

Drilling





Types of Drilling Rigs



Marine Rigs

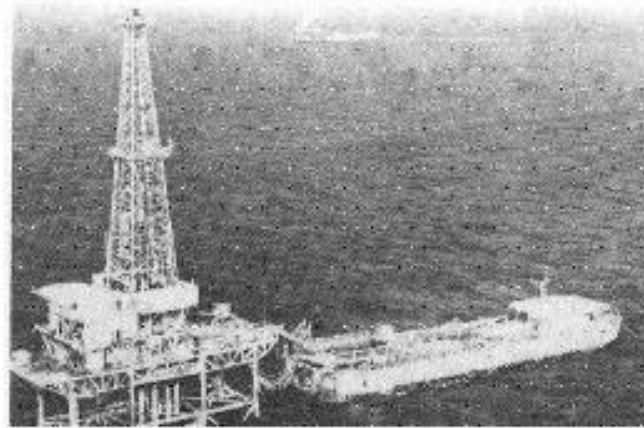


Barge Rig



Self Contained Rig

Types of Drilling Rigs



Tendered Platform



Submersible



Jack-up Rig

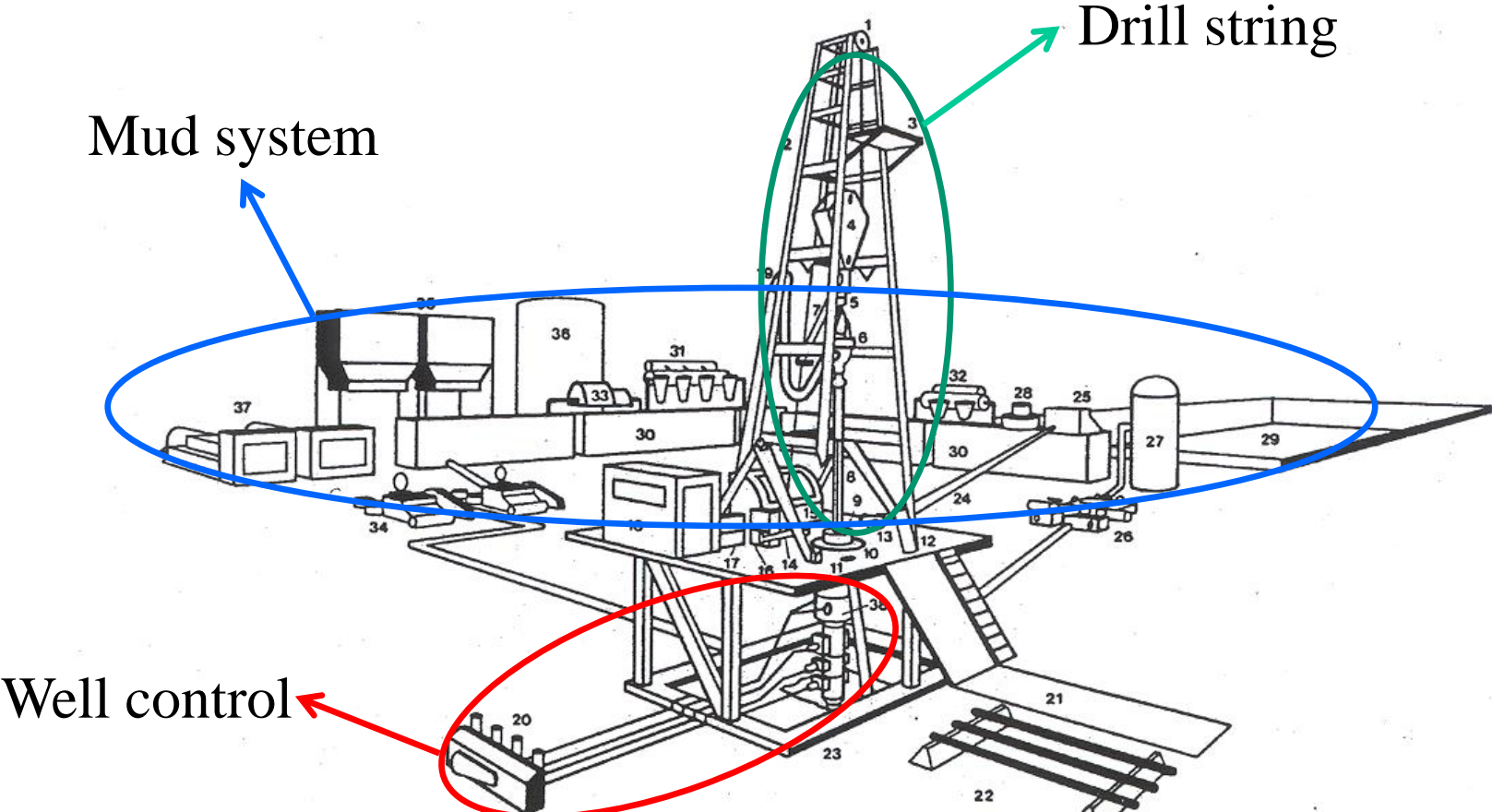


Semi-Submersible Rig

BP disaster, Offshore Gulf Coast



Components of Drill Rig



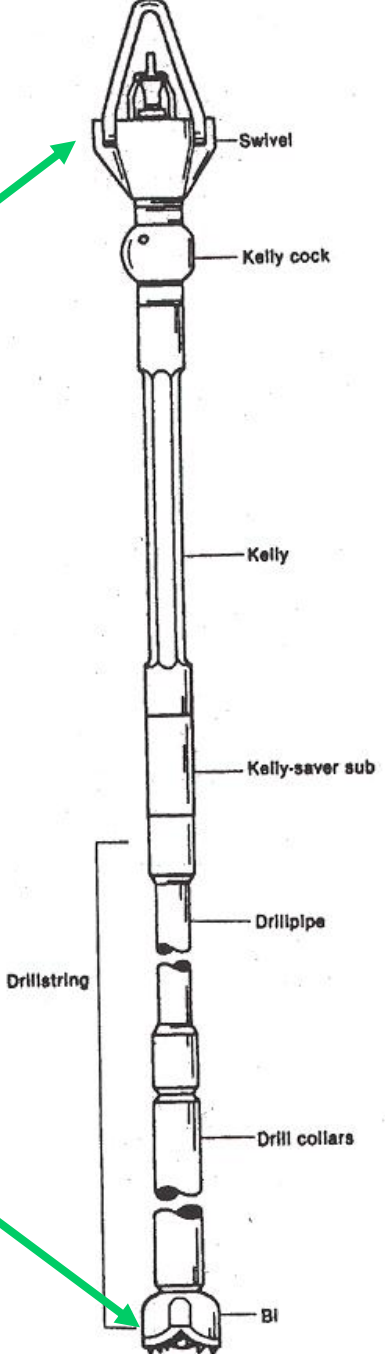
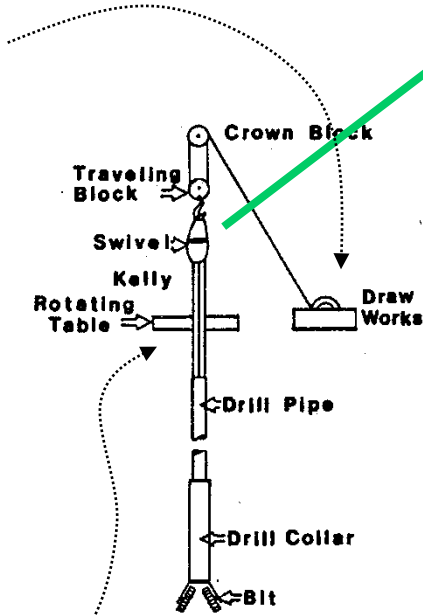
Drill string

