hole; the casing string. (Compare *drill string* and *drill stem*.)

string up *v*: to thread the drilling line through the sheaves of the crown block and traveling block. One end of the line is secured to the hoisting drum and the other to the derrick substructure.

structural trap *n*: a petroleum trap that is formed because of deformation (as folding or faulting) of the rock layer that contains petroleum.

stuck pipe *n*: the drill pipe, drill collars, casing, or tubing that has inadvertently become lodged immovably in the hole. It may occur when drilling is in progress, when casing is being run in the hole, or when the drill pipe is being hoisted.

sub *n*: a short, threaded piece of pipe used to adapt parts of the drilling string which cannot otherwise be screwed together because of difference in thread size or design. A sub may also perform a special function. Lifting subs are used with drill collars to provide a shoulder to fit the drill-pipe elevators. A kelly saver sub is placed between the drill pipe and kelly to prevent excessive thread wear of the kelly and drill-pipe thread. A bent sub is used when drilling a directional hole.

submersible rig *n*: an offshore drilling structure with several compartments that are flooded to cause the structure to submerge and rest on the seafloor.

substructure *n*: the foundation on which the derrick or mast and drawworks sit, containing space for storage and well-control equipment.

surface casing *n*: (See *surface pipe*.)

surface pipe *n*: the first string of casing (after the conductor pipe) that is set in a well, varying in length from a few hundred feet to several thousand. Some states require a minimum length to protect freshwater sands. Compare *conductor pipe*.

swivel *n*: a rotary tool that is hung from the rotary hook and traveling block to suspend and permit free rotation of the drill stem. It also provides a connection for the rotary hose and a passageway for the flow of drilling fluid into the drill stem.

T

thread protector *n*: a device that is screwed onto pipe threads to protect the threads from damage when the pipe is not in use.

thribble *n*: a stand of pipe made up of three joints and handled as a unit.

thribble board *n*: the monkeyboard when it is located at a height in the derrick equal to the length of three lengths of pipe joined together. Compare *double board* and *fourble board*.

throw the chain *n*: to flip the spinning chain up from a tool-joint box so that the chain wraps around the tool-joint pin after it is stabbed into the box. The stand or joint of drill pipe is turned or spun by a pull on the spinning chain from the cathead on the drawworks.

tight formation *n*: a petroleum- or water-bearing formation of relatively low porosity and permeability.

tight hole *n*: a well about which information is restricted and passed only to those authorized for security or competitive reasons.

tongs *n*: the large wrenches that are latched onto drill pipe or drill collars in order to make up (tighten) or break out (loosen) a joint of drill pipe or drill collars. Power tongs are pneumatically or hydraulically operated tools that serve to spin the pipe up tight and, in some cases, to apply the final makeup torque.

tool joint *n*: a heavy coupling element for drill pipe, made of special alloy steel. Tool joints have coarse, tapered threads and seating shoulders designed to sustain the weight of the drill stem, withstand the strain of frequent coupling and uncoupling, and provide a leakproof seal. The male section of the joint, the pin, is attached to one end of a length of drill pipe, and the female section, or the box, is attached to the other end. The tool joint may be welded to the end of the pipe, or screwed on or both. A hard metal facing is often applied in a band around

the outside of the tool joint to enable it to resist abrasion from the walls of the borehole.

tool pusher *n*: an employee of a drilling contractor who is in charge of the entire drilling crew and the drilling rig.

torque *n*: the turning force that is applied to a shaft or other rotary mechanism to cause it to rotate or tend to do so. Torque is measured in foot-pounds, joules, meter-kilograms, and so forth.

torque converter *n*: a connecting device between a prime mover and the machine actuated by it. The elements that pump the fluid in the torque converter automatically increase the output torque of the engine to which the torque is applied, with an increase of load on the output shaft. Torque converters are used extensively on mechanical drilling rigs that have a compound.

total depth (TD) *n*: the maximum depth reached in a well.

tour *n*: (pronounced "tower") a shift worked by a drilling crew or other oil-field workers. Sometimes 12-hour tours are employed, especially on offshore drilling rigs. The most common divisions of tours are daylight, evening, and graveyard.

transmission *n*: the gear or chain arrangement by which power is transmitted from the prime mover to the drawworks, mud pump, or rotary table of a drilling rig.

trap *n*: layers of buried rock strata that are arranged so that petroleum accumulates in them.

traveling block *n*: an arrangement of pulleys, or sheaves, through which drilling cable is reeved, and which moves up and down in the derrick or mast. (See *block* and *crown block*.)

tricone bit *n*: a type of bit in which three cone-shaped cutting devices are mounted in such a way that they intermesh and rotate together as the bit drills. The bit body may be fitted with nozzles or jets through which the drilling fluid is discharged.

trip *n*: (See *make a trip*.)

turbodrill *n*: a drilling tool that rotates a bit attached to it by the action of the drilling mud on the turbine blades built into the tool. When a turbodrill is used, rotary motion is imparted only at the bit; thus, it is unnecessary to rotate the drill stem. Although straight holes can be drilled with the tool, it is used most often in directional drilling.

V

valve *n*: a device used to control the rate of flow in a line, to open or shut off a line completely, or to serve as an automatic or semi-automatic safety device. Those with extensive usage include the gate valve, plug valve, globe valve, needle valve, check valve, and relief valve.

v-belt *n*: a belt with a trapezoidal cross section that is made to run in sheaves, or pulleys, with grooves of corresponding shape.

W

waiting on cement (WOC) *adj*: pertaining to or during the time when drilling or completion operations are suspended so that the cement in a well can harden sufficiently.

wall cake *n*: the compacted solid or semisolid material remaining on a filter after pressure filtration of mud with a standard filter press. Its thickness is measured in thirty-seconds of an inch. Wall cake may also refer to a layer of concentrated solids from drilling mud, which forms on the walls of the borehole opposite permeable formations, sometimes called mud cake.

weevil *n*: (See *boll weevil*.)

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

weighting material *n*: a material with a high specific gravity, used to increase the density of drilling fluids or cement slurries.

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

well completion *n*: the activities and methods necessary to prepare a well for the production of oil and gas; the method by which a flow line for hydrocarbons is established between the reservoir and the surface.

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

well logging *n*: the recording of information about subsurface geological formations. Logging methods include records kept by the driller, mud and cuttings analyses, core analysis, drill-stem tests, and electric and radioactivity procedures.

well stimulation *n*: any of several operations used to increase the production of a well. (See *acidize, formation fracturing.*)

wildcat *n*: a well drilled in an area where no oil or gas production exists. With present-day exploration methods and equipment, about one wildcat out of every six proves to be productive although not necessarily profitable.

wire rope *n*: a rope composed of steel wires twisted into strands that are in turn twisted around a central core of hemp or other fiber, to create a rope of great strength and considerable flexibility. Wire rope is used as drilling line (in rotary and cable-tool rigs), coring line, servicing line, winch line, and so on.

WOC *abbr*: waiting on cement.

worm *n*: a new and inexperienced worker on a drilling rig.