

HYDRAULICS CALCULATIONS

PLASTIC VISCOSITY 10.00 cP
 YIELD POINT 16.00 lb/cft²
 POWER LAW k 1.4354
 POWER LAW n .4695
 DEPTH 2982.4 ft (909.0m).
 VERTICAL DEPTH 2982.3 ft
 DEPTH OF RETURNS 2810.8 ft
 CUTTINGS BULK DENSITY 2.40 spc grv
 MUD DENSITY 9.20 lb/gal
 ACTIVE SURFACE MUD VOLUME 450 bbl
 FLOW RATE 744 gal/min
 BOOSTER FLOW 0 gal/min
 PUMP PRESSURE 2030 psi
 PUMP gal/stk 4.96 gal/stk
 BIT NOZZLES 18, 18, 18, 11

CALCULATED RESULTS:

FROM ft	TO ft	LENGTH ft	ANNULUS/PIPE in	ANN VELO. ft/min	CRIT VELO ft/min	FLOW REGIME	PRESS LOSS psi
0.0	343.0	343.0	18.750/ 5.000	55.8	235.4	LAMINAR	.4
343.0	1356.0	1013.0	18.730/ 5.000	56.0	235.5	LAMINAR	1.2
1356.0	2093.4	737.4	17.500/ 5.000	64.8	242.7	LAMINAR	1.1
2093.0	2609.4	516.0	17.500/ 5.000	64.8	242.7	LAMINAR	.7
2609.0	2890.4	281.0	17.500/ 8.000	75.3	266.3	LAMINAR	.7
2890.0	2982.4	92.0	17.500/ 9.500	84.4	281.4	LAMINAR	.3

Annulus Diam	Pipe j.d.	Pipe o.d.	Pipe i.d.
18.750	6.370	5.000	4.276
18.730	6.370	5.000	4.276
17.500	6.370	5.000	4.276
17.500	6.375	5.000	3.000
17.500	8.000	8.000	2.875
17.500	9.500	9.500	3.000

MUD HYDROSTATIC 8.67 lb/gal
 FLOW CONTRIBUTION .03 lb/gal
 CUTTINGS CONTRIBUTION 1.15 lb/gal
 EQUIVALENT CIRCULATING DENSITY 9.85 lb/gal

SURFACE PRESSURE LOSS 61 psi NOZZLE VELOCITY 284.7 ft/sec
 PIPEBORE PRESSURE LOSS 571 psi HYDRAULIC POWER 289.0 hp
 ANNULAR PRESSURE LOSS 4 psi JET IMPACT FORCE 1008.6 lbs
 BIT PRESSURE LOSS 666 psi % OF PRESS LOSS AT BIT 51
 TOTAL CALC. PRESS LOSS 1301 psi

VOLUMES:	gal	bbl	Strokes	Minutes @ 150 s.p.m.
1) Pipe Capacity	1880	45	379	2.5
2) Pipe Displacement	1936	46	390	2.6
3) Total Annulus	35829	853	7224	48.2 ← LAG
4) Mud in active pits	18917	450	3814	25.4
Circulation (1) + (3)	37708	898	7602	50.7
Hole Volume (1)+(2)+(3)	39644	944	7993	53.3
Total Mud Circulation	56625	1348	11416	76.1

