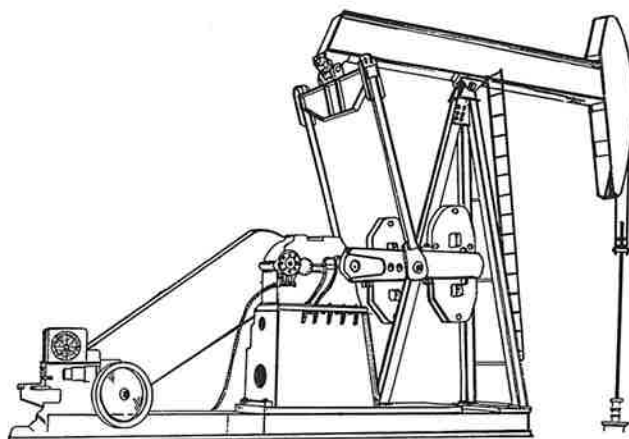


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Dictionary of Petroleum Exploration, Drilling, & Production.

Norman J. Hyne, Ph.D.



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one and ten as references. They are talc, (1) gypsum, (2) calcite, (3) fluorite, (4) apatite, (5) orthoclase, (6) quartz, (7) topaz, (8) corundum, (9) and diamond (10). Talc is the softest and diamond the hardest. (*Mohs' Hardness Scale*)

hard-rock geology the study of igneous and metamorphic rocks and the exploration for ore minerals

hard scale a salt composed of sulfates of barium, strontium, and/or calcium. It can precipitate out of water and build up in equipment such as tubular goods. Hard scale can be caused by mixing unlike brines. Hard scale is in contrast to soft scale.

hardship gas natural gas that must be sold, if at all possible, at substandard prices. If the hardship gas is not sold, all parties in the well would suffer financial loss due to loss of lease, reservoir drainage or reservoir damage.

hard trim *see hard faced*

hardware computer equipment that is relatively solid matter, such as the frame, integrated circuits, wires, and terminals. Hardware is in contrast to software which is the computer programs.

hard water water containing Ca or Mg ions

harmonic a frequency that is a unit multiple, such as second or third, of a fundamental frequency

harmonic analysis *see Fourier analysis*

harmonic decline an oil well production decline that is proportional to the producing rate. When the production rate is plotted on a log scale versus the cumulative production on a regular scale, it is a straight line. The equation is $Q_t = Q_i (1 + D_i t)^{-1}$, where Q_t = production rate at a certain time, Q_i = initial production rate, D_i = initial decline, and t = time. Harmonic decline has a very steep initial decline and best approximates a dissolved gas-drive oilfield decline.

harmonic folding folding sedimentary rocks in which the number and position of folds in successive surfaces broadly match in contrast to disharmonic folding

HAS drive heated annulus steam drive

Hassler chamber or holder a core holder used with a permeameter to measure the permeability of a core. The core is placed in a metal screen and then a rubber jacket. The core and jacket are then placed in the Hassler chamber where dry air is passed through the core. The permeability of the core is calculated from Darcy's law. A Fancher holder serves the same purpose.

hat the enlarged upper section of a salt stock or plug that was formed by the sideways swelling of salt. The part of the hat that protrudes beyond the stem is called the overhang. (*bulb, cap, or head*)

hatch an opening on a tank or vessel that can be open and closed

hatchettite a variety of ozokerite found in Belgium and Germany

Hauterivian a global age of geological time that occurred about 130–125 m. y. ago. It is part of the Lower Cretaceous epoch.

have a hole in the wall to claim more footage than is actually drilled

hay rack or hayrack a rack with finger-like projections located near the top of a mast or derrick. The hay rake is used to separate and hold the upper ends of tubing strings when they are pulled from the well. (*finger board*)

hay section the part of a heater or heater-treater filled with fibrous material used to filter emulsions

hay tank a vessel filled with hay used to filter oil out of water

haz hazardous

hazard a dangerous condition

hazard survey *see wellsite survey*

hazard zone an area of high fire or explosion risk

Hb hornblende

HBP held by production

HC hydrocarbon

h_c height of cement column

H/C hydrogen to carbon ratio

HCl hydrochloric acid

HCO heavy cycle oil

H/C ratio the atomic ratio of hydrogen to carbon. The H/C ratio is usually made of kerogen and plotted on a Van Krevelen diagram with O/C ratios to show kerogen type and maturity. *H/C*

HCV hand controlled valve

HD 1) hydril 2) hard 3) hole diameter

hd hard

hdl handle

hdns hardness

Hd.sd. hard sand

hdr header

HDT™ high-resolution dipmeter tool

HDT-D dipmeter-digital log

HE hydrogen embrittlement

He 1) helium 2) hematite

head 1) the pressure differential in a fluid that causes flow 2) a device that utilizes magnetic tape to write on or read from a storage medium such as a magnetic head 3) the volume of reservoir fluids produced as a result of a short period of gas injection into a well 4) the enlarged upper portion of a salt stock or plug that was formed by the sideways swelling of salt. The part of the head that protrudes beyond the stem is called the overhang. (*bulb, cat, or bat*) 5) the bottom end of a survey cable that contains the threaded and electrical connectors

headache! a shouted warning when something has been dropped or falls from overhead

headache post a post under the walking beam on one side of the drill floor of a cable-tool rig. The headache post prevents the walking beam from falling when the pitman is disconnected from the crank.

