IADC WellCAP Well Control Worksheet
Surface Stack - Wait and Weight Method

PTTCO Ltd.

Well Name: _____ **Completed By:** _____ **Date:** ____ / ____ / ____

PRE-RECORDED INFORMATION

TRUE PUMP OUTPUT: _____ (Bbls/Stk @ 100%) x _____ (% Efficiency) = _____ (TPO (Bbls/Stk))

Surface Line: _____ (Bbls) Surface Line Capacity ÷ _____ True Pump Output (Bbls/Stk) = _____ Strokes to Pump

DRILL STRING CAPACITY:

	Size (in.)	Weight (lb/ft)	Bbls/ft		Length (ft)		
Drill Pipe #1:				x		=	Bbls DP
Drill Pipe #2:				x		=	Bbls DP
HWDP:				x		=	Bbls HWDP
Drill Collars #1:				x		=	Bbls DC
Drill Collars #2:				x		=	Bbls DC

_____ Total Drill String Capacity (Bbls)

STROKES FROM SURFACE TO BIT:

_____ Total Drill String Capacity (Bbls) ÷ _____ True Pump Output (Bbls/Stk) = _____ Strokes, Surface to Bit

ANNULAR CAPACITY:

Between CSG and DP:	_____ Bbls/ft	x	_____ ft	=	_____ Bbls
Between Liner #1 and DP:	_____ Bbls/ft	x	_____ ft	=	_____ Bbls
Between Liner #2 and DP:	_____ Bbls/ft	x	_____ ft	=	_____ Bbls
Between OH and DP/HWDP:	_____ Bbls/ft	x	_____ ft	=	_____ Bbls
Between OH and DC:	_____ Bbls/ft	x	_____ ft	=	_____ Bbls

STROKES FROM BIT TO SHOE:

_____ Open Hole Annular Vol. (Bbls) ÷ _____ True Pump Output (Bbls/Stk) = _____ Strokes, Bit to Shoe

STROKES FROM BIT TO SURFACE:

_____ Total Annular Volume (Bbls) ÷ _____ True Pump Output (Bbls/Stk) = _____ Strokes, Bit to Surface

TOTAL STROKES FROM SURFACE TO SURFACE:

_____ Strokes, Surface to Bit + _____ Strokes, Bit to Surface = _____ Strokes, Surface to Surface

MAXIMUM ALLOWABLE ANNULUS SURFACE PRESSURE (MAASP)

(_____ Max. MW from Shoe Test (ppg) - _____ Present Mud Weight (ppg)) x 0.052 x _____ True Vertical Depth Shoe (ft) = _____ psi MAASP

MAXIMUM ALLOWABLE ANNULUS SURFACE PRESSURE (MAASP) WITH KILL MUD

(_____ Max. MW from Shoe Test (ppg) - _____ Kill Mud Weight (ppg)) x 0.052 x _____ True Vertical Depth Shoe (ft) = _____ psi MAASP WITH KILL MUD

CURRENT WELL DATA

PRESENT MUD WEIGHT: _____ ppg

SLOW CIRCULATION RATE (SCR):

SCR taken @ _____ (ft)

	Stks/min	Pressure(psi)	Bbl/min	Pressure(psi)
Pump #1				
Pump #2				
Pump #3				

CASING DATA:

CASING _____ size , _____ ID , _____ weight

SHOE DEPTH @ MD / TVD _____ / _____ ft

SHOE TEST DATA:

Depth #1 _____ (psi) @ Test MW of _____ (ppg)

Depth #2 _____ (psi) @ Test MW of _____ (ppg)

Depth #3 _____ (psi) @ Test MW of _____ (ppg)

LINER #1 _____ size , _____ ID , _____ weight

LINER #2 _____ size , _____ ID , _____ weight

LINER #1 TOP DEPTH _____ ft

LINER #2 TOP DEPTH _____ ft

LINER #1 SHOE DEPTH _____ ft

LINER #2 SHOE DEPTH _____ ft

TVD CASING or LINER _____ ft

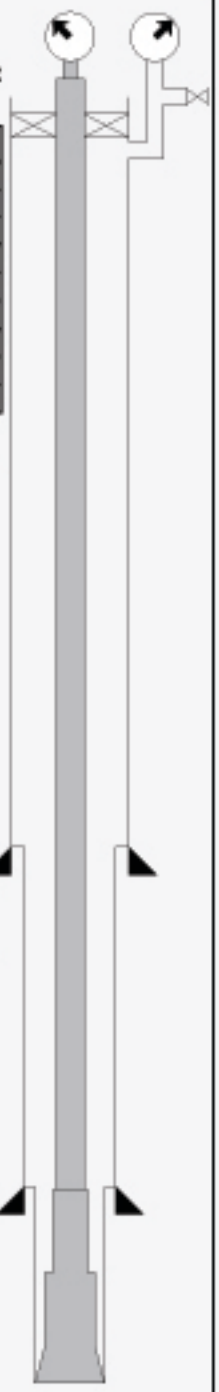
HOLE DATA:

