

**DICTIONARY  
OF  
PETROLEUM  
EXPLORATION,  
DRILLING &  
PRODUCTION**

**Second Edition**

NORMAN J. HYNE, PH.D.

PennWell®

# Contents

---

<b>Dictionary of Petroleum, Exploration, Drilling &amp; Production</b>	1
<b>Abbreviations</b>	609
<b>Petroleum Related Organizations</b>	743
<b>Appendix</b>	
Abbreviations Used in This Text	751
Rotary Drilling Rig Parts	752
Cable Tool Drilling Rig Parts	753
Cranked Counterbalanced Beam Pumping Unit Parts	754
Common Geological Map Symbols	755
Common Geological Symbols for Rocks	756
Drillstem Test Symbols	759
Land Subdivisions (United States)	760
Geological Features (United States and Canada)	762
Atomic Weights and Numbers	769
Greek Alphabet	769
<b>About the Author</b>	771

# A

**Aalenian** global age of geological time ~174–170 million years ago. It is part of the Jurassic Period.

**abaft** directed toward the stern, or back, of an offshore drilling rig or drillship

**abandon** 1) to permanently cease petroleum production from a well, followed by plugging of the well. Injection, service, observation, and water wells can also be abandoned. 2) to not attempt completion of a well, declaring it a dry hole. This is in contrast to temporarily shutting in a well that can later be put back on production.

**abandoned & junked** a well abandoned because of mechanical problems (*lost well*)

**abandoned & whipstocked** a well that was drilled and was then plugged back and had another wellbore drilled from it by whipstock ABW

**abandoned oil** crude oil that has leaked from a pipeline or tank that the operator has made no effort to recover

**abandoned pressure** see *abandonment pressure*

**abandoned well** 1) a well that has been drilled as a dry hole and is going to be or has been plugged 2) a well that no longer serves its purpose. This could be a producer that is no longer economic or a water, injection, service, or observation well that is no longer in use. *abd*

**abandonment contour** the subsurface elevation contour in a water-drive oil reservoir where the rising oil/water contact reaches the top of the pay and the well is abandoned

**abandonment costs** the cost incurred in plugging a well and removing the equipment

**abandonment plug** a cement bridge used to seal a well

**abandonment pressure** 1) the minimum gas reservoir pressure necessary to keep a gas well economic as the reservoir pressure decreases with gas production. Abandoned pressure often depends on pipeline purchase contract pressure, usually between 700 and 1,000 psi. Sometimes it is economically possible to compress the gas to pipeline pressure.  $P_a$  2) the minimum reservoir pressure when an oil or gas well is abandoned

**abbreviated abstract** a set of summaries of all recorded instruments concerning the title to a tract of land. This is in contrast to a verbatim abstract, which has complete copies of all the recorded instruments. (*bob-tail abstract*)

**ABC method** a technique used in refraction seismic to determine the effect of the irregular weathered zone (low-velocity layer) near the surface. Two seismic shots are made at stations A and C and are recorded at A, B, and C.

**AB electrodes** electric resistivity logging tool electrodes. The A electrode is current emitting whereas the B electrode is for current return.

**abiogenic gas** methane gas formed from an inorganic source [Cf. *biogas*]

**abiogenic theory** or **abiotic theory** the theory that some hydrocarbons, such as methane, were formed inorganically from carbon in the upper mantle and lower crust of the earth

during and subsequent to its formation. Upward-migrating methane was affected by heat and pressure to form higher hydrocarbons. This theory was proposed by Alexander von Humbolt in 1804 and was most popular in Russia and the Ukraine during the mid-20th century. [Cf. *biogenic theory*]

**abnormal event** recorded seismic energy that is not a direct reflection such as a multiple, refraction, surface wave, or diffraction (*noise*)

**abnormal high pressure** subsurface fluid pressure higher than normal hydrostatic pressure at that depth. It can occur in reservoirs that are sealed either by surrounding rocks such as shales or by faults that prevent fluids from being expelled from the reservoir during burial. Lithostatic pressure is then transferred to fluid pressure. Overpressure is the excess pressure above normal pressure. Abnormal high pressure reservoirs have relatively low seismic velocities and low densities. [Cf. *abnormal low pressure*]

