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**From:** Mix, Kurt [Kurt.Mix@bp.com]  
**Sent:** Tuesday, April 27, 2010 5:59 PM  
**To:** William Burch  
**Subject:** FW: Preliminary Compositional & Viscosity Data  
**Attachments:** 36126 Preliminary Wellstream.xls; RE: Viscosity Measurements

For modeling

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**From:** Kercho, Debbie A  
**Sent:** Tuesday, April 27, 2010 4:15 PM  
**To:** Mix, Kurt  
**Cc:** Epps, David S; Bozeman, Walt  
**Subject:** Preliminary Compositional & Viscosity Data

Kurt,

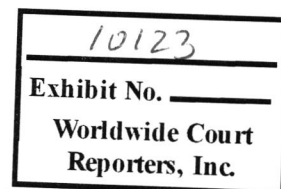
Per your request, here's the compositional and viscosity data that we have to date. This spreadsheet is a preliminary set of atmospheric flash compositions for the 3 downhole samples. Quoting Pencor's Jason LeBlanc, "...they should give us a good starting point for correlations." This data is the best we have now, but will change slightly with time as the rigorous analytical work proceeds. Sample 18086 appears to have slight mud contamination as evidenced by the elevated C16 & C18, so we'd suggest that you use either of the other samples.

<<36126 Preliminary Wellstream.xls>>

Also attached is the preliminary viscosity data. The measured value of 0.168 cP is consistent with the 0.17 cP we used in yesterday's WCD modeling for the relief well. Again, this is preliminary data that hasn't been QC'd. The other piece of data that we've received verbally is the measured bubble point is ~6550 psig.

