



Well Drilling Engineering

DRILLING FLUIDS

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DRILLING FLUIDS

Definition

A mixture of clays, water, and chemicals pumped down the drill string while an oil well is being drilled to lubricate the mechanism, carry away rock cuttings, and maintain pressure so that oil or gas does not escape.

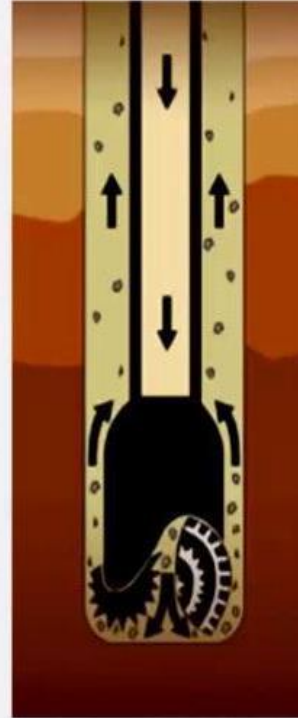
In other term

A drilling fluid, or mud, is any fluid that is used in a drilling operation in which that fluid is circulated or pumped from the surface, down the drill string, through the bit, and back to the surface via the annulus.

Mud Fluid

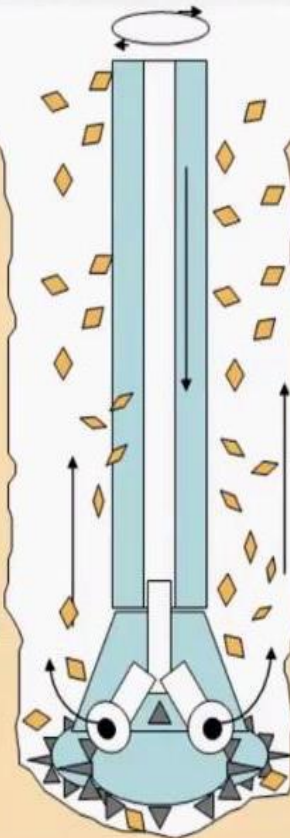
mud

- The drilling fluid or mud is a mixture of water, clay and weighting material.
- The properties of the drilling fluid are maintained by the rig crew
 - Mud weight
 - Viscosity



The drill string is turned at surface, which turns the bit at the bottom of the hole.

The teeth on the drill bit grind the rock into fragments, or "cuttings".



Drilling mud is pumped down the inside of the drill pipe, through jet nozzles in the bit, and into the "annulus". This is the space between the sides of the hole and the drill pipe.

The mud lifts the cuttings and circulates them back to surface where they are removed.

Function

A major function of the fluid circulating system is to remove the rock cuttings from the hole as the drilling progresses

Principal Components:

