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Exploration Department

EAST PILCHARD 1

WIRELINE FORMATON TESTING

KUMAR KUTTAN

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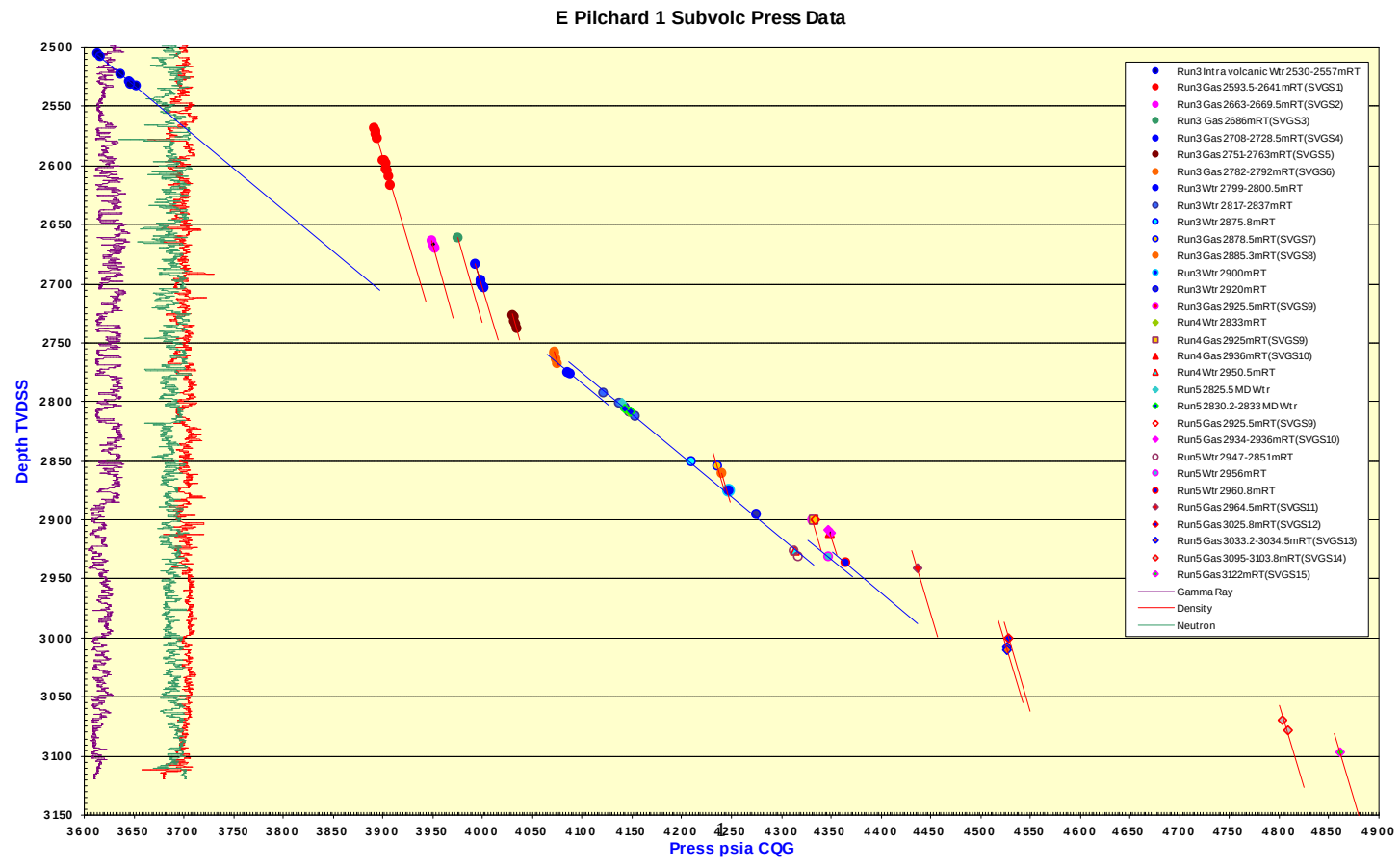

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SUMMARY

Schlumberger's MDT was used in obtaining formation pressures and fluid samples in East Pilchard 1. A total of 178 pressure tests and 22 fluid samples were attempted with 20 successful gas recoveries.
The pressure data indicates that the water sands from the top of porosity down to 2212mRT(2187mSS) are in one fluid system. The water gradient is about 1.45psi/m (0.44psi/ft) and is similar to the water gradients found in the other parts of the basin. At least 4 pressure systems are interpreted in the water bearing sands that extend from 2212mRT(2187mSS) to the top of volcanics at 2432mRT(2407mSS). The sandstones between the volcanic layers are also water bearing and appear to be in separate system and the position of the gradient is almost the same as that of the sands above 2212mRT. All the water sands above and in the intra-volcanics have been affected by production in the basin, some more than others have. The different positions of the water gradients suggest either that some of the sands have been drawn down more than others or that these sands have poorer aquifer support.
In the reservoirs below volcanics at least 15 gas and 3 aquifer systems have been identified by the pressure data. Because of the uncertainty of the position of the water gradients it is very difficult to interpret gas-water contacts and column heights. It is likely that the gas column heights are very variable.
Gas analysis indicates that there is very little difference in the gas composition from sand to sand. The gas as gradient is estimated to be 0.354 psi/m or 0.108psi/ft, with a carbon dioxide content that varies from about 11% to about 22%

1.0 Operational Summary

Schlumberger's MDT (Modular Dynamic Tester) was used to obtain formation pressures and fluid samples in the East Pilchard 1 exploration well. The tool was run with the following modules:

Single large area probe with large area packer
Pump-out
Optical Fluid Analyser (OFA)
2 X Multi-chamber module (MRMS)
2 X 1-gallon chambers

A total of 5 MDT runs were made and 178 pressure tests were attempted. A total of 22 fluid samples at 15 depth points were obtained. Several problems were encountered with the MDT and these are detailed in the Field Wireline Logging Reports (Appendix 3) of the Quantitative Petrophysical Interpretation report. Onsite gas analyses were carried for gas composition was carried out by ACS Laboratories. Onshore gas analysis was also carried out by Petrolab.

2.0 Pressure Data Observation and Interpretation

2.1 Top of Porosity to Intra-Volcanics

The MDT data is presented in Tables 2.1, 2.2 and 2.3. Fig.2.1 is a plot of the pressure data from the top of porosity at 1687.8mRT (1662.8mSS) down to the base of the first gas system below the volcanics at 2641mRT (2616mSS). All the pressure data shown is from the crystal quartz gauge or CQG. The reservoirs from the top of porosity to the top of first volcanic layer (Volcanic Layer 1) at 2432mRT (2407mSS) are water bearing. The pressure data as shown by Fig.2.1 suggests that these water bearing reservoirs appear to belong to several pressure systems with a clear pressure discontinuity at 2212mRT (2187mSS). The sands above this depth appear to belong to one pressure system whereas those below this depth appears to be in at least 4 systems. The water gradient of this system is 1.45psi/m (0.44psi/ft) and is similar to those gradients in the other parts of the Gippsland Basin. It is likely all the reservoirs above the Volcanic Layer 1 were once in the same pressure system but now appear to belong to several systems as a result of production in the basin. The differences in the position of the water gradients could be ascribed to the fact that some sands have been drawn down more than others (higher offtake in these sands than others) or that they have poorer aquifer support.
The pressure data indicates that water bearing sands between the volcanic layers appear to be in a separate pressure system and the position of this gradient almost matches that of the water sands above 2212mRT (2187mSS). This observation suggests that these reservoirs have been affected by the production in the basin but not to same extent as those between 2212mRT and Volcanic Layer 1.

2.2 Sub-Volcanics

Fig. 2.2 is a plot of the pressure data predominantly from the reservoirs below the volcanic layers. The pressure data suggest that there are at least 15 gas and 3 aquifer systems. With the exception of a few gas-bearing reservoirs, no attempt is made to interpret possible gas-water contacts and gas column heights in this report, because of the uncertainty in the position of the water gradients.
As shown by Fig. 2.2 and Fig. 2.3 the first gas system below the volcanics or SVGS1 (for the purpose of this report all the gas sands below the volcanics are referred to as Sub-Volcanic Gas System or SVGS) extends from 2592.2mRT to 2644.5mRT.

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Well: East Pickard - 1

Date

Tool Type (MDT-GR-LEHQT)

Gauge Type: CQG

Pressure units (psia, psig)

