

# Basic Concepts of Oil Well Cementing



**Presented to the Garfield County  
Energy Advisory Board  
February 3, 2011**

# Cementing

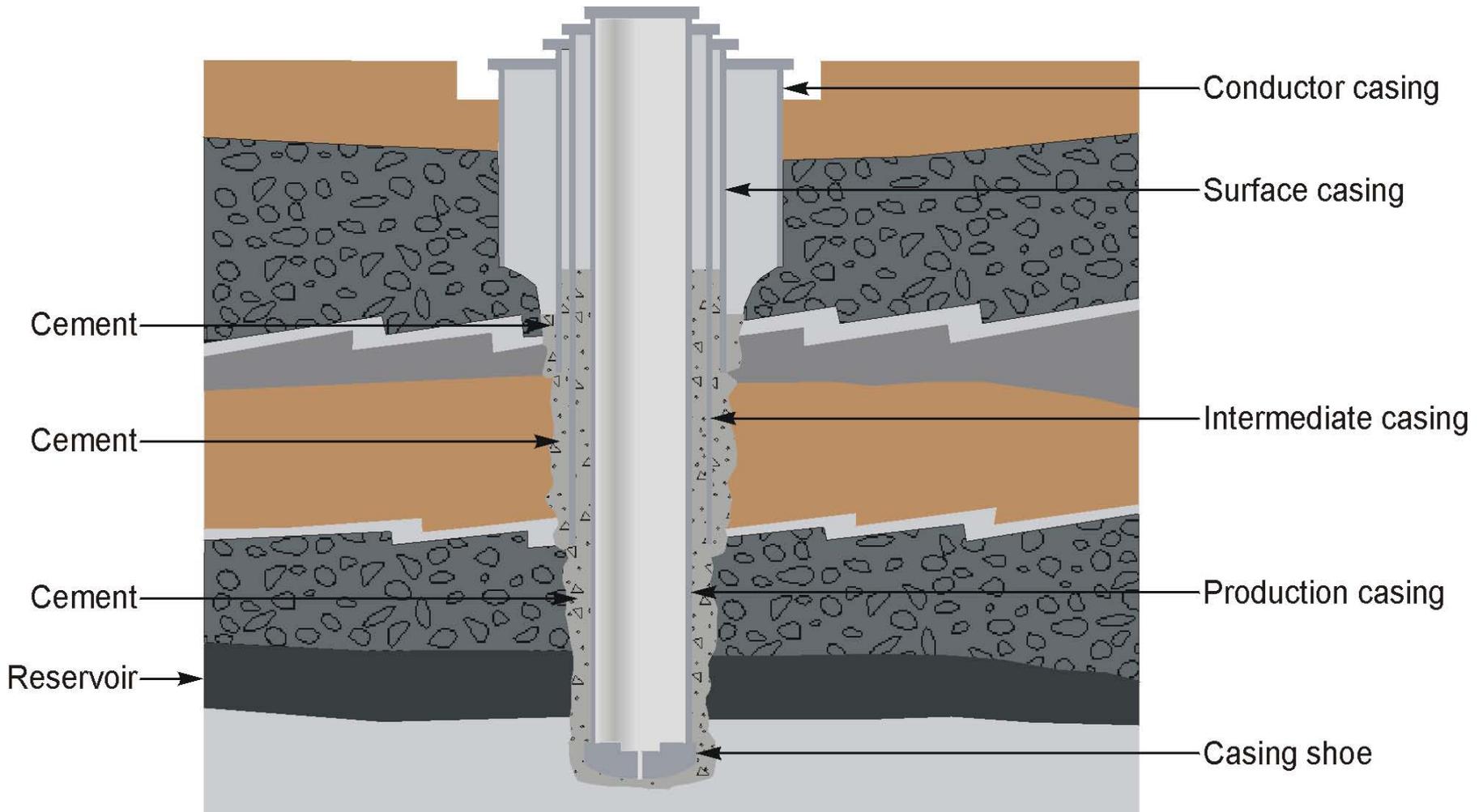


# Reasons for Cementing the Casing



- Seal formations penetrated
- Protect casing from burst, collapse, drilling shock, and corrosive fluids
- Maintain control of well

