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To: pflemings@jsg.utexas.edu
Subject: reservoir volumes

Attachments: Attachment

- reservoir volume.xls



CONFIDENTIAL

IGS629-003004

TREX 008642.0001

based on discussions with BP reservoir modellers and well test analysts

Estimation of Reservoir Area

Original Oil in Place	1.10E+08 stb			
Formation Volume Factor (Oil Boi)	2.56 rb/stb			
Volume of oil in reservoir	2.82E+08 rb	1.5812E+09 ft ³	1 barrel =	5.615 ft ³
Porosity	0.21			
Bulk volume of reservoir	8.37E+09 ft ³			
Reservoir thickness	88 ft			
Area of aquifer	9.51E+07 ft ²			
Square root of aquifer area	9,750 ft			
width	3,400 ft			
length	27,961 ft			

Reservoir and Oil Properties

permeability	500 md	4.93E-13 m ²	1 md =	9.87E-16 m ²
Sw	0.100			
formation, rock, or pore compressibility, cf	6.00E-06 psia ⁻¹			
water compressibility, cw	3.00E-06 psia ⁻¹			
oil compressibility, co	1.46E-05 psia ⁻¹			
Total compressibility	1.94E-05 psia ⁻¹	= (1-Sw)*co + Sw*cw + cf	1 psi	6894.75728 N/m ²
Oil density	0.568 gm/cc			
Oil viscosity	0.168 cp		1 cp =	0.001 N/m ² = kg/m*s ²

Production

45,000	40,000	stb/d
115,200	102,400	rb/d
646,848	574,976	ft ³ /d

200	7600	200
200	7800	200
200	8000	200
200	8200	200
200	8400	200
200	8600	200
200	8800	200
200	9000	200
200	9200	200
200	9400	200
200	9600	200
200	9800	200
100	9900	100
100	10000	100
100	10100	100
100	10200	100
100	10300	100
100	10400	100
100	10500	100
100	10600	100
94.70850579	10694.70851	94.70850579
72.46541926	10767.17393	72.46541926
55.44630807	10822.62023	55.44630807
42.42427782	10865.04451	42.42427782
32.46058053	10897.50509	32.46058053
24.83694107	10922.34203	24.83694107
19.00377725	10941.34581	19.00377725
14.54058086	10955.88639	14.54058086
11.12560355	10967.01199	11.12560355
8.51266229	10975.52466	8.51266229
6.51339219	10982.03805	6.51339219
4.983667432	10987.02172	4.983667432
3.813211358	10990.83493	3.813211358
2.917646704	10993.75257	2.917646704
2.232412917	10995.98499	2.232412917
1.708112029	10997.6931	1.708112029
1.3069476	10999.00005	1.3069476

1	1	1.3069476	11000.00005	1
1.3069476	2.3069476		11001.30699	1.3069476
1.708112029	4.015059629		11003.01511	1.708112029
2.232412917	6.247472546		11005.24752	2.232412917
2.917646704	9.16511925		11008.16517	2.917646704
3.813211358	12.97833061		11011.97838	3.813211358
4.983667432	17.96199804		11016.96204	4.983667432
6.51339219	24.47539023		11023.47544	6.51339219
8.51266229	32.98805252		11031.9881	8.51266229
11.12560355	44.11365607		11043.1137	11.12560355
14.54058086	58.65423693		11057.65428	14.54058086
19.00377725	77.65801418		11076.65806	19.00377725
24.83694107	102.4949553		11101.495	24.83694107
32.46058053	134.9555358		11133.95558	32.46058053
42.42427782	177.3798136		11176.37986	42.42427782
55.44630807	232.8261217		11231.82617	55.44630807
72.46541926	305.2915409		11304.29159	72.46541926
94.70850579	400.0000467		11399.00009	94.70850579
100	500.0000467		11499.00009	100
100	600.0000467		11599.00009	100
100	700.0000467		11699.00009	100
100	800.0000467		11799.00009	100
100	900.0000467		11899.00009	100
100	1000.000047		11999.00009	100
100	1100.000047		12099.00009	100
100	1200.000047		12199.00009	100
100	1300.000047		12299.00009	100
100	1400.000047		12399.00009	100
100	1500.000047		12499.00009	100
100	1600.000047		12599.00009	100
100	1700.000047		12699.00009	100
100	1800.000047		12799.00009	100
100	1900.000047		12899.00009	100
100	2000.000047		12999.00009	100
100	2100.000047		13099.00009	100
100	2200.000047		13199.00009	100
100	2300.000047		13299.00009	100