Mud system

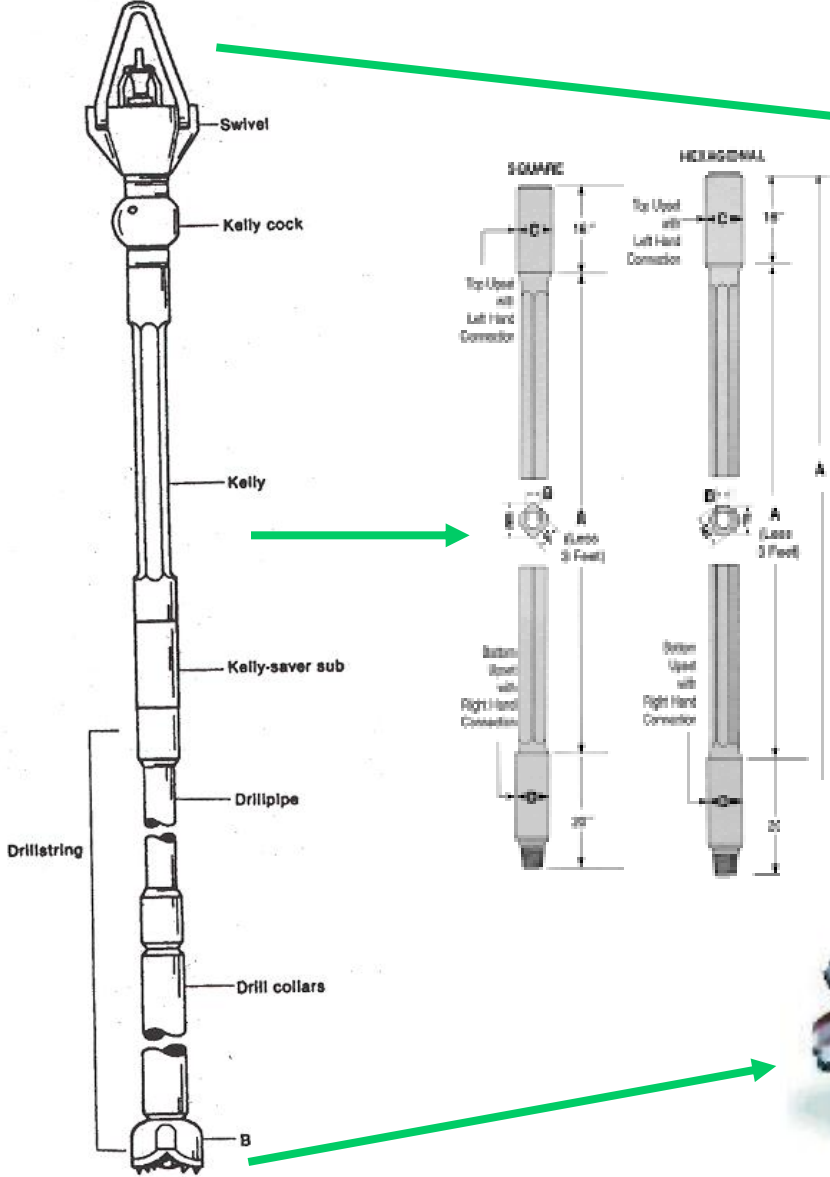
Well control

- | | | | |
|--------------------|-----------------------|-----------------------|--------------------------------|
| 1. Crown block | 11. Mousehole | 21. Pipe ramp | 31. Desilter |
| 2. Mast | 12. Rathole | 22. Pipe rack | 32. Desander |
| 3. Monkeyboard | 13. Backup tongs | 23. Substructure | 33. Centrifuge |
| 4. Traveling block | 14. Makeup tongs | 24. Mud return line | 34. Mud pumps |
| 5. Hook | 15. Drawworks | 25. Shale shaker | 35. Dry mud components storage |
| 6. Swivel | 16. Weight Indicator | 26. Choke manifold | 36. Water storage |
| 7. Elevators | 17. Driller's console | 27. Mud-gas separator | 37. Engines and generators |
| 8. Kelly | 18. Doghouse | 28. Degasser | 38. Blowout preventer stack |
| 9. Kellybushing | 19. Rotary hose | 29. Reserve pit | |
| 10. Master bushing | 20. Accumulator unit | 30. Mud pits | |

