OIL and GAS DIVISION

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UNION TEXAS AUSTRALIA INC. WELL: PISCES No. 1

V.S.P. PROCESSING COMMENT:

A V.S.P. check level survey was conducted in this well on 9.5.1982. Check levels were shot generally at 20-30 m intervals, where possible, between 190 and 2568 m below KB.

The energy source was a 40 cu.in. single Bolt air gun operating at a pressure of 2000 psi. This has produced a generally consistent waveform although there is some variation throughout the deeper levels.

The well geophone signal for the check level at 190 m below KB is distorted due to poorly bonded casing and as any results obtained from this level are considered to be unreliable, this level has been omitted from the V.S.P. processing.

All the remaining levels have been included in the V.S.P. processing although the trace spacing is inconsistent as the shallow levels were shot generally at 30 m intervals and the deeper levels at 20 m intervals.

The well geophone data quality is generally good. The shallow levels, above about 750 m below KB, are distorted slightly by high frequency noise interference. There is a high amplitude low velocity event (identified as a tube wave) present on the downhole signal throughout the V.S.P. data.

After editing the well geophone data, constant depth traces have been aligned and stacked to attenuate random noise, using an automated trace alignment procedure.

A source signature deconvolution with an operator derived from the first 300 ms of the gun hydrophone signal has been applied to the well geophone data in an attempt to debubble the signal. This processing has been fairly satisfactory in collapsing the bubble energy into the first arrival on the signal.

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An amplitude recovery curve proportional to T has been applied to the stacked geophone data. The downgoing energy has been aligned by shifting the first arrival troughs to zero time and this is displayed on the 'Downgoing Events' display, Panel D1. The alignment of the downgoing events has been enhanced by a 13:1 median pick, followed by a preliminary bandpass filer 1-5, 80-100 Hz, Panel D2.

The amplitude recovered data has been shifted to corrected two-way times below MSL datum to align the upgoing energy and the bandpass filter, 1-5, 80-100 Hz has been applied, Panel U1. The alignment of the upgoing wavetrain is weak. The continuity of the upgoing events is impaired by the downgoing energy which can be seen parallel to the first arrival curve.

The upgoing events have been enhanced by subtracting the downgoing waves before applying the 1-5, 80-100 Hz bandpass filter, Panel U2. The continuity of the upgoing events has been further improved by the use of a 13:1 median pick preceded and followed, separately, by the bandpass and a time variant filter, Panels U3 and U4. The time variant filter, as defined below, was used in order that the V.S.P. should have similar frequency content to that of the seismic section Line GC80-11A.

TVF:	At 0.16 s	15-65 Hz
	At 0.56 s	13-65 Hz
	At 1.16 s	12-55 Hz

After a study of the V.S.P. data, Panel U2, possible diffraction effects are identified within the body of the data. In order to enhance the diffraction effects, a tracking filter consisting of a 13:1 median coherency filter and slope filter enhancing dips between +8 and -8 ms/trace has been applied to the undeconvolved data. The tracking filter has been preceded and followed by the time variant filter, Panel U5.

In order to attenuate the upgoing multiple activity within the data and to spike up the primary reflections, a Special V.S.P. Deconvolution has been applied after the downgoing wave subtraction. It can be seen on Panel D2 that the nature of the first 590 ms of the downgoing wave is generally consistent and this has been used to derive deconvolution operators on a trace by trace basis. The deconvolution process has been followed by the application of the 1-5, 80-100 Hz preliminary bandpass filter, Panel S1. Some high energy high frequency noise has been introduced by the process. To improve the continuity of the primary reflections, a 13:1 median pick preceded and followed, separately, by the bandpass and time variant filter has been applied (Panels S2 and S3).

Some moveout is evident on the deconvolved upgoing events displays and, to improve the continuity of the dipping events, a tracking filter (i.e., a 0-4 ms/trace left dip enhancement, 13:1 median coherency filter) has been applied in place of the horizontal 13:1 median pick. This has been preceded and followed, separately, by the bandpass and time variant filter (Panels S4 and S5).

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To aid comparison with the seismic section, a front corridor composite trace has been produced from the medianed deconvolved data and this has been filtered using the bandpass and time variant filters separately (Panels V2 and V3). In the presence of dipping reflectors, there will be some uncorrected migration effects, particularly below TD. The Synthetic Seismogram Primaries without transmission loss trace has been filtered using the bandpass and time variant filters to produce panels V1 and V4 and has been displayed alongside the V.S.P. front corridor composite trace for comparison purposes.

There is a good agreement between changes in velocity on the two-way travel time log and reflections observed on the V.S.P. especially after V.S.P. deconvolution.

There is a fair character match between the V.S.P. composite traces and the Synthetic Seismogram displays, although the events on the V.S.P. data occur at a slightly earlier time than on the Synthetic Seismogram data. This mis-tie is probably due to the dip of events around the first arrival curve.

The correlation of events on the deconvolved polarity 2 V.S.P. data with the seismic section is fairly good, with zero time on the V.S.P. data correlating with approximately + 10 ms on the seismic section.

Approved by:

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P. Kennett
Manager, Well Survey Division

Processed by:

Virginia Collyer

V. Collyer

18th August 1982

/JJD

UNION TEXAS AUSTRALIA INC. PISCES No. 1

V.S.P. STACKED GEOPHONE DATA:

LEVEL No.	DEPTH IN M BELOW KB	STACK	LEVEL No.	DEPTH IN M BELOW KB	STACK
1	2568	2	47	1600	4
2	2550	1	48	1570	1
3	2530	3	49	1540	4
4	2510	2	50	1510	4
5	2489	1	51	1480	4
6	2460	4	52	1450	5
7	2440.5	2	53	1420	4
8	2420	2	54	1390	3
9	2400	1	55	1360	3
10	2376	3	56	1330	4
11	2347.5	3	57	1300	3
12	2322	2	58	1270	3
13	2304	2	59	1240	3
14	2288.5	2	60	1210	2
15	2268.5	1	61	1180	2
16	2245	3	62	1150	3
17	2227	4	63	1120	3
18	2193.5	2	64	1090	2
19	2171	1	65	1050	4
20	2151.5	3	66	1025	3
21	2134.5	2	67	990	3
22	2117	2	68	960	3
23	2096	3	69	930	3
24	2073	2	70	900	4
25	2051	3	71	870	3
26	2035	2	72	840	4
27	2017	4	73	810	4
28	2005	2	74	780	3
29	1978.5	1	75	750	4
30	1967	2	76	720	5
31	1945.5	4	77	679	3
32	1926	3	78	640	3
33	1902.5	2	79	610	4
34	1882	1	80	583	2
35	1859	3	81	550	4
36	1838	1	82	520	2
37	1826	5	83	490	4
38	1807	2	84	460	3
39	1796	4	85	430	2
40	1770	2	86	400	4
41	1750	3	87	370	2
42	1730	3	88	340	4
43	1710	4	89	310	5
44	1683	2	90	280	4
45	1653	2	91	250	4
46	1623	4	92	220	1