

From: Mason, Mike C
Sent: Sat May 01 22:37:03 2010
To: Sweeney, Frank M; Cecil, Chris; Liao, Tony T
Subject: LiaoCases (3).xls
Importance: Normal
Attachments: LiaoCases (3).xls

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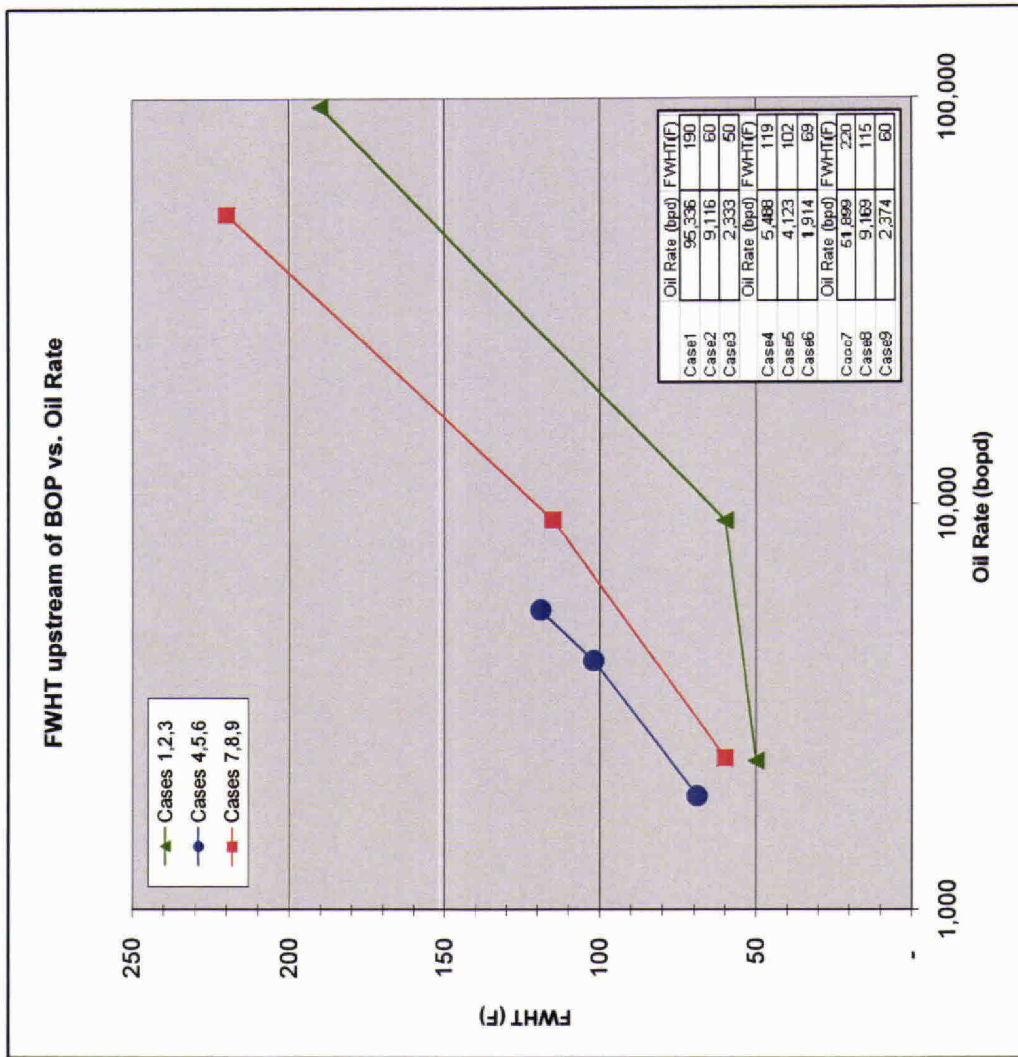
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TREX 011160.0001

