

State of Nebraska Well Drillers Licensing Exam

Nebraska Well
Drillers Association



Study Guides

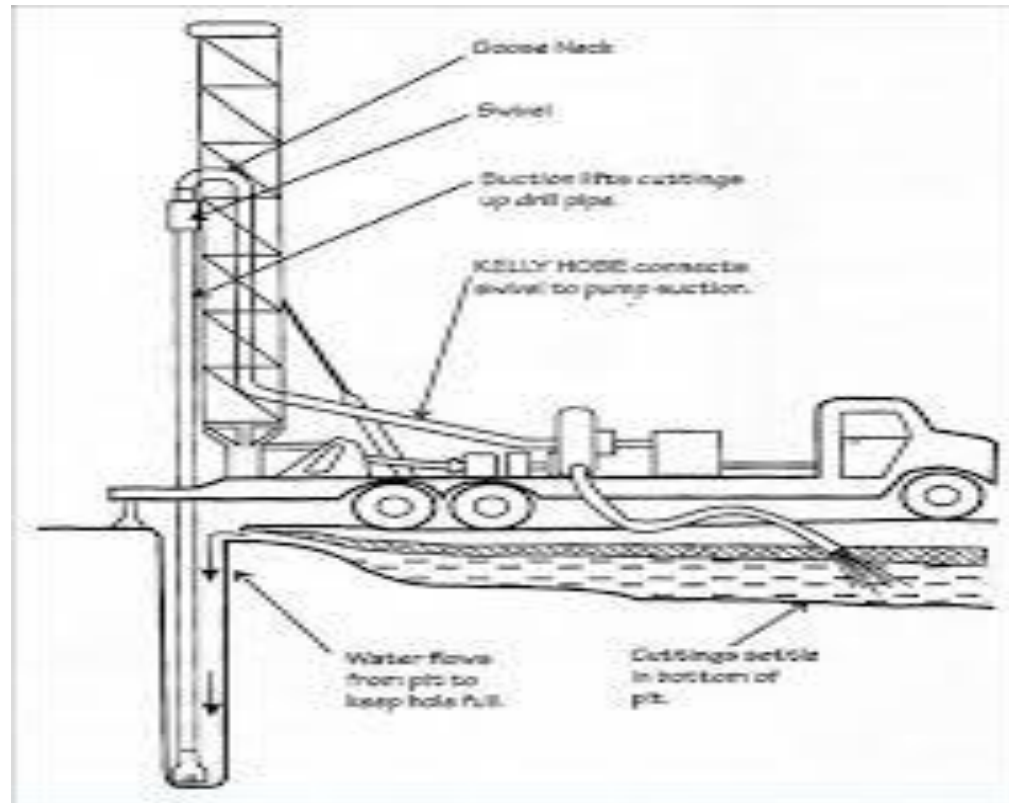
- Ground Water and Wells
- Nebraska Water Well Standards
- Groundwater Atlas of Nebraska
- Practical Handbook of
Groundwater Monitoring



CABLE TOOL DRILLING IS THE OLDEST METHOD OF DRILLING



Reverse Rotary Drilling



Reverse Rotary Facts

- Large diameter holes are drilled best with reverse rotary.
- An air line down the drill stem is used to assist the return of the drilling fluid.
- It relies on an additional head of water to keep the hole open.



More Reverse Rotary Facts

- Drilling fluid descending into the hole usually has a velocity much less than the fluid returning through the drill stem.
- Mud pits should be 1 ½ to 3 times the volume of the hole being drilled,



Common Drilling Tools

- **REAMER** - Used to enlarge the borehole
- **SAND LINE** - A winch that the bailer is attached to.
- **OVERSHOT** - Common fishing tool used in the drilling industry



Few more drilling facts

- Too much down pressure will cause a crooked hole.
- When drilling in unconsolidated material with a tri-cone roller bit regulate bit pressure and rpm.
- Collecting samples can help correlate formation from one area to another.



Drilling Fluid



Purpose of Drilling Fluids

- Remove cuttings from bit and send them to the surface.
- Replace water in the drill hole.
- Cool drill bit.



Drilling Fluid Should Be

- SMOOTH
- SLICK
- TOUGH
- THIN



Fluid Testing

DENSITY - Weight of the fluid

- Used to calculate Solids Content.

VISCOSITY - Resistance to flow

- Measures thickness of the fluid.

SAND CONTENT

- Measures the amount of sand the fluid is carrying.



Fluid Testing (cont.)

FILLTRATION

- Measures the amount of water going into the permeable formations and also the thickness of the borehole wall (filter cake).



Measuring Density

Density is measured using a Mud Balance and Reported in Pounds Per Gallon.



Measuring Viscosity

Viscosity is measured using a Marsh Funnel and is recorded in Seconds Per Quart.



Measuring Sand Content

- Sand Content is measured near the suction hose inlet.
- High sand content can cause unnecessary pump wear.



More Fluid Info.

- Bentonite mixes better in High pH water.
- Drilling fluid with a pH less than 7.0 is acidic.
- Fluid mixtures should be suited for the formations being drilled in.



Know the Regulations

- All wells should be centered in the hole to ensure a minimum 2 inch annular space.
- A surface seal of all water wells should have at least a 5 foot seal in the top 15 feet.
- All well that pump over 50gpm must have a permit by the NRD prior to drilling.



Know the Regulations Cont.

- When completing a well in confined aquifers grout must be placed between the aquifers.

KNOW THE DECOMMISSIONING REGS



Definitions

- Aquifer
- Permeability
- Drawdown
- Pitless Unit
- Cone of Depression
- Water Table
- Confined Aquifer
- Artesian Pressure
- Porosity
- Static Water Table



SAFETY OF THE CREW IS THE FIRST CONCERN IN WELL DRILLING



Questions?