# Cement Applications

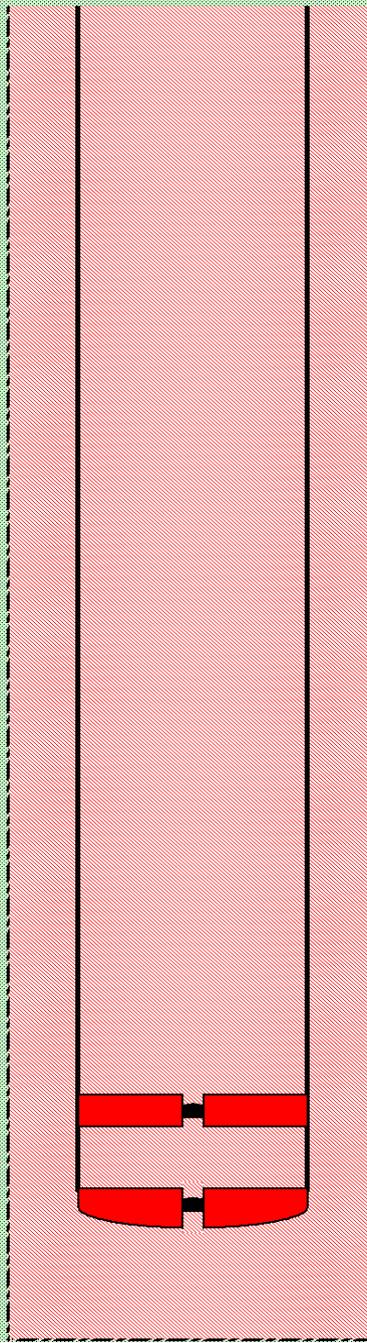


# Fluid Flows

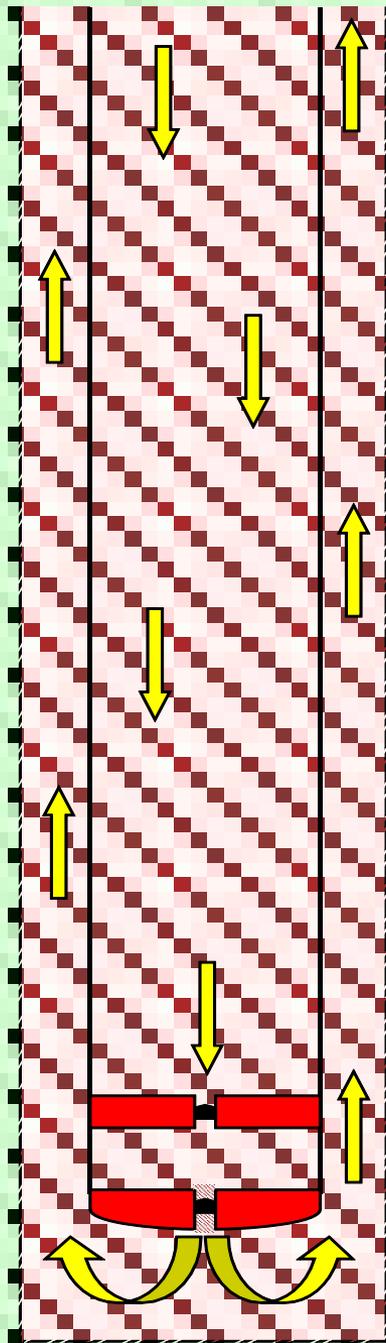


- The following fluid flow diagrams, while very basic, demonstrate the typical cement job sequence.

