How to drill a well in FIVE easy steps

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How to Drill a Well in 5 Easy Steps

- Identify where the oil is.
How to Drill a Well in 5 Easy Steps

- Identify where the oil is.
- Rent yourself a rig.

FOR RENT CHEAP
Yours for only
$300,000 a day
How to Drill a Well in 6 Easy Steps

- Identify where the oil is.
- Rent yourself a rig.
- Drill a hole

Our wells may take 60 Days or longer & approx. $15MM to Drill and Case
How to Drill a Well in 5 Easy Steps

- Identify where the oil is.
- Rent yourself a rig.
- Drill a hole
- Run casing & cement

Diagram:

16" Conductor
11 ¾" Surface
14 ½" Hole

9 5/8" Drilling Liner
10 5/8" Hole w/ 12 ¼" Hole Opener

7 " Intermediate
8 ½" Hole w/ 9 ½" Hole Opener

4 ½" Production Liner
6 1/8" Hole
How to Drill a Well in 5 Easy Steps

- Identify where the oil is.
- Rent yourself a rig.
- Drill a hole
- Run casing & cement
- Run your completion

“Completing” a well can take another $15MM to execute the program

The lower completion will have 127 pieces of equipment going in the hole
Half-time Takeaways

- Expensive art, science, and luck
- Drilling does not equal production
- Very technical and regulated process
Semi-Detailed look at drilling a Well

- Identifying a target.
- Design the directional path to reach the target.
- Select tools and services required.
- Design a complete program to drill to target
- Install a completion to achieve the wells objective.
Identifying an objective & target.

What do you want out of your well?

- Disposal well
- Injector or producer well
- Data collection

Where should you drill it?
Design a directional path to reach the target.

1.3 Miles of Oil bearing formation
Design a directional path to reach the target.

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Select tools and services required.

- Drilling Rig
- Drillstring
- Fluid System
- Casing
- Cement
- Completion
Design & Execution of the Drilling Program
Design & Execution of the Drilling Program

- Drill Surface Hole
- Run Surface Casing
- Cement Surface Casing
- Drill Next Hole Section
Drillstring: The Bit and Motor

**Bit**
- Cuts or crushes rock

**Motor (simple)**
- Orients the bit in the desired direction

**Rotary Steerable (smooth)**
- Orients the bit in the desired direction while continuously rotating
Drillstring: MWD/LWD

- **Measurement While Drilling**
  - Pressure, temperature, & wellbore position in 3D
  - “Downhole GPS”

What is going on down there?
Where are we relative to the rig?
- **Logging While Drilling**
  - Provides real-time information on formation characteristics.
  - Allows us to determine where the bit is relative to the formation we are drilling.
  - Helps define well placement and predict drilling hazards

**What is going on down there?**

**Where are we relative to the formations we are drilling?**
Drilling Mud

The life blood of the modern drilling operations

- Drilling fluid, known as mud, has several different functions essential to drilling an oil or gas well, including
  - Subsurface pressure control
  - Cuttings removal and transport to the surface
  - Suspend solids
  - Helps suspends weight of the drillstring and casing
  - Lubrication & cooling of the drillstring & bit
  - Wellbore stability
  - Transmit hydraulic energy to downhole tools
Casing

- Protect freshwater formations
- Isolate formations with significantly different pressure gradients
- Isolate unstable formations or zones of lost returns
Cement

Protects & seals the wellbore
- Isolate fluids from moving between formations
- Isolate unstable formations
- Plug off unwanted wellbore
Cutting Edge Technology We Use

- **Logging tools**
  - Formation pressure sampling.
  - Perpendicular cores from the borehole.

- **Real time down-hole data streaming**
  - Formation data streamed anywhere in the world.

- **Managed pressure drilling**
  - High tech pressure control

- **Radio Frequency ID downhole tools**
  - Digital chip tool activation.

- **Survey management**
  - Crustal Anomalies
  - Gravitational field shifts
  - Solar flares