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

PTTCO

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

PRE-RECORDED INFORMATION

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

Surface Line: _____ (Surface Line Capacity (Bbls)) ÷ _____ (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 MUD DENSITY (ppg)

(_____ (Surface LOT Pressure (psi)) ÷ 0.052 ÷ _____ (Shoe Depth (ft,TUD))) + _____ (LOT Mud Density (ppg)) = _____ ppg **MAX. ALLOWABLE MUD DENSITY**

MAXIMUM ALLOWABLE ANNULAR SURFACE PRESSURE (MAASP) (psi)

(_____ (Max. Allowable Mud Density (ppg)) - _____ (Present Mud Density (ppg))) x 0.052 x _____ (Shoe Depth (ft,TUD)) = _____ psi **MAX. ALLOWABLE ANNULAR SURFACE PRESSURE**

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)

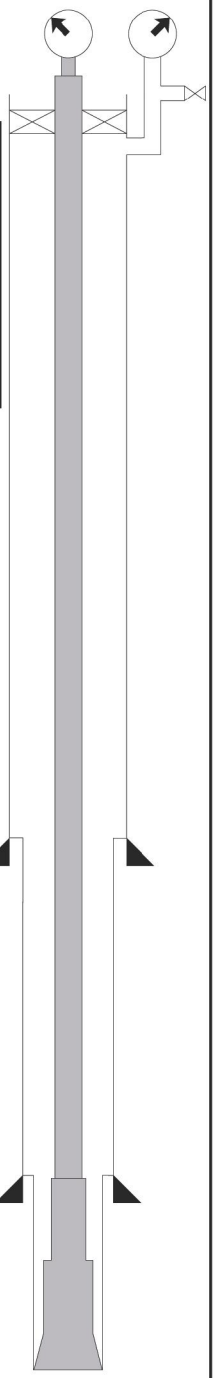
LINER #2 _____ (size) , _____ (ID) , _____ (weight)

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			

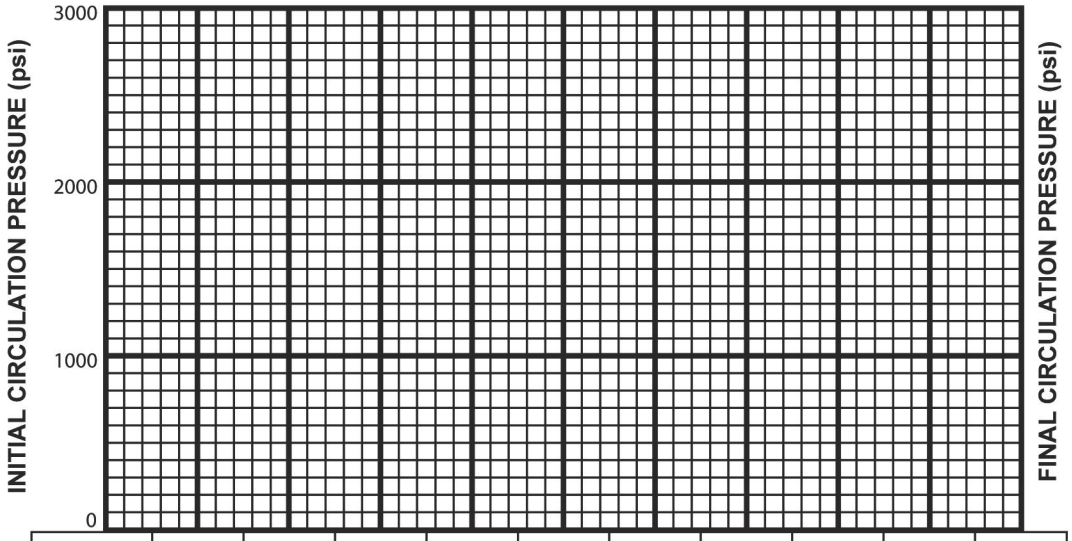
_____ ÷ 10 = _____ Strokes Surface to Bit | Strokes per Step

_____ - _____ ÷ 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) = $\left[\frac{\text{Pressure (psi)}}{\text{Depth (ft, TVD) x 0.052}}\right]$ + 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 $\frac{\text{New Mud Weight (ppg)}}{\text{Old Mud Weight (ppg)}}$