Components of Drill String



Components of Drill String



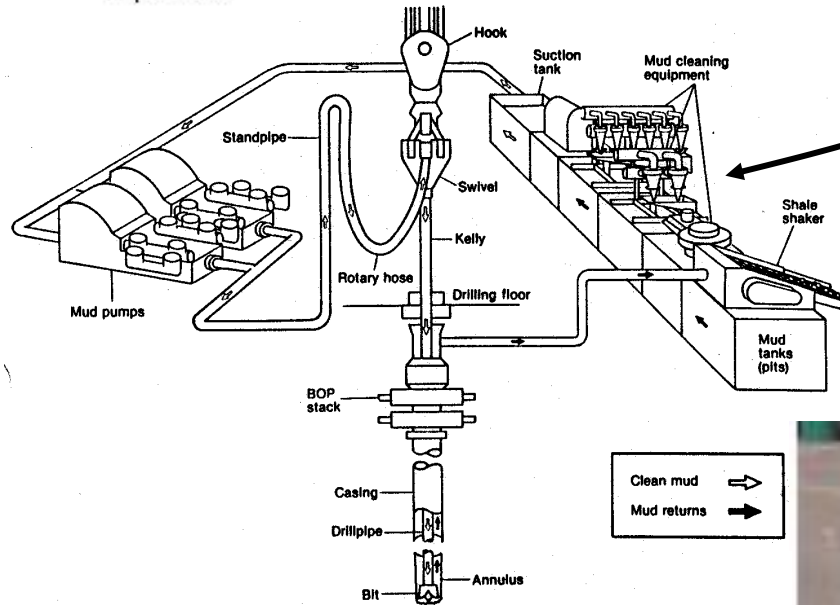
Mud/Circulating System



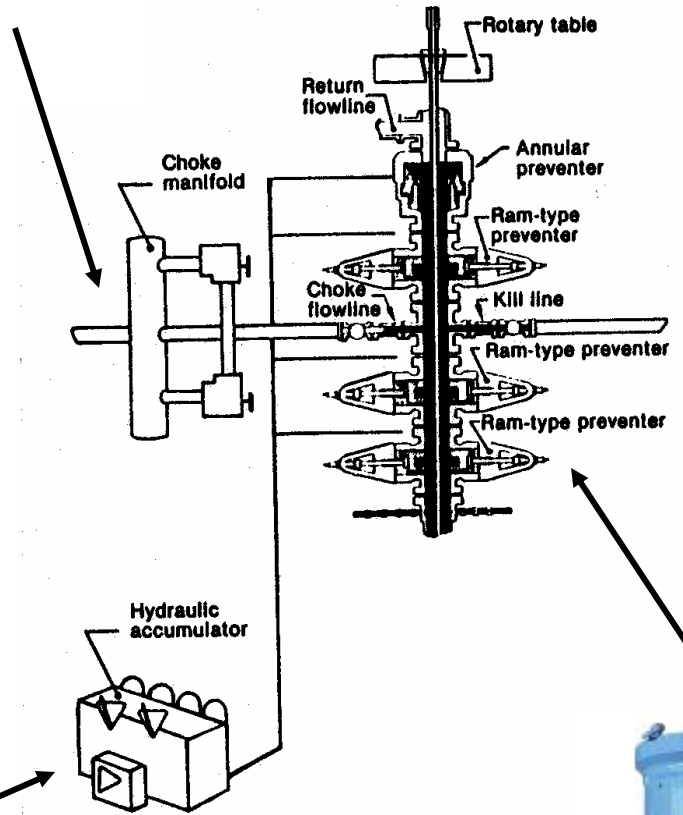
Duplex PDM



Triplex PDM



Components of the Well Control System



BOP stack

Interoil Antelope-2 flare, Indonesia



Drill Bits



Two types of rolling cutter bits
(L) Milled tooth bit
(R) Insert bit

PDC



Wellbore Diagram And History

CC: 20127800
KB: 22'
GL: 413'