1. Mud Pump

2. Pump Manifold

3. Standpipe

4. Swivel

5. Drillstring

6. Annulus

7. Return Line

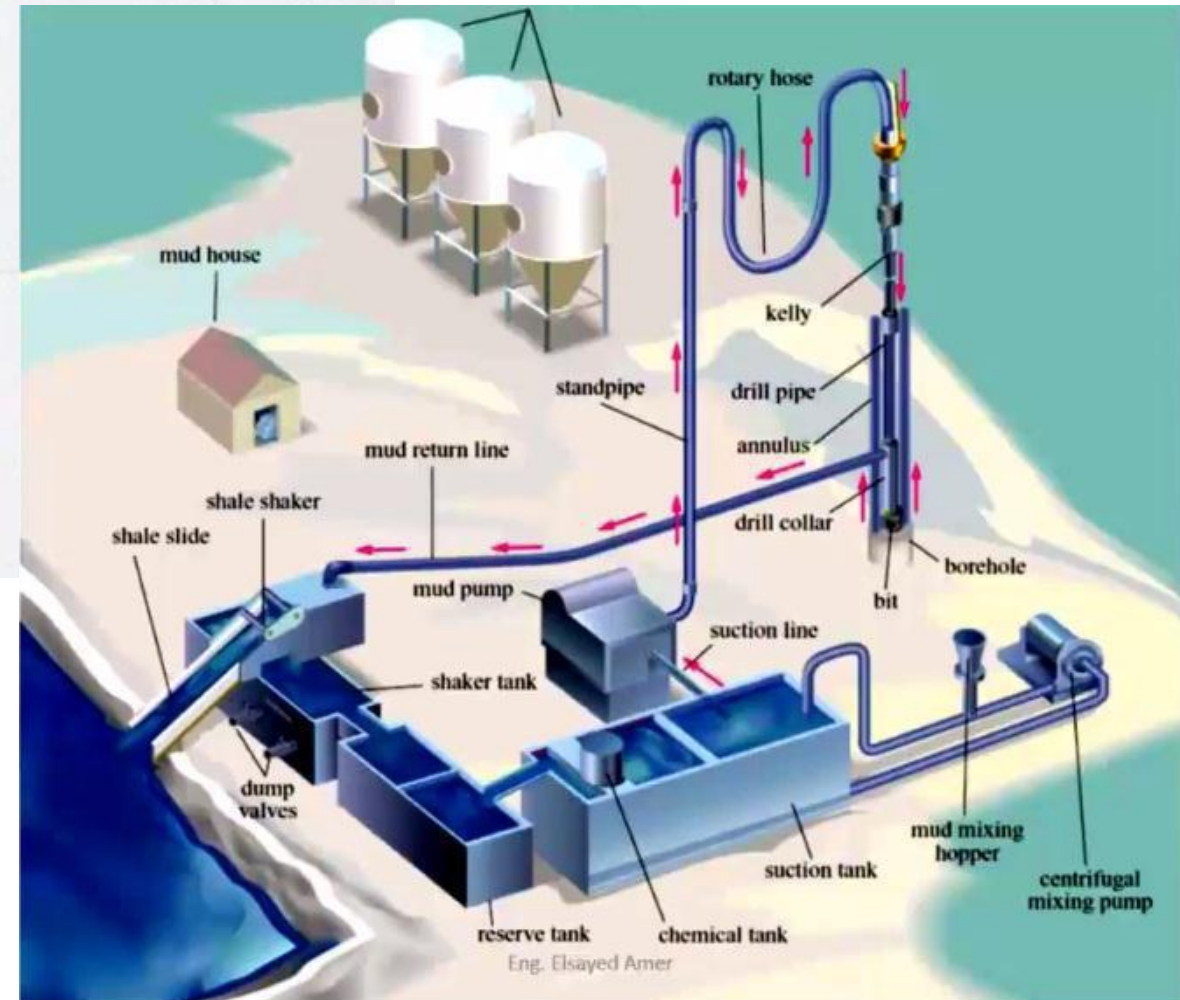
8. Shale Shaker

9. Desander

10. Desilter

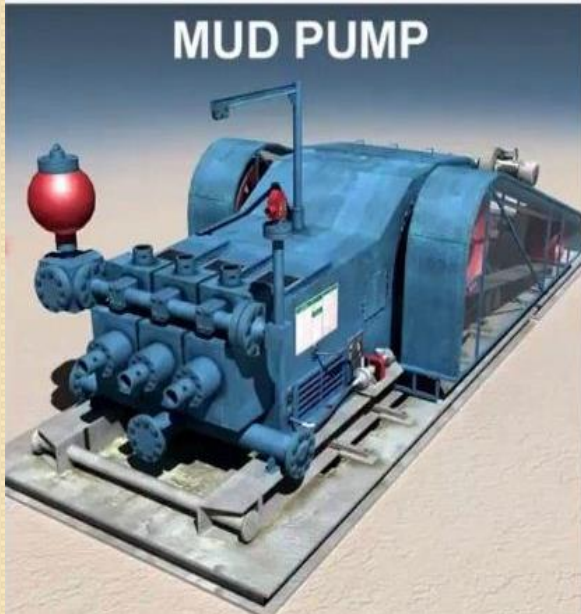
11. Degasser

12. Mud Pit



1. Mud pumps

- ❖ A large, high-pressure reciprocating pump used to circulate the mud on a drilling rig.
- ❖ The mud pumps take the fluid from the pit and pump it into the well
 - Triplex pumps
 - Duplex pumps
- ❖ receive their power from an electric motor independent from other uses.



