

9446

Exhibit No. _____
Worldwide Court
Reporters, Inc.

From: Lockett, Tim
Sent: Mon May 03 17:18:07 2010
To: Hill, Trevor
Subject: Best estimate
Importance: Normal
Attachments: Flow estimation.ZIP

Trevor

Some of the data from Ian's model has been updated (fluid model, completion below the end of the drill string) so I re-ran the cases to generate the attached xls which then uses that data to give a flowrate estimate as a function of pressure at the BOP, temperature at the BOP and D/s of the crimp, and velocity of either liquid or mixed phase in the riser - which is currently 19.5 inch ID in the model.

<<...>>

- The velocity is very dependent on the riser ID being correct, and the hold-up, but is probably the best line of estimation if we can measure the transport of a dispersion pulse and get gamma to clarify the hold-up.
- The temperature is dependent on the U-value assumed for the tubing.
- The pressure is dependent on the assumed PI of the formation.

Best regards

Tim

Tim Lockett

Flow Assurance Engineer

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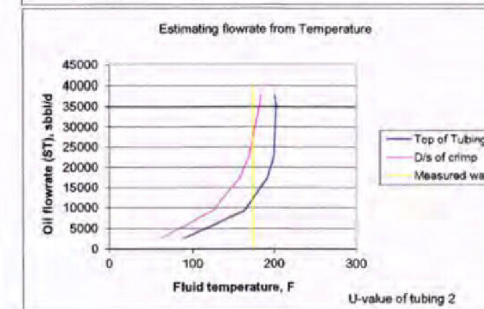
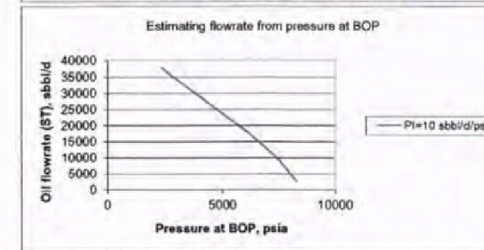
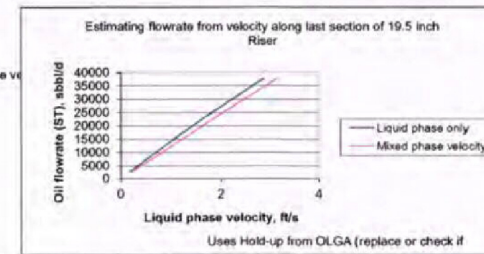
TREX 009446.0002

| Outlet of Riser | | | | | | | | | | | | | | | Calculated values | | | | Mixed phase velocity | |
|-----------------|------------|-----------|-----------|-----------|-------------------------|--------------------------|----------|-------------|---------------------------|-----------|----------|------------|-------------|-----------|-------------------|----------|---------|--|----------------------|--|
| Hole size | STOCK TANK | IN SITU | | | | | | | | | | | | | PHASE ACTUAL | | USG+USL | | | |
| inch | QGST [MA] | QGST [ST] | GG [lb/s] | GT [lb/s] | QG [ft ³ /s] | QLT [ft ³ /s] | HOL [-] | ROG [lb/ft] | ROL [lb/ft ³] | PT [psia] | TM [F] | USG [ft/s] | USLT [ft/s] | UG [ft/s] | ULT [ft/s] | ft/s | | | | |
| 0.25 | 7.144334 | 2517.027 | 2.078935 | 13.55251 | 0.168821 | 0.258681 | 0.719178 | 12.31205 | 44.34568 | 2250.083 | 39.20192 | 0.08141 | 0.124743 | 0.289899 | 0.173452 | 0.206153 | | | | |
| 0.5 | 25.98098 | 9153.404 | 7.565798 | 49.28494 | 0.614758 | 0.940559 | 0.707894 | 12.30459 | 44.34723 | 2250.084 | 39.32861 | 0.296452 | 0.453561 | 1.01488 | 0.640719 | 0.750014 | | | | |
| 0.75 | 49.14728 | 17315.17 | 14.35055 | 93.23055 | 1.168619 | 1.778126 | 0.690675 | 12.27759 | 44.35286 | 2250.088 | 39.79337 | 0.563538 | 0.857457 | 1.821828 | 1.241478 | 1.420995 | | | | |
| 1 | 64.17776 | 22610.57 | 18.80666 | 121.7428 | 1.536861 | 2.320024 | 0.678773 | 12.2427 | 44.36009 | 2250.093 | 40.43344 | 0.740631 | 1.118774 | 2.305628 | 1.648232 | 1.859406 | | | | |
| 2 | 99.90224 | 35196.59 | 29.84173 | 189.5102 | 2.475171 | 3.595519 | 0.650149 | 12.0542 | 44.39917 | 2250.104 | 43.89119 | 1.19359 | 1.73385 | 3.41171 | 2.66685 | 2.92744 | | | | |
| 4 | 106.7139 | 37596.28 | 32.03885 | 202.4312 | 2.688615 | 3.836098 | 0.64475 | 12.00361 | 44.40966 | 2250.106 | 44.81902 | 1.286874 | 1.849864 | 3.62245 | 2.869116 | 3.136737 | | | | |
| 5 | 107.0196 | 37704.63 | 32.13845 | 203.0134 | 2.67743 | 3.846021 | 0.64451 | 12.00104 | 44.41019 | 2250.107 | 44.86621 | 1.291124 | 1.855082 | 3.631956 | 2.878263 | 3.146206 | | | | |

