IADC Driller's Method Worksheet

PTTCO

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

KICK DATA

SIDPP: __________ **psi** **SICP:** __________ **psi**

PIT GAIN: __________ **Bbls** **Time of Incident:** ____ **:** ____

PROCEDURE

First Circulation to clear influx from well:

1. Bring pump(s) up to slow circulation rate and attempting to hold casing pressure constant by manipulating or adjusting the choke. The slow circulation rate will normally be 50% of the rate used in drilling operations.
2. Read and record Initial Circulating Pressure on Drill Pipe. This pressure should equal the SIDPP plus the slow circulation rate pressure.

   Recorded ICP __________ psi @ rate __________ spm
3. Maintain pump rate and drill pipe pressure constant until influx is circulated out of well.
4. Shut down pump(s) while holding casing pressure constant closing the choke as required. The trapped SIDPP will represent formation pressure.
5. With the pumps off and choke closed, the casing pressure and drill pipe pressures should be equal. If not, continue to circulate out the influx.
6. Record the new shut in casing pressure.

   SICP __________ psi
7. Calculate Kill Mud Weight.

   KMW = __________ ppg
8. Increase surface mud system to required KMW density.

Second Circulation to balance well:

1. Bring bump(s) up to slow circulation rate and open choke as required while holding new casing pressure contant.
2. Adjust the choke to hold the <u>new casing pressure constant</u> until the drill pipe is full of kill mud of the required density.
3. After drill pipe is full of kill mud, record drill pipe pressure.

   __________ psi
4. Hold pipe rate constant and drill pipe pressure by adjusting the choke until the annulus is filled with kill mud.
5. When kill mud reaches the surface, choke pressure, if any, is bled off.
6. Stop circulating and check for flow.

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				

TOTAL DEPTH (MD) ______ ft

TOTAL DEPTH (TVD) ______ ft

CASING DATA:

CASING ________ , ________ , ________
size ID weight

CASING SHOE DEPTH ______ ft

SHOE TEST DATA:

____
Depth #1
__________ @ Test MW of __________
(psi) (ppg)

____
Depth #2
__________ @ Test MW of __________
(psi) (ppg)

____
Depth #3
__________ @ Test MW of __________
(psi) (ppg)

LINER #1 ________ , ________ , ________
size ID weight

LINER #2 ________ , ________ , ________
size ID weight

LINER #1 TOP DEPTH ______ ft

LINER #2 TOP DEPTH ______ ft

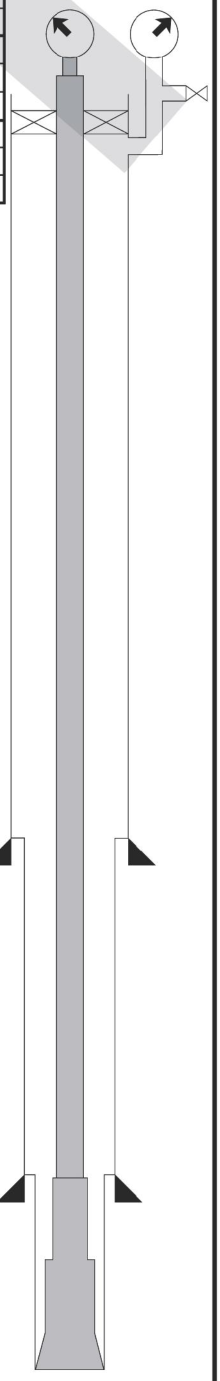
LINER #1 SHOE DEPTH ______ ft

LINER #2 SHOE DEPTH ______ ft

TVD CASING or LINER ______ ft

HOLE DATA:

BIT SIZE ______ inches



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

TRUE PUMP OUTPUT:

__________ x __________ = __________

Bbls/Stk @ 100% — % Efficiency — TPO (Bbls/Stk)

DRILL STRING CAPACITY:

	Size (in.)	Weight (lb/ft)	Bbls/ft	x	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
Surface: Line	____	____	____	x	____	=	____ SL	Bbls

______________ Total Drill String Capacity (Bbls)

STROKES, 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
Liner #1 and DP:	____ Bbls/ft	X	____ ft	=	____	Bbls
Liner #2 and DP:	____ Bbls/ft	X	____ ft	=	____	Bbls
OH and DP/HWDP:	____ Bbls/ft	X	____ ft	=	____	Bbls
OH and DC:	____ Bbls/ft	X	____ ft	=	____	Bbls

STROKES, BIT TO SHOE:

______________ ÷ ______________ = ______________

Open Hole Annular Volume (Bbls) — True Pump Output (Bbls/Stk) — Strokes, Bit to Shoe

STROKES, BIT TO SURFACE:

______________ ÷ ______________ = ______________

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

TOTAL STROKES, SURFACE TO SURFACE:

______________ + ______________ = ______________

Strokes, Surface to Bit — Strokes, Bit to Surface — Strokes, Surface to Surface

MAXIMUM ALLOWABLE ANNULUS SURFACE PRESSURE (MAASP)

(______________ - ______________) x 0.052 x ______________ = ______________ psi **MAASP**

Max. MW from Shoe Test (ppg) — Present Mud Weight (ppg) — True Vertical Depth Shoe (ft)

MAXIMUM ALLOWABLE ANNULUS SURFACE PRESSURE (MAASP) WITH KILL MUD

(______________ - ______________) x 0.052 x ______________ = ______________ psi **MAASP WITH KILL MUD**

Max. MW from Shoe Test (ppg) — Kill Mud Weight (ppg) — True Vertical Depth Shoe (ft)

COMMENTS

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) = $\dfrac{\text{Surface LOT Pressure (psi)}}{\text{Shoe Depth (ft, TVD)} \times 0.052}$ + 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) = $\dfrac{\text{Drilling Mud Weight (ppg)} \times 0.052 \times \text{Metal Displacement (bbl/ft)}}{\text{Casing Capacity (bbl/ft)} - \text{Metal Displacement (bbl/ft)}}$

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

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 = $\dfrac{\text{Bbls of Mud in System} \times 14.9 \times (\text{KMW} - \text{OMW})}{(35.4 - \text{KMW})}$

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) = $\dfrac{\text{Pressure (psi)}}{\text{Depth (ft, TVD)} \times 0.052}$

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

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

COMMENTS