2. Stand pipe manifold

- ❖ Divert Mud flow to kill lines in case of kill or lost circulation



3. Stand Pipe

The fluid is pumped up the standpipe and through the rotary hose into the swivel



Rotary hose

A large-diameter (3- to 5-in. inside diameter), high-pressure flexible line used to connect the standpipe to the swivel. This flexible piping arrangement permits the kelly (and, in turn, the drillstring and bit) to be raised or lowered while drilling fluid is pumped through the drillstring. The simultaneous lowering of the drillstring while pumping fluid is critical to the drilling operation.



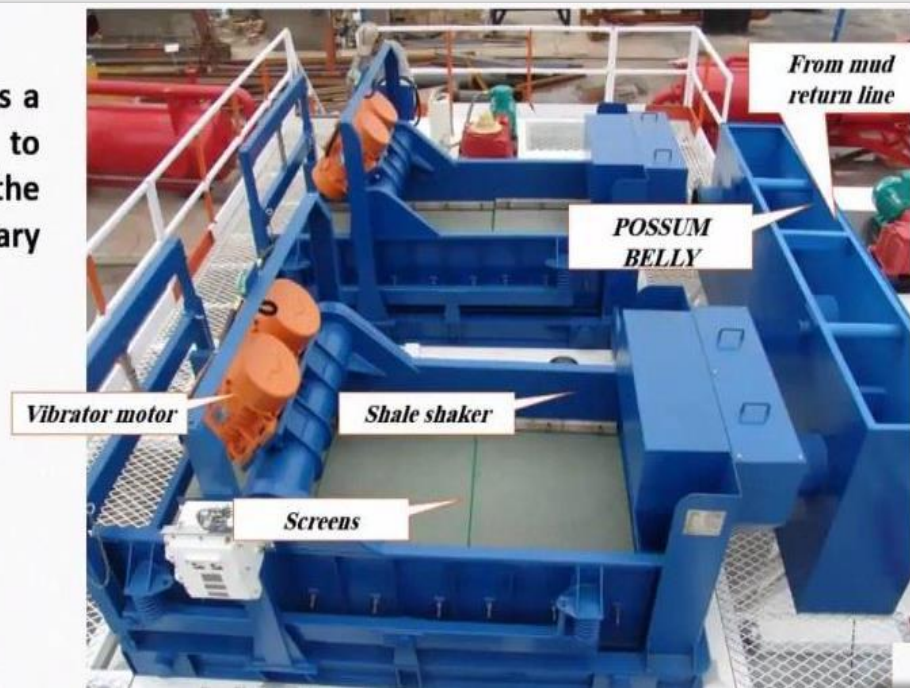
7. Mud return

The passageway of the drilling fluid as it comes out of the well.



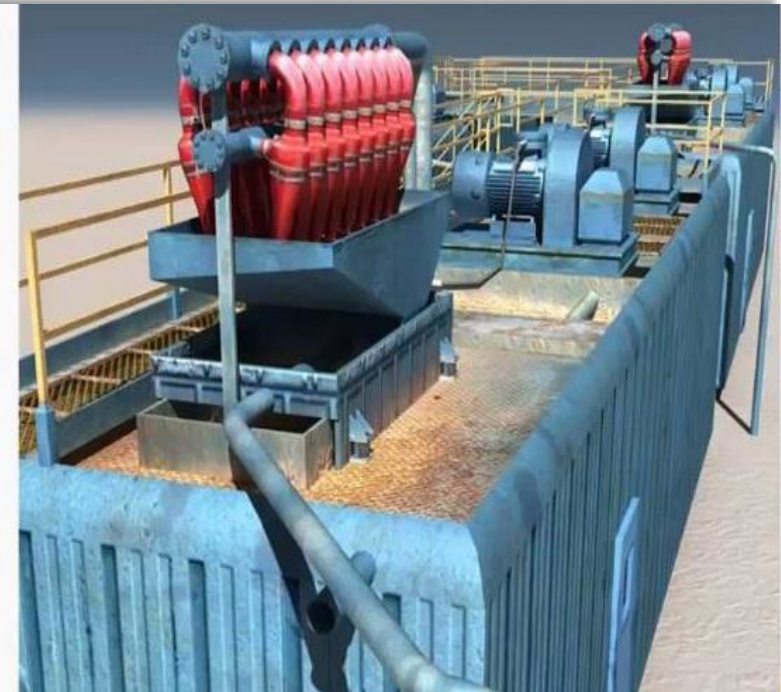
8. Shale Shaker

An equipment the uses a vibrating screen to remove cuttings from the circulating fluid in rotary drilling operations.



