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EAST PILCHARD 1

QUANTITATIVE PETROPHYSICAL INTERPRETATION

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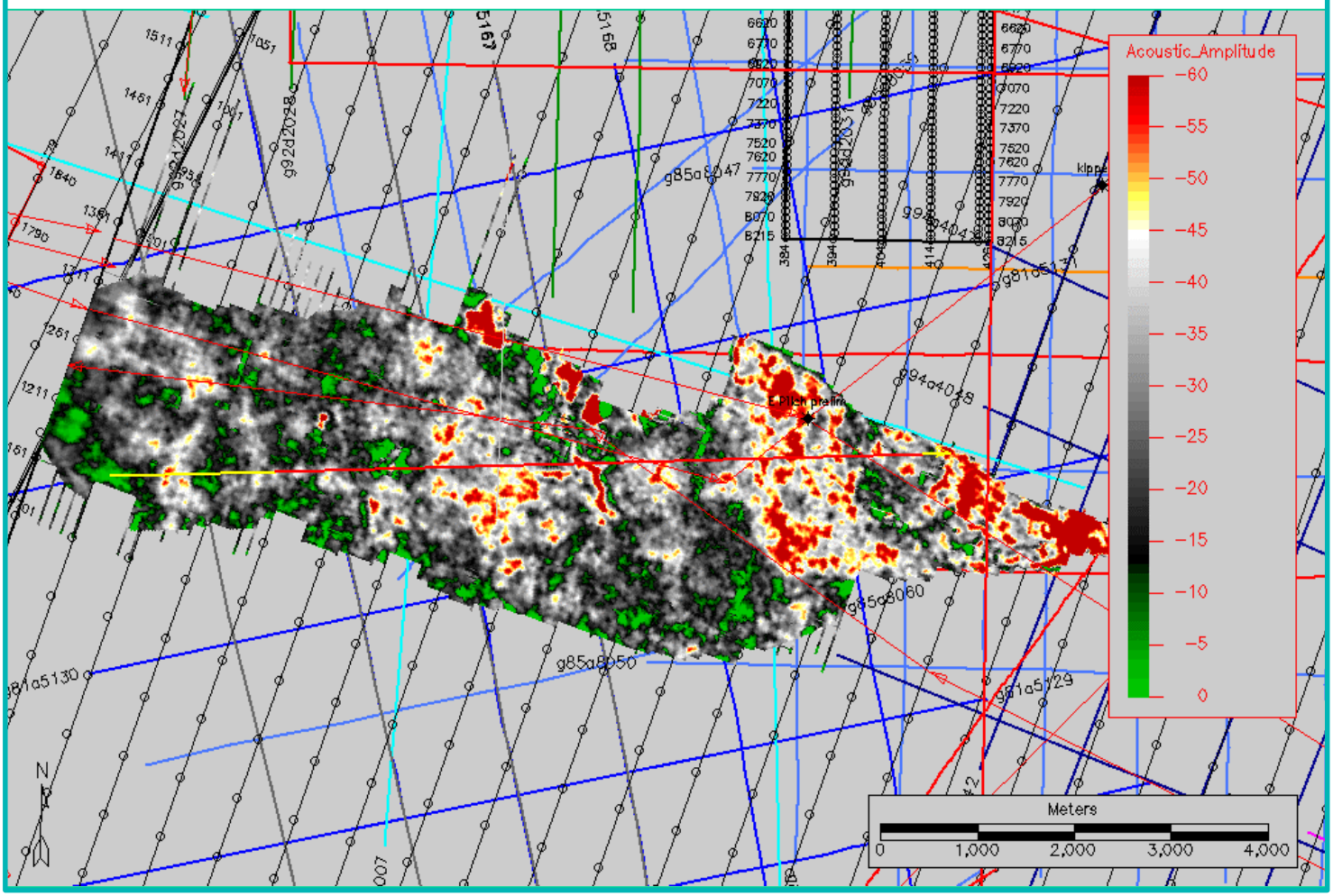

SUMMARY

East Pilchard 1 was drilled as an exploration well in VIC/L9 licence area of the Gippsland Basin. It was drilled to test the hydrocarbon potential of the fluvial reservoirs of the sub-volcanic Golden Beach Group in a fault dependent closure in the Pilchard fault block. The well found water bearing reservoirs between the top of porosity at 1687mRT and 2558mRT and several gas bearing sands in the interval 2592 - 3126.5mRT. The gas-bearing interval could be broadly divided into 3 main zones.

The reservoirs in the upper zone from 2592mRT to 2793mRT are all gas bearing and are probably the best of the three zones from a reservoir quality standpoint. The average effective porosity of the sandstones in this zone ranges from 12 to 16% and with permeabilities up to 2900md. The average effective water saturation ranges from 22% to 75%. The pressure data indicates that there are at least 6 separate fluid systems in this zone. However, there are no observable fluid contacts within the sandstone intervals.

The middle zone, which extends from 2798mRT to 2966mRT, is predominantly water bearing with three gas bearing intervals. The gas bearing sandstones reservoirs are generally thin with average effective porosities ranging from 12% to 15% and high effective water saturations (37% to 73%). The pressure data indicates that the gas sands are in separate fluid systems.

The bottom zone extends from 3023mRT to 3126.5mRT and all the sandstones reservoirs in this zone are interpreted to be gas bearing. The reservoir quality of these reservoirs is the poorest of the three zones as indicated by numerous tight MDT pressure tests. Average effective porosity and water saturation ranges from 9% to 13% and 51% to 88% respectively. Pressure data indicate that the gas sands appear to be in separate fluid systems.

An effective porosity cut-off of 8% was used to determine net porous intervals in the interval 2592 mRT to 3126.5 mRT. Net gas pay was then determined using a combination of volume of clay and MDT pressure testing results. The total net gas pay in East Pilchard 1 is estimated to be **100.7m**. The contribution to this net pay from the three zones is as follows:

Interval (m)	Net Pay (m)	% of Total Pay
2592 - 2793	68.9	68
2798 - 2966	13.9	14
3023 - 3126.5	17.9	18

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1.0 Introduction

1.1 General

East Pilchard 1 was drilled as an exploration well in VIC/L9 licence area of the Gippsland Basin (Fig 1.1). It was drilled to evaluate the hydrocarbon potential of the fluvial reservoirs of the sub-volcanic Golden Beach Group in a fault dependent closure in the Pilchard fault block. The well was spudded on the 3^{trd} of July 2001, drilled to a total depth of 3138 mRT (Driller) 3140.6 mRT (Logger) and cased and suspended as a future gas producer. 2000. The primary objective of this quantitative petrophysical interpretation was to evaluate the reservoirs for porosity, water saturation and net pay.

Note: All depths quoted in this report are logged mRT unless otherwise specified

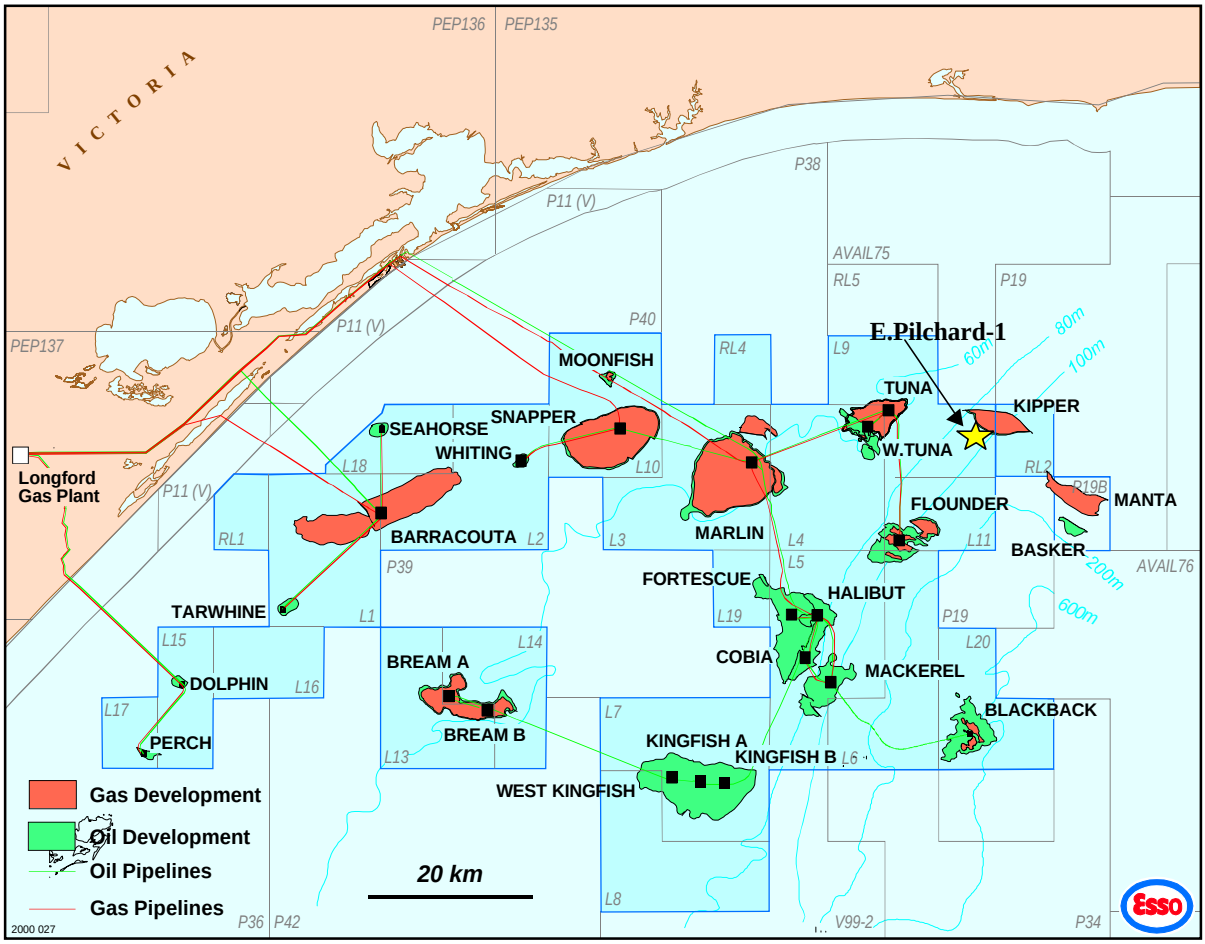


Fig 1.1 East Pilchard 1 Location Map

2.0 Data

2.2 Wireline Logs

The open hole logs run in the well are listed in Table 2.1.

Survey /Log	Company	Top (m RT)	Bottom (m RT)
Suite 1 Run at 2947.5m			
MWD Survey	Anadrill Schlumberger	146.11	2459.4
Multishot Survey	SDI	2488.3	2771.0
PEX-HALS-DSI-HNGS-LEHQT	Schlumberger	873.5	2945.2
MDT-GR-LEHQT	Schlumberger	1689.03	2926.5
FMI-HRLA-GR-LEHQT	Schlumberger	2220	2947.5
MDT-GR-LEHQT	Schlumberger	2593	2641
MDT-GR-LEHQT	Schlumberger	2641	2885.4
MSCT-GR_LEHQT	Schlumberger	2450	2878.5
Suite 2 Run at 3140m			
TLD-HGNS-HNGS	Schlumberger	3139	2870
HALS-HGNS-DSI-LEHQT	Schlumberger	3139	2870
MDT-GR-LEHQT	Schlumberger	2825.5	2956.2
DUAL CSAT-VSP	Schlumberger	3140	146
MDT-GR-LEHQT	Schlumberger	2825.5	3125.5
CST-GR	Schlumberger	3134	1650

Table 2.1 Summary of Wireline Logs

2.2.1 Logging Suite 1

The PEX density-neutron and GR logs were acquired in very high-resolution mode from 2947.5m to 1564m at 900ft/hr. Above this depth all logs were acquired in standard resolution mode. The DSI was run in P & S and Upper Dipole modes. The HRLA was run with the FMI in order to evaluate the tool for possible use in future exploration wells. While logging up with the PEX-HALS-DSI-HNGS from 2947.5m there were several buffer overloads and as a result the interval had to be logged in several sections. Two MDT runs were made, the first run was for pressures while the second was for fluid samples. A total of 25 MSCT samples were attempted with 20 successful recoveries.

2.2.2 Logging Suite 2

In order that density-neutron data could be obtained for the very bottom part of the hole the PEX-HALS-HNGS-DSI string was split and run separately. As was done in the first logging suite, the PEX-density-neutron and GR logs were obtained in very high-resolution mode and the DSI was run in P& S and Upper Dipole mode. Several technical problems were encountered with MDT run as part of this suite of logs. Details of the logging operations of both these suites are to be found in Appendix 3.

2.3 Log Quality

The overall data quality of the resistivity, density-neutron logs and the MDT pressure data is good. Except for ECGR there is general agreement between PEX GR (HGR, GR) and the HNGS derived GR (HSGR) below 1560m. Above this depth there is a significant difference between HSGR and HGR. This difference is due to the fact that the logging speed was increased from 1800 ft/hr to 3600 ft/hr above 1560m (HNGS data was not required above this depth per Esso's logging program). As for the DSI data, visual examination of the wellsite STC processed logs namely DT2R indicated that the dipole data was of acceptable quality. Subsequent Geoquest computer centre processing indicated that the dipole data was unusable (the error bars of the computed DT shear curve were well outside acceptable limits). Investigation of the problem by Schlumberger indicated that that the poor quality of the dipole data was due to the misorientation of the receivers in the DSI sonde. Hence, no usable shear data were derived from the dipole data. The only shear wave data available for this well comes from the monopole data and it is sporadic. The MSCT core depths had to be adjusted and this was done on the basis of the petrographic data and comparison of log derived porosity with measured MSCT core porosity data.

2.4 MSCT Core Analysis and Petrology

ACS Laboratories Pty. Ltd carried out the core analysis on 16 of the 20 MSCT cores. The measurements included porosity, permeability at ambient and overburden conditions and grain density. The results of the analysis are provided in Appendix 2. Petrographic and XRD analysis of small samples taken from the 16 MSCT cores were also carried out and results are presented in a separate report.

