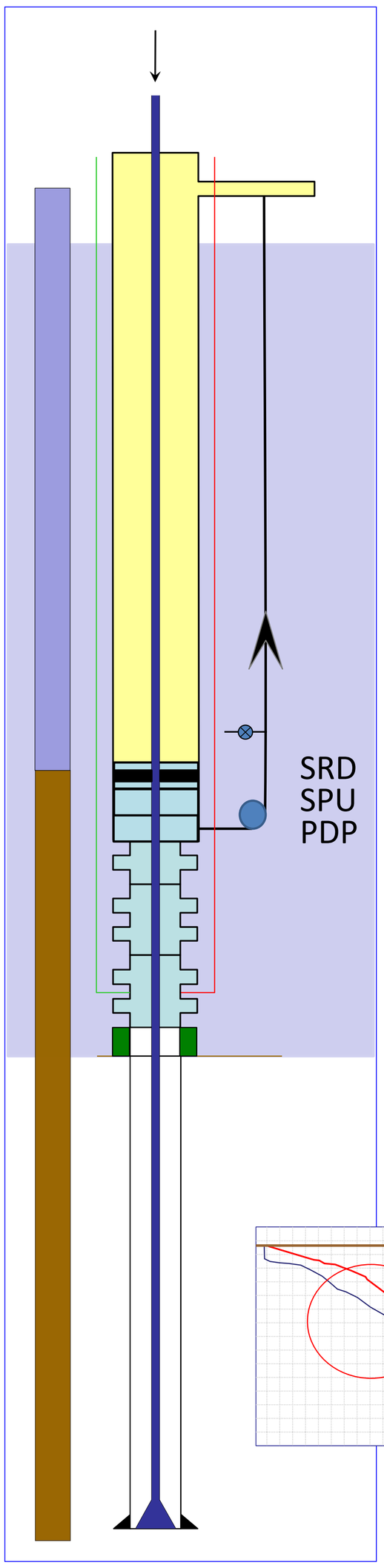
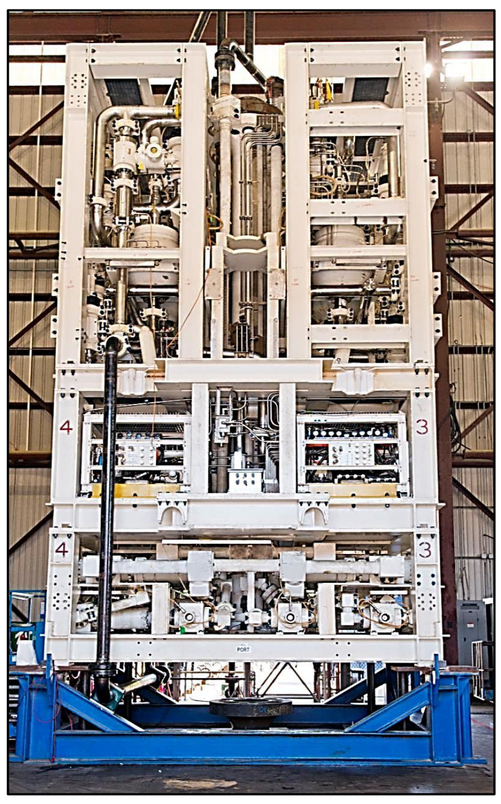
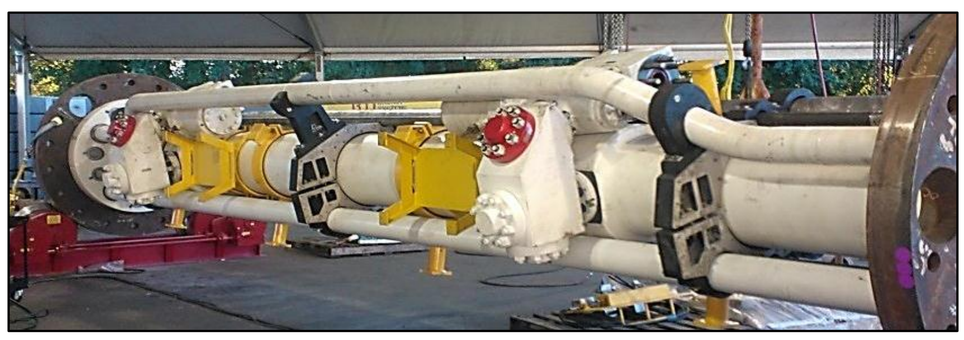
# Subsea Pumping- Positive Displacement Pump

- Two fluids of different density are used to achieve a desired pressure gradient with heavy mud in the wellbore up to the mud line and a lighter fluid (typically seawater density) in the riser.
- A very high resolution positive displacement pump is used to lift cuttings and mud from near the mud line back to the drilling vessel. It is above the LMRP. Manipulation of the pump inlet pressure can alter the back pressure profile on the wellbore.
- A solids processing unit is above the pump. Its function is to ensure that all solids are small enough to pump without plugging lines.
- A subsea RCD is above the solids processing unit. It is a mechanical barrier between the wellbore and the riser. It allows the well to be statically and dynamically overbalanced during AFP management operations.
- Changes in pump speed can be used to detect kicks or losses early, thus limiting their size. The high resolution positive displacement aspect of the pump allows very low rate kicks to also be detected.
- Despite the RCD, the BOP is closed during kicks and all kicks are circulated up the choke/kill lines. Although kick sizes will typically be quite small, the pump can safely circulate out kicks of virtually any size, including gas kicks.
- Currently, the system can be used in water depths up to 10,000'.