<<RE: Viscosity Measurements>>

Please let us know if you have any questions.  
Debbie





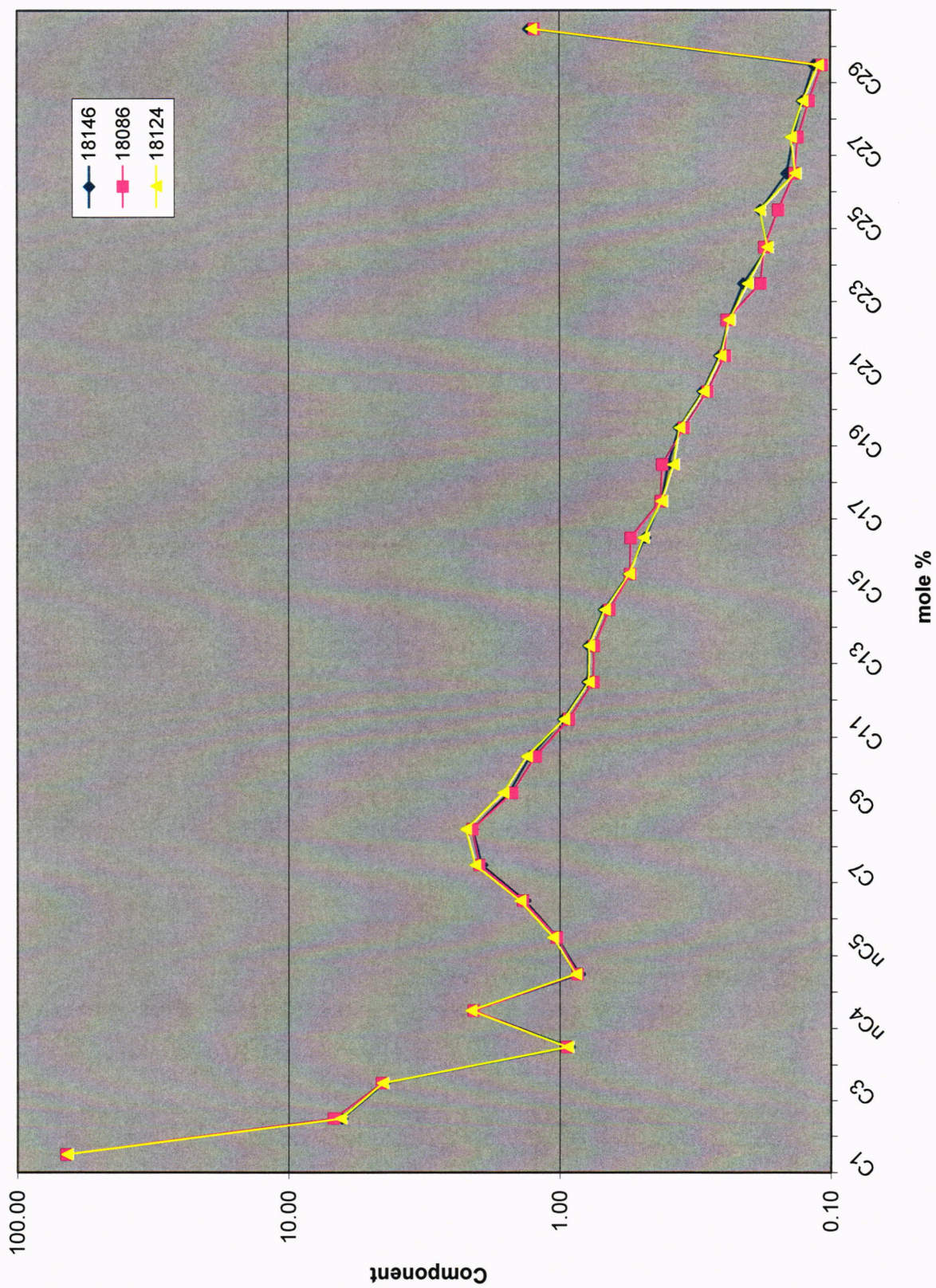
Name: 36126 Preliminary Wellstream.xls

Size: 74KB (75,264 bytes)

Modified: Monday, April 26, 2010 1:10 PM

Comments: This Document Produced in Native  
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**Job Information:**

PENCOR I.D. No: 36126-44

Company: BP

Well Name: OCS-G-32306 #1 ST00 BP01

Field Name: Mississippi Canyon Block 252

Notes: Preliminary Wellstream based on Mobile Lab GOR and Broussard Comps  
18,142 ft. MD SampleFlash Gas-Oil Ratio: **2840**

SCF/bbl

Gas Gravity

**0.7853**

(Air = 1.00)

