

J&J TECHNICAL SERVICES L.L.C.

Decrease operating costs by replacing ESP with Hydraulic Jet Pump

JET PUMPS AND OIL PRODUCTION SYSTEMS FOR THE OIL AND GAS INDUSTRY

Objective: Decrease operating costs by installing Jet Pump
Customer replaced 4 ESP's in a 12 month period

Results: One year after installing JJ Tech Jet Pump,
No workover rig has been needed, and well remains as productive as it was on
ESP

Advantages of Jet Pump vs. Electric Submersible Pump

Can produce moderate to high volumes of solids

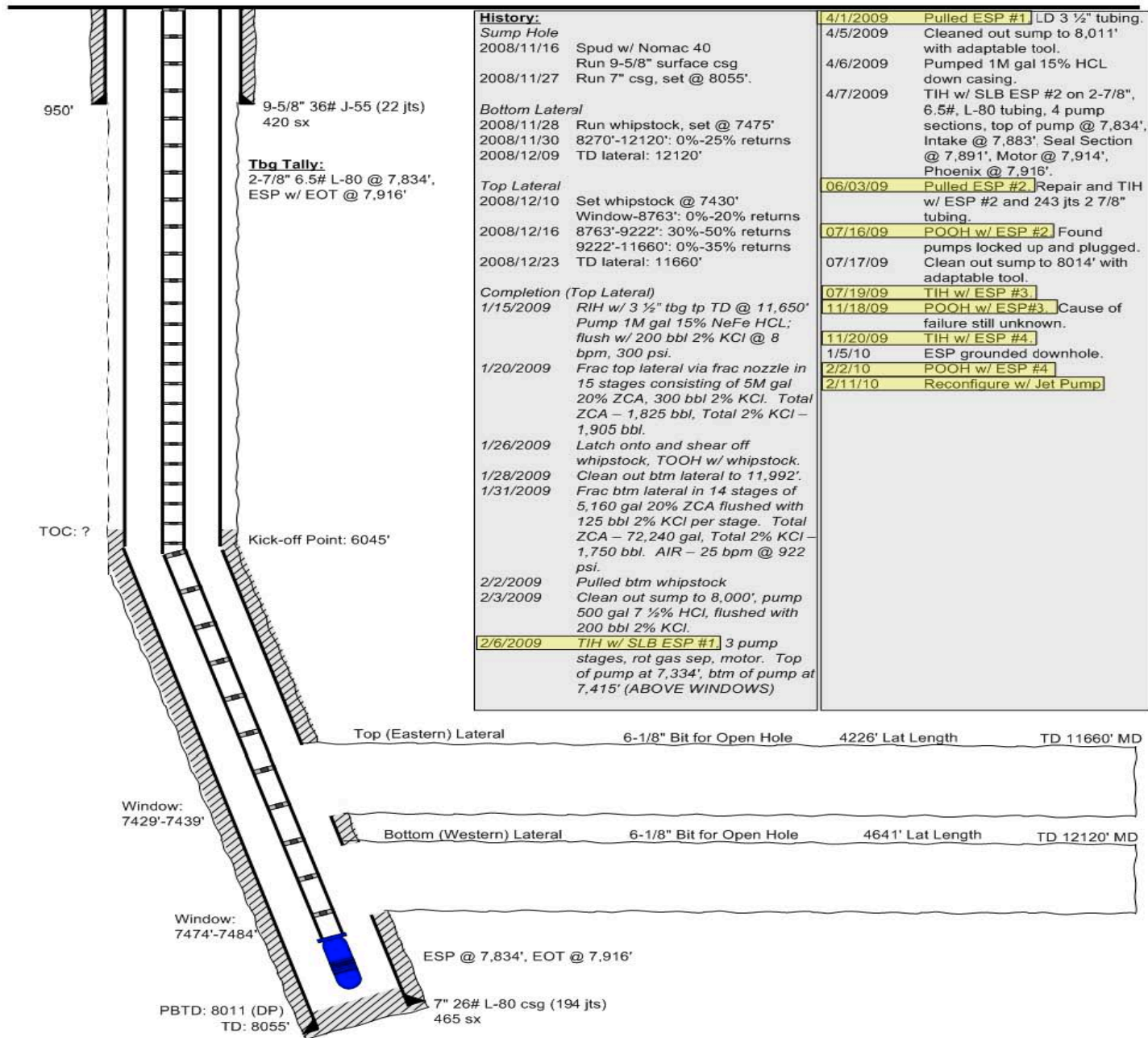
Has no moving parts down-hole

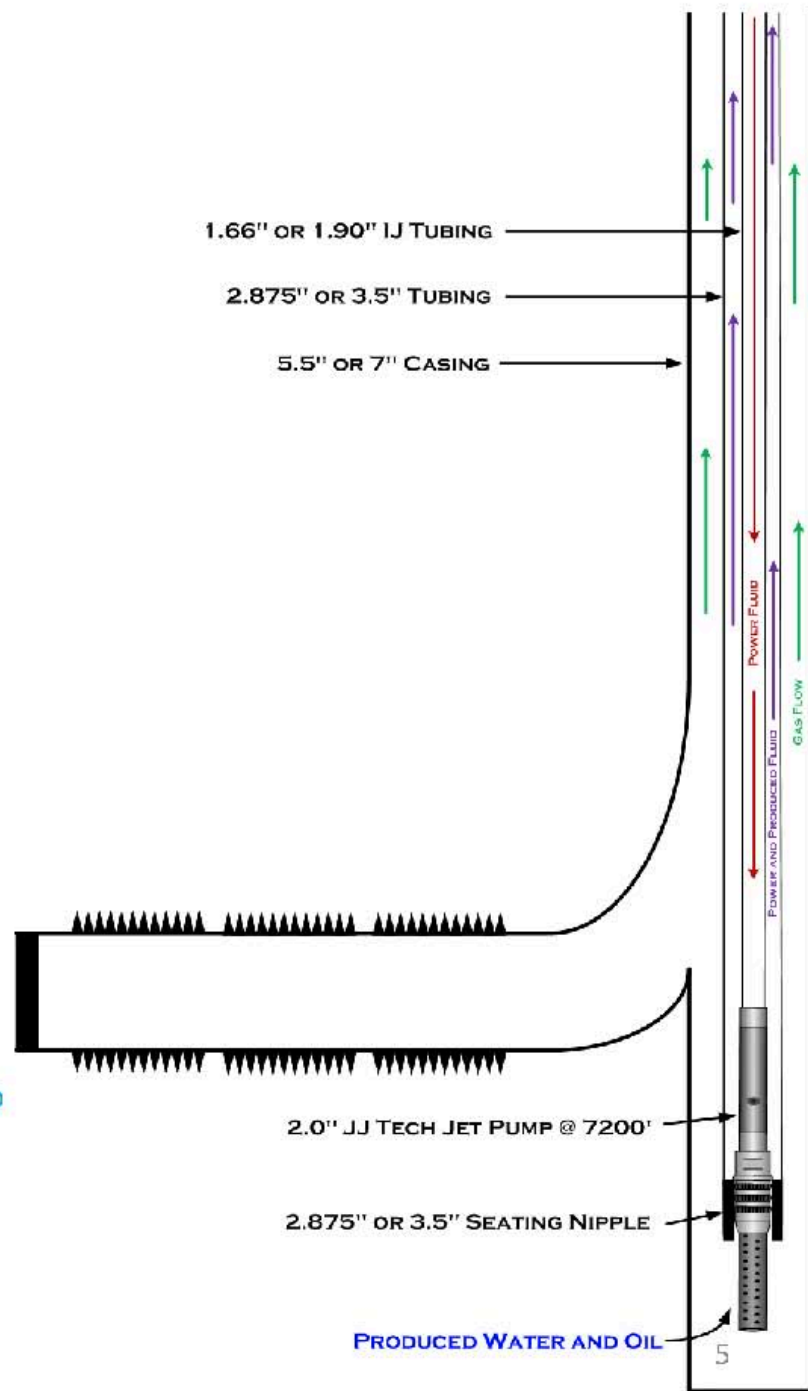
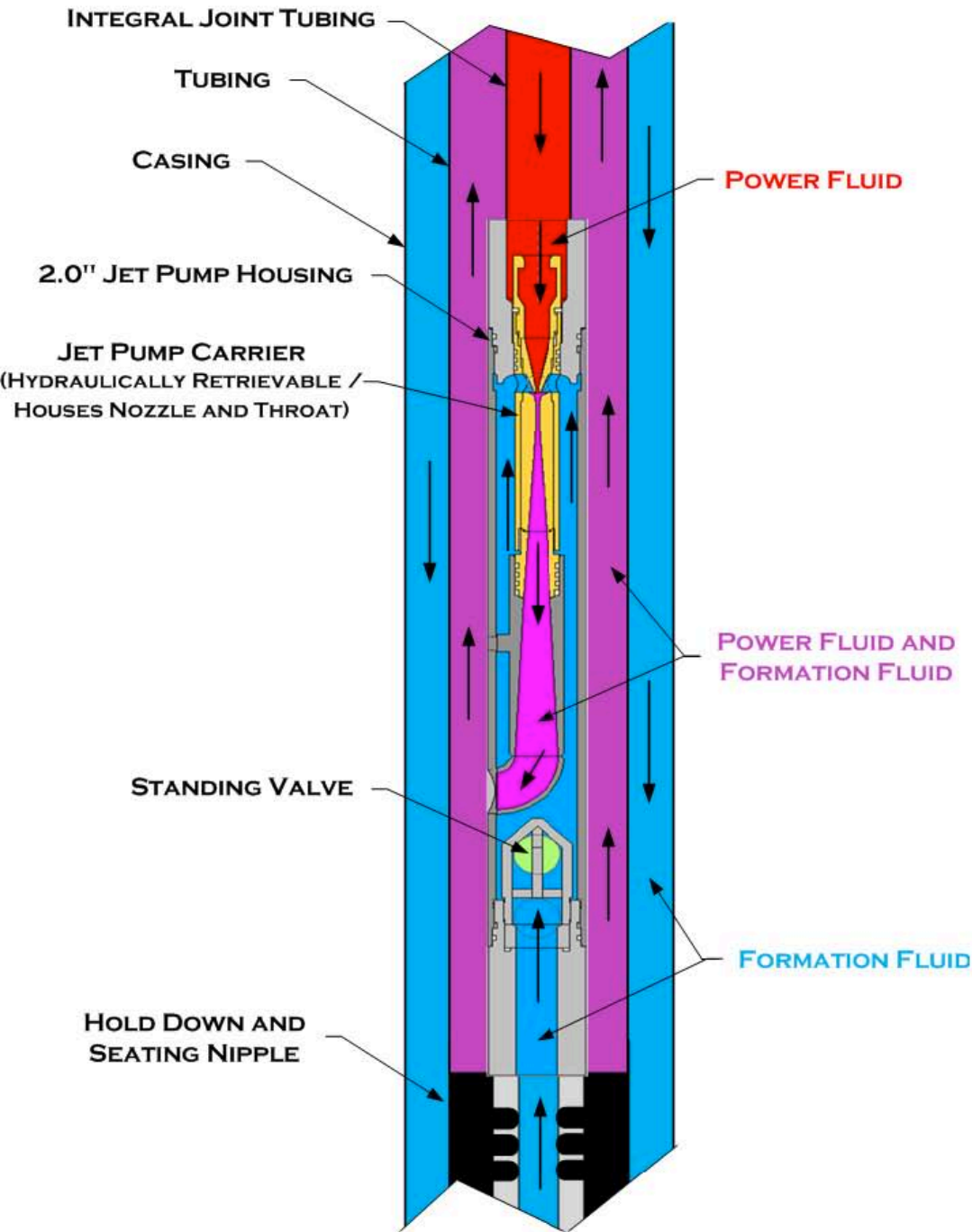
Can produce high volumes of oil