TOTAL DEPTH (MD) _____ ft

TOTAL DEPTH (TVD) _____ ft

BIT DEPTH @ MD / TVD _____ / _____ ft

BIT SIZE _____ inches



KICK DATA

SIDPP: _____ psi **SICP: _____ psi** **PIT GAIN: _____ Bbls** **Time of Incident: ____ : ____**

CALCULATIONS

KILL MUD WEIGHT (KMW)

(_____ ÷ 0.052 ÷ _____) + _____ = _____ ppg KILL MUD WEIGHT

SIDPP (psi) | True Vertical Depth (ft) | Present Mud Weight (ppg)

INITIAL CIRCULATING PRESSURE (ICP)

_____ + _____ = _____ psi INITIAL CIRCULATING PRESSURE

SIDPP (psi) | Pump Pressure (psi) @ SCR of _____SPM

FINAL CIRCULATING PRESSURE (FCP)

_____ x _____ ÷ _____ = _____ psi FINAL CIRCULATING PRESSURE

Pump Pressure (psi) @ SCR of _____SPM | Kill Mud Weight (ppg) | Present Mud Weight (ppg)

PRESSURE CHART

Stroke or Volume	Theoretical Drill Pipe Pressure	Actual Drill Pipe Pressure	Actual Casing Pressure	Actual Pit Volume Deviation
SURFACE 0	ICP			
BIT	FCP			

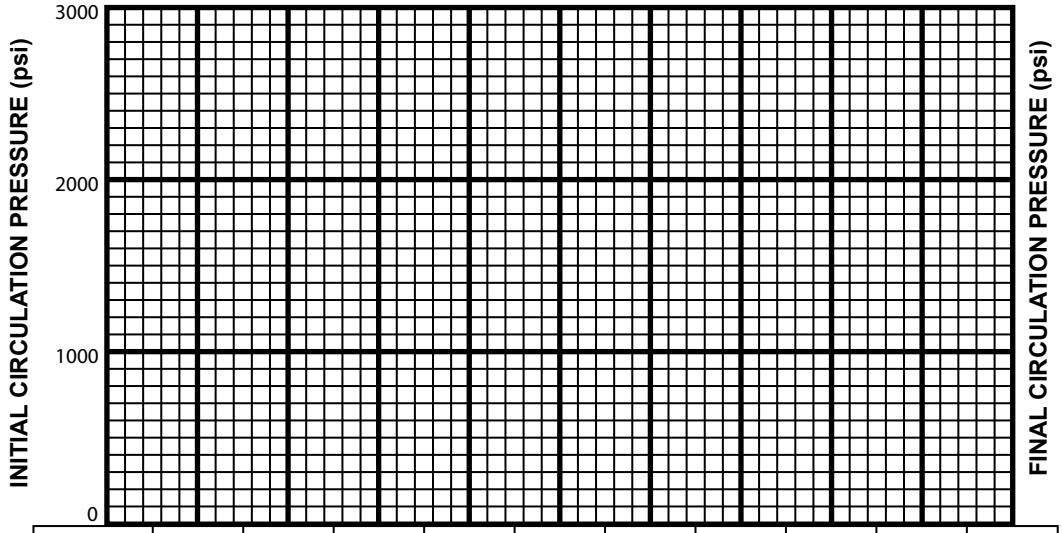
_____ ÷ 10 = _____ Strokes Surface to Bit / Strokes per Step

_____ - _____ ÷ 10 = _____ Initial Circulation Pressure / Final Circulation Pressure / PSI per Step

BIT	FCP			
SURFACE				

_____ ÷ 10 = _____ Strokes Bit to Surface / Strokes per Step

GRAPHIC ANALYSIS



Stroke										
Pressure										
Time										

FORMULAS

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) = $\frac{\text{Surface LOT Pressure (psi)}}{\text{Shoe Depth (ft, TVD) x 0.052}}$ + 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 = $\frac{\text{Bbls of Mud in System x 14.9 x (KMW - OMW)}}{\text{(35.4 - KMW)}}$

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) = $\frac{\text{Pressure (psi)}}{\text{Depth (ft, TVD) x 0.052}}$

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 $\frac{\text{New Mud Weight (ppg)}}{\text{Old Mud Weight (ppg)}}$