Case 1	Oil Rate (bpd)	95,336	FWHT(F)	190
Case 2	Oil Rate (bpd)	9,116	FWHT(F)	60
Case 3	Oil Rate (bpd)	2,333	FWHT(F)	50
Case 4	Oil Rate (bpd)	5,488	FWHT(F)	119
Case 5	Oil Rate (bpd)	4,123	FWHT(F)	102
Case 6	Oil Rate (bpd)	1,914	FWHT(F)	69
Case 7	Oil Rate (bpd)	51,899	FWHT(F)	220
Case 8	Oil Rate (bpd)	9,169	FWHT(F)	115
Case 9	Oil Rate (bpd)	2,374	FWHT(F)	60



Case	Eqv Choke	FWHT	Qo	Qg	FWHPUp	FWHPDn	FBHP	dP Friction	dp Gravity	dp Total
Case 1	No Choke	190	95,336	276	2337		9927	4956	2634	7590
Case 2	1/2"	60	9,116	26.4	8494	2486	11,666	46	3167	3213
Case 3	1/4"	50	2,333	6.8	8650	2509	11802	4	3235	3239
Skin = 50, 10' Pay Open										
Case 4	No Choke	119	5,488	15.9	2270		4885	74	2508	2582
Case 5	1/2"	102	4,123	12	3865	2270	6760	42	2873	2915
Case 6	1/4"	69	1,914	5.5	6524	2270	9505	10	2913	2923
Skin = 0, 88' Pay open										
Case 7	No Choke	220	51,899	150.5	2270		10804	6043	2421	8464
Case 8	1/2"	115	9,169	26.6	8485	2270	11665	190	2925	3115
Case 9	1/4"	60	2,374	6.9	8662	2270	11802	40	2978	3018

Situation 1 **Drill Pipe Top at BOP**

Tubulars Summary	Approx. Footage (MD) below Mud Line	OD	Top	Bottom
		2,542	5.500	4,989
	831	3.500	7,531	8,362
	3,998	9.875	5,067	12,360
	5,812	7.000	12,488	18,300
	13,183	Total Length		

Assumptions: Tubing + Annular Flow
 No Riser Effects
 Flow from Float Shoe @ TD
 Choke Located Above BOP
 No Water production
 All Prosper calculations based on depth below mud line
 Assumed 88' of reservoir open to flow with Total Skin = 0

Calculations:

	Case 1	Case 2	Case 3
Equivalent Choke ID (in)	None	1/2	1/4
Oil Flow Rate (bopd)	95,336	9,116	2,333
Gas Flow Rate (mmscfd)	276.0	26.4	6.8
Annular Liquid Velocity below BOP (ft/s)	70	4.2	1.1
Annular Gas Velocity below BOP (ft/s)	70	-	-
Annular Liquid Velocity in (mph)	48		
FWHP (psig)	2,337		
FWHP (Upstream of Choke) (psig)		8,494	8,650
FWHP (Downstream of Choke) (psig)		2,486	2,509
Delta P across Choke		6,008	6,141
SIWHP (psig)	8,815	8,815	8,815
FBHP (psig)	9,927	11,666	11,802
Fluid Phase upstream of Choke	Gas + Liquid	Liquid	Liquid
GOR (scf/bbl)	2,895	2,896	2,915
Friction Pressure Loss	4,956	46	4
Gravitational Pressure Loss (Hydrostatic)	2,634	3,167	3,235
FWHT (F) Rough Approx Model, HTC = 8	190	60	50

Situation 2 **Drill string has fallen into well. Base of 3.5 at top of 9.875" to 7" XOver**

Calculations: No significant difference with respect to Situation 1
 Fluid velocities will be slightly lower at the BOP & fluid rates slightly higher

PVT Data:	
GOR (scf/stb)	2,847
API Gravity	35
Pbp (psig)	6,601 (@ 243F)
Reservoir Pressure (psig)	11,850
Reservoir Depth (ft)	18,000
Reservoir Temperature (F)	243
Mudline Temperature (F)	40
Bo (rb/stb)	2.77
μ _o (cp)	0.168

Uncertainties: Uncertainties in Case 1 (No Choke) calculated fluid velocities.
 PVT data based on single Lab Test. Repeat test planned.
 Unknown whether the well is producing any Water.