API Gravity **35.0**

°API at 60°F

**Molar Recombination of Atmospheric Flash Products**

Component	Atmos. Gas (mole %)	Atmos. Liquid (mole %)	Atmos. Liquid (weight %)	Molecular Weight	Specific Gravity (Water = 1.0)	Reservoir Liquid (mole %)	Reservoir Liquid (weight %)
N <sub>2</sub>	0.743	0.000	0.000	28.01	0.809	0.624	0.338
CO <sub>2</sub>	1.160	0.000	0.000	44.01	0.818	0.974	0.830
H <sub>2</sub> S	0.000	0.000	0.000	34.08	0.801	0.000	0.000
C1	78.522	0.004	0.000	16.04	0.300	65.920	20.483
C2	7.578	0.076	0.011	30.07	0.356	6.374	3.712
C3	5.217	0.368	0.080	44.10	0.507	4.439	3.791
iC4	1.049	0.246	0.071	58.12	0.563	0.920	1.036
nC4	2.305	0.924	0.264	58.12	0.584	2.083	2.345
iC5	0.814	1.006	0.357	72.15	0.624	0.845	1.181
nC5	0.897	1.688	0.600	72.15	0.631	1.024	1.431
C6	0.768	4.337	1.840	86.18	0.664	1.341	2.238
C7	0.630	8.755	4.042	93.26	0.709	1.934	3.493
C8	0.252	11.714	6.240	107.80	0.730	2.092	4.367
C9	0.049	9.311	5.525	120.54	0.762	1.536	3.585
C10	0.016	7.924	5.228	134.22	0.779	1.285	3.341
C11		6.048	4.377	147.00	0.790	0.971	2.764
C12		4.908	3.891	161.00	0.801	0.788	2.456
C13		4.879	4.203	175.00	0.812	0.783	2.654
C14		4.268	3.992	190.00	0.815	0.685	2.521
C15		3.462	3.512	206.00	0.828	0.556	2.217
C16		3.014	3.294	222.00	0.834	0.484	2.080
C17		2.622	3.060	237.00	0.842	0.421	1.932
C18		2.472	3.055	251.00	0.843	0.397	1.929
C19		2.258	2.923	263.00	0.847	0.362	1.846
C20		1.847	2.501	275.00	0.858	0.296	1.579
C21		1.597	2.288	291.00	0.868	0.256	1.445
C22		1.476	2.216	305.00	0.873	0.237	1.399
C23		1.305	2.043	318.00	0.878	0.209	1.290
C24		1.057	1.723	331.00	0.882	0.170	1.088
C25		1.129	1.918	345.00	0.886	0.181	1.211
C26		0.901	1.593	359.00	0.890	0.145	1.006
C27		0.851	1.567	374.00	0.894	0.137	0.989
C28		0.789	1.508	388.00	0.897	0.127	0.952
C29		0.714	1.413	402.00	0.900	0.115	0.892
C30+		8.050	24.665	622.46	1.029	1.292	15.577
Total	100.000	100.000	100.000			100.000	100.000
Mol. Wt.	22.67	203.11				51.63	

**Compositional Groupings**

	Mole %	Wt. %	M.W.	S.G. (Water = 1.0)
Tot. Fluid	100.000	100.000	51.63	
C7+	15.457	62.614	209.15	0.853
C10+	9.896	51.168	266.97	0.886
C20+	3.164	27.428	447.50	0.959
C30+	1.292	15.577	622.46	1.029

**Job Information:**

PENCOR I.D. No: 36126-27

Company: BP

Well Name: OCS-G-32306 #1 ST00 BP01

Field Name: Mississippi Canyon Block 252

Notes: Preliminary Wellstream based on Mobile Lab GOR and Broussard Comps  
18,086 ft. MD Sample:Flash Gas-Oil Ratio: **2977**

SCF/bbl

Gas Gravity

**0.8011**

(Air = 1.00)