2.5. Data Processing

The PEX-HALS-HNGS-HRLA data from the two logging suites were spliced with Geoframe Petrophysics Welledit module. Because the suite 1 logs were obtained at two different logging speeds (900ft below 1560m and 3600ft/hr above) and were presented as separate runs there were all together two splices for each of the logs. The two splice points were at 1553m and 2902m. PRE-PLUS (Schlumberger's environmental corrections module in Geoframe Petrophysics) was run on one of the suites of logs before the logs were spliced. Comparison of the processed and the field logs indicated that there was only negligible difference between the two sets of data and therefore it was decided not to run PRE-PLUS on the remaining suite. All the resistivity logs (HLLD, HLLS, RXOZ, RXOI etc) were depth aligned to the high-resolution density log (RHO8).
The high-resolution density log (RHO8) was edited for washouts and in zones which were interpreted to be carbonaceous (values in these zones were set to values of adjacent true shales). Curves identifying coals (FLAG.COAL) and volcanics (FLAG.VOLC were also created. A temperature log was also created using the bottom hole and surface temperature data obtained from the PEX-HALS suites. This was used as one of the inputs for the quantitative interpretation.

3.0 Quantitative Interpretation

3.1 Methodology

Total porosity (PHIT), Effective Porosity (PHIE or PIGE), mineral volumes and fluid volumes were derived using Schlumberger's least square inversion program, ELAN+. The ELAN+ mineral model was constructed from the results of XRD analysis carried out on the 16 MSCT samples. The bulk rock XRD analysis as shown in Table 3.1 indicated that the

mineral composition of the reservoirs consists predominantly of quartz, clays (illite/micas and kaolinite), k-feldspars and plagioclase. Some samples contain siderite and ankerite. The petrographic analysis indicates that most of the clay appears to be dispersed.

Sample #	Depth (mRT)	Qtz	KF	PF	I/M	Ka	Sid	Ank
3	2594.0	91	3	2	2	2	-	-
4	2598.0	93	4	1	1	1	-	-
5	2602.0	90	4	1	1	4	-	-
7	2620.0	41	2	3	26	16	12	-
8	2627.5	90	1	2	2	4	1	-
9	2633.5	60	3	2	15	20	-	-
11	2644.0	56	5	2	10	10	17	-
12	2652.0	84	2	-	5	8	1	-
13	2663.0	87	2	1	4	5	-	1
15	2700.5	80	3	1	8	8	-	-
17	2721.5	91	2	-	4	3	-	-
18	2728.5	92	3	1	-	3	-	1
19	2751.0	91	4	-	1	4	-	-
21	2759.0	56	2	1	15	26	-	-
22	2763.0	88	3	1	-	4	-	4
23	2764.5	92	2	1	1	2	-	2

Qtz = quartz KF = K-feldspar PF = plagioclase I/M = illite/mica Ka = kaolinite Sid = siderite Ank = ankerite

Table 3.1 Bulk Rock XRD Analyses

The ELAN+ model and input parameters are described in Appendix 1

3.2 Fluid Saturations

ELAN+ uses the Dual Water saturation model for determining water saturations both in the invaded and uninvaded zones. However it does not output parameters such as *SWT* and *SWE* at the end of the processing. These have to be recomputed from the ELAN+ bulk fluid volume outputs per the equations shown below (equations 1 and 2)

$$SWT = \frac{VXBW + VUWA}{PHIT} \quad (1)$$

$$SWE = \frac{VUWA}{VUWA + VUGA} \quad (2)$$

where *VXBW* = Bulk Volume Clay Bound Water in the Invaded Zone, *VUWA*= Bulk Volume Free Water in the Uninvaded Zone ,*VUGA* = Bulk Volume Gas in the Uninvaded Zone, *PHIT* = Total Porosity

3.3 Results/Observations

The sandstone reservoirs in the interval 1687m - 2580m are all water bearing (Enclosure 1). The hydrocarbons are to be found in the sandstone reservoirs in the interval that extends from 2592m to 3126.5m. (Enclosure 2). All the hydrocarbons is gas and MDT recoveries indicate this gas to be extremely dry with a carbon dioxide content that ranges from 11% to 22%. This interval could be broadly divided into 3 main zones.

The reservoirs in the upper zone from 2592m to 2793m are all gas bearing. The sandsontes show considerable variation in reservoir quality as indicated by the MSCT permeabilities (Table in Appendix 2). However, in general the reservoirs are probably the best of all the 3 zones, in terms of thickness, porosity and gas saturation. The average effective porosity of the sandstones range from 12 to 16% and with permeabilities up to 2900md as indicated by the MSCT core analysis data. The average effective water saturation ranges from 22% to 75%. The MDT pressure data indicates that there are at least 6 separate fluid systems in this zone. However, there are no observable fluid contacts within the sandstone intervals.

The middle zone, which extends from 2798m to 2966m is predominantly water bearing with three gas bearing intervals. The gas sandstone reservoirs are generally thin with average effective porosities ranging from 12% to 15% and high effective water saturations (37% to 73%). The MDT pressure data indicates that the gas sands in this zone are in separate fluid systems.

The bottom zone extends from 3023m to 3126.5m. All the sandstone reservoirs are interpreted to be gas bearing. The reservoir quality of these reservoirs is the poorest of the three zones as indicated by numerous tight MDT pressure tests. Average effective porosity and water saturation ranges from 9% to 13% and 51% to 88% respectively. As observed in the other two zones, MDT pressure data indicate that the gas sands appear to be in separate fluid systems.

4.0 Net Pay

4.1 General

In the interval 1687m - 2520m (top of porosity to base of uppermost volcanic layer) net porous intervals were determined using a effective porosity cut-off of 12%. All the sandstone reservoirs in this interval are water bearing and hence no pay is reported. The results of the netting are presented in Table 7.1.

An effective porosity cut-off of 8% was used to determine net porous intervals in the interval 2520m to 3126.5m. Net gas pay was then determined using a combination of volume of clay and MDT pressure testing results. The results of the net porous/net pay intervals are presented in Table 7.2

7.3 Results and Observations

The total net gas pay in East Pilchard 1 is estimated to be **100.7m**. The contribution to this net pay from the three zones is as follows:

Interval (m)	Net Pay (m)	% of Total Pay
2592 - 2793	68.9	68
2798 - 2966	13.9	14
3023 - 3126.5	17.9	18

EAST PILCHARD 1

PETROPHYSICS ANALYSIS SUMMARY 1680 - 2520m MD

Net porosity cut-off: 0.120 volume per volume
Depth reference: MDKB

Net Porous Interval based on Porosity cut-off only.

GROSS INTERVAL		NET POROUS INTERVAL									
metres		Gross	Net	Net to	Mean	(Std.)	Mean	(Std.)	Mode	Mean	Remarks
top	base	Metres	Metres	Gross(%)	VCL	(Dev.)	PHIE	(Dev.)	PHIE	SWE	
1687.8	1696.8	8.9	7.2	80	0.10	0.11	0.230	0.030	0.250	1.00	Water Bearing
1699.6	1701.3	1.8	1.8	100	0.32	0.14	0.210	0.041	0.180	0.99	Water Bearing
1702.3	1710.3	8.0	7.4	92	0.10	0.13	0.230	0.050	0.280	1.00	Water Bearing
1714.1	1715.1	1.0	0.7	70	0.30	0.06	0.170	0.026	0.190	1.00	Water Bearing
1716.9	1717.8	0.9	0.8	84	0.20	0.14	0.250	0.053	0.300	1.00	Water Bearing
1725.4	1728.0	2.6	1.1	41	0.42	0.12	0.170	0.034	0.130	1.00	Water Bearing
1728.8	1745.7	16.8	12.8	76	0.19	0.13	0.210	0.045	0.240	1.00	Water Bearing
1747.6	1764.1	16.5	4.6	28	0.28	0.16	0.190	0.044	0.130	1.00	Water Bearing
1766.6	1780.8	14.2	7.5	53	0.28	0.10	0.220	0.038	0.180	0.99	Water Bearing
1785.8	1787.2	1.3	0.8	56	0.30	0.06	0.200	0.028	0.220	1.00	Water Bearing
1792.9	1821.7	28.7	24.3	85	0.15	0.13	0.240	0.047	0.270	1.00	Water Bearing
1822.8	1837.7	14.8	8.7	59	0.18	0.18	0.200	0.050	0.250	1.00	Water Bearing
1838.3	1860.1	21.8	17.9	82	0.20	0.15	0.220	0.048	0.260	1.00	Water Bearing
1860.4	1867.6	7.2	3.5	50	0.36	0.11	0.170	0.030	0.180	1.00	Water Bearing
1868.3	1879.2	10.9	10.6	97	0.09	0.10	0.230	0.047	0.290	1.00	Water Bearing
1880.1	1905.1	25.0	18.9	76	0.21	0.12	0.200	0.040	0.180	1.00	Water Bearing
1906.8	1919.5	12.8	9.9	78	0.13	0.16	0.210	0.035	0.220	1.00	Water Bearing
1923.3	1946.7	23.3	19.1	82	0.15	0.16	0.230	0.051	0.280	1.00	Water Bearing
1948.4	1953.7	5.2	2.4	46	0.24	0.10	0.190	0.037	0.220	0.98	Water Bearing
1963.0	1979.6	16.6	13.6	82	0.14	0.12	0.240	0.048	0.280	1.00	Water Bearing
1987.8	1992.9	5.1	4.5	87	0.13	0.10	0.210	0.039	0.240	1.00	Water Bearing
1997.9	2001.1	3.1	2.2	73	0.20	0.05	0.220	0.040	0.190	0.98	Water Bearing
2006.7	2011.7	5.0	3.0	60	0.21	0.09	0.220	0.044	0.250	1.00	Water Bearing
2015.3	2035.8	20.5	2.3	11	0.26	0.14	0.170	0.036	0.170	1.00	Water Bearing
2036.4	2102.8	66.3	61.0	92	0.13	0.11	0.210	0.029	0.230	1.00	Water Bearing
2115.1	2129.9	14.8	12.6	85	0.18	0.09	0.210	0.031	0.220	1.00	Water Bearing
2136.1	2153.9	17.8	12.4	70	0.16	0.11	0.210	0.032	0.220	1.00	Water Bearing
2185.7	2195.6	9.9	5.7	57	0.19	0.11	0.200	0.045	0.250	0.99	Water Bearing
2206.6	2255.1	48.5	20.6	42	0.30	0.10	0.170	0.030	0.150	1.00	Water Bearing
2257.1	2295.6	38.5	20.9	54	0.30	0.09	0.170	0.032	0.150	1.00	Water Bearing
2296.5	2306.4	9.9	8.3	84	0.22	0.07	0.190	0.034	0.190	1.00	Water Bearing
2316.7	2332.1	15.4	10.1	65	0.23	0.07	0.190	0.031	0.210	1.00	Water Bearing
2338.8	2360.1	21.3	9.9	46	0.11	0.09	0.210	0.039	0.240	1.00	Water Bearing
2371.1	2432.1	60.9	31.8	52	0.14	0.11	0.190	0.039	0.230	1.00	Water Bearing

Table 4.1 Petrophysical Summary 1687 - 2520

EAST PILCHARD 1

PETROPHYSICS ANALYSIS SUMMARY 2520 - 3143 m MD

Net porosity cut-off: 0.080 volume per volume
Depth reference: MDKB

Net Porous Interval based on Porosity cut-off only.