| Hole size BOP | | | | | | | | | | | | | | | Mixed phase velocity | |
|---------------|-----------|-----------|-----------|-----------|-------------------------|--------------------------|----------|-------------|---------------------------|-----------|----------|------------|-------------|-----------|----------------------|------|
| Hole size | QGST [MA] | QGST [ST] | GG [lb/s] | GT [lb/s] | QG [ft ³ /s] | QLT [ft ³ /s] | HOL [-] | ROG [lb/ft] | ROL [lb/ft ³] | PT [psia] | TM [F] | USG [ft/s] | USLT [ft/s] | UG [ft/s] | ULT [ft/s] | ft/s |
| 0.25 | 7.14435 | 2517.038 | 0 | 13.55256 | 0 | 0.334318 | 1 | 24.91726 | 40.53019 | 8293.854 | 89.31429 | 0 | 0.161216 | No Gas | 0.161216 | |
| 0.5 | 25.98098 | 9153.404 | 0 | 49.28494 | 0 | 1.263394 | 1 | 23.72237 | 38.09789 | 7519.211 | 163.7448 | 0 | 0.623707 | No Gas | 0.623707 | |
| 0.75 | 49.38225 | 17268.66 | 0.869295 | 93.23055 | 0.039224 | 2.532633 | 0.978577 | 22.18911 | 36.43725 | 6217.074 | 191.3843 | 0.018915 | 1.2213 | 0.88294 | 1.248036 | |
| 1 | 64.20016 | 22806.14 | 17.22822 | 121.7428 | 0.924408 | 2.683462 | 0.756785 | 18.63727 | 38.93997 | 5198.458 | 199.4505 | 0.445773 | 1.294033 | 1.832636 | 1.709908 | |
| 2 | 99.90175 | 35196.69 | 46.86678 | 189.5102 | 4.615092 | 3.271585 | 0.495919 | 10.10954 | 43.65373 | 2814.332 | 202.5777 | 2.225514 | 1.577641 | 4.414995 | 3.181246 | |
| 4 | 106.7128 | 37596.49 | 52.04572 | 202.4312 | 6.226698 | 3.374697 | 0.443275 | 8.356817 | 44.55417 | 2355.881 | 200.6721 | 3.002672 | 1.627385 | 5.393453 | 3.671233 | |
| 5 | 107.0209 | 37704.36 | 52.29925 | 203.0134 | 6.320942 | 3.378709 | 0.440611 | 8.272359 | 44.59857 | 2333.798 | 200.5528 | 3.048118 | 1.629299 | 5.449013 | 3.697819 | |

