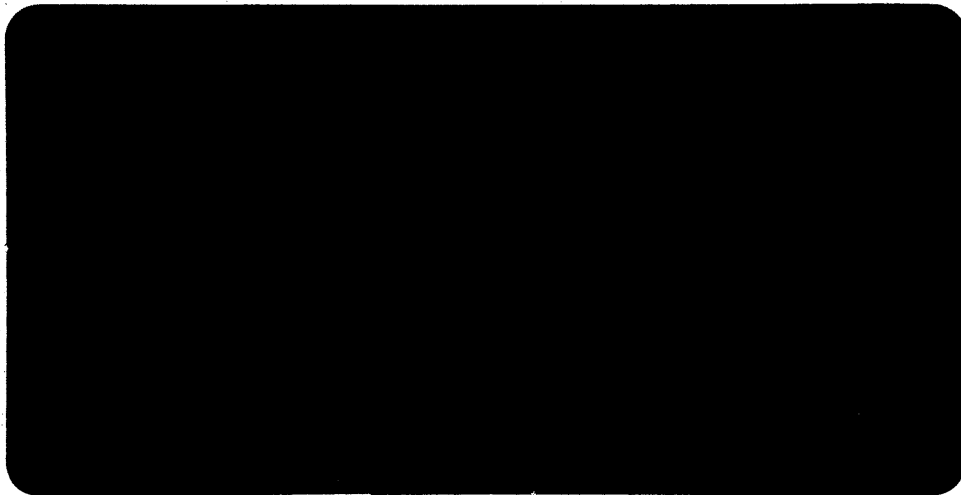




AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.



ATTACHMENT 5

WCR SPEKE-1

(W870)

ATTACHMENT 5

W870

SPEKE-1

Well-to-Seismic Tie

OIL and GAS DIVISION

J. R. Hoare  
June, 1985

16 AUG 1985 W.C.R.

to accompany:

SPEKE-1 WELL COMPLETION REPORT

PG/226/84

### Well-to-Seismic Tie

Correlation between the synthetic seismogram and the seismic data is good, with horizons intersected in the well as interpreted on the seismic.

The synthetic seismogram (Enclosure 1), produced in-house by Elf-Aquitaine, shows a good tie at the well location (S.P. 230 on GA82B-211A). Best correlation is observed with the minimum phase wavelet (20 Hz at the lower part of the section, 35 Hz in the upper part). Only the sonic log was used in calculating the synthetic seismogram response.

It should be noted that the initial checkshot times displayed in Schlumberger's CSU Velocity Survey Field Log are inaccurate due to subtraction of erroneous reference pulse times. Times to the moonpool hydrophone were subtracted instead of times to the reference phone suspended below the airgun. Schlumberger subsequently produced correct checkshot times, as given in this report, and supplied a complimentary GEOGRAM (Enclosures 2 and 3). The GEOGRAM produced with the 20 Hz zero-phase wavelet ("reverse polarity") corresponds in every detail to the 20 Hz zero-phase synthetic seismogram produced by Elf-Aquitaine.

The relationship of the geological section to the seismic is shown in Enclosure 4.

Relevant pages from the final Schlumberger report are included overleaf.

## DATA ACQUISITION

### FIELD EQUIPMENT

Energy Source : Bolt airgun (model 1900B)  
200 cu.in.

Source Offset : 48.0m

Source Depth : 4m below MSL

Source Azimuth : 65 Deg.

Reference Sensor : Accelerometer

Sensor Offset : 48.0m

Sensor Depth : 4m below MSL

Downhole Geophone : Geospace HS-1  
High temperature (350 Deg. F), Coil Resistance  
225 + 10%, Natural Frequency 8-12 Hz, Sensitivity  
0.45 V/in/sec. Maximum tilt angle 60 Deg. Min.

### Recording Instrument

Recording was made on the Schlumberger Computerized Service Unit (CSU)  
using LIS format recorded.

### SHOT DATA

Level Depth (m below KB)	Stacked Shots	Rejected Shots	Quality	Comment
2750	3	19	Good	
2600	7	3	Good	
2580	0	8	Bad	Omitted
2430	4	2	Good	
2190	4	0	Good	
1970	4	2	Good	
1880	8	0	Good	
1775	10	0	Good	
1700	4	0	Good	
1450	8	0	Good	
1275	4	0	Good	
1250	0	6	Bad	Omitted
1080	4	0	Good	
1050	2	4	Good	
1010	2	12	Good	
950	4	0	Good	
940	4	0	Good	
690	5	5	Poor	Omitted
675	15	0	Poor	Omitted
460	3	7	Poor	Omitted
250	6	6	Poor	Omitted

A total of 21 check levels were shot with the number of stacked and rejected shots for each level being shown in the table above.

