## PRE-RECORDED INFORMATION

**TRUE PUMP OUTPUT:**

\[
\text{Bbls/Stk} @ 100\% \times \frac{\text{% Efficiency}}{\text{TPO (Bbls/Stk)}} = \text{Strokes to Pump}
\]

**DRILL STRING CAPACITY:**

\[
\text{Drill #1:} \quad \text{Pipe Size (in.)} \times \text{Weight (lb/t)} \times \text{Length (ft)} = \text{Bbls}
\]

\[
\text{Drill #2:} \quad \text{Pipe Size (in.)} \times \text{Weight (lb/t)} \times \text{Length (ft)} = \text{Bbls}
\]

\[
\text{HWDP:} \quad \text{Pipe Size (in.)} \times \text{Weight (lb/t)} \times \text{Length (ft)} = \text{Bbls}
\]

**STROKES FROM SURFACE TO BIT:**

\[
\text{Total Drill String Capacity (Bbls)} \div \text{True Pump Output (Bbls/Stk)} = \text{Strokes, Surface to Bit}
\]

**ANNULAR CAPACITY:**

\[
\text{Between CSG and DP:} \quad \text{Bbls} \div \text{Bbls/ft} = \text{Bbls}
\]

\[
\text{Between Liner #1 and DP:} \quad \text{Bbls} \div \text{Bbls/ft} = \text{Bbls}
\]

\[
\text{Between Liner #2 and DP:} \quad \text{Bbls} \div \text{Bbls/ft} = \text{Bbls}
\]

\[
\text{Between OH and DP/HWDP:} \quad \text{Bbls} \div \text{Bbls/ft} = \text{Bbls}
\]

\[
\text{Between OH and DC:} \quad \text{Bbls} \div \text{Bbls/ft} = \text{Bbls}
\]

**STROKES FROM BIT TO SHOE:**

\[
\text{Open Hole Annular Vol. (Bbls)} \div \text{True Pump Output (Bbls/Stk)} = \text{Strokes, Bit to Shoe}
\]

**STROKES FROM BIT TO SURFACE:**

\[
\text{Total Annular Volume (Bbls)} \div \text{True Pump Output (Bbls/Stk)} = \text{Strokes, Bit to Surface}
\]

**TOTAL STROKES FROM SURFACE TO SURFACE:**

\[
\text{Strokes, Surface to Bit} + \text{Strokes, Bit to Surface} = \text{Strokes, Surface to Surface}
\]

**MAXIMUM ALLOWABLE MUD DENSITY (ppg)**

\[
\left( \frac{\text{Surface LOT Pressure (psi)}}{0.052} \right) + \left( \frac{\text{Shoe Depth (ft, TUD)}}{\text{LOT Mud Density (ppg)}} \right) = \text{MAX. ALLOWABLE MUD DENSITY (ppg)}
\]

**MAXIMUM ALLOWABLE ANNULAR SURFACE PRESSURE (MAASP) (psi)**

\[
\left( \frac{\text{Max. Allowable Mud Density (ppg)} - \text{Present Mud Density (ppg)}}{\text{Shoe Depth (ft, TUD)}} \right) \times 0.052 \times \text{Shoe Depth (ft, TUD)} = \text{MAX. ALLOWABLE ANNULAR SURFACE PRESSURE (psi)}
\]

---

**CURRENT WELL DATA**

**PRESENT MUD WEIGHT:**

**SLOW CIRCULATION RATE (SCR):**

\[
\text{SCR taken at } \frac{\text{Stk/ft}}{\text{Pressure (psi)}} \quad \text{Bbl/min} \div \text{Pressure (psi)}
\]

**CASING DATA:**

**CASING**

<table>
<thead>
<tr>
<th>size</th>
<th>ID</th>
<th>weight</th>
</tr>
</thead>
</table>

**SHOE DEPTH**

\[
\text{MD / TVD} \quad \text{ft}
\]

**SHOE TEST DATA:**

\[
\text{Depth #1} \quad \text{Test MW of} \quad \text{ppg}
\]

\[
\text{Depth #2} \quad \text{Test MW of} \quad \text{ppg}
\]

\[
\text{Depth #3} \quad \text{Test MW of} \quad \text{ppg}
\]

**LINER #1**

<table>
<thead>
<tr>
<th>size</th>
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<th>weight</th>
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</thead>
</table>

**LINER #2**

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<th>ID</th>
<th>weight</th>
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</thead>
</table>

**LINER #1 TOP DEPTH**

**LINER #2 TOP DEPTH**

**LINER #1 SHOE DEPTH**

**LINER #2 SHOE DEPTH**

**TVD CASING or LINER**

\[
\text{ft}
\]

**HOLE DATA:**

**TOTAL DEPTH (MD)**

\[
\text{ft}
\]

**TOTAL DEPTH (TVD)**

\[
\text{ft}
\]

**BIT DEPTH**

\[
\text{MD / TVD} \quad \text{ft}
\]

**BIT SIZE**

\[
\text{inches}
\]
### KICK DATA

**SIDPP:** __________ psi  
**SICP:** __________ psi  
**PIT GAIN:** __________ Bbls  
**Time of Incident:** __ : __

### CALCULATIONS

**KILL MUD WEIGHT (KMW)**

\[
\text{SIDPP (psi)} \div 0.052 \div \left( \frac{\text{True Vertical Depth (ft)}}{\text{Present Mud Weight (ppg)}} \right) + \frac{\text{Present Mud Weight (ppg)}}{\text{Pump Pressure (psi) @ SCR of _______ SPM}} = \text{KILL MUD WEIGHT (ppg)}
\]

