THUNDER
WELL CONTROL LLC

www.thunderwellcontrol.com

FORMULA SHEET

Pressure Formulas

Pressure Gradient	Mud Weight (ppg)	X	0.052	=	Pressure Gradient (psi/ft)					
Hydrostatic Pressure	Mud Weight (ppg)	X	0.052	X	TVD (ft)	=	Hydrostatic Pressure (psi)			
Formation Pressure	Hydrostatic Pressure (psi)	+	SIDPP (psi)	=	Formation Pressure (psi)					

Circulation Formulas

Pump Displacement	Output 100% (bbls/stk)	X	Efficiency (%)	=	Displacement (bbls/stk)					
Pump Strokes	Volume (bbls)	÷	Displacement (bbls/stk)	=	Pump Strokes (stks)					
Pump Time	Pump Strokes (stks)	÷	Kill Rate (spm)	=	Pump Time (mins)					
Initial Circulating Press	Kill Rate Press (psi)	+	SIDPP (psi)	=	ICP (psi)					
Final Circulating Press	Kill MW (ppg)	÷	Current MW (ppg)	X	Kill Rate Press (psi)	=	FCP (psi)			
Annular Pressure Loss	Pump Pressure (psi)	X	approx. 10%	=	Annular Pressure Loss (psi)					
Equivalent Circulating Density	Annular Pressure Loss (psi)	÷	0.052	÷	TVD (ft)	+	Current MW (ppg)	=	ECD (ppg)	

Mud / MAASP Formulas

Max Mud Weight	FIT / LOT Pressure (psi)	÷	0.052	÷	Casing Shoe TVD (ft)	+	Test MW (ppg)	=	Max MW (ppg)		
MAASP with Current MW	Max MW (ppg)	-	Current MW (ppg)	X	0.052	X	Casing Shoe TVD (ft)	=	MAASP with Current MW	psi	
Kill Mud Weight	SIDPP (psi)	÷	0.052	÷	Bit TVD Depth (ft)	+	Current MW (ppg)	=	Kill MW (ppg)		
MAASP with Kill MW	Max MW (ppg)	-	Kill MW (ppg)	X	0.052	X	Casing Shoe TVD (ft)	=	MAASP with Kill MW	psi	
Equivalent Mud Weight	SICP (psi)	÷	0.052	÷	TVD Depth (ft)	+	Current MW (ppg)	=	Equivalent MW (ppg)		

Capacity Formulas

Capacity	ID Drill Pipe ^{2} (in)	÷	1029.4	X	MD Length (ft)	=	Capacity (bbls)			
Annular Capacity	ID Casing / OH ^{2} (in)	-	OD Drill Pipe ^{2} (in)	÷	1029.4	X	MD Length (ft)	=	Annular Capacity (bbls)	
Pipe Displacement	OD Drill Pipe ^{2} (in)	-	ID Drill Pipe ^{2} (in)	÷	1029.4	X	MD Length (ft)	=	Pipe Displacement (bbls)	

Force Formulas

Force Square	Length (in)	X	Width (in)	X	Pressure (psi)	=	Force (lbs)			
Force Round	Diameter ^{2} (in)	X	0.7854	X	Pressure (psi)	=	Force (lbs)			

Tank Formulas

Tank Capacity Square	Tank Length (ft)	X	Tank Width (ft)	X	0.178	=	Tank Capacity (bbls/ft)			
Tank Capacity Round	Tank Diameter ^{2} (ft)	÷	7.148	=	Tank Capacity (bbls/ft)					