The shot data for the levels at 1250m and 2580m below KB was affected by poor coupling of the well geophone with the formation and hence no shots from these levels have been used in the stacked results.

The check shot data has been stacked after subtracting a constant surface sensor delay time from each geophone record. With the absence of any other reliable surface sensor data this constant delay time of 22ms has been obtained from the accelerometer signal times at 250m and 940m below KB.

At and above 690m below KB the stacked data was distorted by noise and the first arrival pulse for these levels is not clearly defined. These levels have not been used in the computations or the calibration of the sonic log.

The general data quality was fair to good and a plot of the stacked check shot data (PLOT 1) has been displayed.

COMPANY : AUST. AQUITAINE

WELL : SPEKE 1

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LEVEL NUMBER	MEASUR DEPTH FROM KB M	VERTIC DEPTH FROM SRD M	VERTIC DEPTH FROM GL M	OBSERV TRAVEL TIME HYD/GEO MS	VERTIC TRAVEL TIME SRC/GEU MS	VERTIC TRAVEL TIME SRD/GEU MS	AVERAGE VELOC SRD/GEU M/S	DELTA DEPTH BETWEEN SHOTS M	DELTA TIME BETWEEN SHOTS MS	INTERV VELOC BETWEEN SHOTS M/S
SEARED	77.00	55.00	0	47.32	34.46	37.16	1480			
IMPOSED	220.07	198.07	143.07	101.29	98.33	101.03	1961	143.07	63.87	2240
3	940.00	918.00	863.00	378.00	377.48	380.18	2415	719.93	279.15	2579
4	950.00	928.00	873.00	382.00	381.49	384.19	2415	10.00	4.01	2496
5	1010.00	988.00	933.00	404.00	403.52	406.22	2432	60.00	22.03	2723
6	1050.00	1028.00	973.00	416.00	415.54	418.25	2458	40.00	12.02	3327
7	1080.00	1058.00	1003.00	425.00	424.56	427.26	2476	30.00	9.02	3327
8	1275.00	1253.00	1198.00	487.00	486.64	489.34	2561	195.00	62.08	3141
9	1450.00	1428.00	1373.00	541.00	540.69	543.40	2628	175.00	54.05	3238
10	1700.00	1678.00	1623.00	618.00	617.75	620.45	2704	250.00	77.05	3245
11	1775.00	1753.00	1698.00	645.00	644.76	647.46	2708	75.00	27.01	2777
12	1880.00	1858.00	1803.00	679.00	678.77	681.48	2726	105.00	34.02	3087
13	1970.00	1948.00	1893.00	703.00	702.79	705.49	2761	90.00	24.01	3748
14	2190.00	2168.00	2113.00	769.00	768.81	771.51	2810	220.00	66.03	3332
15	2430.00	2408.00	2353.00	837.00	836.83	839.54	2868	240.00	68.02	3528
16	2600.00	2578.00	2523.00	879.00	878.85	881.55	2924	170.00	42.01	4046
17	2750.00	2728.00	2673.00	921.00	920.86	923.56	2954	150.00	42.01	3571