| Hole size D/S of Crimp | | | | | | | | | | | | | | | Mixed phase velocity | |
|------------------------|-----------|-----------|-----------|-----------|-------------------------|--------------------------|----------|-------------|---------------------------|-----------|----------|------------|-------------|-----------|----------------------|------|
| Hole size | QGST [MA] | QGST [ST] | GG [lb/s] | GT [lb/s] | QG [ft ³ /s] | QLT [ft ³ /s] | HOL [-] | ROG [lb/ft] | ROL [lb/ft ³] | PT [psia] | TM [F] | USG [ft/s] | USLT [ft/s] | UG [ft/s] | ULT [ft/s] | ft/s |
| 0.25 | 7.144331 | 2517.026 | 2.288540 | 13.5525 | 0.196111 | 0.253629 | 0.694283 | 11.66742 | 44.40273 | 2329.78 | 61.5456 | 0.09457 | 0.122306 | No Gas | 0.176162 | |
| 0.5 | 25.9809 | 9153.422 | 10.58598 | 49.28494 | 1.135015 | 0.863263 | 0.597843 | 9.324906 | 44.82016 | 2274.906 | 124.6957 | 0.547333 | 0.416287 | No Gas | 0.696316 | |
| 0.75 | 49.14768 | 17315.1 | 21.93504 | 93.23055 | 2.5625 | 1.58628 | 0.535037 | 8.558471 | 44.87994 | 2248.106 | 157.3554 | 1.235702 | 0.765909 | 2.657637 | 1.431507 | |
| 1 | 64.18761 | 22608.63 | 29.46098 | 121.7428 | 3.534583 | 2.055551 | 0.504501 | 8.334975 | 44.88557 | 2237.182 | 168.3351 | 1.704465 | 0.991239 | 3.439897 | 1.964789 | |
| 2 | 99.90206 | 35196.63 | 47.05734 | 189.5102 | 5.644273 | 3.182395 | 0.45972 | 8.335599 | 44.75427 | 2286.203 | 181.8608 | 2.721812 | 1.534632 | 5.03778 | 3.338188 | |
| 4 | 106.7131 | 37596.43 | 50.28463 | 202.4312 | 5.955657 | 3.404204 | 0.456019 | 8.441554 | 44.68521 | 2318.457 | 183.552 | 2.871968 | 1.641593 | 5.279535 | 3.599837 | |
| 5 | 107.0205 | 37704.45 | 50.43375 | 203.0134 | 5.974631 | 3.4138 | 0.455687 | 8.439988 | 44.68538 | 2318.261 | 183.6127 | 2.881215 | 1.646221 | 5.2933 | 3.612617 | |

173 0
173 40000



Over-view

| Case# | OG (R3)AI | DLT (R3)AI | OGST (R3) | AI (R3)AI | OGST (R3)AI | OG (R3)AI | DLT (R3)AI | OGST (R3) | AI (R3)AI | OGST (R3)AI | OG (R3)AI | DLT (R3)AI | OGST (R3) | AI (R3)AI | OGST (R3)AI | OG (R3)AI | DLT (R3)AI | OGST (R3) | AI (R3)AI | OGST (R3)AI | |
|----------|-----------|------------|-----------|-----------|-------------|-----------|------------|-----------|-----------|-------------|-----------|------------|-----------|-----------|-------------|-----------|------------|-----------|-----------|-------------|--|
| 2.87343 | 3.849921 | 107.0190 | 37704.83 | 32.15845 | 203.0134 | 0.84451 | 2350.107 | 12.00154 | 44.49119 | 44.89821 | 1.261124 | 1.895082 | | | | | | | | | |
| 5.874831 | 3.4130 | 107.0208 | 37704.45 | 32.4375 | 203.0134 | 0.459637 | 2318.281 | 6.439685 | 44.68958 | 133.6127 | 2.801215 | 1.646221 | | | | | | | | | |
| 6.320042 | 3.378709 | 107.0200 | 37704.36 | 32.20025 | 203.0134 | 0.440691 | 2333.798 | 6.272389 | 44.59667 | 200.5528 | 3.048118 | 1.632929 | | | | | | | | | |

| Pipeline to Geometry | Pipeline to OG (R3)AI | Pipeline to DLT (R3)AI | Pipeline to OGST (R3)AI | Pipeline to AI (R3)AI | Pipeline to OGST (R3)AI | Pipeline to OG (R3)AI | Pipeline to DLT (R3)AI | Pipeline to OGST (R3)AI | Pipeline to AI (R3)AI | Pipeline to OGST (R3)AI | Pipeline to OG (R3)AI | Pipeline to DLT (R3)AI | Pipeline to OGST (R3)AI | Pipeline to AI (R3)AI | Pipeline to OGST (R3)AI | Pipeline to OG (R3)AI | Pipeline to DLT (R3)AI | Pipeline to OGST (R3)AI | Pipeline to AI (R3)AI | Pipeline to OGST (R3)AI |
|----------------------|-----------------------|------------------------|-------------------------|-----------------------|-------------------------|-----------------------|------------------------|-------------------------|-----------------------|-------------------------|-----------------------|------------------------|-------------------------|-----------------------|-------------------------|-----------------------|------------------------|-------------------------|-----------------------|-------------------------|
| 163.4033 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 314.965 | 0 | 168.4033 | 6.320042 | 168.4033 | 3.378709 | 168.4033 | 107.0200 | 168.4033 | 37704.36 | 32.20025 | 168.4033 | 3.378709 | 168.4033 | 107.0200 | 168.4033 | 37704.36 | 32.20025 | 168.4033 | 3.378709 | 168.4033 |
| 427.979 | 4.915-13 | 427.979 | 5.874831 | 427.979 | 3.4130 | 427.979 | 107.0208 | 427.979 | 37704.45 | 32.4375 | 427.979 | 5.874831 | 427.979 | 107.0208 | 427.979 | 37704.45 | 32.4375 | 427.979 | 5.874831 | 427.979 |

