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FracCADE*
STIMULATION PROPOSAL

Operator : Caza Petroleum
Well : Forehand 27-5
Field :
Formation : Cherry Canyon

Well Location :
County : Eddy
State : New Mexico
Country : United States

Prepared for : Tony Sams
Proposal No. :
Date Prepared : 11-25-2013

Service Point :
Business Phone :
FAX No. :

Ex. 8

Prepared by :
Phone :
E-Mail Address :

* Mark of Schlumberger

Client : Caza Petroleum
Well : Forehand 27-5 SWD
Formation : Cherry Canyon
District :
Country : United States
Loadcase : Stage 1

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Section 1: Wellbore Configuration

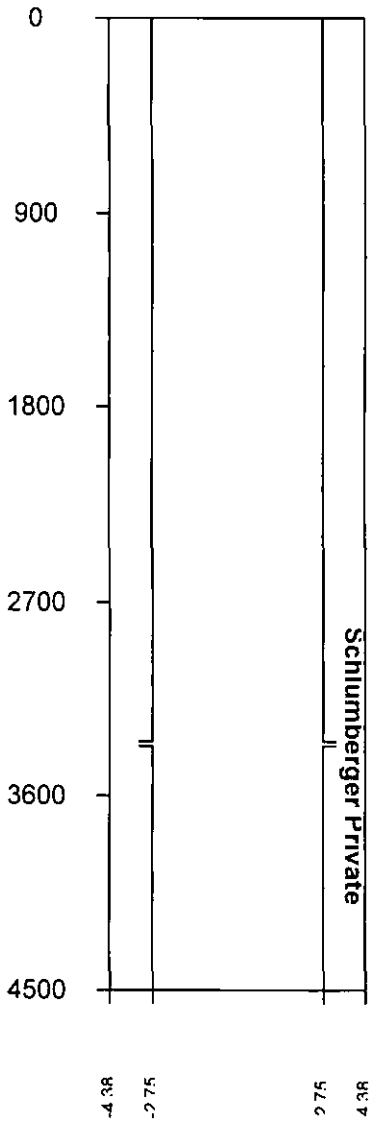
Bottom Hole Temperature.....115 degF
Deviated Hole.....NO
Treat Down.....CASING

Well Type.....Vertical
Well Location.....OnShore

No Tubing.

Casing Data			
OD (in)	**Weight** (lb/ft)	**ID** (in)	**Depth** (ft)
5.500	17.0	4.892	4500.0

Perforation Data						
Top MD (ft)	**Top TVD** (ft)	**Bottom MD** (ft)	**Bottom TVD** (ft)	**Shot Density** (shot/ft)	**Number**	**Diameter** (in)
3350.0	3350.0	3370.0	3370.0	2.00	40	0.32



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Section 2: Zone Data

Formation Mechanical Properties							
Zone Name	**Top TVD** (ft)	**Zone Height** (ft)	**Frac Grad.** (psi/ft)	**Insitu Stress** (psi)	**Young's Modulus** (psi)	**Poisson's Ratio**	**Toughness** (psi.in0.5)
CLEAN-SANDSTONE	2900.0	100.0	0.700	2065	7.953E+6	0.20	2400
CLEAN-SANDSTONE	3000.0	40.0	0.700	2114	8.674E+6	0.20	2400
CLEAN-SANDSTONE	3040.0	80.0	0.700	2156	5.619E+6	0.20	1200
CLEAN-SANDSTONE	3120.0	130.0	0.700	2229	7.953E+6	0.20	2400
CLEAN-SANDSTONE	3250.0	100.0	0.680	2244	5.619E+6	0.20	1200
CLEAN-SANDSTONE	**3350.0**	**150.0**	**0.680**	**2329**	**4.343E+6**	**0.20**	**1200**
CLEAN-SANDSTONE	3500.0	100.0	0.700	2485	5.028E+6	0.20	1200

