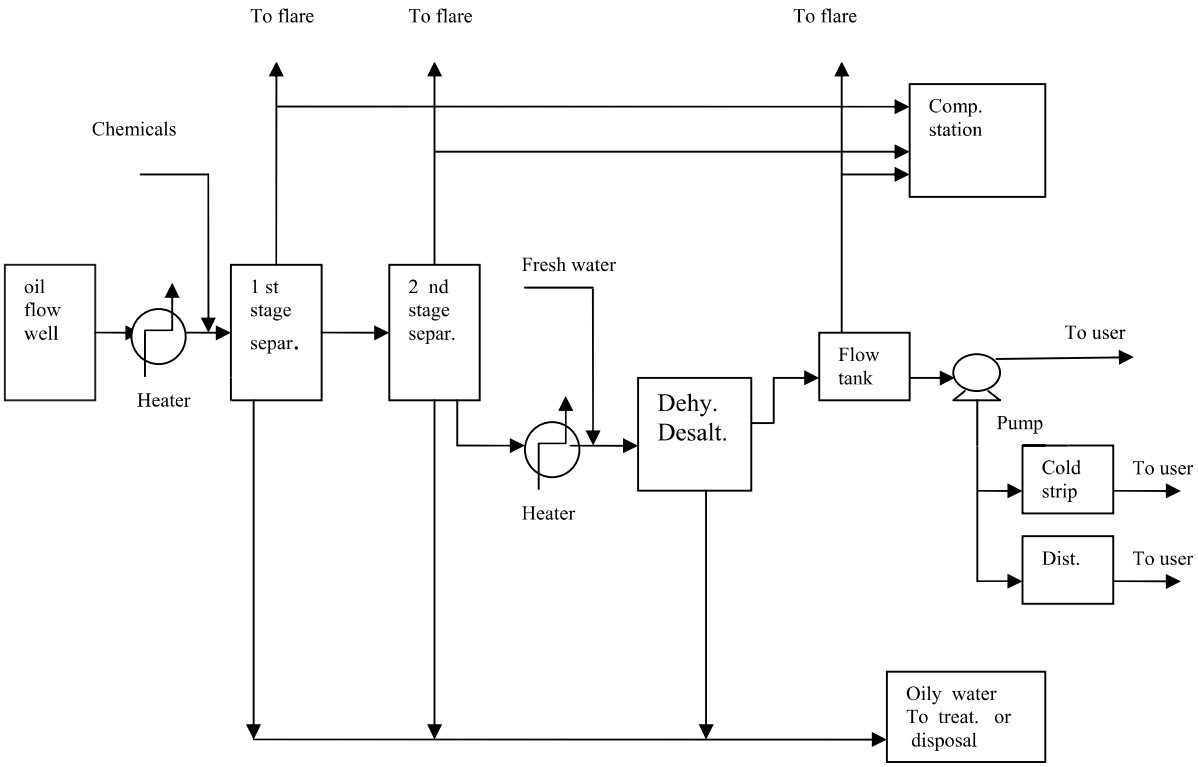
Degassing and Dehydration

In a producing oilfield the fluid obtained at the wellhead is submitted to ***degassing*** and ***dehydration*** operations . In the first operation the gases evolved by releasing the pressure of the fluid are recovered, stripped of the less volatile components, and either sent to consumer centers as ***natural gas or used to repressurize*** the oilfield.

The stripped liquid components are marketed as ***stabilized natural gasoline.***



Crude oil Degassing station (From Gary and Handwerk, 2001)

Dehydration and desalting of crude

The second operation aims to completely eliminate the water that appears in the fluid forming stable emulsions, and the removal of water-soluble inorganic salts associated with the water which, if left in the oil, would give rise to serious corrosion problems in the course of refining operation.

All crude contain moisture and salts to varying degrees. Water is likely to occur in emulsion form when the crude are naphthenic or sulfurous *(**No harm may be expected to the distillation column due to the presence of moisture , as there is always steam in distillation. However , crude has to be dehydrated to remove the salts**)*.

Water being good solvent for these salts the removal is very much effective in the form of brine.

Of all of the existing salts, chlorides of calcium and magnesium distinguish themselves in playing an invincible role in overhead corrosion . *(**These salts in presence of steam at 150-200 ^{0}C easily hydrolyze generating hydrochloric vapors.***

These vapors cause corrosion to equipments). Any crude that contains more than 5 kgs of total salts expressed in terms of sodium chloride per thousand barrels may be regarded as ***salty crude***.

Dehydration of crude is practiced in two stages, first in the site and later in the refinery.

At the site (oil field) : salt is removed by 1) settling or by 2) adding chemicals or by 3) Combination of these two.

Crude possessing emulsifying characteristics are not responsive to settling method; these demand demulsifying agent to increase the coalescence of water drops. (Soda ash, sodium hydroxide, salt of fatty acids petroleum sulfonates which assist coalescence of water droplets).

A good amount of water should be available in crude for such treatment ; lack of water demands the fresh additions to about 20 % . After adding the chemicals and water to the desired extent the crude mixture is allowed to stand 75-80 ^{o}C at 15 kgs/cm^2 in huge tall tanks. Demulsifying chemicals , if necessary are added in very small amounts. Retention time is about 48 hours.

Coalescence

Water droplets will settle at a velocity proportional to the square of their diameter

$$V = c\frac{D^2(\rho_w - \rho_o)}{\mu}$$

Salt water is present in oil in the form of an emulsion, created by dispersion of water in droplet form, and held by emulsifying agents present in the oil.

These emulsifying agent are generally

Resin, asphalts, organic acids, and solids which are produced with the oil, and aid in the formation of a tough film around the droplet, thus isolating each separate water droplet from the other. The film which isolates the water droplets from the other must be broken before coalescence take place

1)Chemical aids deemulsifiers 2)Heat	are used to displace this film from the water droplet. The proper use of heat is also an aid

The final phase of the coalescence process is the collision of these small water droplets under the influence

3) An electrostatic field	to form layer drops which will settle faster