

PREDICTIVE DESIGN

***EFFICIENT RESOURCES LIMITED
EFFICIENT et al PROLIFIC 1-2-30-4
100/01-02-030-04W5/0
SURFACE LOCATION: 08-02-030-04W5
FIELD / FORMATION: PROLIFIC / GOODSAND***

(Analysis Provided by: NR-Tec Ltd.)

DISTRIBUTION:

BOB LOBLAW

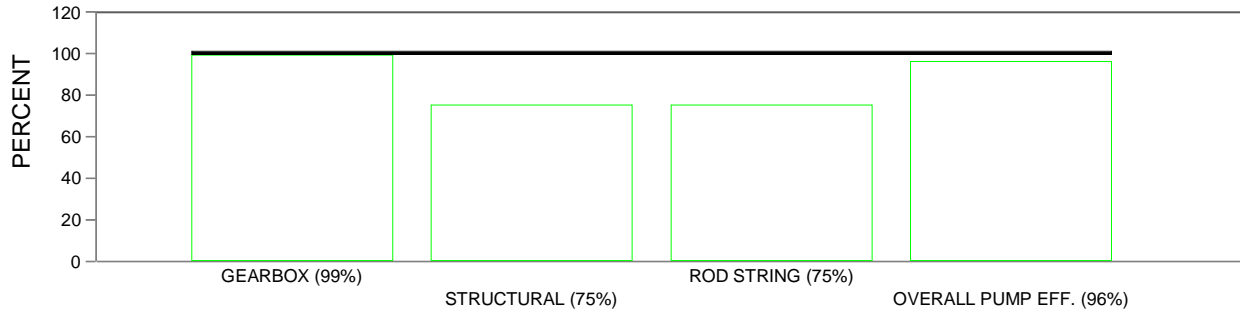
PREPARED BY:

EXPERT ANALYST

DATE:

Today

DESIGN GRAPHIC SUMMARY



A pumping system design was conducted on the above noted well in order to evaluate the optimum pumping system to produce a production rate of (118.5 m³/day) from a pumping depth of 1,304 meters (4,278 ft). The pumping unit will be operated at a pumping speed of 7.1 SPM with an overall stroke length of 143 inches. The system should deliver a production rate of 118.5 m³/day at 96 percent efficiency.

The following pumping system meets all design criteria:

Pumping Unit: AMPSCOT (Conventional) 912-365-168

Bottomhole Pump: 69.85 mm (2.75 inch) plunger diameter

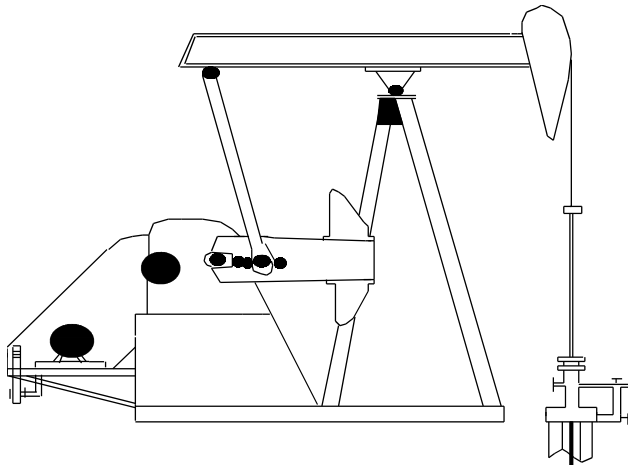
NOTE: Tubing string is anchored

Horsepower Requirements: 52.1 HP - inbalance and stabilized

Rod String:

SECTION	TYPE	ROD GRADE	DIAMETER		LENGTH		TENSILE
			(in.)	(mm)	(ft.)	(m)	(psi)
1	Pol. Rod	D	1.500	38.10	30.0	9.1	115,000
2	Steel	ELECTRA	1.000	25.40	1683.0	513.0	50,000
3	Steel	ELECTRA	0.875	22.23	2350.0	716.3	50,000
4	Sinker Bar	C	1.500	38.10	250.0	76.2	90,000