**abnormal low pressure** subsurface fluid pressure that is lower than normal hydrostatic pressure at that depth. This can be caused by erosion through removal of overlying sedimentary rocks, as a result of which the reservoir rock expands in volume. Underpressure is the amount of pressure below hydrostatic pressure. (*subnormal pressure*) [Cf. *abnormal high pressure*]

**abnormal pressure** or **abnormal pore pressure** pore pressure greater or lower than normal hydrostatic pressure for that depth

**aboard** on a ship or offshore drilling rig

**abrasion** mechanical wearing or grinding away by friction

**abrasion drilling** a well-cutting method using abrasive particles such as sand jetted from nozzles

**abrasion test** a laboratory test to determine the abrasiveness of drilling fluid weighting additives. The weight loss of stainless steel blades run in a mixer with a weighting additive sample after a specific time (in mg/min) and number of revolutions per minute are recorded.

**abrasive jet cleaning** a well-stimulation technique that uses a jetting tool with nozzles on a tubing string. Water, sometimes carrying sand or acid, is jetted at pressures up to 1,000 psi to clean perforations and remove gypsum.

**abrasive jetting** use of a high-velocity, liquid/abrasive sediment slurry jet for perforating [See also *hydrajet-assisted fracturing*]

**abrasive resistance** the ability of a diamond bit to resist scratching

**abrogate** 1) to fail to fulfill a contract 2) to repeal a contract by a legislative or authoritative act

**absolute age dating** exact dating of the origin of a rock or mineral in millions of years ago by radioactive age dating [Cf. *relative age dating*]

**absolute dogleg** a well dogleg angle reported that allows for both horizontal and vertical component deviation. E.g., if a well changes in deviation from 2° east to 2° west in 100 ft, the absolute dogleg would be 4°/100 ft.

**absolute filter** a filter designed to separate all particles larger than a specific size in microns [Cf. *nominal filter*]

**absolute humidity** amount of water in air measured in terms of weight per unit volume, e.g., mg/m<sup>3</sup>

**absolute open flow** or **open flow potential** theoretical rate a well could flow at the well wall (sandface) with zero atmo-

**bonding** a measure of adhesion between cement and casing or cement and wellbore walls

**bond log** see *cement bond log*

**bond number** gravitational forces divided by capillary forces. It is  $\sim 10^{-6}$  in waterfloods.  $N_B$

**bone** a difficult formation to drill

**bone dry** gas that contains no water vapor.

**bones** a hard, carbonate-cemented sedimentary rock that causes a seismic amplitude anomaly

**bonnet** 1) an end connection such as a cap that is designed to retain pressure other than an API end or outlet connection 2) the valve part that packs off, protects, and supports the valve stem 3) the steel retaining cover on a swivel (*housing cap*) 4) the flange or clamp connecting tubing to a Christmas tree master valve

**bonus** a payment to initiate a contract. It can be part of a production sharing contract or a payment to the lessor by the lessee for signing a lease (signature bonus). It is usually money but can be an oil or royalty bonus. It can also be monies paid at a Crown mineral rights land auction. (*consideration*)

**bonus allocation rule** a bonus allocation paid by the lessee against the gross income from the property in order to compute the percentage depletion allowance. It is not a deductible expense. (*bonus exhaustion rule*)

**bonus allowable** an extra saltwater injection well granted in an allowable by a government agency

**bonus bidding** a method of competitive bidding for leases. The leases have a fixed royalty and are awarded to the highest bonus offered. The U.S. Minerals Management Service uses this for Outer Continental Shelf blocks.

**bonus exhaustion rule** see *bonus allocation rule*

**bonus payment** see *bonus*

**book rate of return** an accounting rate of return used to evaluate corporations. It is the net earnings per average dollar invested. The book rate of return is calculated by dividing the book profits or earnings by the difference of net cash flow minus depreciation and any unusual items such as write-offs.