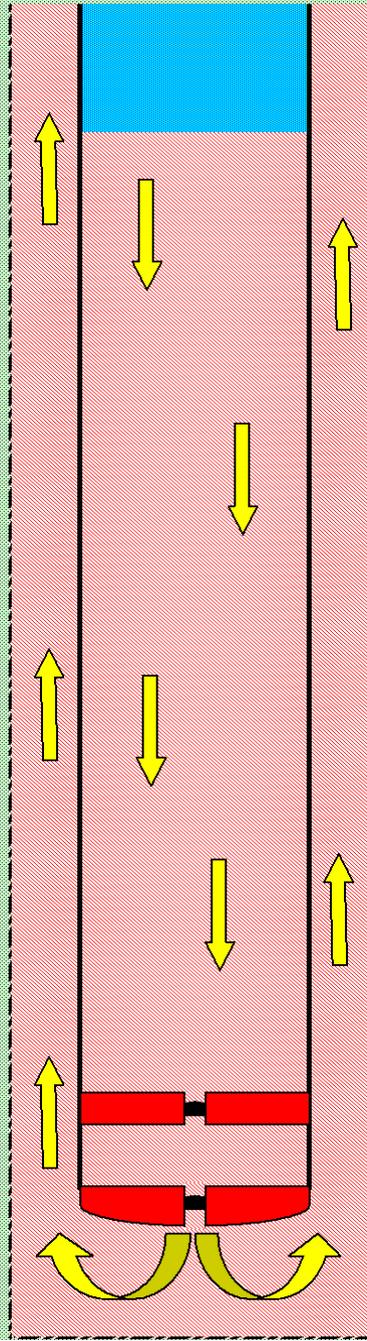
# Cement Casing



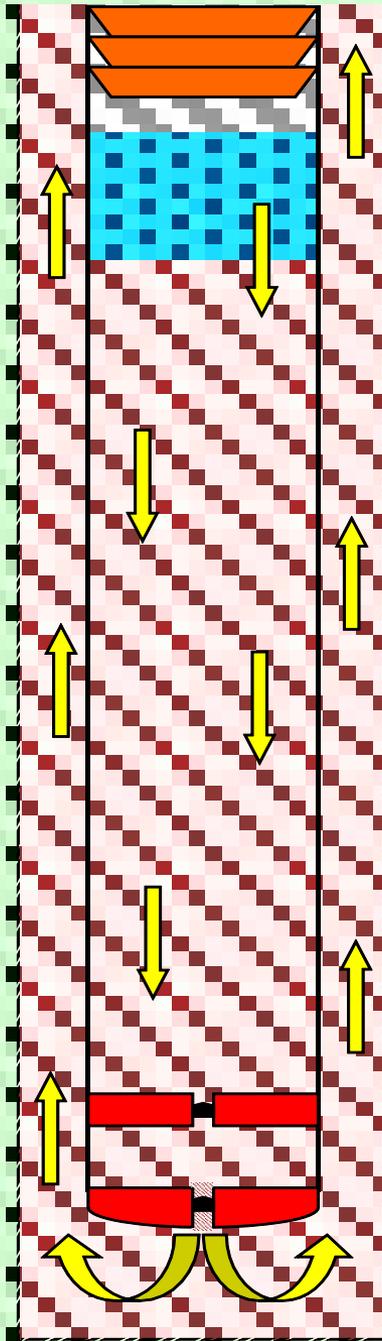
# Circulating to condition drilling fluid