Spud Date 06/30/04
WI: 100% NRI: 100%
11" 5000PSI X 9-5/8" SOW casing head

9 5/8", 36 lb/ft, K-55,LTC @ 932'. Cemented w/ 380 sks

June 2004 - Well drilled
7/21/2004 - Perforate Pettet, breakdown w/ PPI tool
7/29/2004 - Acidize Pettet comp w/ 6000 gals 15% HCl
9/10/2004 - Relocate packer to 7287' to isolate lwr perms
11/20/2004 - Perf, breakdown, and acidize Transition zone

223 jts. 2-3/8 4.7# L-80 8rd tbg

Weatherford AS1-X @ 7,212'

EOT @ 7,219.35'

Pettet Completion (7/2004)

Perf: 7239-45', 7250-54', 7268-70', 7288-90', 7298-302'
7315-19', 7324-30', 7337-40', 7372 -76'; 7395-97'
Perforate 4 SPF, top down 15% HCL
Breakdown and Acidize each interval.

Transition Zone (11/2004)

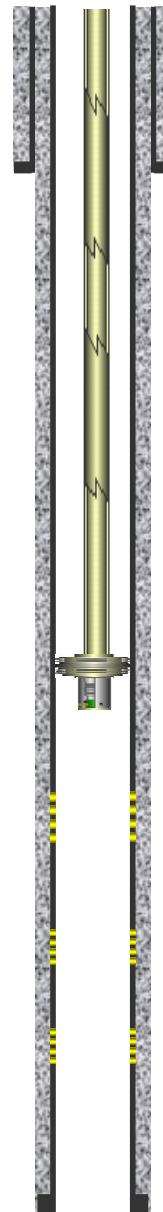
Perts: 7456-52', 7472-80' w/ 4 SPF
Breakdown and acidize w/ 1400 gals 15% HCl
Commingle w/ Pettet

Travis Peak - Fluvial (12/2004)

Perf: 7705-12', 7669-82'; 7645-48'
CO₂ Frac w/ 47,000 # 20/40 resin coated

5 1/2", 17&15.5# K-55 LTC@ 7,825' Cmt w/1070sxs

TD: 7,825' MD



Directions: At Buffalo, turn right onto FM 75 & go 1000 yards, turn left onto FM 164. Travel 18 miles on FM 164 to FM 3371, turn left onto 3371 & go approx 8.1 miles to LCR 750. Turn left onto LCR 750 & go approx. 7 mile to location on the right.

