



## DEFINITIONS

### **-A-**

**Abandon** - To cease efforts to produce oil or gas from a well, and to plug a depleted formation and salvage all material and equipment.

**Absolute Volume** - The volume per unit mass, the reciprocal of absolute density.

**Absorption** - The penetration or apparent disappearance of molecules or ions of one or more substances into the interior of a solid or liquid. For example, in hydrated bentonite the planar water that is held between the mica-like layers is the result of absorption.

**Accelerator** - A material which accelerates or speeds up the normal rate of reaction between cement and water, resulting in an increase in the development of early strength, and, in some cases, a decrease in the setting time or thickening time.

**Acid** - Any chemical compound containing hydrogen capable of being replaced by positive elements or radicals to form salts and water. In terms of the dissociation theory, it is a compound which, on dissociation in solution, yields excess hydrogen ions. Acids lower the pH. Examples of acids or acidic substances are: hydrochloric acid, tannic acid, sodium acid pyrophosphate.

**Acid Resistance** - The ability of a hardened cement slurry to withstand the softening and corrosive effects of organic or mineral acids, or water solutions of these acids and their salts having a pH lower than 7.0.

**Acidity** - The relative acid strength of liquids as measured by pH. A pH value below 8. See pH.

**Acidizing** - The practice of applying acids to the walls of oil and gas well to remove any material which obstructs the entrance to fluids.

Also used in carbonate formations, such as limestone, to increase porosity.

**Adapter** - A device to provide connection between two other parts.

**Additive** - A material other than cement and water which is added to a cement subsequent to its manufacture to modify its properties.

**Adhesion** - The force which holds together unlike molecules.

**Admix** - To add one material to another by mixing  
**NOTE:** Admix should not be used replicably with additive.

**Adsorption** - A surface phenomenon exhibited by a solid (adsorbent) to hold or concentrate gases, liquids, or dissolved substances (adsorptive) upon its surface, a property due to adhesion. For example, that water held to the outside surface of hydrated bentonite is adsorbed water.

**Aerate** - Intimately admixing water and air.

**Aeration** - The technique of injecting air or gas in varying amounts into a drilling fluid for the purpose of reducing hydrostatic head.

**Aerobic** - Bacteria that are active only in the presence of oxygen.

**Agglomerate** - The larger group of individual particles usually originating in sieving or drying operations.

**Agglomeration** - The grouping of individual particles.

**Aggregate** - A group of two or more individual particles held together by strong forces. Aggregates are stable to normal stirring, shaking, or handling as powder or a suspension.

They may be broken by drastic treatment such as a ball milling a powder or by shearing a suspension.

**Aggregate** - An essentially inert material of mineral origin having particle size predominantly greater than 100 mesh, which forms a mortar or concrete when bound together with hardened cement paste.

**Aggregation** - Formation of aggregates. In drilling fluids, aggregation results in the stacking of the clay platelets face to face. The viscosity and gel strength decrease in consequence.

**Aging** - Natural or artificial maturing of cement, cement slurries, and hardened cement paste during which various physical-chemical changes take place.



**Air Cutting** - The inadvertent mechanical incorporation and dispersion of air into a drilling-fluid system. Compare Aeration.

**Air/Gas Lift** - Lifting of liquids by injection, directly into the well, of air or gas.

**Alkali** - Any compound having marked basic properties. See Base.

**Alkalinity** - The combination power of a base measured by the maximum number of equivalents on an acid with which it can react to form a salt. In water analysis, it represents the carbonates, bi-carbonated, hydroxides, and occasionally the borated, silicates, and phosphates in the water. It is determined by titration with standard acid to certain datum points. See API RP 13B\* for specific directions for determination of phenolphthalein (P<sub>f</sub>) and methyl orange (Mt) alkalinites of the filtrate in drilling fluids and the alkalinity of the mud itself (P.). Also see P<sub>f</sub>, M<sub>f</sub>, and P<sub>m</sub>.

**Allowable** - The amount of oil or gas that a well is permitted by state authorities to produce during a given period.

**Aluminum Stearate** - An aluminum salt of stearic acid used as a de-foamer. See Stearate.

**Analysis, Core** - Laboratory examination of geological samples taken from the well bore. This examination is used to determine the capacity of the formation to contain oil and gas, the possibility of oil and gas passing through the formation, the degree of saturation of the formation with oil, gas, and water, and for other purposes.

**Analysis, Mud or Drilling Fluid** - Examination and testing of the drilling fluid to determine its physical and chemical properties and condition.

**Anhydrite** - See Calcium Sulphate. Anhydrite is often encountered while drilling. It may occur as thin stringers or massive formations.

**Anhydrous** - Without water.

**Aniline Point** - The lowest temperature at which equal volumes of freshly distilled aniline and an oil which is being tested are completely miscible. This test finds an infliction of the character (paraffin, naphthenic, asphaltic,

aromatic, mid-continent, etc) of the oil. The aniline point of diesel or crude's used in drilling mud is also an indication of the deteriorating effect these materials may have on natural or synthetic rubber. The lower the aniline point of an oil the more severe it usually is in damaging rubber parts.

**Anion** - A negatively charged atom or radical, such as Cl<sup>-</sup>, OH<sup>-</sup>, So<sub>4</sub><sup>-</sup>, etc, in solution of an electrolyte. Anions move toward the anode (positive electrode) under the influence of an electrical potential.

**Annular Velocity** - The velocity of a fluid moving in the annulus.

**Annular Space** - Any space in a well bounded by two or more circular surfaces, one of which is concave. This would include single or multiple strings of tubing in a hole or casing.

**Annulus** - The space surrounding pipe suspended in the well bore. The outer wall of the annulus may be an open hole or it may be a larger pipe.

**Antifoam** - A substance used to prevent foam by greatly decreasing the surface tension. Compare Defoamer.

**API** - American Petroleum Institute. Headquarters of the API Division of Production are 300 Corrigan Tower Building, Dallas, Texas.

**API Cement Classes** - A classification system for oil well cements defined in API Std 10A.

**API Gravity** - The gravity (weight per unit volume) of crude oil or other related fluids as measured by a system recommended by the American Petroleum Institute. It is related to specific gravity by the following formula:

$$\text{API Gravity (degrees)} = \frac{141.5}{\text{SG}} - 131.5$$

**Apparent Viscosity** - The viscosity of fluid appears to have on a given instrument at a stated rate of shear. It is a function of the plastic viscosity and the yield point. The apparent viscosity in centipoises, as determined by the direct-indicating viscometer, is equal to the 600-rpm reading. See also Newtonian fluid, the apparent viscosity is numerically equal to the plastic viscosity.



Apron ring - The first or lowest ring of plates in a tank.

Apron Spreader - A flat plate in the bottom of a gun barrel tank that causes fluid coming into the tank to spread out.

Aquifer - Ground stratum which bears water in recoverable quantities.

Asbestos - Term applied to many fibrous silicate minerals, some forms of which are used in certain drilling fluids.

Asphalt - A natural or mechanical mixture of solid or viscous bitumen's found in natural beds or obtained as a residue from petroleum. Asphalt, blends containing asphalt, and altered asphalted materials (e.g., air-blown, chemically modified, etc.) have been added to certain drilling fluids for such widely different purposes as a component in oil-base mulls, loss circulation material, emulsifier, fluid-loss control agents, wall-plastering agent, etc.

Asphalted Materials - One of a group of solid, liquid, or semi-solid materials, predominantly mixtures of hydrocarbons and their non-metallic derivatives, obtained either from natural bituminous deposits, or from the residue of petroleum refining.

Atom - According to the atomic theory, the smallest quantity of an element which is capable of entering into chemical reaction or that can exist alone.

Atomic Number- The relative weight of an atom of an element as compared with the weight of 1 atom of oxygen, using 16 as the weight of 1 atom of oxygen.

Attapulgitic Clay - A colloidal, viscosity-building clay used principally in salt-water mulls. Attapulgitic, a special fuller's earth, is hydrous magnesium aluminum silicate.

Autoclave Expansion - A measurement or test made as provided in ASTM C 151: test for Autoclave Expansion of Portland Cement. See Soundness.

## **-B-**

Babbitt - Soft, easily melted metal used for bearings.

Back-Off - To unscrew.

Back Pressure - The pressure resulting from restriction of full natural flow of oil or gas.

Back-Up Man - The person who holds one length of pipe while another length is being screwed into or out of it.

Baffles - Plates which change the direction of flow of fluids.

Balance, Mud - A beam type balance used in determining mud density. It consists primarily of a base, graduated beam with constant-volume cup, lid, rider, knife edge, and counterweight.

Ball and Seat - The main parts of the valves in a plunger-type oil-well pump.

Barite - A native crystalline barium sulphate, which occurs in snow-white crystalline masses, or grayish, reddish, and greenish ores with a specific gravity of 4 to 4.6. It is used for increasing the density of oil well cement slurries and drilling fluids. See API Std 10A. Synonym-Barites, heavy spar.

Barium Sulphate - BaSO<sub>4</sub>- See Barite.

Barrel - A volumetric unit of measure used in the petroleum industry consisting of 42 gal.

Barrel of Cement - A dry weight measure of cement equal to 4 sacks or 376 pounds.

Barrel of Cement Slurry - 42 gallons of cement slurry.

Barrel Equivalent - A laboratory unit used for evaluating or testing drilling fluids. One gram of material when added to 350 ml. of fluid, is equivalent to 1 lb of material when added to one 42-gal barrels of fluid.

Barrel Wrench - A friction wrench used in repairing oil well pumps.

Base - A compound of a metal, or a metal-like group, with hydrogen and oxygen in the proportion to form an OH radical, which ionizes in aqueous solution to yield excess hydroxyl ions. Bases are formed when metallic oxides react with water. Base increase the pH. Examples are caustic soda and lime.

Base Exchange - The replacement of cations associated with the clay surface by those of another species, e.g., the conversion of sodium clay to calcium clay.

Basicity - pH value above 7. Ability to neutralize or accept protons from acids alkalinity.

Bastard - Any equipment of non-standard shape or size.



**Batch** - A definite amount of oil, mud, acid, or other liquid in a tack of pipe line.

**Beam** - The walking beam of a pumping jack or unit.

**Beam Well** - A well using pumping jack or unit and rods to lift fluid.

**Bean** - A choke, used to regulate flow of fluid from a well. Different sizes of beans are used for different producing rates.

**Bean Back** - To use a smaller-size bean or choke to make the amount of production smaller.

**Bed** - A specific layer of earth or rock material in contrast to other layers of earth or rock material in contrast to other layers of earth or rock of different material lying above, below, or adjacent to the bed in reference.

**Bell Hole** - A bell-shaped hole dug beneath a pipe line to provide room for use of tools.

**Bench Marks** - Permanent reference points of known elevation usually placed on concrete foundations, or on top of an iron stake driven securely into the ground.

**Bentonite** - A plastic, colloidal clay, largely made up of the mineral sodium montmorillonite. For use in drilling fluids, bentonite has a yield in excess of 85 bbl/ton. the generic term "bentonite" is neither an exact mineralogical name, nor is the clay of definite mineralogical composition.

**Bicarb** - See Sodium Bicarbonate.

**Bird Cage** - To flatten and spread the strands in a wire rope.

**Bird Dog** - To pay close attention to a job or a person, or an oil trader's helper in securing an oil or gas lease.

**Blank Flange (also a blind flange)** - A solid disc used to dead end a companion flange.

**Blank Liner** - A liner without perforations.

**Blank-Off** - To close off, such as with a blank flange or bull plug.

**Blocks, Crown and Traveling** - The block and tackle on a rig that raises and lowers the drill string.

**Bleed Into** - To cause a gas or liquid to mingle slowly with another gas or liquid, usually by pressure.

**Bleed Off or Bleed Down** - Reduce pressure by letting oil or gas escape at a low rate.

**Bleeder** - A valve or pipe through which bleeding is done.

**Bleeding** - Separation of the liquid phase in a cement slurry.

**Blooie Line** - Flow line for air or gas drilling.

**Blowdown** - An operation by which accumulated sediment is blown from a boiler. Also applies to removal of surplus water from a boiler under pressure.

**Blowout** - An uncontrolled escape of drilling fluid, gas, oil, or water from the well caused by the formation pressure being greater than the hydrostatic head of the fluid in the hole.

**Blowout Preventer** - A device attached immediately above the casing, which can be closed and shut off the hole should a blowout occur.

**Bob Tail** - Any short truck.

**Boll Weevil** - Any inexperienced worker or roustabout.

**Bond** - Adhering, bonding, or joining of two materials, e. g. cement to casing.

**Bonding** - The state of bond between cement and casing and/or formation.

**Bonnet** - The part of a valve that packs off and encloses the valve stem.

**Boomer** - A link and lever mechanism which is used to tighten a chain holding a load on a truck.

**Bottom -Hole Pressure** - The pressure at the bottom of a well.

**Bottom Water** - Water occurring in a producing formation below the oil or gas in that same formation.

**Bowl** - A device into which fit the slips or wedges which support tubing.

**Bowline** - A knot much used in lifting heavy equipment with the cat line. Its advantages lies in the fact that it can be readily untied irrespective of the load that has been placed on it.

**Brackish water** - Water containing low concentrations of any soluble salts.



Braden head gas - Commonly called casing head gas; gas that is produced with oil or from the casing head of an oil well.

Break Circulation - To start movement of the drilling fluid after it has been quiescent in the hole.

Breakout - Refers to the act of unscrewing one section of pipe from another section, especially in the case of drill pipe while it is being withdrawn from the well bore. During this operation the breakout tongs are used to start the unscrewing operation. Also refers to promotion of a crew member to the position of driller or of a driller to become a tool pusher. For example, "He broke out as driller at Conroe".

Breakout Block - A heavy plate which fits in the rotary table and holds the drill bit while it is being unscrewed from the drill collar.

Breakout, Oil - Oil that has risen to the surface of the mud which previously had been combined in the mud as emulsion.

Breaking out Tong - See Breakout.

Break Tour - Moving the rig and rigging-up is usually carried on during daylight hours only. When the rig is ready for operation on a new location, crew break tours and start operating 24 hours per day.

Breaking Down - Usually means unscrewing the drill stem into single joints and placing them on the pipe rack. This operation takes place at the completion of the well when the drill pipe will no longer be used. It also takes place when changing from one size drill pipe to another drilling operation. It is necessary to "break the pipe down" in order that it will be in lengths short enough to be handled and moved. Also called laying down.

Bridge - An obstruction in a well formed by intrusion of subsurface formations.

Bridging Material - Fibrous, flaky, or granular material added to a cement slurry or drilling fluid to aid in sealing formation in which lost circulation has occurred. See Lost Circulation Material.

Brine - Water saturated with or containing a high concentration of common salt sodium chloride); hence, any strong saline solution containing such other salts as calcium chloride, zinc chloride, calcium nitrate, etc.

Bronc - A term applied to a new driller recently promoted from helper. Also may apply to new tool pusher recently promoted from driller.

Brownian Movement - Continuous, irregular motion exhibited by particles suspended in a liquid or gaseous medium, usually as a colloidal dispersion.

BS or BS & W - Base sediment, or base sediment and water.

Buck Up - To tighten a threaded connection.

Bug Blowers - A large fan installed on a drilling rig to blow insects away from the work area.

Buffer - Any substance or combination of substances which, when dissolved in water, produces a solution which resists a change in its hydrogen ion concentration upon the addition of acid or base.

Bump Down - To have too long a length of rods between the pumping jack and the pump seat so that the pump hits bottom on the down stroke.

Bump off a Well - To disconnect a pull -rod line from a central power unit. Same as "knock off a well".

Bum Fit - An earthen pit in which waste oil and other materials are burned.

By Heads - A term applied to a flowing well when the flow is made intermittently.

By-pass - Usually refers to a pipe connection around a valve or other control mechanism. A by-pass is installed in such cases to permit passage of fluid through the line while adjustments or repairs are made on the control which is by-passed.