Geologist-Engineer: M. Woodmansee / A. Ribeiro

KB (metres): 25.0

Probe type: Large

Temperature units (degF, degC): Deg C

Sample No	Depth mRT	Depth mSS	Strain Gauge (SG) Hydrostatic before psig	SG PPG	SG Reservoir psig	SG PPG	Quartz Gauge (CQG) Hydrostatic psia	CQG PPG	CQG Reservoir psia	CQG PPG	CQG Temp deg C	SG hyd after	CQG hyd after	Comments	Mobility
Suite 1 Run 3															
1	1685.03	1663.94	2952.00	10.3	2369.90	8.3584	2942.90	10.2	2362.68	8.33	74.90	2952.70	2943.90	20cc DD	549.7
2	1694.47	1669.38	2962.20	10.3	2381.90	8.3733	2953.60	10.2	2374.87	8.35	75.83	2962.30	2953.16	20cc DD	1238.8
3	1709.54	1684.44	2987.70	10.3	2405.90	8.3807	2979.27	10.2	2390.61	8.35	76.45	2988.10	2979.23	20cc DD	4421.8
4	1732.01	1706.91	3026.70	10.3	2436.20	8.3759	3017.70	10.2	2429.21	8.35	77.25	3026.20	3017.50	20cc DD	1953.4
5	1748.53	1723.42	3054.60	10.3	2463.10	8.3873	3046.20	10.2	2455.00	8.36	76.09	3054.60	3045.68	20cc DD	583.2
6	1799.02	1773.89	3141.20	10.2	2548.60	9.7548	3132.70	10.2	2541.34	8.41	79.03	3141.30	3132.50	20cc DD	1876.8
7	1812.01	1786.88	3163.80	10.2	2567.10	8.431	3154.90	10.2	2559.81	8.41	79.65	3163.80	3154.94	20cc DD	2079.8
8	1876.03	1850.88	3273.00	10.2	2657.90	8.4273	3265.40	10.2	2650.44	8.40	80.45	3273.80	3264.96	20cc DD	3282.8
9	1908.98	1883.80	3330.40	10.2	2704.90	8.4265	3321.80	10.2	2697.22	8.40	81.20	3330.70	3321.40	20cc DD	3857.8
10	1933.49	1908.31	3372.70	10.2	2737.70	8.4191	3363.60	10.2	2729.88	8.39	82.23	3372.70	3363.30	20cc DD	1108.8
11	1936.95	1911.76	3378.70	10.2	2742.50	8.4197	3369.40	10.2	2734.76	8.39	83.23	3378.40	3369.32	20cc DD	866.8
12	1966.86	1941.66	3429.90	10.2	2774.00	8.3842	3421.20	10.2	2766.21	8.36	83.84	3430.10	3420.70	20cc DD, Correlate	2050.8
13	1978.36	1953.15	3449.60	10.2	2790.80	8.3842	3440.60	10.2	2783.38	8.36	84.60	3449.90	3440.50	20cc DD	929.8
14	1991.95	1966.74	3472.80	10.2	2811.70	8.3898	3464.00	10.2	2803.78	8.37	84.96	3473.00	3463.60	20cc DD	2365.8
15	2038.51	2013.27	3552.50	10.2	2869.60	8.423	3543.60	10.2	2861.41	8.40	85.47	3552.80	3543.40	20cc DD	3561.6
16	2053.98	2028.74	3579.60	10.2	2911.30	8.4215	3570.30	10.2	2863.33	8.40	85.68	3579.60	3570.10	20cc DD	2031.1
17	2119.00	2094.00	3691.30	10.2	3004.40	8.42	3681.75	10.2	2956.11	8.40	86.48	3691.10	3681.70	20cc DD, Mobility later	913.1
18	2141.50	2116.21	3729.60	10.2	3036.40	8.4204	3720.70	10.2	3020.21	8.40	87.18	3729.90	3720.50	20cc DD	488.8
19	2152.00	2127.00	3747.70	10.2	3051.20	8.4105	3739.77	10.2	3043.13	8.40	87.94	3748.00	3739.60	20cc DD Restart computer	887.3
20	2212.03	2186.70	3850.70	10.2	3136.20	8.4168	3841.70	10.2	3127.78	8.39	88.17	3850.80	3841.70	20cc DD, set probe twice	887.6
21	2305.02	2279.64	4009.60	10.2	3265.90	8.036	4000.80	10.2	3136.71	8.07	90.35	4009.80	4000.80	20cc DD	528.6
22	2345.04	2319.64	4078.60	10.2	3218.50	8.1426	4069.60	10.2	3210.00	8.12	91.30	4079.70	4069.20	20cc DD	71.5
23	2377.04	2351.62	4133.40	10.2	3283.90	8.1941	4124.50	10.2	3274.97	8.17	92.00	4133.70	4123.90	20cc DD	818.9
24	2390.00	2364.57	4156.00	10.2	3302.20	8.2455	4146.60	10.2	3313.70	8.22	92.60	4155.00	4146.30	20cc DD	95.3
25	2397.50	2372.06	4168.80	10.2	3333.30	8.2467	4159.80	10.2	3324.00	8.23	93.33	4168.40	4159.40	20cc DD	197.4
26	2413.51	2388.07	4196.10	10.2	3354.90	8.2445	4187.50	10.2	3346.46	8.22	94.03	4196.30	4187.00	20cc DD	632.7
27	2530.02	2504.49	4396.50	10.2	3521.60	8.4002	4387.20	10.2	3512.64	8.47	95.00	4396.20	4386.60	20cc DD	257.7
28	2532.51	2506.99	4400.50	10.2	3524.80	8.4852	4391.50	10.2	3515.00	8.46	95.55	4400.70	4391.20	20cc DD	52.7
29	2547.01	2521.48	4426.70	10.2	3544.90	8.4832	4416.50	10.2	3535.58	8.46	96.15	4426.50	4416.40	20cc DD	74.5
30	2553.49	2527.95	4436.70	10.2	3553.20	8.4805	4427.70	10.2	3544.58	8.46	96.76	4436.60	4427.00	20cc DD	1080.4
31	2554.99	2529.45	4439.50	10.2	3555.20	8.4804	4430.50	10.2	3546.65	8.46	97.47	4438.80	4430.20	20cc DD	3.4
32	2557.03	2531.49	4443.20	10.2	3561.10	8.4872	4433.90	10.2	3551.98	8.47	98.13	4443.60	4433.60	20cc DD	6.2
33	2555.49	2529.96	4440.40	10.2	3556.10	8.4808	4431.40	10.2	3546.98	8.46	98.65	4440.70	4430.98	20cc DD	968.4
34	2593.53	2567.98	4506.00	10.2	3600.00	8.9126	4496.80	10.2	3591.01	8.89	98.70	4506.20	4496.60	20cc DD	1519.5
35	2596.05	2570.49	4510.50	10.2	3600.90	8.9059	4501.30	10.2	3592.07	8.89	99.15	4510.50	4501.70	20cc DD	847.2
36	2598.01	2572.45	4514.10	10.2	3601.70	8.901	4504.80	10.2	3592.68	8.88	99.68	4514.20	4504.80	20cc DD GR correlate	232.8
37	2601.99	2576.43	4521.50	10.2	3603.30	8.8909	4511.30	10.2	3593.53	8.87	99.63	4521.40	4511.60	20cc DD	1587.1
38	2619.98	2594.42	4551.50	10.2	3609.30	8.8426	4542.60	10.2	3600.52	8.82	99.73	4551.70	4542.60	20cc DD - Temporary Lost Seal	23.2
39	2619.98	2594.42	4551.50	10.2	3609.10	8.8423	4542.80	10.2	3600.38	8.82	99.21	4551.50	4542.80	20cc DD Pretest redone	41.5
40	2623.01	2597.45	4559.60	10.2	3611.60	8.8377	4548.60	10.2	3602.97	8.82	99.58	4558.80	4547.95	20cc DD, Aborted	4.9
41	2627.51	2601.94	4554.60	10.2	3611.40	8.822	4556.90	10.2	3602.64	8.80	100.32	4564.70	4556.00	20cc DD	1768.8
42	2629.01	2603.44	4567.40	10.2	3612.90	8.8208	4559.20	10.2	3603.65	8.80	100.70	4567.50	4559.20	20cc DD	61.2
43	2633.51	2607.93	4575.30	10.2	3615.00	8.8098	4566.30	10.2	3605.69	8.79	100.86	4575.30	4566.20	20cc DD	2.2
44	2641.00	2615.42	4588.30	10.2	3616.00	8.7868	4579.30	10.2	3607.15	8.77	101.32	4588.30	4579.60	20cc DD	46.5
45	2642.50	2616.92	4590.70	10.2	n/a	n/a	4581.50	10.2	n/a	n/a	101.27	4590.90	4581.50	20cc DD - Tight, GR correlate	
46	2644.01	2618.43	4593.50	10.2	n/a	n/a	4583.70	10.2	n/a	n/a	100.87	n/a	n/a	20cc DD - Lost seal twice	
47	2642.47	2616.89	4590.50	10.2	n/a	n/a	4581.30	10.2	n/a	n/a	99.90	n/a	n/a	20cc DD - Tight	
48	2649.92	2624.33	4603.20	10.2	n/a	n/a	4593.70	10.2	n/a	n/a	100.38	n/a	n/a	20cc DD - Tight	
49	2649.80	2637.41	4603.30	10.2	n/a	n/a	4593.70	10.2	n/a	n/a	100.66	n/a	n/a	20cc DD - Lost seal	
50	2663.00	2641.44	4626.50	10.2	3668.60	8.7949	4616.30	10.2	3649.38	8.77	101.03	4625.70	4616.90	20cc DD	31.8

Table 2.1

ESSO AUSTRALIA PTY LTD

Well: East Pilchard - 1
Date:
Tool Type (MDT-GR-LEHQT)
Gauge Type: CQG
Pressure units (psia, psig)

Geologist-Engineer: M Woodmansee / A Ribeiro
KB (metres): 25.0
Probe type: Large
Temperature units (degF, degC): Deg C

Sample No	Depth mRT	Depth mSS	Strain Gauge (SG) Hydrostatic before psig	PPG	Reservoir psig	PPG	Quartz Gauge (CQG) Hydrostatic psia	PPG	Reservoir psia	PPG	Temp deg C	SG hyd after	CQG hyd after	Comments	Mobility
Suite 1 Run 3															
51	2667.04	2643.97	4632.60	10.2	3959.80	8.7892	4623.30	10.2	3950.43	8.77	101.30	4632.40	4623.20	20cc DD	429.8
52	2669.50	2644.50	4636.50	10.2	3960.60	8.7892	4627.48	10.2	3951.37	8.77	101.83	4637.00	4627.05	20cc DD	18.4
53	2672.51	2646.91	4642.10	10.2	n/a	n/a	4632.54	10.2	n/a	n/a	102.20	4641.90	4632.50	20cc DD - Tight	
54	2686.03	2660.42	4664.80	10.2	3984.50	8.7893	4655.68	10.2	3975.14	8.77	102.68	4664.70	4655.20	20cc DD	84.9
55	2691.51	2665.90	4674.10	10.2	n/a	n/a	4664.81	10.2	n/a	n/a	102.56	4674.30	4664.60	20cc DD - Tight	
56	2700.00	2675.00	4688.70	10.2	n/a	n/a	4679.56	10.2	n/a	n/a	103.09	4688.60	4679.54	20cc DD - Lost seal	
57	2708.49	2682.86	4702.90	10.2	4002.20	8.7545	4693.98	10.2	3992.90	8.73	103.04	4702.80	4693.60	10cc DD - Slow buildup	22.17
58	2719.53	2693.90	4722.40	10.2	n/a	n/a	4713.14	10.2	n/a	n/a	103.30	4722.30	4712.40	10cc DD - Tight	
59	2721.49	2695.85	4726.30	10.2	4007.10	8.723	4716.02	10.2	3997.58	8.70	103.65	4726.50	4715.60	20cc DD	92.5
60	2724.02	2698.38	4729.50	10.2	4008.20	8.7172	4720.50	10.2	3998.82	8.70	103.81	4729.50	4720.50	20cc DD	21.5
61	2726.53	2700.89	4734.30	10.2	4009.00	8.7108	4724.68	10.2	3999.40	8.69	104.08	4734.50	4724.50	20cc DD	97.6
62	2728.54	2702.90	4737.80	10.2	4010.00	8.7065	4727.60	10.2	4000.44	8.69	104.04	4737.70	4727.79	20cc DD	342.1
63	2741.50	2715.86	4759.90	10.2	n/a	n/a	4750.50	10.2	n/a	n/a	103.94	4759.40	4750.70	20cc DD - Tight	
64	2751.01	2725.36	4775.70	10.2	4038.70	8.9366	4767.16	10.2	4030.11	8.68	104.58	4775.50	4767.38	20cc DD	1167.3
65	2753.00	2727.34	4778.80	10.2	4039.70	8.9524	4770.50	10.2	4031.04	8.67	104.95	4775.10	4770.82	20cc DD	3.9
66	2755.99	2730.33	4784.40	10.2	4040.60	8.9648	4775.68	10.2	4031.91	8.67	105.51	4784.30	4775.73	20cc DD	248.8
67	2758.99	2733.33	4789.50	10.2	4042.50	8.9794	4780.65	10.2	4033.57	8.66	105.85	4788.70	4780.70	20cc DD	191.5
68	2763.04	2737.38	4796.50	10.2	4043.40	8.9885	4787.80	10.2	4034.60	8.65	105.88	4796.60	4787.80	10cc DD - Leak in packer to probe. Retest	
69	2763.04	2737.38	4796.90	10.2	4043.20	8.988	4787.90	10.2	4034.28	8.65	105.88	4796.90	4787.71	10cc DD	1826.2
70	2782.01	2756.33	4829.20	10.2	4080.40	8.9876	4820.48	10.2	4071.52	8.67	105.99	4829.40	4820.57	20cc DD	5.8
71	2784.02	2758.33	4832.40	10.2	4080.80	8.9822	4823.78	10.2	4072.21	8.66	106.46	4832.60	4823.79	20cc DD	391.2
72	2789.01	2763.32	4841.20	10.2	4082.30	8.9697	4832.64	10.2	4073.69	8.65	106.50	4840.60	4832.27	15cc DD	511.8
73	2792.02	2766.32	4846.40	10.2	4083.40	8.9626	4837.60	10.2	4074.69	8.64	107.08	4846.30	4837.50	15cc DD	1586.6
74	2799.50	2773.80	4859.50	10.2	4084.30	8.9523	4849.90	10.2	4085.27	8.64	107.08	4859.50	4850.40	10cc DD	43.5
75	2800.50	2774.79	4860.90	10.2	4096.20	8.9633	4852.11	10.2	4087.40	8.64	106.40	4861.30	4852.19	10cc DD - poor gauge stability	39.4
76	2817.47	2791.75	4890.40	10.2	4130.10	8.9819	4881.29	10.2	4121.50	8.66	106.77	4888.90	4881.50	20cc DD	14.7
77	2825.52	2799.78	4903.90	10.2	4146.00	8.9903	4895.82	10.2	4137.50	8.67	106.84	4903.40	4895.62	20cc DD	93.8
78	2829.98	2804.25	4911.50	10.2	4151.40	8.9878	4903.40	10.2	4143.15	8.67	107.60	4911.60	4903.25	20cc DD	352.5
79	2832.99	2807.25	4916.80	10.2	4155.70	8.9875	4908.60	10.2	4147.28	8.67	107.82	4196.60	4908.59	20cc DD	122.8
80	2836.97	2811.23	4923.80	10.2	4161.30	8.9869	4915.53	10.2	4152.69	8.67	108.35	4923.90	4915.30	15cc DD	77.2
81	2860.98	2835.21	4965.40	10.2	n/a	n/a	4956.90	10.2	n/a	n/a	109.44	4965.10	4956.83	15cc DD - aborted, slow buildup, retest	
82	2861.20	2835.43	4966.20	10.2	4231.80	8.7586	4957.10	10.2	4222.70	8.74	109.32	4966.10	4957.38	5cc DD (+5cc + 2cc), seal leaked immediately after taking pressure	
83	2875.45	2849.66	4990.40	10.2	n/a	n/a	4981.90	10.2	n/a	n/a	109.70	n/a	n/a	15cc DD - aborted, slow buildup, retest	
84	2875.77	2849.99	4991.40	10.2	4218.30	8.6861	4982.40	10.2	4209.63	8.67	109.90	4991.30	4982.77	10cc DD (+5cc DD)	33.2
85	2878.51	2852.72	4996.00	10.2	4243.70	8.73	4987.50	10.2	4235.85	8.71	110.15	4996.10	4987.70	15cc DD (+5cc DD)	25.3
86	2882.01	2856.22	5002.20	10.2	n/a	n/a	4993.77	10.2	n/a	n/a	110.46	n/a	n/a	10cc DD - no seal, retest 1m higher	
87	2881.08	2855.29	5000.60	10.2	n/a	n/a	4992.30	10.2	n/a	n/a	110.54	n/a	n/a	20cc DD - Tight, aborted	
88	2885.31	2859.52	5008.10	10.2	4248.60	8.7193	4999.32	10.2	4239.50	8.70	110.76	5008.20	4999.20	10cc DD	48.6
89	2900.52	2874.71	5034.80	10.2	4266.60	8.6973	5025.80	10.2	4246.62	8.67	110.67	5034.80	5025.90	10cc DD	9.0
90	2918.46	2892.63	5065.40	10.2	n/a	n/a	5057.77	10.2	n/a	n/a	110.81	n/a	n/a	10cc DD - aborted, slow buildup, suspect leaking	
91	2920.47	2894.64	5069.50	10.2	4269.40	8.6941	5061.22	10.2	4274.60	8.67	111.26	5070.00	5060.62	10cc DD additional 5cc DD to reconfirm	22.4
92	2925.00	2899.17	5077.70	10.2	n/a	n/a	5069.26	10.2	n/a	n/a	111.74	n/a	n/a	10cc DD (+5cc DD) - aborted, slow buildup, possible leak	
93	2926.51	2900.68	5080.30	10.2	n/a	n/a	5071.79	10.2	n/a	n/a	112.05	n/a	n/a	20cc DD - aborted, tight, try 1m higher	
94	2925.53	2899.69	5078.60	10.2	4339.50	8.7825	5070.32	10.2	4330.59	8.75	112.38	5078.60	5070.00	10cc DD (+5cc DD), sample diverted to OFA then to 1 Gallon chamber	11.8

