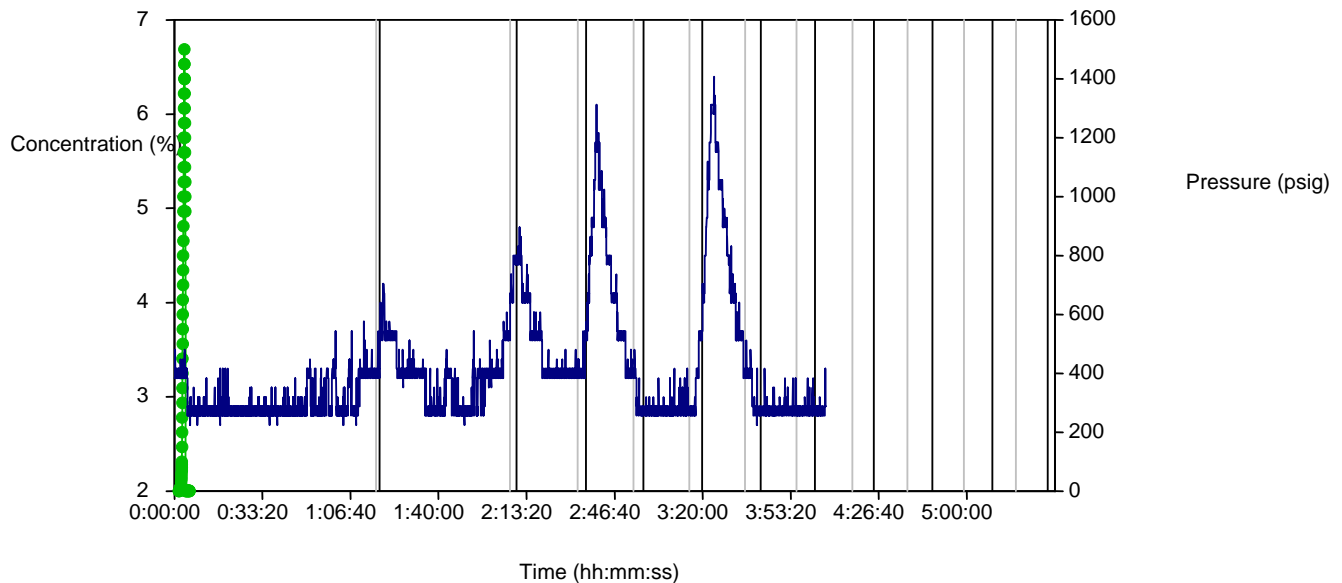


# WellTracer™ Surveillance Report – Multi-Pointing

## Conclusions

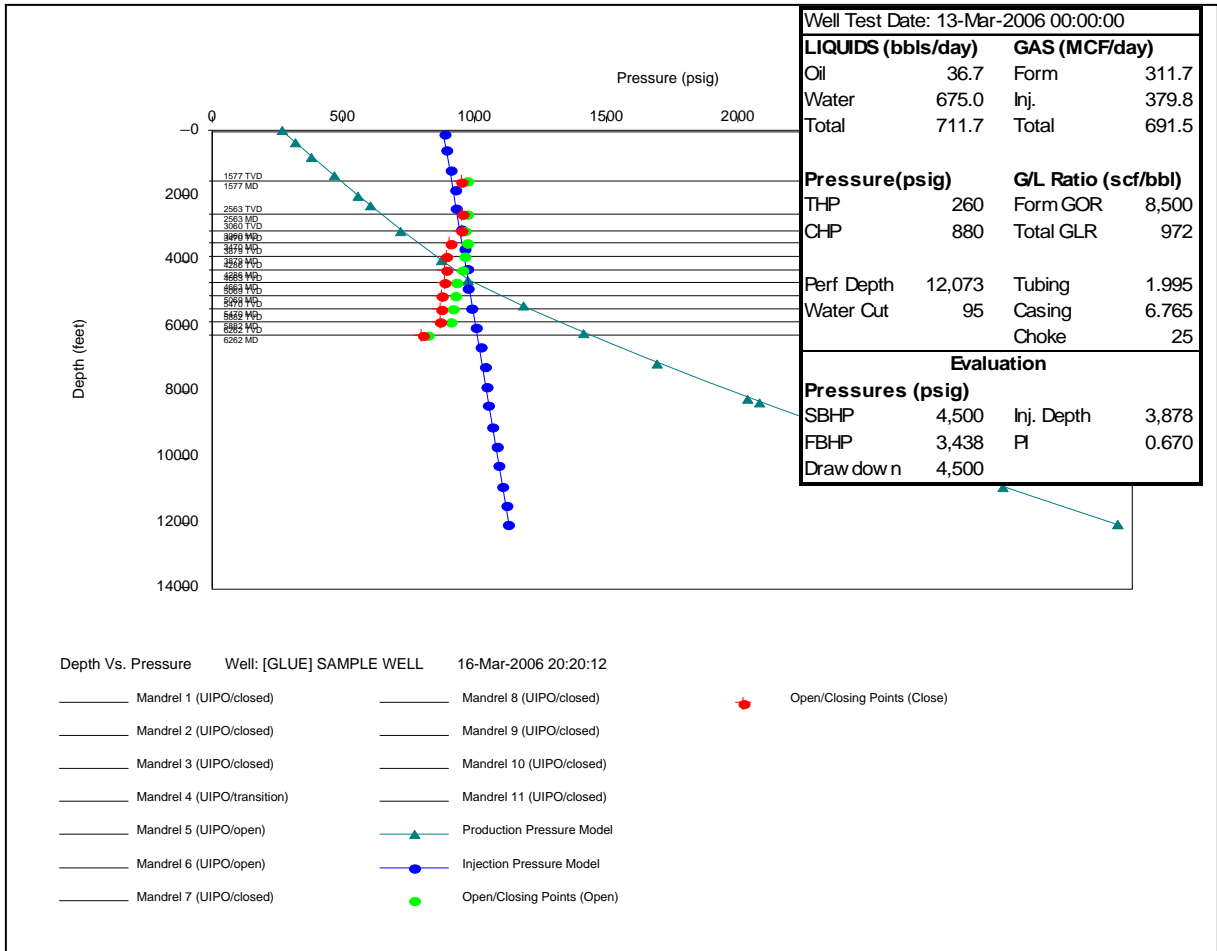
The WellTracer report indicates that this well is lifting from 4 points, associated with valve 1, valve 2, valve 3, and valve 5. Valve 4 is closed, and is shown to have a higher opening pressure. WinGLUE shows there is enough pressure to open the 6<sup>th</sup> mandrel, but the fluid level is 286 ft below the 5<sup>th</sup> mandrel.



Concentration Vs. Time Well: [GLUE] SAMPLE WELL 16-Mar-2006 18:17:21

- Time Corrected CO2 Injection Pressures
- Casing Transit 1 @ 1577 MD
- Casing Transit 2 @ 2563 MD
- Casing Transit 3 @ 3060 MD
- Casing Transit 4 @ 3470 MD
- Casing Transit 5 @ 3879 MD
- Casing Transit 6 @ 4286 MD
- Casing Transit 7 @ 4663 MD
- Casing Transit 8 @ 5069 MD