### -C-

Cable-Tool Drilling - A method of drilling a well allowing a weighted bit at the bottom of a cable to fall against the formation being penetrated. See Rotary Drilling.

Cage - The part of a pump valve which holds the ball to limit its movement.

Cake Consistency - According to API RP 13B, such notations as "hard", "soft", "though", "rubbery", "firm", etc. may be used to convey some idea of cake consistency.



**Cake Thickness** - The measurement of the thickness of the filter cake deposited by a drilling fluid against porous medium, most often following the standard API filtration test. Cake thickness is usually reported in 32nd of an inch. See Filter Cake and Wall Cake.

**Calcium** - One of the alkaline earth elements with a valence of 2 and an atomic weight of about 40. Calcium compounds are a common cause of the hardness of water. It is also a component of lime, gypsum, limestone, etc.

**Calcium Carbonate** -  $\text{CaCO}_3$  An insoluble calcium salt sometimes used as a weighting material (lime-stone, oyster shell, etc.), in specialized drilling fluids. It is also used as a unit and/or standard to report hardness.

**Calcium Chloride**- $\text{CaCl}_2$  - A very soluble calcium salt sometimes added to drilling fluids to impart special properties, but primarily to increase the density of the fluid phase.

**Calcium Contamination** - Dissolved calcium ions in sufficient concentration to impart undesirable properties in a drilling fluid, such as flocculation, reduction in yield of bentonite, increase in fluid loss, etc. See also Calcium Sulphate, Gyp, Anhydrite, Lime, Calcium Carbonate.

**Calcium Hydroxide** -  $\text{Ca(OH)}_2$  - The active ingredient of slaked lime. It is also the main constituent in cement (when wet). This material is referred to as "lime" in field terminology.

**Calcium-Treated Mud's** - Calcium-treated mud's are drilling fluids to which quantities of soluble calcium compounds have been added or allowed to remain from the formation drilled in order to impart special properties.

**Calcium Sulphate** - (Anhydrite:  $\text{CaSO}_4$ ; plaster of Paris:  $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ ; and gypsum:  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ). -Calcium sulphate occurs in mud's as a contaminant or may be added to certain mud's to impart special properties.

**Caliper Logging** - An operation to determine the diameter of the well bore or the internal diameter of casing, drill, pipe, or tubing. In the case of the well bore, caliper logging indicates undue enlargement of the bore due to caving condition or other causes. In the cases of tubular goods, the caliper log reveals the internal corrosion.

**Capacity** - Ability of a reservoir to hold fluid; water, oil, gas.

**Capacity Index** - An indication of the capacity of a saltwater disposal well to take water. It is usually measured in barrels per hour per pound increase in bottom hole pressure.

**Casing Cementing** - The practice of filling the annulus between casing and hole with cement in order to prevent fluid migration between permeable zones and to support the casing.

**Cat** - A crawler-type tractor noted for its ability to move over difficult terrain. It is much used in clearing the location, earth-moving operations, and skidding rigs. The operator or driver is frequently referred to as cat driver. This term is probably a shortening of the trade name Caterpillar, which is a brand of this type of equipment.

**Cat Driver** - See Cat.

**Catching Samples** - Geological information is obtained by studying samples of the formations penetrated by the drill. Members of the drilling crews obtain these samples from the drilling fluid as it merges from the well bore. (Or from the bailer in case of cable tools). This is known as catching samples. Cuttings so obtained should be carefully washed until free of foreign matter and then dried and accurately labeled to show the depth at which they were found.

**Cation** - The positively charged particle in the solution of an electrolyte which, under the influence of an electrical potential, moves toward the cathode (negative electrode). Examples are:  $\text{Na}^+$ ,  $\text{H}^+$ ,  $\text{Ca}^{++}$ ,  $\text{Mg}^{++}$ ,  $\text{Al}^{+++}$ .

**Cat line, cathead, cathead man, catwalk** - **Cat line** - A line powered by the cathead, which is an extension of a shaft of the draw works. Used to lift heavy equipment around the rig. Operated by the Cathead man. **Cat walk**- the ramp to the side of the drilling rig where pipe is laid out and lifted to the derrick floor by the cat line.

**Casing Pressure** - Gas pressure built up between the casing and tubing.

**Casing head Gas** - Gas that is produced along with oil from an oil well.

**Caustic or Caustic Soda** - See Sodium Hydroxide.



**Cave-In** - See Sloughing. Cave in is a severe form of sloughing.

**Cavernous Formations** - A formation having voluminous void, usually the result of dissolving by formation water which may or may not be still present.

**CC or Cubic Centimeter** - A metric system unit for the measure of volume. It is essentially equal to the milliliter and commonly used interchangeably. One cubic centimeter of water at room temperature weighs approximately 1 gm.

**Cellar** - Excavation under the derrick to provide space for items of equipment at the top of the well bore. Also serves as a pit to collect drainage of water and other fluids under the floor for subsequent disposal by jetting.

**Cement** - A mixture of calcium aluminates and silicates made by combining lime and clay while heating. Slaked cement contains about 62.5 percent calcium hydroxide, which is a major source of trouble when cement contaminates mud.

**Cement Additive** - See Additive.

**Cement Density** - The specific gravity of an oil well cement as determined by a method similar to ASTM C 188: Specific Gravity of Hydraulic Cement. Most when tested by this method. Cement density should not be confused with slurry density.

**Cement System** - The combination of materials which make up an oil well cement slurry.

**Cementing** - The operation by which cement slurry is forced down through the casing and out at the lower end in such a way that it fills the space between the casing and the sides of the well bore to be a predetermined height above the bottom of the well. This is for the purpose of securing the casing in place and excluding water and other fluids from the well bore.

**Additive Cement** - A cement or cement slurry to which an additive has been blended.

**ASTM Typo Cement** - A Portland cement meeting the requirement of ASTM C 150: Standard Specification for Portland Cement.

**Common Cement** - (a) API Class A cement; (b) ASTM Type I cement.

**Construction Cement** - Normally, an ASTM Type I, II, or III Portland cement (ASTM C 150: Standard Specifications for Portland Cement) and air entraining modification (ASTM C 175 : Air Entraining Portland Cement). API Class A, B, and C are similar to ASTM Type I, II and III, respectively, Air entraining cements are not suitable for oil well cementing.

**Gel Cement** - A cement or cement slurry that has been modified by the addition of bentonite.

**I-Tight Early Cement** - (a) API Class C cement; (b) ASTM Type III cement.

**I-Tight Temperature Cement** - A cement composition designed to overcome strength retrogression.

**Hydraulic Cement** - A cement that hardens or sets under water.

**Modified Cement** - A cement whose properties, chemical or physical, have been altered by additives. This term has been used to refer to specific formulations of gel cement containing certain concentrations of dispersing agent.

**Neat Cement** - A cement or cement slurry containing no additives.

**Oil-Well Cement** - Cement or any mixture of cement with other materials that is intended for use in oil, gas, or water wells.

**Portland Cement** - The product obtained by grinding clinker consisting essentially of hydraulic calcium silicates, to which no additions have been made subsequent to calcinations other than water and untreated calcium sulphate, except that additions not to exceed 1.0% of other materials may be underground with the clinker at the option of the manufacturer, provided such materials in the amount indicated have been shown to be not harmful by tests carried out or reviewed by ASTM Committee C-1 on cement.

**Regular Cement** - (a) API Class A cement, (b) ASTM Type I cement. See Common Cement.

**Retarded Cement** - A cement in which the thickening time is extended by adding a chemical retarder.

**Slow-Set Cement** - A cement in which the thickening time is extended (1) by eliminating the rapid hydrating components in its composition or (2) by adding a chemical retarder. API Class D, E, and F are slow set cements.

**Sulphate Resistant Cement** - Cements which meet applicable requirements of API Std 10A.

**Weighted Cement** - A cement slurry containing additives to increase its normal density.



**Cementing Time** - The total elapsed time for a cementing operation from the beginning of mixing until the completion of displacement to final depth and complete circulation of any excess slurry to the surface.

**Centipoise (CP)** - A unit of viscosity equal to 0.01 poise. A poise equals 1 g per meter-second, and a centipoise is 1 gm per centimeter-second. The viscosity of water at 20 C is 1.005 cp ( 1 cp = 0.000672 lb/ft-sec).

**Centralizers** - Spring steel guides which are attached to casing and which serve to keep it centered in the hole.

**Centrifuge** - A device for the mechanical separation of high specific gravity solids from a drilling fluid. Usually used on weighted muds to recover weight material and discard drill solids. The centrifuge uses high-speed mechanical rotation to achieve this separation, as distinguished from the cyclone-type separator in which the fluid energy alone provides the separation force. See Cyclone and Desander.

**Centrifuge** - A shake-out or grind-out machine. Samples of oil are placed in the machine and whirled at a high speed to settle out sediment.

**Changing Rams** - On rotary drilling rigs, blowouts are prevented by the device known as the blowout preventer is accomplished by means of parts called rams. It is necessary to change the rams when drill pipe of a different size than that previously used is put in service.

**Chase Threads** - To straighten and clean threads of any kind.

**Cheater** - A length of pipe used to increase the leverage of a wrench.

**Chemical Barrel** - A container in which various chemicals are mixed prior to addition to the drilling fluid.

**Chert** - A quartzitic rock with hardness equal to or harder than flint.

**Chisel Tongs** - Pipe tongs that grip the pipe with a chisel-like insert in the jaw of the wrench.

**Christmas Tree** - A term applied to the valves and fitting assembled at the top of a well to control the flow of the oil.

**Chromate** - A compound in which chromium has a valence of 6 e.g., sodium bichromate. Chromate may be added to drilling fluids either directly or as a constituent of chrome lignite's or chrome lignosulfonates. In certain areas, chromate is widely used as an anodic corrosion inhibitor, often in conjunction with lime.

**Chrome Lignite** - Mined lignite, usually Leonardite, to which chromate has been added and/or reacted. The lignite can also be causticized with either sodium or potassium hydroxide.

**Circulate** - To cycle drilling fluid through drill pipe and well bore while drilling operations are temporarily suspended. This is done to condition the drilling fluid and the well bore before hoisting the drill pipe and to obtain cutting from the bottom of the well bore drilling proceeds. Circulation of the drilling fluids while drilling is suspended is usually necessary to prevent drill pipe from becoming stuck.

**Circulation** - The movement of drilling fluid from the suction pit through pump, drill pipe, bit, annular space in the hole, and back again to the suction pit. The time involved is usually referred to as circulation time.

**Circulation, Lost** - The result of drilling fluid escaping into the formation by way of crevices or porous media.

**Circulation Rate** - The volume flow rate of the circulating drilling fluid usually expressed in gallons or barrels per minute.

**Clabbered** - A slang term commonly used to describe moderate to severe flocculation of mud due to various contaminants; also called "gelled-up".

**Clay** - A plastic, soft, variously colored earth, commonly a hydrous silicate of alumina, formed by decomposition of feldspar and other aluminum silicates. See also Attapulgite, Bentonite, High Yield, Low Yield, and Natural Clays. Clay minerals are essentially insoluble in water but disperse under hydration, shearing forces such as grinding, velocity effects, etc., into the extremely small particles varying from sub micron to 100-micron sizes.

**Clay Extender** - Any of several substances, usually high molecular weight organic compounds that, when added in low concentrations to a bentonite or to certain other clay slurries, will increase the viscosity of the system, e.g., polyvinyl acetate-malefic anhydride copolymer. See Low-solids Muds.



**Clip** - A U bolt or similar device used to fasten parts of a wire cable together.

**Close Nipple** - A very short piece of pipe having threads over its entire length.

**Closed-In** - A well capable of producing oil or gas, but temporarily shut in.

**Closed Water - Treating System** - A system of treating water in which the water does not come in contact with air.

**CMC** - See Sodium Carboxymethylcellulose.

**Coagulation** - The joining together of finely divided particles of matter suspended in water, forming a mass large enough to settle out of suspension. A synonym for flocculation.

**Coalesce** - To combine into one body.

**Coalescence** - The change from a liquid to a thickened curd like state by chemical reaction. Also the combination of globules in an emulsion caused by molecular attraction of the surfaces.

**Cohesion** - The attractive force between the same kind of molecules, i.e., the force which holds the molecules of a substance together.

**Collar** - A pipe coupling threaded on the inside.

**Colloid** - A state of subdivision of matter which consists either of single large molecules or of aggregations of smaller molecules dispersed to such a degree that the surface forces become an important factor in determining its properties. The size and electrical charge of the particles determined the different phenomena observed with colloid, e.g., Brownian movement. The sizes of colloids range from  $1 \times 10^{-7}$  cm to  $5 \times 10^{-5}$  cm (0.001 to 0.5 microns) in diameter, although the particle size of certain emulsions can be in the micron range.

**Colloidal** - Pertaining to suspended solids so finely divided that they will not settle.

**Colloidal Composition** - A colloidal suspension containing one or more colloidal constituents.

**Colloidal Suspension** - A stable, homogenous system of very fine particles of matter dispersed uniformly

throughout a liquid medium, having properties which differ both from a true solution and for a suspension of larger particles. True colloidal suspensions have particle size range of 5 to 200 milli-micron.

**Come-Along** - A stretching or tightening device that crawls along a length of chain.

**Coming Out of Hole** - Withdrawing of the drill pipe from the well bore. This withdrawal is necessary to change the bit, or change from bit to core barrel, to prepare for drill stem test, and for other reasons.

**Compressive strength** - The degree of resistance of a material to force acting along one of the axes in a manner tending to crush it, usually expressed in pounds of force per square inch of surface affected. See API RP 10B\*.

**Condensate** - Hydrocarbons which are in the gaseous state under reservoir conditions but which become liquid either in passage up the hole or at the surface.

**Conductivity** - A measure of the quantity of electricity transferred across unit area per unit potential gradient per unit time. It is the reciprocal of resistivity. Electrolytes may be added to the drilling fluid to alter its conductivity for logging purposes.

**Conductor Pipe** - A short string of casing of large diameter which is used in marshy locations and under certain other conditions. Its principal function is to keep the top of the well bore open and to provide means of conveying the up flowing drilling fluid from the well bore to the slush pit.

**Connate Water** - Water inherent to the producing formation; or fossil sea water trapped in the pore space of sediments during their deposition.

**Connection** - The joining of two lengths of pipe.

**Consistence** - The viscosity of a non-reversible fluid, in poises, for a certain time interval at a given pressure and temperature.

**Consistency** - A rheological property of matter which is related to the cohesion of the individual particles of a given material, its ability to deform, and its resistance to flow. The consistency of cement slurries is determined by thickening time tests in accordance with API RP 10B and is expressed in poise.



**Consistometer** - A thickening-time tester having a stirring apparatus to measure the relative thickening time for mud or cement slurries under predetermined temperatures and pressure. See API 1tB 1 OB \*.

**Contaminates** - Materials, usually mud components, which become mixed with the cement slurry during the displacement process, and which have a detrimental effect on cement properties.

**Contamination** - The presence in a drilling fluid of any foreign material that may tend to produce detrimental properties of the drilling fluid.

**Continuous Phase** - The fluid phase which completely surrounds the dispersed phase that may be colloid, oil, etc.

**Contract Depth** - The depth of the well bore at which the drilling contract is fulfilled.

**Controlled Aggregation** - A condition in which the clay platelets are maintained stacked by a polyvalent cation, such as calcium, and are deflocculated by use of a thinner.

**Conventional Mud** - A drilling fluid containing essentially clay and water.

**Copolymer** - A substance formed when two or more substances polymerize at the same time to yield a product which is not a mixture of separate polymers but a complex having properties different from either polymer alone. See Polymer. Examples are polyvinyl acetate-malefic anhydride copolymer (clay extender and selective flocculant), acryl amide-carboxylic acid copolymer (total flocculants), etc.