GROSS INTERVAL		NET POROUS INTERVAL										
metres		Gross	Net	Net to	Mean	(Std.)	Mean	(Std.)	Mode	Mean	Remarks	Net Pay
top	base	Metres	Metres	Gross(%)	VCL	(Dev.)	PHIE	(Dev.)	PHIE	SWE		
2521.10	2522.40	1.3	1.1	81	0.27	0.10	0.120	0.018	0.110	0.95	Water Bearing	
2528.40	2533.30	4.9	4.6	93	0.12	0.12	0.170	0.034	0.200	0.99	Water Bearing	
2542.70	2549.10	6.4	4.2	66	0.17	0.12	0.140	0.034	0.180	1.00	Water Bearing	
2551.40	2557.80	6.3	5.2	82	0.11	0.10	0.160	0.026	0.170	1.00	Water Bearing	
2592.20	2603.10	10.9	10.2	94	0.08	0.11	0.170	0.036	0.200	0.22	Gas Bearing	Y
2617.60	2618.40	0.8	0.8	100	0.31	0.06	0.110	0.021	0.090	0.84	Gas Bearing, tight	N
2619.10	2621.30	2.2	1.4	60	0.22	0.16	0.160	0.043	0.200	0.43	Gas Bearing	Y
2622.10	2623.90	1.8	1.6	89	0.27	0.05	0.120	0.013	0.130	0.72	Gas Bearing, low productivity	Y
2625.90	2629.80	3.9	3.8	95	0.11	0.10	0.160	0.029	0.170	0.29	Gas Bearing	Y
2630.30	2631.80	1.5	1.2	80	0.23	0.17	0.120	0.020	0.130	0.61	Gas Bearing	Y
2633.20	2634.40	1.1	0.7	61	0.11	0.09	0.130	0.024	0.140	0.45	Gas Bearing	Y
2639.70	2644.80	5.1	3.8	75	0.15	0.12	0.140	0.036	0.120	0.37	Gas Bearing	Y
2648.90	2651.40	2.6	1.0	39	0.17	0.08	0.100	0.009	0.100	0.62	Gas Bearing	Y
2661.20	2670.50	9.2	7.1	76	0.11	0.08	0.150	0.025	0.170	0.35	Gas Bearing	Y
2672.00	2673.10	1.1	0.7	67	0.17	0.04	0.130	0.022	0.150	0.74	Gas Bearing, low productivity	Y
2684.90	2686.60	1.8	1.2	69	0.18	0.13	0.140	0.025	0.170	0.36	Gas Bearing	Y
2690.90	2692.10	1.2	0.9	74	0.18	0.08	0.120	0.014	0.130	0.69	Gas Bearing, low productivity	Y
2699.60	2701.50	1.9	1.8	92	0.28	0.07	0.100	0.010	0.090	0.76	Gas Bearing, low productivity	Y
2708.10	2708.90	0.9	0.7	72	0.23	0.05	0.110	0.016	0.100	0.78	Gas Bearing, thin sand, low productivity	Y
2718.90	2729.30	10.4	8.9	85	0.14	0.08	0.150	0.024	0.160	0.40	Gas Bearing	Y
2740.90	2743.40	2.5	1.5	59	0.32	0.10	0.110	0.018	0.100	0.73	Prob. Gas bearing, tight	N
2747.60	2759.80	12.1	10.1	83	0.13	0.13	0.150	0.034	0.160	0.49	Gas Bearing	Y
2761.90	2765.10	3.2	2.9	90	0.11	0.08	0.120	0.022	0.110	0.74	Gas Bearing, low productivity	Y
2772.10	2773.00	0.9	0.3	39	0.24	0.02	0.100	0.011	0.100	0.46	Gas Bearing	Y
2775.40	2777.20	1.9	1.1	57	0.22	0.08	0.100	0.010	0.100	0.90	Gas Bearing, tight	N
2780.70	2793.00	12.3	10.6	86	0.06	0.06	0.160	0.034	0.200	0.54	Gas Bearing	Y
2798.50	2801.50	3.0	2.7	90	0.11	0.05	0.170	0.021	0.180	0.95	Water Bearing	
2816.80	2818.10	1.3	1.1	85	0.16	0.09	0.140	0.021	0.160	1.00	Water Bearing	
2822.90	2842.60	19.7	14.4	73	0.13	0.10	0.150	0.032	0.180	0.98	Water Bearing	
2859.70	2861.60	1.9	1.0	53	0.24	0.13	0.120	0.021	0.140	0.94	Water Bearing	
2864.80	2868.90	4.1	2.2	53	0.33	0.06	0.120	0.028	0.140	0.98	Water Bearing	
2873.10	2876.10	3.0	2.2	74	0.25	0.10	0.130	0.022	0.140	0.94	Water Bearing	
2877.70	2879.10	1.4	1.1	76	0.12	0.10	0.120	0.016	0.130	0.63	Gas Bearing	Y
2880.40	2882.60	2.2	1.8	80	0.2	0.05	0.130	0.013	0.140	0.73	Gas Bearing, low productivity	Y
2885.00	2885.60	0.6	0.5	77	0.1	0.05	0.140	0.023	0.170	0.76	Gas Bearing, thin sand, low productivity	Y
2897.80	2901.50	3.7	3.5	93	0.16	0.07	0.160	0.027	0.170	0.98	Water Bearing	
2906.90	2908.10	1.2	0.7	54	0.2	0.06	0.120	0.015	0.130	0.98	Water Bearing	
2911.80	2921.10	9.3	6.5	69	0.22	0.12	0.130	0.026	0.140	0.97	Water Bearing	
2922.40	2926.90	4.5	4.2	94	0.21	0.08	0.130	0.018	0.140	0.62	Gas Bearing	Y
2933.50	2937.00	3.5	3.3	94	0.18	0.09	0.130	0.019	0.130	0.63	Gas Bearing	Y
2947.00	2953.30	6.3	5.8	91	0.14	0.09	0.160	0.030	0.150	0.94	Water Bearing	
2955.10	2957.40	2.3	2.1	89	0.2	0.05	0.140	0.026	0.160	0.93	Water Bearing	
2959.90	2961.80	1.9	1.6	79	0.25	0.07	0.130	0.015	0.130	0.93	Water Bearing	
2962.80	2966.20	3.4	3.0	88	0.09	0.07	0.150	0.031	0.170	0.37	Gas Bearing	Y
3023.80	3029.40	5.6	3.9	68	0.25	0.09	0.110	0.016	0.120	0.66	Gas Bearing, low productivity	Y
3032.60	3035.50	2.9	2.3	81	0.18	0.06	0.120	0.019	0.140	0.69	Gas Bearing, low productivity	Y
3043.20	3044.20	0.9	0.6	58	0.18	0.02	0.100	0.005	0.100	0.87	Gas Bearing, tight	N
3047.20	3049.90	2.7	1.8	65	0.28	0.05	0.090	0.010	0.080	0.75	Gas Bearing, tight	N
3073.60	3075.20	1.7	1.2	71	0.1	0.04	0.120	0.017	0.130	0.51	Gas Bearing	Y
3076.40	3077.70	1.2	0.9	68	0.13	0.07	0.120	0.015	0.130	0.52	Gas Bearing	Y
3080.30	3083.10	2.8	1.9	69	0.2	0.05	0.120	0.020	0.140	0.59	Gas Bearing, tight	N
3088.50	3089.30	0.8	0.5	56	0.16	0.03	0.090	0.006	0.090	0.88	Gas Bearing, tight	N
3092.80	3097.10	4.4	2.3	52	0.18	0.06	0.120	0.022	0.120	0.52	Gas Bearing, thin sand, low productivity	Y
3100.80	3105.60	4.8	3.9	80	0.23	0.06	0.110	0.021	0.100	0.72	Gas Bearing, thin sand, low productivity	Y
3107.60	3118.10	10.5	8.4	80	0.2	0.05	0.110	0.016	0.130	0.81	Gas Bearing, tight	N
3119.60	3123.20	3.7	3.4	92	0.2	0.08	0.130	0.023	0.150	0.63	Gas Bearing	Y
3124.10	3126.40	2.3	2.0	85	0.19	0.05	0.100	0.008	0.090	0.86	Gas Bearing, tight	N

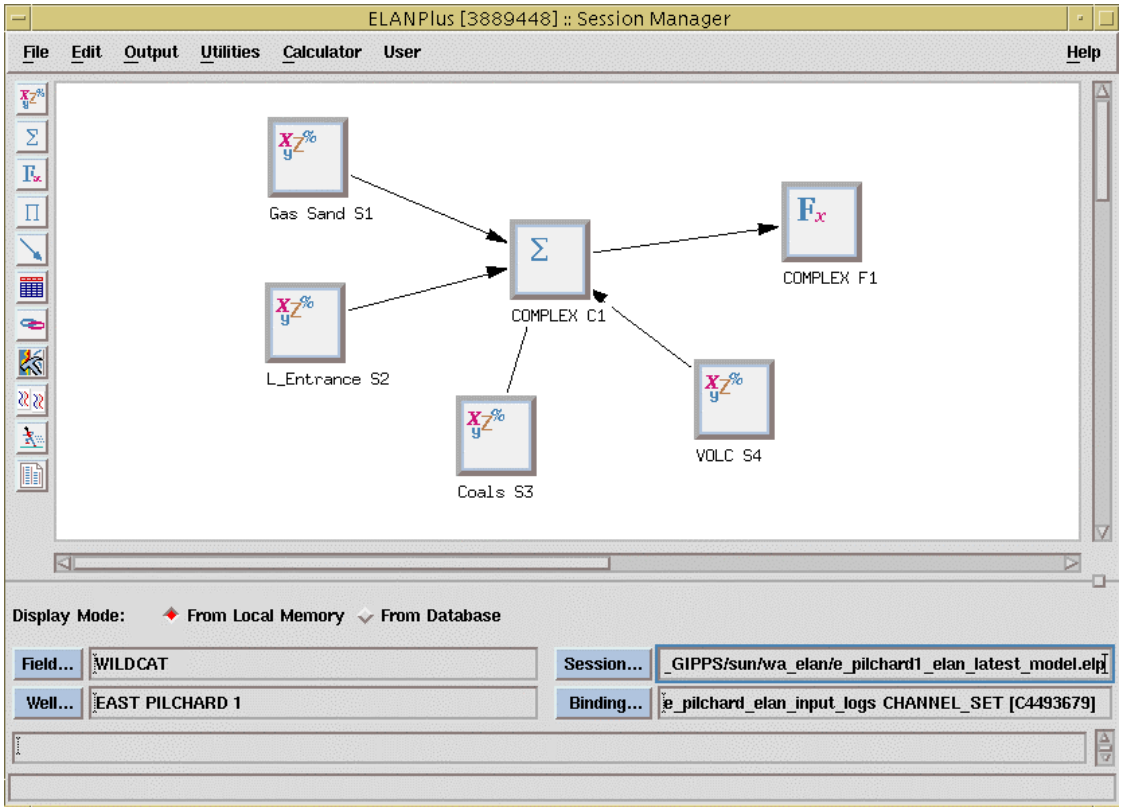
Net Pay Flag: Y=Yes N=No

NET GAS PAY = 100.7 m

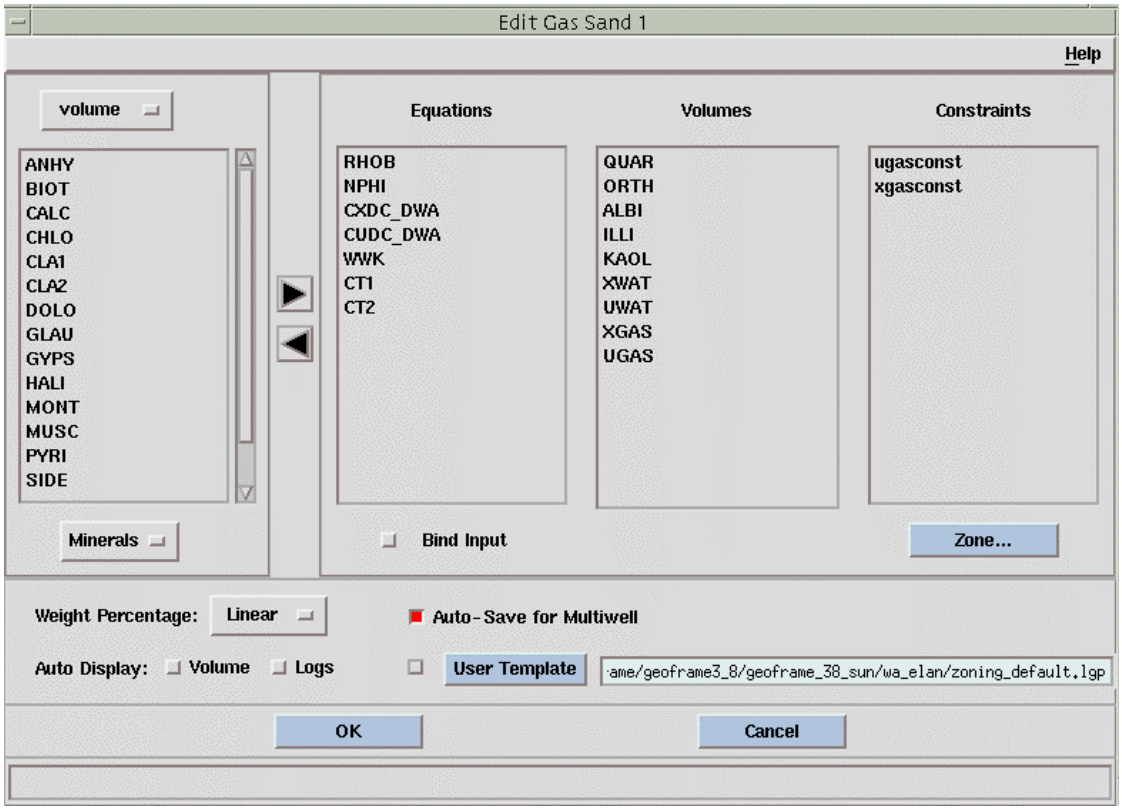
Table 4.2 Petrophysical Summary 2520 -3126.5m