PREDICTIVE RESULTS



PRIME MOVER		
	USER	INBALANCE
POLISHED ROD H.P.	32.3	32.3
CYCLIC LOAD FACTOR	1.37	1.37
APPROXIMATE MOTOR H.P.	52.1	52.1

OPERATING CONDITIONS	
STUFFING BOX FRICTION (lbs.)	0
TUBING HEAD PRESSURE (kPa)	1943

PUMP EFFICIENCY	
TOTAL PLUNGER STROKE (in) / (cm)	124.0 / 314.9
TOTAL PUMP DISPLACEMENT (m3/d)	123.7
TUBING STRETCH LOSSES (m3/d)	0.0
GAS INTERFERENCE LOSSES (m3/d)	5.2
SHRINKAGE LOSSES (m3/d)	0.0
THEORETICAL STOCK TANK PRODUCTION (m3/d)	118.5
NET DISPLACEMENT EFFICIENCY (%)	95.8
INTAKE PRESSURE (kPa)	2839
DISCHARGE PRESSURE (kPa)	14329
FLUID LOAD (lbs.)	9898
TOTAL LOAD ON PUMP (lbs.)	11200
PUMP SPACING OFF BOTTOM (in) / (cm)	2.8 / 7.1

PUMP UNIT (Conventional)		
AMPSHOT	912-365-168	
ROTATION	CW	
PITMAN POSITION	2 OF 4	
PUMPING SPEED (SPM)	7.1	
STROKE LENGTH (in) / (cm)	143.0 / 363.2	
	USER CB	INBALANCE
MAX TORQUE (in-lb)	901522	901522
- % OF RATING	99	99
MIN TORQUE (in-lb)	-111382	-111382
- % OF RATING	12	12
MAX LOAD (lbs.)	27363	27363
- % OF RATING	75	75
C.B. EFFECT (lbs.)	17762	17762
C.B. MOMENT (lbs.)	1276836	1276836

BOTTOM HOLE PUMP CONDITIONS	
PUMP OVER/UND. TRAVEL (in) / (cm)	-19.2 / -48.9
PUMP PLUNGER OD (in) / (mm)	2.75 / 69.85
PUMP VALVE CLEARANCE (in) / (cm)	6.0 / 15.2
VOLUME PERCENT FREE GAS (%)	5.0
AVERAGE TUBING GRADIENT (kPa/m)	9.500
TUBING STRETCH (in) / (cm)	0.0 / 0.0
UPSTROKE PUMP FRICTION (lbs.)	0
DOWNSTROKE PUMP FRICTION (lbs.)	0
PUMP LOAD COEFFICIENT (lbs/(ft/sec) ²)	25
FLUID ACC. COEFFICIENT (lb/(ft/sec) ²)	50