100	2400.000047	13399.00009	100
100	2500.000047	13499.00009	100
100	2600.000047	13599.00009	100
100	2700.000047	13699.00009	100
100	2800.000047	13799.00009	100
100	2900.000047	13899.00009	100
100	3000.000047	13999.00009	100
100	3100.000047	14099.00009	100
100	3200.000047	14199.00009	100
200	3400.000047	14399.00009	200
200	3600.000047	14599.00009	200
200	3800.000047	14799.00009	200
200	4000.000047	14999.00009	200
200	4200.000047	15199.00009	200
200	4400.000047	15399.00009	200
200	4600.000047	15599.00009	200
200	4800.000047	15799.00009	200
200	5000.000047	15999.00009	200
200	5200.000047	16199.00009	200
200	5400.000047	16399.00009	200
200	5600.000047	16599.00009	200
200	5800.000047	16799.00009	200
200	6000.000047	16999.00009	200
200	6200.000047	17199.00009	200
200	6400.000047	17399.00009	200
200	6600.000047	17599.00009	200
200	6800.000047	17799.00009	200
200	7000.000047	17999.00009	200
200	7200.000047	18199.00009	200
200	7400.000047	18399.00009	200
200	7600.000047	18599.00009	200
200	7800.000047	18799.00009	200
200	8000.000047	18999.00009	200
200	8200.000047	19199.00009	200
200	8400.000047	19399.00009	200
200	8600.000047	19599.00009	200
200	8800.000047	19799.00009	200

200 9000.000047	19999.00009	200
200 9200.000047	20199.00009	200
200 9400.000047	20399.00009	200
200 9600.000047	20599.00009	200
200 9800.000047	20799.00009	200
200 10000.00005	20999.00009	200
200 10200.00005	21199.00009	200
200 10400.00005	21399.00009	200
200 10600.00005	21599.00009	200
200 10800.00005	21799.00009	200
200 11000.00005	21999.00009	200
200 11200.00005	22199.00009	200
200 11400.00005	22399.00009	200
200 11600.00005	22599.00009	200
200 11800.00005	22799.00009	200
200 12000.00005	22999.00009	200
200 12200.00005	23199.00009	200
200 12400.00005	23399.00009	200
200 12600.00005	23599.00009	200
200 12800.00005	23799.00009	200
200 13000.00005	23999.00009	200
200 13200.00005	24199.00009	200
200 13400.00005	24399.00009	200
200 13600.00005	24599.00009	200
200 13800.00005	24799.00009	200
200 14000.00005	24999.00009	200
200 14200.00005	25199.00009	200
200 14400.00005	25399.00009	200
200 14600.00005	25599.00009	200
200 14800.00005	25799.00009	200
200 15000.00005	25999.00009	200
200 15200.00005	26199.00009	200
200 15400.00005	26399.00009	200
200 15600.00005	26599.00009	200
200 15800.00005	26799.00009	200
200 16000.00005	26999.00009	200
200 16200.00005	27199.00009	200

)
200 16400.00005
200 16600.00005
200 16800.00005
200 17000.00005

)
27399.00009
27599.00009
27799.00009
27999.00009

)
200
200
200
200

100		100		100
100		200		100
100		300		100
100		400		100
100		500		100
100		600		100
100		700		100
100		800		100
100		900		100
100		1000		100
100		1100		100
100		1200		100
100		1300		100
100		1400		100
100		1500		100
100		1600		100
94.70850579		1694.708506		94.70850579
72.46541926		1767.173925		72.46541926
55.44630807		1822.620233		55.44630807
42.42427782		1865.044511		42.42427782
32.46058053		1897.505091		32.46058053
24.83694107		1922.342033		24.83694107
19.00377725		1941.34581		19.00377725
14.54058086		1955.886391		14.54058086
11.12560355		1967.011994		11.12560355
8.51266229		1975.524656		8.51266229
6.51339219		1982.038049		6.51339219
4.983667432		1987.021716		4.983667432
3.813211358		1990.834927		3.813211358
2.917646704		1993.752574		2.917646704
2.232412917		1995.984987		2.232412917
1.708112029		1997.693099		1.708112029
1.3069476		1999.000047		1.3069476
1		2000.000047		1
1.3069476	1 1.3069476	2001.306994		1.3069476
1.708112029	4.015059629	2003.015106		1.708112029
2.232412917	6.247472546	2005.247519		2.232412917