Table 2.1 Continued

ESSO AUSTRALIA PTY LTD

Well: East Pilchard - 1

Date 27 - 28 July 2001 | Geologist-Engineer M.Woodmansee / A.Ribeiro

Tool Type (MDT-GR-LEHQT) | KB (metres): 25 m

Gauge Type: CQG | Probe type large

Pressure units (psia, psig) | Temperature units (degC)

Sample No	Depth mRT	Depth mSS	Strain Gauge (SG) Hydrostatic before psig	PPG	Reservoir psig	PPG	Quartz Gauge (CQG) Hydrostatic psia	PPG	Reservoir psia	PPG	Temp deg.C	SG hyd after	CQG hyd after	Comments	Mobility
Suite 1 Run 4															
95	2593.50	2568.5	4510.40	10.2	3877.40	8.8591	4525.20	10.2	**3891.22**	8.89	88.37	4510.30	4523.10	20cc DD Collect 1 gallon (MPSC-BB-119) and 450cc (MPSC-0157)	**1737.0**
96	2596.00	2571.0	4513.70	10.2	3877.90	8.8517	4527.50	10.2	**3891.80**	8.88	94.24	4512.50	4526.20	20cc DD Collect 450cc (MPSR-0193)	**323.0**
97	2602.00	2577.0	4523.00	10.2	3879.90	8.8356	4536.55	10.2	**3893.42**	8.87	95.03	4521.80	4535.60	20cc DD Sample chamber empty	**3167.0**
98	2627.50	2602.5	4565.30	10.2	3888.60	8.7687	4579.30	10.2	**3902.37**	8.80	95.45	4563.70	4577.70	20cc DD Collect 450cc (MPSR-0501) and 450cc (MPSR-0123)	**262.6**
99	2641.00	2616.0	4587.70	10.2	3893.20	8.7337	4601.25	10.2	**3907.07**	8.76	94.57	4586.70	4600.50	20cc DD Sample chamber empty	**178.1**
100	2602.00	2577.0	4518.40	10.2	3880.80	8.8377	4533.90	10.2	**3895.14**	8.87	92.21	4590.20	4531.70	15cc DD Sample Chamber empty	**666.9**
101	2627.50	2602.5	4562.20	10.2	3889.00	8.7696	4575.70	10.2	**3902.75**	8.80	99.85	4560.40	4574.50	15cc DD Collect 450cc (MPSR-0123)	**131.5**
Siite 1 Run 4A															
102	2641.00	2616.0	4584.40	10.2	n/a	n/a	4598.02	10.2	n/a	n/a	100.20	4583.60	4597.50	15cc DD - Lost seal, second attempt tight.	
103	2641.30	2616.3	4584.10	10.2	3893.80	8.7341	4597.67	10.2	**3907.21**	8.76	100.10	4584.80	4597.62	15cc DD Build up to slow to sample	**0.8**
104	2640.80	2615.8	4583.50	10.2	n/a	n/a	4597.30	10.2	n/a	n/a	100.16	4584.50	4597.35	15cc DD - Tight. GR correlated.	**16.1**
105	2641.00	2616.0	4585.00	10.2	3893.90	8.7353	4597.74	10.2	**3906.70**	8.76	99.89	4582.70	4596.45	15cc DD Collect 450cc (MPSR-156)	**108.7**
106	2663.00	2638.0	4620.60	10.2	n/a	n/a	4634.79	10.2	n/a	n/a	99.57	4621.10	4634.40	15cc DD - Tight test aborted	**3.9**
107	2663.20	2638.2	4621.10	10.2	3935.60	8.7545	4635.35	10.2	**3949.83**	8.79	100.40	4619.70	4633.35	15cc DD Sample Chamber empty	**35.6**
108	2667.50	2642.5	4627.10	10.2	3936.90	8.7432	4640.80	10.2	**3950.74**	8.77	101.87	4626.30	4640.60	15cc DD, Collect sample 450cc (MPSR-503)	**2.0**
109	2724.00	2699.0	4724.10	10.2	n/a	n/a	4737.87	10.2	n/a	n/a	103.30	4723.80	4737.40	15cc DD abort tight	
110	2724.50	2699.5	4724.90	10.2	3985.20	8.6636	4738.90	10.2	**3998.99**	8.69	103.77	4724.90	4738.85	15cc DD Pre-Test only	**7.8**
111	2726.50	2701.5	4728.70	10.2	3985.70	8.6582	4742.57	10.2	**3999.45**	8.69	104.04	4729.30	4742.66	15cc DD + 5cc DD Pre-Test only	**161.3**
112	2728.50	2703.5	4732.40	10.2	3986.60	8.6538	4746.11	10.2	**4000.22**	8.68	104.49	4731.60	4755.70	15cc DD Collect 1 gallon (MPSC-BB-105) and 450cc (MPSR-487)	**103.3**
113	2756.00	2731.0	4779.90	10.2	4017.60	8.6333	4793.50	10.2	**4031.38**	8.66	105.35	4779.40	4793.47	15cc DD, Collect 450cc sample (MPSR-478)	**336.3**
114	2759.00	2734.0	4785.20	10.2	4018.80	8.6264	4799.10	10.2	**4032.30**	8.66	106.67	4784.70	4798.60	15cc DD OFA Analysis only	**353.3**
115	2763.00	2738.0	4792.20	10.2	n/a	n/a	4805.50	10.2	n/a	n/a	106.88	n/a	n/a	15cc DD + 5cc DD Aborted supercharged	
116	2763.50	2738.5	4793.30	10.2	n/a	n/a	4806.90	10.2	n/a	n/a	106.50	n/a	n/a	15cc DD aborted leaking seal	
117	2763.50	2738.5	4793.70	10.2	4020.70	8.6163	4807.20	10.2	**4035.30**	8.65	106.60	4792.90	4806.42	20cc DD OFA Analysis only	**73.2**
118	2792.00	2767.0	4842.70	10.2	4060.80	8.6126	4856.40	10.2	**4074.30**	8.64	107.70	invalid	4856.50	20cc DD Collect 450cc sample (MPSR-187) and 450cc (MPSR-477)	**322.9**
119	2885.00	2860.0	invalid	invalid	invalid	invalid	5017.50	10.2	n/a	n/a	108.33	n/a	5017.70	20cc DD, tight,test aborted	
120	2885.40	2860.4	invalid	invalid	invalid	invalid	5017.95	10.2	**4240.50**	8.70	108.90	invalid	5017.90	15cc DD OFA Analysis only	**4.5**