**Coring** - The act of procuring a sample of the formation being drilled for geological information purposes. Coring is done by means of a core barrel. A conventional type of core barrel is put on the bottom of the drill pipe where the bit normally operates. As the cutter head of the core barrel penetrates the formations a continuous sample of the formation is taken in the core barrel and later withdrawn with the drill pipe. The wire line core barrel is used in many areas since it permits coring to be done without withdrawing the drill pipe from the well bore. Instead, a cored barrel is dropped inside the drill pipe and automatically locks into coring position when it reaches the bottom of the well bore.

**Corrosion** - The adverse chemical alteration on a metal or the eating away of the metal by air, moisture, or chemicals; usually an oxide is formed.

**Coupon** - Small metal strip which is exposed to corrosive systems for the purpose of determining nature and severity of corrosion.

**C.P.** - Point in cased hole of cementing through perforations. Also abbreviated for "casing point".

**Crack a Valve** - To barely open a valve so that it leaks just a little.

**Crater (To Crater)** - Term meaning the hole is caving in. To crater refers to the results that sometime accompany a violent blowout during which the surface surrounding the well bore falls into a large hole blown in the earth by the force of escaping gas, oil, and water. The crater sometimes cover an area of several acres and reaches a depth of several hundred feet. To crater also refers in the oil field slang to any mishap which may occur to the men or the equipment.

**Creaming of emulsions** - The settling or rising of the particles of the dispersed phase of an emulsion as observed by a difference in color shading of the layers formed. This can be either upward or downward creaming, depending upon the relative densities of the continuous and dispersed phases.

**Created Fractures** - Induced fractures by means of hydraulic or mechanical pressure exerted on the formation.

**Crowbar Connection** - A connection made with the parts in a bind or in a strain; a connection which requires force to be put together.

**Crown Block** - Sheaves and supporting beams on top of derrick.

**Crumb** - To smooth out an even up the bottom of a ditch in which pipe is to be laid.

**Curing** - Aging of cement under specified conditions.

**Atmospheric Pressure Curing** - The aging of cement specimens for test purposes at normal atmospheric pressure (14.7 psi at sea level), for a designated period of time under certain given conditions of temperature and humidity. See API RB IOB.

**Pressure Curing** - The curing of cement specimens for test purposes, in water at pressures above atmospheric pressure. See API RP IOB.

**Cut Oil** - Oil that contains water; also called wet oil.



Cuttings - Particles of formation obtained from a well during drilling operations. These are washed out while circulating mud-laden in rotary drilling. They are bailed out in cable tool drilling.

Cycle Time, Drilling Fluid - The time of a cycle, or down the hole and back, is the time required for the pump to move the drilling fluid in the hole. The cycle in minutes equal the barrels of mud in the hole divided by barrels per minute.

Cyclone - A device for the separation of various particles from a drilling fluid, most commonly used as a desander. The fluid is pumped tangentially into a cone, and the fluid rotation provides enough centrifugal force to separate particles by mass weight. See Centrifuge.

### **-D-**

Darcy - A unit permeability. A porous medium has a permeability of 1 Darcy when a pressure of 1 atm on a sample 1 cm long and 1 sq cm in cross section will force a liquid of 1-cp viscosity through the sample at the rate of 1 cc per sec.

Darcy's Law - The rate of flow of a homogeneous fluid through a porous medium is proportional to the pressure of hydraulic gradient and to the cross-sectional area normal to the direction of flow and inversely proportional to the viscosity of the fluid.

Day Work - When a drilling contract is entered into between an operator and drilling contractor, it is frequently composed of two parts; namely, footage contract and day work. While the rig is on day work it is paid for on a daily basis at a price per day agreed upon. Day work arrangements usually cover drilling at extreme depths, coring, drill stem tests, and other operation where normal drilling operation are suspended for any reason at the request of the operator.

Dead Line - Refers to the end of the drilling line which is not reeled on the hoisting drum of the rotary rig. This end of the drilling line is usually anchored to the derrick substructure and does not move as the traveling block is hoisted, hence the term dead line.

Dead Man - A piece of wood or concrete, usually buried, to which a wire guy line is attached for bracing a mast or tower.

Dead Well - A well that will not flow.

Decontaminants - Materials added to cements or cement slurries for the specific purpose of counteracting the effects of contamination.

Deflocculating - Breakup of flocs of gel structures by use of a thinner.

Defoamer or Defoaming Agent - Any substance used to reduce or eliminate foam by reducing the surface tension. Compare Antifoam.

Dehydration - Loss of water by filtration of cement slurries during or after displacement.

Deliquescence - The liquefaction of a solid substance due to the solution of the solid by adsorption of moisture from the air, e.g., calcium chloride.

Density - Matter measured as mass per unit volume expressed pounds per gallon (ppg), pounds per square inch per 1,000 ft of depth (psi/1,000 ft), and pounds per cubic ft (lb/cu ft). Density is commonly referred to as "weight".

Density - Mass per unit volume. Absolute density considers only the actual volume occupied by the material. Bulk density is mass per unit bulk volume which includes the actual volume of the material plus the volume of trapped air.

Depletion - A deduction allowed in computing the taxable income from oil and gas wells.

Depreciation - The decrease in value of any property such as a drilling rig due to normal wear or the passing of time. By including a charge for depreciation in cost of drilling, the drilling contractor accumulated funds to replace the drilling rig when it is worn out.

Derrick man - The crew member whose work station is in the derrick while the drill pipe is being hoisted or lowered into the hole. He attached the elevators to the stands of drill pipe while the pipe is being lowered into the hole and detaches the elevators while the pipe is being hoisted. Other responsibilities frequently include conditioning the drilling fluid and maintenance of the slush pumps. He is usually next in line of authority under the driller.

Desander - See Cyclone.



Desk and Derrick Clubs - Organizations of women employed in the oil industry. Such clubs now exist in about a dozen major oil centers. The purpose of the organizations is partly educational and partly social.

Diatomaceous Earth - An infusorial earth composed of siliceous skeletons of diatoms and being very porous. Sometimes used for combating lost circulation and as an additive to cement; also has been added to special drilling.

Diatomaceous- Earth Filtration - A process in which a filter cake or pre-coat of diatoms is used as a filter medium.

Diesel-Oil Plug - See Gunk Plug.

Differential Pressure - The difference in pressure between the hydrostatic head of the drilling-fluid column and the formation pressure at any given depth in the hole. It can be positive, zero, or negative with respect to the hydrostatic head.

Differential-Pressure (Wall Sticking) - Sticking which occurs because part of the drill string (usually the drill collars) becomes embedded in the filter cake resulting in a non-uniform distribution of pressure around the circumference of the pipe. The conditions essential for sticking require a permeable formation and a pressure differential across a nearly impermeable filter cake and drill string.

Diffusion - The spreading, scattering, or mixing of a material (gas, liquid, or solid).

Dilatant Fluid - A dilatant fluid or inverted plastic fluid is usually made up of a high concentration of well dispersed solids which exhibits a non-linear consistency curve passing through the origin. The apparent viscosity increases instantaneously with increasing rate of shear. The yield point, as determined by conventional calculations from direct-indicating viscometer readings, is negative; however, the true yield point is zero.

Diluent - Liquid added to dilute or thin a solution.

Direct-Indicating Viscometer - See Viscometer, Direct-indicating.

Directional Drilling - While the normal well bore under usual conditions is planned to be drilled vertically, controlled directional drilling is sometimes used to drill a well at an angle from the vertical. Examples are the drilling of wells under the sea from a location on dry land

and killing a blowout by means of a well drilled from a point at a safe distance from the one being brought under control. In the latter instance, the well bore drilled at an angle permits the pumping of heavy fluids into the bore of the well which is not under control. Modern development of this technique makes possible close control on both the direction and the degree of deviation of a directional well from the vertical.

Dispersants - A cement additive which reduces the consistency of cement slurries.

Dispersed Phase - The scattered phase (solid, liquid, or gas) of a dispersion. The particles are finely divided and completely surrounded by the continuous phase.

Dispersion (of Aggregates) - Subdivision of aggregates. Dispersion increases the specific surface of the particle; hence results in an increase in viscosity and gel strength.

Dispersoid - A colloid or finely divided substance.

Displacement Rate - The volumetric flow rate at which cement slurry is pumped down the hole.

Disposal Well - A well through which water (usually salt water) is returned to substances.

Dissociation - The splitting up of a compound or element into two or more simple molecules, atoms, or ions. Applied usually to the effect of the action of heat or solvents upon dissolved substances. The reaction is reversible and not as permanent as decomposition; i.e., when the solvent is removed, the ions recombine.

Distillation - Process of first vaporizing a liquid and then condensing the vapor into a liquid (the distillate), leaving behind non-volatile substances, the total solids of a drilling fluid. The distillate is the water and/or oil content of a fluid.

Dog-Leg - The "elbow" caused by a sharp change of direction in the well bore.

Dog-Leg - A bend in pipe, a ditch, or a well.

Doghouse - A small house used for keeping lease records, changing clothes, or any other use around a lease.

Donkey Pump - Any little pump; used for many kinds of small temporary pumping operations.



**Doodlebug** - A slang term for the seismograph which is used in prospecting for potential oil-bearing geological structures. Also is applied to various devices used in searching for petroleum deposits.

**Dope** - Material used on threads of pipe or tubing to lubricate and prevent leakage.

**Double** - Two lengths or joints of pipe joined together.

**Doughnut** - A ring of wedges that supports a string of pipe or a threaded, tapered ring used for the same Purpose.

**Down comer** - A pipe through which flow is downward.

**Dozer** - A powered machine for earth work excavations.

**Dresser Sleeve** - A slip-type collar that is used to join plain-end pipe.

**Dressing** - Sharpening (as in the case of a drag bit), repairing, and replacing parts to make items of equipment ready for re-use. The term applies especially to drilling bits and tool joints.

**Drilling Out** - The operation during the drilling procedure when the cement is drilled out of the casing before further hole is made or completing attempted.

**Drilling Under Pressure** - Carrying on drilling operations while maintaining a seal at the top of the well bore to prevent the well fluids from blowing out.

**Drip** - Equipment designed to remove small quantities of liquids from a gas stream.

**Dry Basis** - The weight of an additive corrected for moisture.

**Dry Blending** - The process of admixing finely-divided solid components.

**Dry Gas** - Natural gas that is produced without liquids; also a gas that has been treated to remove all liquids.

**Dry Hole** - Somewhat loosely used in oil work, but in general any well that does not produce oil or gas in commercial quantities. A dry hole may flow water, or as, or may even yield some oil to the pump, but not in commercial quantities.

**Drifter** - A worker who never stays long in one place.

**Drill-Stem Test (DST)** - A test to determine whether oil and/or gas in commercial quantities has been encountered in the well bore.

**Drill String** - The string of pipe that extends from the bit to the Kelley, carries the mud down to the bit, and rotates the bit.

**Driller** - The employee directly in charge of a drilling rig and crew. Operation of the drilling and hoisting equipment constitute his main duties.

**Drilling Block** - Usually a lease or a number of leases of adjoining tracts of land which constitute a unit of acreage sufficient to justify the expense of drilling a wildcat well.

**Drilling Fluids** - Any fluid, such as air or gas, water or oil-base mud's, circulated in a well during drilling operations.

**Drilling-In** - The operation during the drilling procedure at the point of drilling into the pay formation.

**Drilling Mud or Fluid** - A circulating fluid used in rotary drilling to perform any or all of various functions required in the drilling operation.

**Duster** - A non-productive well. A dry hole.

**Dutchman** - The portion of a stud or screw which remains in place after the head has been twisted off in an effort to remove the entire stud or screw. Also used to refer to a tool joint pin broken off in the drill-pipe box or drill-collar box.

**Dynamic** - The state of being active or in motion; opposed to static.

### **-E-**

**Effective Size** - A term used in specifying sand. It is the sieve size in millimeters that permits 10 percent of the filter sand by weight to pass.

**Elevation** - Height above sea level.

**Electric Logging** - Electric logs are run on a wire line to obtain information concerning the porosity, permeability, fluid content of the formations drilled, and other information. The drilling-fluid characteristics may need to be altered to obtain good logs.

**Electrolyte** - A substance which dissociates into charges positive and negative ions when in solution or a fused state and which will then conduct an electric current. Acids, bases, and salts are common electrolytes.

**Elevators** - Latches which secure the drill pipe; attached to the traveling block which raises and lowers the pipe from the hole.



**Emulsifier or Emulsifying Agent** - A substance used to produce an emulsion of two liquids which do not mix. Emulsifiers may be divided, according to their behaviors, into ionic and non-ionic agents. The ionic types may be further divided into anionic, cationic, and amphoteric, depending upon the nature of the ion active groups.

**Emulsion** - A substantially permanent heterogeneous liquid mixture of two or more liquids which do not normally dissolve in each other but which are held in suspension or dispersion, one in the other, by mechanical agitation or, more frequently, by adding small amounts of substances known as emulsifiers. Emulsions may be mechanical, chemical, or a combination of the two. They may be oil-in-water or water-in-oil types.

**Emulsoid** - Colloidal particles which take up water.

**End Point** - Indicates the end of some operation or when a definite change is observed. In titration this change is frequently a change in color of an indicator which has been added to the solution or the disappearance of a colored reactant.

**Engineer, Mud or Drilling-Fluid** - One versed in drilling fluids whose duties are to manage, carry through, and maintain the various types of oil-well mud program.

**HP Additive** - See Extreme-pressure Lubricant.

**EPM or Equivalents per Million** - Unit chemical weight of solute per million unit weights of solution. The epm of a solute in solution is equal to the ppm (parts per million) divided by the equivalent weight. Refer also to ppm.

**Equivalent Circulating Density** - For a circulating fluid, the equivalent circulating density in lb/gal equals the hydrostatic head (psi) plus the total annular pressure drop (psi) divided by the depth (ft) and by 0.052.

**Equivalent Weight or Combining Weight** - The atomic or formula weight of an element, compound, or ion divided by its valence. Elements entering into combination always do so in quantities proportional to their equivalent weights.

**Expanded Pearlite** - A siliceous volcanic rock that is ground to small size and subjected to extreme temperature in an oven, resulting in an expansion and release of combined water, leaving the rock particle considerably expanded and porous.

**Expansion Loop** - A bend placed in a line to absorb stretch or shrinkage.

**Extrapolated Thickening Time** - The time required for a cement slurry to reach a consistency of 100Bc obtained by extending the curve recorded during a thickening time test which may be stopped at 70 Bc under given conditions. See API RP IOB.

**Extreme-pressure Lubricant** - Additives which, when added to the drilling fluid, impart lubrication to the bearing surfaces when subjected to extreme pressure conditions.

**Eyeball** - To straighten or align pipe by eye.

### **-F-**

**Fermentation** - Decomposition process of certain organic substances, e.g., starch in which a chemical change is brought about by enzymes, bacteria, or other microorganisms. Often referred to as "souring".

**Fiber or Fibrous Materials** - Any tough stringy material used to prevent loss of circulation or to restore circulation. In field use, fiber generally refers to the larger fibers of plant origin.

**Field** - The area around a group of producing oil wells.

**Filler Material** - A material added to a cement or cement slurry for the primary purpose of increasing the yield of the slurry.

**Filing the Hole** - Pumping drilling fluid continuously or intermittently into the well bore to maintain the fluid level in the hole near the surface. The purpose is to avoid danger of blowout, water intrusion, and/or caving of the well bore, e.g., as the pipe is withdrawn.

**Fill up Line** - The line through which fluid is added to the hole.

**Filter** - A porous medium through which fluid is passed to separate it from material held in suspension.

**Filter Cake** - The suspended solids that are deposited on a porous medium during the process of filtration. See also **Cake Consistency**.

**Filter-Cake Texture** - The physical properties of a cake as measured by toughness, slickness, and brittleness. See also **Cake Consistency**.

**Filter-Cake Thickness** - A measurement of the solids deposited on filter paper in 32md of an inch during the standard 30-min API filter test. See **Cake Thickness**. In certain areas the filter-cake thickness is a measurement of the solids deposited on filter paper for a 7 min. duration.



**Filter-Loss** - Misnomer sometimes applied to fluid loss.

**Filter Paper** - Porous un-sized paper for filtering liquids. API filtration test specifies one thickness of 9-cm filter paper Whatman No. 50, S & S No. 576, or equivalent.

