IADC Driller's Method Worksheet

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

KICK DATA

SIDPP: _____ bar **SICP:** _____ bar

PIT GAIN: _____ Liters **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 _____ bar @ 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 _____ bar
7. Calculate Kill Mud Weight.

   KMW = _____ kg/l
8. Increase surface mud system to required KMW density.

Second Circulation to balance well:

1. Bring pump(s) up to slow circulation rate and open choke as required while holding new casing pressure contant.
2. Adjust the choke to hold the new casing pressure constant 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.

   _____ bar
4. Hold pump 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.

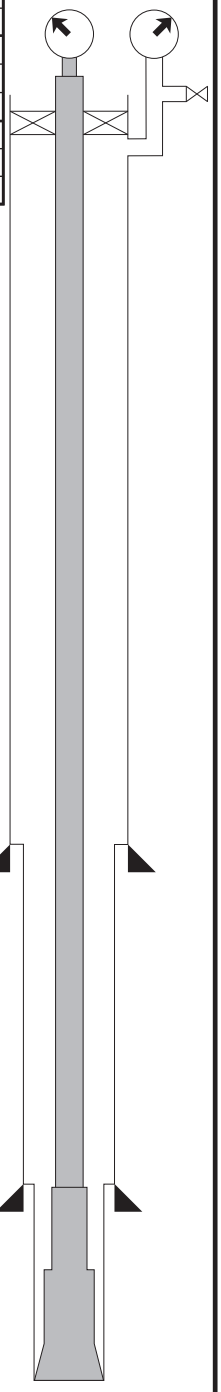
CURRENT WELL DATA

PRESENT MUD WEIGHT: _____ kg/l

SLOW CIRCULATION RATE (SCR):

SCR taken @ _____ (m)

	Stks/min	Pressure(bar)	Liter/min	Pressure(bar)
Pump #1				
Pump #2				
Pump #3				



TOTAL DEPTH (MD) _____ m

TOTAL DEPTH (TVD) _____ m

CASING DATA:

CASING _____ (size) , _____ (ID) , _____ (weight)

CASING SHOE DEPTH _____ m

SHOE TEST DATA:

Depth #1 _____ (bar) @ Test MW of _____ (kg/l)

Depth #2 _____ (bar) @ Test MW of _____ (kg/l)

Depth #3 _____ (bar) @ Test MW of _____ (kg/l)

LINER #1 _____ (size) , _____ (ID) , _____ (weight)

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

LINER #1 TOP DEPTH _____ m

LINER #2 TOP DEPTH _____ m

LINER #1 SHOE DEPTH _____ m

LINER #2 SHOE DEPTH _____ m

TVD CASING or LINER _____ m

HOLE DATA:

BIT SIZE _____ inches

DISCLAIMER: This Well Control Worksheet is intended solely for the use of the IADC and IADC accredited schools and organizations engaging in the teaching of the IADC WellCAP Well Control classes. The IADC, its employees or others acting on its behalf, makes no warranties or guarantees expressed, implied or statutory, as to any matter whatsoever, with respect to the use of this Well Control Worksheet.

CALCULATIONS

KILL FLUID DENSITY (kg/l)

[(_____ x 10.2) ÷ _____] + _____ = _____ kg/l — KILL FLUID DENSITY

SIDPP (bar) | TVD (m) | Original Fluid Density (kg/l)

INITIAL CIRCULATING PRESSURE (ICP)

_____ + _____ = _____ bar — INITIAL CIRCULATING PRESSURE

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

TRUE PUMP OUTPUT:

_____ x _____ = _____

Liters/Stk @ 100% | % Efficiency | TPO (Liters/Stk)

DRILL STRING CAPACITY:

	Size (mm)	Weight (kg/m)	Liters/m		Length (m)			
Drill #1: Pipe	_____	_____	_____	x	_____	=	_____	Liters DP
Drill #2: Pipe	_____	_____	_____	x	_____	=	_____	Liters DP
HWDP:	_____	_____	_____	x	_____	=	_____	Liters HWDP
Drill #1: Collars	_____	_____	_____	x	_____	=	_____	Liters DC
Drill #2: Collars	_____	_____	_____	x	_____	=	_____	Liters DC
Surface: Line	_____	_____	_____	x	_____	=	_____	Liters SL

_____ Total Drill String Capacity (Liters)

STROKES, SURFACE TO BIT:

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

ANNULAR CAPACITY (Between):

CSG and DP:	_____	Liters/m x	_____	m =	_____	Liters
Liner #1 and DP:	_____	Liters/m x	_____	m =	_____	Liters
Liner #2 and DP:	_____	Liters/m x	_____	m =	_____	Liters
OH and DP/HWDP:	_____	Liters/m x	_____	m =	_____	Liters
OH and DC:	_____	Liters/m x	_____	m =	_____	Liters

STROKES, BIT TO SHOE:

_____ (Open Hole Annular Volume (Liters)) ÷ _____ (True Pump Output (Liters/Stk)) = _____ (Strokes, Bit to Shoe)

STROKES, BIT TO SURFACE:

_____ (Total Annular Volume (Bbls)) ÷ _____ (True Pump Output (Liters/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 _____ ÷ 10.2 = _____ bar — MAASP

Max. Allowable Fluid Density (kg/l) | Current Fluid Density (kg/l) | Shoe TVD (m)

MAXIMUM ALLOWABLE ANNULUS SURFACE PRESSURE (MAASP) WITH KILL MUD

(_____ - _____) x _____ ÷ 10.2 = _____ bar — MAASP WITH KILL MUD

Max. Allowable Fluid Density (kg/l) | Kill Mud Weight (kg/l) | Shoe TVD (m)

COMMENTS

FORMULAS

1. Pressure Gradient (bar/m) = Fluid Density (kg/l) ÷ 10.2

2. Hydrostatic Pressure (bar) = Fluid Density (kg/l) x TVD (m) ÷ 10.2

3. Capacity (l/m) = Inside Diameter^2 (mm) ÷ 1273

4. Annular Capacity(l/m) = (Inside Diameter of Casing^2 (mm) or Hole Diameter^2(mm) - Outside Diameter of Pipe^2 (mm)) ÷ 1273

5. Pipe Displacement (l/m) = (Outside Diameter of pipe^2 (mm) - Inside Diameter of pipe^2 (mm)) ÷ 1273

6. $$\text{Maximum Allowable Fluid Density (kg/l)} = \frac{\text{Surface LOT Pressure (bar)} \times 10.2}{\text{Shoe TVD (m)}} + \text{LOT Fluid Density (kg/l)}$$

7. $$\text{MAASP (bar)} = \frac{[\text{Maximum Allowable Fluid Density (kg/l)} - \text{Current Fluid Density (kg/l)}] \times \text{Shoe TVD (m)}}{10.2}$$

8. $$\text{Pressure Drop per Metre Tripping Dry Pipe (bar/m)} = \frac{\text{Drilling Fluid Density (kg/l)} \times \text{Metal Displacement (l/m)}}{[\text{Riser/Casing Capacity (l/m)} - \text{Metal Displacement (l/m)}] \times 10.2}$$

9. $$\text{Pressure Drop per Metre Tripping Wet Pipe (bar/m)} = \frac{\text{Drilling Fluid Density (kg/l)} \times \text{Closed End Displacement (l/m)}}{[\text{Riser/Casing Capacity (l/m)} - \text{Closed End Displacement (l/m)}] \times 10.2}$$

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

11. $$\text{Equivalent Circulating Density (kg/l)} = \frac{\text{Annular Pressure Loss (bar)} \times 10.2}{\text{TVD (m)}} + \text{Fluid Density (kg/l)}$$

12. $$\text{Kg of Barite Needed to Weight-Up Mud} = \frac{\text{Liters of Mud in System} \times 4.25 \times (\text{KMW} - \text{OMW})}{(4.25 - \text{KMW})}$$

13. $$\text{Volume Increase from Adding Barite (l)} = \frac{\text{Kg of Barite Needed to Weight-Up Mud}}{4.25}$$

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

15. $$\text{Estimated New Pump Pressure with New Mud Weight (bar)} = \text{Old Pump Pressure (bar)} \times \frac{\text{New Mud Weight (kg/l)}}{\text{Old Mud Weight (kg/l)}}$$

COMMENTS

DISCLAIMER: This Well Control Worksheet is intended solely for the use of the IADC and IADC accredited schools and organizations engaging in the teaching of the IADC WellCAP Well Control classes. The IADC, its employees or others acting on its behalf, makes no warranties or guarantees expressed, implied or statutory, as to any matter whatsoever, with respect to the use of this Well Control Worksheet.