Table 2.2

ESSO AUSTRALIA PTY LTD

Well: East Pitcheri - 1

Date: 27 - 28 July 2001 | Geologist-Engineer: M.Woodmansee / A.Ribeiro

Tool Type (MDT-GR-LEHQT) | KB (metres): 25 m

Gauge Type: CQG | Probe type: large

Pressure units (psia, psig) | Temperature: Deg C

Sample No	Depth mRT	Depth mSS	Strain Gauge (SG) Hydrostatic before psig	SG PPG	SG Reservoir psig	SG PPG	Quartz Gauge (CQG) Hydrostatic psia	CQG PPG	CQG Reservoir psia	CQG PPG	CQG Temp deg C	SG hyd after	CQG hyd after	Comments	DMobil
Suite 2 Run 3															
121	2925.50	2900.5	4809.80	10.2	n/a	n/a	4809.30	10.2	n/a	n/a	97.65	n/a	n/a	20cc DD, (GR coorelate)dry test	
122	2933.00	2908.0	4802.80	10.2	4127.90	8.6271	4921.30	10.2	4146.58	8.67	99.80	4802.80	4930.80	20cc DD	406.3
123	2925.64	2900.6	4803.70	10.2	n/a	n/a	4907.70	10.2	n/a	n/a	101.25	n/a	n/a	20cc DD Dry test	
124	2929.99	2905.0	4901.60	10.2	n/a	n/a	4915.30	10.2	n/a	n/a	101.03	n/a	n/a	20cc DD (GR coorelate)Dry test	
125	2930.33	2905.3	4901.60	10.2	n/a	n/a	4916.70	10.2	n/a	n/a	101.24	n/a	n/a	20cc DD. Lost seal	
126	2895.31	2860.3	4895.00	10.2	n/a	n/a	5009.70	10.2	n/a	n/a	101.50	n/a	n/a	20cc DD. Lost seal	
127	2895.14	2860.1	4894.50	10.2	n/a	n/a	5009.70	10.2	n/a	n/a	101.61	n/a	n/a	20cc DD. Dry test	
128	2925.46	2900.5	5083.30	10.2	4317.70	8.7361	5078.60	10.2	4332.98	8.77	102.50	5083.60	5078.30	20 cc DD	12.7
129	2928.83	2901.8	5088.30	10.2	n/a	n/a	5080.90	10.2	n/a	n/a	103.00	5088.30	5080.40	20 cc. (Tight wait 5 munutes for stabilization)	0.2
130	2933.92	2909.9	5079.40	10.2	n/a	n/a	5092.40	10.2	n/a	n/a	103.68	n/a	n/a	15cc DD (GR co-orelate) Dry test	
131	2936.52	2911.6	5082.90	10.2	4306.20	8.7379	5096.80	10.2	4349.14	8.77	103.90	5082.40	5096.80	15cc DD	9.4
132	2947.59	2922.6	5101.40	10.2	n/a	n/a	5116.81	10.2	n/a	n/a	104.17	n/a	n/a	15cc DD. Dry test	
133	2947.78	2922.8	5101.70	10.2	n/a	n/a	5115.80	10.2	n/a	n/a	104.71	n/a	n/a	15cc DD. Dry test	
134	2936.56	2911.6	5082.40	10.2	4305.40	8.7384	5096.40	10.2	4348.98	8.77	105.22	5081.70	5096.16	**15cc DD. Retest to check Schlumberger toolist no charge**	12.2
135	2947.80	2922.8	5101.00	10.2	n/a	n/a	5116.50	10.2	n/a	n/a	104.90	n/a	n/a	**5cc DD. Reduce the pretest drawdown rate to 20cc/min from 60cc/min - no charge**	
136	2960.53	2935.6	5105.40	10.2	4299.80	8.6255	5119.80	10.2	4314.17	8.65	105.15	5105.90	5119.90	15cc DD, rate 20cc/min	409.6
137	2956.20	2931.2	5115.00	10.2	n/a	n/a	5129.40	10.2	n/a	n/a	105.37	n/a	n/a	15cc DD. Dry test	
Suite 2 Run 5															
138	2925.50	2900.5	4888.40	10.2	4125.30	8.6447	4903.30	10.2	4148.83	8.68	101.30	4901.10	4902.90	20cc DD. Temperature not completely stable	46.8
139	2930.20	2905.2	4888.50	10.2	4130.40	8.6409	4912.07	10.2	4143.20	8.67	105.62	4898.70	4911.12	20cc DD	157.3
140	2933.00	2908.0	4901.40	10.2	4132.10	8.6368	4916.11	10.2	4148.34	8.67	106.90	4901.10	4930.60	15cc DD +5ccDD	104.3
141	2925.50	2900.5	5061.80	10.2	4319.60	8.7368	5076.59	10.2	4333.68	8.77	108.24	5061.60	5075.20	20cc DD	24.3
142	2926.60	2901.6	5064.00	10.2	4305.60	8.7606	5077.50	10.2	4348.86	8.79	109.34	5064.30	5077.07	20cc DD	3.3
143	2956.00	2930.0	5078.80	10.2	4333.70	8.7427	5090.80	10.2	4347.28	8.77	110.90	5076.60	5089.80	20cc DD	14.0
144	2936.60	2911.6	5079.90	10.2	4332.30	8.7321	5095.50	10.2	4350.36	8.77	111.08	5079.70	5094.30	20cc DD	114.1
145	2947.60	2922.6	5098.60	10.2	4296.50	8.6273	5113.90	10.2	4312.94	8.66	111.86	5099.90	5112.50	20 cc DD	212.1
146	2960.80	2935.8	5104.60	10.2	4301.10	8.6271	5119.34	10.2	4316.38	8.66	112.52	5104.80	5118.86	20cc DD	385.1
147	2956.00	2931.0	5113.80	10.2	4332.30	8.6743	5128.37	10.2	4346.46	8.70	113.24	n/a	5128.00	20cc DD. Strain gauge failed	30.6
148	2960.60	2935.6	n/a	n/a	n/a	n/a	5136.45	10.2	4363.85	8.72	113.72	n/a	5136.07	20cc DD	0.8
149	2965.00	2940.0	n/a	n/a	4421.70	8.8262	5143.78	10.2	4436.38	8.86	113.98	5139.30	5143.70	20cc DD re-set packer 20cc DD suspect pressure response zone up 0.5m	83.7
150	2965.50	2940.5	5130.10	10.2	4421.90	8.8251	5144.57	10.2	4436.56	8.86	114.28	n/a	5144.65	20cc DD collect 2 X 450cc MRSM chambers 38min build up	30.3
151	3025.00	3000.0	n/a	n/a	n/a	n/a	5247.30	10.2	n/a	n/a	114.12	n/a	5247.00	20cc DD tight to slow build up	n/a
152	3025.20	3000.2	n/a	n/a	n/a	n/a	5247.70	10.2	n/a	n/a	114.56	n/a	5247.60	10cc DD tight to slow build up	0.9
153	3025.80	3000.8	n/a	n/a	n/a	n/a	5248.70	10.2	4526.19	8.86	115.24	n/a	5248.65	10cc DD	2.0
154	3027.20	3002.2	n/a	n/a	n/a	n/a	5251.25	10.2	n/a	n/a	115.90	n/a	5251.90	10ccDD tight to slow build up	
155	3027.50	3002.5	n/a	n/a	n/a	n/a	5251.70	10.2	n/a	n/a	116.42	n/a	5251.40	10cc DD +5cc DD Super charged	
156	3028.40	3003.4	n/a	n/a	n/a	n/a	5253.40	10.2	n/a	n/a	116.87	n/a	5253.20	10cc DD tight to slow build up tight	
157	3033.20	3008.2	n/a	n/a	n/a	n/a	5261.60	10.2	4526.88	8.83	117.19	n/a	5261.60	10cc DD	1.3
158	3035.10	3010.1	n/a	n/a	n/a	n/a	5264.80	10.2	n/a	n/a	117.39	n/a	5264.80	10cc DD, tight move up 0.5m and retest	
159	3034.50	3009.5	n/a	n/a	n/a	n/a	5263.80	10.2	4526.67	8.83	117.61	n/a	5263.67	10 cc DD lost seal +5ccDD ok	7.2
160	3047.90	3022.9	n/a	n/a	n/a	n/a	5286.60	10.2	n/a	n/a	117.70	n/a	5286.60	10cc DD tight	
161	3074.60	3049.6	n/a	n/a	n/a	n/a	5331.70	10.2	n/a	n/a	117.19	n/a	5331.80	20cc DD to tight to sample	
162	3074.70	3049.7	n/a	n/a	n/a	n/a	5332.30	10.2	n/a	n/a	117.89	n/a	5332.10	10cc DD tight	
163	3074.30	3049.3	n/a	n/a	n/a	n/a	5331.60	10.2	4774.88	9.19	118.35	n/a	5331.50	10cc DD probably supercharged attempt pump out, no go	
164	3027.00	3052.0	n/a	n/a	n/a	n/a	5336.26	10.2	n/a	n/a	119.00	n/a	5336.36	10cc DD tight	
165	3080.90	3055.9	n/a	n/a	n/a	n/a	5343.21	10.2	n/a	n/a	118.95	n/a	5343.14	5 cc DD Tight	
166	3089.00	3064.0	n/a	n/a	n/a	n/a	5357.30	10.2	n/a	n/a	119.07	n/a	5357.40	5cc DD + 10cc DD retract 5cc DD tight then lost seal	
167	3093.60	3068.6	n/a	n/a	n/a	n/a	5365.50	10.2	5169.88	9.66	119.50	n/a	5365.80	5cc DD + 5cc DD super charged	
168	3086.00	3070.0	n/a	n/a	n/a	n/a	5368.10	10.2	4803.87	9.18	119.84	n/a	5368.66	5cc DD pump to OFA take two 450 MRSM samples	20.5
169	3103.50	3078.5	n/a	n/a	n/a	n/a	5383.40	10.2	5252.88	10.20	120.50	n/a	5383.40	5cc DD + 5cc DD super charged leaking/supercharged	
170	3103.80	3078.8	n/a	n/a	n/a	n/a	5384.00	10.2	4808.78	9.17	120.29	n/a	5383.60	5cc DD Take 2 X 450cc MRSM chamber samples	292.5
171	3110.20	3085.2	n/a	n/a	n/a	n/a	5394.70	10.2	n/a	n/a	120.12	n/a	5394.88	5cc DD + 5cc DD super charged	
172	3110.50	3085.5	n/a	n/a	n/a	n/a	5395.75	10.2	n/a	n/a	121.00	n/a	5395.40	5cc DD tight	
173	3114.00	3089.0	n/a	n/a	n/a	n/a	5402.00	10.2	n/a	n/a	121.10	n/a	5402.02	5cc DD supercharged	
174	3115.10	3090.1	n/a	n/a	n/a	n/a	5404.00	10.2	n/a	n/a	122.00	n/a	5405.05	5cc DD leaking, pump to try to get seal, no go	
175	3116.80	3091.8	n/a	n/a	n/a	n/a	5407.10	10.2	n/a	n/a	121.61	n/a	5407.08	5cc DD leaking + 10cc DD Leaking	
176	3121.00	3096.0	n/a	n/a	n/a	n/a	5414.44	10.2	n/a	n/a	121.50	n/a	5414.03	10cc DD leaking 10cc DD leaking	
177	3122.00	3097.0	n/a	n/a	n/a	n/a	5416.40	10.2	4860.79	9.21	121.80	n/a	5415.89	10cc DD pump to OFA take two 450cc MRSM samples	24.2
178	3125.50	3100.5	n/a	n/a	n/a	n/a	5422.10	10.2	n/a	n/a	122.50	n/a	5421.20	10cc DD tight	

Table 2.3

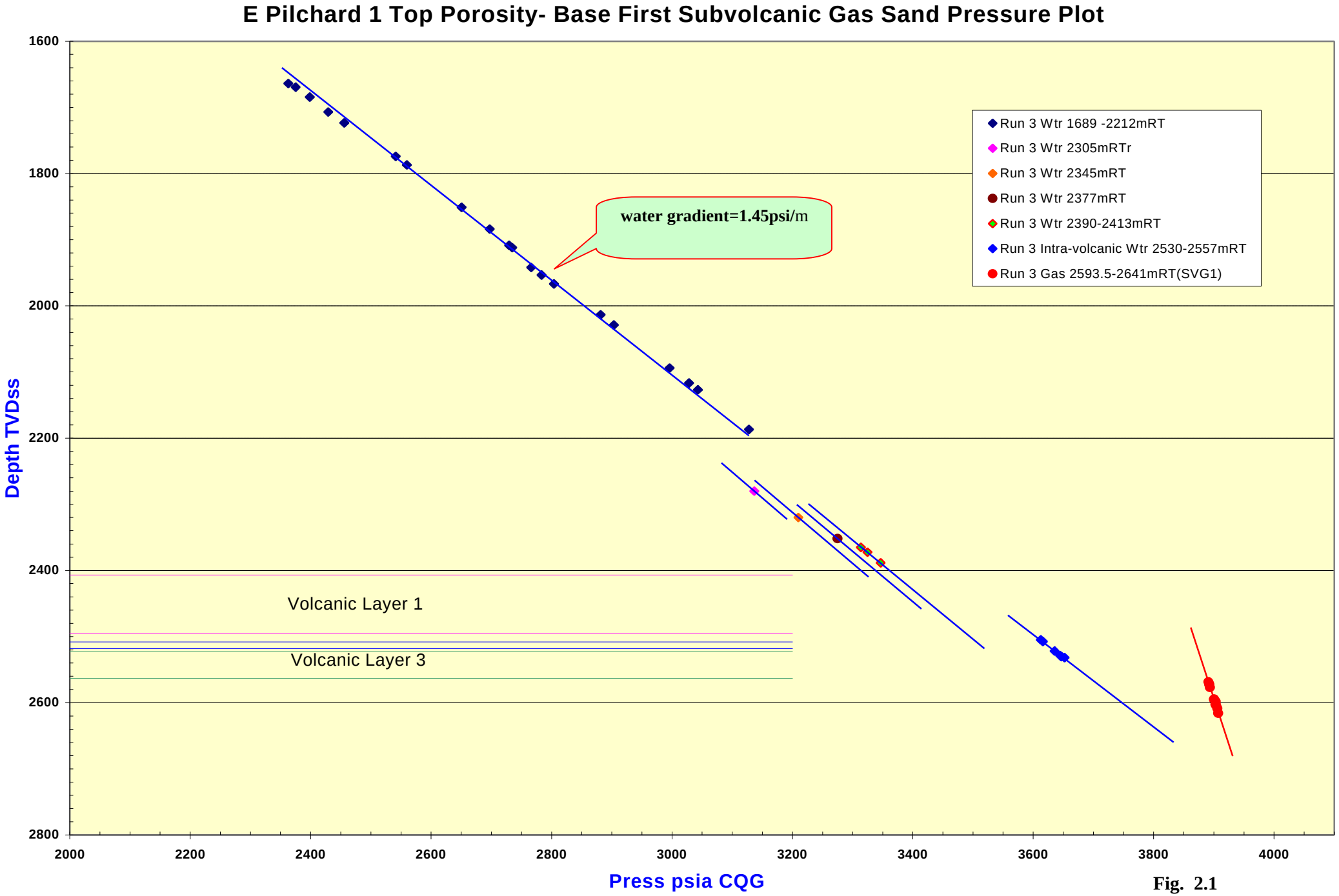
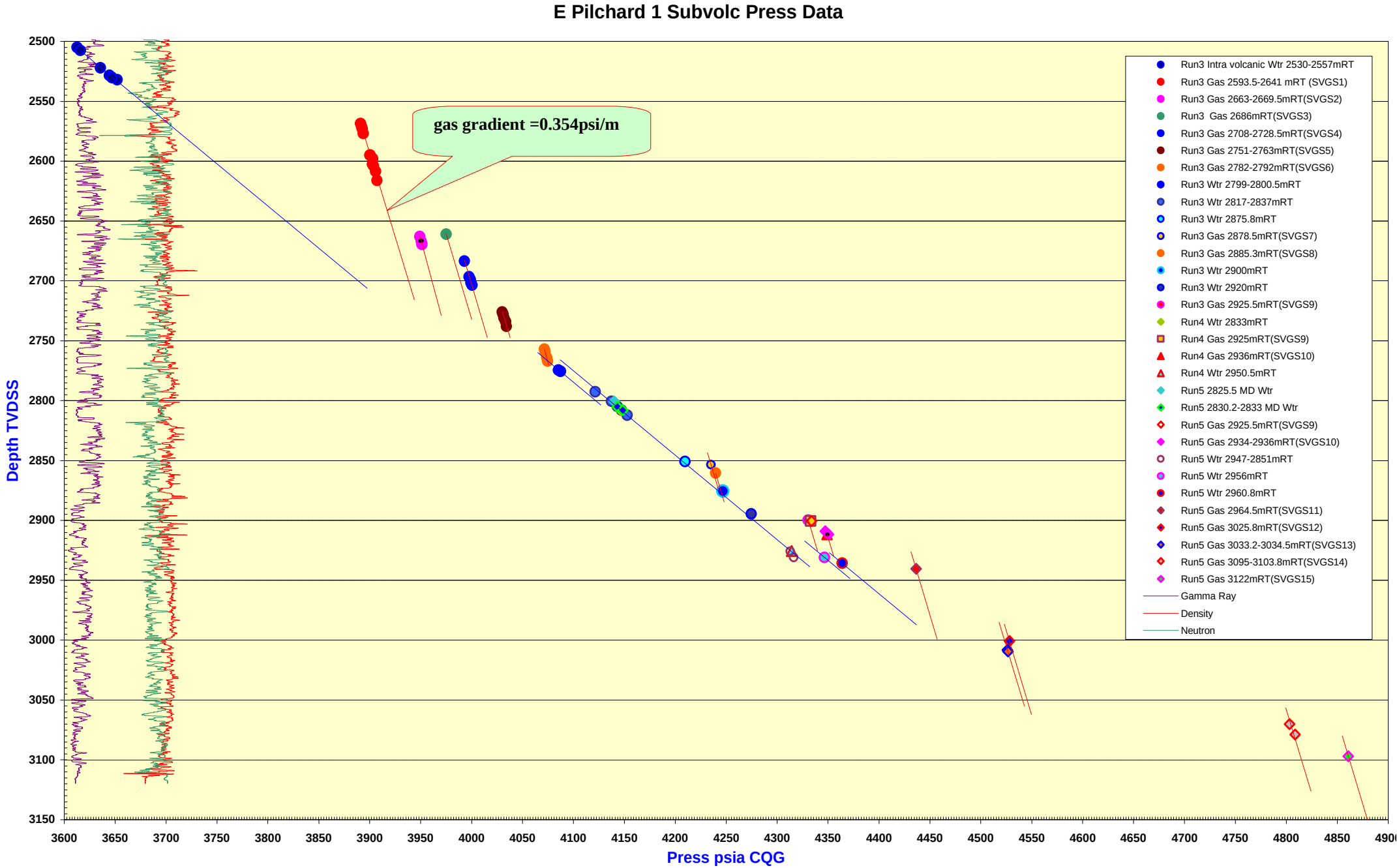

