

GENERAL OIL & GAS FAQ

What is Oil Exploration?

Oil exploration is the search by petroleum geologists for hydrocarbon deposits beneath the Earth's surface. Oil and gas exploration are grouped under the science of petroleum geology.

What is the method of Exploration?

Visible surface features such as oil seeps, natural gas seeps, pockmarks (underwater craters caused by escaping gas) provide basic evidence of hydrocarbon generation (be it shallow or deep in the Earth).

However, most exploration depends on highly sophisticated technology to detect and determine the extent of these deposits. Areas thought to contain hydrocarbons are initially subjected to a gravity survey or magnetic survey to detect large scale features of the sub-surface geology.

Features of interest (known as leads) are subjected to more detailed seismic surveys which work on the principle of the time it takes for reflected sound waves to travel through matter (rock) of varying densities and using the process of depth conversion to create a profile of the substructure.

Finally, when a prospect has been identified and evaluated and passes the oil company's selection criteria, an exploration well is drilled to conclusively determine the presence or absence of oil or gas.

What is Licensing?

Petroleum resources are typically owned by the government of the host country. The government issues licenses to explore, develop and produce its oil and gas resources, which are typically administered by the oil ministry. There are several different types of licenses. Typically oil companies operate in joint ventures to spread the risk, one of the companies in the partnership is designated the operator who actually supervises the work.

What is the difference between Resources and Reserves?

Resources are hydrocarbons which may or may not be produced in the future. A resource number may be assigned to an undrilled prospect or an unappraised discovery. Appraisal by drilling additional delineation wells or acquiring extra seismic data will confirm the size of the field and lead to project sanction. At this point the relevant government body gives the oil company a production license which enables the field to be developed. This is also the point at which oil reserves can be formally booked.

Oil reserves are primarily a measure of geological risk – of the probability of oil existing and being producible under current economic conditions using current technology. The three categories of reserves generally used are proven, probable and possible reserves.

Proven reserves are defined as oil and gas "reasonably Certain" to be producible using current technology at current prices, with current commercial terms and government consent, also known in the industry as 1P. Some industry specialists refer to this as P90 i.e. having a 90% certainty of being produced.

Probable reserves are defined as oil and gas “Reasonably Probable” of being produced using current or likely technology at current prices, with current commercial terms and government consent. This is also known in the industry as 2P or Proven plus Probable. Some industry specialists refer to this as P50 i.e. having a 50% certainty of being produced.

Possible reserves are defined as “having the chance of being developed under favorable circumstances.” This is also known in the industry as 3P or Proven plus Probable plus Possible. Some industry specialists refer to this as P10 i.e. having a 10% certainty of being produced.

What is an Oil Well?

An oil well is a term used for any perforation through the Earth’s surface designed to find and release both petroleum oil and gas hydrocarbons.

What are the different stages of a Well?

The life of a well can be divided up into five segments;

- 1) Planning
- 2) Drilling
- 3) Completion
- 4) Production
- 5) Abandonment

Drilling

The well is created by drilling a hole 5 to 30 inches (13–76 cm) diameter into the earth with an oil rig which rotates a drill bit. After the hole is drilled, a steel pipe (casing) slightly smaller than the hole is placed in the hole, and secured with cement. The casing provides structural integrity to the newly drilled wellbore in addition to isolating potentially dangerous high pressure zones from each other and from the surface.

With these zones safely isolated and the formation protected by the casing, the well can be drilled deeper (into potentially more-unstable and violent formations) with a smaller bit, and also cased with a smaller size casing. Modern wells often have 2-5 sets of subsequently smaller hole sizes drilled inside one another, each cemented with casing.

This process is all facilitated by a drilling rig which contains all necessary equipment to circulate the drilling fluid, hoist and turn the pipe, control downhole pressures, remove cuttings from the drilling fluid, and generate onsite power for these operations.

Completion

After drilling and casing the well, it must be ‘completed’. Completion is the process in which the well is enabled to produce oil or gas.

Production

The production stage is the most important stage of a well's life, when the oil and gas are produced. By this time, the oil rigs and workover rigs used to drill and complete the well have moved off the wellbore, and the top is usually outfitted with a collection of valves called a "Christmas Tree". These valves regulate pressures, control flows, and allow access to the wellbore in case further completion work needs to be performed. From the outlet valve of the Christmas Tree, the flow can be connected to a distribution network of pipelines and tanks to supply the product to refineries, natural gas compressor stations, or oil export terminals.

Abandonment (Plugged and Abandoned)

Finally, when the well no longer produces or produces so poorly that it is a liability to its owner, it is abandoned. In this simple process the wellbore is filled with cement so that the flowpath from the reservoir to the surface is plugged.

What are the different Types of Wells?

A common way to classify wells is by their purpose in contributing to the development of a resource. They can be characterized as:

Production wells are drilled primarily for producing oil or gas, once the producing structure and characteristics are established.

Appraisal wells are used to assess characteristics (such as flowrate) of a proven hydrocarbon accumulation.

Discovery/exploration wells are drilled purely for exploratory (information gathering) purposes in a new area.

Wildcat wells are drilled based on a large element of hope, in a frontier area where very little is known about the subsurface.