Vertical and Datum-corrected Checkshots

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1330.1	1805.90			.018	.64267	.01156	.03853	.02697
1332.1	1808.73	2832	2,364	-.005	.64265	-.00324	-.04047	-.03723
1334.1	1811.53	2806	2,362	.015	.64251	.00960	.01938	.00978
1336.1	1814.43	2893	2,361	-.002	.64250	-.00108	-.01702	-.01594
1338.1	1817.31	2885	2,359	-.002	.64250	-.00142	.01707	.01848
1340.1	1820.19	2875	2,357	.005	.64249	.00292	.02751	.02459
1342.1	1823.09	2903	2,355	.037	.64163	.02346	.02529	.00182
* 1344.1	1826.22	3126	2,353	.130	.63081	.08331	.06832	-.01499
1346.1	1830.01	3794	2,517	-.088	.62593	-.05550	-.05203	.00347
1348.1	1833.48	3471	2,307	.073	.62257	.04585	.03574	-.01011
1350.1	1837.23	3752	2,471	-.031	.62198	-.01927	.02361	.04288
1352.1	1840.81	3575	2,438	-.055	.62010	-.03418	-.05969	-.02550
1354.1	1844.24	3430	2,276	-.001	.62010	-.00077	.03541	.03618
1356.1	1847.68	3438	2,265	-.001	.62009	-.00090	-.03001	-.02911
1358.1	1851.12	3446	2,254	-.001	.62009	-.00085	.00152	.00237
1360.1	1854.58	3457	2,240	-.011	.62001	-.00713	-.00588	.00126
1362.1	1858.01	3434	2,204	.009	.61996	.00538	.01413	.00875
1364.1	1861.48	3467	2,221	0	.61996	-.00010	-.01753	-.01743
1366.1	1864.92	3441	2,237	.002	.61996	.00135	.01034	.00899
1368.1	1868.40	3479	2,223	-.002	.61996	-.00140	-.02049	-.01910
1370.1	1871.87	3467	2,220	-.004	.61995	-.00219	-.00535	-.00316
1372.1	1875.28	3411	2,241	.106	.61295	.06587	.02232	-.04355
1374.1	1879.03	3751	2,522	-.134	.60189	-.08233	-.01437	.06797
1376.1	1882.28	3254	2,219	-.016	.60174	-.00965	-.02301	-.01337
1378.1	1885.47	3191	2,191	.116	.59364	.06979	.07918	.00939

\* Brown Horizon

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1428.1	1972.73			.012	.57547	.00663	.00953	.00290
1430.1	1976.25	3522	2,269	-.001	.57547	-.00067	-.01623	-.01556
1432.1	1979.76	3514	2,269	-.003	.57547	-.00155	.01870	.02024
1434.1	1983.27	3510	2,259	.053	.57385	.03050	.02623	-.00427
1436.1	1987.03	3756	2,348	.021	.57361	.01182	.05339	.04156
1438.1	1990.69	3659	2,511	-.068	.57093	-.03916	-.05157	-.01241
1440.1	1994.15	3459	2,317	-.005	.57092	-.00270	-.00299	-.00029
1442.1	1997.64	3498	2,270	-.010	.57086	-.00579	-.03928	-.03349
1444.1	2001.07	3424	2,272	-.007	.57083	-.00398	.03010	.03408
1446.1	2004.44	3375	2,273	-.114	.56348	-.06479	-.09863	-.03383
1448.1	2007.37	2933	2,082	.114	.55614	.06429	.02345	-.04085
1450.1	2010.81	3434	2,237	-.002	.55614	-.00086	.01591	.01677
1452.1	2014.31	3500	2,188	.049	.55479	.02743	.05592	.02849
1454.1	2017.92	3607	2,343	-.110	.54811	-.06086	-.05536	.00549
1456.1	2021.16	3248	2,087	.085	.54416	.04643	.02215	-.02428
1458.1	2024.82	3656	2,198	.014	.54408	.00740	.03992	.03253
1460.1	2028.46	3643	2,267	-.415	.45027	-.22592	-.24512	-.01920
1462.1	2030.80	2340	1,458	-.025	.44999	-.01121	-.06873	-.05752
1464.1	2033.23	2426	1,338	.472	.34959	.21255	.16249	-.05006
1466.1	2037.09	3864	2,345	-.161	.34051	-.05634	.01837	.07471
1468.1	2040.14	3050	2,146	.039	.33999	.01330	.04492	.03162
1470.1	2043.41	3271	2,163	-.278	.31363	-.09468	-.08964	.00503
1472.1	2046.07	2653	1,505	.386	.26679	.12120	.06777	-.05343
1474.1	2050.04	3972	2,272	.014	.26674	.00370	.04383	.04012
1476.1	2053.82	3780	2,454	-.065	.26560	-.01740	.09904	.11643