E Pilchard 1 Top Porosity- Base First Subvolcanic Gas Sand Pressure Plot
Depth TVDss
Press psia CQG
1600
1800
2000
2200
2400
2600
2800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
water gradient=1.45psi/m
Volcanic Layer 1
Volcanic Layer 3
Run 3 Wtr 1689 -2212mRT
Run 3 Wtr 2305mRTr
Run 3 Wtr 2345mRT
Run 3 Wtr 2377mRT
Run 3 Wtr 2390-2413mRT
Run 3 Intra-volcanic Wtr 2530-2557mRT
Run 3 Gas 2593.5-2641mRT(SVG1)

Fig. 2.1


E Pilchard 1 Subvolc Press Data
gas gradient =0.354psi/m
Depth TVDSS
Press psia CQG
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2550
2600
2650
2700
2750
2800
2850
2900
2950
3000
3050
3100
3150
3600
3650
3700
3750
3800
3850
3900
3950
4000
4050
4100
4150
4200
4250
4300
4350
4400
4450
4500
4550
4600
4650
4700
4750
4800
4850
Run3 Intra volcanic Wtr 2530-2557mRT
Run3 Gas 2593.5-2641 mRT (SVGS1)
Run3 Gas 2663-2669.5mRT(SVGS2)
Run3 Gas 2686mRT(SVGS3)
Run3 Gas 2708-2728.5mRT(SVGS4)
Run3 Gas 2751-2763mRT(SVGS5)
Run3 Gas 2782-2792mRT(SVGS6)
Run3 Wtr 2799-2800.5mRT
Run3 Wtr 2817-2837mRT
Run3 Wtr 2875.8mRT
Run3 Gas 2878.5mRT(SVGS7)
Run3 Gas 2885.3mRT(SVGS8)
Run3 Wtr 2900mRT
Run3 Wtr 2920mRT
Run3 Gas 2925.5mRT(SVGS9)
Run4 Wtr 2833mRT
Run4 Gas 2925mRT(SVGS9)
Run4 Gas 2936mRT(SVGS10)
Run4 Wtr 2950.5mRT
Run5 2825.5 MD Wtr
Run5 2830.2-2833 MD Wtr
Run5 Gas 2925.5mRT(SVGS9)
Run5 Gas 2934-2936mRT(SVGS10)
Run5 Wtr 2947-2851mRT
Run5 Wtr 2956mRT
Run5 Wtr 2960.8mRT
Run5 Gas 2964.5mRT(SVGS11)
Run5 Gas 3025.8mRT(SVGS12)
Run5 Gas 3033.2-3034.5mRT(SVGS13)
Run5 Gas 3095-3103.8mRT(SVGS14)
Run5 Gas 3122mRT(SVGS15)
Gamma Ray
Density
Neutron

Fig. 2.2

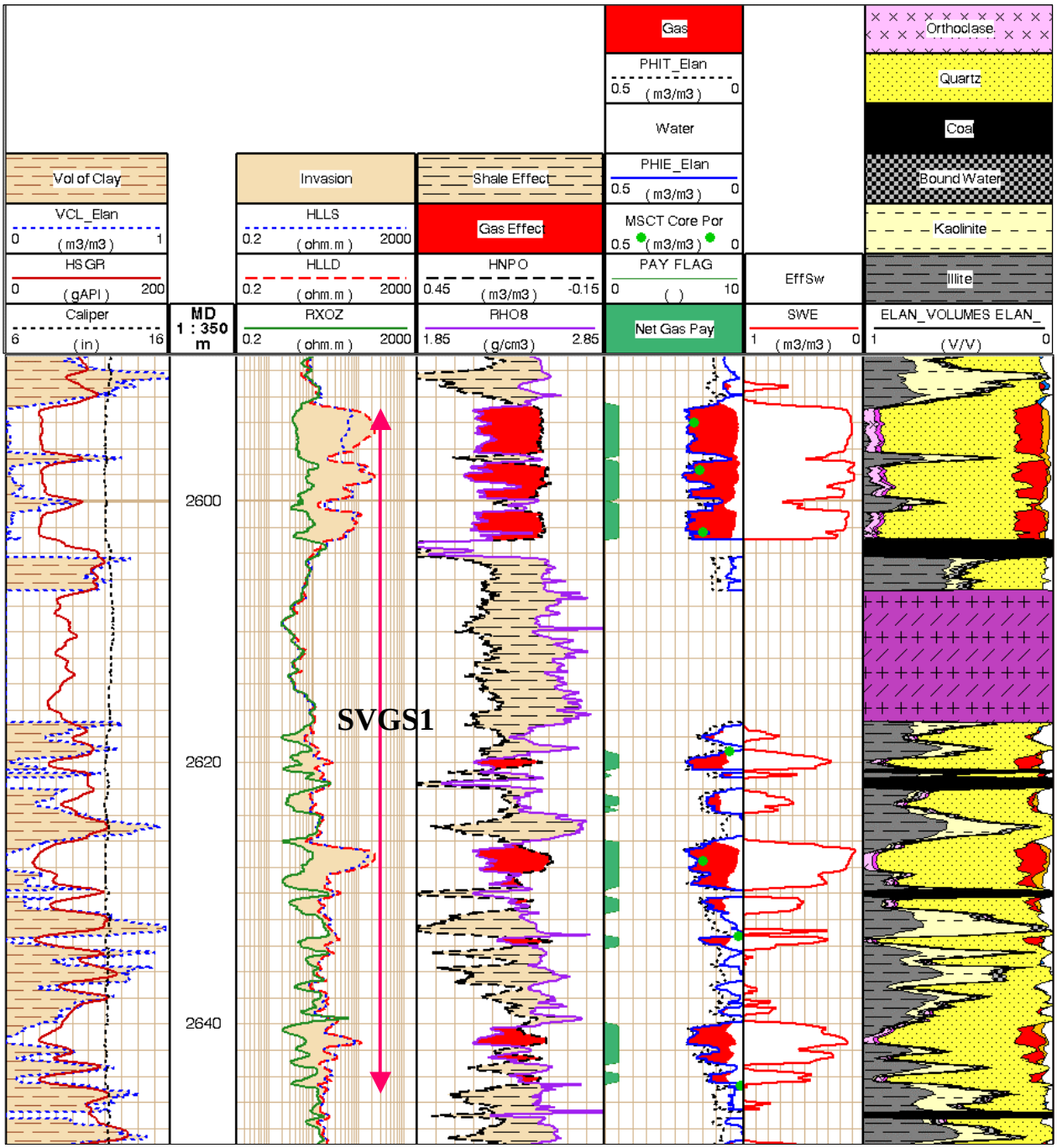


Fig. 2.3

The gas gradient of SVGS1 calculated from the pressure data is 0.354psi/m (0.108psi/ft). Subvolcanic gas system 2 or SVGS2 as shown in Fig.2.4 extends from 2661.2mRT(2636mSS) to 2670.5mRT(2645.5mSS). Its gas gradient is almost the same as SVGS1. SVGS3 is represented by a thin gas sand the extends from 2684.9 - 2686.6mRT (Fig.2.4).

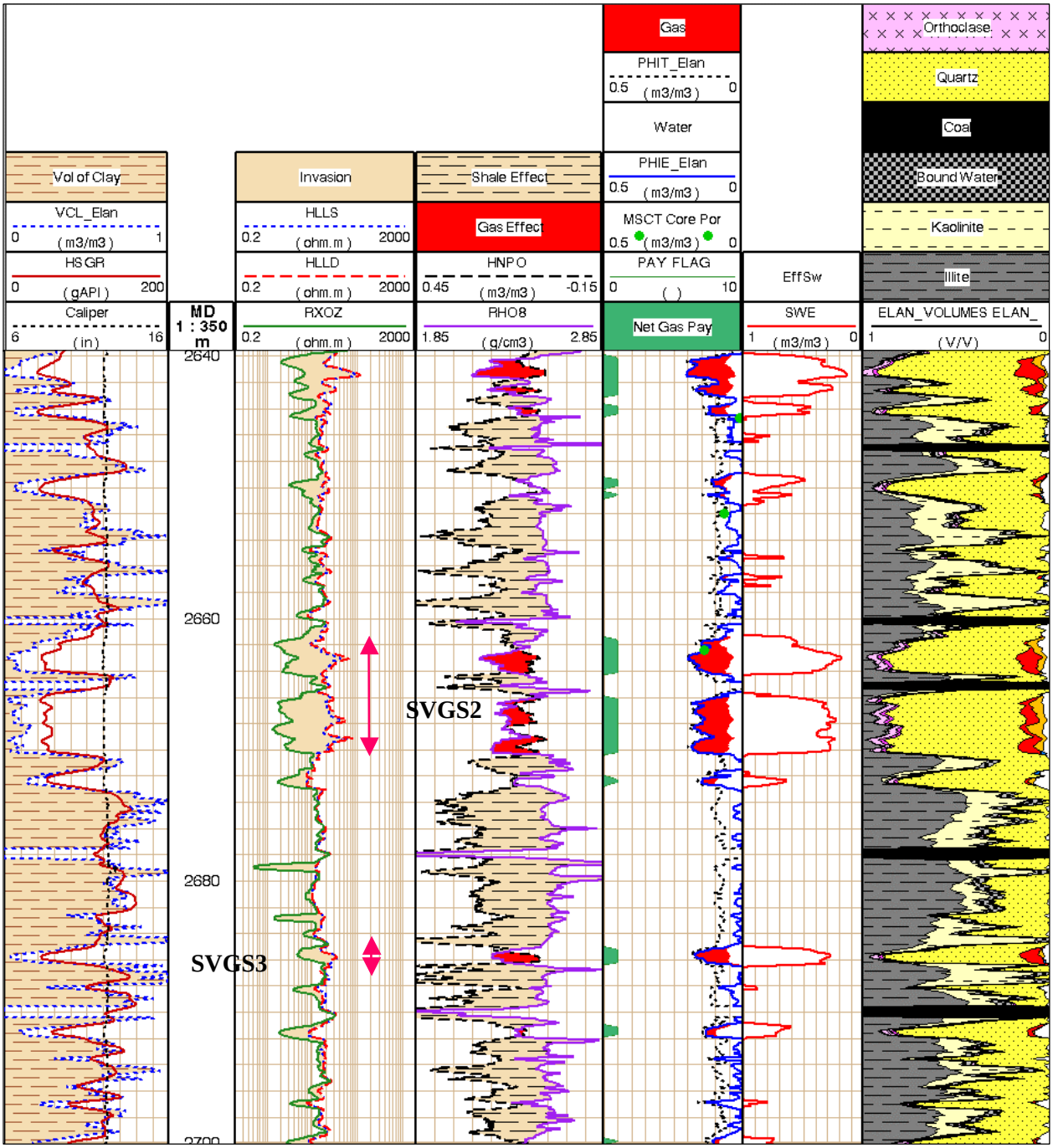


Fig. 2.4

The gas sands that belong to SVGS4 extend from 2708.9mRT to 2729.3mRT (Fig.2.5). The apparent gas gradient is very similar to that of SVGS1.