APPENDIX 1

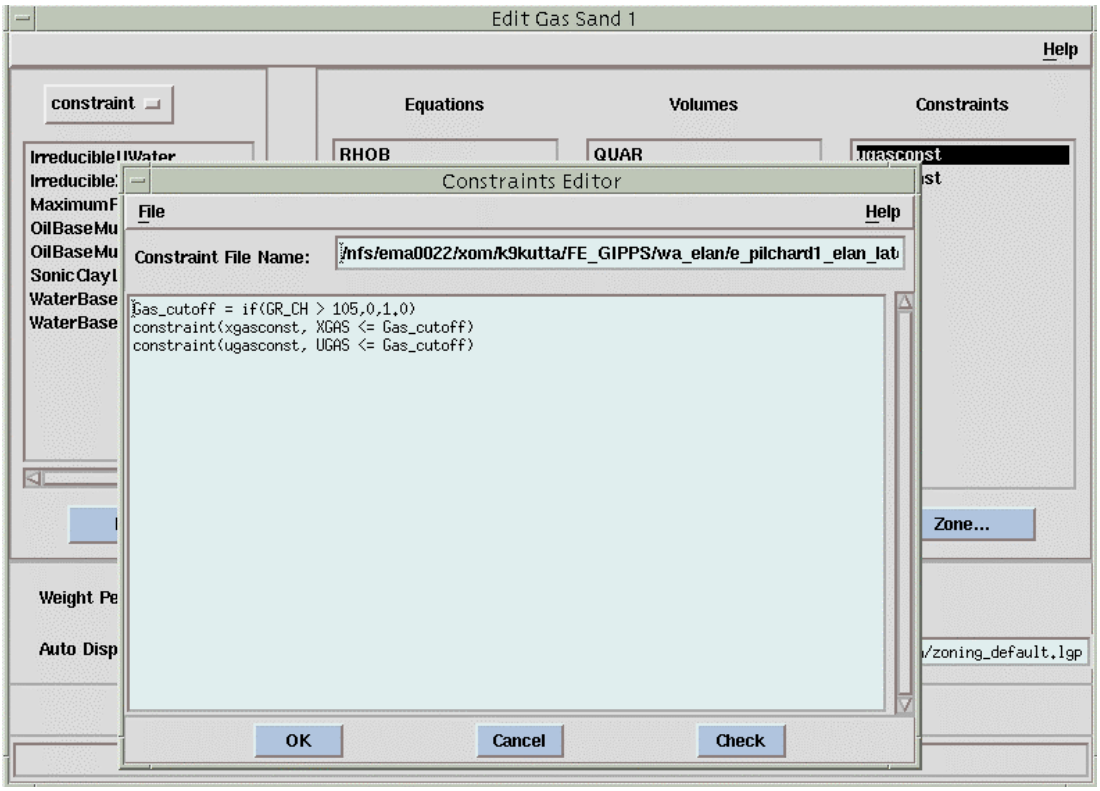
ELAN+ Analysis Model & Parameters



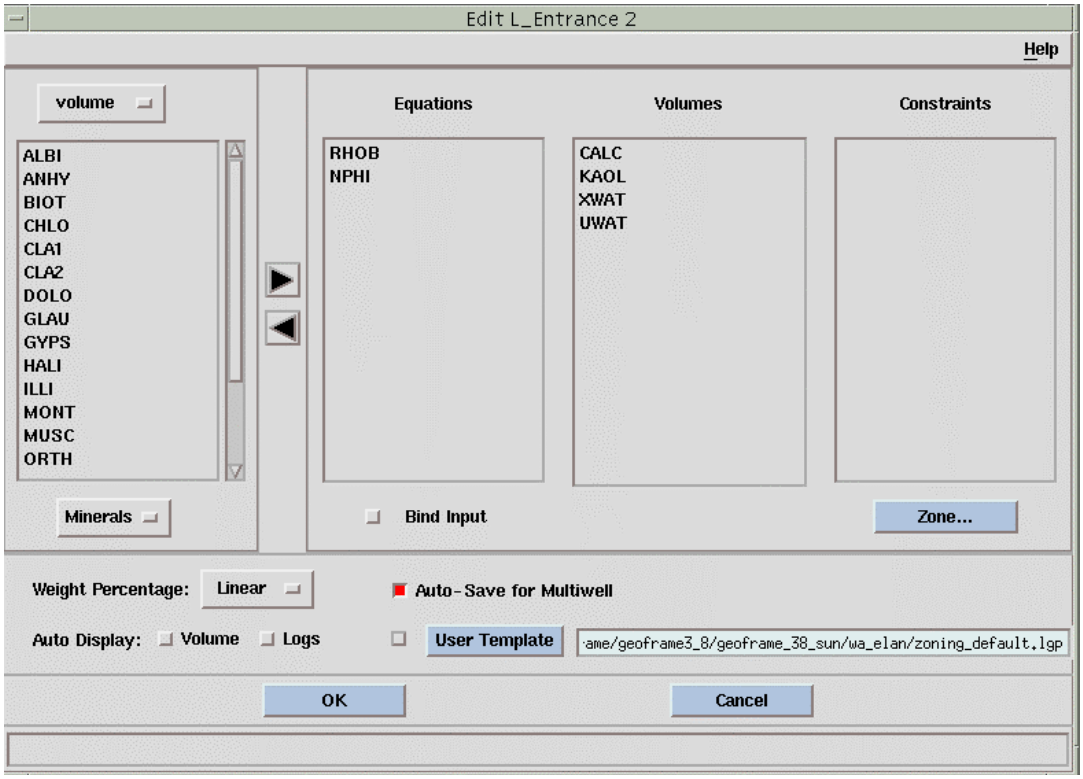
East Pilchard 1 Elan + Model



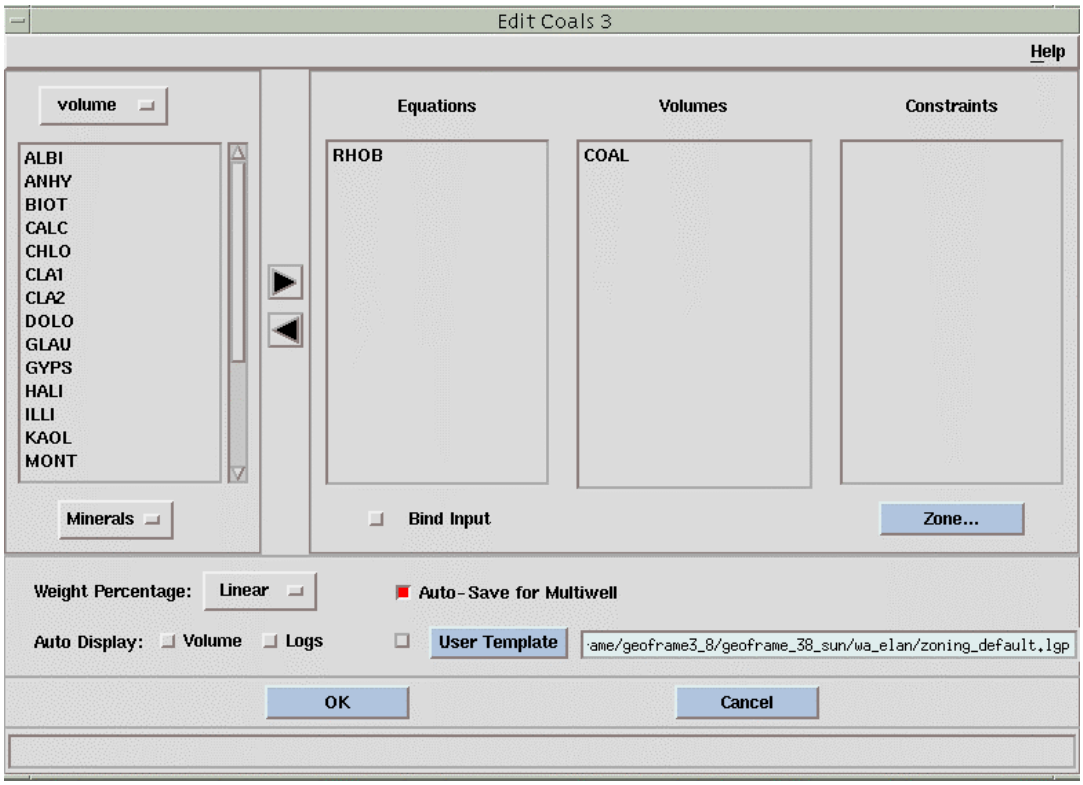
East Pilchard 1 Gas Sand Solve Process



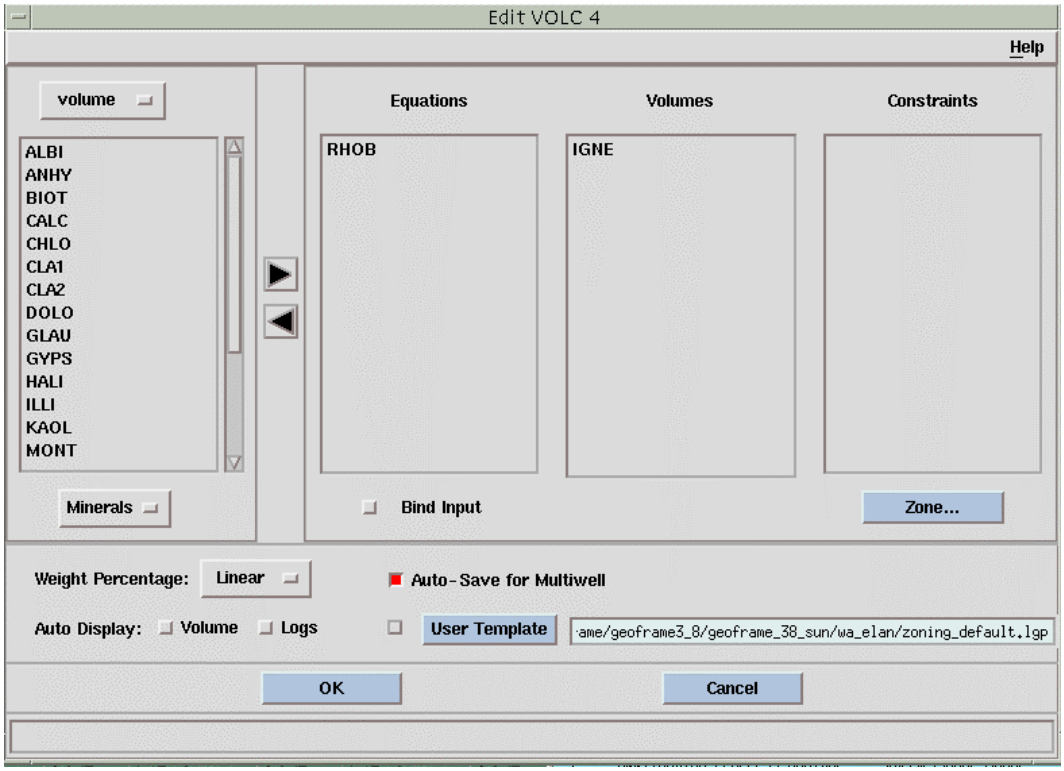
East Pilchard 1 Gas Sand Solve Process Constraint



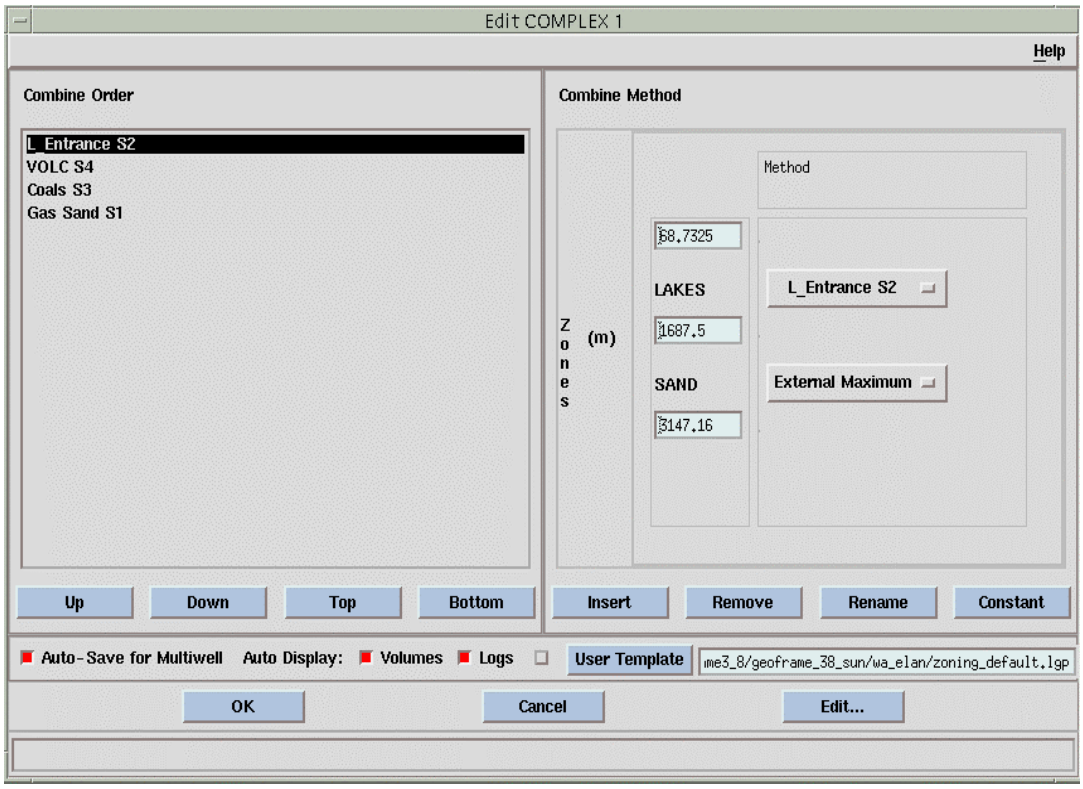
East Pilchard 1 Lakes Entrance Solve Process



