

J&J TECHNICAL SERVICES L.L.C.

Accelerated Frac-Flowback using Hydraulic Jet Pump

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

Objective: Recover frac fluid as fast and economical as possible while bringing production to the market immediately

Results: JJ Tech removed 15,200 bbls of fluid (100% recovery) in 27 days 2100 bbls of Oil was recovered in addition to frac fluid

Gas would have been sold, however pipeline was not in place

JJ Tech recovered in 27 days what would have taken 6 months with conventional rod pump (pumping @ 100 bbls / day)

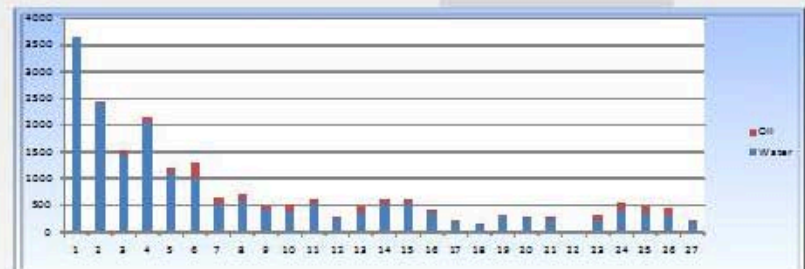
Advantages of Jet Pump Frac Flowback:

Jet pump can produce moderate to high volumes of sand

Gas can be brought to market immediately

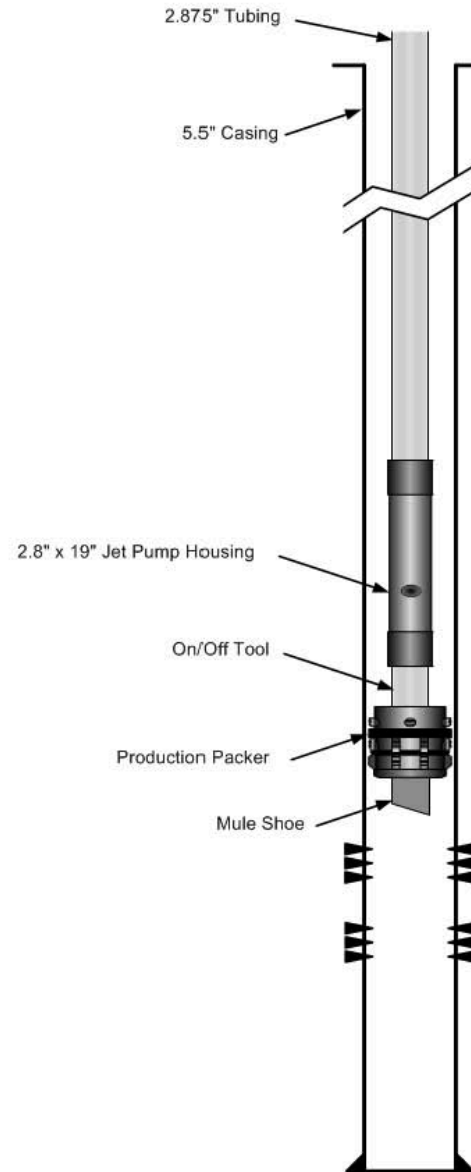
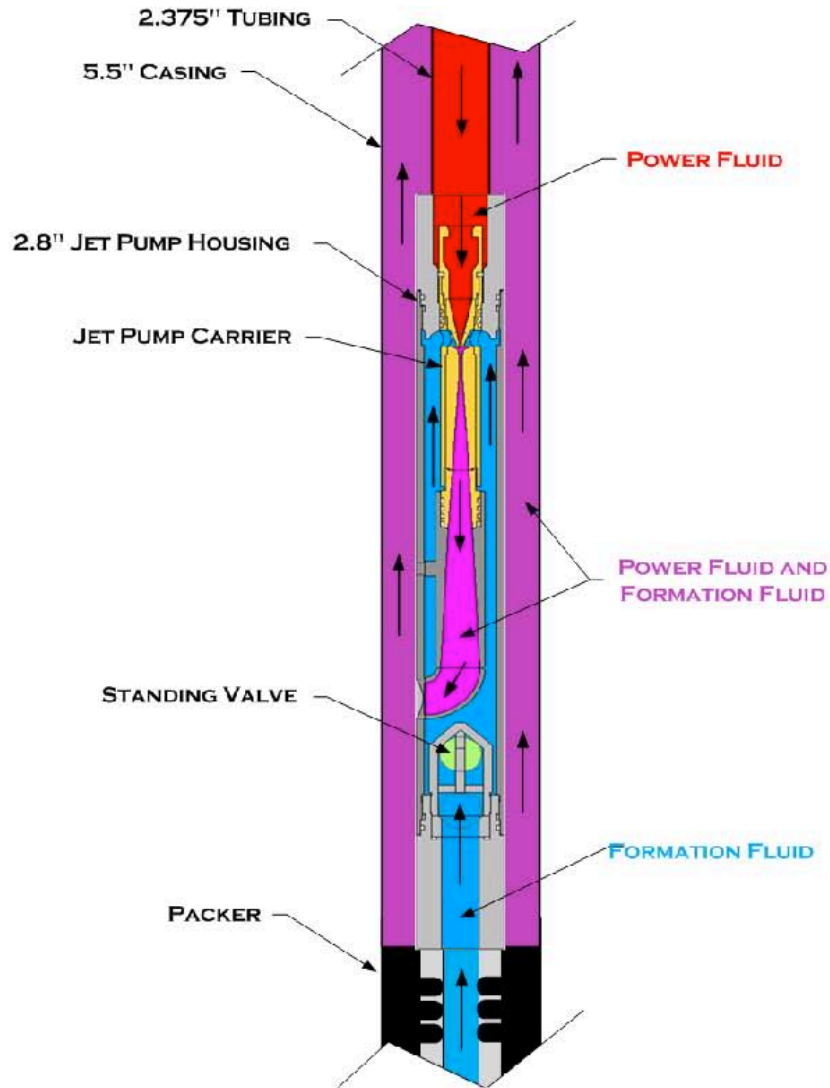
No backpressure is put on formation (as with Nitrogen)