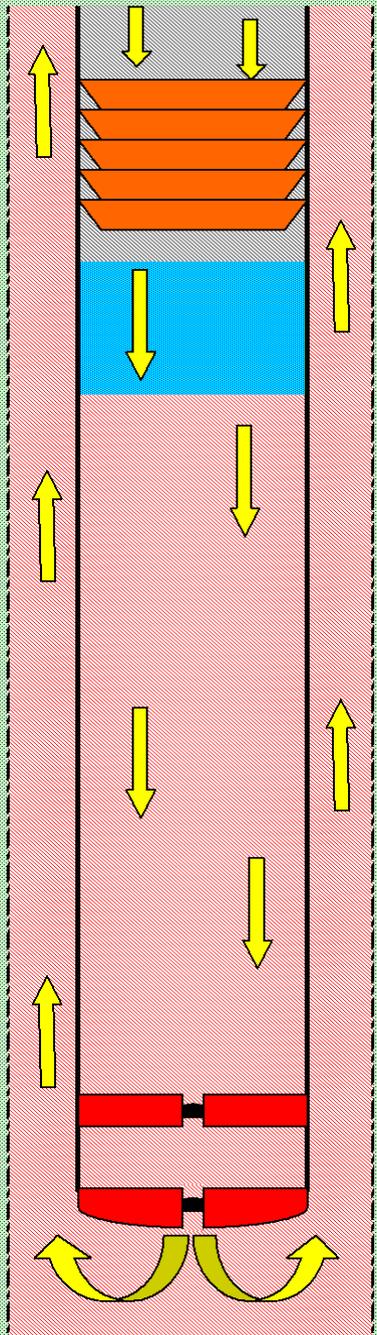
# Pumping Spacer Ahead



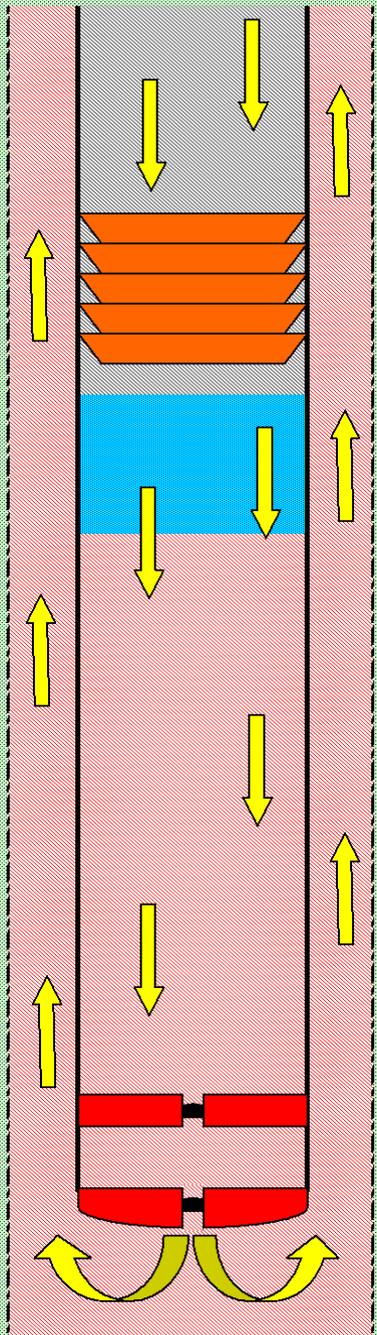
# Drop bottom plug and Pump Lead-Cement



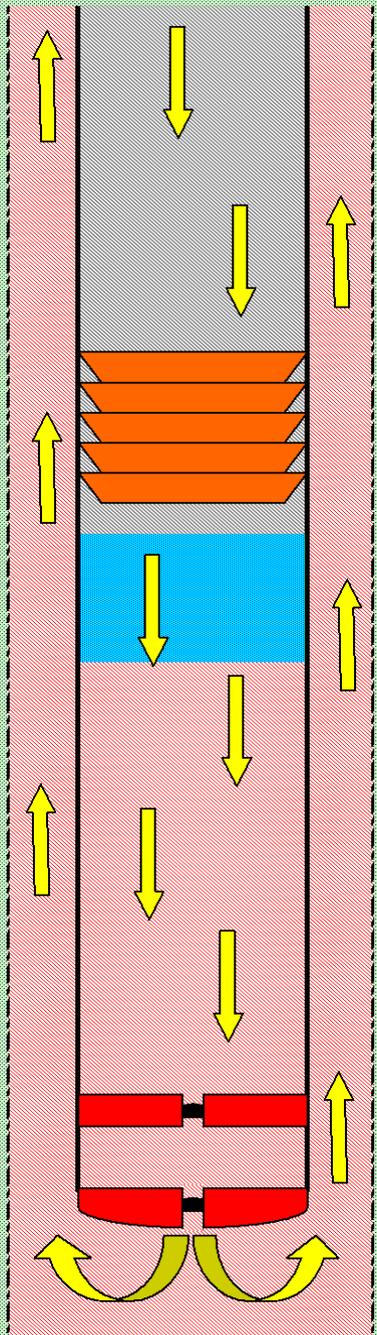