Casing & Cement

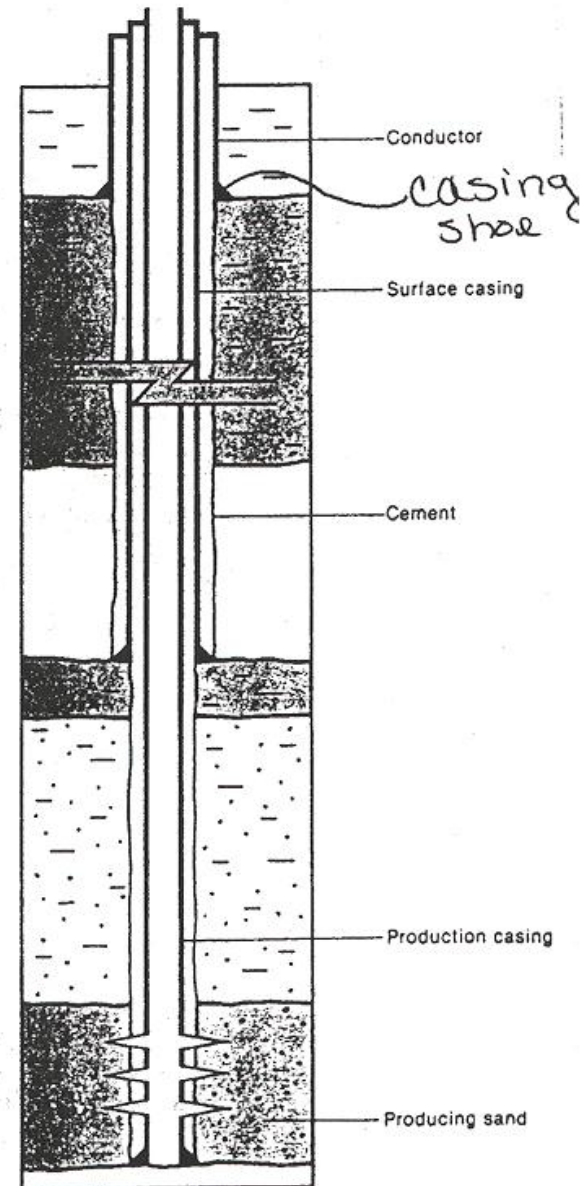
supports the sides of hole

prevents unwanted communication of fluids and pressure between different formations,