Software can calculate PBHP based on production volumes



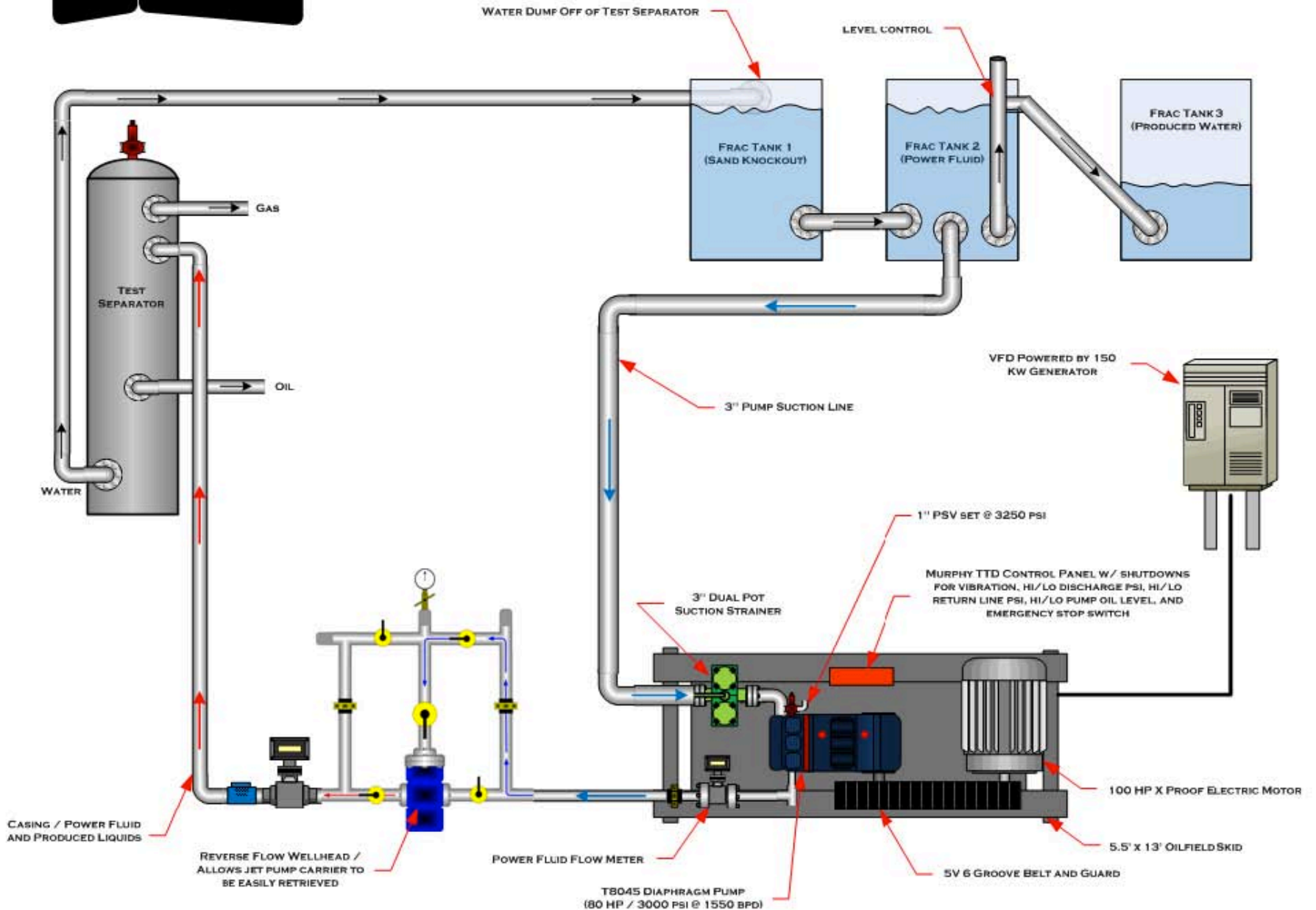
2.8 Jet Pump Conventional Configuration

HOW IT WORKS





SURFACE INSTALLATION FOR FRAC FLOWBACK



FRAC EVAC WITH T8045 DIAPHRAGM PUMP / 2.8 JET PUMP / WEST TEXAS



GLR = 5 scf/bbl w/ 1% oil cut 2000# pump intake pressure

Input Data

COMPANY:.....	LEASE:.....XX
WELL IDENTIFICATION:.....XX	REPRESENTATIVE:.....CBL
PUMP DEPTH:.....5200Feet	TUBING LENGTH TO PUMP:.....5200Feet
TUBING ID:.....2.441Inches	TUBING OD:.....2.875Inches
CASING ID.:.....4.892Inches	POWER FLUID:.....Water
BH TEMP.:.....145Deg F	FLOWING WH TEMP.:.....75Deg F
GAS LIQ. RATIO:......5 SCF/BBL	DESIGN LIQ. PROD. RATE:.....3000BBL/DAY
PROD. RETURN:.....Annulus	PRODUCED OIL GRAVITY:.....37API
PROD. WATER GRAV: (Sp.Gr.):.....1.05	PRODUCED GAS GRAVITY:.....0.7
WAT. FRAC.: (50% = 0.50):.....0.99	SURFACE HYD. PRESS.:.....5000psig
PUMPING BHP:.....2000psig	FLOWING WH PRESS.:.....30psig
Date: 15 - October - 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
E:11	2342	1536	68	4355	3000	2000	.0241	.1195