# Pumping Lead Cement



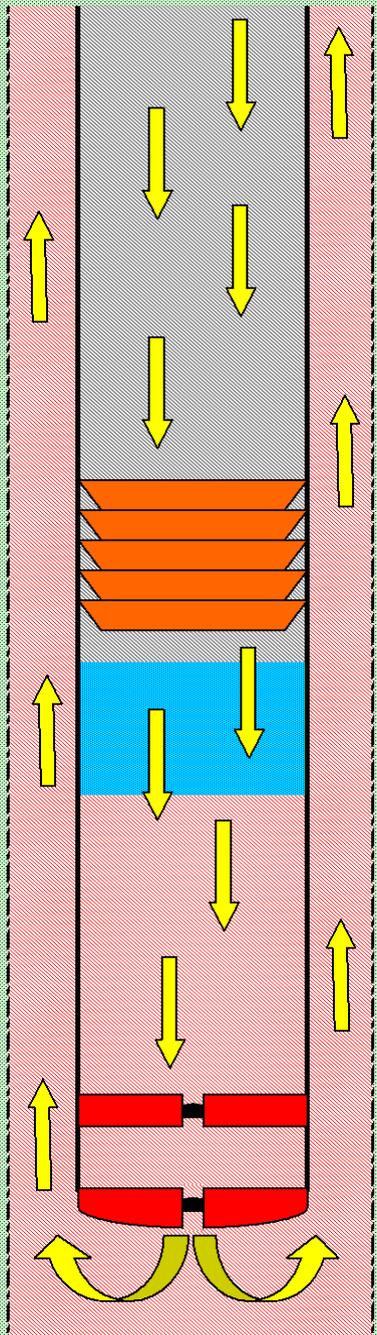
# Pumping Lead Cement



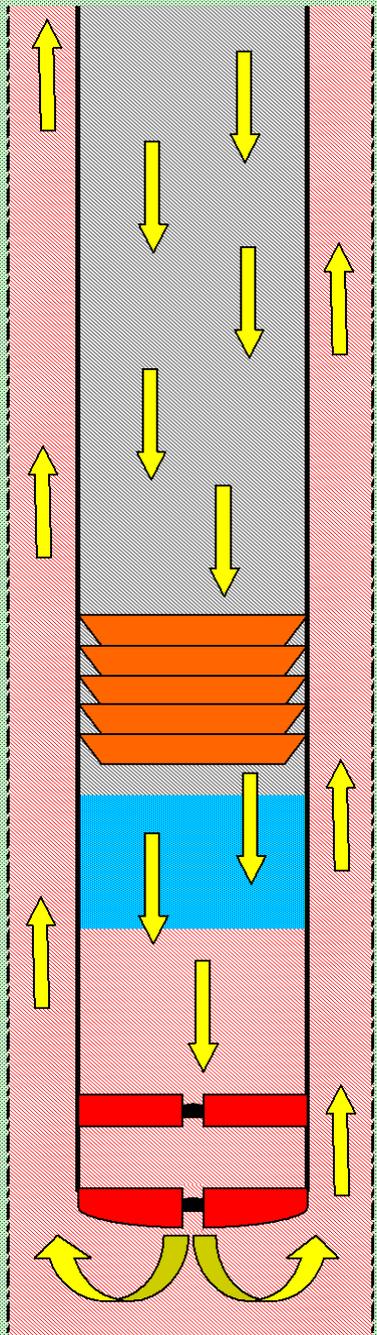
# Pumping Lead Cement



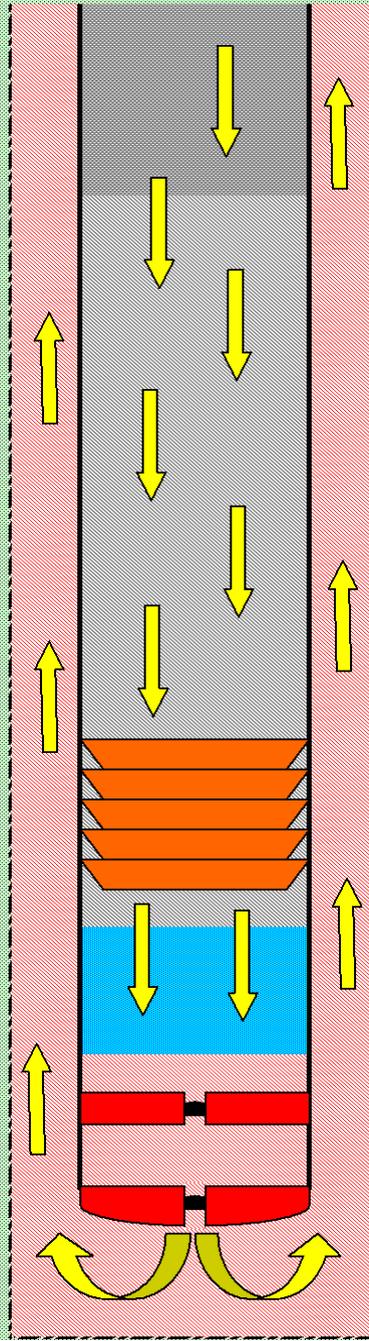
# Pumping Lead Cement



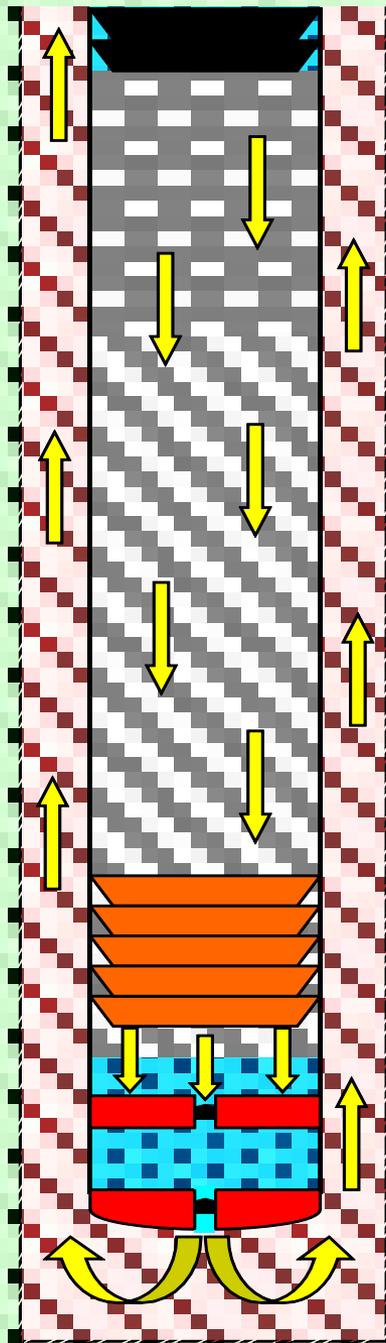