- Casing Transit 9 @ 5470 MD
- Casing Transit 10 @ 5882 MD
- Casing Transit 11 @ 6262 MD
- Total Transit 1 (1577 MD - Camco BK 1/8)
- Total Transit 2 (2563 MD - Camco BK 1/8)
- Total Transit 3 (3060 MD - Camco BK 1/8)

WellTracer Return Data											
#	Return Time	Return Duration	Return Elapsed	Calc Trav Time	Casing Trav Time	Tubing Trav Time	Total Gas Vel	Mand MD	Calcd Inj MD	Pct Error	Man No.
		hh:mm:ss	hh:mm:ss	hh:mm:ss	hh:mm:ss	hh:mm:ss	feet/sec	feet	feet	%	
1	03/15/2006 12:06:37	00:16:51	01:07:35	01:15:50	01:14:31	00:01:19	0.69319	1,577	1,405	12.21%	1
2	03/15/2006 13:01:32	00:15:07	02:02:30	02:07:43	02:05:12	00:02:31	0.66893	2,563	2,458	4.26%	2
3	03/15/2006 13:32:24	00:19:52	02:33:22	02:34:02	02:30:50	00:03:12	0.66219	3,060	3,047	0.43%	3
4	03/15/2006 14:14:27	00:21:51	03:15:25	03:18:01	03:13:10	00:04:51	0.65298	3,879	3,828	1.33%	5