particularly to protect fresh water zone near the surface

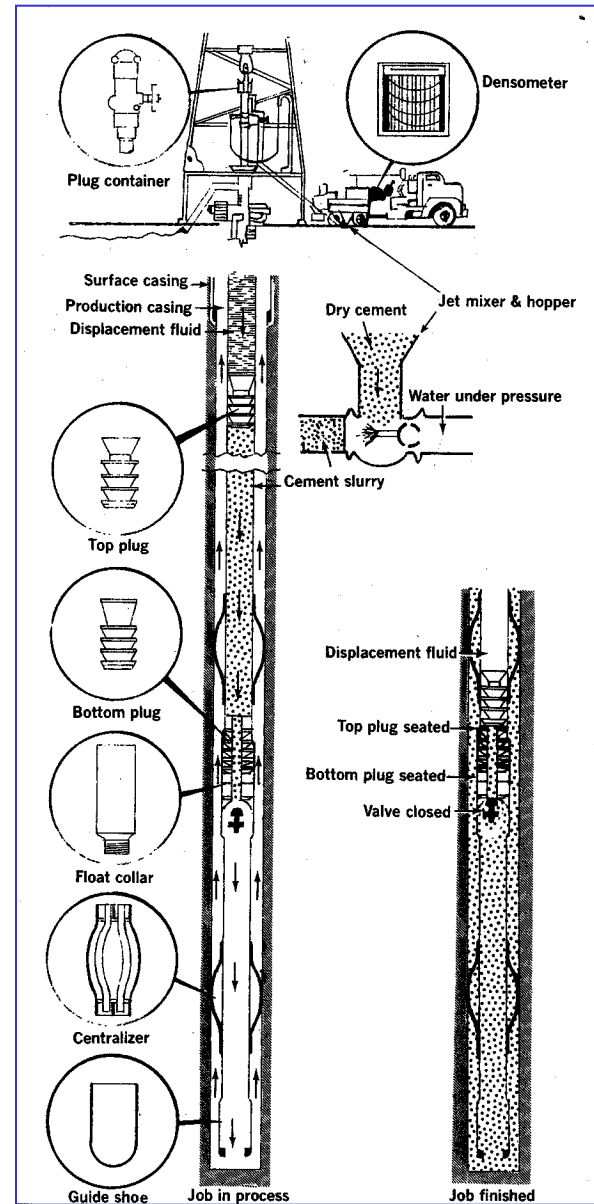
allows control of pressures

provides a 'base- for surface and subsurface equipment



Cementing

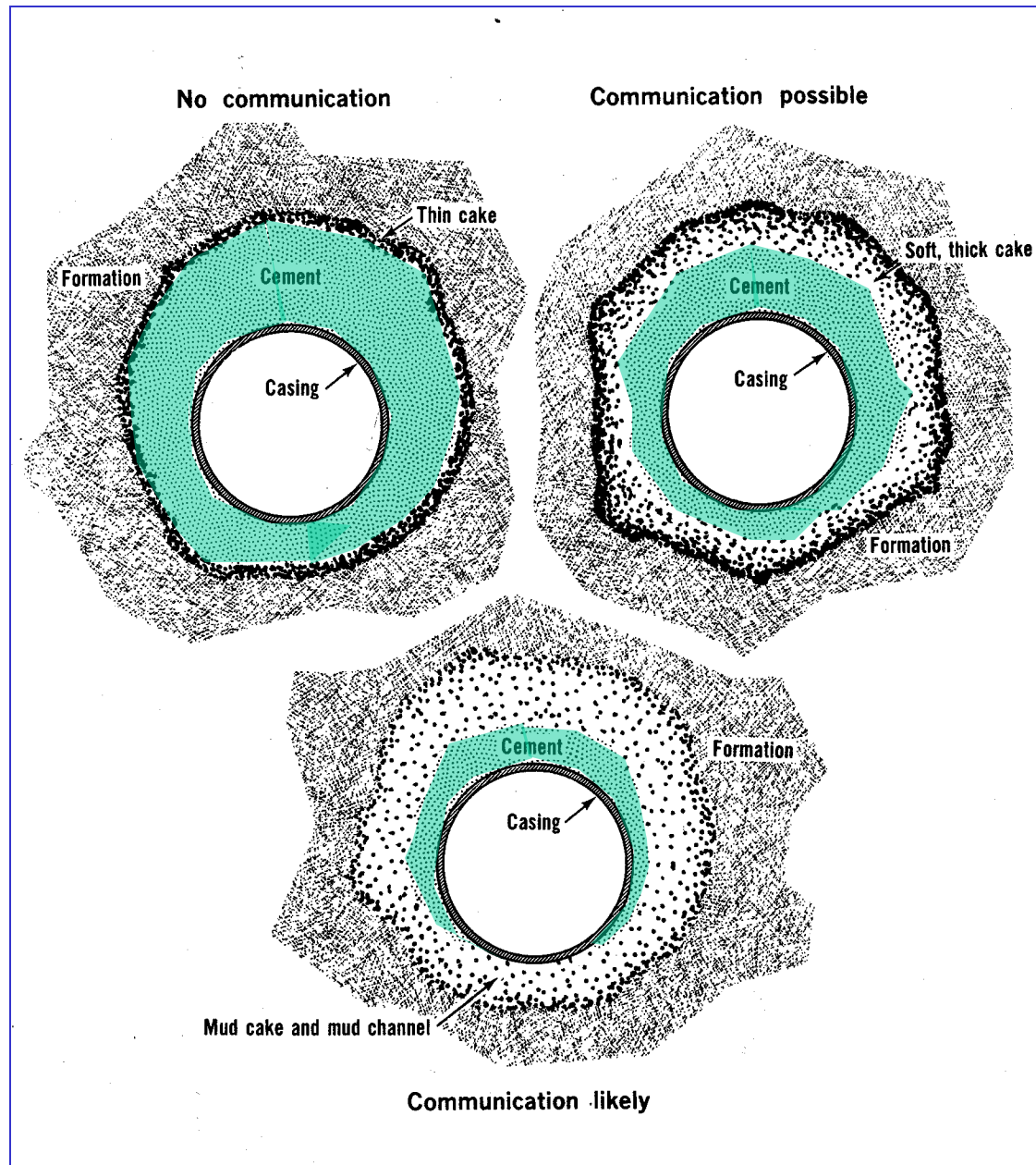
Schematic of cement placement



Courtesy of Allen & Roberts