COMPANY : AUST. AQUITAINE

WELL : SPEKE 1

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TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEM. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1526.1	2142.07			-.033	.18471	-.00608	-.17908	-.17299
1528.1	2144.07	2002	1.293	.234	.17459	.04326	-.04148	-.08474
1530.1	2146.70	2632	1.585	-.092	.17311	-.01603	-.01713	-.00110
1532.1	2149.17	2467	1.407	.411	.14385	.07117	.08218	.01100
1534.1	2152.76	3588	2.318	0	.14385	-.00001	.04338	.04339
1536.1	2156.33	3571	2.328	.009	.14384	.00129	.02845	.02716
1538.1	2159.98	3657	2.315	.036	.14366	.00512	.08150	.07639
1540.1	2163.73	3743	2.429	.002	.14366	.00032	.08877	.08845
1542.1	2167.56	3835	2.381	-.044	.14338	-.00629	.01059	.01688
1544.1	2171.14	3580	2.336	0	.14338	.00004	-.03559	-.03562
1546.1	2174.77	3622	2.311	-.043	.14311	-.00617	-.00434	.00182
1548.1	2178.13	3365	2.282	.122	.14097	.01752	.02016	.00264
1550.1	2182.02	3889	2.525	-.026	.14087	-.00366	.03613	.03979
1552.1	2185.85	3826	2.437	.016	.14084	.00232	.01430	.01198
1554.1	2189.74	3898	2.472	-.120	.13881	-.01688	-.03224	-.01536
1556.1	2193.03	3285	2.305	-.407	.11584	-.05647	-.05275	.00372
1558.1	2195.25	2223	1.436	-.036	.11569	-.00413	-.03416	-.03003
1560.1	2197.55	2302	1.292	.532	.08297	.06153	-.01255	-.07408
1562.1	2201.54	3986	2.440	-.092	.08226	-.00766	.01220	.01986
1564.1	2204.97	3425	2.360	.050	.08206	.00408	.02655	.02248
1566.1	2208.62	3653	2.444	.030	.08199	.00246	.04528	.04282
1568.1	2212.48	3863	2.453	.001	.08199	.00012	-.09428	-.09440
1570.1	2216.27	3790	2.508	-.083	.08142	-.00685	.06692	.07377
1572.1	2219.78	3509	2.291	0	.08142	.00001	.00117	.00116
1574.1	2223.29	3507	2.294	-.003	.08142	-.00026	-.04464	-.04438

• Purple Horizon

COMPANY : AUST, AQUITAINE

WELL : SPEKE 1

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TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1576.1	2226.73	3441	2,322					
		3738	2,415	.061	.08111	.00496	.00761	.00265
1578.1	2230.47	3947	2,518	.048	.08093	.00390	.02849	.02459
1580.1	2234.41	3368	2,435	-.096	.08018	-.00775	.00027	.00802
1582.1	2237.78	3602	2,228	-.011	.08017	-.00088	.04555	.04642
1584.1	2241.38	4134	2,570	.139	.07861	.01118	-.05312	-.06431
1586.1	2245.52	3581	2,336	-.119	.07750	-.00936	.03179	.04115
1588.1	2249.10	3455	2,356	-.014	.07749	-.00105	.01665	.01770
1590.1	2252.55	3523	2,309	0	.07749	-.00003	.07390	.07393
1592.1	2256.08	3431	2,286	-.018	.07746	-.00142	.07772	.07914
1594.1	2259.51	3468	2,289	.006	.07746	.00048	-.05126	-.05174
1596.1	2262.97	3533	2,291	.010	.07745	.00075	-.04843	-.04917
1598.1	2266.51	3568	2,301	.007	.07745	.00055	-.00018	-.00073
1600.1	2270.08	3199	2,116	-.096	.07673	-.00745	-.02511	-.01767
1602.1	2273.27	2755	2,003	-.102	.07593	-.00781	-.04464	-.03682
1604.1	2276.03	3659	2,372	.223	.07217	.01692	-.01805	-.03497
1606.1	2279.69	3743	2,583	.054	.07196	.00388	.02004	.01616
1608.1	2283.43	3314	2,156	-.150	.07034	-.01079	-.07964	-.06885
1610.1	2286.74	3387	2,322	.048	.07018	.00336	.03129	.02792
1612.1	2290.13	3925	2,465	.103	.06943	.00724	.02847	.02123
1614.1	2294.06	3803	2,451	-.019	.06941	-.00129	.08409	.08538
1616.1	2297.86	3586	2,368	-.047	.06926	-.00324	-.00262	.00061
1618.1	2301.45	4123	2,516	.100	.06857	.00692	-.09645	-.10337
1620.1	2305.57	3644	2,367	-.092	.06799	-.00631	.02619	.03249
1622.1	2309.21	3438	2,292	-.045	.06785	-.00307	.05430	.05737

Orange Horizon

FIGURES

AAP Dwg. No.