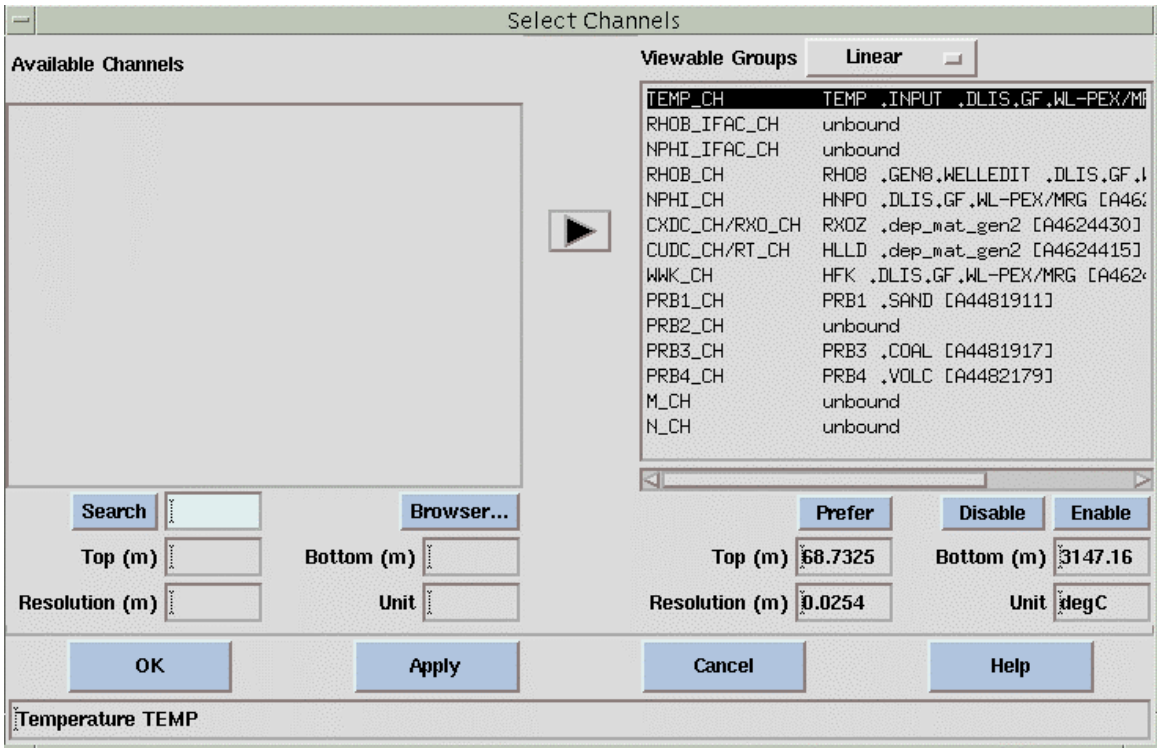
East Pilchard 1 Coal Solve Process



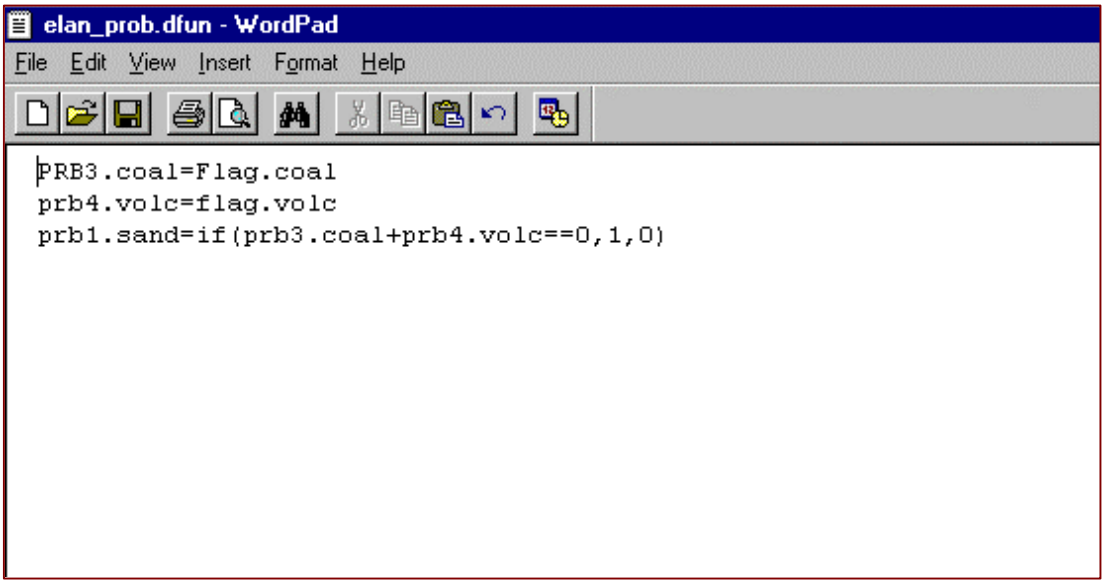
East Pilchard 1 Volcanics Solve Process



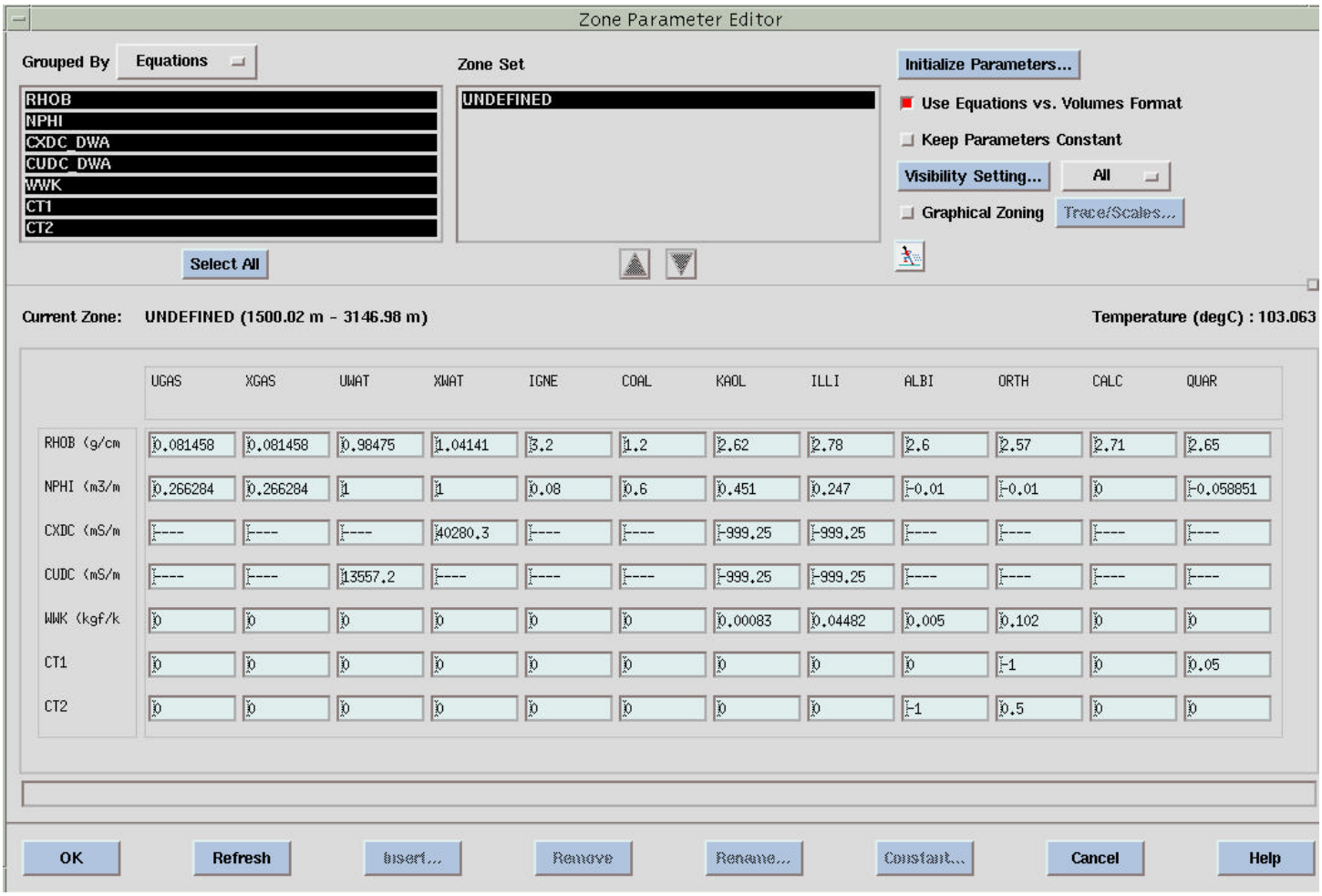
East Pilchard 1 Combine Process



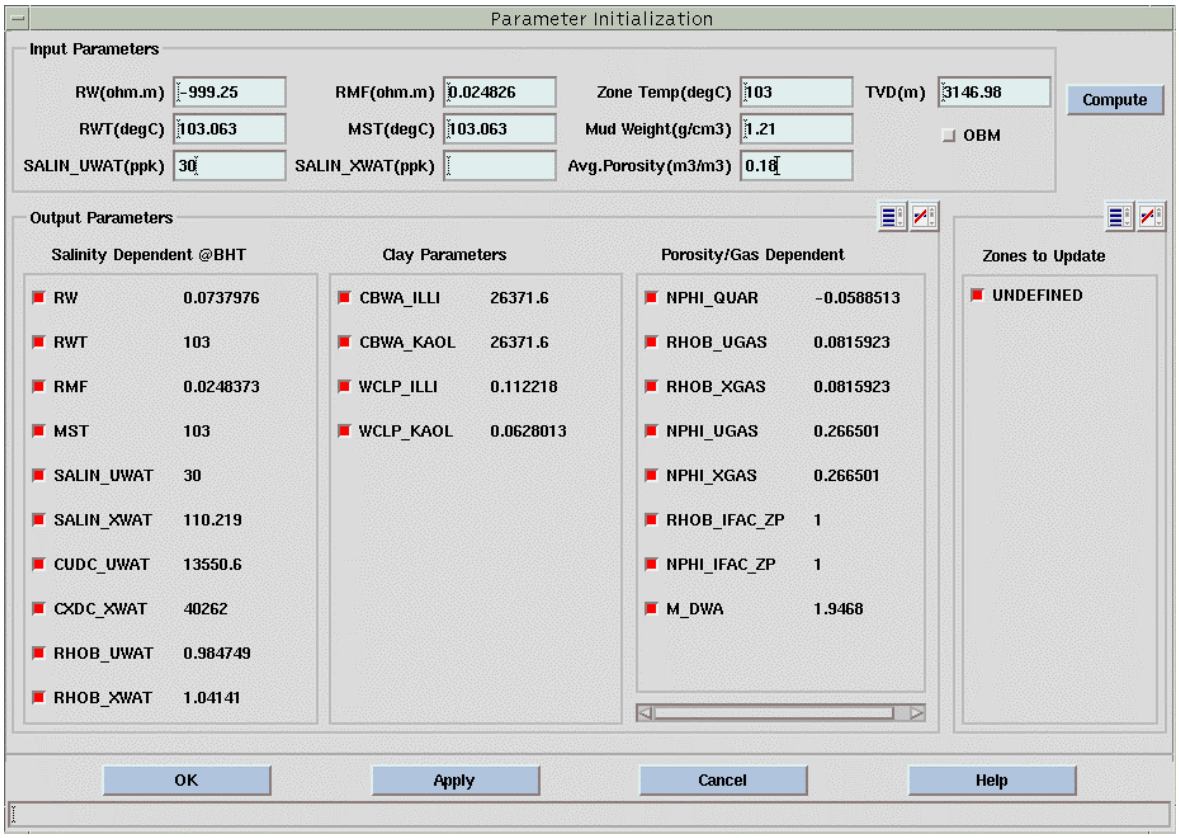
East Pilchard 1 Logs Used in Interpretation



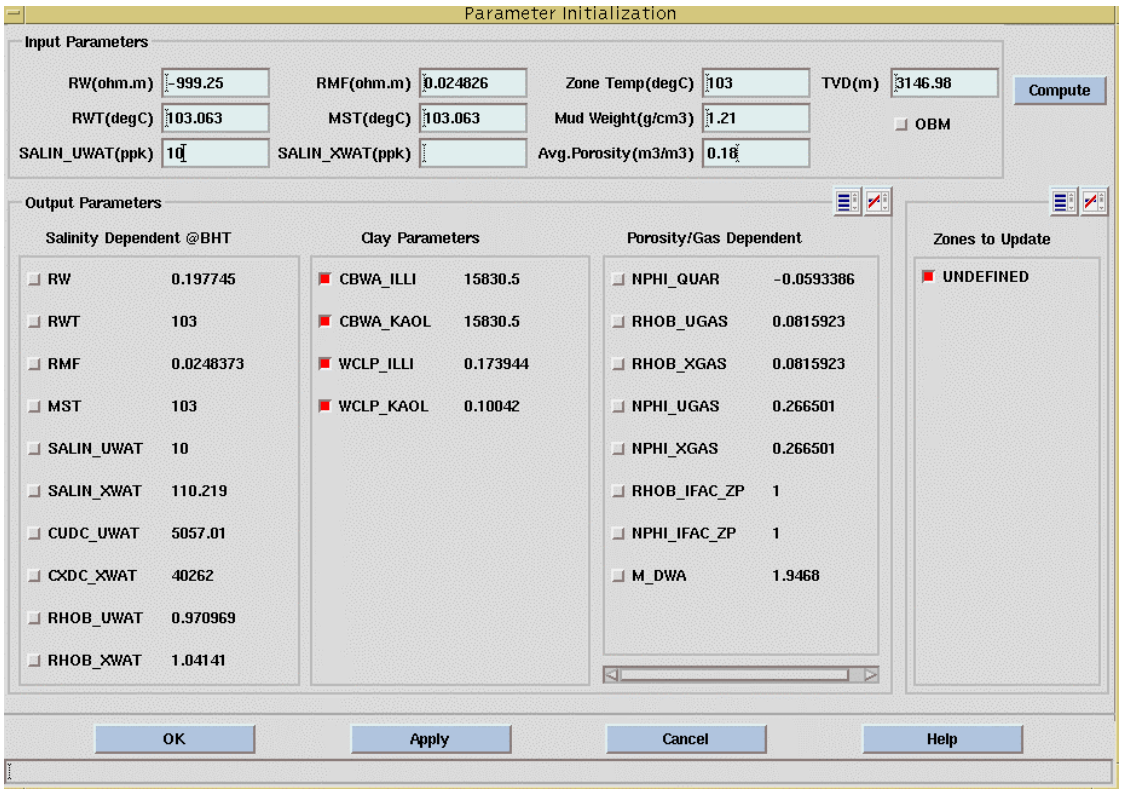
East Pilchard 1 Probability Functions used in the Combine Process