**Filter Press** - A device for determining fluid loss of a drilling fluid having specifications in accordance with API RP 13 B.

**Filtrate** - The liquid that is forced through a porous medium during the filtration process. For test, see Fluid loss.

**Filtration** - The process of separating suspended solids from their liquid by forcing the latter through a porous medium. Two types of fluid filtration occur in a well: dynamic filtration while circulating, and static filtration when at rest.

**Filtration Qualities** - The filtration characteristics of a drilling mud. Generally these qualities are inverse to the thickness of the filter cake deposited on the face of a porous medium and the amount of filtrate allowed to escape from the drilling fluid into or through the medium.

**Filtration Rate** - See Fluid Loss.

**Final Set** - Cement shall be considered to have acquired its final set when it will bear, without appreciable indentation, the final Gilmore needle. This is not an API test. See ASTM C 266: Time of Setting of Hydraulic Cement by Gilmore Needles. **Final Strength** - The strength of a cement at such a time when under the five conditions of temperature and pressure it ceases to change significantly. Synonym -Ultimate Strength.

**Fineness** - The particle size to which a cement clinker is ground. This value is generally reported as surface area as determined with the Blaine air permeability apparatus or Wagner turbid meter.

**Finger Board** - A rack located in the derrick to support stands of pipe while stacked in the derrick.

**Fish** - An object accidentally lost in the hole.

**Fishing** - Operations on the rig for the purpose of retrieving from the well bore sections of pipe, collars, junk, or other obstructive items which are in the hole.

**Fissures** - The natural cracks or fractures which occur in a formation.

**Fire Wall** - A wall of earth built around an oil tank to hold the oil if the tank breaks or burns.

**Fireman** - The member of the crew on a steam powered rig who is responsible for the care and operation of the boilers. On a mechanical rig his counterpart is the motorman.

**Fittings** - The small pipes and valves that are used to make up a system of piping.

**Flag** - To tie a piece of cloth or other marker on a bailing or swabbing line to enable the operator to know the depth at which the swab or bailer is operating in the hole.

**Flange Up** - The act of making the final connection on the piping system. Also in oil field slang it refers to the completion of any operation. Frequently refers to quitting a job.

**Flare** - An open flame used to dispose of unwanted gas around a completed well.

**Flash Set** - Flash set is abnormal early thickening or setting of cement slurry wherein the cement slurry becomes unpumpable.

**Flat Gel** - A condition wherein the 10-min gel strength is substantially equal to the initial gel strength.

**Flipped** - When the opposite occurs of what is intended in a drilling fluid. In an invert water-in-oil emulsion, the emulsion is said to be flipped when the continuous and dispersed phases reverse.

**Float** - A long flat-bed semi-trailer.

**Flocculates** - Groups of aggregates or particles in suspension subject to being broken up by normal shaking and stirring and reforming on standing.

**Flocculating Agent** - Substances, such as most electrolytes, some polysaccharides, certain natural or synthetic polymers, that bring about the thickening of the consistency of a drilling fluid. In Bingham plastic fluids, the yield point and gel strength increase.

**Flocculation** - Loose association of particles in lightly bonded group, non-parallel association of clay platelets. In concentrated suspensions, such as drilling fluids, flocculation results in gelation. In some drilling fluids, flocculation may be followed by irreversible precipitation of colloids and certain other substances from the fluid, e.g., red beds.

**Flocs** - See Flocculates.



**Flooding** - The process of drowning out a well with water; also the process by which oil is sometimes driven from the sand into the well by water introduced under pressure into a key well.

**Floor man** - A member of the drilling crew whose work station is about the derrick floor. On rotary drilling rigs normally there are two floor men on each drilling crew.

**Flow a Well Hard** - To let a well flow at too high a rate.

**Flow Bean** - A plug in the flow line at the well head which has a small hole drilled through it, through which oil flows, and which keeps a well from flowing at too high a rate.

**Flow by Heads** - A well flowing oil at irregular intervals.

**Flow Chart** - A chart made by a recording meter which shows rate of production.

**Flowing Well** - A well which produces oil or gas without any means of artificial lift.

**Flow Lines** - The surface pipes through which oil travels from the well to storage.

**Flow Tank** - A lease storage tank to which produced oil is run.

**Flow Treater** - A single unit which acts as an oil and gas separator, an oil heater, and an oil and water treater.

**Fluid** - A fluid is a substance readily assuming the shape of the container in which it is placed. The term includes both liquids and gases. It is a substance in which the application of every system of stresses (other than hydrostatic pressure) will produce a continuously increasing deformation without any relation between time rate of deformation at any instant and the magnitude of stresses at that instant. Drilling fluids are usually Newtonian and plastic, seldom pseudoplastic, and rarely dilatant fluids.

**Fluid Flow** - The state of fluid dynamics of a fluid in motion is determined by the type of fluid (e.g., Newtonian, Plastic, pseudoplastic, dilatant), the properties of the fluid such as viscosity and density, the geometry of the system, and the velocity. Thus, under a given set of conditions and fluid properties, the fluid flow can be described as plug flow, laminar (called also Newtonian, streamline, parallel, or viscous) flow, or turbulent flow. See above terms and Reynolds number.

**Fluid Injection** - Injection of gases or liquids into a reservoir to force oil toward and into producing wells.

**Fluid Level** - Distance between well head and point to which fluid rises in the well.

**Fluid Loss** - The volume of fluid lost to a permeable material due to the process of filtration. The API fluid loss is the volume of fluid in a filtrate as determined according to the Fluid-Loss Test given in API RP IOB. See Water Loss.

**Fluid Loss Additive** - An additive used to reduce the fluid loss of cement slurries.

**Fluidity** - The reciprocal of viscosity. The measure of rate with which a fluid is continuously deformed by a shearing stress. Ease of flowing.

**Fluorescence** - Instantaneous re-emission of light of a greater wave length than that light originally absorbed.

**Flush Production** - The high rate of flow made by a good well right after it is drilled.

**Foam** - A foam is a two-phase system, similar to an emulsion, where the dispersed phase is a gas or air.

**Foaming Agent** - A substance that produces fairly stable bubbles at the air-liquid interface due to agitation, aeration, or ebullition. In air or gas drilling, foaming agents are added to turn water influx into aerated foam. This is commonly called "mist drilling".

**Formation Damage** - Damage to the productivity of a well resulting from invasion into the formation by mud particles or mud filtrates. Asphalt from crude oil will also damage some formations. See Mudding Off.

**Formation Pressure** - Pressure at the bottom of a well that is shut in.

**Formation Sensitivity** - The tendency of certain producing formations to adversely react with invading mud filtrates.

**Fourble** - A section of drill pipe, casing or tubing consisting of four joints screwed together. See Double; Thribble.

**Fourble Board** - A platform installed in the derrick at an elevation of 80 feet to 120 feet above the derrick floor. The derrick man works on this board while the pipe is being hoisted from or lowered into the well bore.

**Fracture** - Cracks and crevices in the formation either inherent or induced.



Fracturing - Application of hydraulic pressure to the reservoir formation to create fractures through which oil or gas may move to the well bore.

Frost Up - Icing of equipment due to the cooling effect of expanding gas.

Frozen Up - Said of equipment of which the components do not operate freely.

Functions of Drilling Fluids - The most important function of drilling fluids in rotary drilling is to bring cuttings from the bottom of the hole to the surface. Some other important functions are: control subsurface pressures, cool and lubricate the bit and drill string, deposition of an impermeable wall cake, etc.

Funnel Viscosity - See Marsh Funnel Viscosity.

### **-G-**

Gel Cement - Cement having a small to moderate percentage of bentonite added as a filler and/or to reduce the slurry weight. See Gunk Plug.

Gel Strength - The value of the shear stress required to cause permanent deformation of a colloidal suspension.

Gel Strength - The ability or the measure of the ability of a colloid to form gels. Gel strength is a pressure unit usually reported in lb/100 sq.ft. It is a measure of the same inter-particle forces of a fluid as determined by the yield point except that gel strength is measured under static conditions, yield point under dynamic conditions. The common gel-strength measurements are initial and the 10-sec gels. See also Shear and Thixotropy.

Gel Strength, Initial - The measured initial gel strength of a fluid is the maximum reading (deflection) taken from a direct-reading viscometer after the fluid has been quiescent for 10 min. The reading is reported in lb/100 sp ft. See API RP 13B for details of test procedure.

Gel Strength, 10 Min - The measured 10-min gel strength of a fluid is the maximum reading (deflection) taken from a direct-reading viscometer after the fluid has been quiescent for 10 min. The reading is reported in lb/100 sq. ft. See API RP 13B for details of test procedure.

Gelled Up - Oil-field jargon usually referring to any fluid with high gel strength and/or highly viscous properties. Often a state of severe flocculation.

Gelation - Association of particles to form a continuous structure.

Gilsonite - A naturally occurring solid hydrocarbon belonging to the asphalt group. A granular form of gilsonite is sometimes used as a cement additive.

Gin-Pole Truck - A truck equipped with a pair of poles, and hoisting equipment for use in lifting heavy machinery around a lease.

Gauging Nipple - A small section of pipe in the top of a tank through which a tank may be gauged.

Galena - Lead sulfide (PbS). Technical grades (specific gravity about 7) are used for increasing the density of drilling fluids to points impractical or impossible with barite.

Gas Cut - Gas entrained by a drilling fluid or cement. See Air Cutting.

Gas-Oil Ratio - The number of cubic feet of gas produced with a barrel of oil.

*Gathering Lines* - The flow lines which run from several wells to a single tank battery.

Gel - A state of a colloidal suspension in which shearing stresses below a certain finite value fail to produce permanent deformation. The minimum shearing stress that will produce permanent deformation is known as the shear or gel strength of the gel. Gels commonly occur when the dispersed colloidal particles have a great affinity for the dispersing medium, i.e., are lyophilic. Thus gels commonly occur with bentonite in water. For their measurement, see Gel Strength, Initial and 10 min.

Gel - A term used to designate highly colloidal, high yielding, viscosity-building commercial clays, such as bentonite and attapulgite clays, such as bentonite and attapulgite clays.

Girth or Girt - One of the horizontal braces between the legs of a derrick.

Gone of Water - Describes a well in which water production is increasing.

GPG or Grains per Gallon - Ppm equals gpg x 17.1.

Grass Gooser - A hoe or other kind of weed cutter.



Gravity Gathering System - A gathering systems that depends upon the natural fall of ground level for the movement of fluid.

Gravity Pressure Head - The head of pressure created by the weight of water, rather than pressure as a result of pumping.

Gravity, Specific - The weight of a particular volume of any substance compared to the weight of an equal volume of water at a reference temperature. For gases, air usually taken as the reference substance, although hydrogen is sometimes used.

Greasing Out - Certain organic substances, usually fatty-acid derivative, which are added to drilling fluids as emulsifiers, e.p. lubricants, etc., may react with such ions as calcium and magnesium that are in or will subsequently come into the system. An essentially water-insoluble greasy material separates out.

Grind Out - See Shake Out.

Grouting - The filling of void space with a substance that hardens (grout). It is performed to prevent passage of fluids or gases or to prevent compaction of materials in a formation.

Guar Gum - A naturally occurring hydrophilic polysaccharide derived from the seed of the guar plant. The gum is chemically classified as a galactomannan. Guar gum slurries made up in clear fresh or brine water possess pseudoplastic flow properties.

Gum - Any hydrophilic plant polysaccharides or their derivatives which, when dispersed in water, swell to produce viscous dispersion or solution. Unlike resins, they are soluble in water and insoluble in alcohol.

Gumbo - Any relatively sticky formation, such as clay, encountered in drilling.

Gunk Plug - A slurry in crude or diesel oil containing any of the following materials or combinations: bentonite, cement, attapulgite, and guar gum (never with cement). Use primarily in combating lost circulation. The plug may or may not be squeezed.

Gunk Squeeze - A bentonite, diesel-oil mixture that is pumped down the drill pipe to mix with drilling mud being pumped down the annulus. These two mix to form a stiff, putty-like material that can be squeezed into lost circulation zones.

Gunning the pits - Mechanical agitation of the drilling fluid in a pit by means of a mud gun, electric mixer, or agitator.

Guy Wire - A rope or cable used to steady a mast or pole.

Gyp or Gypsum - See Calcium Sulphate. Gypsum is often encountered while drilling. It may occur as thin stringers or massive formations/

## **-H-**

Handy - A connection that can be unscrewed by hand.

Hang a Well Off - To Stop operation of jack operating from a central power unit by disconnecting the rod line.

Hardness (of Water) - The hardness of water is due principally to the calcium and magnesium ions present in the water and is independent of the accompanying acid ions. The total hardness is measured in terms of parts per million of calcium carbonate or calcium and sometimes equivalents per million of calcium. for hardness test, see API RP 13 B.

Hatch - An opening into a tank, usually through the top deck.

Hay tank - A tank or enclosure filled with hay-like material used to filter oil out of water.

Headache - A warning cry given when anything is dropped from overhead.

Headache Post - A frame built over a truck cab to prevent pipe from falling on the cab.

Heat - To loosen a collar or other threaded connection by striking it with a hammer.

Heaving - The partial or complete collapse of the walls of a hole resulting from internal pressures due primarily to swelling from hydration or formation gas pressures. See Sloughing.

Heterogeneous - A substance that consists of more than one phase and is not uniform, such as colloids, emulsion, etc. If has different properties in different parts.

High-pH Mud - A drilling fluid with a pH range above 10.5. A high-alkalinity mud.



**High yield Drilling Clay** - A classification given to a group of commercial drilling-clay preparations having a yield of 35 to 50 bbl/ton and intermediate between bentonite and low-yield clays. High-yielding drilling clays are usually prepared by peptizing low-yield calcium montmorillonite clays or, in a few cases, by blending some bentonite with the peptized low-yield clay.

**Hold-Down** - A clamp used on rod line posts to keep the rod from moving in any direction but back and forth.

**Homogeneous** - Of uniform or similar nature throughout; or a substance or fluid that has at all points the same property or composition.

**Hopper, Jet** - See Mud-Mixing Devices. A device to hold or feed drilling-mud additives.

**Hot Oil** - Oil produced in violation of state regulations or transported interstate in violation of federal regulations.

**Humic Acid** - Organic acids of indefinite composition in naturally occurring Leonardite lignite. The humic acids are the most valuable constituent. See Lignin.

**Hydrafrac** - A copyrighted name of an operation whereby producing formations are fractured by hydraulic pressure to increase productiveness.

**Hydrate** - A substance containing water combined in the molecular form (such as  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ). A crystalline substance containing water of crystallization.

**Hydration** - The act of a substance to take up water by means of absorption and/or adsorption.

**Hydraulic Gradient** - The quotient of the change in pressure head between any two points along a line of flow and the actual length of stream between the points.

**Hydrocarbon** - A compound consisting only of molecules of hydrogen and carbon.

**Hydrogen Ion Concentration** - A measure of the acidity or alkalinity of a solution, normally expressed as pH. See pH.

**Hydrolysis** - Hydrolysis is the reaction of a salt with water to form an acid and base. For example, soda ash ( $\text{Na}_2\text{CO}_3$ ) hydrolyzes basically, and hydrolysis is responsible for the increase in the pH of water when soda ash is added.

**Hydrometer** - A floating instrument for determining the specific gravity or density of liquids, solutions, and slurries. A common example is the Mudwater hydrometer used to determine the density of mud.

**Hydrophile** - A substance usually in the colloidal state or an emulsion, which is wetted by water, i.e., it attracts water or water adheres to it.

**Hydrophilic** - A property of a substance having an affinity for water or one that is wetted by water.

**Hydrophilic-Lipophilic Balance (HLB)** - The hydrophilic-lipophilic balance (HLB) is one of the most important properties of emulsifiers. It is an expression of the relative attraction of an emulsifier for water and oil, determined largely by the chemical composition and ionization characteristics of a given emulsifier. The HLB of an emulsifier is not directly related to solubility, but it determines the type of an emulsion that tends to be formed. It is an indication of the behavior characteristics and not an indication of emulsifier efficiency.