The gas sands in the intervals 2747.7 - 2765.1mRT and 2780.7 - 2793.0mRT (Fig.2.6) are clearly in separate systems and are designated as SVGS5 and SVGS6 respectively. The first water sand occurs 5m below the sand that belong to SVGS6 (Fig.2.6). The pressure data suggest that a gas-water contact for this sand lies close to the base of sand (+/-2794mRT).

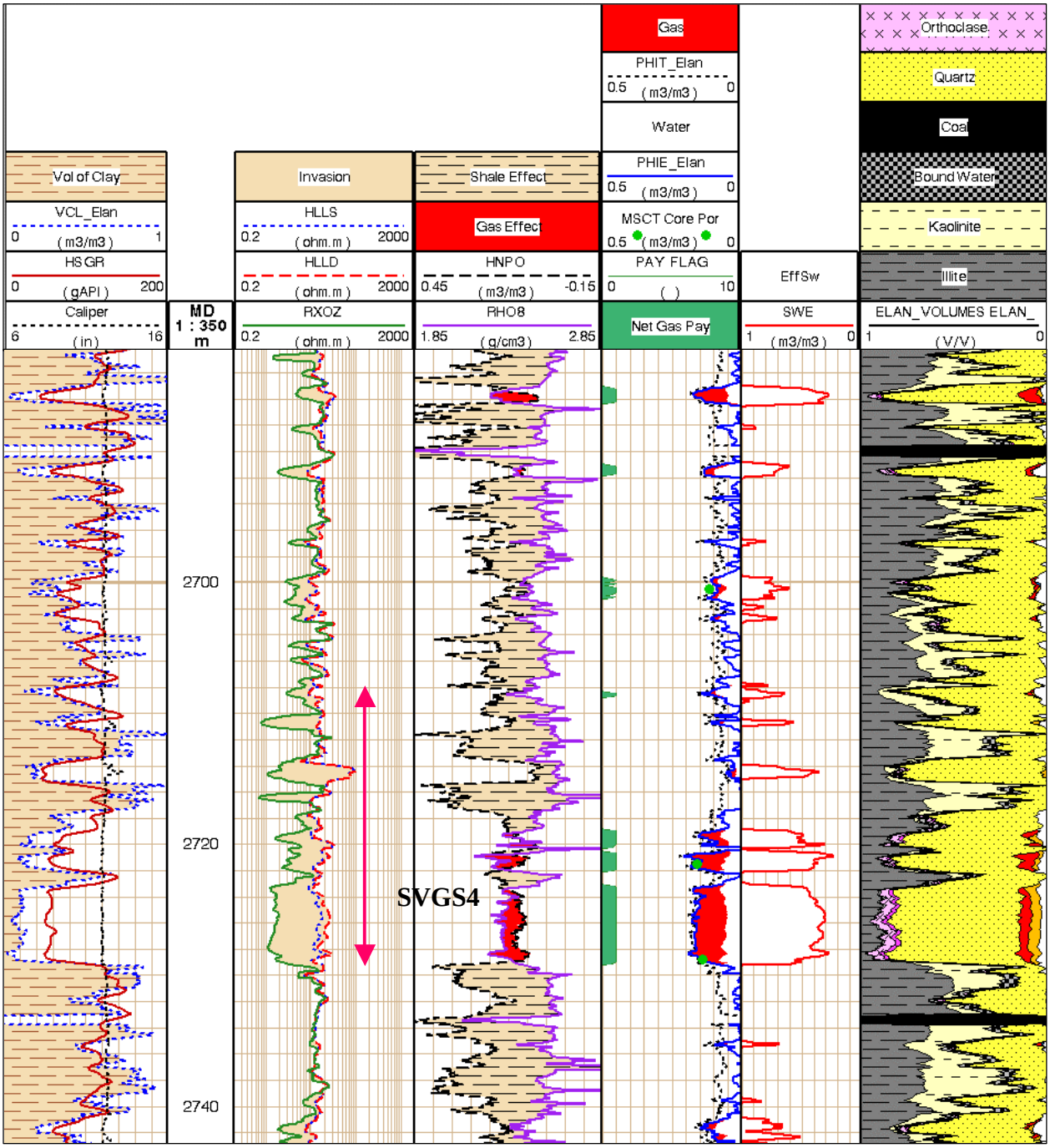
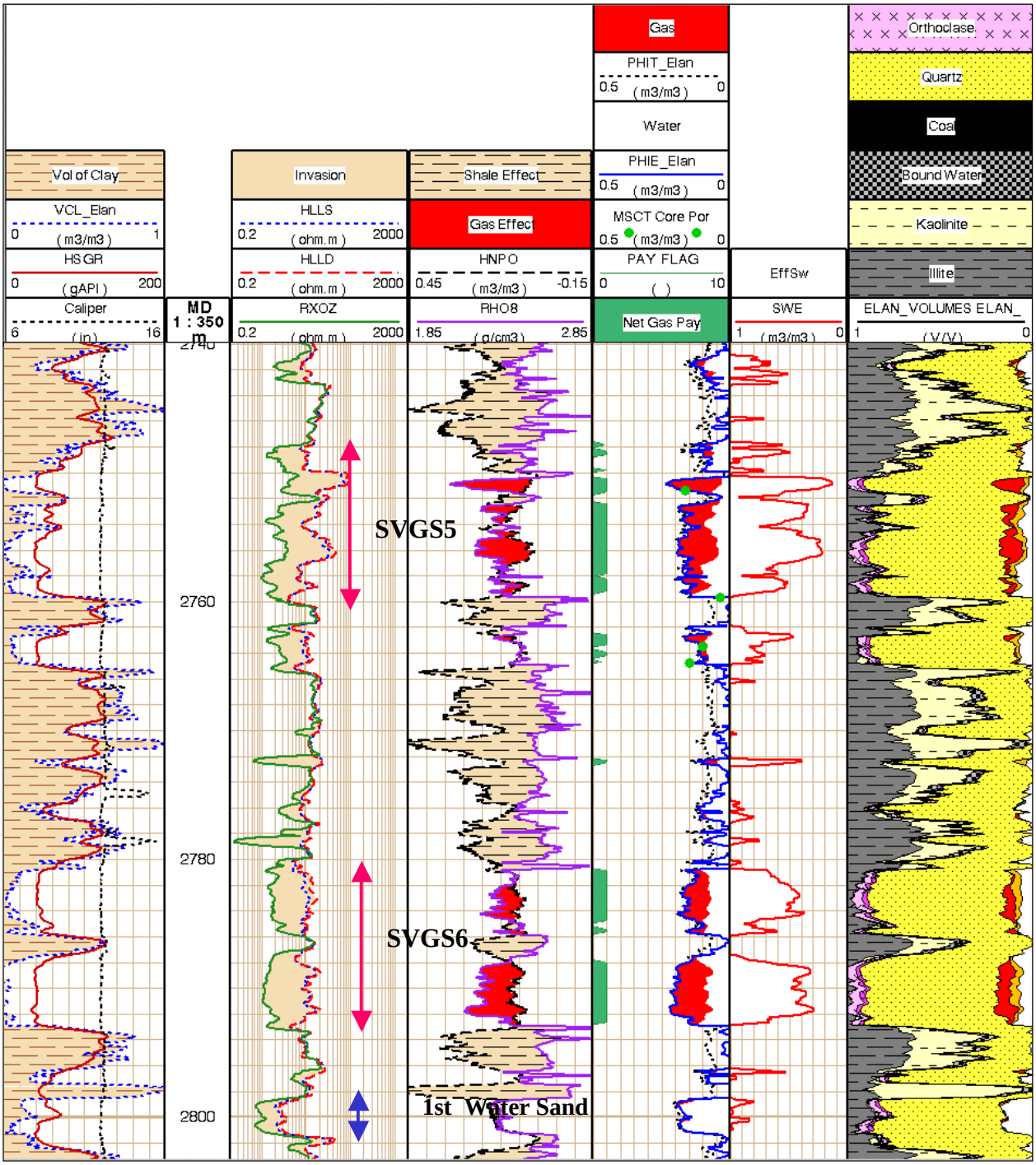


Fig. 2.5

Four gas bearing sands occur in the interval 2816.8mRT to 2953mRT (Fig. 2.7) which is predominantly water bearing. The pressure data indicates that the water bearing sands in this interval belong to one pressure system with the top seal being the shale at 2802 - 2816mRT and the base seal being a thin shale at 2953.5 - 2955.1mRT. The indication from the pressure data is that the two thin gas sands that extend from 2877.7mRT to 2879.1mRT ((SVGS7) and 2885.0mRT to 2885.6mRT (SVGS8) probably have small gas columns. It is also possible they could be in one pressure system given the similar pressure values.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Water
PHIE_Elan
0.5 (m3/m3) 0
MSCT Core Por
0.5 (m3/m3) 0
Orthoclase
Quartz
Coal
Bound Water
Kaolinite
Illite
Vol of Clay
VCL_Elan
0 (m3/m3) 1
HSGR
0 (gAPI) 200
Caliper
6 (in) 16
MD
1 : 350
m
Invasion
HLLS
0.2 (ohm.m) 2000
HLLD
0.2 (ohm.m) 2000
RXOZ
0.2 (ohm.m) 2000
Shale Effect
Gas Effect
HNPO
0.45 (m3/m3) -0.15
RHOB
1.85 (g/cm3) 2.85
PAY FLAG
0 ( ) 10
Net Gas Pay
EffSw
SWE
1 (m3/m3) 0
ELAN_VOLUMES ELAN_
1 (V/V) 0
2740
2760
2780
2800
SVGS5
SVGS6
1st Water Sand