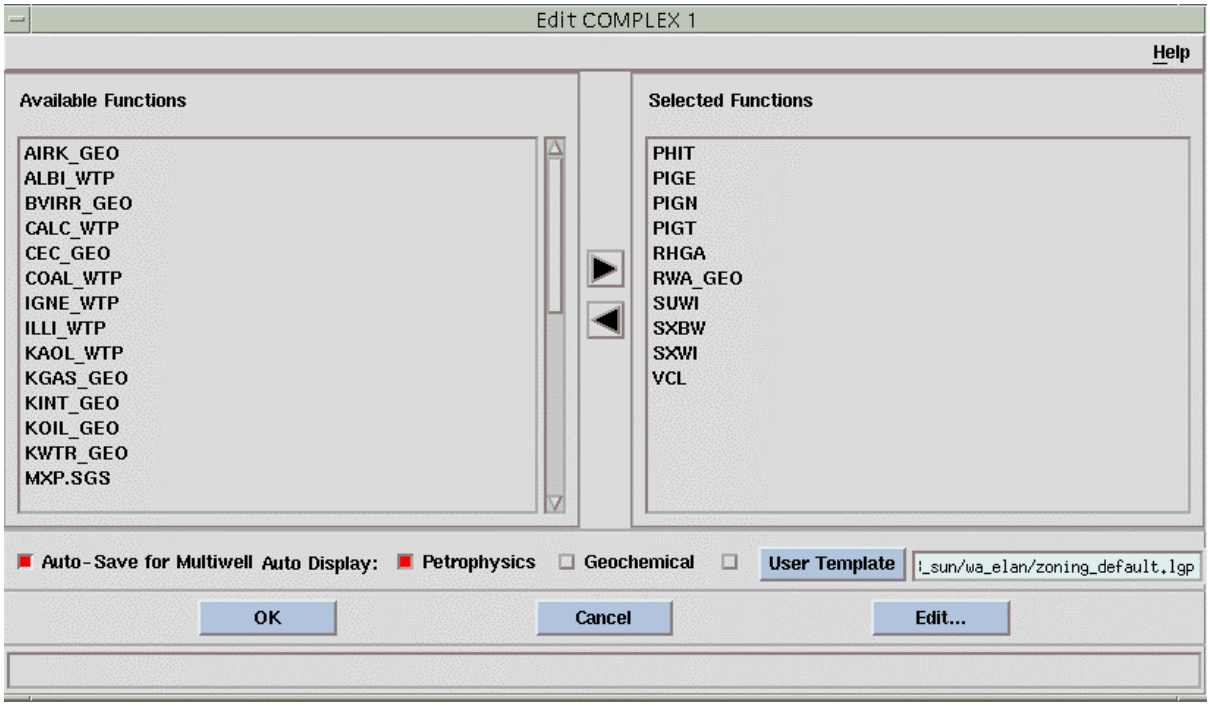
East Pilchard 1 Zone Parameters



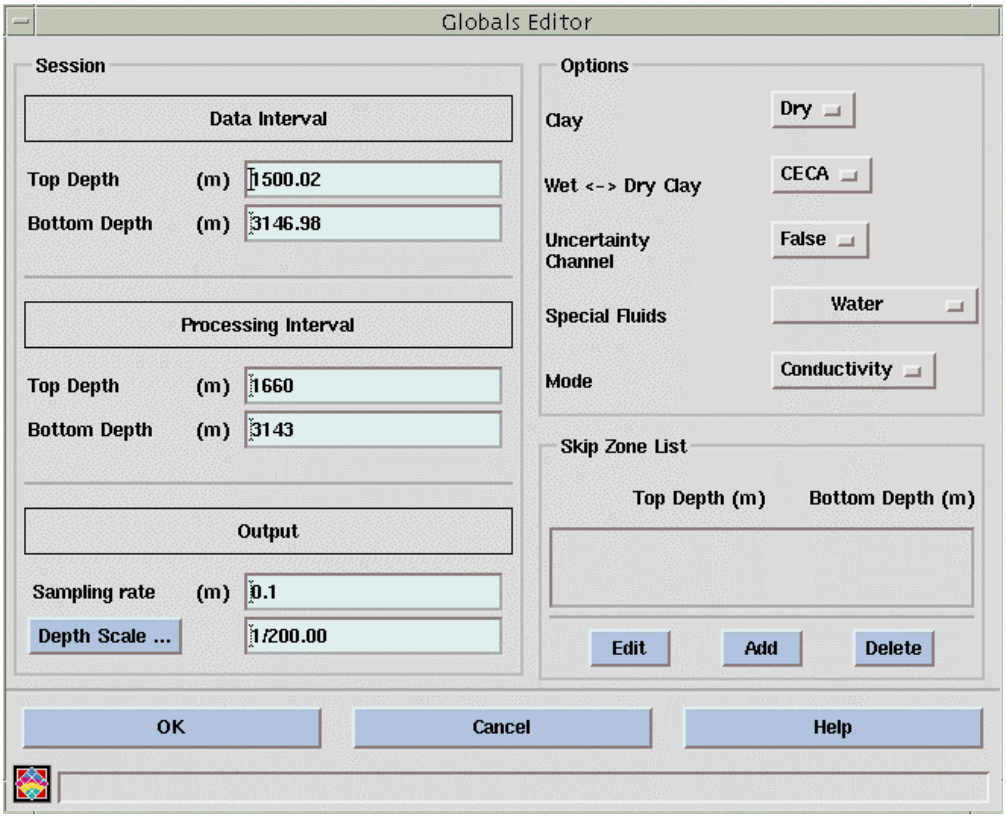
East Pilchard 1 Free Water Parameters



East Pilchard 1 Bound Water Parameters



East Pilchard 1 Function Process



East Pilchard 1 Globals

Constant Tools (CT1, CT2)

The following relationships were used for the Constant Tools

CT1

$0 = 0.05QUAR - ORTH$

Weight Multiplier = 0.5

CT2

$0 = 0.5ORTH - ALBI$

Weight Multiplier = 1

APPENDIX 2

MSCT Core Analysis Data

East Pilchard_1 MSCT Core Analysis												
Sample No	**Depth**	**Amb He Porosity**	**Amb Perm to Air**	**Amb Klinkenberg Perm**	**Ovb Pressure**	**Ovb He Porosity**	**Ovb Perm to Air**	**Ovb Klinkenberg Perm**	**Grain Density**	**Remarks**	**DPor Amb-OB**	**Depth Shift**
	(m)	***frac***	***(mD)***	***(mD)***	***(psi)***		***(mD)***	***(mD)***	***(g/cm^3)***			*m*
3	2594.0	0.206	3750.000	3630.000	4400	0.182	3470.000	2890.000	2.64		0.024	0.00
4	2598.0	0.195	3280.000	2870.000	4400	0.159	2630.000	2600.000	2.64		0.036	-0.37
5	2602.0	0.192	1570.000	1460.000	4400	0.147	1290.000	1190.000	2.64		0.045	0.39
7	2620.0	0.060	0.004	0.001	4450	0.055	0.000	0.001	2.68		0.005	-0.87
8	2627.5	0.172	135.000	131.000	4450	0.148	117.000	112.000	2.64		0.024	0.00
9	2633.5	0.052	19.200	5.800	4500	0.022	0.410	0.170	2.36	Frac	0.030	-0.22
11	2644.0	0.019	0.001	0.001	4500	0.015	0.001	0.001	2.64		0.004	0.70
12	2652.0	0.079	0.018	0.001	4550	0.069	0.001	0.001	2.63		0.010	0.00
13	2663.0	0.160	30.800	26.300	4550	0.141	24.200	20.400	2.65		0.019	-0.62
15	2700.5	0.139	0.730	0.470	4650	0.119	0.320	0.150	2.64		0.020	0.00
17	2721.5	0.179	61.800	55.500	4700	0.160	53.300	48.300	2.65		0.019	0.00
18	2728.5	0.176	573.000	531.000	4700	0.140	463.000	444.000	2.64		0.036	0.28
19	2751.0	0.195	57.900	47.700	4750	0.166	41.700	31.800	2.66		0.029	0.37
21	2759.0	0.042	0.010	0.001	4750	0.037	0.001	0.001	2.60		0.005	0.70
22	2763.0	0.144	13.100	10.200	4800	0.101	6.100	4.660	2.66		0.043	0.51
23	2764.5	0.170	118.000	113.000	4800	0.147	94.800	83.200	2.65		0.023	0.28

APPENDIX 3

Wireline Logging Reports

FIELD ELECTRIC LOG REPORT

GENERAL INFORMATION

WELL:	**East Pilchard - 1**	**REPORT NUMBER 1**
LOCATION:	**Local:**	Suite # 1 at 2945m
	Lat : 38° 11'54.184"S	
	Long: 148° 33' 42.825"E	
	AMG: X= 5,771,005.83 N	**WATER DEPTH:** 91.3m
	Y= 636,764.56 E	
		RT TO MSL: 25m
PERMIT:	VIC/L9	**LOGGING COMPANY:** Schlumberger
AREA:	Bass Straits	**LOGGING ENGINEER:** Francisco/Rohan
COUNTRY:	Australia	**GEOLOGIST:** Arnaldo Ribeiro/M Woodmansee

LOGGING SUITE NUMBER 1

DATE LOGGED: 24/07/01 - 29/07/01	**DRILLERS DEPTH:** 2945m
HOLE SIZE: 12 1/4"	**LOGGERS DEPTH:** 2947.5m
CASING SHOE: 873m	**LOGGERS CASING SHOE:** 873m

LABEL	TYPE OF LOG	FROM	TO	RPT. SECT. / SUMMARY.	Time Since Last Circ / BHT
1	PEX-HALS-DSI-HNGS-LEHQT	2947.5	873.5	2695 - 2590m, GR recorded to 91m.	15:05 hrs/ BHT = 96.7°C, 97.2°C and 97.8°C
2	MDT-GR-LEHQT	1689.03	2926.5	93 pretests and 1 sample. 11 tight, 6 lost seal.	48:30 hrs/ BHT = 108.9°C, 108.9°C, 108.9°C
3	FMI-HRLA-GR-LEHQT	2947.5	2220	2922 - 2860m, HRLA rpt 2638 - 2575m.	52:40 hrs/ BHT = 109.4°C, 109.4°C, 109.4°C,
4	MDT-GR-LEHQT (for samples)	2593.5	2641.0	5 Sample points, all ok. 7 samples, 4 ok, 2 empty, 1 filtrate	14:20 hrs/ BHT 93.3°C, 92.2°C
4A	MDT-GR-LEHQT (for pressures, samples and OFA)	2602.0	2885.4	21 Sample points, 13 ok, 2 lost seal, 5 tight, 1 supercharged 8 samples, 3 OFA, 2 pretest	35:53 hrs/ BHT 107.8°C, 107.8°C, 108.9°C
5	MSCT-GR-LEHQT	2450	2878	Cut 25 cores, recovered 20. Recovery: 80%	44:54 hrs/ BHT 110°C, 110°C, 100°C

MUD DATA

MUD TYPE:	KCL/PHPA/Glycol/GEM	**SAMPLE SOURCE:**	Flowline
MUD WEIGHT:	10.15ppg	**Rm @ Measured Temp.**	0.0932@18.9°C
FUNNEL VISCOSITY:	64	**Rmf @ Meas. Temp.**	0.0761@18.9°C
pH:	10	**Rmc @ Measured Temp.**	0.210@18.9°C

FLUID LOSS	2.8	**Rm @ BHT.**	
CHLORIDES: (Titration/Water phase)	47000	**COMMENTS:**	Last circulation 12:00hrs on 24th july 2001.

CIRCULATION HISTORY & DIARY OF OPERATIONS

From	To	**Activity** (Downtime/Lost time in bold typeface)	**Lost time**
	22:30 hrs	**23-July-01** East Pilchard reached TD at 2945m	
22:30	12:00	Circulate bottoms up and pull out for a wiper trip to the shoe.	
12:00	18:45	**24-July-01** Pull out of the hole. Last Circulation at 2945m 12:00 hrs.	
18:45	19:00	JSA	

CIRCULATION HISTORY & DIARY OF OPERATIONS (cont)

From	To	Activity (Downtime/Lost time in bold typeface)	Lost time
19:00	20:20	Schlumberger rig up sheaves and rig up run #1 PEX-HALS-DSI-HNGS-LEHQT.	
20:20	20:30	Load Sources	
20:30	20:55	RIH to 934m.	
20:55	21:07	Open calipers and log up the shoe. Shoe found at 873.5m. Sonic check 55.6 us/ft. Caliper found to be 12.1" adjust to read 12.41". Close calipers.	
21:07	**21:40**	**RIH log down. Software crash. Due to Stopping and starting the log. Reboot (main processor) at 847m.**	**33 min**
21:40	22:40	RIH log down at 2500 to 3000 ft/hr. Missed 200m from 1425 to 1625, as the computer overloaded. Had to abort the log.	
22:40	**22:50**	**Reboot the system (main processor) at 1629m.**	**10 min**
22:50	23:10	Continue logging down from 1610m at 3500 ft/hr. Switch off Sonic processing, record only raw data, as the software wants to log it at 1500 ft/hr. Had to slow down to 1000 ft/hr. Computer buffer getting full. Stop log at 1850m.	
23:10	23:15	Switch off sonic.	
23:15	24:00	Continue down log from 1800m to 2450m at 3000 to 3500 ft/hr. Computer overloading. Stop log.	
00:00	**00:20**	**25-July-01. Stop and start software.**	**20 min**
00:20	00:37	Log down from 2360m to 2430m. Start logging at 1000 ft/hr, increase to 1500 ft/hr, then reduce to 500 ft/hr. Buffer getting overloaded. Stop log.	
00:37	**01:00**	**Reboot all computers, second processor and main processor.**	**23 min**
01:00	01:45	Log down from 2330m to 2947.5m at 3000ft/hr, increase to 4000 ft/hr, reduce to 3000 ft/hr	
01:45	02:50	Start log up parameters. Log up repeat section from 2695m to 2590m at 900ft/hr	
02:50	03:05	RIH to TD at 2947.5m	
03:05	05:07	Main log up from 2947.5m to 2435m at 900 ft/hr, in Very Hi res mode, DSI in P & S and Upper Dipole modes.	
05:07	**05:20**	**Computer buffer overloaded, log aborted**	**13 min**
05:20	07:23	Main log from 2489m.	
07:23	**07:27**	**1970m pre-empt computer buffer overloaded, log aborted, run in 70m then continue log up.**	**5 min**
07:27	09:25	Main log up to 1564m	
09:25	09:32	1564m, start recording in normal res, turn off dipole sonic, stop HNGS. Run in 80m to overlap logs.	
09:32	10:10	log up at 3400 ft/hr, at normal res.	
10:10	**10:17**	**Computer buffer overloaded, log aborted 990m. Run in 80m, re-set system.**	**7 min**
10:17	10:33	Log up, normal resolution. Casing shoe logged at 874 m.12.41", sonic 57.5 us/ft	
10:33	10:55	Log up, normal resolution.	
10:55	11:00	**Computer buffer overloaded, log aborted 430m. Run in 40m, re-set system.**	**5 min**
11:00	11:20	PEX logging run finished. unload sources and rig down. Bottom hole temp recorded 206°,207°,208°F (96.7, 97.2, 97.8°C)	
11:20	12:00	Unload sources and rig down. PEX	
12:00	13:45	Rig up run (#2) MDT-GR-LEHQT	

CIRCULATION HISTORY & DIARY OF OPERATIONS (cont)			
From	**To**	**Activity** (Downtime/Lost time in bold typeface)	**Lost time**
13:45	14 :50	Run in hole MDT-GR-LEHQT	
14:50	15:05	Gamma correlation at 1680m crank 0.4m up.	
15:05	17:30	Commenced MDT Pressure Tests, 12 pressure tests.	
17:30	17:34	Correlate Gamma at 1967m	
17:34	18:50	Re-commence MDT pressure tests.	
18:50	**19:00**	**Software crash. Restart computer at 2152m.**	**10 min**
19:00	19:10	Re-commence MDT pressure tests.	
19:10	19:17	Correlate Gamma at 2300m	
19:17	22:22	Re-commence MDT pressure tests.	
22:22	22:30	Correlate Gamma at 2602m	
22:30	00:20	**26-July-01** Re-commence MDT pressure tests.	
00:20	00:28	Correlate Gamma at 2650m	
00:28	06:10	Re-commence MDT pressure tests.	
06:10	06:20	Correlate Gamma at 2800m. No offset	
06:20	10:37	Re-commence MDT pressure tests.	
10:37	11:10	Running last sample (at 2925.5m) start pumping through OFA.	
11:10	11:58	Slow down sampling pump to 300rpm for 2 litres	
11:58	12:30	Pump to sample chamber, final pressure 3000psi	
12:30	12:43	Close sample chamber, and retract.	
12:43	13:40	Pull out of the hole, Last BHT at 11:10hrs 112.83°C	
13:40	14:30	Rig down MDT run (#2). LEHQT thermometers 108.9°C	
14:30	15:20	Rig up Run # 3 FMI-HRLA-GR-LEHQT	
15:20	15:35	Run in Run # 3 to casing shoe, and check calipers. 12.40" and 12.42" in tolerance.	
15:35	16:28	Run to bottom	
16:28	16:40	Log repeat section (from 2922m to 2860m), crank depth 0.2m up.	
16:40	18:10	Start main log. Tag bottom at 2947.5m. FMI to 2220m, HRLA to 2575m	
18:10	**18:30**	**RIH to 2650m. Log up HRLA at 1700 ft/hr from 2650m to 2575m,**	**20 min**
18:30	20:10	POOH, thermometer readings 109.4°C. Rig down tools and remove Schlumberger sheaves.	
20:10	12:00	RIH with Security XL20D, run wiper trip. Last circulation 06:00 hrs, 27-07-01	

MUD DATA

MUD TYPE:	KCL/PHPA/Glycol/GEM	**SAMPLE SOURCE:**	Flowline
MUD WEIGHT:	10.15ppg	**Rm @ Measured Temp.**	0.0932@18.9°C
FUNNEL VISCOSITY:	64	**Rmf @ Meas. Temp.**	0.0761@18.9°C
pH:	10	**Rmc @ Measured Temp.**	0.210@18.9°C
FLUID LOSS	2.8	**Rm @ BHT.**	
CHLORIDES: (Titration/Water phase)	47000	**COMMENTS:**	Last circulation 06:00hrs on 27th July 2001.

