IADC WellCAP Well Control Worksheet PTTCO
Subsea Stack - Wait and Weight Method

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 #1: Pipe	_____	_____	_____	x	_____	=	_____ DP	Bbls
Drill #2: Pipe	_____	_____	_____	x	_____	=	_____ DP	Bbls
HWDP :	_____	_____	_____	x	_____	=	_____ HWDP	Bbls
Drill #1: Collars	_____	_____	_____	x	_____	=	_____ DC	Bbls
Drill #2: Collars	_____	_____	_____	x	_____	=	_____ DC	Bbls

_____ Total Drill String Capacity (Bbls)

STROKES FROM SURFACE TO BIT:

_____ Total Drill String Capacity (Bbls) ÷ _____ True Pump Output (Bbls/Stks) = _____ 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
Choke line capacity:	_____ Bbls/ft	x	_____ ft	=	_____ Bbls

STROKES FROM BIT TO SHOE:

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

STROKES FROM BIT TO SURFACE:

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

ANNULAR VOL. BETWEEN DRILL PIPE & RISER:

(_____ Riser ID² – _____ Drill Pipe OD²) ÷ 1029.4 = _____ Capacity Drill Pipe/Riser (Bbls/ft)

_____ Capacity Drill Pipe/Riser (Bbls/ft) x _____ Riser Length ft = _____ Volume between Drill Pipe & Riser (Bbls)

STROKES TO DISPLACE RISER:

_____ Volume between Drill Pipe & Riser (Bbls) ÷ _____ True Pump Output (Bbls/Stks) = _____ Strokes

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

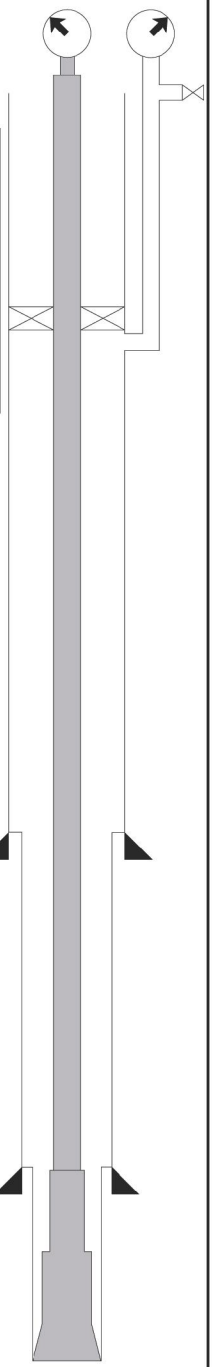
TVD CASING or LINER _____ ft

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)

MAXIMUM ALLOWABLE MUD DENSITY (ppg)

(_____ ÷ 0.052 ÷ _____) + _____ = _____ ppg MAX. ALLOWABLE MUD DENSITY

Surface LOT Pressure (psi) | Shoe Depth (ft,TUD) | LOT Mud Density (ppg)

MAXIMUM ALLOWABLE ANNULAR SURFACE PRESSURE (MAASP) (psi)

(_____ - _____) x 0.052 x _____ = _____ psi MAX. ALLOWABLE ANNULAR SURFACE PRESSURE

Max. Allowable Mud Density (ppg) | Present Mud Density (ppg) | Shoe Depth (ft,TUD)

SELECTED KILL PUMP DATA

	Kill Rate Speed (STKS/MIN)	Pump Output (BBLS/STK)	Circ. Rate (BBLS/MIN)	Slow Pump Pressure (Circ. Down DP & Up Riser)	Circ. Pres thru Choke Line (PSI)	Circ. Pres thru Choke & Kill Line (PSI)	CLFP Choke Line (PSI)	CLFP Choke & Kill Line (PSI)
PUMP No. 1								
PUMP No. 2								
PUMP No. 3								

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			

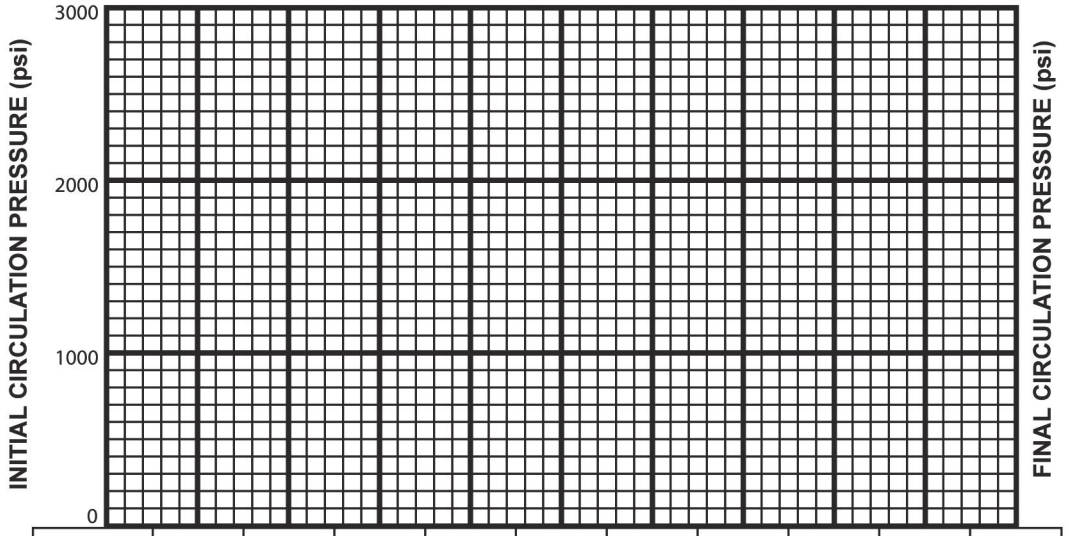
_____ ÷ 10 = _____ Strokes Surface to Bit | Strokes per Step

_____ - _____ ÷ 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. $$\text{Maximum Allowable Mud Weight (ppg)} = \frac{\text{Surface LOT Pressure (psi)}}{\text{Shoe Depth (ft, TVD) x 0.052}} + \text{LOT Mud Weight (ppg)}$$

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

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

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

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

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

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

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