



IADC WellCAP Well Control Worksheet

Bullhead

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

PRE-RECORDED INFORMATION

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

PUMP RATE CONSIDERATIONS:

Kill Rate Speeds and Volume

_____ ÷ _____ = _____ Desired Barrels per Minute (BBLS/MIN) Pump Output (BBLS/STK) Pump Rate (STKS/MIN)
_____ ÷ _____ = _____ Desired Barrels per Minute (BBLS/MIN) Pump Output (BBLS/STK) Pump Rate (STKS/MIN)
_____ ÷ _____ = _____ Desired Barrels per Minute (BBLS/MIN) Pump Output (BBLS/STK) Pump Rate (STKS/MIN)

VOLUME AND STROKE CONSIDERATIONS:

Tubing Volume/Strokes (Surface to End of Tubing, E.O.T.)

_____ **X** _____ **=** _____ ÷ _____ **=** _____
Tubing Length Surface to E.O.T. (MD — FT) Capacity per Foot in Tubing (BBLS/FT) Tubing Volume Surface to E.O.T. (BBLs) Pump Output (BBLs/STK) Strokes Surface to E.O.T. (STKS)

Casing Volumes/Strokes (Below End of Tubing, E.O.T. to Perforations)

_____ **X** _____ **=** _____ ÷ _____ **=** _____
Length E.O.T. to Perfs Top/Middle/Bottom (MD — FT) Capacity per Foot in Casing (BBLs/FT) Casing Volume E.O.T. to Perforations (BBLs) Pump Output (BBLs/STK) Strokes E.O.T. to Perforations (STKS)

Surface to Perforations Volume/Strokes (Kill Point)

_____ **+** _____ **=** _____ ÷ _____ **=** _____
Tubing Volume Surface to E.O.T. (BBLs) Casing Volume E.O.T. to Perforations (BBLs) Surface to Perforations Volume (BBLs) Pump Output (BBLs/STK) Strokes Surface to Perforations (Kill Point — STKS)

Total Volume/Strokes to Pump (Including Overdisplacing)

_____ **+** _____ **=** _____ ÷ _____ **=** _____
Surface to Perforations Volume (BBLs) Overdisplacement — if any — (BBLs) Total Volume to Pump (BBLs) Pump Output (BBLs/STK) Total Strokes to Pump (Overdisplace — STKS)

FORMATION PRESSURE CONSIDERATIONS:

Kill Fluid Density

_____ ÷ 0.052 ÷ _____ **=** _____
Formation Pressure (PSI) Depth to Perforations Top/Middle/Bottom (TVD — FT) Kill Fluid Density (PPG)

Estimated Formation Integrity Pressure (Fracture)

_____ **X** 0.052 **X** _____ **=** _____
Max. Allowable Mud Density (PPG) Depth to Perforations Top/Middle/Bottom (TVD — FT) Estimated Formation Integrity Pressure (PSI)

Average Hydrostatic Pressure in Tubing

_____ **-** _____ **=** _____
Formation Pressure (PSI) Initial Shut in Tubing Pressure (PSI) Average Hydrostatic Pressure in Tubing (PSI)

Initial Estimated Maximum Pressure on Tubing (Static)

_____ **-** _____ **=** _____
Est. Formation Integrity Pressure (PSI) Average Hydrostatic Pressure in Tubing (PSI) Initial Estimated Max. Pressure on Tubing (PSI)

Kill Fluid Hydrostatic Pressure

_____ **X** 0.052 **X** _____ **=** _____
Kill Fluid Density (PPG) Depth to Perforations Top/Middle/Bottom (TVD — FT) Kill Fluid Hydrostatic Pressure (PSI)

SLOW CIRCULATION RATE (SCR):

	STKS/MIN	Pressure(PSI)	BBL/MIN	Pressure(PSI)
Pump #1				
Pump #2				
Pump #3				

RECORDED WELL DATA:

Formation Pressure

_____ PSI

Max. Allowable Mud Density

_____ PPG

Maximum Pump Pressure

_____ PSI

Shut In Tubing Pressure

_____ PSI

Shut In Casing Pressure

_____ PSI

Tree/Wellhead/

BOP Stack Rating

_____ PSI

Annulus Fluid Density

_____ PPG

Packer Set

_____ TVD FT
 _____ MD

Top Perforation

_____ TVD FT
 _____ MD

Middle Perforation

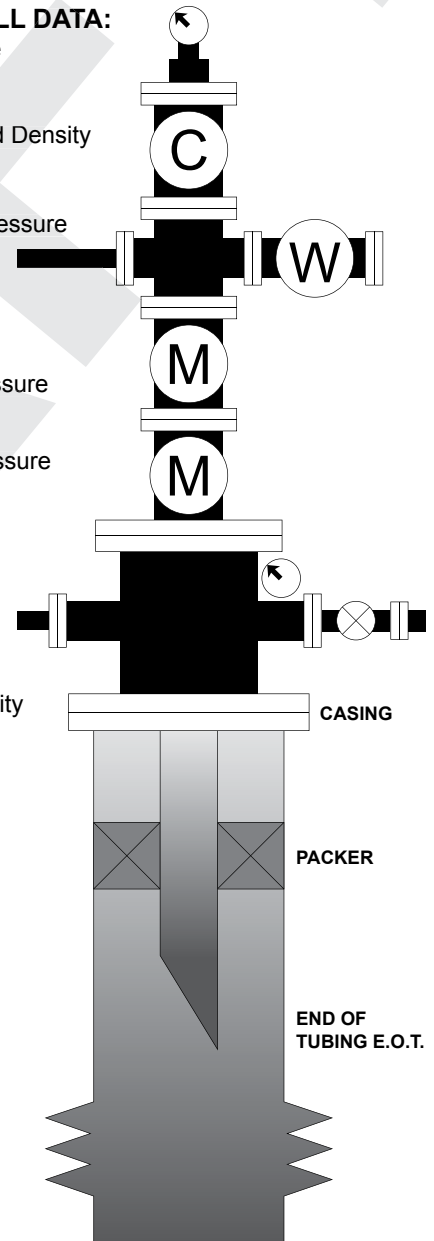
_____ TVD FT
 _____ MD

Bottom Perforation

_____ TVD FT
 _____ MD

Final Estimated Maximum Pressure on Tubing (Static)

_____ **-** _____ **=** _____
Est. Formation Integrity Pressure (PSI) Kill Fluid Hydrostatic Pressure (PSI) Final Estimated Max. Pressure on Tubing (PSI)



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Field Units
 (psi, ft, ppg)

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TUBING & CASING DATA

TUBING DATA:

Tubing

Outside Diameter (INCHES)	Inside Diameter (INCHES)	Capacity per Foot (BBL/FT)	Length to E.O.T. (MD — FT)

Tubing Collapse

	X		=	
Tubing Collapse (PSI)		Safety Factor (0.70 or Less)		Adjusted Tubing Collapse (PSI)

Tubing

Weight (LBS/FT)	Grade	Internal Yield (PSI @ 100%)	Collapse (PSI @ 100%)

Tubing Yield

	X		=	
Tubing Yield (PSI)		Safety Factor (0.70 or Less)		Adjusted Tubing Internal Yield (PSI)

CASING DATA:

Casing

Outside Diameter (INCHES)	Inside Diameter (INCHES)	Capacity per Foot (BBL/FT)	Length (MD — FT)

Casing Internal Yield

	X		=	
Casing Internal Yield (PSI)		Safety Factor (0.70 or Less)		Adjusted Casing Yield (PSI)

Casing

Weight (LBS/FT)	Grade	Internal Yield (PSI @ 100%)	TREE/BOP Rated Pressure (PSI)

PRESSURE CONSIDERATIONS:

Pressure Consideration PSI per "Step"

	-		÷ 10 =	
Initial Max. Pressure on Tubing (PSI)		Final Max. Pressure on Tubing (PSI)		Number of "Steps"
				PSI per "Step" (PSI/STEP)

- A** Lesser value of "Tubing Yield" or "Initial Estimated Maximum Pressure on Tubing" results
(see page 1)
- B** Lesser value of "Tubing Yield" or "Final Estimated Maximum Pressure on Tubing (Static)" results
(see page 1)

Volume per "Step"

	÷ 10 =		X 42 =	
Surface to Perforations Volume (BBL)		Number of "Steps"		Volume per "Step" (BBL/STEP)
				Volume per "Step" (GALS/STEP)

Strokes per "Step"

	÷ 10 =	
Stroke Surface to Perforations (STKS)		Number of "Steps"
		Strokes per "Step" (STKS/STEP)

PRESSURE CHART

Strokes	Volume in BBL	Volume in GALS	Estimated Max. Static Pressure	Actual Tubing Pressure	Casing Pressure	Pump Rate	Notes
0	0	0	Initial				
Kill Point ↓	Final ↓						
Overdisplace ↓							

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Field Units
(psi, ft, ppg)

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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 Diameter² (in.) ÷ 1029.4
4. Annular Capacity (bbls/ft) = (Inside Diameter of Casing² (in.) or Hole Diameter² (in.) - Outside Diameter of Pipe² (in.)) ÷ 1029.4
5. Pipe Displacement (bbls/ft) = (Outside Diameter of pipe² (in.) - Inside Diameter of pipe² (in.)) ÷ 1029.4
6. Maximum Allowable Mud Weight (ppg) = $\frac{\text{Surface LOT Pressure (psi)}}{\text{Shoe Depth (ft, TVD)} \times 0.052} + \text{LOT Mud Weight (ppg)}$
7. MAASP (psi) = [Maximum Allowable Mud Weight (ppg) - Present Mud Weight (ppg)] x 0.052 x Shoe TVD (ft)
8. Formation Pressure (psi) = Hydrostatic Pressure Mud in Hole (psi) + SIDPP (psi)
9. Sacks (100 lb) of Barite Needed to Weight-Up Mud = $\frac{\text{Bbls of Mud in System} \times 14.9 \times (\text{KMW} - \text{OMW})}{(35.4 - \text{KMW})}$
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.
10. Volume Increase from Adding Barite (bbls) = Number of Sacks (100 lb) added ÷ 14.9
11. Equivalent Mud Weight (ppg) @ _____ depth (ft) = $\frac{\text{Pressure (psi)}}{\text{Depth (ft, TVD)} \times 0.052}$
12. Estimated New Pump Pressure at New Pump Rate (psi) = Old Pump Pressure (psi) x $\left[\frac{\text{New Pump Rate (SPM)}}{\text{Old Pump Rate (SPM)}} \right]^2$
13. Estimated New Pump Pressure with New Mud Weight (psi) = Old Pump Pressure (psi) x $\frac{\text{New Mud Weight (ppg)}}{\text{Old Mud Weight (ppg)}}$

COMMENTS

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