GLR = 200 scf/bbl w/ 10% oil cut w/ pump intake = 1200#

Input Data

COMPANY:.....	LEASE:.....XX
WELL IDENTIFICATION:.....XX	REPRESENTATIVE:.....CBL
PUMP DEPTH:.....5200Feet	TUBING LENGTH TO PUMP:.....5200Feet
TUBING ID:.....2.441Inches	TUBING OD:.....2.875Inches
CASING ID.:.....4.892Inches	POWER FLUID:.....Water
BH TEMP.:.....145Deg F	FLOWING WH TEMP.:.....75Deg F
GAS LIQ. RATIO:.....200SCF/BBL	DESIGN LIQ. PROD. RATE:.....2500BBL/DAY
PROD. RETURN:.....Annulus	PRODUCED OIL GRAVITY:.....37API
PROD. WATER GRAV: (Sp.Gr.):.....1.05	PRODUCED GAS GRAVITY:.....0.7
WAT. FRAC.: (50% = 0.50):.....0.90	SURFACE HYD. PRESS.:.....5000psig
PUMPING BHP:.....1200psig	FLOWING WH PRESS.:.....30psig
Date: 15 - October - 2010	

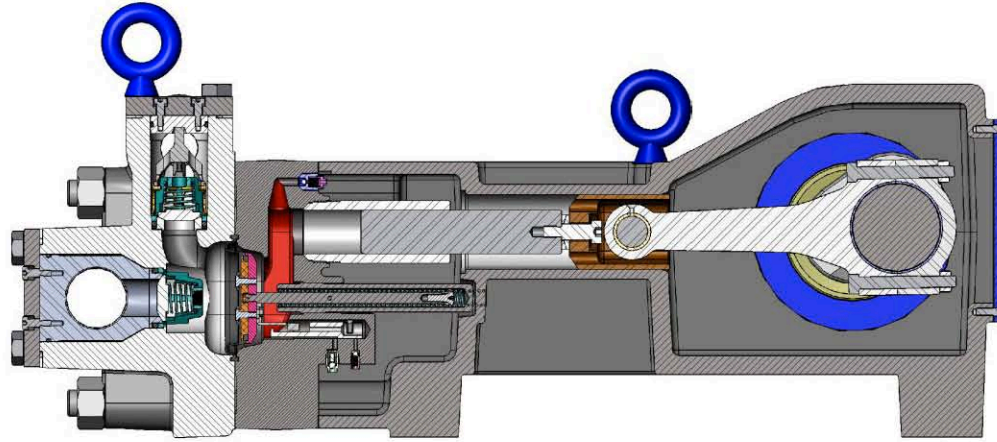
Computed Output Data - English Units

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
E:11	1211	1439	32	2753	2500	1200	.0241	.1195

350 HP MULTI-STAGE CENTRIFUGAL POWERING TWO 1.6 JET PUMPS / N. CO



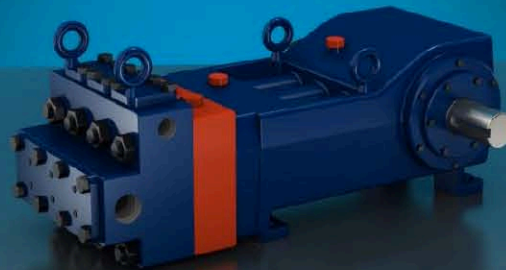
T-80 SERIES DIAPHRAGM PUMPS



T-8045

T-8030

T-80100



3000 psi / 1543 bpd

4500 psi / 926 bpd

1440 psi / 3154 bpd³⁶