CIRCULATION HISTORY & DIARY OF OPERATIONS (cont)

From	To	Activity (Downtime/Lost time in bold typeface)	Lost time
12:00	13:05	**27-July-01** Run in hole run # 4 MDT-GR-LEHQT	
14:10	14:17	Gamma correlation at 2590m. Crank up 0.3 m.	
14:17	14:33	Run down, and transfer OFA calibration.	
14:33	15:49	Sample point 2593.5m, MRMS and 1 Gallon sample. (see MDT report for timings)	
15:49	16:29	Move to sample point 2596m, MRMS sample. (see MDT report for timings)	
16:29	17:17	Move to sample point 2602m, MRMS sample. (see MDT report for timings) suspect sample chamber opening	
17:17	17:50	Move to sample point 2627.5m, MRMS sample. (see MDT report for timings) suspect chamber opening.	
17:50	**18:50**	**Chamber seal problem. No indication of opening the sample chambers. Analyse logs**	**01:00**
18:50	**19:35**	**Get off the wall, retract probe – to test MDT tool. Attempted to pump up – successful. Move string pump down, screens blocked, clean up.**	**00:45**
19:35	19:45	GR correlate from 2640m. 0.2m deeper. Correct depth.	
19:45	**20:20**	**Move to sample point 2641.0m, MRMS sample. (see MDT report for timings). Pump working intermittently.**	**00:35**
20:20	**21:00**	**POOH and check MDT**	**00:40**
21:00	**23:30**	**Redress multisample chamber, swap sample chambers, change pump out sub. Pump out full of sand. No sample recovery at 2602m, and 2627.5m.**	**02:30**
23:30	**23:50**	**MDT tool check.**	**00:20**
23:50	**01:00**	**RIH to 2660m**	
01:00	01:12	**28-July** GR correlated from 2660m. 0.6m shallower, correct depth	
01:12	02:50	Move to sample point 2602.0m, MRMS sample. (see MDT report for timings)	
02:50	0:430	Move to sample point 2627.5m, MRMS sample. (see MDT report for timings). **From 03:50 hrs have trouble opening the sample chamber**. At 04:05hrs opened second sample chamber	**00:15**
04:30	04:43	Move to sample point 2641.0, MRMS sample. (see MDT report for timings). Lost seal. Retract probe, reset, tight formation.	
04:43	05:15	Move point down 0.3m to 2641.3m. Slow pretest, low mobility 0.8. Began pumping at 300rpm (pumped 0.5L in 7 minutes), produced a draw down of 2200psi. Abort and retract.	
05:15	05:27	Move point up to 2640.8m. Tight formation. Abort point	
05:27	05:37	GR correlation from 2655m. 0.2m deeper, correct depth.	
05:37	06:32	Move to sample point at 2641.0m. Begin pumping 05:50.	
06:32	07:23	Wait on Build Up at 2641m, complete pretest and retract.	
07:23	07:40	Move to sample point 2663m, Formation tight, move to 2663.2m	
07:40	09:42	On station sample point 2663.2m, MRMS sample and Build Up. (see MDT report for timings) Shut in for 53min. Unlatch and move to next sample station.	

CIRCULATION HISTORY & DIARY OF OPERATIONS (cont)			
From	**To**	**Activity** (Downtime/Lost time in bold typeface)	**Lost time**
09:42	10:07	On station sample point 2667.5m, MRMS sample. Conduct pretest, formation pressure to high, reset packer.	
10:07	**10:35**	**Sample pump only pumping on one stroke. Abort sampling and trouble shoot pump from surface.**	**00:28**
10:35	11:09	Re-commence pumping out at 2667.5m	
11:09	11:20	Move to station 2724m, for pre-test. Tight abort and move down 0.5m	
11:21	11:34	2724.5m pre-test.	
11:34	11:43	Move to Station 2726.5m and conduct pre-test.	
11:45	13:22	Move to Station 2728.5m Sample 1 gallon and 450cc. One gallon chamber failed to open divert to second One Gallon chamber.	
13:22	13:40	Move to Station 2756m Sample 450cc.	
13:40	**14:10**	**Pump stopped, only pumping on one stroke. Trouble shoot pump from surface.**	**00:30**
14:30	14:36	Commenced pumping at 2756m, and take 450cc sample	
14:36	15:06	Move to Station 2759m, OFA analysis “gas” no sample taken.	
15:06	15:17	Move to Station 2763m. Test aborted “supercharged”, move down 0.5m	
15:17	15:28	Move to Station 2763.5m, Test aborted seal failure.	
15:28	15:42	Retract, and Re-Set tool with 20cc Draw Down, seal ok. Conduct OFA analysis.	
15:42	**15:45**	**Pump stopped, only pumping on one stroke. Trouble shoot pump from surface.**	**00:03**
15:45	16:03	Pump fixed resume pumping sample through OFA at 2763.5m	
16:03	16:45	Move to Station 2792m, collect 2 X 450cc samples.	
16:45	**16:50**	**Problem with Strain gauge - Pump down through equalization valve to help stabilize Strain Gauge. Problem not resolved. 16:45 -**	**00:05**
16:50	17:05	Move to Station 2885m, OFA analysis. Formation tight, retract tool and move down 0.5m.	
17:07	17:53	Move to Station 2885.4m. OFA analysis indicates gas no sample taken.	
17:53	19:03	Finished MDT and Pull out of hole.	
19:03	20:11	Rig down MDT tools	
20:11	21:10	Check MSCT coring tools.	
21:10	22:15	RIH MSCT	
22:15	22:30	GR Correlate, found to be 2m deep.	
22:30	22:36	MSCT core point @ 2450m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
22:36	22:48	MSCT core point @ 2586m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
22:48	22:59	MSCT core point @ 2594m. Anchor shoe open and start coring. Stop coring and close anchor shoe. Hard Formation.	
22:59	23:09	MSCT core point @ 2598m. Anchor shoe open and start coring. Stop coring and close anchor shoe. Hard Formation.	
23:12	23:18	MSCT core point @ 2602m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
23:20	23:24	MSCT core point @ 2610m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
23:25	23:29	MSCT core point @ 2620m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
23:31	23:38	MSCT core point @ 2627.5m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	

CIRCULATION HISTORY & DIARY OF OPERATIONS (cont)

From	To	Activity (Downtime/Lost time in bold typeface)	Lost time
23:39	23:42	MSCT core point @ 2633.5m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
23:44	23:55	RIH and GR correlate. On depth.	
23:57	00:03	MSCT core point @ 2641m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
00:03	00:14	MSCT core point @ 2644m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
00:14	00:21	MSCT core point @ 2652m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
00:21	00:36	MSCT core point @ 2663m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
00:36	00:43	MSCT core point @ 2669m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
00:43	00:50	MSCT core point @ 2700.5m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
00:50	01:00	MSCT core point @ 2708.5m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
01:00	01:08	**29-July-01** MSCT core point @ 2721.5m. Anchor shoe open and start coring. Stop coring and close anchor shoe. Hard formation.	
01:08	01:25	MSCT core point @ 2728.5m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
01:25	01:32	RIH to 2650m. GR correlate. Shallower by 0.1m	
01:32	01:45	MSCT core point @ 2751m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
01:45	01:57	MSCT core point @ 2754m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
01:57	02:18	MSCT core point @ 2759m. Anchor shoe open and start coring. Stop coring. Problems with stalled coring motor. Close anchor shoe.	
02:19	02:25	MSCT core point @ 2763m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
02:27	02:33	MSCT core point @ 2764.5m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
02:37	02:45	MSCT core point @ 2783.0m. Anchor shoe open and start coring. Stop coring and close anchor shoe. Hard formation.	
02:50	02:57	RIH 2895m. GR correlate. Shallower by 0.1m, shift down.	
02:57	03:06	MSCT core point @ 2878.5m. Anchor shoe open and start coring. Stop coring and close anchor shoe.	
03:06	04:05	Pull out of hole MSCT. Cut 25 cores, recovered 20. Had loaded 29 rings (Blank, 10 grooved rings, Marker ring, 10 grooved rings, Marker ring, 6 grooved rings) in the MSCT tool. When tool opened found 33 rings (**Blank, 3 grooved rings**, Blank, 10 grooved rings, Marker ring, 10 grooved rings, Marker ring, 6 grooved rings). MSCT core lithology correlated with the logs, the two volcanic cores and the sixth shale core were found to be in the correct sequence. Indicating that the additional **Blank and 3 grooved rings** were left in the tool from a prior job had not been removed when loading the MSCT.	
04:05	04:15	Rig down Schlumberger	

HOLE PROBLEMS

There were no hole problems encountered. The hole was in good shape, except for a few places in the Volcanics where it was washed out.

COMMENTS

Run 1: PEX-HALS-DSI-HNGS-LEHQT. Had to slow down whilst logging down due to numerous software crashes. The software patch which was installed prior to the job, was faulty.
Run 2: MDT-GR-LEHQT. No serious problems during this run, except for 6 seal failures, and once the probe was leaking.
Run 3: FMI-HRLA-GR-LEHQT. Had to relog the HRLA from 2638m to 2575m to reconfirm the repeat of the resistivity data which had QC flags marked at places.
Run 4: MDT-GR-LEHQT. Had sample chamber seal problems at 2627.5m. After trouble shooting found that the pump out was the problem. Pulled out of hole, and found that 2 x 450cc sample chambers were empty.

Run 4A: MDT-GR-LEHQT Found sample pump pumping on one stroke at 2667.5m, 2756m, and 2763.5m. The strain gauge stopped working from 2792m @ 16:45 hrs on the 28th "July.

Run 5: MSCT-GR-LEHQT: Pull out of hole MSCT. Cut 25 cores, recovered 20. Had loaded 29 rings (Blank, 10 grooved rings, Marker ring, 10 grooved rings, Marker ring, 6 grooved rings) in the MSCT tool. When tool opened found 33 rings (**Blank, 3 grooved rings**, Blank, 10 grooved rings, Marker ring, 10 grooved rings, Marker ring, 6 grooved rings). MSCT core lithology correlated with the logs, the two volcanic cores and the sixth shale core were found to be in the correct sequence. Indicating that the additional **Blank and 3 grooved rings** were left in the tool from a prior job had not been removed when loading the MSCT.

FIELD ELECTRIC LOG REPORT

GENERAL INFORMATION

WELL:	**East Pilchard - 1**	**REPORT NUMBER 1**
LOCATION:	**Local:**	Suite # 2 at 3138m RT
	Lat : 38° 11'54.184"S	
	Long: 148° 33' 42.825"E	
	AMG: X= 5771005.83 N	**WATER DEPTH:** 91.3m
	Y= 636764.56 E	
		RT TO MSL: 25m
PERMIT:	VIC/L9	**LOGGING COMPANY:** Schlumberger
AREA:	Bass Straits	**LOGGING ENGINEER:** Francisco/Rohan
COUNTRY:	Australia	**GEOLOGIST:** Arnaldo Ribeiro/M Woodmansee

LOGGING SUITE NUMBER 2

DATE LOGGED: 02/08/01 - 05/08/01	**DRILLERS DEPTH:** 3138m
HOLE SIZE: 12 1/4"	**LOGGERS DEPTH:** 3140.6
CASING SHOE: 873m	**LOGGERS CASING SHOE:** 873m

LABEL	TYPE OF LOG	FROM	TO	RPT. SECT. / SUMMARY.	Time Since Last Circ / BHT
1	TLD-HGNS-HNGS	3139m	2870m	Repeat 3139m - 3078m	9:40 hrs/ BHT = 97.8°C, 97.8°C and 98.9°C
2	HALS-HGNS-DSI-LEHQT	3139m	2870m	Repeat 3139m - 3080m	14:46 hrs/ BHT = 103.3°C, 103.3°C, 102.2°C
3	MDT-GR-LEHQT (for pressures)	2825.5m	2956.2m	17 pre-tests, 9 dry,2 lost seal, 1 tight, 5 good.	Did not reach TD.
4	DUAL-CSAT-VSP	3140m	146m	Check shot at 1775m	38:11 hrs/BHT = 111.1°C, 113.9°C,110°C
5	MDT-GR-LEHQT (for pressures and samples)	2825.5m	3125.5m	41 pre-tests. 13 good, 12 lost seal/supercharged, 12 tight, 8 samples taken from 4 depths 7 recovered	70:45 hrs/ BHT 117.7°C, 118.3°C, 118.9°C, 122.5°C
6	CST-GR	3134m	1650m	Shot 60 cores shot, 54 recovered, 2 Empty, 4 miss fire	

MUD DATA

MUD TYPE:	KCL/PHPA/Glycol/GEM	**SAMPLE SOURCE:**	Flowline
MUD WEIGHT:	10.1ppg	**Rm @ Measured Temp.**	0.1020@15.6°C
FUNNEL VISCOSITY:	61	**Rmf @ Meas. Temp.**	0.0883@15.6°C
pH:	9.5	**Rmc @ Measured Temp.**	0.2055@15.6°C
FLUID LOSS	2.8	**Rm @ BHT.**	

CHLORIDES: (Titration/Water phase)	46000	**COMMENTS:**	Last circulation 22:40hrs on 01st Aug 2001.

