

HYDRAULICS CALCULATIONS

PLASTIC VISCOSITY 21.33 cp  
 YIELD POINT 13.33 lb/ft<sup>2</sup>  
 POWER LAW k .4597  
 POWER LAW n .5939  
 DEPTH 2713.95 m (8921')  
 VERTICAL DEPTH 2713.33 m  
 DEPTH OF RETURNS 2700.46 m  
 CUTTINGS BULK DENSITY 2.27 sec grv  
 MUD DENSITY 9.33 lb/gal  
 ACTIVE SURFACE MUD VOLUME 453 bbl  
 FLOW RATE 511 gal/min  
 BOOSTER FLOW 3 gal/min  
 PUMP PRESSURE 2357 psi  
 PUMP gal/stk 4.95 gal/stk  
 BIT NOZZLES 13, 13, 13, 3

CALCULATED RESULTS:

FROM m	TO m	LENGTH m	ANNULUS/PIPE in	ANN VELO. ft/min	CRIT VELO ft/min	FLOW REGIME	PRESS LOSS psi
0.00	134.55	134.55	13.750/	5.333	45.9	164.3	LAMINAR .2
134.55	1651.4	1516.9	12.347/	5.333	117.5	232.4	LAMINAR 15.2
1651.4	2435.2	783.8	12.253/	5.333	119.7	234.1	LAMINAR 7.7
2435.2	2572.6	137.4	12.253/	5.333	119.7	234.1	LAMINAR 1.7
2572.6	2713.95	141.35	12.253/	3.333	174.3	313.1	LAMINAR 4.7

Annulus Diam	Pipe		
	j.i.	o.d.	i.d.
13.750	6.375	5.333	4.276
12.347	6.375	5.333	4.276
12.253	6.375	5.333	4.276
12.253	6.375	5.333	3.333
12.253	3.333	3.333	2.375

MUD HYDROSTATIC 9.27 lb/gal  
 FLOW CONTRIBUTION .36 lb/gal  
 CUTTINGS CONTRIBUTION .36 lb/gal  
 EQUIVALENT CIRCULATING DENSITY 9.43 lb/gal

SURFACE PRESSURE LOSS 44 psi NOZZLE VELOCITY 447.6 ft/sec  
 PIPEBORE PRESSURE LOSS 1227 psi HYDRAULIC POWER 593.0 hp  
 ANNULAR PRESSURE LOSS 29 psi JET IMPACT FORCE 1316.5 lbs  
 BIT PRESSURE LOSS 1664 psi 3 OF PRESS LOSS AT BIT 56  
 TOTAL CALC. PRESS LOSS 2964 psi

VOLUMES:	gal	bbl	Strokes	Minutes @ 123 s.p.m.
1) Pipe Capacity	6253	149	1260	10.2
2) Pipe Displacement	3377	92	732	5.3
3) Total Annulus	47512	1131	9579	77.8 ← LAG
4) Mud in active pits	19652	468	3962	32.2
Circulation (1) + (3)	53752	1293	13839	89.0
Hole Volume (1)+(2)+(3)	57639	1372	11621	94.3
Total Mud Circulation	73414	1748	14831	123.2
HOLE OUT OF GAUGE:				
CIRCULATION CORRECTION FACTOR =	1.3564			
Corrected Annulus	53544	1293	13190	82.7 ← LAG
Corrected Hole	67671	1445	12232	99.3