2.917646704	9.16511925	2008.165166	2.917646704
3.813211358	12.97833061	2011.978377	3.813211358
4.983667432	17.96199804	2016.962045	4.983667432
6.51339219	24.47539023	2023.475437	6.51339219
8.51266229	32.98805252	2031.988099	8.51266229
11.12560355	44.11365607	2043.113703	11.12560355
14.54058086	58.65423693	2057.654284	14.54058086
19.00377725	77.65801418	2076.658061	19.00377725
24.83694107	102.4949553	2101.495002	24.83694107
32.46058053	134.9555358	2133.955583	32.46058053
42.42427782	177.3798136	2176.37986	42.42427782
55.44630807	232.8261217	2231.826168	55.44630807
72.46541926	305.2915409	2304.291588	72.46541926
94.70850579	400.0000467	2399.000093	94.70850579
100	500.0000467	2499.000093	100
100	600.0000467	2599.000093	100
100	700.0000467	2699.000093	100
100	800.0000467	2799.000093	100
100	900.0000467	2899.000093	100
100	1000.000047	2999.000093	100
100	1100.000047	3099.000093	100
100	1200.000047	3199.000093	100
100	1300.000047	3299.000093	100
100	1400.000047	3399.000093	100

	A	B	C	D	E	F	G	H	I
1		based on discussions with BP reservoir modellers and well test analysts							
2									
3	Estimation of Reservoir Area								
4	Original Oil in Place	1.10E+08	stb						
5	Formation Volume Factor (Oil Boi)	2.56	rb/stb						
6	Volume of oil in reservoir	2.82E+08	rb	1.5812E+09	ft^3		1 barrel =	5.615	ft^3
7	Porosity	0.21							
8	Bulk volume of reservoir	8.37E+09	ft^3						
9	Reservoir thickness	88	ft						
10	Area of aquifer	9.51E+07	ft^2						
11	Square root of aquifer area	9,750	ft						
12	width	3,400	ft						
13	length	27,961	ft						
14									
15	Reservoir and Oil Properties								
16	permeability	500	md	4.93E-13	m^2		1 md =	9.87E-16	m^2
17									
18	Sw	0.100							
19	formation, rock, or pore compressibility, cf	6.00E-06	psia^-1						
20	water compressibility, cw	3.00E-06	psia^-1						
21	oil compressibility, co	1.46E-05	psia^-1						
22	Total compressibility	1.94E-05	psia^-1	=(1-Sw)*co + Sw*cw + cf			1 psi	6894.75728	N/m^2
23	Oil density	0.568	gm/cc						
24	Oil viscosity	0.168	cp				1 cp =	0.001	N/m^2 = kg/m/s^2
25									
26	Production	45,000	40,000	stb/d					
27		115,200	102,400	rb/d					
28		646,848	574,976	ft^3/d					

	A	B	C	D	E	F	G
1	200			200			200
2	200			400			200
3	200			600			200
4	200			800			200
5	200			1000			200
6	200			1200			200
7	200			1400			200
8	200			1600			200
9	200			1800			200
10	200			2000			200
11	200			2200			200
12	200			2400			200
13	200			2600			200
14	200			2800			200
15	200			3000			200
16	200			3200			200
17	200			3400			200
18	200			3600			200
19	200			3800			200
20	200			4000			200
21	200			4200			200
22	200			4400			200
23	200			4600			200
24	200			4800			200
25	200			5000			200
26	200			5200			200
27	200			5400			200
28	200			5600			200
29	200			5800			200
30	200			6000			200
31	200			6200			200
32	200			6400			200
33	200			6600			200
34	200			6800			200
35	200			7000			200
36	200			7200			200
37	200			7400			200
38	200			7600			200
39	200			7800			200
40	200			8000			200
41	200			8200			200
42	200			8400			200
43	200			8600			200
44	200			8800			200
45	200			9000			200
46	200			9200			200
47	200			9400			200
48	200			9600			200
49	200			9800			200
50	100			9900			100
51	100			10000			100
52	100			10100			100
53	100			10200			100
54	100			10300			100
55	100			10400			100
56	100			10500			100