Formation Transmissibility Properties								
Zone Name	**Top TVD** (ft)	**Net Height** (ft)	**Perm** (md)	**Porosity** (%)	**Res. Pressure** (psi)	**Gas Sat.** (%)	**Oil Sat.** (%)	**Water Sat.** (%)
CLEAN-SANDSTONE	2900.0	100.0	1.000	5.0	1381	65.0	10.0	25.0
CLEAN-SANDSTONE	3000.0	40.0	1.000	4.0	1413	65.0	10.0	25.0
CLEAN-SANDSTONE	3040.0	80.0	1.000	10.0	1432	65.0	10.0	25.0
CLEAN-SANDSTONE	3120.0	130.0	1.000	5.0	1500	65.0	10.0	25.0
CLEAN-SANDSTONE	3250.0	100.0	1.000	10.0	1544	65.0	10.0	25.0
CLEAN-SANDSTONE	**3350.0**	**150.0**	**1.000**	**15.0**	**1603**	**65.0**	**10.0**	**25.0**
CLEAN-SANDSTONE	3500.0	100.0	1.000	12.0	1661	65.0	10.0	25.0

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Section 3: Propped Fracture Schedule

Pumping Schedule

The following is the Pumping Schedule to achieve a propped fracture half-length (X_f) of 445.0 ft with an average conductivity (K_fw) of 1658 md.ft.

Job Description

Step Name	Pump Rate (bbl/min)	Fluid Name	Step Fluid Volume (gal)	Gel Conc. (lb/mgal)	Prop. Type and Mesh	Prop. Conc. (PPA)
Pad	60.0	YF120-Flex	40000	20.0		0.00
0.5 PPA	60.0	YF120-Flex	10000	20.0	Jordan Unimin 16/30	0.50
1.0 PPA	60.0	YF120-Flex	12000	20.0	Jordan Unimin 16/30	1.00
2.0 PPA	60.0	YF120-Flex	14000	20.0	Jordan Unimin 16/30	2.00
3.0 PPA	60.0	YF120-Flex	15000	20.0	Jordan Unimin 16/30	3.00
4.0 PPA	60.0	YF120-Flex	15000	20.0	Jordan Unimin 16/30	4.00
5.0 PPA	60.0	YF120-Flex	10000	20.0	Jordan Unimin 16/30	5.00
Flush	60.0	WF120	3271	20.0		0.00

Fluid Totals

116000 gal	of	YF120-Flex
3271 gal	of	WF120

Proppant Totals

200000 lb	of	Jordan Unimin 16/30

Pad Percentages

% PAD Clean	34.5
% PAD Dirty	32.0

Job Execution

Step Name	Step Fluid Volume (gal)	Cum. Fluid Volume (gal)	Step Slurry Volume (bbl)	Cum. Slurry Volume (bbl)	Step Prop (lb)	Cum. Prop. (lb)	Avg. Surface Pressure (psi)	Step Time (min)	Cum. Time (min)
Pad	40000	40000	952.4	952.4	0	0	3257	15.9	15.9
0.5 PPA	10000	50000	243.5	1195.9	5000	5000	3223	4.1	19.9
1.0 PPA	12000	62000	298.7	1494.6	12000	17000	3185	5.0	24.9
2.0 PPA	14000	76000	363.6	1858.1	28000	45000	3076	6.1	31.0
3.0 PPA	15000	91000	405.8	2263.9	45000	90000	2881	6.8	37.7
4.0 PPA	15000	106000	422.0	2685.9	60000	150000	2628	7.0	44.8
5.0 PPA	10000	116000	292.1	2978.0	50000	200000	2433	4.9	49.6
Flush	3271	119271	77.9	3055.8	0	200000	2347	1.3	50.9

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Pumping Schedule Totals

Summary for This Stage:

Average Pump Rate	60.0 bbl/min
Volume Weighted Average Rate	60.0 bbl/min
Total Fluid Volume	119271 gal
Total Proppant Mass	200000 lb
Total Slurry Volume	3055.8 bbl
Total Pump Time	50.9 min