**Hydrophobe** - A substance, usually in the colloidal state, not wetted by water.

**Hydrophobic** - Descriptive of a substance which repels water.

**Hydrostatic Head** - The pressure exerted by a column of fluid, usually expressed in pounds per square inch. To determine the hydrostatic head at a given depth in psi, multiply the depth in feet by the density in pounds per gallon by 0.052.

**Hydroxide** - A designation that is given for basic compounds containing the OH radical. When these substances are dissolved in water, they increase the pH of the solution. See Base.

**Hygroscopic** - The property of a substance enabling it to absorb water from the air.

## **-I-**

**Initial Gel** - See Gel Strength, Initial.

**Initial Set** - Cement shall be considered to have acquired its initial set when it will bear, without appreciable indentation, the initial Gilmore needle. This is not an API test. See ASTM C 266: Time of Setting of Hydraulic Cement by Gilmore Needles.



**In Situ Combustion** - The setting a fire of some portion of the reservoir in order that the gases produced by combustion will drive oil ahead of it to the producing wells.

**Inspection Spool** - A short length of pipe inserted in a pipeline in such a manner that it is easily removed for inspection. It should be one of the same materials as the remainder of the pipeline.

**Insulating Flange** - A flange which incorporated plastic pieces to separate the metal parts.

**Interfacial tension** - The force required to break the surface between two immiscible liquids. the lower the interfacial tension between the two phases of an emulsion, the grater the ease of emulsification. When the values approach zero, emulsion formation is spontaneous. See Surface Tension.

**Interstitial Water** - Water contaminated in the interstices or voids of formations.

**Invert Oil-emulsion Mud** - An invert emulsion is a water-in-oil emulsion where fresh or salt water is the dispersed phase and diesel, crude, or some other oil is the continuous phase. Water increases the viscosity and oil reduces the viscosity.

**Iodine Number** - The number indication the amount of iodine absorbed by oils, fats and waxes, giving a measure of the unsaturated linkages present. Generally, the higher the iodine number, the more severe the action of the oil on rubber.

**Ion** - Acids, bases, and salts (electrolytes) when dissolved in certain solvents, especially water, are more or less dissociated into electrically charged ions or parts of the molecules, due to loss or gain of one or more electrons. Loss of electrons results in positive charges producing a cation. A gain of electrons results in the formation of an anion with negative charges. The valence of an ion is equal to the number of charges born by it.

**Jack Board** - A device use to support the end of a length of pipe while another length is being screwed on.

**Jack Lines** - The pull-rod lines running from a central power unit to a pumping jack.

**Jet-Perforating** - An operation similar to gun-perforating except that a shaped charge of high explosives is used to burn a hole through the casing instead of the gun which fires a projectile in

gun-perforating. This use of explosive originated during World War II as a defensive measure against tanks.

**Jetting** - The process of periodically removing a portion of, or all of, the water, mud and/or solids, form the pits, usually by means of pumping through a jet nozzle arrangement.

**Joint** - A length of pipe - usually from 20 to 30 ft. Long.

**Jones Effect** - The net surface tension of salt solutions first decrease with an increase of concentration, passes through a minimum, and then increases as the concentration is raised.

## **-K-**

**Kelly or Kelly Joint** - A heavy Square pipe or other configuration that works through a hole in the rotary table and rotates the drill stem.

**Key Seat** - That section of a hole, usually of abnormal deviation and relatively soft formation, which has been eroded or worn by drill pipe to a size smaller than the tool joints or collars. This keyhole type configuration will not allow these members to pass when pulling out of the hole.

**Kill a Well** - To overcome pressure in a well by use of mud or water so that surface connections may be removed.

**Kill Line** - A line connected to the annulus below the blowout preventers for the purpose of pumping into the annulus while the preventers are closed.

**Killing a Well** - Bringing a well under control that is blowing out. Also the procedure of circulating water and mud into a completed well before staring well-service operations.

**Kinematic Viscosity** - The kinematic viscosity of a fluid is the ratio of the viscosity (e.g., cp in g/cc) to the density (e.g., g/cc) using consistent units. In several common commercial viscometer the kinematic viscosity is measured in terms of the time of efflux (in seconds) of a fixed volume of liquid through standard capillary tube or orifice. See Marsh Funnel Viscosity.



Knock-off Block or Post - The post and hook that are used to hand off a well operated through rod line.

Knockout - A kind of tank or filter used to separate oil and water.

Knuckle Buster - A wrench that is liable to slip.

### **-L-**

LACT - "Lease Automatic Custody Transfer", possible where measuring equipment installed at point of transfer from lease to pipeline is so completely automated as not to require any manual activity or witnesses.

Laminar Flow - Fluid elements flowing along fixed streamline which are parallel to the walls of the channel of flow. In laminar flow, the fluid moves in plates or sections with a differential velocity across the front which varies from zero at the wall to a maximum toward the center of flow. Laminar flow is the first stage of flow in a Newtonian fluid; it is the second stage in a Bingham plastic fluid. This type of motion is also called parallel, streamline, or viscous flow. See Plug and Turbulent Flow.

Latex - Colloidal suspension or emulsion of organic materials. Certain latexes are sometimes used as cement additives.

Lazy Board - See Jack Board.

Lease Power - A central Unit which provides the power to pump more than one well.

Leonardite - A naturally occurring oxidized lignite. See Lignins.

Lignins, Mined or Humic Acids - Mined lignins are naturally occurring special lignite, e.g., leonardite, that are produced by strip mining from special lignite deposits. The active ingredients are the humic acids.

Mined lignins are used primarily as thinners, which may or not be chemically modified. However, they are also widely used as emulsifiers.

Lignosulfonates - Organic drilling-fluid additives derived from by-products of sulfite paper manufacturing process from coniferous woods. Some of the common salts, such as the ferrochrome, chrome, calcium and sodium, are used as universal dispersant while others are used selectively for calcium-treated systems. In large quantities, the ferrochrome and chrome salts are used for fluid-loss control and shale inhibition.

Lime - Commercial form of calcium hydroxide.

Lime-Treated Mud's - Commonly referred to as "lime-base" mud's. These high-pH systems contain most of the conventional fresh-water additives to which slaked lime has been added to impart special properties. The alkalinities and lime contents vary from low to high.

Limestone - See Calcium Carbonate.

Liner - Any string of casing whose top is situated at any point below the surface.

Lipophile - A substance usually colloidal and easily wetted by oil.

Lipophilic - Having an affinity for oil.

Live Oil - Crude oil that contains gas and has not been stabilized or weathered. This oil can cause gas cutting when added to mud and is a potential fire hazard.

Load Binder - Chain or rope used to tie down loads of equipment, or the "boomer" used to tighten the chains.

Location - The place at which a well is to be or has been.

Log - A running account listing a series of events in chronological order. The driller's log is a tour-to-tour account of progress made in drilling. Electric well log is the record of geological formations which is made by a well logging device. This device operates on the principle of differential resistance of various formations to the transmission of electric current.

Logging - See Mud Logging and Electric Logging.

Lost Circulation - The result of drilling fluid escaping into the formation by way of crevices or porous media.

Loss of Circulation - See Circulation, Loss of.

Loss of Head or Friction Loss - See Pressure-drop Loss.

Loss-Circulation Additives - Materials added to the mud to control or prevent lost circulation. These materials are added in varying amount and are classified as fiber, flake, or granular.

Lost Circulation Material - A material added to cement slurries or drilling fluid which is designed to prevent the loss of cement or mud to the formation. See Bridging Materials.

Lost Returns - See Lost Circulation.



**Low-solids Mud's** - A designation given to any type of mud where high performing additives, e.g., CMC, have been partially or wholly substituted for commercial or natural clays. For comparable viscosity and densities (weighted with barite), a low-solids mud will have a lower volume-percent solids content.

**Low-yield Clays** - Commercial clays chiefly of the calcium montmorillonite type having a yield of approximately 15 to 30 bbl/ton.

**Lyophilic** - Having an affinity for the suspending medium, such as bentonite in water.

**Lyophilic Colloid** - A colloid that is not easily precipitated from a solution and is readily dispersible after precipitation by an addition of the solvent.

**Lyophobic Colloid** - A colloid that is readily precipitated from a solution and cannot be redispersed by an addition of the solution.

### **-M-**

**Make a Hand** - To become a good worker.

**Make It Up Another Wrinkle** - To make up a connection one more turn.

**Male Connection** - A connection with the threads on the outside.

**Manhole** - A hole in the side of a tank through which a man can enter the tank, also the clean-out plate.

**Marginal Well** - An oil or gas well the production of which is so limited in relation to production costs that profit approaches the vanishing point.

**March Funnel** - An instrument used in determining the Marsh funnel viscosity. The Marsh funnel is a container with a fixed viscosity. The Marsh funnel is a container with a fixed orifice at the bottom so that when filled with 1,500 cc fresh water, 1 qt (946 ml) will flow out in 26 -+ 0.5 sec. See API RP 13B for specifications.

**Marsh Funnel Viscosity** - Commonly called the funnel viscosity. The Marsh funnel viscosity is reported as the number of seconds required for a given fluid to flow 1 qt through the Marsh funnel. In some areas, the efflux quantity is 1,000 cc. See API RP 13 B for instruction. See also Kinematic Viscosity.

**Master Gate** - A large valve used to shut in a well.

**Material Balance** - In reservoir engineering, a volumetric balance which states that since the volume of a reservoir is constant, the algebraic sum of the volume changes of the oil, free gas, and water volumes must be zero.

**Mechanical Rig** - A drilling rig whose source of power is one or more internal-combustion engines.

**Meniscus** - The curved upper surface of a liquid column, concave when the containing walls are wetted by the liquid and convex when not.

**Mesh** - A measure of fineness of a woven material, screen, or sieve; e.g., a 200-mesh sieve has 200 openings per linear inch. A 200-mesh screen with a wire diameter of 0.0021 in. (0.0533 mm) has an opening of 0.0743 mm, or will pass a particle of 74 microns. See Micron.

**Mf** - The methyl orange alkalinity of the filtrate, reported as the number of milliliters of 0.02 Normal (N/50) acid required per milliliter of filtrate to reach the methyl orange end point (pH 4.3).

**Mica** - A naturally occurring flake material of varying size used in combating lost circulation. Chemically, an alkali aluminum silicate.

**Micelles** - Organic and inorganic molecular aggregate occurring in colloidal solutions. Long chains of individual structural units chemically joined to one another and laid side by side to form bundles. When bentonite hydrates, certain sodium or other metallic ions go into the solution, the clay particle plus its atmosphere of ions go into the solution, the clay particle plus its atmosphere of ions is technically known as a micelle.

**Micron  $\mu$  =  $\mu$**  - A unit of length equal to one millionth part of a meter, or one thousandth part of a millimeter.

**Milk Emulsion** - See Oil-emulsion Water.

**Mille Darcy** - 1/1000 Darcy. See Darcy.

**Minimum Water** - The minimum water content of a cement slurry determined by the procedure given in Section 3 of API RP IOB.

**Miscible Flood** - An oil-recovery process which involves the injection of a solvent followed by a displacing fluid.

**Mist Drilling** - A method of rotary drilling whereby water and/or oil is dispersed in air and/or gas as the drilling fluid.



MI or Milliliter - A metric system unit for the measure of volume. Literally 1/1000<sup>th</sup> of a liter. In drilling-mud analysis work, this term is used interchangeably with cubic centimeter (cc). One quart is about equal to 949 ml.

Molecular Weight - The sum of the atomic weights of all the constituent atoms in the molecule of an element or compound.

Molecule - When atoms combine they form a molecule. In the case of an element or a compound, a molecule is the smallest unit which chemically still retains the properties of the substance in mass.

Montmorillonite - A clay mineral commonly used as an additive to drilling mud's. Sodium montmorillonite is the main constituent in bentonite. The structure of montmorillonite is characterized by a form which consists of a thin platy-type sheet with the width and breadth indefinite, and thickness that of the molecule. The unit thickness of the molecule consists of three layers. Attached to the surface are ions that are replaceable. Calcium montmorillonite is the main constituent in low-yield clays.

Mud - A water or oil-base drilling fluid whose properties have been altered by solid, commercial and/or native, dissolved and/or suspended. Used for circulating out cutting and many other functions while drilling a well. Mud is the term most commonly given to drilling fluids (which see).

Mud Additive - Any material added to a drilling fluid to achieve a particular purpose.

Mudding Off - Commonly thought of as reduced productivity caused by the penetrating, sealing, or plastering effect of a drilling fluid.

Mudding Up - Process of mixing mud additives to achieve some desired purpose not possible with the former fluid, which usually has been water, air or gas.

Mud House - A structure at the rig to store and shelter sacked materials used in drilling fluids.

Mud Logging - A method of determining the presence or absence of oil or gas in the various formations penetrated by the drill bit. The drilling fluid and the cutting are continuously tested on their return to the surface, and the results of these tests are correlated with the depth or origin.

Mud-mining Devices - The most common device for adding solids to the mud is by means of the jet hopper. Some other

devices for mixing are: educators, paddle mixers, electric stirrers, mud R6~a6,

Mud Pit - Earthen or steel storage facilities for the surface mud system. Mud pits which vary in volume and number are two types: circulating and reserve. Mud testing and conditioning is normally done in the circulating pit system.

Mud Program - A proposed or followed plan or procedure for the types) and properties of drilling fluids) used in drilling a well with respect to depth. Some factors that influence the mud program are the casing program and such formation characteristics as type, competence, solubility, temperature, pressure, etc.

Mud Pumps - Pumps at the rig used to circulate drilling fluids.

Mud Scales - See Balance, Mud.

Mud Still - An instrument used to distill oil, water and other volatile material in a mud to determine oil, water, and total solids contents in volume-percent.

Mule Head - A horse head, the curved device on the oil-well end of a walking beam.

Multiple Completion - A well completion which provides for simultaneous production from separate zones.

Natural Clays - Natural clay, as opposed to commercial clay, are clays that are encountered when drilling various formations. The yield of these clays varies greatly, and they may or may not be purposely incorporated into the mud system.

Neat Cement - A slurry composed of Portland cement and water.

Neutralization - A reaction in which the hydrogen ion of an acid and hydroxyl ion of a base unite to form water, the other ionic product being a salt.

Newtonian Flow - See Newtonian Fluid.

Newtonian Fluid - The basic and simplest fluids from the standpoint of viscosity consideration in which the shear force is directly proportional to the shear rate. These fluids will immediately begin to move when a pressure or force in excess of zero is applied. Examples of Newtonian fluids are water, diesel oil, and glycerin. The yield point a determined by direct indicating viscometer is zero.



Non-conductive Mud - A drilling fluid, usually oil based or invert-emulsion mud's, whose continuous phase does not conduct electricity, e.g., oil. The spontaneous potential (SP) and normal resistivity can not be logged, although such other logs as the induction acoustic velocity, etc., can run.

Normal Solution - A solution of such a concentration that it contains 1 gram-equivalent of a substance per liter of solution.

### **-O-**

Off Production - Said of a well when it is shut in or temporarily not able to produce.

Offset Well - well drilled near another one.

Oil Base Mud - the term "oil-base mud" is applied to a special type drilling fluid where oil is the continuous phase and water the dispersed phase.. Oil-base mud contains blown asphalt and usually 1 to 5 percent water emulsified into the system with caustic soda or quick lime and an organic acid. Silicate, salt, and phosphate may also be present. Oil-base mud's are differentiated from invert-emulsion mud's (both water-in-oil emulsions) by the amounts of water used, method of controlling viscosity and thixotropic properties, well building materials, and fluid loss.

Oil Content - The oil content of any drilling fluid is the amount of oil in volume-percent.

Oil and Water Separation Facility - The gun barrel, settling tank, water knockout, or emulsion treater, installed by the lease owner for the purpose of separating produced oil and water.

