Ten things you may not know about Wikipedia.

Casing (borehole)

From Wikipedia, the free encyclopedia

Casing is large diameter pipe that is assembled and inserted into a recently drilled section of a borehole and typically cemented into place.

Contents

Purpose

Casing that is cemented in place aids the drilling process in several ways:

- Prevent contamination of fresh water well zones.
- Prevent unstable upper formations from caving-in and sticking the drill string or forming large caverns.
- Provides a strong upper foundation to use high-density drilling fluid to continue drilling deeper.
- Isolates different zones (that may have different pressures or fluids - known as zonal isolation) in the drilled formations from one another.
- Seals off high pressure zones from the surface, avoiding potential for a blowout
- Prevents fluid loss into or contamination of production zones.
- Provides a smooth internal bore for installing production equipment

A slightly different metal string, called production tubing, is often used without cement in the smallest casing of a well completion to contain production fluids and convey them to the surface from an underground reservoir.

Design

In the planning stages of a well a drilling engineer, usually with input from geologists and others, will pick strategic depths at which the hole will need to be cased in order for drilling to reach the desired total

depth. This decision is often based on subsurface data such as formation pressures, strengths, and makeup, and is balanced against the cost objectives and desired drilling strategy.

With the casing set depths determined, hole sizes and casing sizes must follow. The hole drilled for each casing string must be large enough to easily fit the casing inside it, allowing room for cement between the outside of the casing and the hole. Also, the inside diameter of the first casing string must be large enough to fit the second bit that will continue drilling. Thus, each casing string will have a subsequently smaller diameter.

Casing strings are supported by casing hangers that are set in the wellhead or the christmas tree.

Intervals

Typically, a well contains multiple intervals of casing successively placed within the previous casing run. The following casing interval is typically used in an oil or gas well:

- Conductor casing
- Surface casing
- Intermediate casing (optional)
- Production casing
- Production liner

The *conductor casing* serves as a support during drilling operations, to flowback returns during drilling and cementing of the surface casing, and to prevent collapse of the loose soil near the surface. It can normally vary from sizes such as 18" to 30".

The purpose of *surface casing* is to isolate freshwater zones so that they are not contaminated during drilling and completion. Surface casing is the most strictly regulated due to these environmental concerns, which can include regulation of casing depth and cement quality. A typical size of surface casing is 13⅜".

Intermediate casing may be necessary on longer drilling intervals where necessary drilling mud weight to prevent blowouts may cause a hydrostatic pressure that can fracture deeper formations. Casing placement is selected so that the hydrostatic pressure of the drilling fluid remains between formation pore and fracture pressures.

The final interval is either *production casing*. As with the casing intervals described above, the production casing string extends to the surface where it is hung off. As the smallest casing, it will former the outer boundary of the 'A' annulus, which may involve it being used for gas lift and well kills. A typical size is 9⅝".

In order to reduce cost, a liner may be used which extends just above the shoe (bottom) of the previous casing interval and hung off downhole rather than at the surface. It may typically be 7", although many liners match the diameter of the production tubing.

Few wells actually produce through casing, since producing fluids can corrode steel or form deposits such as asphaltenes or paraffins and the larger diameter can make flow unstable. Production tubing is therefore installed inside the last casing string and the tubing annulus is usually sealed at the bottom of the tubing by a packer. Tubing is easier to remove for maintenance, replacement, or for various types of

workover operations. Tubing is significantly lighter than casing and does not require a drilling rig to run in and out of hole; smaller *pulling units* are used for this purpose.

Cementing

Cementing is performed by circulating a cement slurry through the inside of the casing and out into the annulus through the casing shoe at the bottom of the casing string. In order to precisely place the cement slurry at a required interval on the outside of the casing, a plug is pumped with a displacement fluid behind the cement slurry column, which "bumps" in the casing shoe and prevents further flow of fluid through the shoe. This bump can be seen at surface as a pressure spike at the cement pump. To prevent the cement from flowing back into the inside of the casing, a float collar above the casing shoe acts as a check valve and prevents fluid from flowing up through the shoe from the annulus.

See also

- Oil well
- Production tubing
- Production packer
- Annulus
- Expandable Tubular Technology

External links

- Schlumberger Oilfield Glossary: Casing (http://www.glossary.oilfield.slb.com/Display.cfm?Term=casing)

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