head end the outlet end of a reciprocating compressor. Head end is in contrast to the crank end.

header 1) a pipe or tube with one inlet and several outlets, or several inlets and one outlet (*manifold*)

bdr 2) a large-diameter pipe having several smaller pipes extending from it at right angles 3) the

information that includes seismic profile, shot, and trace numbers on a magnetic tape 4) the information section on a seismic profile. The header can include such information as the names of the contractor and client, shooting date, multiplicity, geophone types, spread layout, cable lengths, data processing company, processing date, deconvolution, and migration. 5) the information located at the top of a well log. The header includes the company name, type of log, date, operator, well name, field, county and state, temperature, and type of fluid in the well.

headgate the gate valve located nearest to a pump or compressor on a flow line

heading or heading flow a type of fluid flow with long intervals of alternating liquid and gas slugs. Fluid flow with short intervals of alternating liquid and gas slugs is slugging flow.

head pressure the pressure exerted by the weight of a column of fluid. Head pressure is usually measured in inches of mercury or water.

head right an undivided interest in mineral rights. For some Indian lands, it is the pooled mineral interest in the reservation that is or was shared by each member of that tribe and can be passed on by inheritance.

head roustabout a person in charge of supervising and training a crew of roustabouts. The head roustabout works under the production foreman. (*gang pusher or leadman*)

headspace gas gas that collects in the sealed container above the cuttings, drilling mud, and fluid sample taken during mud logging. A sample is taken by a syringe inserted into the can wall. The headspace gas is then analyzed by a gas chromatograph.

heads up drilling a well or developing some acreage without any financial help

head-type meter a device that is used to measure the velocity of a fluid. A head-type meter measures the differential pressure between two points in the flow. The flow rate will be proportional to the square root of the pressure differential. Common types of head-type meters include a) orifice, b) Venturi, c) flow, d) pitot tube-annubar, and e) elbow meter.

head up to tighten a hatch cover on a tank

head wave a wave in refraction seismic that enters and leaves a high-velocity medium at the critical angle and gives the refraction first break, the first recorded arrival of the seismic signal. The head wave travels along the interface of two sedimentary rock layers.

head well a well that produces most efficiently by intermittent pumping or flowage. A head well usually lacks enough gas to cause the oil to flow to the surface.

head well puller the workover employee who is in charge of a pulling unit and crew that pulls sucker rods and tubing from a well. (*pulling-unit operator or crew chief*)

heal to close a rock fracture by precipitation of minerals in the fracture

healed fracture a previously open fracture such as a joint or fault in a rock along which fluid was able to flow. Subsequently, the fracture has filled with mineral grains such as calcite or quartz that have grown along the fracture and now prevent fluid flow. (*sealed fracture*)

heart-break rock a sedimentary rock with porosity but lacking permeability

heat a connection to strike a collar or threaded connection with a hammer to loosen it. (*warm or whip a connection*)

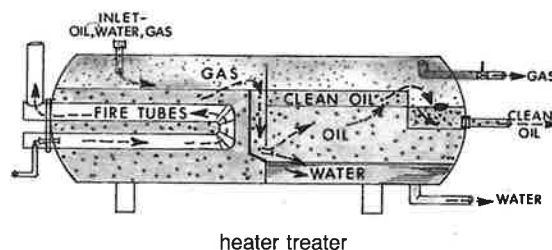
heat capacity 1) the amount of heat necessary to raise the temperature of a sample 1°C 2) the ratio of heat absorbed or radiated on a surface to the rise and fall of temperature. Heat capacity is expressed in calories per gram per °C (cal/gm/°C). (*thermal capacity*) *c*

heat checking the excessive heating caused by friction of tool joints rotating against the wellbore wall

heat conductivity the amount of heat in calories transmitted per second through a plate-shaped substance that is 1 cm thick with an area of 1 cm² and a temperature difference of 1°C from top to bottom. The heat conductivity of rocks ranges from about 3–15 millicalories/cm/sec/°C. Heat conductivities in sedimentary rocks are greatest in evaporites and lowest in shales. (*thermal conductivity*)

heated annulus steam drive a heavy oil recovery method in which heat is applied to a horizontal drain well in the reservoir. Vertical steam injection wells are used to sweep the oil to the horizontal well. *HAS drive*

heater heating equipment that is used with natural gas to prevent hydrates (ice with gas molecules trapped in the ice lattice) from forming when the gas is produced. The heater burns with natural gas and is either a direct flowline or indirect heater. The indirect heater is the most common and consists of a shell that usually contains fresh water, a fire tub, burner, and a coil through which the gas flows through the heated water. Heating is used when dehydration of the gas is not economical. *btr*



heater-treater a type of vertical or horizontal field separator that uses heat to break an emulsion such as oil-in-water or water-in-oil. A temperature of 80° to 180° F is necessary to separate emulsions. The steel tank contains a U-shaped pipe called a fire tube. In the direct-fired fire-tube furnace, a flame is directed down the center line of the pipe to heat and break the emulsion. In the indirect-fired type, the flame is used to heat water that is in contact with the emulsion. The exhaust gases exit the stack which extends 10–15 ft above the separator. The burner uses either natural gas or heavy oil. (*fire-tube heater or emulsion treater*) *bt*

heat exchanger an arrangement of pipes that provides for the transfer of heat from one fluid to another. The heat exchangers used in gas-processing