Software can calculate PBHP based on production volumes

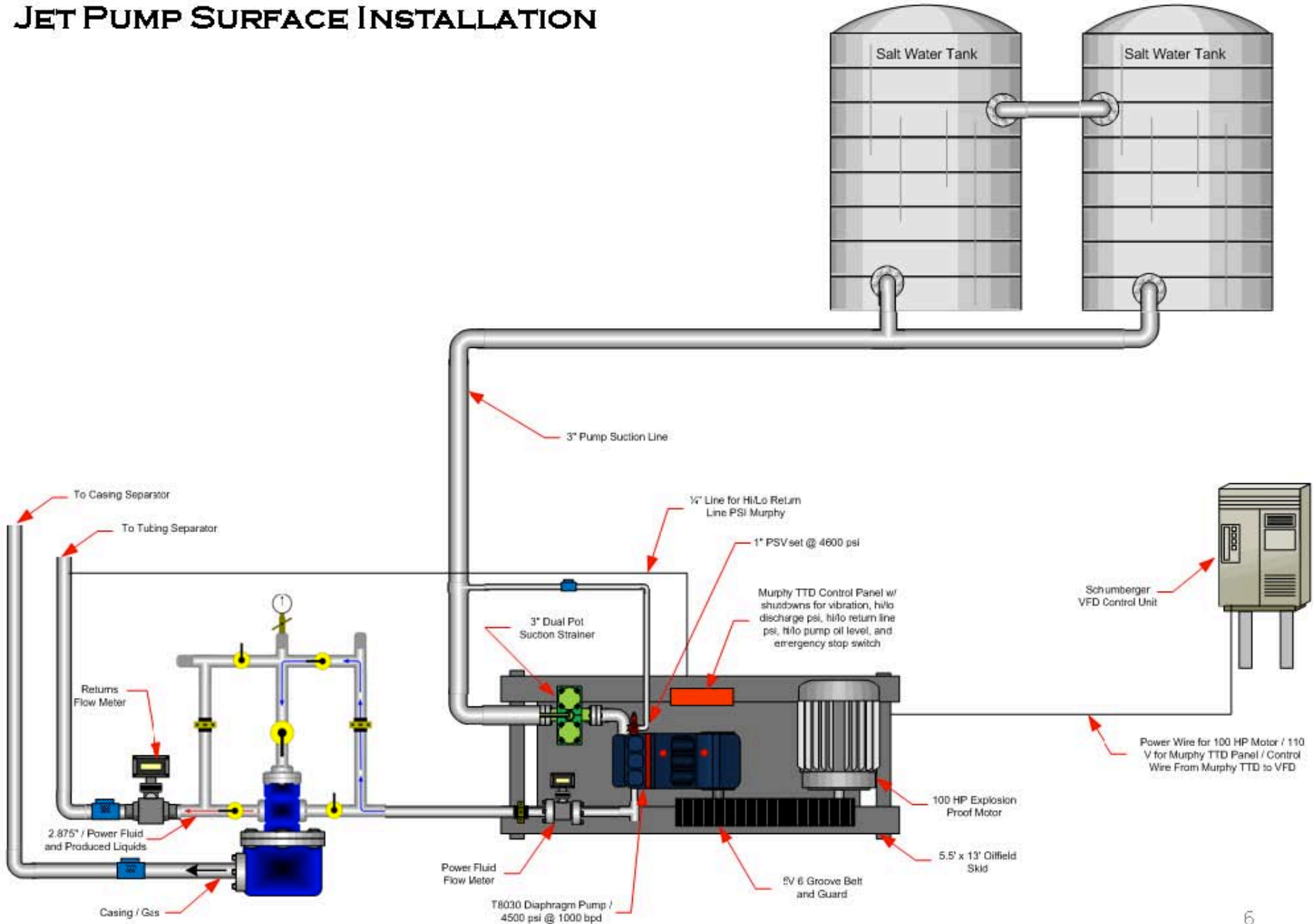


CUSTOMER PROVIDED SCHEMATIC (HI-HIGHLIGHTED ESP FAILURES)