9. Desander

A centrifugal device for removing sand from the drilling fluid to prevent abrasion of the pumps.



10. Desilter

Also a centrifugal device for removing free particles of silt from the drilling fluid to keep the amount of solids in the fluid at the lowest possible point.



Degasser

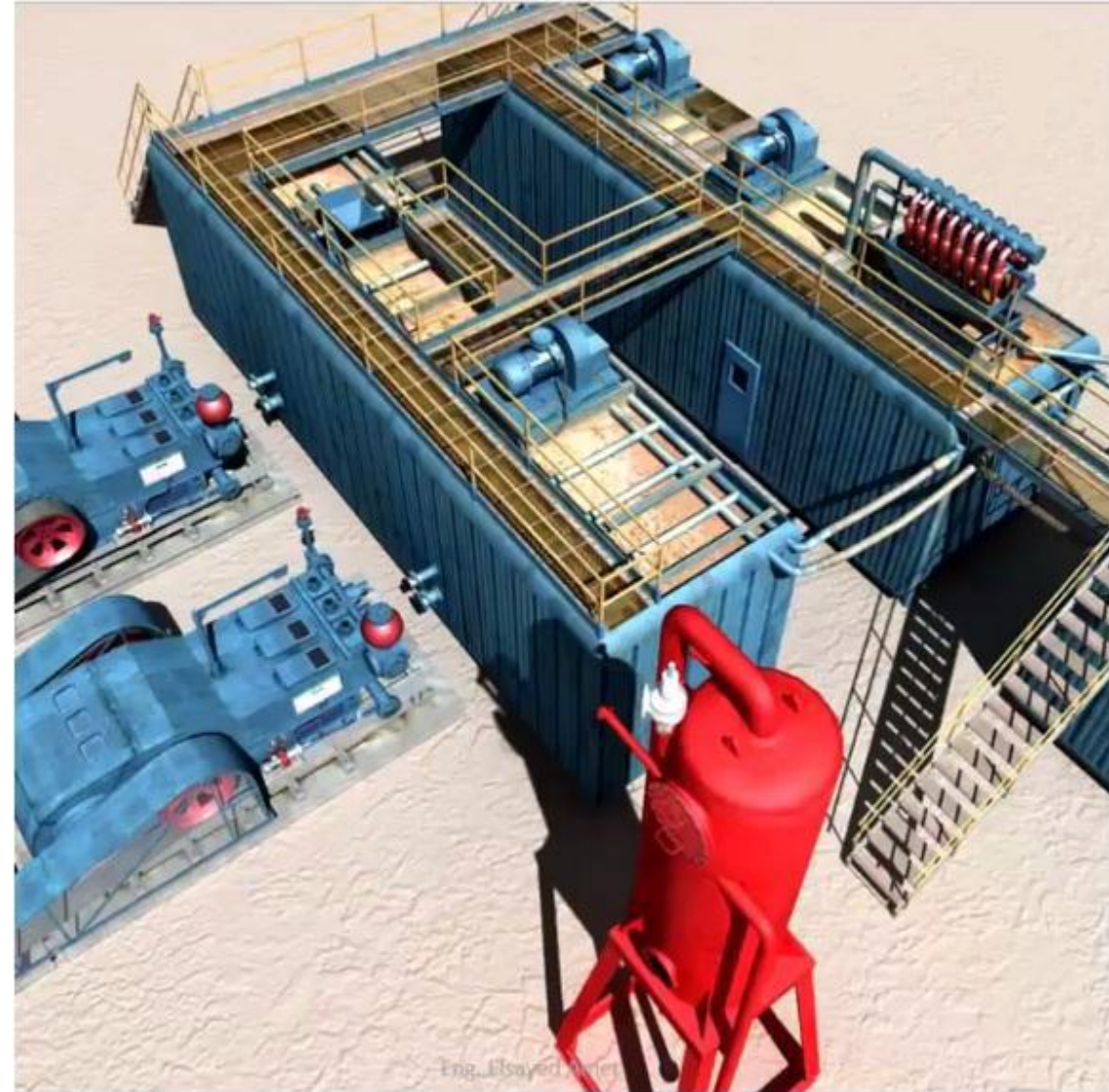


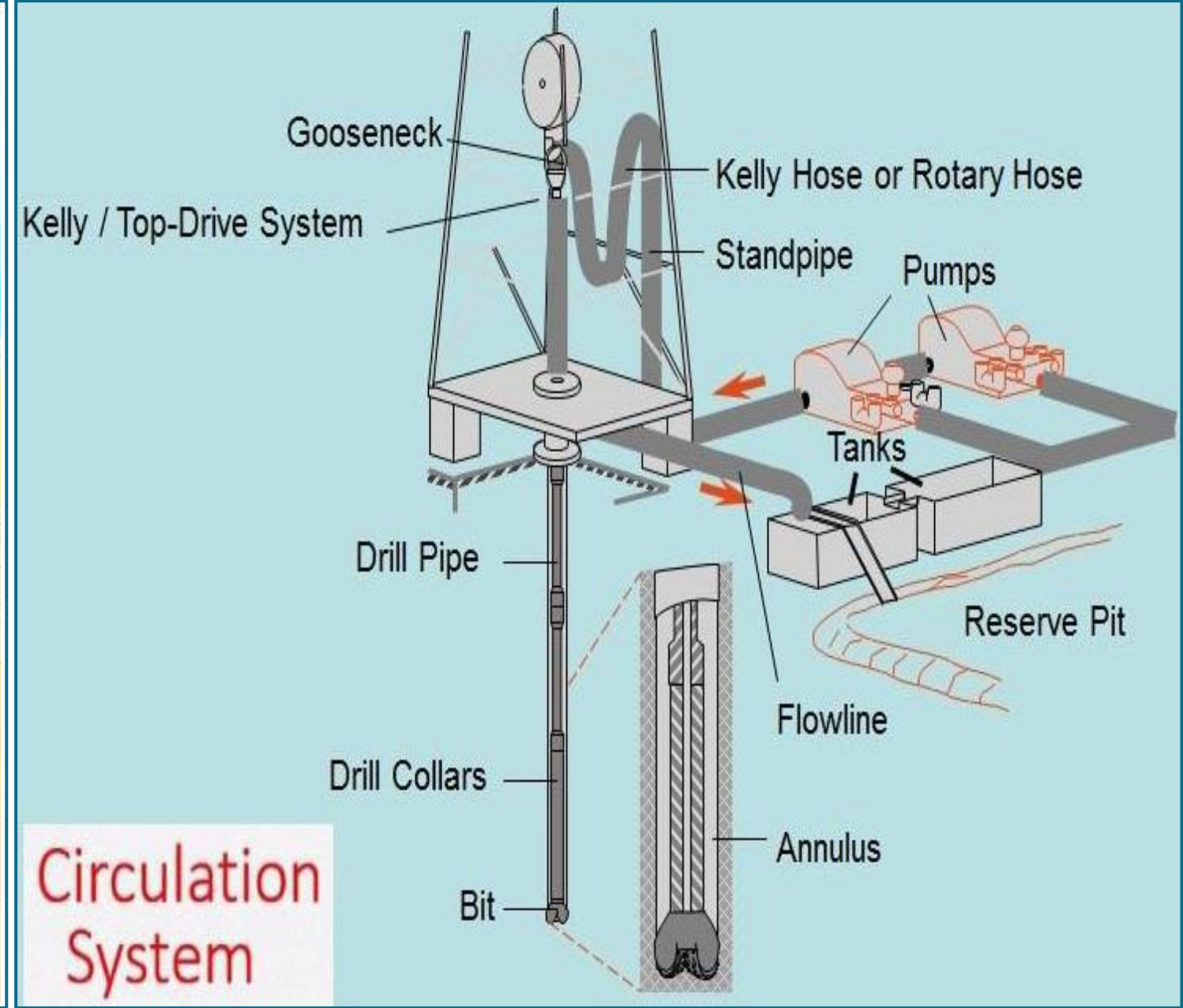
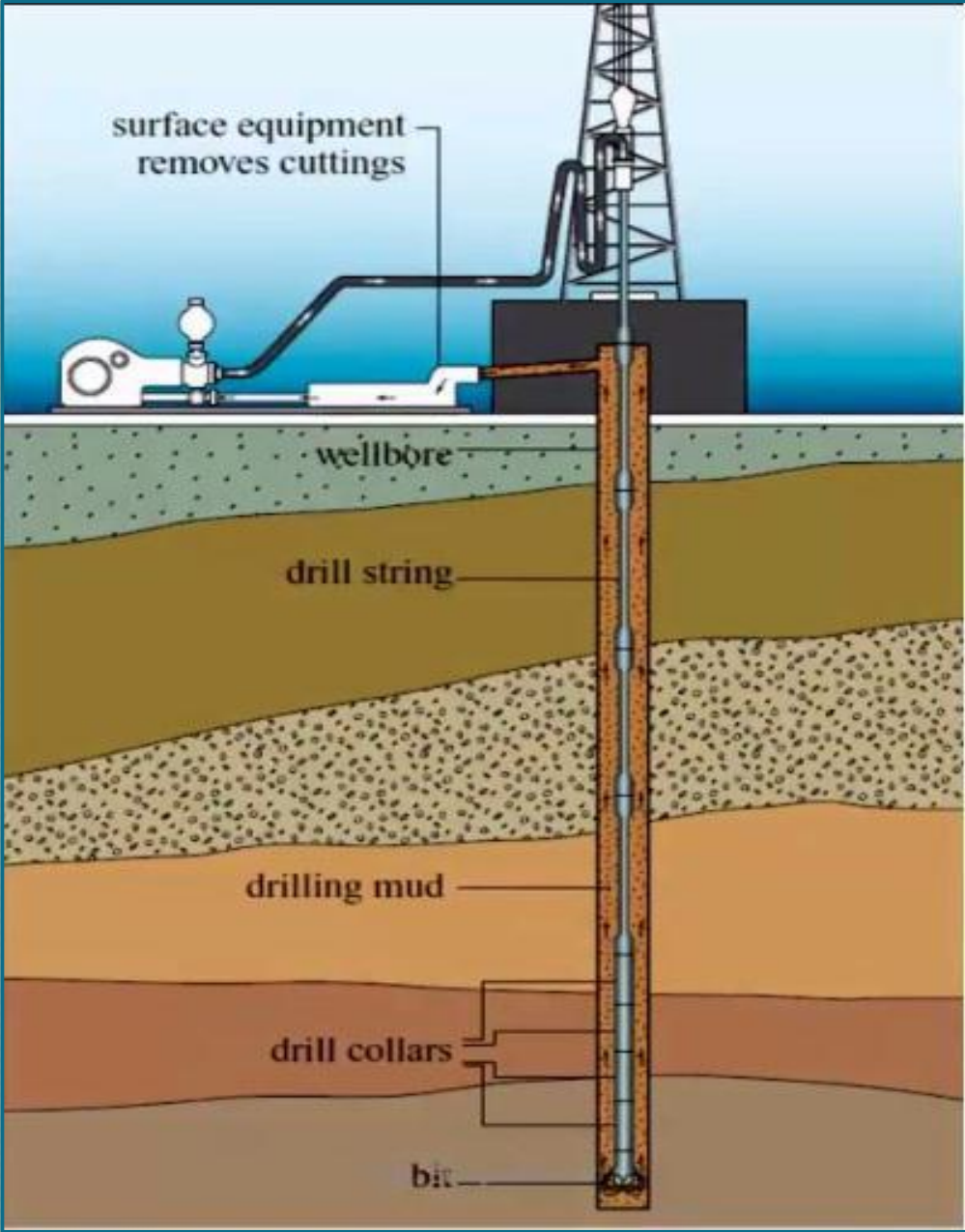
Mud Gas Separator

