Vocab

Surge - occurs when running in hole. not enough space around bit and BHA for fluid to flow past as its displaced but instead force down into formation

Swab - opposite of surge. Casing or DS pulled out to fast may pull fluids out of annulus leaving vacuum effect reducing Pcss. May allow influx of res fl

Differential Sticking - occurs in DH permeable formations (sand). Must have Pcss in wellbore is higher than formation pressure and DS is up against well cake in filter cake. Force equal to Δpressure x Surface area results. Direction of force is into the hole wall. Solution: Jarring - increase up/down force decrease fluid density to decrease sticking

Freepoint Tool or Log - way to determine depth of stuck DS or CS. Top are bottom of tool anchors inside DS and pull upward. Strain gauge tells if stuck or not You can then find exact stuck depth.

Overshot (Fishing) - Downhole tool in fishing operations to engage at outside surface of tube or tool. Grapple or slip mechanism on overshot grips fish allowing tensile force or jarring.

Junk Basket - Fishing tool run into well to retrieve junk, debris ect. Most common relies on venture flow to pull debris into tool while circulating. Used when "milling" or drilling up is not possible.

Whip Stock - hardened steel wedge or ramp which forces the bit or mill to the side of the hole and makes it deviate from original path.

Key seat - Occurs in high DLS (Dog Leg Severity) area of wellbore or a tortuous area. A channel or seat will be worn where the DS rest on the wellbore wall and rotates/moves. Area is the size of the DS (smaller than hole) can result in difficulty tripping / stuck pipe.

Crossover - component that connects 2 DS or BHA (bottom hole assy) with different threads types/sizes. Responsibility of directional driller.

Jars (drilling or fishing) - DH tool to get DS or fish unstuck. Uses KE stored in a slowly stretche or slowly downward moving to apply a sudden impact to fish. Drilling jars are run while drilling to prevent when fishing jars other being stuck. Fishing jars have greater impact

Caliper (logging) - tool run on OH logging runs, consists of 3 or more (4 here) arms that stick out. As log is pulled up arms measure the whole, allows for accurate cementing job of trouble zones over entire length. Cased calipers have more arms to detect holes in casing.

Deadman / Deadline anchor — where drilling line is anchored on rig. From deadline anchor drilling line runs through crown over traveling block and spooled on drawworks drum. Hookload measurement is taken from sensor mounted on line at this time.

Sidewall core - core taken at side of hole. 1" diam and 2" long. Taken via wireline over usually 25-75 cores. Not as high of quality due to small size but MUCH cheaper.

Hopper (Mud) - device used to mix additives into mud system. Shaped like a funnel 3'-4' high sized ft diameter. Located close to sluggin tank / suction line on the pits. Mud is pumped past end of funnel resulting in suction pulling additive into system.

Packed Off (drilling or fishing) - when cuttings buildup or wellbore collapses around DP. Nothing at BS will be unable to move or fluid unable to flow in or out. Due to inability to pump/remove cuttings problem gets worse. Improperly hole cleaned = packoffs = stuck pipe.

Wellbore and Reservoir Evaluation, Well control, Safety and An

Evaluation: Reasons

- Geological correlation
- Geosteering
- decision (no or nogo)
- Completion design
- Problem Id / Identification
- Data Gathering
- Reservoir model verification
- geological confirmation

Methods

4 primary methods
- Physical sampling at surface
- Physical sampling downhole
- Downhole logging and measurements
- Production Testing.

Mud Logging

- Sampling mud/cutting in return line
- inexact science
- Physical properties observers
- Issues - (depth correlation, experience, usage)

MWD (Measure while drilling)

- Survey measurements
- Inclination, Azimuth

LWD (Logging while drilling)

- most technology available in LWD
- needed to geosteer
- higher risk due to LIH cost
- Comm to surface with mud pulse
- Correlate with MWD

DST (Drill stem test)

- exploration wells
- test secondary uphole pay
- Surface press and flow
- DH press
- fluid comp
- Res Press
- test many zones

Logging Wireline

- Direct measure
  - Gamma
  - Electric resistance
  - Neutron density
  - Sonic response
  - temp
  - Hole size
  - Inclination
  - Pressure
  - Image
  - etc
- Indirect
  - Φ poro
  - K perm
  - fluid type
  - density
  - mud invasion
  - many others