**book reserves** to add petroleum reserves to the balance sheet of a company. The reserves are first recalculated and reconfirmed several times. They must be stated to the U.S. Securities and Exchange Commission for any company listed on the New York Stock Exchange.

**boom** a long steel arm used to support a hoisting system line

**boomer** 1) a shallow-water seismic source that uses a magnetostrictive source towed in a sled behind a ship. Capacitors are charged to a high voltage and then discharged through a transducer (flat, spiral coil) into the water. It has a relatively shallow bottom penetration and is used primarily for engineering surveys. 2) a transient field worker 3) a strong seismic reflection off a massive reflector 4) see *load binder*

**booster** 1) a compressor or pump used to raise oil or gas pressure in a pipeline or flowline 2) a small amount of high explosive used to transfer the detonation between perforating guns

**booster compressor** a compressor used to increase air volume and pressure going into a regular compressor inlet. It is used for air drilling in deep or large-diameter holes.

**booster jar** see *jar accelerator*

**booster platform** an offshore platform that supports compressors or pumps for a pipeline

**booster station** an oil pipeline pumping installation designed to keep the oil flowing. The stations are often located from 80–150 miles (130–240 km) apart and can include separators, storage, scraper traps, and control equipment. On a gas pipeline, compressor stations are used. (*intermediate pump station*)

**boot** 1) a bonus, often in the form of extra acreage or monies, paid by one party in an exchange of properties such as a farmout 2) a vertical pipe on a lease stock-tank pipe that maintains hydrostatic pressure on the oil and allows gas to escape before the oil enters the pipeline gathering system (*conductor pipe*) 3) the protective shield on a seismic hydrophone, connector, or other device. 4) the vertical tubular in a gun barrel separator that directs the oil and water to the bottom of the tank. A spreader on the bottom of the boot distributes the oil and water outward. It can be located either on the inside or outside of the gun barrel shell. (*conductor pipe, flume, or stack*) 5) a gas separating chamber located on the top of a vertical flow treater 6) a seismic source with a heavy rubber sleeve around a steel frame. A spark plug ignites an explosive gas mixture in the sleeve. 7) see *surge column*

**boot acreage** extra acreage earned by a farmee in a farmout outside the earning well drilling and spacing unit

**boot basket** or **boot sub** see *basket sub*

**BOP elevator** a lifting mechanism that moves the blowout preventers into storage when not being used on an offshore drilling rig

**BOP stack** see *blowout-preventer stack*

**borate** a boric acid salt,  $H_2BO_3$ , used as a crosslinker for guar-based gels

**border price** the official price of natural gas sold at the U.S./Canada border, as determined by the Canadian government

**bore** 1) to cut a hole 2) the inside diameter of a pipe, cylinder, piston, or well 3) a fluid opening or passage

**borehole** see *wellbore* bh

**borehole ballooning** see *wellbore ballooning*

**borehole breakout** see *breakout*

**borehole compensated sonic log** a modern sonic log that uses two transducers above and below the receiver pair on the logging tool. Borehole rugosity and logging tool tilt are reduced by alternately pulsing both transducers and averaging the measurements. Another logging tool type has two transmitters above and below four receivers.

**borehole correction** the amount that a wireline well log measurement is adjusted for wellbore effects. It is called borehole compensated.

**borehole direction** the wellbore azimuth

**borehole directional survey** see *directional survey*

**borehole effect** the well log distortion caused by the size, shape, or other characteristics of the borehole and the filter cake. Compensated logs are adjusted for borehole effect.

**borehole enlargement tool** a tool, usually run on the bottom of a bottomhole assembly, that is rotated to enlarge the diameter of a well or pilot hole. It is defined by pass-through diameter and expanded diameter. Two types are a) eccentric, with a maximum diameter less than twice the radius measured from the drillstring center; and b) concentric, with

## Cranked Counterbalanced Beam Pumping Unit