**INITIAL CIRCULATING PRESSURE (ICP)**

\[
\frac{\text{SIDPP (psi)}}{\text{Pump Pressure (psi) @ SCR of _______ SPM}} \times \frac{\text{Kill Mud Weight (ppg)}}{\text{Present Mud Weight (ppg)}} = \text{INITIAL CIRCULATING PRESSURE (psi)}
\]

**FINAL CIRCULATING PRESSURE (FCP)**

\[
\frac{\text{Pump Pressure (psi) @ SCR of _______ SPM}}{\text{Kill Mud Weight (ppg)}} \div \frac{\text{Present Mud Weight (ppg)}}{} = \text{FINAL CIRCULATING PRESSURE (psi)}
\]

### PRESSURE CHART

<table>
<thead>
<tr>
<th>Stroke or Volume</th>
<th>Theoretical Drill Pipe Pressure</th>
<th>Actual Drill Pipe Pressure</th>
<th>Actual Casing Pressure</th>
<th>Actual Pit Volume Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SURFACE</td>
<td>0</td>
<td>ICP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[
\frac{\text{FCP}}{10} = \frac{\text{STrokes Surface to Bit}}{\text{STrokes per Step}} - \frac{\text{ICP}}{10} = \frac{\text{Initial Circulation Pressure}}{\text{Final Circulation Pressure PSI per Step}}
\]

<table>
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</thead>
<tbody>
<tr>
<td>BIT</td>
<td>FCP</td>
<td></td>
<td></td>
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\[
\frac{\text{FCP}}{10} = \frac{\text{STrokes to Surface}}{\text{STrokes per Step}}
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<tbody>
<tr>
<td>SURFACE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[
\frac{\text{FCP}}{10} = \frac{\text{STrokes to Surface}}{\text{STrokes per Step}}
\]
1. Pressure Gradient (psi/ft) = Mud Weight (ppg) x 0.052

2. Hydrostatic Pressure (psi) = Mud Weight (ppg) x 0.052 x Depth (ft, TVD)

3. Capacity (bbls/ft) = Inside Diameter\(^2\) (in.) + 1029.4

4. Annular Capacity (bbls/ft) = (Inside Diameter of Casing\(^2\) (in.) or Hole Diameter\(^2\) (in.) - Outside Diameter of Pipe\(^2\) (in.)) + 1029.4

5. Pipe Displacement (bbls/ft) = (Outside Diameter of pipe\(^2\) (in.) - Inside Diameter of pipe\(^2\) (in.)) + 1029.4

6. Maximum Allowable Mud Weight (ppg) = \(\frac{\text{Surface LOT Pressure (psi)}}{\text{Shoe Depth (ft, TVD)} \times 0.052} + \text{LOT Mud Weight (ppg)}\)

7. MAASP (psi) = [Maximum Allowable Mud Weight (ppg) - Present Mud Weight (ppg)] x 0.052 x Shoe TVD (ft)

8. Pressure Drop per Foot Tripping Dry Pipe (psi/ft) = \(\frac{\text{Drilling Mud Weight (ppg) x 0.052 x Metal Displacement (bbl/ft)}}{\text{Casing Capacity (bbl/ft) - Metal Displacement (bbl/ft)}}\)

9. Pressure Drop per Foot Tripping Wet Pipe (psi/ft) = \(\frac{\text{Drilling Mud Weight (ppg) x 0.052 x Closed End Displacement (bbl/ft)}}{\text{Casing Capacity (bbl/ft) - Closed End Displacement (bbl/ft)}}\)

10. Formation Pressure (psi) = Hydrostatic Pressure Mud in Hole (psi) + SIDPP (psi)

11. EMW (ppg) @ Shoe = (SICP (psi) ÷ 0.052 ÷ Shoe Depth (ft, TVD)) + Present Mud Weight (ppg)

12. Sacks (100 lb) of Barite Needed to Weight-Up Mud = \(\frac{\text{Bbls of Mud in System} \times 14.9 \times (\text{KMW - OMW})}{(35.4 - \text{KMW})}\)

   *NOTE: This formula assumes that the average density of Barite is 35.4 ppg and the average number of sacks (100lb) per barrel is 14.9.*

13. Volume Increase from Adding Barite (bbls) = Number of Sacks (100 lb) added ÷ 14.9

14. Equivalent Mud Weight (ppg) @ [depth (ft)] = \(\left[\frac{\text{Pressure (psi)}}{\text{Depth (ft, TVD)} \times 0.052}\right] + \text{Current Mud Weight (ppg)}\)

15. Estimated New Pump Pressure at New Pump Rate (psi) = Old Pump Pressure (psi) x \(\left[\frac{\text{New Pump Rate (SPM)}}{\text{Old Pump Rate (SPM)}}\right]^2\)

16. Estimated New Pump Pressure with New Mud Weight (psi) = Old Pump Pressure (psi) x \(\frac{\text{New Mud Weight (ppg)}}{\text{Old Mud Weight (ppg)}}\)