Fluid Based Totals for This Stage

Fluid	Average Pump Rate (bbl/min)	Volume Weighted Average Rate (bbl/min)	Total Fluid Volume (gal)	Total Proppant Mass (lb)	Total Slurry Volume (bbl)	Total Pump Time (min)
YF120-Flex	60.0	60.0	116000	200000	2978.0	49.6
WF120	60.0	60.0	3271	0	77.9	1.3

Proppant Based Totals for This Stage

Proppant	Average Pump Rate (bbl/min)	Volume Weighted Average Rate (bbl/min)	Total Fluid Volume (gal)	Total Proppant Mass (lb)	Total Slurry Volume (bbl)	Total Pump Time (min)
Jordan Unimin 16/30	60.0	60.0	76000	200000	2025.6	33.8

Summary for Each Treatment

Treatment Type	Average Pump Rate (bbl/min)	Volume Weighted Average Rate (bbl/min)	Total Fluid Volume (gal)	Total Proppant Mass (lb)	Total Slurry Volume (bbl)	Total Pump Time (min)
Propped Fracture	60.0	60.0	119271	200000	3055.8	50.9

Summary for Each Fluid in Each Treatment

Treatment Type	Fluid	Average Pump Rate (bbl/min)	Volume Weighted Average Rate (bbl/min)	Total Fluid Volume (gal)	Total Proppant Mass (lb)	Total Slurry Volume (bbl)	Total Pump Time (min)
Propped Fracture	YF120-Flex	60.0	60.0	116000	200000	2978.0	49.6
Propped Fracture	WF120	60.0	60.0	3271	0	77.9	1.3

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Section 4: Propped Fracture Simulation

The following are the results of the computer simulation of this Fracturing Proposal using a Pseudo 3-D Vertical model. Effective Conductivity and Effective Fcd are calculated based on perforated intervals with positive net heights.

Initial Fracture Top TVD ..... **3350.0 ft**
Initial Fracture Bottom TVD ..... **3500.0 ft**

Propped Fracture Half-Length ..... **445.0 ft**
EOJ Hyd Height at Well ..... **639.0 ft**
Average Propped Width ..... **0.044 in**
Average Gel Concentration ..... **1120.2 lb/mgal**
Average Gel Fluid Retained Factor ... **1.00**
Net Pressure ..... **139 psi**
Efficiency **0.544**
Effective Conductivity ..... **540 md.ft**
Effective Fcd **1.2**
Max Surface Pressure ..... **3297 psi**

Simulation Results by Fracture Segment

From (ft)	To (ft)	Prop. Conc. at End of Pumping (PPA)	Propped Width (in)	Propped Height (ft)	Frac. Prop. Conc. (lb/ft2)	Frac. Gel Conc. (lb/mgal)	Fracture Conductivity (md.ft)
0.0	111.3	4.9	0.081	297.8	0.73	323.7	3102
111.3	222.5	3.3	0.060	451.4	0.59	391.3	2238
222.5	333.8	1.5	0.034	361.5	0.40	659.7	1271
333.8	445.0	0.1	0.011	247.6	0.19	3105.9	376

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Fracture Geometry Data Per Zone for Production Prediction							
Zone Name	**Top MD** (ft)	**Top TVD** (ft)	**Gross Height** (ft)	**Net Height**	**Fracture Width** (in)	**Fracture Length** (ft)	**Fracture Conductivity** (md.ft)
CLEAN-SANDSTONE	2900.0	2900.0	100.0	100.0	0.000	24.5	0
CLEAN-SANDSTONE	3000.0	3000.0	40.0	40.0	0.017	119.9	623
CLEAN-SANDSTONE	3040.0	3040.0	80.0	80.0	0.046	320.6	1740
CLEAN-SANDSTONE	3120.0	3120.0	130.0	130.0	0.074	424.4	2742
CLEAN-SANDSTONE	3250.0	3250.0	100.0	100.0	0.063	445.0	2303
CLEAN-SANDSTONE	**3350.0**	**3350.0**	**150.0**	**150.0**	**0.015**	**445.0**	**540**
CLEAN-SANDSTONE	3500.0	3500.0	100.0	100.0	0.000	404.3	0