CIRCULATION HISTORY & DIARY OF OPERATIONS

From	To	Activity (Downtime/Lost time in bold typeface)	Lost time
	09:00 hrs	**01-Aug-01** East Pilchard reached TD at 3138m	

CIRCULATION HISTORY & DIARY OF OPERATIONS (cont)

From	To	Activity (Downtime/Lost time in bold typeface)	Lost time
09:00	15:45	Circulate bottoms up and pull out for a wiper trip to the shoe.	
15:45	05:35	**02-Aug-01** Pull out of the hole. Last Circulation at 3138 m 22:40 hrs on 1st Aug.	
05:35	05:45	JSA	
05:45	06:25	Schlumberger rig up sheaves and rig up **Run #1 TLD-HGNS-HNGS**.	
06:25	06:45	Load Sources	
06:45	06:50	Compensate up	
06:50	07:04	RIH to 910m.	
07:04	07:11	Open calipers and log up the shoe. Shoe found at 873.2m. Caliper found to be 12.83" adjust to read 12.41". Close calipers.	
07:11	07:57	RIH (8350ft/hr – 10100ft/hr) to 2870m	
07:57	08:20	Start logging down at 2870m at 2500ft/hr.	
08:20		Tag bottom at (bottom of hole washed out to 24" inches)	
08:20	08:38	Start repeat section from TD to 3078m.	
08:38	08:47	Running back to bottom.	
08:47	10:01	Start main log TD to 2870m. Very Hi-Res 900ft/hr, 3083m minor overpull	
10:01	10:25	Pull out of the hole. Re-process data and depth correct. TD corrected to 3140.6m	
10:25	11:30	Break down tools	
11:30	12:00	Make up **Run #2 HALS-HGNS-DSI-LEHQT**	
12:00	12:12	Run into hole Run #2	
12:12	12:16	Casing check, casing shoe 873m, sonic 57.2us/ft	
12:16	12:53	Run in hole to 2850m	
12:53	13:13	Log down from 2870m to TD. Tag TD at	
13:13	13:22	Log repeat section TD to 3080m,	
13:22	13:26	Run back to bottom	
13:26	14:00	Log main log, HALS-DSI in P & S in Upper Dipole Mode	
14:00	14:50	Pull out of hole	
14:50	15:10	Rig down Run #2	
15:10	16:30	Rig up **Run #3 MDT-GR-LEHQT**	
16:30	16:45	Surface checks	
16:45	**17:45**	**Run into hole Run #3 to 2088m, could not communicate with PS (probe).**	**01:00**
17:45	**18:15**	**POOH to 700m checking tool. Started to work. (moisture in tool the cause)**	**00:30**
18:15	18:50	RIH to 2825m	
18:50	19:00	Gr correlate 1m shallower. Adjust depth	

19:00	19:08	RIH to 2825m, check GR again. Need good correlation as we have thin sands. 0.1m deeper. Adjust depth	
19:08	19:30	At station 2825.5m, observed pretest pressure drop to 33psia, redo test. Dry test.	
19:30	19:40	At station 2833m,	
19:40	19:53	RIH to 2873m, correlate, adjust 0.3m	
19:53	20:03	At station 2825.64m. Dry test	
20:03	20:07	At station 2829.99m. Dry test	
20:07	20:16	At station 2830.33m. Lost seal	
20:16	20:27	At station 2885.31m. Lost seal	
20:27	21:13	continue stations to sample 9	

CIRCULATION HISTORY & DIARY OF OPERATIONS (cont)

From	To	Activity (Downtime/Lost time in bold typeface)	Lost time
21:13	21:19	Gr correlate, from 2930m, shallow by 0.3m. Adjust depth	
21:19	22:15	Suspect tool at stations on less permeable sands	
22:15	**22:55**	**Check tool at 2936.36m and redo a pretest and pump out. Found formation pressure build up very slow after stopping the pump.**	**00:40**
22:55	23:10	Pretest at 2950.5m. OK	
23:10	**23:15**	**Prestest at 2956.2m. Dry test again. Decide to check tool at surface**	**00:05**
23:15	**00:34**	**POOH. Tool at surface.**	**01:19**
00:34	**01:25**	**03-Aug-01 Lay down sample chamber, clean and check tool. Probe filter found to be partially clogged with mud cake, but was still OK. Found slow hydraulic pressure leak in the tool. Decided to change to the back up tool.**	**00:51**
01:25	**02:00**	**Change MDT tool (change HY and PS).**	**00:35**
02:00	**03:05**	**Rig up Run #3A MDT-GR-LEHQT. Check PS, OK. RIH to 80m.**	**01:05**
03:05	**04:45**	**Unable to communicate with PS. Telemetry problem. Disconnect tools. Found connector problem. Function test probe. OK. Pump silicone oil from a hole in the tool, which came out through the probe. Probe OK.**	**01:40**
04:45	**04:48**	**Tool zero, and RIH to 80m. Encountered same problem as 03:05 hrs. Unable to communicate with PS. Telemetry problem. Everytime the tool is in the mud, we have the problem.**	**00:03**
04:48	**05:55**	**POOH and disconnect head. Check insulation, OK. Change PS module used in run #3**	**01:07**
05:55	**06:21**	**Check tool, connect MRMS and RIH.**	**00:26**
06:21	07:30	Rig up **Run #4 DUAL CSAT-VSP**	
07:30	07:40	Run in hole Run #4	
07:40	09:00	Test air gun and tune, test surface acquisition at 768m. gun set 5m below sea level.	
09:00	09:33	Finished check shot at 768m correct to 757m (330.17ms) after Gamma correlation at 1775m	
09:33	10:25	Run down to 1775m and Gamma (crank up 11.0 m) correlate for check shot. top 684.48ms bottom 694.0ms	
10:25	11:12	Run down to 3005m function test tool ok , bottom sensor 1023.23ms top sensor 1020.95ms	
11:12	11:22	Gamma correlation at 3100m crank 0.2m	

11:22	12:51	Increase air pressure to 2050psi, tag bottom at 3140m start velocity survey first point 3140m, take velocities every 15m with extra specified depths. (measure 14 stations)	
12:51	13:45	Hoist air guns out of the water to clear crane for chopper arrival / departure. Three guns working.	
13:45	15:19	Continue VSP from station 2930m going up. Gamma tracked for correlation while moving between stations.	
15:19	15:53	Hoist air guns out of the water to clear crane for chopper arrival / departure	
15:53	21:07	Continue VSP from station 2720m going up. Gamma tracked for correlation while moving between stations. Adjust depth by 0.1m at station 2240m.Adjust depth at station 1970m, by 0.15m (deeper).Check shot at 1775 repeated. OK(684.72 and 684.48ms). Adjust depth at 1730m, 0.1m deeper.	
21:07	23:15	Take check shots from 1476m.	
23:15	23:40	POOH.	
23:40	00:12	**4 Aug 2001** Rig down DUAL CSAT-VSP	
00:12	01:25	**Rig up run #5 MDT-GR-LEHQT**	

CIRCULATION HISTORY & DIARY OF OPERATIONS (cont)

From	To	Activity (Downtime/Lost time in bold typeface)	Lost time
01:25	**05:15**	**Found a leak in the rope socket. Cut the cable and terminate it. Still have a leak in one of the conductor wires. Found two cables with their shields partially cut in the collector of the cable drum. Terminate it. Cut 5meters of the cable at the rope socket end, and terminate it. Still have a leak. Rewire it so that the MDT can use 6 wires out of seven.**	**3:50**
05:15	05:50	Rig up and RIH to 935m.	
05:50	06:38	Check Probe function at 935m.	
06:38	06:53	Correlate Gammar, reset up 0.4m, @ 2670	
06:53	07:03	On first station 2825.5m	
07:03	07:06	Having trouble getting draw down above 0.7cc	
07:06	07:22	Resume test, lost seal, reset, good test.	
07:22	09:38	Complete tests, pre-tests 2830.0m, 2833.0m, 2925.53m, 2926.8m, 2934.0m, 2936.6m, 2947.6m, 2950.8m, 2956m. strain gauge failed at 09:38 hrs on test 2956m. 600 psi pressure increase when unlatching.	
09:58	10:24	On sample station 2965m pre-test and two MRSM samples 1 certified 1 none certified.	
		Pre-test reservoir pressure to high re-set packer, try pump to achieve packer seal. conduct pre-test. Suspect high pressure move up 0.5m	
10:24	11:53	On station 2965.5m good pre-test, divert through OFA, fill 2 X 450cc MRSM chambers, I certified one none certified. poor indication of first chamber opening divert to new chamber. fill 2 chambers, conduct 38min build up.	
11:53	14”03	Pre-test 3025.0m tight, 3025.2m tight, 3025.8m OK, 3027.2m tight, 3027.5 super charged, 3028.4m tight, 3033.2 m OK, 3035.1m tight, 3034.5m ok, 3047.9m tight.	
14:03	14:15	Gamma Correlation at 3070m, crank 0.9 down.	
14:15	14:15	Move to sample station 3074.5m. to tight to sample move to 3074.7m supercharged	
14:50	14:56	Re-check Gamma at 3070m	
14:56	15:17	Move to sample station 3074.3m. Probably supercharged, attempt pump out DD 2000 psi. draw down abort test.	
15:17	16:14	Move to next sample point 3077.0m tight, 3080.9m tight, 3089.0m tight, 3093.8m supercharged	

16:14	17:27	sample point 3095m Pre-test and divert to OFA and take two 450cc MRSM samples	
17:27	17:40	Move to sample station 3103.5m supercharged/leaking	
1740	18:43	3103.8m Pre-test and divert to OFA and take two 450cc MRSM samples	
1843	19:50	Move to station 3110.2m super charged, 3110.5m tight, 3114m super charged, 3115.1 leaking, 3116.8m leaking, 3121m leaking	
19:50	21:17	3122m pre-test, divert to OFA, collect 2 X 450cc MRSM samples	
21:17	21:25	Station 3125.5m , tight.	
21:25	22:30	Pull out of hole Run # 5	
22:30	23:20	rig down run #5 MDT-GR-LEHQT	
23:20	00:12	**5 August 2001** Prepare Rig up for **Run #6 CST-GR**	
00:15	00:36	JSA undertaken for procedure	
00:36	01:54	RIH to 3100 m	

CIRCULATION HISTORY & DIARY OF OPERATIONS (cont)

From	To	Activity (Downtime/Lost time in bold typeface)	Lost time
01:54	01:57	Gamma correlation at 3100m on depth.	
01:57	02:03	Run to bottom	
02:03	03:16	Pull up firing each bullet while stationary, 3134, 3130?, 3127, 3115, 3088, 3087, 3072, 3056, 3018?, 3005, 2997, 2965, 2959?, 2943, 2932?, 2911, 2905, 2985, 2887, 2875, 2857, 2850, 2835, 2821, 2810, 2800, 2771, 2761, 2747, 2730?, 2698.	
03:16	03:18	Gamma correlate at 2700m on depth.	
03:18	04:57	Move to next sample and fire at 2690m, 2675, 2654, 2647, 2613, 2604, 2590, 2582, 2565, 2557, 2555, 2545, 2535, 2525, 2513, 2480, 2475?, 2433, 2420, 2398 (tension), 2369.5, 2177, 2105, 2014, 1983, 1720, 1680, 1658, 1650 (tension).	
04:57	05:55	POOH to 227.8m,	
05:55	05:58	Awaiting radio clearance for explosives.	
05:58	06:24	Continue POOH, and samples brought to the surface	

HOLE PROBLEMS

There were no hole problems encountered. The hole was in good shape, except for a few places in the Volcanics where it was washed out.

COMMENTS

Run 1: TLD-HGNS-HNGS Run went well

Run 2: HALS-HGNS-DSI-LEHQT Run went well

Run 3: MDT-GR-LEHQT (for pressures) 17 pre-tests, 9 dry, 2 lost seal, 5good, 1 tight. Communication lost with probe while running into the hole, pulled out of the hole to 700m where communication was re-established. The tool was then run in to the hole, After a series of suspect dry tests (formation pressures reading negative or zero and not building up) the tool was pulled out for testing and replaced with the backup. The backup tool was run into the hole, however while running in telemetry problems were encountered each time the tool was run into the mud. The MDT run was then abandoned and we moved on to the DUAL-CSAT-VSP run. While rigging up the MDT for Run #5 an electrical leak was found in the rope socket, the cable was cut (5 metres) and shortened in an attempt to fix it. However there remained a leak in one of the conductor wires, also two cables had their shields partially cut in the connector at the cable drum. The electrical leak persisted so the tool was re-wired to use 6 wires out of the seven in the cable, this fixed the problem. While trouble shoots the tool a small screw was found to be loose in the AMS module this module contains electronics for the signal transmission to surface,

Run 4: DUAL-CSAT-VSP Run went well

Run 5: MDT-GR-LEHQT (for pressures and samples) 41 pre-tests. 13 good, 12 lost seal/supercharged, 12 tight, 8 samples taken from 4 depths 7 recovered. The strain gauge failed at test 2956m about half way through the run.
Problems occurred with the electrical connections prior to running the tool. These are outlined above under Run 3 discussion, and are probably related to the problems that occurred during that (run 3#) run.

Run 6: CST-GR Shot 60 cores shot, 54 recovered, 2 Empty, 4 miss fire