1. STACKED CHECKSHOT DATA

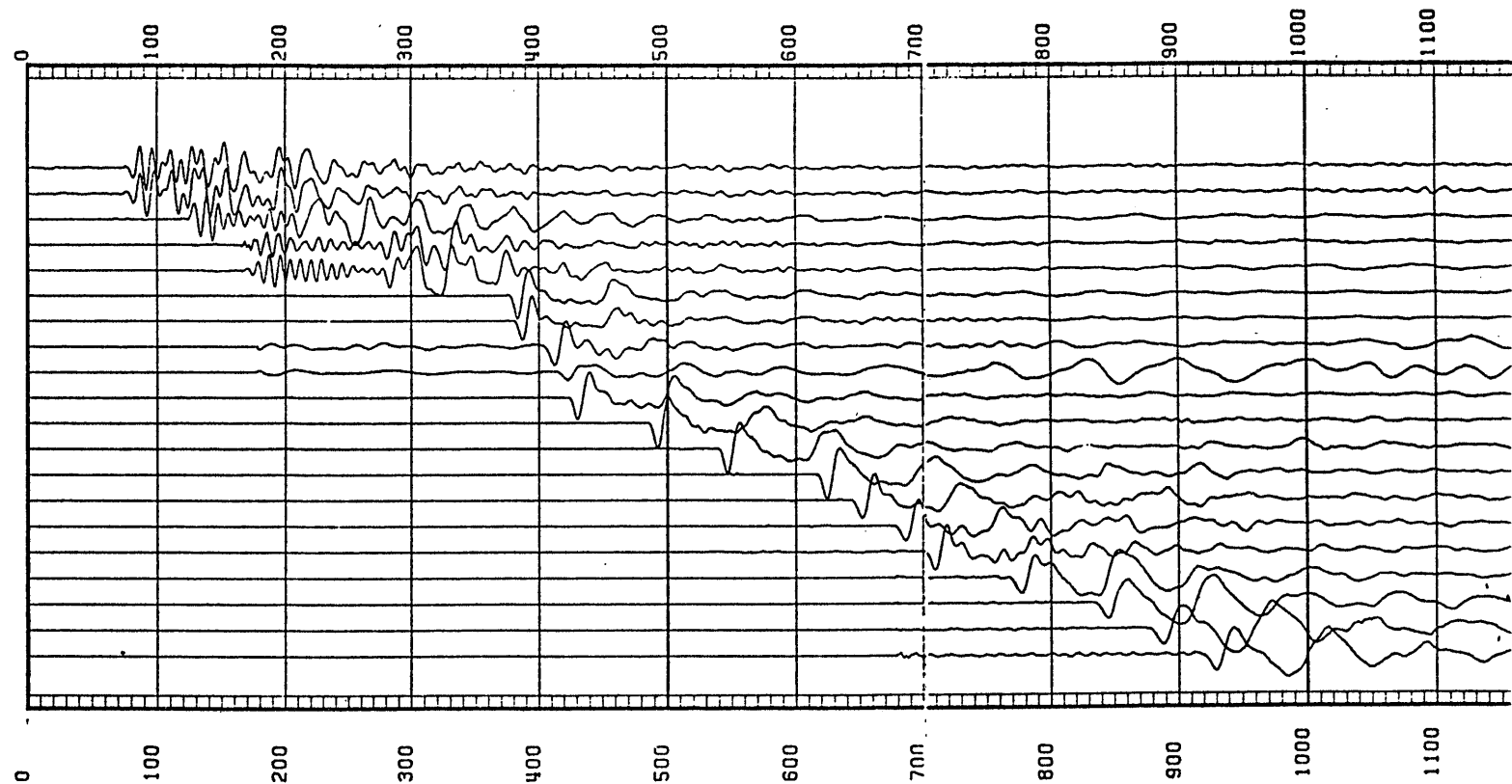
ENCLOSURES

AAP Dwg. No.

- |  |       |
|--|-------|
| 1. ELF-AQUITAINE IN-HOUSE SYNTHETIC SEISMOGRAM | 24930 |
| 2. SEISMIC CALIBRATION LOG (SCHLUMBERGER)      | 25049 |
| 3. GEOGRAM (SCHLUMBERGER)                      | 25050 |
| 4. WELL-TO-SEISMIC TIE SECTION                 | 25048 |

FIG 1 : STACKED CHECK SHOT DATA.

