

MUD: GENERAL GUIDELINES AND RULES-OF-THUMB

TESTING EQUIPMENT:

- 1.) Diameter of orifice in viscosity funnel is 3/16". Use drill bit with fingers to clean.
- 2.) Clean pipettes with water after tests to keep them from plugging up.
- 3.) To get accurate chloride reading, run filter press twice and test chlorides on 2nd run. (This is especially important with high-salinity fluids)
- 4.) Potassium test: Dip strip for 3 seconds, pull it and hold drop of water on strip for 10 seconds before shaking it off and dipping into developing solution.

MUD:

Comparing gel (clay-based materials) to polymers:

- To get a 40 viscosity fluid with fresh water gel, mix 15 ppb.
- To get a 40 viscosity fluid with salt water gel, mix 20 ppb.
- To get a 40 viscosity with most any polymer, mix 1 ppb.

Weighting up with salt:

- 1.) 180,000 ppm is saturated.(9.9-10.0 ppg)
- 2.) 110 ppb weights fresh water to saturation.(9.9-10.0 ppg)
- 3.) 7 ppb NaCl increases fluid weight by 1/10 ppg.

Weighting up with Barite:

- 1.) Old-school formula: $(W2-W1) \times 5 \times W2 = \text{sks}/100 \text{ bbl}$ (or ppb)
- 2.) New formula: $\frac{W2 - W1}{35.8 - W2} \times 1505 = \text{sks}/100 \text{ bbl}$ (or ppb)

Maintaining good rheology in a fresh water mud when there is severe chloride contamination (5000-10,000 mg/L):

If vis is low from high amounts of salt water cutting, mix 1 vis. Cup of HEC along with each bag of M-I GEL. NOTE: May need SPERSENE to deflocculate the system...If you add SPERSENE, you will surely need to add HEC and GEL to get your vis back.

Stinky fresh water mud:

If fresh water mud is dark gray colored or black with foul odor, this is a fluid with bacteria present. The alkalinity will show moderate to high levels of carbonates CO₃ and bicarbonates HCO₃.

“If it’s black, treat it with white”. The proper material to use to eliminate the CO₃ and HCO₃ is LIME.

Formula: $(M - 2P) \times 20 = \text{epm}$ $\text{epm} \times .013 = \text{ppb lime needed to treat.}$

NOTE: Always run a complete mud check to confirm your visual observation.

If $2P = M$, this is good.

Adding GREENCIDE 25G is recommendable.

Treating cement contamination with BICARB:

Rules of thumb: If pH is;

- 11, treat with 1 ppb BICARB.
- 12, treat with 2 ppb BICARB.
- 12 ½-13, treat with 3-4 ppb BICARB.
- 13+, treat with 5-6 ppb BICARB.

Formula: $(P_m - P_f) \times .25 =$ ppb of cement in the mud.

But if pH is 12, this answer from using the formula must be doubled.

If the pH is 12 ½-13, the answer must be tripled or quadrupled.

MYACIDE GA25:

Typical additions for pretreating and continuous treating. If mixing water smells foul or appears cloudy with a low pH, pre-treat this water with 1 gallon MYACIDE per 10 bbl. Then proceed to adjust pH and mix your materials. Every 4-5 days, follow up GREENCIDE treatment ranging from 1 gallon per 20 bbl to 1 gallon per 50 bbl.

ENGINEERING CALCULATIONS:

Open hole diameter squared equals bbl/1000'. To be precise, divide this result by 1.029.

Be Careful with calculating casing volumes...Casing size is not inside diameter.

BOTTOM-HOLE PRESSURE:

- 1.) $WHP \times 1.2 = BHP$...Can sometimes use numbers between 1.12 and 1.19 in place of 1.2. Can use this formula on most Oriskany wells 5500' and deeper.
- 2.) $\frac{WHP}{100} + \frac{D}{100} \times .25 =$ Gas column weight.

Gas column weight is then added to WHP to get BHP. A safety factor is then added to this BHP before a mud weight can be calculated. This formula should be used on shallower wells with depths of 4500' or less.

CALCULATING KILL MUD WEIGHT:

$(BHP + SF) \text{ divided by Depth divided by } .052 =$ Kill mud weight (ppg)

PUMPS AND MUD VOLUMES:

- 1.) 42 gallons per barrel / 7.5 gallons per cubic foot.
- 2.) Mud pump outputs must be evaluated for their percentage of efficiency.
 - a.) A pump pulling from below it's skid level will have 80-85% eff.
 - b.) A pump pulling from a steel pit that is setting on it's same level is said to have a flooded suction. This efficiency will be 85-90%.
 - c.) A pump with flood suction, using a centrifugal pump to "pressurize" the suction, will have a 95-97% efficiency.