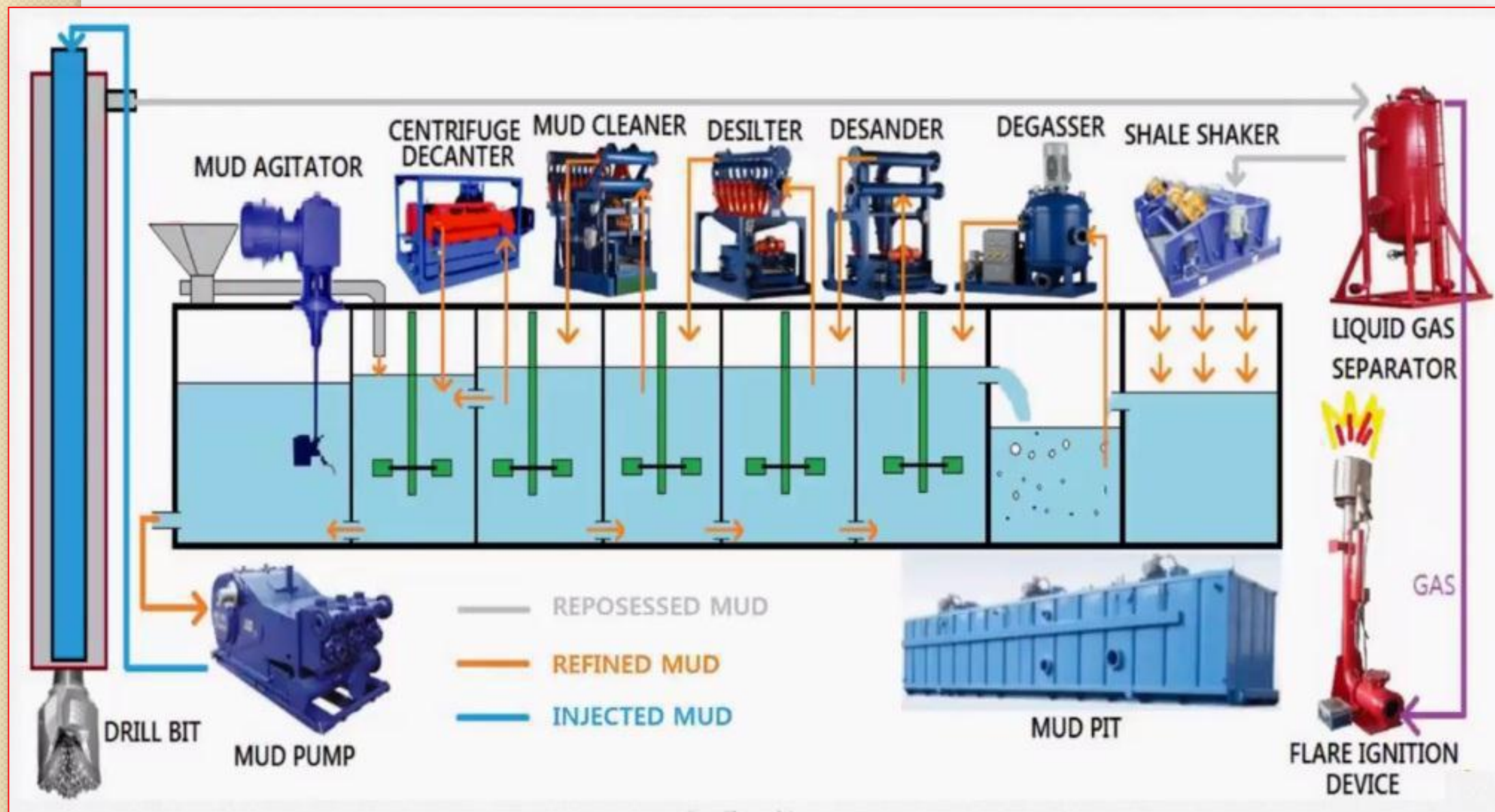


12. Reserve Pit

A waste pit, usually an excavated earthen-walled pit.









Thanks!