API Gravity **35.0**

°API at 60°F

**Molar Recombination of Atmospheric Flash Products**

Component	Atmos. Gas (mole %)	Atmos. Liquid (mole %)	Atmos. Liquid (weight %)	Molecular Weight	Specific Gravity (Water = 1.0)	Reservoir Liquid (mole %)	Reservoir Liquid (weight %)
N <sub>2</sub>	0.603	0.000	0.000	28.01	0.809	0.511	0.281
CO <sub>2</sub>	1.108	0.000	0.000	44.01	0.818	0.938	0.811
H <sub>2</sub> S	0.000	0.000	0.000	34.08	0.801	0.000	0.000
C1	77.693	0.004	0.000	16.04	0.300	65.791	20.720
C2	8.019	0.080	0.012	30.07	0.356	6.803	4.016
C3	5.279	0.351	0.076	44.10	0.507	4.524	3.916
iC4	1.069	0.230	0.065	58.12	0.563	0.940	1.073
nC4	2.301	0.850	0.241	58.12	0.584	2.079	2.372
iC5	0.847	0.922	0.325	72.15	0.624	0.858	1.216
nC5	0.932	1.538	0.542	72.15	0.631	1.025	1.452
C6	0.878	4.064	1.711	86.18	0.664	1.366	2.311
C7	0.797	8.488	3.887	93.27	0.707	1.975	3.617
C8	0.369	11.674	6.165	107.65	0.729	2.101	4.440
C9	0.083	9.306	5.459	120.17	0.764	1.496	3.529
C10	0.022	7.881	5.159	134.42	0.779	1.226	3.235
C11		6.042	4.339	147.00	0.790	0.926	2.671
C12		4.895	3.850	161.00	0.801	0.750	2.370
C13		4.872	4.165	175.00	0.812	0.746	2.564
C14		4.274	3.967	190.00	0.815	0.655	2.442
C15		3.575	3.598	206.00	0.826	0.548	2.215
C16		3.564	3.865	222.00	0.825	0.546	2.380
C17		2.760	3.195	237.00	0.839	0.423	1.967
C18		2.723	3.339	251.00	0.838	0.417	2.056
C19		2.269	2.916	263.00	0.847	0.348	1.795
C20		1.853	2.489	275.00	0.857	0.284	1.533
C21		1.597	2.270	291.00	0.868	0.245	1.398
C22		1.572	2.343	305.00	0.873	0.241	1.442
C23		1.179	1.831	318.00	0.878	0.181	1.128
C24		1.142	1.846	331.00	0.882	0.175	1.137
C25		1.013	1.707	345.00	0.886	0.155	1.051
C26		0.882	1.546	359.00	0.890	0.135	0.952
C27		0.858	1.567	374.00	0.894	0.131	0.965
C28		0.780	1.479	388.00	0.897	0.119	0.910
C29		0.699	1.372	402.00	0.900	0.107	0.845
C30+		8.063	24.674	626.52	1.025	1.235	15.193
Total	100.000	100.000	100.000			100.000	100.000
Mol. Wt.	23.12	204.71				50.94	

**Compositional Groupings**

	Mole %	Wt. %	M.W.	S.G. (Water = 1.0)
Tot. Fluid	100.000	100.000	50.94	
C7+	15.165	61.834	207.70	0.851
C10+	9.593	50.248	266.83	0.883
C20+	3.009	26.553	449.59	0.957
C30+	1.235	15.193	626.52	1.025



**Job Information:**

PENCOR I.D. No: 36126-10

Company: BP

Well Name: OCS-G-32306 #1 ST00 BP01

Field Name: Mississippi Canyon Block 252

Notes: Preliminary Wellstream based on Mobile Lab GOR and Broussard Comps  
18,124 ft. MD SampleFlash Gas-Oil Ratio: **2909**

SCF/bbl

Gas Gravity

**0.8122**

(Air = 1.00)

API Gravity **34.7**

°API at 60°F

**Molar Recombination of Atmospheric Flash Products**

Component	Atmos. Gas (mole %)	Atmos. Liquid (mole %)	Atmos. Liquid (weight %)	Molecular Weight	Specific Gravity (Water = 1.0)	Reservoir Liquid (mole %)	Reservoir Liquid (weight %)
N <sub>2</sub>	0.699	0.000	0.000	28.01	0.809	0.590	0.319
CO <sub>2</sub>	1.157	0.000	0.000	44.01	0.818	0.976	0.829
H <sub>2</sub> S	0.000	0.000	0.000	34.08	0.801	0.000	0.000
C1	77.516	0.004	0.000	16.04	0.300	65.412	20.254
C2	7.601	0.026	0.004	30.07	0.356	6.418	3.725
C3	5.280	0.226	0.049	44.10	0.507	4.491	3.822
iC4	1.074	0.185	0.053	58.12	0.563	0.935	1.049
nC4	2.377	0.749	0.212	58.12	0.584	2.123	2.381
iC5	0.872	0.869	0.306	72.15	0.624	0.872	1.214
nC5	0.980	1.491	0.525	72.15	0.631	1.060	1.476
C6	0.919	3.990	1.677	86.18	0.664	1.399	2.326
C7	0.853	8.513	3.894	93.68	0.707	2.049	3.705
C8	0.454	11.756	6.201	107.70	0.728	2.219	4.612
C9	0.152	9.513	5.578	120.31	0.761	1.614	3.747
C10	0.066	8.106	5.293	134.26	0.779	1.322	3.424
C11		6.174	4.424	147.00	0.790	0.964	2.735
C12		5.003	3.927	161.00	0.801	0.781	2.428
C13		4.984	4.252	175.00	0.812	0.778	2.629
C14		4.358	4.037	190.00	0.814	0.681	2.496
C15		3.544	3.559	206.00	0.827	0.553	2.200
C16		3.134	3.392	222.00	0.832	0.489	2.097
C17		2.691	3.109	237.00	0.841	0.420	1.922
C18		2.433	2.977	251.00	0.845	0.380	1.841
C19		2.312	2.964	263.00	0.846	0.361	1.833
C20		1.880	2.521	275.00	0.857	0.294	1.558
C21		1.627	2.308	291.00	0.868	0.254	1.427
C22		1.513	2.249	305.00	0.873	0.236	1.391
C23		1.294	2.006	318.00	0.878	0.202	1.240
C24		1.091	1.760	331.00	0.882	0.170	1.088
C25		1.164	1.957	345.00	0.886	0.182	1.210
C26		0.860	1.505	359.00	0.890	0.134	0.931
C27		0.893	1.629	374.00	0.894	0.139	1.007
C28		0.808	1.528	388.00	0.897	0.126	0.945
C29		0.708	1.387	402.00	0.900	0.111	0.858
C30+		8.101	24.717	625.89	1.027	1.265	15.281
Total	100.000	100.000	100.000			100.000	100.000
Mol. Wt.	23.44	205.13				51.81	