LEVEL	DEPTH M	TIME S	PEAK/PEAK
22	250.0	0.078	48213.43
21	250.1	0.078	44936.62
20	460.0	0.207	18237.20
19	675.0	0.278	13854.62
18	690.0	0.280	8729.20
17	940.0	0.378	6526.00
16	950.0	0.382	7992.25
15	1010.0	0.406	5403.33
14	1050.0	0.416	6836.50
13	1080.0	0.425	4532.75
11	1275.0	0.487	2813.50
10	1450.0	0.541	1837.25
9	1700.0	0.618	1405.75
8	1775.0	0.645	1762.30
7	1880.0	0.679	1850.37
6	1970.0	0.703	1473.00
5	2190.0	0.769	861.75
4	2430.0	0.837	567.75
2	2600.0	0.879	434.67
1	2750.0	0.921	399.00



PE603658

This is an enclosure indicator page.  
The enclosure PE603658 is enclosed within the  
container PE906329 at this location in this  
document.

The enclosure PE603658 has the following characteristics:

ITEM\_BARCODE = PE603658  
CONTAINER\_BARCODE = PE906329  
NAME = Synthetic Seismogram  
BASIN = GIPPSLAND  
PERMIT = VIC/P17  
TYPE = WELL  
SUBTYPE = SYNTH\_SEISMOGRAPH  
DESCRIPTION = Synthetic Seismogram (in house) for  
Speke-1  
REMARKS =  
DATE\_CREATED =  
DATE\_RECEIVED = 16/08/85  
W\_NO = W870  
WELL\_NAME = SPEKE-1  
CONTRACTOR =  
CLIENT\_OP\_CO = AUSTRALIAN AQUITAINE PETROLEUM

(Inserted by DNRE - Vic Govt Mines Dept)

PE601200

This is an enclosure indicator page.  
The enclosure PE601200 is enclosed within the  
container PE906329 at this location in this  
document.

The enclosure PE601200 has the following characteristics:

- ITEM\_BARCODE = PE601200
- CONTAINER\_BARCODE = PE906329
- NAME = Seismic Calibration Log
- BASIN = GIPPSLAND
- PERMIT =
- TYPE = WELL
- SUBTYPE = VELOCITY\_CHART
- DESCRIPTION = Seismic Calibration Log (enclosure from  
attachment 5 to WCR) for Speke-1
- REMARKS =
- DATE\_CREATED = 6/07/84
- DATE\_RECEIVED = 16/08/85
- W\_NO = W870
- WELL\_NAME = Speke-1
- CONTRACTOR = SCHLUMBERGER
- CLIENT\_OP\_CO = AUSTRALIAN AQUITAINE PETROL

(Inserted by DNRE - Vic Govt Mines Dept)

PE603659

This is an enclosure indicator page.  
The enclosure PE603659 is enclosed within the  
container PE906329 at this location in this  
document.

The enclosure PE603659 has the following characteristics:

ITEM\_BARCODE = PE603659  
CONTAINER\_BARCODE = PE906329  
NAME = Synthetic Seismogram (Geogram)  
BASIN = GIPPSLAND  
PERMIT = VIC/P17  
TYPE = WELL  
SUBTYPE = SYNTH\_SEISMOGRAPH  
DESCRIPTION = Synthetic Seismogram (Geogram) for  
Speke-1  
REMARKS =  
DATE\_CREATED = 3/06/85  
DATE\_RECEIVED = 16/08/85  
W\_NO = W870  
WELL\_NAME = SPEKE-1  
CONTRACTOR = SCHLUMBERGER  
CLIENT\_OP\_CO = AUSTRALIAN AQUITAINE PETROLEUM

(Inserted by DNRE - Vic Govt Mines Dept)

PE902465

This is an enclosure indicator page.  
The enclosure PE902465 is enclosed within the  
container PE906329 at this location in this  
document.

The enclosure PE902465 has the following characteristics:

ITEM\_BARCODE = PE902465  
CONTAINER\_BARCODE = PE906329  
NAME = GA82B Seismic Survey  
BASIN = GIPPSLAND  
PERMIT =  
TYPE = SEISMIC  
SUBTYPE = SECTION  
DESCRIPTION = GA82B Seismic Survey (from attachment 5  
to WCR) for Speke-1  
REMARKS =  
DATE\_CREATED = 30/09/82  
DATE\_RECEIVED = 16/08/85  
W\_NO = W870  
WELL\_NAME = Speke-1  
CONTRACTOR = WESTERN GEOPHYSICAL  
CLIENT\_OP\_CO = AUSTRALIAN AQUITAINE PETROL

(Inserted by DNRE - Vic Govt Mines Dept)