Exposure Time Prediction by Step						
Step Name	**Fluid Name**	**Pump Rate** (bbl/min)	**Fluid Volume** (gal)	**Perforation Injection Temp.** (degF)	**Exposure at BHST of 115 degF** (min)	**Exposure aboveWatch Temp. of 110 degF** (min)
Pad	YF120-Flex	60.0	40000	84	31.7	31.7
0.5 PPA	YF120-Flex	60.0	10000	83	23.7	23.7
1.0 PPA	YF120-Flex	60.0	12000	83	17.5	17.5
2.0 PPA	YF120-Flex	60.0	14000	83	10.9	10.9
3.0 PPA	YF120-Flex	60.0	15000	83	3.7	3.7
4.0 PPA	YF120-Flex	60.0	15000	83	0.0	0.0
5.0 PPA	YF120-Flex	60.0	10000	83	0.0	0.0
Flush	WF120	60.0	3271			

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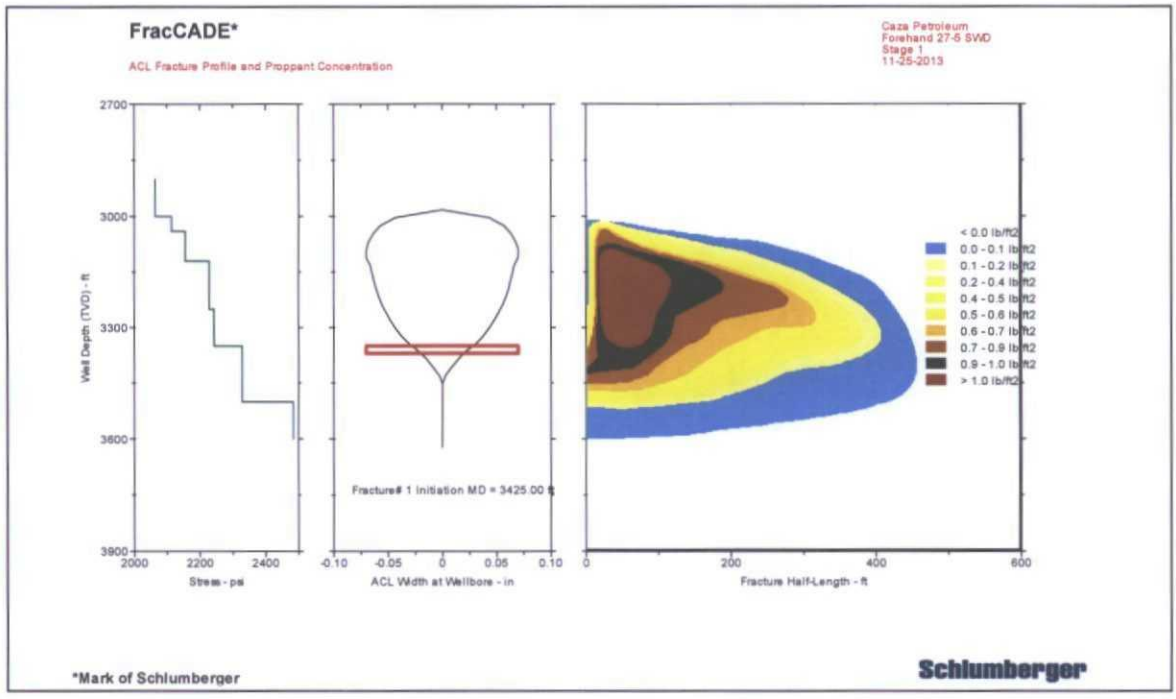
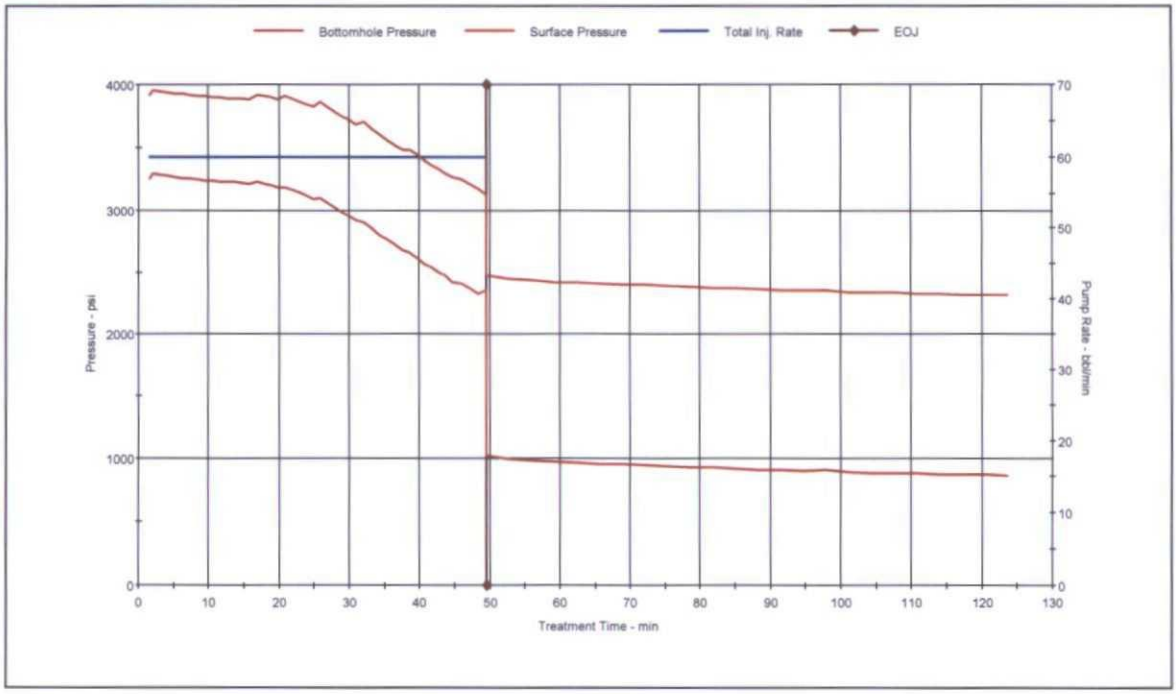
Section 5: Propped Fracture Simulation Results

