IADC Driller's Method Worksheet

IADC

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

KICK DATA

SIDPP: __________ **kPa** **SICP:** __________ **kPa**

PIT GAIN: __________ **m^3** **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 __________ kPa @ 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 __________ kPa
7. Calculate Kill Mud Weight.

   KMW = __________ kg/m^3
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 <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.

   __________ kPa
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/m^3]

SLOW CIRCULATION RATE (SCR):

SCR taken @ ______________ (m)

	Stks/min	Pressure(kPa)	m^3/min	Pressure(kPa)
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 ________ (kPa) @ Test MW of ________ (kg/l)

Depth #2 ________ (kPa) @ Test MW of ________ (kg/l)

Depth #3 ________ (kPa) @ 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]

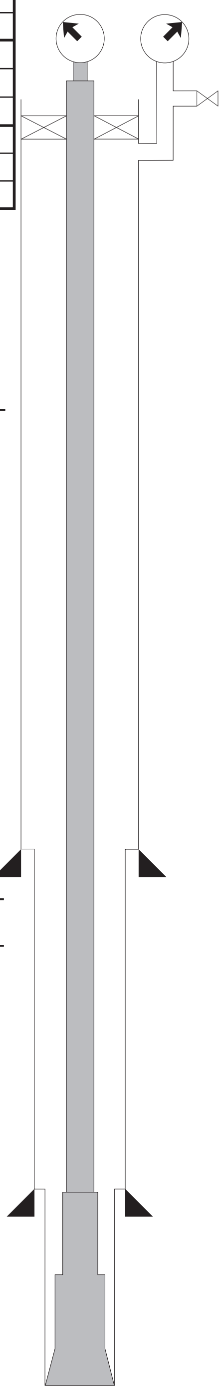
LINER #1 SHOE DEPTH [m]

LINER #2 SHOE DEPTH [m]

TVD CASING or LINER [m]

HOLE DATA:

BIT SIZE [inches]



CALCULATIONS

KILL FLUID DENSITY (kg/m³)

[____________ ÷ (0.00981 x ____________)] + ____________ = ____________ kg/m³ KILL FLUID DENSITY

SIDPP (kPa) | TVD (m) | Original Fluid Density (kg/m³)

INITIAL CIRCULATING PRESSURE (ICP)

____________ + ____________ = ____________ kPa INITIAL CIRCULATING PRESSURE

SIDPP (kPa) | Pump Pressure (kPa) @ SCR of _______SPM

TRUE PUMP OUTPUT:

____________ x ____________ = ____________

m³/Stk @ 100% | % Efficiency | TPO (m³/Stk)

DRILL STRING CAPACITY:

Drill #1: Pipe	______ Size (mm)	______ Weight (kg/m)	______ m³/m	x	______ Length (m)	=	______ DP m³
Drill #2: Pipe	______ Size (mm)	______ Weight (kg/m)	______ m³/m	x	______ Length (m)	=	______ DP m³
HWDP:	______ Size (mm)	______ Weight (kg/m)	______ m³/m	x	______ Length (m)	=	______ HWDP m³
Drill #1: Collars	______ Size (mm)	______ Weight (kg/m)	______ m³/m	x	______ Length (m)	=	______ DC m³
Drill #2: Collars	______ Size (mm)	______ Weight (kg/m)	______ m³/m	x	______ Length (m)	=	______ DC m³
Surface: Line	______ Size (mm)	______ Weight (kg/m)	______ m³/m	x	______ Length (m)	=	______ SL m³

____________ Total Drill String Capacity (m³)

STROKES, SURFACE TO BIT:

____________ ÷ ____________ = ____________

Total Drill String Capacity (m³) | True Pump Output (m³/Stk) | Strokes, Surface to Bit

ANNULAR CAPACITY (Between):

CSG and DP:	______ m³/m	X	______ m	=	______ m³
Liner #1 and DP:	______ m³/m	X	______ m	=	______ m³
Liner #2 and DP:	______ m³/m	X	______ m	=	______ m³
OH and DP/HWDP:	______ m³/m	X	______ m	=	______ m³
OH and DC:	______ m³/m	X	______ m	=	______ m³

STROKES, BIT TO SHOE:

____________ ÷ ____________ = ____________

Open Hole Annular Volume (m³) | True Pump Output (m³/Stk) | Strokes, Bit to Shoe

STROKES, BIT TO SURFACE:

____________ ÷ ____________ = ____________

Total Annular Volume (m³) | True Pump Output (m³/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)(kPa)

(____________ - ____________) x 0.00981 x ____________ = ____________ kPa MAASP

Max. Allowable Fluid Density (kg/m³) | Current Fluid Density (kg/m³) | Shoe TVD (m)

MAXIMUM ALLOWABLE ANNULUS SURFACE PRESSURE (MAASP) WITH KILL MUD

(____________ - ____________) x 0.00981 x ____________ = ____________ kPa MAASP WITH KILL MUD

Max. Allowable Fluid Density (kg/m³) | Kill Mud Weight (kg/m³) | Shoe TVD (m)

COMMENTS

FORMULAS

1. Pressure Gradient (kPa/m) = Fluid Density (kg/m³) x 0.00981

$$\text{Pressure Gradient}_{(kPa/m)} = \text{Fluid Density}_{(kg/m^3)} \times 0.00981$$

2. Hydrostatic Pressure (kPa) = Fluid Density (kg/m³) x 0.00981 x TVD (m)

$$\text{Hydrostatic Pressure}_{(kPa)} = \text{Fluid Density}_{(kg/m^3)} \times 0.00981 \times \text{TVD}_{(m)}$$

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

4. Annular Capacity (m^3/m) = (Inside Diameter of Casing^2 (mm) or Hole Diameter^2 (mm) - Outside Diameter of Pipe^2 (mm)) ÷ 1273

5. Pipe Displacement (m^3/m) = (Outside Diameter of pipe^2 (mm) - Inside Diameter of pipe^2 (mm)) ÷ 1273

6. Maximum Allowable Fluid Density (kg/m^3) =

$$\frac{\text{Surface LOT Pressure}_{(kPa)}}{\text{Shoe TVD}_{(m)} \times 0.00981} + \text{LOT Fluid Density}_{(kg/m^3)}$$

7. MAASP (kPa) = [Maximum Allowable Fluid Density (kg/m^3) - Current Fluid Density (kg/m^3)] x 0.00981 x Shoe TVD (m)

8. Pressure Drop per Metre Tripping Dry Pipe (kPa/m) =

$$\frac{\text{Drilling Fluid Density}_{(kg/m^3)} \times 0.00981 \times \text{Metal Displacement}_{(m^3/m)}}{\text{Riser/Casing Capacity}_{(m^3/m)} - \text{Metal Displacement}_{(m^3/m)}}$$

9. Pressure Drop per Metre Tripping Wet Pipe (kPa/m) =

$$\frac{\text{Drilling Fluid Density}_{(kg/m^3)} \times 0.00981 \times \text{Closed End Displacement}_{(m^3/m)}}{\text{Riser/Casing Capacity}_{(m^3/m)} - \text{Closed End Displacement}_{(m^3/m)}}$$

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

11. Equivalent Circulating Density (kg/m^3) =

$$\frac{\text{Annular Pressure Loss}_{(kPa)}}{\text{TVD}_{(m)} \times 0.00981} + \text{Fluid Density}_{(kg/m^3)}$$

12. Kg of Barite Needed to Weight-Up Mud =

$$\frac{m^3 \text{ of Mud in System} \times 4250 \times (\text{KMW} - \text{OMW})}{(4250 - \text{KMW})}$$

13. Volume Increase from Adding Barite (m^3) =

$$\frac{\text{Kg of Barite Needed to Weight-Up Mud}}{4250}$$

14. Estimated New Pump Pressure at New Pump Rate (kPa) =

$$\text{Old Pump Pressure}_{(kPa)} \times \left[\frac{\text{New Pump Rate}_{(SPM)}}{\text{Old Pump Rate}_{(SPM)}}\right]^2$$

15. Estimated New Pump Pressure with New Mud Weight (kPa) =

$$\text{Old Pump Pressure}_{(kPa)} \times \frac{\text{New Mud Weight}_{(kg/m^3)}}{\text{Old Mud Weight}_{(kg/m^3)}}$$

COMMENTS