Situation 3 **Flow is behind Long Casing String**

Tubulars Summary	Approx. Footage (MD) below Mud Line	Long String Dia	Annular Dia	MD below Sea level	
				Top	Bottom
	6,164	9.875	14.850	4,989	11,153
	1,334	9.875	12.375	11,153	12,487
	316	7.000	12.375	12,487	12,803
	1,956	7.000	10.711	12,803	14,759
	2,409	7.000	8.650	14,759	17,168
	962	7.000	9.875	17,168	18,130
	170	7.000	8.500	18,130	18,300
	13,311	Total Length			

Assumptions: Flow Behind 9-7/8" x 7" Tapered Long String
 No Riser Effects
 No Flow from Float Shoe... full Float Shoe integrity
 Inflow occurs at 9-7/8" Drilling Liner Shoe
 Choke Located Within BOP at Shear Rams
 No Water production
 All Prosper calculations based on depth below mud line
 Assume 10' of reservoir open (top of sand) with Total Skin = 50

Calculations:

	Case 4	Case 5	Case 6
Equivalent Choke ID (in)	None	1/2	1/4
Oil Flow Rate (bopd)	5,488	4,123	1,914
Gas Flow Rate (mmscfpd)	15.9	12.0	5.5
Annular Liquid Velocity below BOP (ft/s)	1.79	0.93	0.48
Annular Gas Velocity below BOP (ft/s)	1.79	1.73	-
FWHP (psig)	2,270		
FWHP (Upstream of Choke) (psig)		3,865	6,524
FWHP (Downstream of Choke) (psig)		2,270	2,270
Delta P across Choke		1,595	4,254
SIWHP (psig)	8,815	8,815	8,815
FBHP (psig)	4,885	6,760	9,505
Fluid Phase upstream of Choke	Gas + Liquid	Gas + Liquid	Liquid
GOR (scf/bbl)	2,897	2,911	2,874
Friction Pressure Loss	74	42	10
Gravitational Pressure Loss (Hydrostatic)	2,508	2,873	2,913
FWHT (F) Rough Approx Model, HTC = 8	119	102	69

PVT Data:

GOR (scf/stb)	2,847
API Gravity	35
Pbp (psig)	6,601 (@ 243F)
Reservoir Pressure (psig)	11,850
Reservoir Depth (ft)	18,000
Reservoir Temperature (F)	243
Mudline Temperature (F)	40
Bo (rb/stb)	2.77
μ _o (cp)	0.168

Uncertainties: Uncertainties in Case 1 (No Choke) calculated fluid velocities.
 PVT data based on single Lab Test. Repeat test planned.
 Unknown whether the well is producing any Water.

Situation 3 **Flow is behind Long Casing String**

MD below Sea level

Tubulars Summary	Approx. Footage (MD) below Mud Line	Long String Dia	Annular Dia	MD below Sea level	
				Top	Bottom
	6,164	9.875	14.850	4,989	11,153
	1,334	9.875	12.375	11,153	12,487
	316	7.000	12.375	12,487	12,803
	1,956	7.000	10.711	12,803	14,759
	2,409	7.000	8.650	14,759	17,168
	962	7.000	9.875	17,168	18,130
	170	7.000	8.500	18,130	18,300
	13,311	Total Length			

Assumptions: Flow Behind 9-7/8" x 7" Tapered Long String
 No Riser Effects
 No Flow from Float Shoe...full Float Shoe integrity
 Inflow occurs at 9-7/8" Drilling Liner Shoe
 Choke Located Within BOP at Shear Rams
 No Water production
 All Prosper calculations based on depth below mud line
 Assume 88' of reservoir open (entire sand) with Total Skin = 0

Calculations:

	Case 7	Case 8	Case 9
Equivalent Choke ID (in)	None	1/2	1/4
Oil Flow Rate (bopd)	51,899	9,169	2,374
Gas Flow Rate (mmscfpd)	150.5	26.6	6.9
Annular Liquid Velocity below BOP (ft/s)	66.9	3.84	0.96
Annular Gas Velocity below BOP (ft/s)	66.9	-	-
Annular Liquid Velocity in (mph)	46		
FWHP (psig)	2,270		
FWHP (Upstream of Choke) (psig)		8,485	8,662
FWHP (Downstream of Choke) (psig)		2,270	2,270
Delta P across Choke		6,215	6,392
SIWHP (psig)	8,815	8,815	8,815
FBHP (psig)	10,804	11,665	11,802
Fluid Phase upstream of Choke	Gas + Liquid	Liquid	Liquid
GOR (scf/bbl)	2,900	2,901	2,906
Friction Pressure Loss	6,043	190	40
Gravitational Pressure Loss (Hydrostatic)	2,421	2,925	2,978
FWHT (F) Rough Approx Model, HTC = 8	220	115	60

PVT Data:

GOR (scf/stb)	2,847
API Gravity	35
Pbp (psig)	6,601 (@ 243F)
Reservoir Pressure (psig)	11,850
Reservoir Depth (ft)	18,000
Reservoir Temperature (F)	243
Mudline Temperature (F)	40
Bo (rb/stb)	2.77
μ _o (cp)	0.168

Uncertainties: Uncertainties in Case 1 (No Choke) calculated fluid velocities.
 PVT data based on single Lab Test. Repeat test planned.
 Unknown whether the well is producing any Water.

Situation 3 Flow is within Long Casing String and then Drill Pipe

Tubulars Summary	Approx. Footage (MD) below Mud Line	Long String Dia	Annular Dia	MD below Sea level	
				Top	Bottom
	6,164	9.875	14.850	4,989	11,153
	1,334	9.875	12.375	11,153	12,487
	316	7.000	12.375	12,487	12,803
	1,956	7.000	10.711	12,803	14,759
	2,409	7.000	8.650	14,759	17,168
	962	7.000	9.875	17,168	18,130
	170	7.000	8.500	18,130	18,300
	13,311	Total Length			

Assumptions: Flow into 9-7/8" x 7" Tapered Long String then through Drill Pipe
 No Riser Effects
 No Float Shoe integrity
 Inflow occurs at base of Long Casing String
 No Choke
 No Water production
 All Prosper calculations based on depth below mud line
 Assume 88' of reservoir open (entire sand) with Total Skin = 0
Case 11 - GAP, simplified Temp model; Tortuaos Flow Path just belo BOP Stack

Calculations:

	Case 10	Case 11
Equivalent Choke ID (in)	None	None
Oil Flow Rate (bopd)	4,546	27,808
Gas Flow Rate (mmscfd)	13.6	83.4
Annular Liquid Velocity below BOP (ft/s)	7.7	
Annular Gas Velocity below BOP (ft/s)	7.7	
Annular Liquid Velocity in (mph)	5	
FWHP (psig)	2,270	2270
FWHP (Upstream of Choke) (psig)		
FWHP (Downstream of Choke) (psig)		
Delta P across Choke		
SIWHP (psig)	8,815	8,815
FBHP (psig)	7,049	11,295
Fluid Phase upstream of Choke	Gas + Liquid	
GOR (scf/bbl)	2,992	2,999
Friction Pressure Loss	96	
Gravitational Pressure Loss (Hydrostatic)	2,817	
FWHT (F) Rough Approx Model, HTC = 8	88	154

PVT Data:

GOR (scf/stb)	2,847
API Gravity	35
Pbp (psig)	6,601 (@ 243F)
Reservoir Pressure (psig)	11,850
Reservoir Depth (ft)	18,000
Reservoir Temperature (F)	243
Mudline Temperature (F)	40
Bo (rb/stb)	2.77
μ _o (cp)	0.168

Uncertainties: Uncertainties in Case 1 (No Choke) calculated fluid velocities.
 PVT data based on single Lab Test. Repeat test planned.
 Unknown whether the well is producing any Water.