Oil-Country tubular Goods - Oil-well casing, tubing, or drill pipe.

Oil-emulsion Water (Milk Emulsion) - A drilling fluid in which the oil content is usually kept between 3 to 7 percent and seldom over 10 percent (it can be considerably higher). The oil is emulsified into fresh or salt water with a chemical emulsifier. Sometimes CMC, starch, or gum may be added to the fresh-and salt-water systems.

Oil Fields - An area where oil is found. A loosely defined term referring to an area in which one or more separate pools or reservoirs may be found.

Oil String - A string of casing used to keep the oil well open through the rock formation, down to or through the producing formation.

Oil-in-water Emulsion Mud - Commonly called "emulsion mud". Any conventional or special water base mud to which oil has been added. The oil becomes the dispersed phase and may be emulsified into the mud either mechanically or chemically.

Old Hand - A man who has been around the oil field for a long time.

On the Line - Said of a tank when it is being emptied into a pipe line.

On tile Pump - Said of a well that is being pumped.

Open Hole - The uncased part of the well.

Open Water-treating System- A system of treating water in which the water comes in contact with air.

Operator - The person, whether proprietor or lessee, actually operating a mine or oil well or lease.

Operating Pressure - The pressure at which a line or system is operating at any give time.

Optimum Water - The amount of water used in a cement slurry which gives the slurry the best properties for its particular application.

Overproduced - Said of a well that has produced more than its allowable.

### **-P-**

Packer Fluid - Any fluid placed in the annulus between the tubing and casing above a packer. Along with other functions, the hydrostatic pressure of the packer fluid is utilized to reduce the pressure differentials between the formation and the inside of the casing and across the packer itself.

Particle - A minute unit of matter, usually a single crystal or of regular shape with a specific gravity approximating that of a single crystal.

Parts per Million - See Ppm.



Parallel Flow - See Laminar Flow. Pay Zone or Pay Formation - The formation drilled into that contains oil and/or gas in commercial quantities.

Penetration, Rate of - The rate in feet per hour at which the drill proceeds to deepen the well bore.

Peptization - An increased dispersion due to the addition of electrolytes or other chemical substances. See Deflocculation and Dispersion.

Peptized Clay - A clay to which an agent has been added to increase its initial yield. For example, soda ash is frequently added to calcium montmorillonite clay.

Percent - For weight-percent, see Ppm. Volume percent is the number of volumetric parts of any liquid or solid constituent per 100 like volumetric parts of the whole. Volume-percent is the most common method of reporting solids, oil, and water contents of drilling fluids.

Percent Additive - The parts of additive per 100 parts of cement with by volume or by weight. Per cent usually refers to percent by weight. If per cent by volume is meant, it should be so stated.

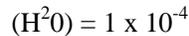
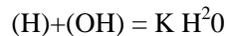
Percent Water - The water content of a cement slurry expressed as parts of water per 100 parts of dry cement by weight. If per cement by volume is meant, it should be so stated.

Permeability - The property of a solid medium which allow a fluid to flow through its interconnected pore network. A procedure for determining the permeability of hardened cement is give in API RP IOB. Unit of measurement is the Darcy or mille Darcy (0.001 Darcy).

Persuader - A big tool for a small job, used to overcome some trouble.

P,-The phenolphthalein alkalinity of the filtrate, reported as the number of milliliters of 0.02 Normal (N/50) acid required per milliliter of filtrate to reach the phenolphthalein end point.

pH - An abbreviation for potential hydrogen ion. the pH numbers range form 0 to 14, 7 being neutral, and are indices of the acidity (below 7) or alkalinity (above 7) of the fluid. The numbers are a function of the hydrogen ion concentration in gram ionic weights per liter which, in turn is a function of the dissociation of water as given by the following expression:



The pH may be expressed as the logarithm (base 10) of the reciprocal (or the negative logarithm) of the hydrogen ion concentration. The pH of a solution offers valuable information as to the immediate acidity or alkalinity (which may be titrated).

Phosphate - Certain complex phosphates, usually sodium tetraphosphate ( $Na_6P_4O_{13}$ ) and sodium acid pyrophosphate (SAPP,  $Na_2B_2P_2O_7$ ), are used either as mud thinners or for treatment of various forms of calcium and magnesium contamination.

Pig - A scraping tool forced through a flow line or pipe line to clean out wax or other deposits. See Rabbit.

Pig Iron - Slang for any piece of oil field equipment made of iron or steel.

Pilot Testing - A method of predicting behavior of mud system by mixing small quantities of mud and mud additive, then testing the results.

Pipe Coefficients - A factor used in the Hazen-Williams flow formula to correct for roughness of the inside surface if the pipe.

Pipe-Line Oil - Oil that is in good enough shape to be run into a pipe line.

Pipeline Pig - A scraping tool forced through a flow line or pipeline to clean the line or pipeline to clean the line or test for obstruction.

Plastic Flow - See Plastic Fluid.

Plastic Fluid - A complex, non-Newtonian fluid in which the shear force is not proportional to the shear rate. A definite pressure is required to start and maintain movement of the fluid. Plug flow is the initial type of flow and only occurs in plastic fluids. Most drilling mud's are plastic fluids. The yield point as determined by direct-indicating viscometer is in excess of zero.

Plasticity - The property possessed by some solids, particularly clays and clay slurries, of changing shape or flowing under applied stress without developing shear planes or fractures.



Such bodies have yield points, and stress must be applied before movement begins. Beyond the yield point, the rate of movement is proportional to the stress applied, but ceases when the stress is removed. See Fluid.

**Plastic Viscosity** - The plastic viscosity is a measure of the internal resistance to fluid flow attributable to the amount, type, size of solids present in a given fluid. It is expressed as the number of dynes per sq cm of tangential shearing force in excess of the Bingham yield value that will induce a unit rate of shear. This value, expressed in centipoises, is proportional to the slope of the consistency curve determined in the region of laminar flow for materials obeying Bingham's law of Plastic Flow. When using the direct-indicating viscometer, the plastic viscosity is found by subtracting the 300 rpm reading from the 600-rpm reading.

**Plug Back** - To seal off the bottom section of a well bore to prevent the inflow of fluid from that portion of the hole. This permits the inflow of oil and gas from the formations above the section so sealed off, without contamination of fluids below that depth.

**Plug Flow** - The movement of a material as a unit without shearing within the mass. Plug flow is the first type of flow exhibited by a plastic fluid after overcoming the initial force required to produce flow.

**Plugging Material** - A material used to block off zones while treating or working on other portions of the well. This blocking off may be temporary or permanent.

**Plunger Lift** - A method of lifting oil using swab or free piston propelled by compressed gas from the lower end of the tubing string to the surface.

**Pm** - The phenolphthalein alkalinity of the mud reported as the number of milliliters of 0.02 Normal (N/50) acid required per milliliter of mud.

$$\frac{\text{ppm} = \text{mg/l}}{\text{soln den, g/ml}} \times \frac{\% \text{ by wt.} = \text{mg/l}}{(10,000) (\text{soln den, g/ml})} = \text{PPM}$$


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10,000

Thus, 316,000 mg/l salt is commonly called 316,000 ppm or 31.6 percent, which correctly should be 264,000 ppm and 26.4 percent, respectively.

**Pressure-Drop Loss** - The pressure lost in a pipeline or annulus due to the velocity of the liquid in the pipeline, the properties of the fluid, the condition of the pipe wall, and the alignment of the pipe. In certain mud-mixing systems, the loss of head can be substantial.

**Pressure Regulator** - A valve which controls pressure in a line, downstream from the valve.

**Pressure Surge** - A sudden usually short-duration increase in pressure. When pipe or casing is run into a hole too rapidly, an increase in the hydrostatic pressure results, which may be great enough to create lost circulation.

**Primary Cementing** - Primary casing cementing is the original cementing operation performed immediately after casing has been run into the hole. See Casing Cementing.

**Prime Mover** - As applied to oil well drilling, this is the steam engine, diesel drive, electric motor or internal combustion engine which is the source of power for the drilling rig.

**Productivity Test** - A test of a well's capacity to produce, usually conducted at different pumping rates or rates of flow. See Potential Test.

**Proration** - A system enforced by the state or by agreement between operators which limits the amount of oil which can be produced from a particular well of field within a given period.

**Precipitate** - Material that separated out a solution or slurry as a solid. Precipitation of solids in a drilling fluid may follow flocculation or coagulation, such as the dispersed red-bed clays upon addition of a flocculation agent to the fluid.

**Preservative** - Usually Para formaldehyde. Any material used to prevent starch or another substance from fermenting through bacterial action.

**Pressure** - Force per unit area.

**Bottom Hole Circulating Pressure** - The pressure at the bottom of a well during circulating of any fluid. It is equal to the hydrostatic head plus the annular friction loss required to pump the fluid to the surface plus any back pressure held at the surface.



**Bottom Hole Static Pressure** - The pressure at the bottom of a well after the well is shut-in long enough to reflect ambient formation pressure.

**Circulating Pressure** - The pressure at a specified depth required to circulate a fluid in a well at a give rate.

**Final Squeeze Pressure** - The pressure a the completion of a squeeze cementing operation. Final squeeze pressure usually refers to the surface pressure.

**Surface Pressure** - The pressure measured at the wellhead.

**Protection Casing** - A string of casing set to protect a section of the hole and to permit drilling to continue to a greater depth. Sometimes called "protection string" and "intermediate string".

**Pseudoplastic Fluid** - A complex non-Newtonian fluid that does not possess thixotropy. A pressure or force in excess of zero will start fluid flow. The apparent viscosity or consistency decreases instantaneously with increasing rate of shear until at a given point as determined by direct-indicating viscometer is positive, the same as in Bingham plastic fluids; however, the true yield point is zero.

An example of a pseudoplastic fluid is guar gum in fresh or salt water.

**Paddling** - In cement evaluation work, the term applies to agitation of cement slurry in molds with a rod, to remove any trapped air bubbles. In field practice, the term has been used to denote the reciprocation or rotation of the casing during or after a cementing operation.

**Pump Off** - To pump so rapidly that the oil level drops below the standing valve on the pump.

**Pump-ability** - A measure of the properties of a fluid or cement slurry to be pumped.

**Pumping Time** - Synonymous with cementing time except in those instances where a volume of cement slurry is premixed prior to displacement in a well. In this instance, the pumping time will be total cementing time minus mixing time.

**Pulling Casing** - Removing casing from a well.

**Put a Well On** - To start a well flowing or pumping.

**Put on Pump** - To install a pump jack or pumping unit, sucker rods, and bottom-hole pump.

### **-Q-**

**Quebracho** - A drilling-fluid additive used extensively for thinning or dispersing to control viscosity and thixotropy. It is a crystalline extract of the quebracho tree consisting of tannic acid.

**Quicklime** - Calcium oxide, CaO. Used in certain oil base mulls to neutralize the organic acid.

**Quiescence** - The state of being quiet or at rest (being still). Static.

### **-R-**

**Rabbit** - A small plug that is run through a flow line by pressure to clean the line or test for obstructions. See Pig.

**Racking Pipe** - The act of placing stands of pipe in orderly arrangement in the derrick while hoisting pipe from the well bore.

**Radical** - Two or more atoms behaving as a single chemical unit, ie., as an atom; e. g, sulfate, phosphate, nitrate.

**Rate of Shear** - The rate at which an action, resulting from applied forces, causes or tends to cause two adjacent parts of a body to slide relatively to each other in a direction parallel to their plane of contact. Commonly five rpm.

**Reaming** - During drilling operating the sides of the bit become worn with a resulting tendency to drill a well bore smaller than was originally intended. Reaming is the operation employed to enlarge the hole to the size originally planned.

**Red Mud** - A clay, water-based drilling fluid containing sufficient amounts of caustic soda and tannate to give a pronounced red appearance. Normally a high-pH mud.

**Red-Lime Mud** - A red mud which has been converted to a lime-Treated mud. The pH is usually 12.0 to 13.0.

**Relief Valve** - A valve that will open automatically when pressure gets too high.



Reservoir - Each separate, unconnected body of producing formation.

Resin - Semisolid or solid complex, amorphous mixture of organic compounds having no definite melting point nor tendency to crystallize. Resins may be a component of compound materials that can be added to drilling fluids to impart special properties to the system, wall cake, etc.

Resistivity - The electrical resistance offered to the passage of a current, expressed in ohm-meters; the reciprocal of conductivity. Fresh-water mud's are usually characterized by high resistivity, salt-water mud's by a low resistivity.

Resistivity Meter - An instrument for measuring the resistivity of drilling fluids and their cakes.

Retarder - A chemical which is added to cements to increase their thickening time.

Reverse Circulate - The method by which the normal flow of a drilling fluid is reversed by circulating down the annulus and up and out the drill string.

Reynolds Number - A dimensionless number.  $Re$ , that occurs in the theory of fluid dynamics. The diameter, velocity, density and viscosity (consistent units) for a fluid flowing through a cylindrical conductor are related as follows: -

$$Re = (\text{diameter}) (\text{velocity}) (\text{density}) / (\text{viscosity}) \text{ or } = DV \rho / \mu$$

The number is important in fluid hydraulics calculations for determining the type of fluid flow, i.e., whether laminar or turbulent. The transitional range occurs approximately from 2,000 to 3,000; below 2,000 the flow is laminar, above 3,000 the flow is turbulent.

Rheology - The science that deals with deformation and flow of matter.

Rig, Jackknife or Folding Mast - The type mast that can be folded for moving, as contrasted with the standard derrick, which has to be completely dismantled and re-erected.

Rigging up - Before the work of drilling can be started, but after the derrick has been built, tools and machinery must be installed and a supply of fuel and water must be established. This operation, which in substance is that of

getting the rig ready, is conveniently described by the driller's term "rigging up."

Riser - A pipe through which liquid travels upward.

Rock a Well - To bleed pressure from casing of a dead well, then from tubing, then from casing, and so on so that the well will start to flow.

Rock Pressure - A term used for the initial pressure of gas in a well.

Rotary Drilling - The hydraulic process of drilling consists of rotating a column of drill pipe, to the bottom of which is attached a rotary drilling bit, and during the operation, circulating through the pipe a current of mud-laden fluid, under pressure, by means of special slush pumps.

Roughneck - A driller's helper and general all-around worker on a drilling rig.

Roustabout - A laborer who assists the fore man in the general work about producing oil well and around the property of the oil company. The roustabout is a semiskilled laborer in that he requires considerable training to fit him for his work.

## -S-

Sack - Sack is a weight measure. Cement, bentonite, and barite are marketed in sacks containing amounts as follows:

Cement 94 pounds  
Bentonite 100 pounds  
Barite 100 pounds

Saddle Bearing - A bearing between the walking beam and the Sampson post of a pump jack or pumping unit.

Safety Joint - A special joint used in drilling which can be unscrewed should the tool become stuck in the hole.

Salt - In mud terminology, the term salt is applied to sodium chloride, NaCl. Chemically, the term salt is also applied to any one of a class of similar compounds formed when the acid hydrogen of an acid is partly or wholly replaced by a metal or a metallic radical. Salts are formed by the action of acids on metals, or oxides and hydroxides, directly with ammonia, and in other ways.



Salt Water Clay - See Attapulgite Clay.

Salt Water Mud's - A drilling fluid containing dissolved salt (brackish to saturated). These fluids may also include native solids, oil, an/or such commercial additives as clays, starch, etc.

Samples - Cutting obtained for geological information from the drilling fluid as it emerges from the hole. They are washed, dried, and labeled as to the depth.

Sand - A loose granular material resulting from the disintegration of rocks, most often silica.

Sand Content - The sand content of a drilling fluid is the insoluble abrasive solids content rejected by a 200-mesh screen. It is usually expressed as the percentage bulk volume of sand in a drilling fluid.

This test is an elementary in that the retained solids are not necessarily silica nor may not be altogether abrasive. For additional information concerning the kinds of solids retained on the 200-mesh screen, more specific test would be required. See Mesh.

Sanded Up - Clogged by sand entering the well bore with oil.