	A	B	C	D	E	F	G
57	100			10600			100
58	94.70850579			10694.70851			94.70850579
59	72.46541926			10767.17393			72.46541926
60	55.44630807			10822.62023			55.44630807
61	42.42427782			10865.04451			42.42427782
62	32.46058053			10897.50509			32.46058053
63	24.83694107			10922.34203			24.83694107
64	19.00377725			10941.34581			19.00377725
65	14.54058086			10955.88639			14.54058086
66	11.12560355			10967.01199			11.12560355
67	8.51266229			10975.52466			8.51266229
68	6.51339219			10982.03805			6.51339219
69	4.983667432			10987.02172			4.983667432
70	3.813211358			10990.83493			3.813211358
71	2.917646704			10993.75257			2.917646704
72	2.232412917			10995.98499			2.232412917
73	1.708112029			10997.6931			1.708112029
74	1.3069476			10999.00005			1.3069476
75	1	1	1.3069476	11000.00005			1
76	1.3069476	2.3069476		11001.30699			1.3069476
77	1.708112029	4.015059629		11003.01511			1.708112029
78	2.232412917	6.247472546		11005.24752			2.232412917
79	2.917646704	9.16511925		11008.16517			2.917646704
80	3.813211358	12.97833061		11011.97838			3.813211358
81	4.983667432	17.96199804		11016.96204			4.983667432
82	6.51339219	24.47539023		11023.47544			6.51339219
83	8.51266229	32.98805252		11031.9881			8.51266229
84	11.12560355	44.11365607		11043.1137			11.12560355
85	14.54058086	58.65423693		11057.65428			14.54058086
86	19.00377725	77.65801418		11076.65806			19.00377725
87	24.83694107	102.4949553		11101.495			24.83694107
88	32.46058053	134.9555358		11133.95558			32.46058053
89	42.42427782	177.3798136		11176.37986			42.42427782
90	55.44630807	232.8261217		11231.82617			55.44630807
91	72.46541926	305.2915409		11304.29159			72.46541926
92	94.70850579	400.0000467		11399.00009			94.70850579
93	100	500.0000467		11499.00009			100
94	100	600.0000467		11599.00009			100
95	100	700.0000467		11699.00009			100
96	100	800.0000467		11799.00009			100
97	100	900.0000467		11899.00009			100
98	100	1000.000047		11999.00009			100
99	100	1100.000047		12099.00009			100
100	100	1200.000047		12199.00009			100
101	100	1300.000047		12299.00009			100
102	100	1400.000047		12399.00009			100
103	100	1500.000047		12499.00009			100
104	100	1600.000047		12599.00009			100
105	100	1700.000047		12699.00009			100
106	100	1800.000047		12799.00009			100
107	100	1900.000047		12899.00009			100
108	100	2000.000047		12999.00009			100
109	100	2100.000047		13099.00009			100
110	100	2200.000047		13199.00009			100
111	100	2300.000047		13299.00009			100
112	100	2400.000047		13399.00009			100

	A	B	C	D	E	F	G
113	100	2500.000047		13499.00009			100
114	100	2600.000047		13599.00009			100
115	100	2700.000047		13699.00009			100
116	100	2800.000047		13799.00009			100
117	100	2900.000047		13899.00009			100
118	100	3000.000047		13999.00009			100
119	100	3100.000047		14099.00009			100
120	100	3200.000047		14199.00009			100
121	200	3400.000047		14399.00009			200
122	200	3600.000047		14599.00009			200
123	200	3800.000047		14799.00009			200
124	200	4000.000047		14999.00009			200
125	200	4200.000047		15199.00009			200
126	200	4400.000047		15399.00009			200
127	200	4600.000047		15599.00009			200
128	200	4800.000047		15799.00009			200
129	200	5000.000047		15999.00009			200
130	200	5200.000047		16199.00009			200
131	200	5400.000047		16399.00009			200
132	200	5600.000047		16599.00009			200
133	200	5800.000047		16799.00009			200
134	200	6000.000047		16999.00009			200
135	200	6200.000047		17199.00009			200
136	200	6400.000047		17399.00009			200
137	200	6600.000047		17599.00009			200
138	200	6800.000047		17799.00009			200
139	200	7000.000047		17999.00009			200
140	200	7200.000047		18199.00009			200
141	200	7400.000047		18399.00009			200
142	200	7600.000047		18599.00009			200
143	200	7800.000047		18799.00009			200
144	200	8000.000047		18999.00009			200
145	200	8200.000047		19199.00009			200
146	200	8400.000047		19399.00009			200
147	200	8600.000047		19599.00009			200
148	200	8800.000047		19799.00009			200
149	200	9000.000047		19999.00009			200
150	200	9200.000047		20199.00009			200
151	200	9400.000047		20399.00009			200
152	200	9600.000047		20599.00009			200
153	200	9800.000047		20799.00009			200
154	200	10000.00005		20999.00009			200
155	200	10200.00005		21199.00009			200
156	200	10400.00005		21399.00009			200
157	200	10600.00005		21599.00009			200
158	200	10800.00005		21799.00009			200
159	200	11000.00005		21999.00009			200
160	200	11200.00005		22199.00009			200
161	200	11400.00005		22399.00009			200
162	200	11600.00005		22599.00009			200
163	200	11800.00005		22799.00009			200
164	200	12000.00005		22999.00009			200
165	200	12200.00005		23199.00009			200
166	200	12400.00005		23399.00009			200
167	200	12600.00005		23599.00009			200
168	200	12800.00005		23799.00009			200