# Pumping Lead Cement



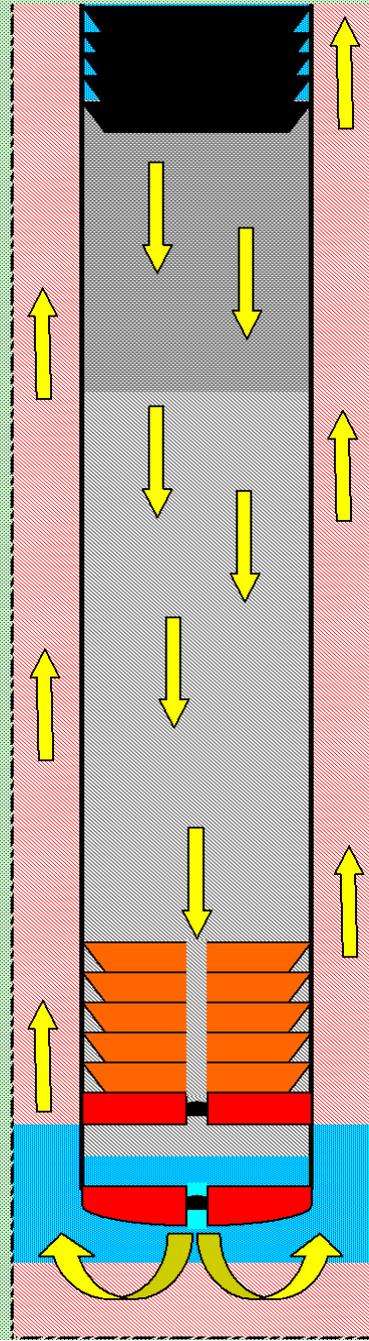
# Pumping Tail Cement



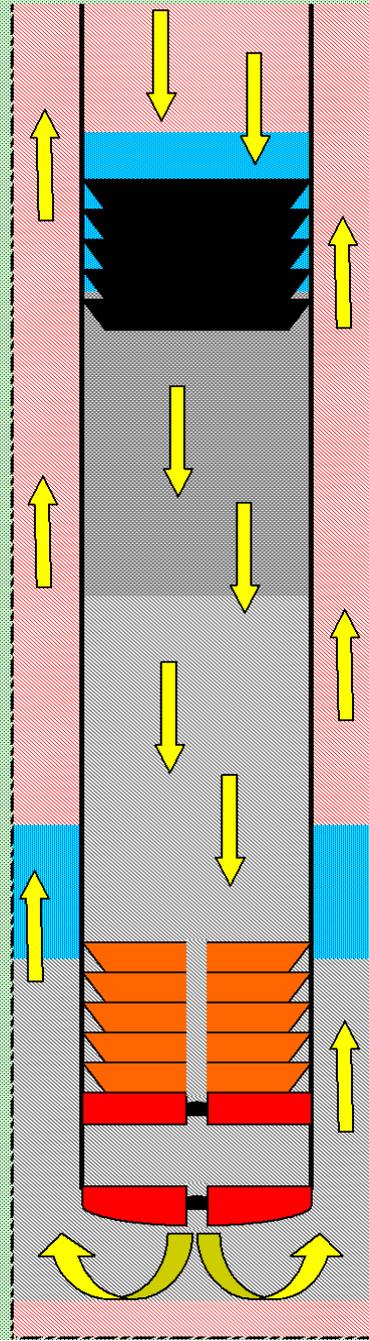
# Drop Top Plug & Start Displacing with Water