Saturated Solution - A solution is saturated if it contains at a given temperature as much of a solute as it can retain. At 68F it takes 126.5 lb salt to saturate 1 bbl of fresh water. See Supersaturated.

Schlumberger - Refers to electric well logging. It is derived from the name of a French scientist who first developed well logging. One of the leading companies in this field of operation bears this name. Around drilling rigs throughout the country it is pronounced "slumberjay."

Sealing Agents - Any of many materials added to drilling fluids to restore circulation.

Sea-water Mud's - A special class of salt-water mud's where sea water is used as the fluid phase.

Second API - A unit of viscosity as measure with a Marsh funnel according to API procedure. See API RP 13B and Marsh Funnel Viscosity.

Seismograph - A device for detecting vibrations in the earth. It is used in prospecting for probable oil-bearing structure. In this application the vibrations are created by discharging explosives in shallow bore holes. The nature and velocity of the vibrations are recorded by the seismograph indicate the general nature of the section of earth through which the vibration pass.

Sequestration - The formation of stable calcium, magnesium, iron complex by treating water or mud with certain complex phosphates.

Set Casing - To install steel pipe or casing in a well bore. An accompanying operation is the cementing of the casing in place by surrounding it with a wall of cement extending for all or part of the depth of the well.

Setting Time - A term defining the hardening time of construction cement. This term is not normally used with reference to oil-well cement.

Settled Production - A loose term used to describe oil field that produce at nearly the same rate from day to day.

Settling - Separation of particles because of different sizes and specific gravities.

Settling Velocity - The velocity at which particle of particular size, type, specific gravity, and concentration will settle in a fluid of a particular specific gravity and viscosity. It is usually measure in millimeters per second.

Scraper - A device used to clean deposits of paraffin from tubing or flow lines.

Scratcher - A device fastened to casing which removes the mud cakes form the hole to condition it for cementing. It is fashioned of stiff wire.

Scraper Trap - A trap for inserting or removing a scraper, or "pipeline pig," from a pipeline. The pig is forced through the line for cleaning or testing for obstructions.

Screen Analysis - Determination of the relative percentages of substances, e.g., the suspended solids of a drilling fluid, passing through or retained on a sequence of screens of decreasing mesh size. Analysis may be wet or dry method.

Referred to also as "sieve analysis". See Mesh.

Shackle Line - A pull-rod line.

Shake Out - To spin a sample of oil at high speed to determine its BS&W content.

Shale - Fine-grained clay rock with slate-like cleavage, sometimes containing an organic oil-yielding substance.

Shale Shaker - Any of several mechanical devices for removing cutting and other large solids form the mud. Common examples are vibrating screen, rotating cylindrical screen, etc.



Sharpshooter - A long narrow shovel used in ditch digging.

Shear (Shearing Stress) - An action, resulting from applied forces, which causes or tends to cause two contiguous parts of a body to slide relatively to each other in a direction parallel to their plane of contact.

Shearometer - A device used as an alternative method for measuring gel strengths. See API RP 13B for specifications and procedure.

Shear Strength - A measure of the shear value of the fluid. The minimum shearing stress that will produce permanent Deformation. See Gel Strength.

Sheave - A grooved pulley/

Shooting - Exploding nitroglycerine or other high explosives in a hole to shatter the rock and increase the flow of oil same as torpedoing. Also, in seismograph work this refers to the discharge of explosives to create vibrations in the earth's crust. See Seismograph.

Shot - A charge of high explosive, usually nitroglycerine, deposited in a well to shatter the sand and to expedite the recovery of oil.

Shutdown - A term denoting that work has been temporarily stopped, as on an oil well.

Shut In - To close valves on a well so that it stops producing; said of a well on which the valves are closed.

Shut-in Pressure - Pressure at the top of a well when it is shut in.

Side Irons - The housing and supports for the bearing of a walking beam.

Side Tracking - Drilling past a broken drill or casing which has become permanently lodged in the hole. This operation is usually accomplished by use of a special tool known as a whip-stock.

Side Wall Coring - The taking of geological samples of the formation which constitutes the wall of the well bore. Another term in general use for this operation is "side wall sampling."

Sieve Analysis - See Screen Analysis.

Silica Gel - A porous substance consisting of SiO<sub>2</sub>. Used on occasion as a dehydrating agent in air or gas drilling where small amount of water is encountered.

Silica Flour - Silica (SiO<sub>2</sub>) ground to a fineness equal to Portland cement. The fineness of Portland cement is specified in API std 10A.

Silt - Materials that exhibit little or no swelling whose particle size generally falls between 2 microns and API sand size, or 74 microns (200-mesh). A certain portion of dispersed clays and barite for the most part also fall into the same particle-size range.

Single - A join of drill pipe. See Double, Thribble, Fourble.

Skid - Moving a rig from one location to another, usually on tracks where little dismantling is required.

Skidding the Rig - Moving a rig from the location of a lost or completed hole preparatory to starting a new one. In skidding the rig, the move is accomplished with little or no dismantling or equipment.

Slack Off - To lower a load or ease up on a line.

Sling - A wire-rope loop for use in lifting heavy equipment.

Slips - Wedge-shaped toothed pieces of metal that fit inside a bowl and are used to support tubing or other pipe.

Slip Velocity - The difference between the annular velocity of the fluid and the rate at which a cutting is removed from the hole.

Sloughing - The partial or complete collapse of the walls of a hole resulting from incompetent, unconsolidated formation, high angle of repose, and wetting along internal bedding plane. See Heaving and Cave-in.

Slug the Pipe - Before hoisting drill pipe, it is desirable to pump into the top section of a quantity of very heavy mud which will cause the level of the fluids in the pipe to fall. When a stand of pipe is unscrewed the drilling fluid will have been evacuated from it. This prevents crew members and tools from becoming covered with the drilling fluid.

Slurry - Suspension of cement in water, oil, or mixture of both.

Slurry Volume - The sum of the absolute volumes of solids and liquids that constitute a slurry.



**Slurry Density** - The density of a cement slurry expressed in either pounds per gallon or pounds per cubic foot. Light-weight and heavy-weight slurries are prepared by adding suitable additives to modify slurry density.

**Slurry weight** - See Slurry Density.

**Slurry Yield** - (a) Volume of slurry when one sack of cement (94 pounds) is mixed with desired amount of water containing any other additive such as accelerators, fluid-loss control agents, etc. (b) slurry volume as previously defined divided by the total number of sacks of cement (94 pounds per sack).

**Snake Out** - To pull out.

**Snatch Block** - A block that can be opened up for putting a line over the rollers sheave.

**Soap** - The sodium or potassium salt of high-molecular-weight fatty acid. When containing some metal other than sodium or potassium, they are called "metallic" soaps. Soaps are commonly used in drilling fluids to improve lubrication, emulsification, sample size, defoaming, etc.

**Soda Ash** - See Sodium Carbonate.

**Sodium** - One of the alkali metal elements with a valence of 1 and an atomic weight of about 23. Numerous sodium compounds are used as additives to drilling fluids.

**Sodium Bicarbonate** -  $\text{NaHCO}_3$ . A material used extensively for treating cement contamination and occasionally other calcium contamination in drilling fluids. It is the half-neutralized sodium salt of carbonic acid.

**Sodium Dichromate** -  $\text{Na}_2\text{Cr}_2\text{O}_7$ . Also correctly called "sodium dichromate". See Chromate.

**Sodium Carbonate** -  $\text{Na}_2\text{CO}_3$ . A material used extensively for treating out various types of calcium contamination. It is commonly called "soda ash". When sodium carbonate is added to fluid, it increases the pH of the fluid by hydrolysis. Sodium carbonate can be added as salt (NaCl) water to increase the density of the fluid phase.

**Sodium Carboxymethylcellulose** - Commonly called CMC. A non-fermenting cellulose product used in drilling fluids to combat contamination from anhydrite (gyp), and lower the water loss from the drilling fluid to the formation. Water with more than 20,000 ppm of salt (sodium chloride), reduces its effectiveness as a treating agent.

**Sodium Chloride** -  $\text{NaCl}$ . Commonly known as salt.

Salt may be present in the mud as a contaminant or may be added for any of several reasons. See Salt.

**Sodium Chromate** -  $\text{Na}_2\text{CrO}_4$ . See Chromate.

**Sodium Hydroxide** -  $\text{NaOH}$ . Commonly referred to as "caustic" or "caustic soda". A chemical used primarily to impart a higher pH.

**Sodium Polyacrylate** - A synthetic high-molecular weight polymer of acrylonitrile used primarily as a fluid loss control agent.

**Sodium Silicate Mud's** - Special class of inhibited chemical mud's using as their bases sodium silicate, salt, water, and clay.

**Soft Rope** - A small loose fiber rope.

**Sol** - A general term for colloidal dispersions. As distinguished from true solutions.

**Solids Concentration or Content** - The total amount of solids in a drilling fluid as determined by distillation includes both the dissolved and the suspended or undissolved solids. The suspended or undissolved solids. The suspended-solids content may be a combination of high and low specific gravity solids and native or commercial solids. Example of dissolved solids are the soluble salts of sodium, calcium, and magnesium. Suspended solids make up the wall cake; dissolved solids remain in the filtrate. The total suspended and dissolved solids contents are commonly expressed as percent by volume, and less commonly as percent by weight.

**Solubility** - The degree to which a substance will dissolve in a particular solvent.

**Solute** - A substance which is dissolved in another (the solvent).

**Solution** - A mixture of two or more components that form a homogeneous single phase. Example solutions are solids dissolved in liquid, liquid in liquid, gas in liquid.

**Solvent** - Liquid used to dissolve a substance (the solute).

**Sour Gas** - Gas that smells bad because of impurities, usually hydrogen sulfide.

**Souring** - A term commonly used to mean (fermentation).

**Spacing** - Distance between wells producing from the same pool (usually expressed in terms of acres, e.g., 10-acre spacing).



Spaghetti - Very small tubing or pipe.

Specific Gravity - See Gravity, Specific.

Specific Heat - The number of calories required to raise 1 g of a substance 1 deg Centigrade. The specific heat of a drilling fluid give and indication of the fluid's ability to keep the bit cool for a given circulation rate.

Spinner Survey - An operation designed to indicate the point at which fluids are escaping form the well bore into cavernous or porous formation.

Spudding - refers to the action of hoisting the drill pipe and permitting it to fall freely so that the drill bit strikes the bottom for the well bore with considerable force. This is done to clean the bit of an accumulation of sticky shale which has slowed down the rate of penetration. Careless execution of this operation can result in kinks in the drill pipe an damaged bits.

Spudding In - The very beginning of drilling operations of a well. The term has been handed down form cable tool operations in the early days of the oil industry.

Spud Mud - The fluid used when drilling starts at the surface, often a thick bentonite-lime slurry.

Spurt Loss - See Surge Loss.

Squealer - A noise maker attached to the end of an exhaust pipe.

Squeeze - A procedure whereby slurries of cement, mud, gunk plug, etc. Are forced into the formation by pumping into the hole while maintaining a back pressure, usually by closing the rams.

Squeeze Cementing - The process of forcing cementing material under pressure into a specific portion of a well, such as fractures, openings, or permeable zones.

High Pressure Squeeze Cementing - The forcing of cement slurry into the points to be squeezed with a final pressure equal to or greater than the formation breakdown pressure.

Low Pressure Squeeze Cementing - The forcing of cement slurry into the points to be squeezed with a pressure not exceeding the formation breakdown pressure.

Soundness - A measure of the expansive properties of a cement as determined by the autoclave expansion test given in ASTM C 151: Test for Autoclave Expansion of Portland Cement.

Stab - To guide the end of a pipe into a coupling when making up a connection.

Stabbing Board - A temporary platform erected in the derrick at an elevation of about 20 to 40 feet above the derrick floor. The derrick man or other crew member work on this board while casing is being run in a well.

Derived from the term "to stab" meaning to guide a joint while it is being screwed into another joint or section.

Stability Meter - An instrument to measure the breakdown voltage of invert emulsions.

Stabilized - A well is considered "stabilized" when, in the case of a flowing well, the rate of production through a given size of choke remains constant, or, in the case of a pumping well, when the fluid column within the well remains constant in height.

Stacking a Rig - Storing a drilling rig upon completion of a job when the rig is to be withdrawn form operation for a period of time.

Stand it on the Boards - To bring the pipe out of the hole (make a trip) and rack it in the derrick.

Stand of Pipe - Two or three or sometimes four joints of pipe fastened together, called a double, thribble, or fourble, respectively.

Starch - A group of carbohydrates occurring in many plant cells. Starch is specially processed (pregelatinized) for use in mud's to reduce filtration rate and occasionally to increase the viscosity. Without proper protection, starch can ferment.

Static - Opposite of dynamic. See Quiescence.

Steady-State Phase Flow - An equation of flow in which time is assumed to have no significance.

Steam Rig - A drilling rig whose source of power is a battery of portable boilers.

Stearate - Salt of stearic acid, which is saturated, 18-carbon fatty acid. Certain compounds, such as aluminum stearate, calcium stearate, zinc stearate, have been used in drilling fluids for one or more of the following purposes: defoamer, lubrication, air drilling in which a small amount of water is encountered, etc.

Stratification - The natural layering or lamination usually characteristic of sediments and sedimentary rocks. Stratification is the result of the settling of particles of different sizes and specific gravities.



**Streaming Potential** - The electro kinetic portion of the SP (spontaneous potential) electric-log curve which can be significantly influenced by the characteristics of the filtrate and mud cake of the drilling fluid that was used to drill the well.

**Streamline Flow** - See Laminar Flow.

**Strength retrogression** - The decline of strength of the hardened cement slurry with age, which may occur at temperatures above 180.F.

**Stringing-up** - The act of threading the drilling line through the sheaves of the traveling block and the crown block. One end of the line is secured to the hoisting drum and the other anchored to the derrick substructure. See Fast Line, Dead Line.

**Strip a Well** - To pull rods and tubing from a well at the same time. Tubing must be "stripped" over the rods a joint at a time.

**Stripper** - A well which produces a very small amount of oil, usually, in an oil field.

**Structure** - An underground geological feature capable of forming a reservoir for oil and gas.

**Strung Up** - To have rigged up wire rope and heaves or blocks for hoisting.

**Stuck** - Refers to the drill pipe or casing inadvertently becoming fastened in the hole. May occur while drilling is in progress, while casing is being run in the hole or while the drill pipe is being hoisted. Frequently results in a fishing job.

**Substructure** - The foundation on which the derrick and engines sit. Contains space for storage and well control equipment.

**Suitcase Sand** - A formation which has been found to be non-productive of oil and gas. It is derived from the fact that operations are suspended and the crews pack their suitcase and move to another job.

**Sulfate Resistance** - The ability of a cement to resist deterioration in the presence of sulfate ions.

**Super saturation** - If a solution contains a higher concentration of a solute in a solvent than would normally correspond to its solubility at a given temperature, this constitutes super saturation. This is an unstable condition, as the excess solute separates when the solution is seeded by introducing a crystal of the solute. The term "super saturation" is frequently used erroneously for hot salt mud's.

**Surface-Active Materials** - See Surfactant.

**Surface Contours** - Line of equal elevation drawn on a surface map, resulting in a topographic map.

**Surface Pipe** - The first string of casing to be set in a well. The length will vary in different areas from a few hundred feet to three or four thousand feet. Some states require a minimum length to protect fresh-water sands. On some well it is necessary to set a temporary conductor pipe which should not be confused with surface pipe as described here.

**Surface Tension** - generally, the force acting within the interface between a liquid and its own vapor which tends to maintain the area of the surface at a minimum and is expressed in dynes per centimeter. Since the surface tension of a liquid is approximately equal to the interfacial tension between the liquid and air, it is common practice to refer to values measured against air as surface tension, and to use the term "interfacial tension" for measurements at an interface between two liquids, or a liquid and a solid.

**Surfactant** - A material which tends to concentrate at an interface. Used in drilling fluids to control the degree of emulsification, aggregation, dispersion, interfacial tension, foaming, defoaming, wetting, etc.