Fig. 2.6

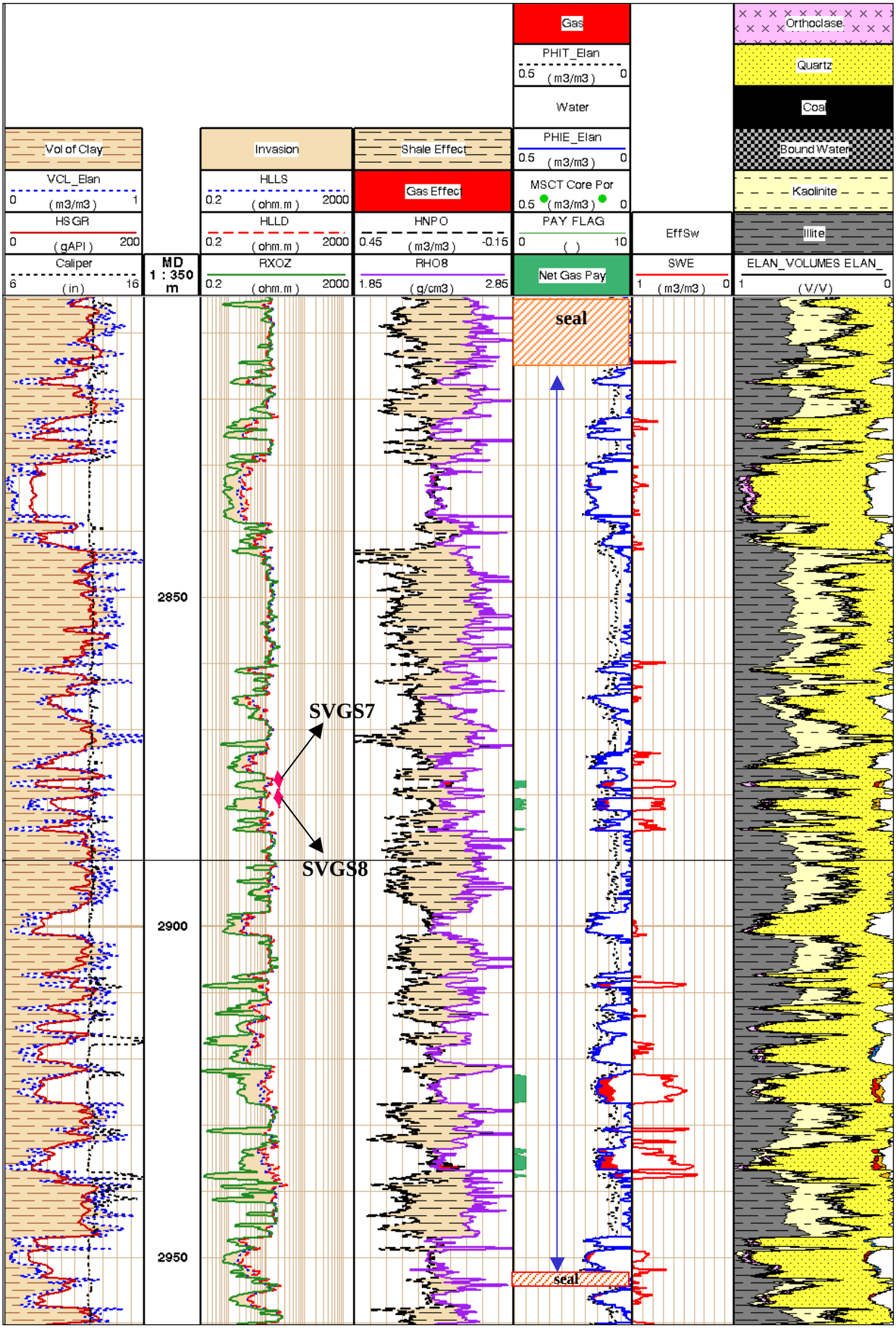

Vol of Clay
VCL_Elan
0 (m3/m3) 1
HSGR
0 (gAPI) 200
Caliper
6 (in) 16
MD
1 : 350
m
Invasion
HLLS
0.2 (ohm.m) 2000
HLLD
0.2 (ohm.m) 2000
RXOZ
0.2 (ohm.m) 2000
Shale Effect
Gas Effect
HNPO
0.45 (m3/m3) -0.15
RHOB
1.85 (g/cm3) 2.85
Gas
PHIT_Elan
0.5 (m3/m3) 0
Water
PHIE_Elan
0.5 (m3/m3) 0
MSCT Core Por
0.5 (m3/m3) 0
PAY FLAG
0 ( ) 10
Net Gas Pay
EffSw
SWE
1 (m3/m3) 0
Orthoclase
Quartz
Coal
Bound Water
Kaolinite
Illite
ELAN_VOLUMES ELAN_
1 (V/V) 0
2850
2900
2950
SVGS7
SVGS8
seal
seal

Fig. 2.7

The other two gas sands from 2922.4mRT to 2926.9mRT (SVGS9) and 2933.5mRT to 2937mRT (SVGS10) (Fig. 2.8) are clearly in separate systems. The only perplexing factor about these sands is determining as to which aquifer system underlies them. Log data would suggest that these sands are likely to be associated with the 2818.8-2953mRT aquifer system because of the water sand at 2947 - 2953mRT. The pressure data on the other hand suggests that they could be associated with the aquifers represented by the water sands, 2955.1mRT to 2957.4mRT and 2959.9mRT to 2961.8mRT. Below 2960mRT at least 5 gas systems have been identified and these are illustrated in Fig.2.8, Fig. 2.9, and Fig. 2.10. It is likely there are more systems but because of the poor quality of the reservoirs it was not possible to define them (tight MDT pressure tests).

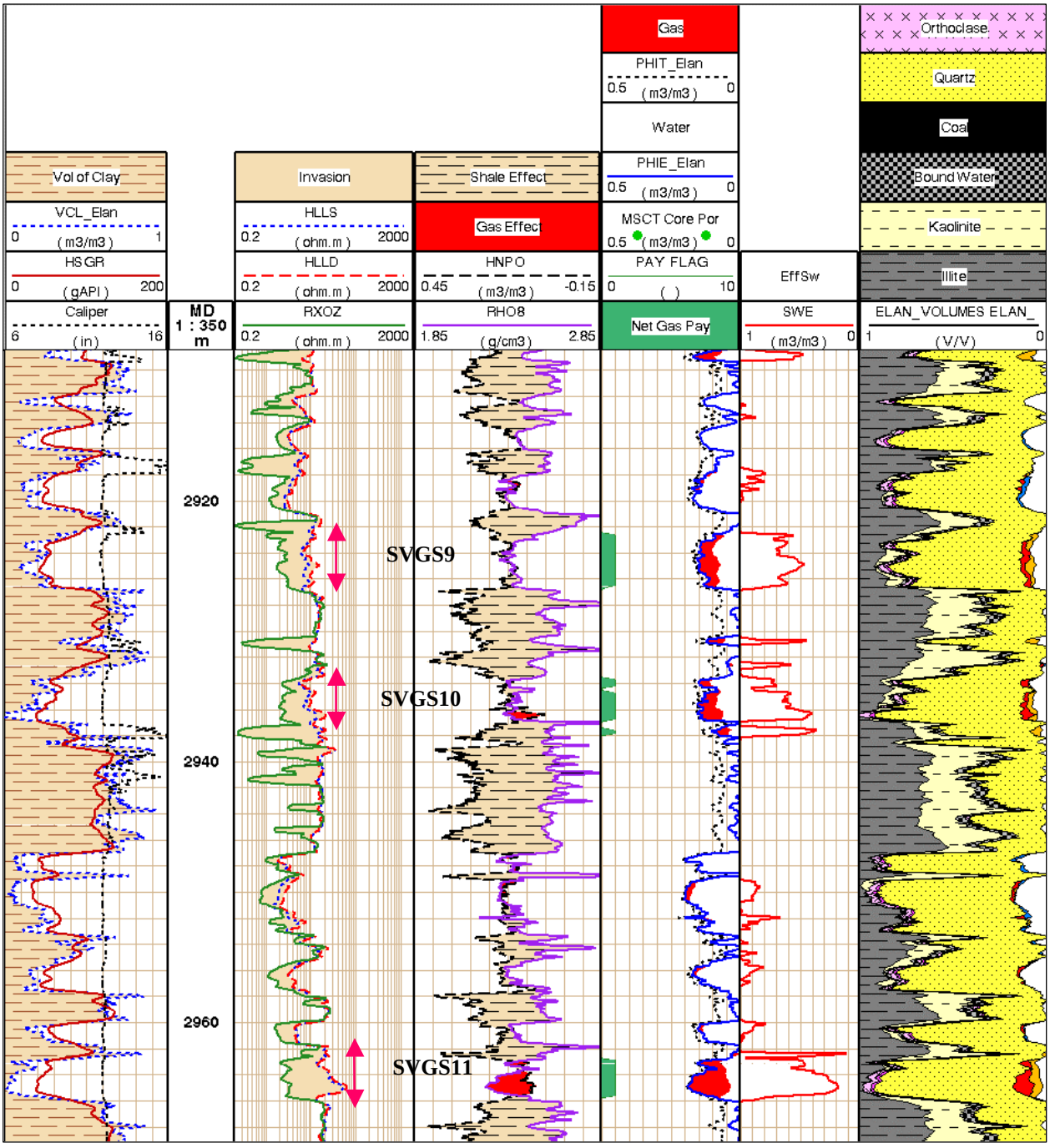
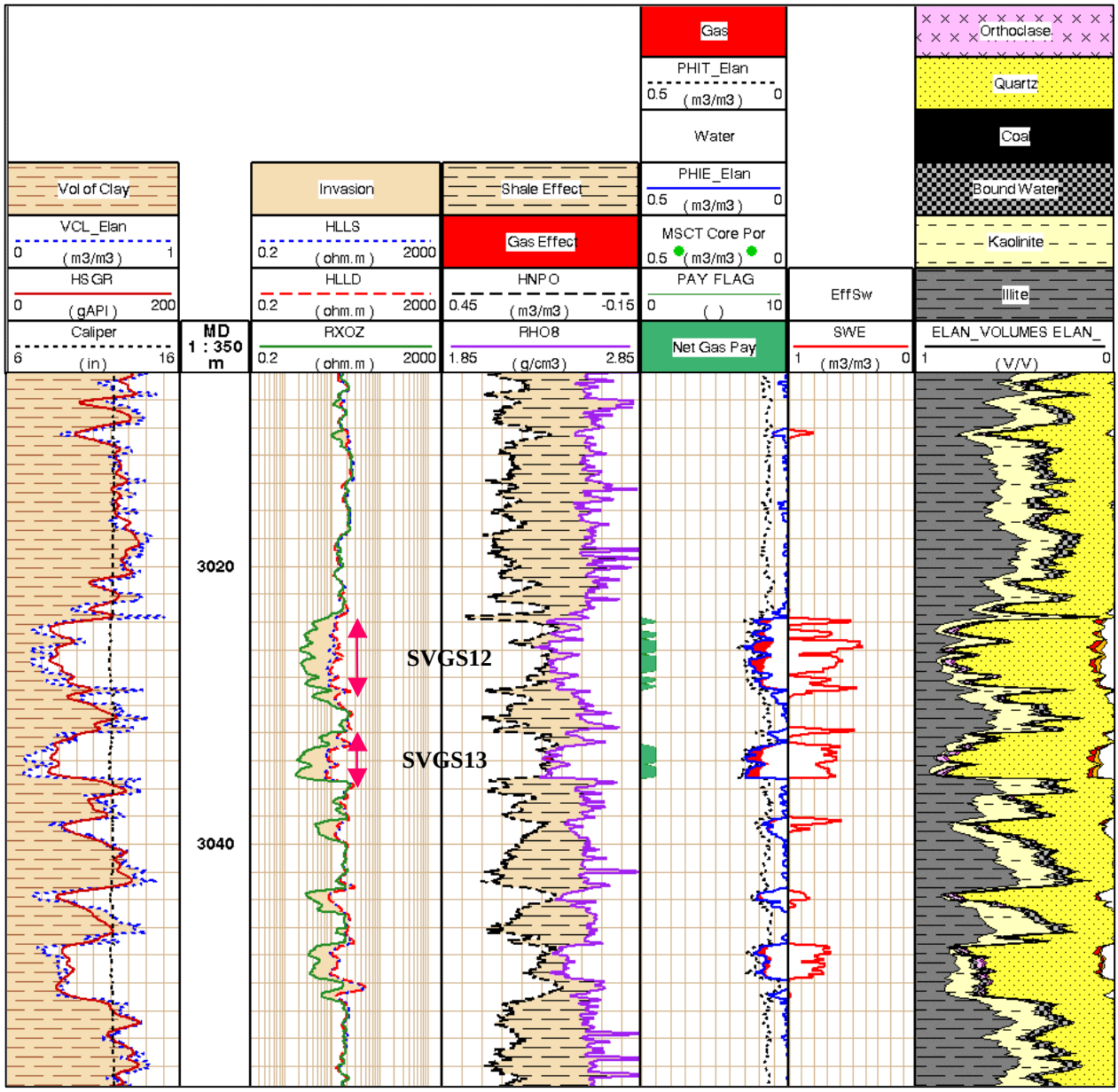


Fig. 2.8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Water
PHIE_Elan
0.5 (m3/m3) 0
MSCT Core Por
0.5 (m3/m3) 0
PAY FLAG
0 ( ) 10
Net Gas Pay
EffSw
SWE
1 (m3/m3) 0
Orthoclase
Quartz
Coal
Bound Water
Kaolinite
Illite
ELAN_VOLUMES ELAN_
1 (V/V) 0
Vol of Clay
VCL_Elan
0 (m3/m3) 1
HSGR
0 (gAPI) 200
Caliper
6 (in) 16
Invasion
HLLS
0.2 (ohm.m) 2000
HLLD
0.2 (ohm.m) 2000
RXOZ
0.2 (ohm.m) 2000
Shale Effect
Gas Effect
HNPO
0.45 (m3/m3) -0.15
RHOB
1.85 (g/cm3) 2.85
MD
1 : 350
m
3020
3040
SVGS12
SVGS13