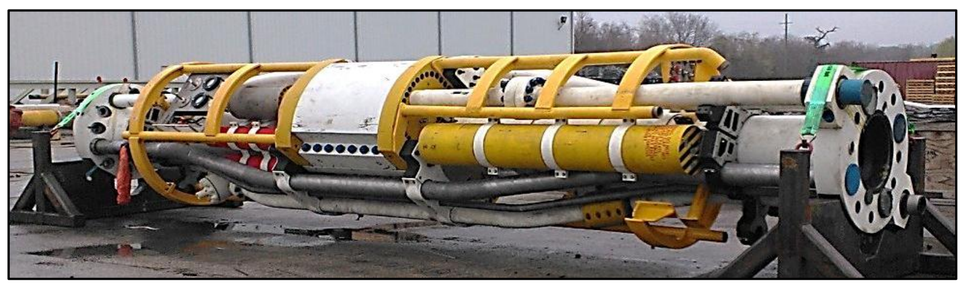


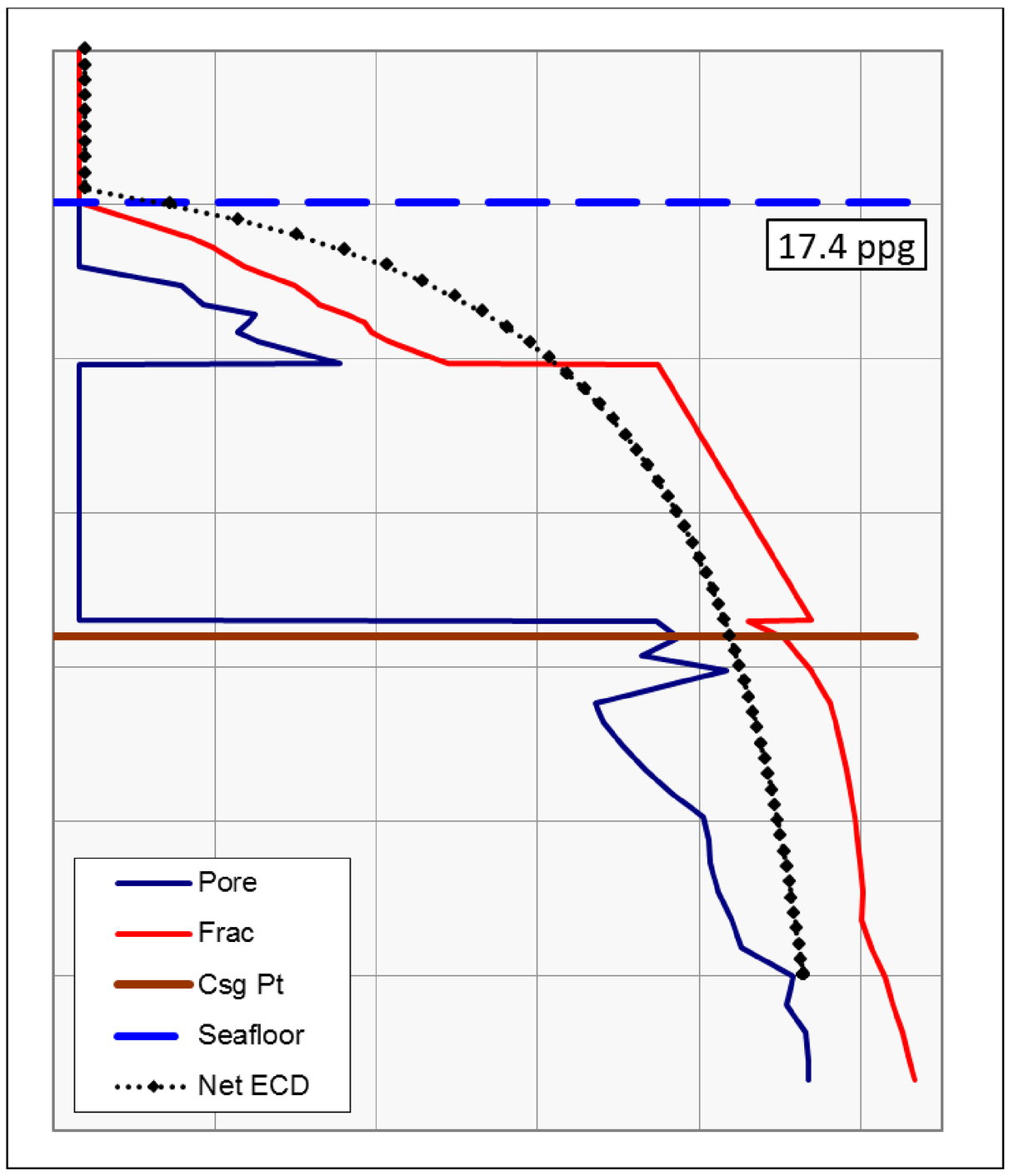
Subsea positive displacement pump (PDP)



Subsea Rotating Control Device (SRD)



Solids Processing Unit (SPU)




From IADC MPD Selection Tool