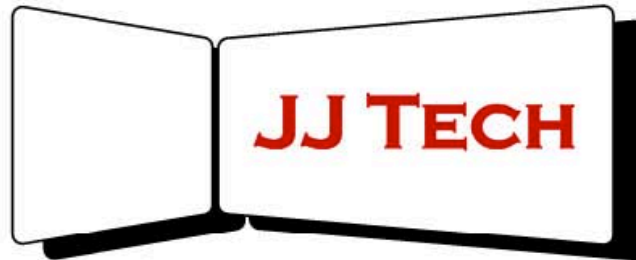


JET PUMP SURFACE INSTALLATION



T-8045 ELECTRIC SKID / 2.0 JET PUMP / N. OKLAHOMA OIL & GAS WELL





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Hydraulic Jet Pump Analysis

Input Data

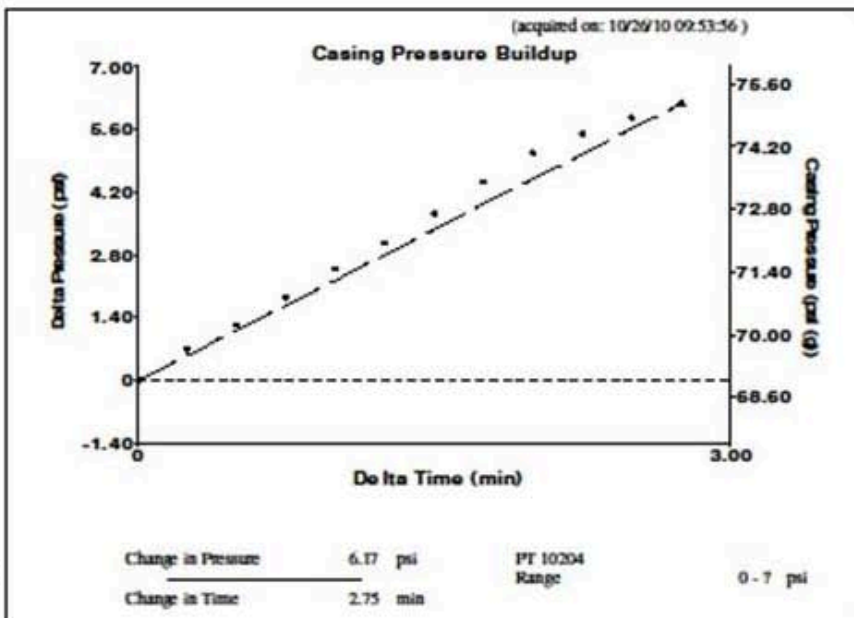
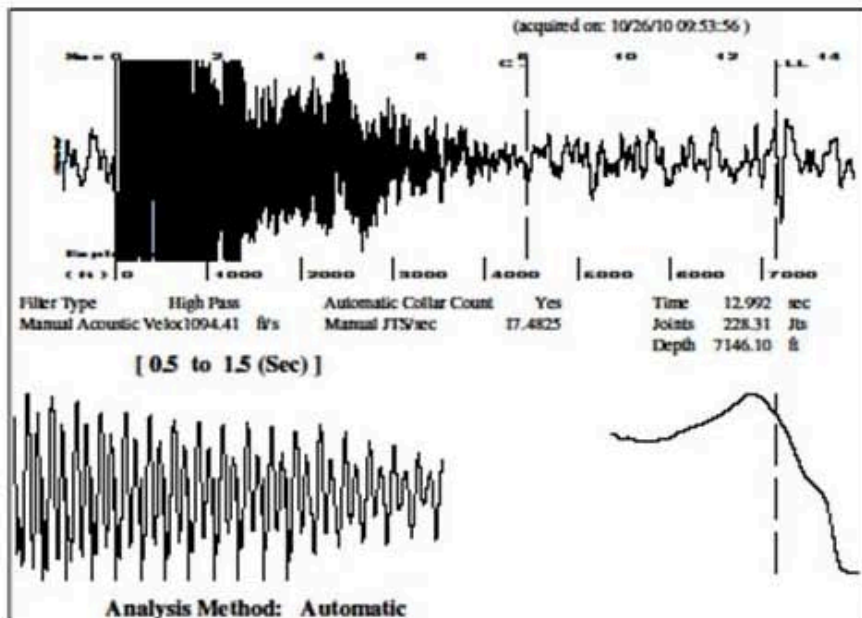
COMPANY:	LEASE:
WELL IDENTIFICATION:	REPRESENTATIVE:.....CBL
PUMP DEPTH:.....7202Feet	TUBING LENGTH TO PUMP:.....7702Feet
TUBING ID:.....1.61Inches	TUBING OD:2.110Inches
CASING ID.:2.992Inches	POWER FLUID:.....Water
BH TEMP.:.....155Deg F	FLOWING WH TEMP.:.....90Deg F
GAS LIQ. RATIO:.....10SCF/BBL	DESIGN LIQ. PROD. RATE:.....200BBL/DAY
PROD. RETURN:.....Annulus	PRODUCED OIL GRAVITY:.....42API
PROD. WATER GRAV: (Sp.Gr.):.....1.13	PRODUCED GAS GRAVITY:.....0.79
WAT. FRAC.: (50% = 0.50):.....0.61	SURFACE HYD. PRESS.:.....4500psig
PUMPING BHP:.....210psig	FLOWING WH PRESS.:.....70psig
Date: 11 February 2010	