Gas Lift Valve Analysis														
Mnrl	Mnrl MD	Mnrl TVD	Mnrl Prod Press	Mnrl Inj Press	Valve Temp	Close Press	Open Press	Surf Close Press	TRO	Est Rate	Valve	Choke	Valve	Valve Status
No.	feet	feet	psig	psig	dg.F	psig	psig	psig	psig	MCF/day	Model	64ths		
1	1,577	1,577	491	918	175.2	944	963	911	785	275.9	Camco BK 1/8	0		closed
2	2,563	2,563	640	938	179.6	945	958	892	780	269.0	Camco BK 1/8	0		closed
3	3,060	3,060	718	949	181.9	943	952	879	775	252.0	Camco BK 1/8	0		closed
4	3,470	3,470	785	957	183.7	900	965	832	785	355.8	Camco BK 5/32	0		transition
5	3,879	3,879	853	966	185.5	891	952	817	775	298.9	Camco BK 5/32	0		open
6	4,286	4,286	923	975	187.3	888	945	807	770	204.1	Camco BK 5/32	0		open
7	4,663	4,663	1,016	983	189.4	880	932	793	760	0.0	Camco BK 5/32	0		closed
8	5,069	5,069	1,122	991	191.7	872	918	779	750	0.0	Camco BK 5/32	0		closed
9	5,470	5,470	1,231	1,000	193.9	869	910	770	745	0.0	Camco BK 5/32	0		closed
10	5,882	5,882	1,347	1,008	196.3	867	902	761	740	0.0	Camco BK 5/32	0		closed
11	6,262	6,262	1,459	1,016	198.4	793	816	692	675	0.0	Camco BK 5/32	0		closed

## Recommendations

Reduce injection gas. Also an orifice could be placed at valve 5, the lowest point of injection.

# Tracer Observations

The gas velocity in the annulus is around 0.3 ft/sec, the “actual gas velocity” in the tubing is an order of magnitude higher, from 4 ft/sec to 30 ft/sec. These are typical rates.

## Key Measurements

Fluid level was determined to be 4286 ft.

The injection line pressure at the wellhead was read from gauge at 885 psi at the beginning of the test, and 880 psi at the end of the test.

The lift gas injection rate varied 20% due to supply instability (below). The lift gas rate from the last well test was reduced from 480 to 380, about 20%. This gave a good fit of the mandrel locations to the measured return times.

Injection line temperature was not measured as a temperature gun was not available. We were given a lift gas injection temperature of 120 F.

We were given a lift gas specific gravity of 0.65. The compressibility of the gas affects the gas velocity in the annulus, and a gas composition and AGA 8 calculation could be done to verify this number.

## Measurement Notes

In the afternoon, the temperature of the analyzer dropped 6-7deg

Well head tubing gauge reading zero, gas lift gas measurement hw paintbrush 18 to 46% and Pf was 48%. Static spring was 2000psig for a chart pressure of 960 psig. The gas meter run appeared to be 2” nom probably sch 80. Orifice plate was 2 X .625”. Casing pressure measured at the wellhead was 880 psig.

Compressor discharge pressure ranged from 990 to 940 psig using panel gauge. Gas sales line hw (differential) paintbrush from 0 to 47% on a 15 to 24 sec period with more than half of the period at 0%. The gas sale line was 3” nom probably sch 80 and the orifice plate was 3 X 1 ½ “. Static spring information not gathered but assumed to be 2000 psig.

The paint brush on both meters was the result of a valve upstream of the gas sales line opening very briefly discharging gas to sales. As mentioned it was somewhat periodic but why it was occurring was not ascertained at the time

### **Chemicals on the lease:**

Corrosion inhibitor	3017-C10
Emulsion breaker	CFT 1207-E