(1) ACL Fracture Profile and Proppant Concentration Plot



(2) Treating Plot



Section 6: Fluid Descriptions

Brine {8.43ppg 2% KCl}

• L071, Temporary Clay Stabilizer	2.00 gal/mgal

YF120-Flex

• J580, Gelling Agent	20.00 lb/mgal
• L071, Temporary Clay Stabilizer	2.00 gal/mgal
• J610, Crosslinker	2.00 gal/mgal
• J475, EB-CLEAN Breaker	4.00 lb/mgal
• J218, Breaker	1.00 lb/mgal
• J318, Liquid Breaker Aid	1.00 gal/mgal
• W064, Emulsion and Sludge Preventer	2.00 gal/mgal
• B244B, Microbiocide	0.20 gal/mgal

WF120

• J580, Gelling Agent	20.00 lb/mgal
• B244B, Microbiocide	0.20 gal/mgal
• J218, Breaker	2.00 lb/mgal
• L071, Temporary Clay Stabilizer	2.00 gal/mgal

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Section 7: Proppant Data

Proppant Permeability is calculated based on the following parameters:

BH Static Temperature:	115 degF
Stress on Proppant:	2315 psi
Propped Fracture Conc.:	1.00 lb/ft2
Average Young's Modulus:	4.343E+06 psi

Proppant Data

Proppant Name	Specific Gravity	Mean Diameter (in)	Pack Porosity (%)	Permeability (md)
Jordan Unimin 16/30	2.64	0.031	35.1	424735

Proppant Permeability Plot