Fig. 2.9

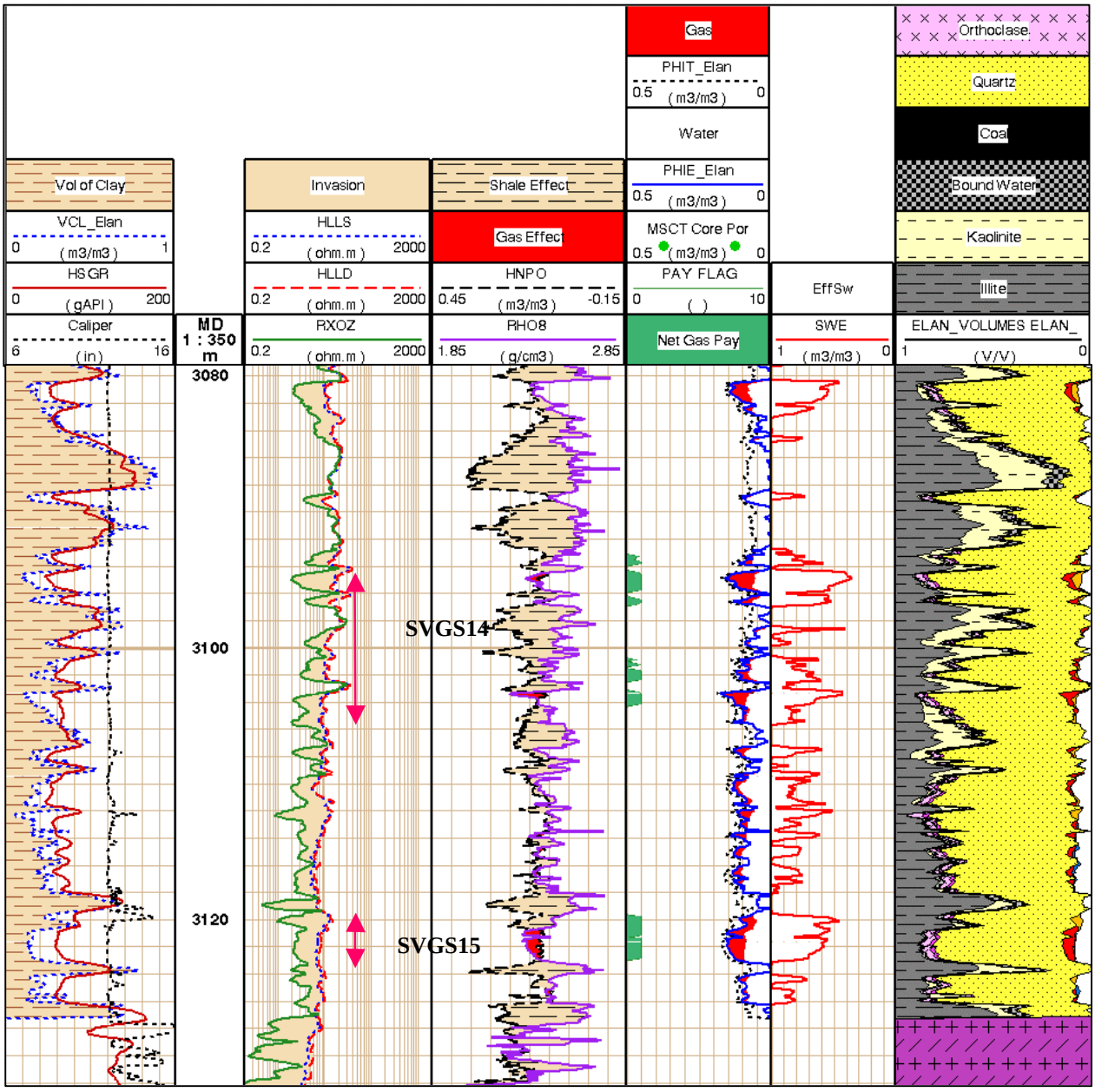
Vol of Clay
VCL_Elan
0 (m3/m3) 1
HSGR
0 (gAPI) 200
Caliper
6 (in) 16
MD
1 : 350
m
Invasion
HLLS
0.2 (ohm.m) 2000
HLLD
0.2 (ohm.m) 2000
RXOZ
0.2 (ohm.m) 2000
Shale Effect
Gas Effect
HNPO
0.45 (m3/m3) -0.15
RHOB
1.85 (g/cm3) 2.85
Gas
PHIT_Elan
0.5 (m3/m3) 0
Water
PHIE_Elan
0.5 (m3/m3) 0
MSCT Core Por
0.5 (m3/m3) 0
PAY FLAG
0 ( ) 10
Net Gas Pay
EffSw
SWE
1 (m3/m3) 0
Orthoclase
Quartz
Coal
Bound Water
Kaolinite
Illite
ELAN_VOLUMES ELAN_
1 (V/V) 0
3080
3100
3120
SVGS14
SVGS15

Fig. 2.10

3.0 Fluid Sampling and Composition

A total of 22 gas samples were attempted at 15 depth points (Table 3.1) with 20 successful recoveries. The samples were taken using a combination of 1-gallon chambers and two multi-sample modules (MRMS). 10 of the samples were analysed at the rigsite for gas composition by ACS Laboratories during the transfer of the gas samples from the MDT chambers to the ACS cylinders. The results are listed in Table 3.2. The samples were then shipped to Petrolab (PVT lab) where another gas composition analysis was carried out. The results are presented in Table 3.3. Both analyses indicate that the gas composition from all the sands is very similar. The carbon dioxide content varies from about 11% to 22% (laboratory analysis). The only unusual feature of the compositional analysis is the fact that the sample from 2925.5mRT showed a carbon dioxide content of 49% by rigsite analysis and only 21% by laboratory analysis. ACS indicated that they performed the analysis by two methods and both gave the same results. No credible explanation is offered for this discrepancy at this stage. Final gas composition of the gas samples is to be determined with PVT analysis, which will be carried out in the near future.

Sampling & Transfer Details				Sampling Conditions		Field Opening Conditions		
Sample Number	Sampling Depth (m RT)	Down Hole Tool Number	ACS Cylinder Number	Pressure (psia)	Temperature (°C)	Pressure (psia)	Temperature (°C)	Free Water Volume (cc's)
1	2925.5	MRSC-BB-090	817398	4329.0	112.4	3415	20	310
2	2593.5	MRSC-BB-119	817397	3891.6	88.4	3855	14	0
-	2593.5	MPSR-0157	N/A	3891.6	88.4	3990	14	N/A
-	2596.0	MPSR-0193	N/A	3892.2	94.2	4015	14	N/A
3	2627.5	MPSR-0501	817395	3907.1	95.5	3965	14	5
-	2627.5	MPSR-0123	N/A	3907.1	95.5		Tool Empty	
5	2667.5	MPSR-0503	817393	3950.8	101.9	3315	13	50
6	2728.5	MPSR-0487	TS-39-18	3999.9	104.5	2615	13	Water Sample
7	2728.5	MRSC-BB-105	817394	3999.9	104.5	3415	13	N/A
8	2756.0	MPSR-0478	TS-33-09	4031.7	105.3	3315	13	0
9	2792.0	MPSR-0477	817396	4074.6	107.2	3415	13	15
-	2627.5	MPSR-0122	N/A	3902.6	95.5	3215	13	N/A
-	2641.0	MPSR-0156	N/A	3906.8	99.9	3265	13	N/A
-	2792.0	MPSR-0187	N/A	4069.9	107.2	3425	13	N/A
-	2965.5	MPSR-0123	TS-24711	4436.5	114.3	2265	13	0
-	2965.5	MPSR-0477	TS-24713	4436.5	114.3	3015	13	0
-	3095.0	MPSR-0186	TS-23-05	4803.1	120.8	2925	13	80
-	3095.0	MPSR-0497	N/A	4803.1	120.8		Tool Empty	
-	3103.8	MPSR-0192	TS-24409	4808.4	120.3	2965	13	0
-	3103.8	MPSR-0479	TS-23804	4804.4	120.3	3015	13	0
-	3122.0	MPSR-0494	TS-27-07	4860.8	121.8	2865	13	0
-	3122.0	MPSR-0485	TS-24410	4860.8	121.8	2815	13	0

Table 3.1

Gas Compositon in Mol %										
Sampling Depth mRT	2593.5	2627.5	2667.5	2728.5	2792.0	2925.5	2965.5	3095.0	3103.8	3122.0
Hydrogen Sulphide	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carbon Dioxide	9.49	12.57	16.00	15.82	16.40	49.60	15.17	14.79	15.77	13.50
Nitrogen	2.35	2.29	2.10	2.31	2.20	0.49	2.84	3.02	2.59	2.57
Methane	76.82	74.98	71.91	72.24	72.21	45.72	71.97	73.95	73.10	75.06
Ethane	6.01	5.55	5.52	5.48	5.20	2.29	5.26	4.92	4.99	5.20
Propane	3.03	2.65	2.65	2.53	2.37	1.11	2.74	2.02	2.14	2.23
iso-Butane	0.52	0.45	0.41	0.38	0.38	0.19	0.65	0.31	0.32	0.33
n-Butane	0.89	0.73	0.68	0.64	0.60	0.26	0.74	0.51	0.56	0.58
iso-Pentane	0.30	0.25	0.23	0.20	0.20	0.10	0.27	0.16	0.18	0.18
n-Pentane	0.31	0.26	0.24	0.21	0.20	0.10	0.19	0.16	0.18	0.18
Hexanes	0.14	0.12	0.11	0.09	0.10	0.06	0.08	0.07	0.08	0.08
Heptanes	0.10	0.10	0.09	0.06	0.08	0.05	0.06	0.06	0.06	0.06
Octanes plus	0.04	0.05	0.06	0.04	0.06	0.03	0.03	0.03	0.03	0.03
Total	100	100	100	100	100	100	100	100	100	100

Table 3.2 ACS Analysis

Gas Composition in Mol%																				
Depth mRT	2593.50	2593.50	2596.00	2627.50	2627.50	2641.00	2667.50	2728.50	2756.00	2756.00	2792.00	2792.00	2925.50	2965.50	2965.50	3095.00	3103.80	3103.80	3122.00	3122.00
Hydrogen Sulphide	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carbon Dioxide	13.06	11.18	13.27	17.45	14.74	16.17	20.41	17.94	17.60	22.02	22.11	19.12	21.47	16.50	19.10	16.22	19.79	16.71	16.82	14.29
Nitrogen	0.20	0.19	0.21	0.17	0.17	0.15	0.16	0.20	0.15	0.13	0.13	0.18	0.14	0.14	0.15	0.13	0.22	0.15	0.17	0.17
Methane	71.67	73.62	71.34	70.03	71.82	71.90	66.65	69.84	71.20	65.71	66.08	69.60	65.87	70.94	68.92	72.57	69.55	72.07	72.90	74.13
Ethane	6.34	6.47	6.34	5.43	5.84	5.49	5.54	5.58	5.65	5.45	5.23	5.39	5.52	5.35	5.22	5.16	4.94	5.18	5.11	5.22
Propane	3.18	3.11	3.02	2.12	2.76	2.11	2.30	2.39	2.34	2.32	1.94	2.14	2.30	2.76	2.64	2.00	1.87	1.93	2.01	2.02
Iso-Butane	0.61	0.45	0.47	0.38	0.45	0.45	0.32	0.42	0.42	0.41	0.38	0.39	0.49	0.76	0.68	0.28	0.30	0.34	0.32	0.36
N-Butane	1.02	0.99	0.97	0.86	0.78	0.77	0.64	0.66	0.74	0.71	0.62	0.63	0.79	0.80	0.77	0.55	0.59	0.68	0.63	0.68
Iso-Pentane	0.35	0.34	0.34	0.29	0.26	0.24	0.21	0.21	0.24	0.23	0.20	0.20	0.28	0.33	0.32	0.18	0.19	0.21	0.19	0.21
N-Pentane	0.37	0.35	0.36	0.30	0.26	0.23	0.21	0.22	0.25	0.24	0.21	0.20	0.26	0.23	0.22	0.19	0.20	0.22	0.20	0.23
Hexanes	0.55	0.55	0.92	0.48	0.43	0.37	0.36	0.37	0.36	0.38	0.36	0.32	0.40	0.40	0.37	0.33	0.30	0.33	0.28	0.36
Heptanes	0.94	0.97	1.03	0.94	0.84	0.73	0.98	0.78	0.57	0.77	0.82	0.64	0.81	0.72	0.64	0.78	0.66	0.75	0.54	0.79
Octanes	0.53	0.55	0.70	0.58	0.52	0.47	0.64	0.49	0.29	0.53	0.60	0.41	0.50	0.35	0.30	0.62	0.47	0.53	0.34	0.55
Nonanes	0.46	0.46	0.37	0.49	0.44	0.35	0.68	0.38	0.14	0.43	0.48	0.32	0.45	0.25	0.22	0.50	0.38	0.42	0.27	0.44
Decanes	0.22	0.23	0.20	0.23	0.21	0.15	0.27	0.20	0.04	0.22	0.24	0.12	0.23	0.13	0.16	0.20	0.16	0.17	0.11	0.21
Undecanes	0.11	0.12	0.11	0.11	0.11	0.08	0.14	0.10	0.01	0.10	0.14	0.06	0.12	0.07	0.08	0.07	0.07	0.09	0.03	0.09
C12+	0.39	0.42	0.35	0.14	0.37	0.34	0.49	0.22	0.00	0.35	0.46	0.28	0.37	0.27	0.21	0.22	0.31	0.22	0.08	0.25
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 3.3 Petrolab Analysis