**Surfactant Mud** - A drilling fluid which contains a surfactant. Usually refers to a drilling fluid containing surfactant material to effect control over degree of aggregation and dispersion or emulsification.

**Surge Loss** - The flux of fluids and solids which occurs in the initial stages of any filtration before pore openings are bridged and filter cake is formed. Also called "spurt loss".

**Suspensoid** - A mixture consisting of finely divided colloidal particles floating in a liquid. The particles are so small that they do not settle but are kept in motion by the moving molecules of the liquid (Brownian movement).

**Swab** - A device that fits the inside of tubing closely that is pulled through the tubing to lift fluid from it, or to pull such a device through the tubing.

**Swabbing** - Operation of a lifting device to bring well fluid to the surface when the well does not flow naturally. This is a temporary operation to determine whether or not the well can be made to flow. In the event the well does not flow after being swabbed, it is necessary then to install a pump as a permanent lifting device to bring oil to the surface.



Swamper - A helper on a truck.

Sweet - Said of oil or gas when it contains no sour impurities.

Swelling - See Hydration.

Swivel - A holes coupling which form a connection between the slush pumps and the drill string and permits rotation of the drill string.

Synergism, Synergistic Properties - Term describing an effect obtain when two or more products are used simultaneously to obtain a certain result. Rather than the results of each product being additive to the other, the result is a multiple of the effects.

### **-T-**

Tail Chain - A short length of chain attached to the end of a winch line.

Tail Out Rods - To pull the bottom end of a sucker rod away from a well when laying rods down.

Take a Strain on - To begin to pull on load.

Tally - To measure and record length of pipe or tubing.

Tank Scrapper - The person who measures a tank to see how much it will hold at various level.

Tannic acid is the active ingredient of quebracho and other quebracho substitutes such as mangrove bark, chestnut extract, hemlock etc.

Tap - A notched tool used to cut inside threads.

Tearing Down - The act of dismantling a rig a the completion of a well and preparing it for moving to the next location.

Temperature - The degree of heat, usually expressed as degrees Fahrenheit.

Bottom Hole Circulating Temperature - The temperature of any fluid at the bottom of the well while it is being circulated.

Bottom Hole Static Temperature - The temperature attained at the bottom of a well after the well is shut-in. See Static Temperature.

Casing Cementing Temperature - The temperature of a cement slurry while it is being displace at the maximum cementing depth in a casing cementing operation.

Circulating Temperature - The temperature of any fluid at any specified depth in well while it is being circulated, as measured inside casing or drill pipe.

Squeeze Cementing Temperature - The temperature of a cement slurry while it is being displaced at he maximum cementing depth in a squeeze cementing operation.

Static Temperature - The temperature attained at a specified depth in a well after the well is shut-in long enough to reflect the ambient formation temperature.

Temperature Stability - The chemical characteristics of a material which determine its resistance to thermal decomposition.

Temperature Survey - An operation to determine temperature at various depths in the hole. This survey is used to fine the location of inflow of water into the hole, where doubt exists as to proper cementing of the casing and for other reasons.

Tender - The barge anchored alongside and offshore drilling platform. Usually contains living quarters, storage space, and the mud system.

Ten Minute gel - See Gel Strength, 10-min.

Tensile Strength - A measure of force per unit cross sectional area required to pull a specimen apart.

Thermal Decomposition - The chemical breakdown of a compound or substance by temperature into simple substance or into constituent elements. Starch thermally decomposes in drilling fluids as the temperature approaches 300 F.

Thickening Time - The time required for a cement slurry of a given composition top reach a consistency of 100 Bc. Determined by method outlined in API RP IOB.

Thinner - Any of various organic agents (tannins, lignins, lignosulfonates, etc) and inorganic agents (pyrophosphates, tetra phosphates, etc.) that are added to a drilling fluid to reduce the viscosity and/or thixotropic properties.



**Thixotropy** - The ability of fluid to develop gel strength with time. That property of a fluid which causes it to build up a rigid or semi rigid gel structure if allowed to stand at rest, yet can be returned to a fluid state by mechanical agitation. This change is reversible.

**Thribble** - A stand of drill pipe made up of three joints, each about 30 feet in length. This equivalent to a fourble of 4 joints about 22 feet in length. Setting back fourbles of 30-foot required a taller derrick than is normally used in rotary drilling. See Fourble; Double.

**Throwing the Chain** - The act of placing several wraps of spinning chain around a section of drill pipe in making a connection. The joint of drill pipe is turned by pulling one end of the spinning chain with power from the cathead.

**Tie Down** - A device to which a guy wire or brace may be attached.

**Tighten Up Emulsion or Mud** - Drilling-fluid jargon to describe condition in some systems to which oil has been added and the oil breaks out and rises to the surface. Any chemical or mechanical means which will emulsify the free oil is known as "tightening up".

**Tin Hat** - The metal hat worn by oil-field workers to protect them from falling objects.

**Titration** - A method, or the process of using a standard solution for the determination of the amount of some substance in another solution. The known solution is usually added in a definite quantity to the unknown until a reaction is complete.

**Tool Joint** - A drill-pipe coupler consisting of a pin and box of various designs and sizes. The internal design of tools joints has an important effect on mud hydrology.

**Tool Pusher** - A foreman in charge of one or more drilling rigs. Supervisor of drilling operations.

**Torque** - A measure of the force or effort applied to a shaft causing it to rotate. On a rotary rig this applies especially to the rotation of the drill stem in its action against the bore of the hole. Torque reduction can usually be accomplished by the addition of various drilling-fluid additives.

**Total Depth (or TD)** - The greatest depth reached by the drill bit.

**Total Hardness** - See Hardness of Water.

**Tour** - The word which designates the shift of a drilling crew or other oil field workers is pronounced usually as if it were spelled T-O-W-E-R. The word does not refer to the derrick or tower, as some seem to think, the day tour starts at 7 or 8 in the morning. The evening tour starts at 3 or 4 o'clock in the afternoon. The morning tours starts at 11 p. m. or midnight (sometimes referred to as graveyard tour). The almost universal practice in oil well drilling is to work 8-hour tours or shifts.

**Trip** - To pull or run a string of rods or tubing from or into a well.

**Tubing Job** - The pulling and running of tubing.

**Turbidity** - A measure of the resistance of water to the passage of light through it. It is caused by suspended and colloidal matter in the water.

**Turbulent Flow** - Fluid flow in which the velocity at a given point changes constantly in magnitude and the direction of flow; pursues erratic and continually varying courses. Turbulent flow is the second and final stage of flow in a Newtonian fluid; it is the third and final stage in a Bingham plastic fluid. See Critical velocity and Reynolds Number.

**Turning to the Right** - A slang term on a rotary rig referring to the drilling operation which the drill stem is rotated in a clockwise direction.

**Twist-Off** - The sever in two of a joint of drill pipe by excessive force applied by the rotary table.

#### -U-

**Ultraviolet Light** - Light waves shorter than the visible blue-violet waves of the spectrum. Crude oil, colored distillates, residuum, a few drilling-fluid additives, and certain minerals and chemicals fluoresce in the presence of ultraviolet light. These substances when present in mud, may cause the mud to fluoresce.

**Under-ream** - To enlarge a drill hole below the casing.

**Uniformity Coefficient** - A term used in specifying sand. Is the ratio of the sieve size that will pass 60 percent of the filter sand, to the effective size.

**Univalent** - Monovalent. See Valence.



## -V-

**Vacuum** - A void, an absence of matter of any kind. Complete vacuum has not yet been attained, but a partial vacuum is achieved in various items of mechanical equipment.

**Vacuum Gauge** - An instrument used on drilling engines to indicate their performance characteristics and the load being carried by each.

**Valence or valency** - The valence is a number representing the combining power of an atom, i.e., the number of electrons lost, gained, or shared by an atom in a compound. It is also a measure of the number of hydrogen atoms with which an atom will combine or replace, e.g., and oxygen atom combines with two hydrogen's, hence has a valence of 2. Thus, there are mon-, tri-, etc. valent ions.

**Valence Effect** - In general, the higher the valence of an ion, the greater the loss of stability to emulsion, colloidal suspensions, etc.

**Vapor-proof** - A term used to describe a product which is not susceptible to the action of gases or other vapors. its principal application on a drilling rig is to describe explosion-proof light fixtures which are safe in the presence of combustible gases.

**V-door (window)** -An opening in a side of a derrick at the floor level having the form of an inverted V. This opening is opposite the draw-works. It is used as an entry to bring in drill pipe and casing from the pipe rack.

**Velocity** -Time rate of motion in a given direction and sense. It is a measure of the fluid flow and may be expressed in terms of linear velocity, mass velocity, volumetric velocity, etc. Velocity is one of the factors which contribute to the carrying capacity of a drilling fluid.

**Velocity, Critical** - The velocity at the transitional point between laminar and turbulent types of fluid flow. This point occurs in the transitional range of Reynolds numbers of approximately 2,000 to 3,000.

**V-G Meter or Viscosity Gravity Viscometer** - The name commonly used for the direct-indicating viscometer (which see).

**Vibrating Screen** - See Shale Shaker.

**Viscometer (Viscosimeter)** - An apparatus to determine the viscosity of a fluid or suspension. Viscometer vary considerably in design and methods of testing.

**Viscometer, Direct Indicating** - Commonly called a " V-G meter." the instrument is a rotational-type device powered by means of an electric motor or hand crank, and is used to determine the apparent viscosity, plastic viscosity, yield point, and gel strength of drilling fluids. The usual speeds are 600 and 300 rpm.. See API RP 13B for operational procedures.

**Viscometer, Stormer** - A rotational shear viscometer used for measuring the viscosity and gel strength of drilling fluids. This instrument has been largely superseded by the direct-indicating viscometer.

**Viscosimeter** - See Viscometer.

**Viscosity** - The internal resistance offered by a fluid to flow. This phenomenon is attributable to the attractions between molecules of a liquid, and is a measure of the combined effects of adhesion and cohesion to the effects of suspended particles, and to the liquid environment. The greater this resistance, the greater the viscosity. See Apparent and Plastic Viscosity.

**Viscosity, Funnel** - See Funnel Viscosity.

**Viscous Flow** - See Laminar Flow.

**Volatile Mater** - Normally gaseous products, except moisture, given off by a substance, such as gas breaking out of live crude oil that has been added to mud. In distillation of drilling fluid, the volatile matter is the water, oil, gas, etc., that are vaporized, leaving behind the total solids which can consist of both dissolved and suspended solids.

**Vugs** - Natural cavities formed in certain formations due to leaching out of soluble minerals. These cavities are lined with a crystalline material and a composition different from that of the surrounding. The size of a vug may vary from a small pea to a large boulder.

## -W-

**W.O.C.** - See Waiting on Cement.

**Waiting on Cement** - After the casing has been cemented, it is necessary to suspend operations and allow time for the cement to set or harden in the well bore. The time during which operations are suspended is designated as waiting on cement.

**Wall Cake** - The solid material deposited along the wall of the hole resulting from filtration of the fluid part of the mud into the formation.



Wall Sticking - See Differential-pressure Sticking,

Warm Up - The same as heat - loosen a connection by hammering on it.

Water-Base Mud - Common conventional drilling fluid. Water is the suspending medium for solids and is the suspending medium for solids and is the continuous phase, whether or not oil is present.

Water Block - Reduction of the permeability of a formation caused by the invasion of water into the pores (capillaries). The decrease in permeability can be caused by swelling of clays, thereby shutting off the pores, or in some cases by a capillary block of the pores due to surface tension phenomena.

Water-Cement Ratio - The ratio by weight of water to cement in a cement slurry.

Water-in-oil Emulsion - See Invert Oil-Emulsion Mud.

Water Loss - See fluid Loss.

Water Loss - The volume of water lost to the permeable material due to the process of filtration. The API water loss is the volume of filtrate determined according to the Fluid-Loss test five in API RP IOB. See Fluid Loss.

High Water Loss - A cement slurry is arbitrarily considered to exhibit a high water loss when the volume of filtrate determined according to the Fluid-Loss test given in API RP IOB is greater than 500 ml.

Medium Water Loss - A cement slurry is considered medium water loss when the volume of filtrate as determined above is between 50 and 500 ml.

Water Loss Control - To regulate the water loss of a cement slurry by the use of additives.

Water of Hydration - The water chemically combined with the solid to form a crystalline compound. In cement slurries, the water necessary to hydrate the cement, forming cementitious materials.

Water-Solids Ratio - The ratio by weight of water to the total solids in a cement slurry.

Water String - A string of casing used to shut off all water above an oil sand. It is often necessary to run more than one string before a well is complete.

Water Table - The underground level at which water is found. This term is often used in connection with underground water supplies used for irrigation and industrial plants. Term also used to designate the top of the drilling derrick which supports the crown block.

Weight - The mud terminology, this refers to the density of a drilling fluid. This is normally expressed in either lb/gal, lb/cu/ft, psi hydrostatic pressure per 1,000 ft. of depth.

Weight Material - Any of the high specific gravity materials used to increase the density of drilling fluids. This material is most commonly barite but can be galena, etc. In special application limestone is also called a weight material.

Well Simulation Test - A test performed in accordance with API RP IOB under conditions simulating those encountered in wells.

Well Logging - See Electric Logging and Mud logging.

Wet Gas - Gas that carries a lot of liquid with it.

Wetting - The adhesion of a liquid to the surface of a solid.

Wetting Agent -- A substance or composition which, when added to a liquid, increases the spreading of the liquid on a surface or the penetration of the liquid into a material.

Whip stock - A device inserted in a well bore used for deflecting or for directional drilling.

Widow Maker - Anything liable to cause death or serious injury of a workman.

Wiggle Stick - The walking beam.

Wildcat - A well in unproved territory. With present day exploration methods and equipment about one wildcat of every 10 drilled proves to be commercially productive.

Winch - A machine used for pulling or hoisting that does so by winding a cable around a spool.

Wind-load rating - A specification of a derrick used to indicate the resistance of the derrick to the force of wind. The wind loading rating is calculated according to formulas incorporated in A. P.I. specifications. Typical wind resistance of derricks is 75 miles per hour with pipe standing in the derrick and 115 miles per hour and more with no pipe standing in the derrick.



Working Interest - Portion of oil production out of which operating and development costs are paid.

Working Pressure - The maximum pressure at which an item is to be used at a specified temperature.

Work-over -To perform one or more of a variety of remedial operations on a producing well with the hope of restoring or increasing production. Examples of work-over operations are deepening, plugging back, pulling and resetting the liner, squeeze cementing, shooting, and acidizing.

Work-over Fluid - Any type of fluid used in the work over operations of a well.

Wrinkle Pipe - To cut threads on a piece of pipe in order to make a connection.

### **-Y-**

Yield - A term used to define the quality of a clay by describing the number of barrels of a given centipoise slurry that can be made from a ton of the clay. Based on the yield, clays are classified as bentonite, high-yield, low-yield, etc., types of clays. Not related to yield value below. See API RP 13B for procedures.

Yield Point - In drilling-fluid terminology, yield point mean yield value. Of the two terms, yield point is by far the most commonly used expression.

Yield Value - The yield value (commonly called "yield point") is the resistance to initial flow, or represents the stress required to start fluid movement. This resistance is due to electrical charges located on or near the surfaces of the particles. The values of the yield point and thixotropy, respectively, are measurements of the same fluid properties under dynamic and static states. The Bingham yield value, reported in lb/100 sq ft, is determined by the direct-indicating viscometer by subtracting the plastic viscosity from the 300-rpm reading.

### **-Z-**

Zero-Zero Gel - A condition wherein the drilling fluid fails to form measurable gels during a quiescent time interval (usually 10 min).

Zeta Potential - Electro kinetic potential of a particle as determined by its electrophoretic mobility. This electric potential causes colloidal particles to repel

each other and stay in suspension.

Zinc Chloride -  $ZnCl_2$ . A very soluble salt used to increase the density of water to point more than double that of water. Normally added to system first saturated with calcium chloride.