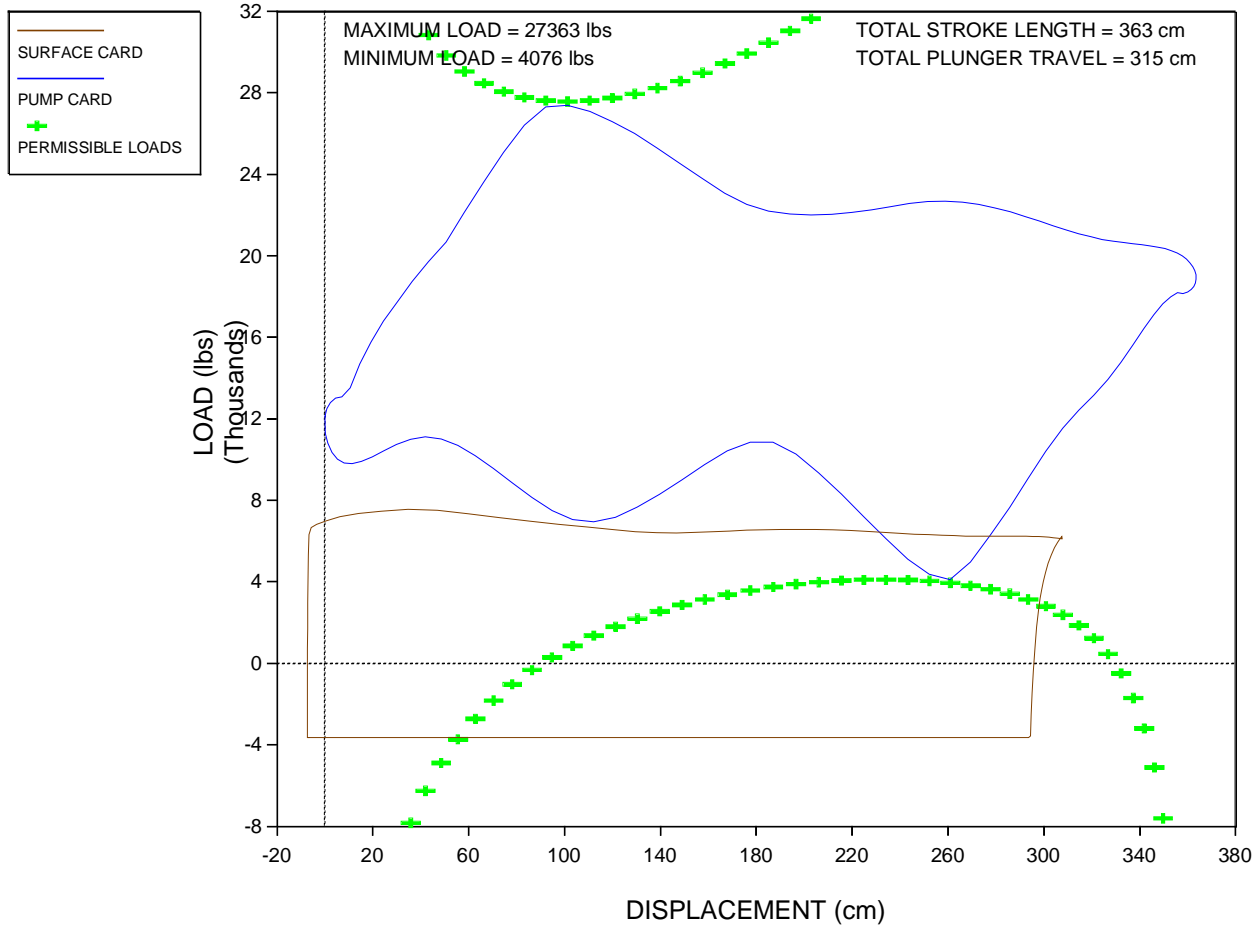
DOWNHOLE EQUIPMENT	
TUBING DIAMETER (in) / (cm)	2.875 / 7.303
PUMP DEPTH (ft) / (m)	4278 / 1304
ANCHOR DEPTH (ft) / (m)	4341 / 1323

ROD STRING

SECTION	DIAMETER (in.)	LENGTH (ft.)	UNIT WT. (lbs./ft.)	WT. IN AIR (lbs.)	WT. IN FLUID (lbs.)	ROD GRADE	TENSILE (psi)	COMMENTS
PolRod	1.500	30.0	6.13	184	162	D	115,000	
2	1.000	1,683.0	2.90	4,881	4,325	ELECTRA	50,000	PLAIN C/W PONIES
3	0.875	2,350.0	2.22	5,217	4,624	ELECTRA	50,000	PLAIN
4	1.500	250.0	6.13	1,533	1,347	C	90,000	SINKER BAR
		4,313.0		11,814	10,458			

ROD LOADING										
DIAMETER		LOAD (lb)		STRESS (psi)		PERCENT API GOODMAN			ROD GRADE	
SECTION	(in)		MAX	MIN	MAX	MIN	1.0 S.F.	0.8 S.F.	0.6 S.F.	
PolRod	1.500	TOP	27,363	4,076	15,485	2,306	48	61	84	D
		BOTTOM	27,180	3,892	15,380	2,202				
2	1.000	TOP	27,456	4,169	34,958	5,308	58	75	104	ELECTRA
		BOTTOM	20,312	1,172	25,861	1,493				
3	0.875	TOP	20,482	1,396	34,062	2,321	60	75	102	ELECTRA
		BOTTOM	11,842	-633	19,693	-1,052				
4	1.500	TOP	9,541	-2,933	5,399	-1,660	30	37	48	C
		BOTTOM	7,528	-3,673	4,260	-2,078				

SURFACE AND PUMP CARDS



GEARBOX TORQUES