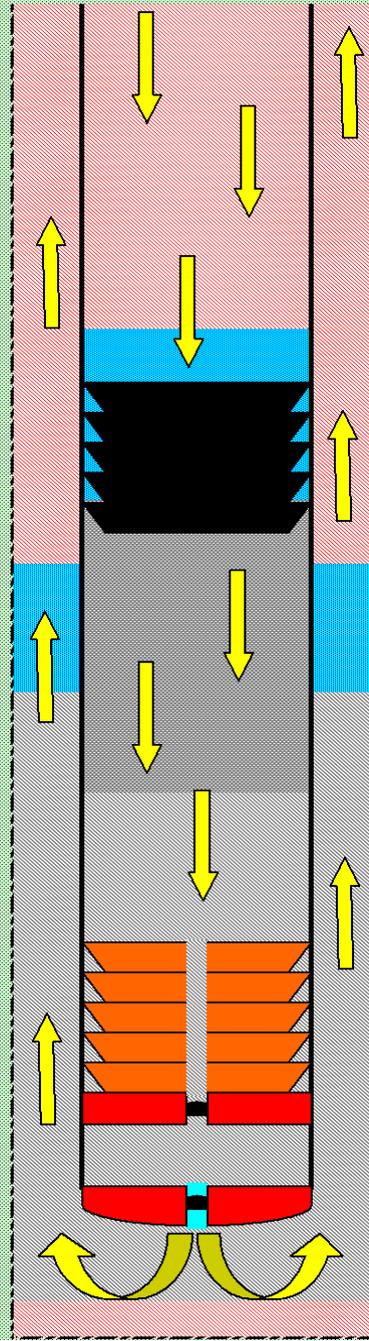
# Displacing



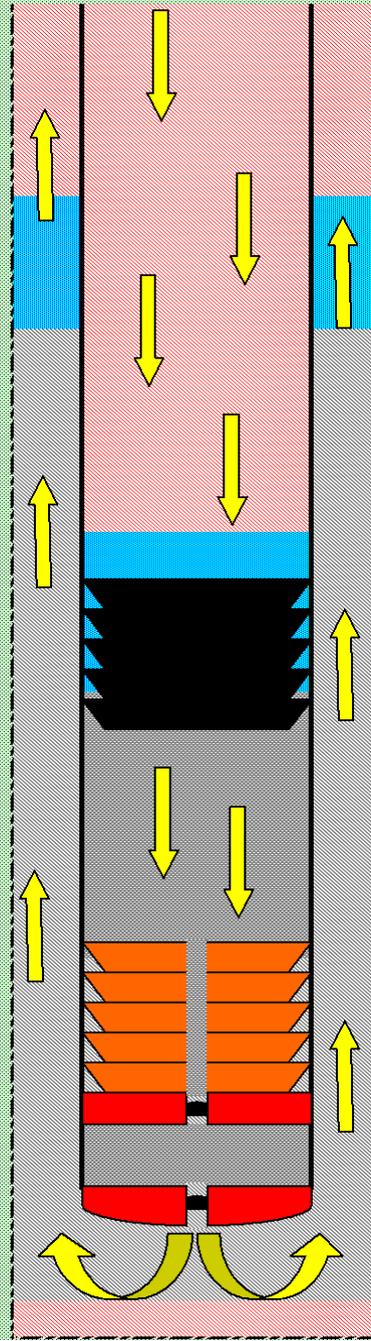
# Displacing



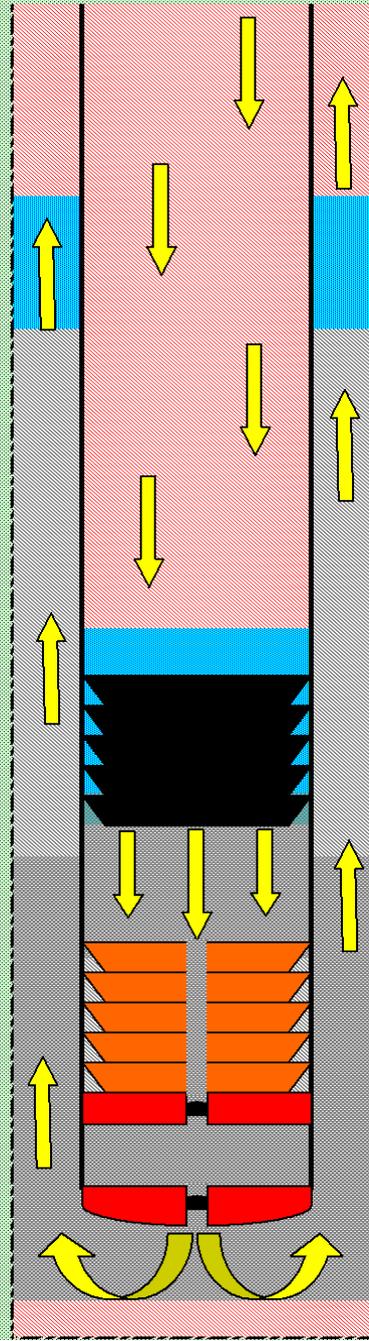
# Displacing



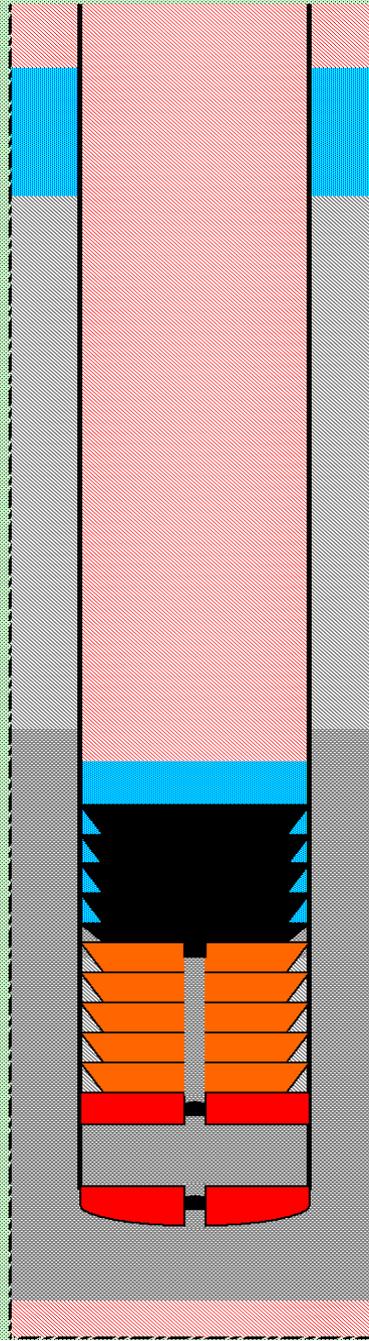
# Displacing



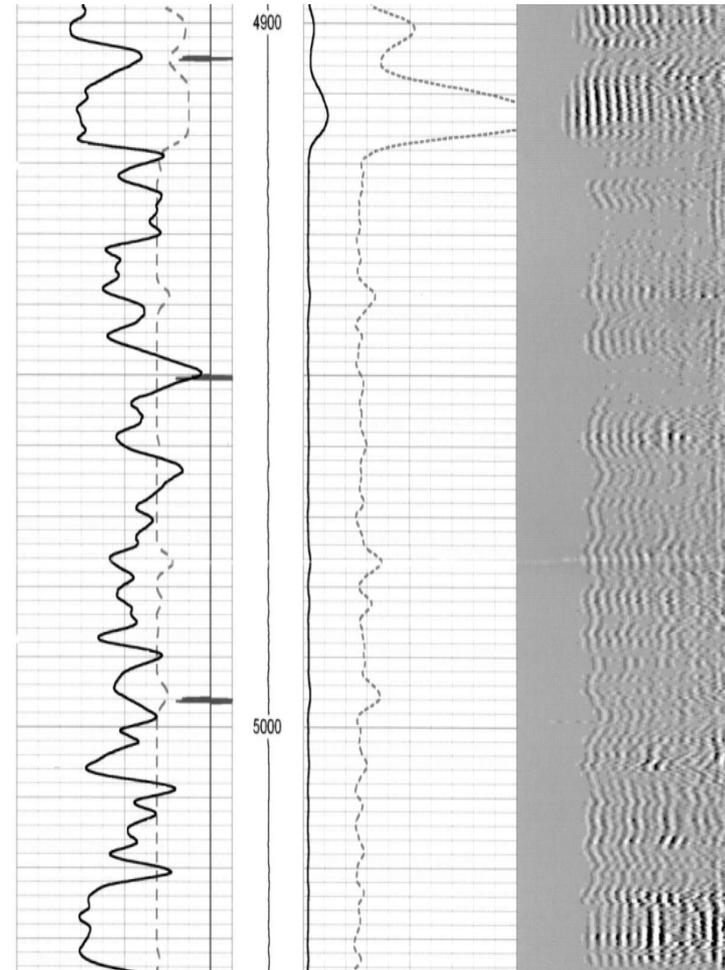
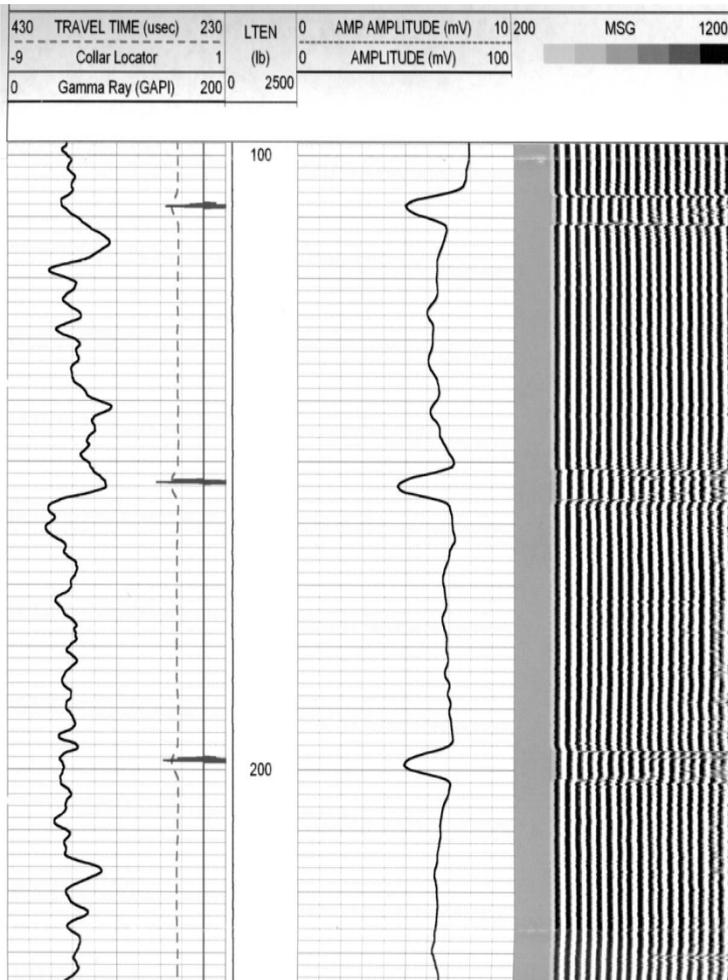
# Displacing



# Plug Down



# Cement Bond Log - Production Casing



# Pressure Testing



- Production casing is pressure tested to above maximum treating pressure prior to perforating.
- Bradenhead pressure between production and surface casing is continuously monitored during fracturing operations.
- A change in the Bradenhead pressure during the fracturing operations may shut down the operation and indicate wellbore issues.
- Chevron has not had a Bradenhead pressure indicated issue in the Piceance Basin since starting fracturing operations in 2006.
- In the Piceance Basin, Chevron has had one production casing not pressure tested prior to fracturing that required repair.