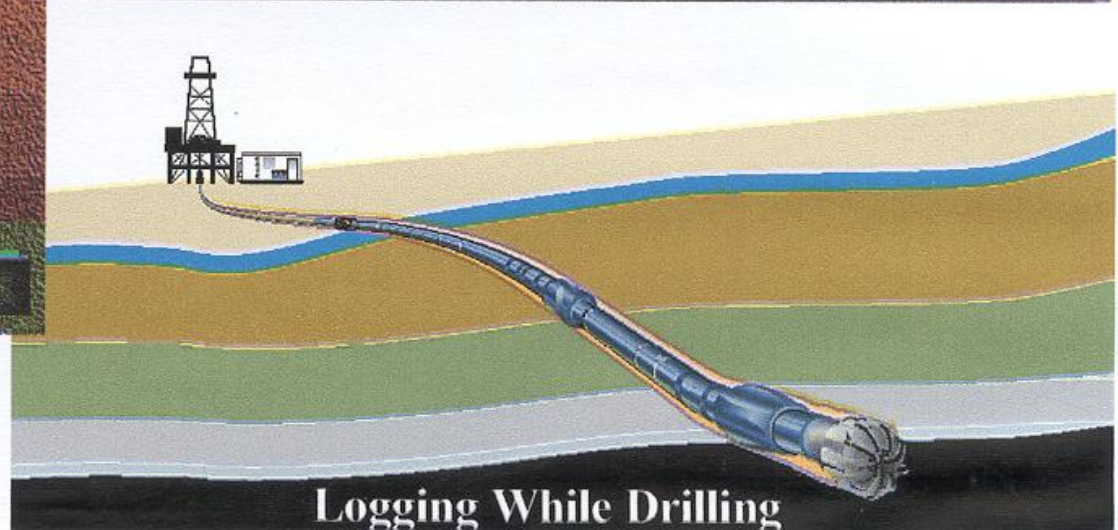
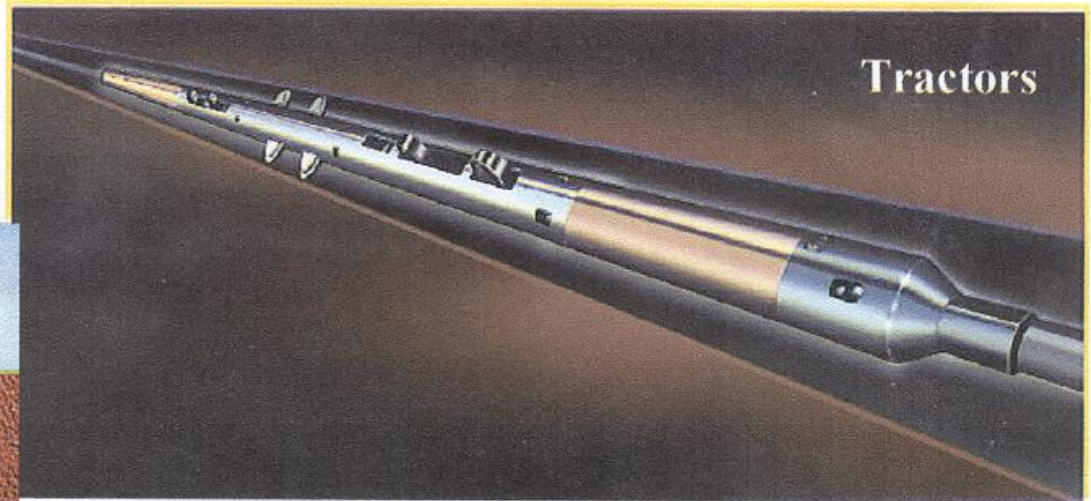
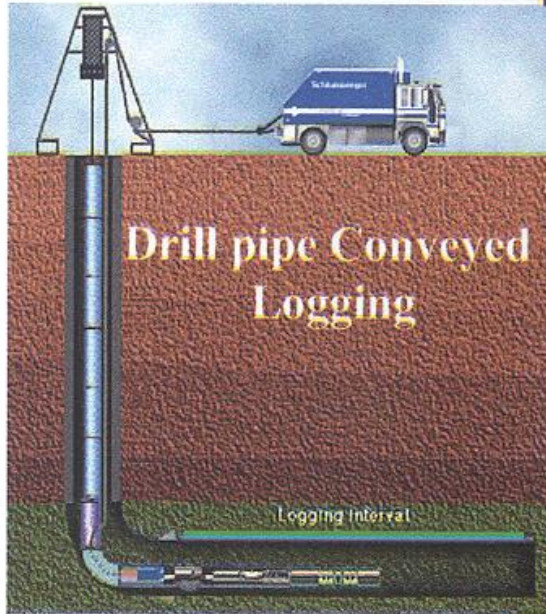
Cementing

Cross-section
Illustrating
Potential fluid
migration



Courtesy of Allen & Roberts

Horizontal Drilling





Hafa (2007) steering

Stacked lateral