	A	B	C	D	E	F	G
169	200	13000.00005		23999.00009			200
170	200	13200.00005		24199.00009			200
171	200	13400.00005		24399.00009			200
172	200	13600.00005		24599.00009			200
173	200	13800.00005		24799.00009			200
174	200	14000.00005		24999.00009			200
175	200	14200.00005		25199.00009			200
176	200	14400.00005		25399.00009			200
177	200	14600.00005		25599.00009			200
178	200	14800.00005		25799.00009			200
179	200	15000.00005		25999.00009			200
180	200	15200.00005		26199.00009			200
181	200	15400.00005		26399.00009			200
182	200	15600.00005		26599.00009			200
183	200	15800.00005		26799.00009			200
184	200	16000.00005		26999.00009			200
185	200	16200.00005		27199.00009			200
186	200	16400.00005		27399.00009			200
187	200	16600.00005		27599.00009			200
188	200	16800.00005		27799.00009			200
189	200	17000.00005		27999.00009			200

	A	B	C	D	E	F
1	100			100		100
2	100			200		100
3	100			300		100
4	100			400		100
5	100			500		100
6	100			600		100
7	100			700		100
8	100			800		100
9	100			900		100
10	100			1000		100
11	100			1100		100
12	100			1200		100
13	100			1300		100
14	100			1400		100
15	100			1500		100
16	100			1600		100
17	94.70850579			1694.708506		94.70850579
18	72.46541926			1767.173925		72.46541926
19	55.44630807			1822.620233		55.44630807
20	42.42427782			1865.044511		42.42427782
21	32.46058053			1897.505091		32.46058053
22	24.83694107			1922.342033		24.83694107
23	19.00377725			1941.34581		19.00377725
24	14.54058086			1955.886391		14.54058086
25	11.12560355			1967.011994		11.12560355
26	8.51266229			1975.524656		8.51266229
27	6.51339219			1982.038049		6.51339219
28	4.983667432			1987.021716		4.983667432
29	3.813211358			1990.834927		3.813211358
30	2.917646704			1993.752574		2.917646704
31	2.232412917			1995.984987		2.232412917
32	1.708112029			1997.693099		1.708112029
33	1.3069476			1999.000047		1.3069476
34	1	1	1.3069476	2000.000047		1
35	1.3069476	2.3069476		2001.306994		1.3069476
36	1.708112029	4.015059629		2003.015106		1.708112029
37	2.232412917	6.247472546		2005.247519		2.232412917
38	2.917646704	9.16511925		2008.165166		2.917646704
39	3.813211358	12.97833061		2011.978377		3.813211358
40	4.983667432	17.96199804		2016.962045		4.983667432
41	6.51339219	24.47539023		2023.475437		6.51339219
42	8.51266229	32.98805252		2031.988099		8.51266229
43	11.12560355	44.11365607		2043.113703		11.12560355
44	14.54058086	58.65423693		2057.654284		14.54058086
45	19.00377725	77.65801418		2076.658061		19.00377725
46	24.83694107	102.4949553		2101.495002		24.83694107
47	32.46058053	134.9555358		2133.955583		32.46058053
48	42.42427782	177.3798136		2176.37986		42.42427782
49	55.44630807	232.8261217		2231.826168		55.44630807
50	72.46541926	305.2915409		2304.291588		72.46541926
51	94.70850579	400.0000467		2399.000093		94.70850579
52	100	500.0000467		2499.000093		100
53	100	600.0000467		2599.000093		100
54	100	700.0000467		2699.000093		100
55	100	800.0000467		2799.000093		100
56	100	900.0000467		2899.000093		100
57	100	1000.000047		2999.000093		100
58	100	1100.000047		3099.000093		100
59	100	1200.000047		3199.000093		100
60	100	1300.000047		3299.000093		100
61	100	1400.000047		3399.000093		100

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