Computed Output Data - English Units

Pump Size	Power Press psig	Power Fluid Rate bblpd	Horse Power	Non-Cav Rate bblpd	Prod. Rate bblpd	Pumping Bot-hole psig	Nozzle Area inches	Throat Area inches
B:3	3340	912	57	204	200	190	.0095	.0241
B:3	3307	908	56	217	200	215	.0095	.0241
B:3	3277	904	56	230	200	240	.0095	.0241

The jet pump software model above shows that using a B nozzle and a #3 throat that it will require a surface pump to output 3307 psi at a rate of 908 bpd (56 hydraulic HP) to produce 200 bpd of formation fluid if the pressure at the jet pump is 215 psi.

FLUID LEVEL SHOT (SHOWS 105.5 PSI PUMP INTAKE PRESSURE)



(acquired on: 10/26/10 09:53:56)

Production Current	Potential	Casing Pressure	Producing
Oil 20	20.9 BBL/D	69.0 psi (g)	
Water 67	69.9 BBL/D	Casing Pressure Buildup	Annular Gas Flow 260 MscFD
Gas 534.0	557.2 MscFD	6.2 psi	% Liquid 23 %
		2.75 min	
IPR Method	Vogel	Gas/Liquid Interface Pressure	
PIHPSBHP	0.14	87.9 psi (g)	
Production Efficiency	95.8		
Oil 40 deg API		Liquid Level Depth	
Water 1.05 Sp.Gr.H2O		7146.10 ft	
Gas 0.88 Sp.Gr.AIR		Main Depth to Liq Level TVD	
		6840.39 ft	
Acoustic Velocity 1100.08 ft/s		Tubing Intake Depth	
		7722.00 ft	
		Formation Depth	
		7722.00 ft	
		Formation Depth TVD	
		7070.56 ft	
Formation Submergence		Tubing Intake	
Total Gaseous Liquid Column HT (TVD)	230 ft	105.5 psi (g)	
Equivalent Gas Free Liquid HT (TVD)	52 ft	Producing BHP	
		105.5 psi (g)	
CASING SHOT, PUMP RUNNING		Static BHP	
		874.4 psi (g)	