**Compositional Groupings**

	Mole %	Wt. %	M.W.	S.G. (Water = 1.0)
Tot. Fluid	100.000	100.000	51.81	
C7+	15.725	62.605	206.28	0.850
C10+	9.843	50.540	266.03	0.885
C20+	3.114	26.936	448.23	0.958
C30+	1.265	15.281	625.89	1.027



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**From:** LeBlanc, Jason [Jason.LeBlanc@corelab.com]  
**Sent:** Tuesday, April 27, 2010 3:18 PM  
**To:** LeBlanc, Jason; Wang, Yun  
**Cc:** Epps, David S; McAughan, Kelly; Kercho, Debbie A  
**Subject:** RE: Viscosity Measurements

Guys,

Here is the viscosity data on the lives sample we have so far. At 243°F. Please remember that these are preliminary and we haven't verified.

Pressure psia	Viscosity cP
15000	0.194484
14500	0.189716
14000	0.186185
13000	0.178228
11856	0.168398
11000	0.161449
10000	0.154492
9000	0.146054
8000	0.138558
7000	0.138833
6900	0.139714
6800	0.13363
6504	0.161706
6430	0.172017
6300	0.182106

Jason LeBlanc  
Core Laboratories LP  
PENCOR Division  
5820 Highway 90 East  
Broussard, LA 70518  
337-839-9060 (office)

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**From:** LeBlanc, Jason  
**Sent:** Tuesday, April 27, 2010 10:08 AM  
**To:** Wang, Yun  
**Cc:** 'Epps, David S'; McAughan, Kelly; Kercho, Debbie A  
**Subject:** Viscosity Measurements

Yun,

As discussed yesterday we took some of the atmospheric oil collected from the 2.75 gallon sampling chamber from 18,142 ft (PENCOR ID 36126-51) and measured a couple of atmospheric viscosity points for you. The was done on a Anton Parr 'Stabinger' viscometer ASTM D-7042. We could not get accurate measurements at 200°F as the fluid was a little too light and would not behave. Hopefully this gives you a bit of a "calibration point" that you were looking for.

Viscosity at 120 °F = 2.887 cP  
Viscosity at 170 °F = 2.026 cP

We do have the pressurized viscometer charged with live fluid and should start those measurements this afternoon. As I get some data I can forward it on.

Jason LeBlanc  
Core Laboratories LP  
PENCOR Division  
5820 Highway 90 East  
Broussard, LA 70518  
337-839-9060 (office)

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