C7-5inch

Case# 0618221 0.25821 7.14434 2817.027 0.207806 13.56251 0.719178 2250.983 12.31203 44.34568 39.20192 0.03141 0.124743

Pipeline Geometry
 G 0 0 334318 0 1684023 314965 427979 5073812 5633386 3023835 6433873 7076873 790825 9181257 1054721 1201826 1251826 1501188 183909 1761484 1875564 1985868 2074048 2131871 2185846 2254308 2340202 2440006 2573827 272358 2884862 3035251 3177836 3319423 3461007 3602582 3744177 3885784 4082247 4227172 4384144 4536135 4685725

Pipeline I/O
 G 0 0 334318 0 1684023 314965 427979 5073812 5633386 3023835 6433873 7076873 790825 9181257 1054721 1201826 1251826 1501188 183909 1761484 1875564 1985868 2074048 2131871 2185846 2254308 2340202 2440006 2573827 272358 2884862 3035251 3177836 3319423 3461007 3602582 3744177 3885784 4082247 4227172 4384144 4536135 4685725

Pipeline I/O
 G 0 0 334318 0 1684023 314965 427979 5073812 5633386 3023835 6433873 7076873 790825 9181257 1054721 1201826 1251826 1501188 183909 1761484 1875564 1985868 2074048 2131871 2185846 2254308 2340202 2440006 2573827 272358 2884862 3035251 3177836 3319423 3461007 3602582 3744177 3885784 4082247 4227172 4384144 4536135 4685725

Pipeline I/O
 G 0 0 334318 0 1684023 314965 427979 5073812 5633386 3023835 6433873 7076873 790825 9181257 1054721 1201826 1251826 1501188 183909 1761484 1875564 1985868 2074048 2131871 2185846 2254308 2340202 2440006 2573827 272358 2884862 3035251 3177836 3319423 3461007 3602582 3744177 3885784 4082247 4227172 4384144 4536135 4685725

Pipeline I/O
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Pipeline I/O
 G 0 0 334318 0 1684023 314965 427979 5073812 5633386 3023835 6433873 7076873 790825 9181257 1054721 1201826 1251826 1501188 183909 1761484 1875564 1985868 2074048 2131871 2185846 2254308 2340202 2440006 2573827 272358 2884862 3035251 3177836 3319423 3461007 3602582 3744177 3885784 4082247 4227172 4384144 4536135 4685725

Pipeline I/O
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Pipeline I/O
 G 0 0 334318 0 1684023 314965 427979 5073812 5633386 3023835 6433873 7076873 790825 9181257 1054721 1201826 1251826 1501188 183909 1761484 1875564 1985868 2074048 2131871 2185846 2254308 2340202 2440006 2573827 272358 2884862 3035251 3177836 3319423 3461007 3602582 3744177 3885784 4082247 4227172 4384144 4536135 4685725

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Pipeline I/O
 G 0 0 334318 0 1684023 314965 427979 5073812 5633386 3023835 6433873 7076873 790825 9181257 1054721 1201826 1251826 1501188 183909 1761484 1875564 1985868 2074048 2131871 2185846 2254308 2340202 2440006 2573827 272358 2884862 3035251 3177836 3319423 3461007 3602582 3744177 3885784 4082247 4227172 4384144 4536135 4685725

Pipeline I/O
 G 0 0 334318 0 1684023 314965 427979 5073812 5633386 3023835 6433873 7076873 790825 9181257 1054721 1201826 1251826 1501188 183909 1761484 1875564 1985868 2074048 2131871 2185846 2254308 2340202 2440006 2573827 272358 2884862 3035251 3177836 3319423 3461007 3602582 3744177 3885784 4082247 4227172 4384144 4536135 4685725

C1-0.25inch