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WELL VELOCITY SURVEY

(FINAL SURVEY)

of

TYLER No. 1

for

MAGELLAN PETROLEUM (N. T.) PTY. LTD.

by

UNITED GEOPHYSICAL CORPORATION

Party 141



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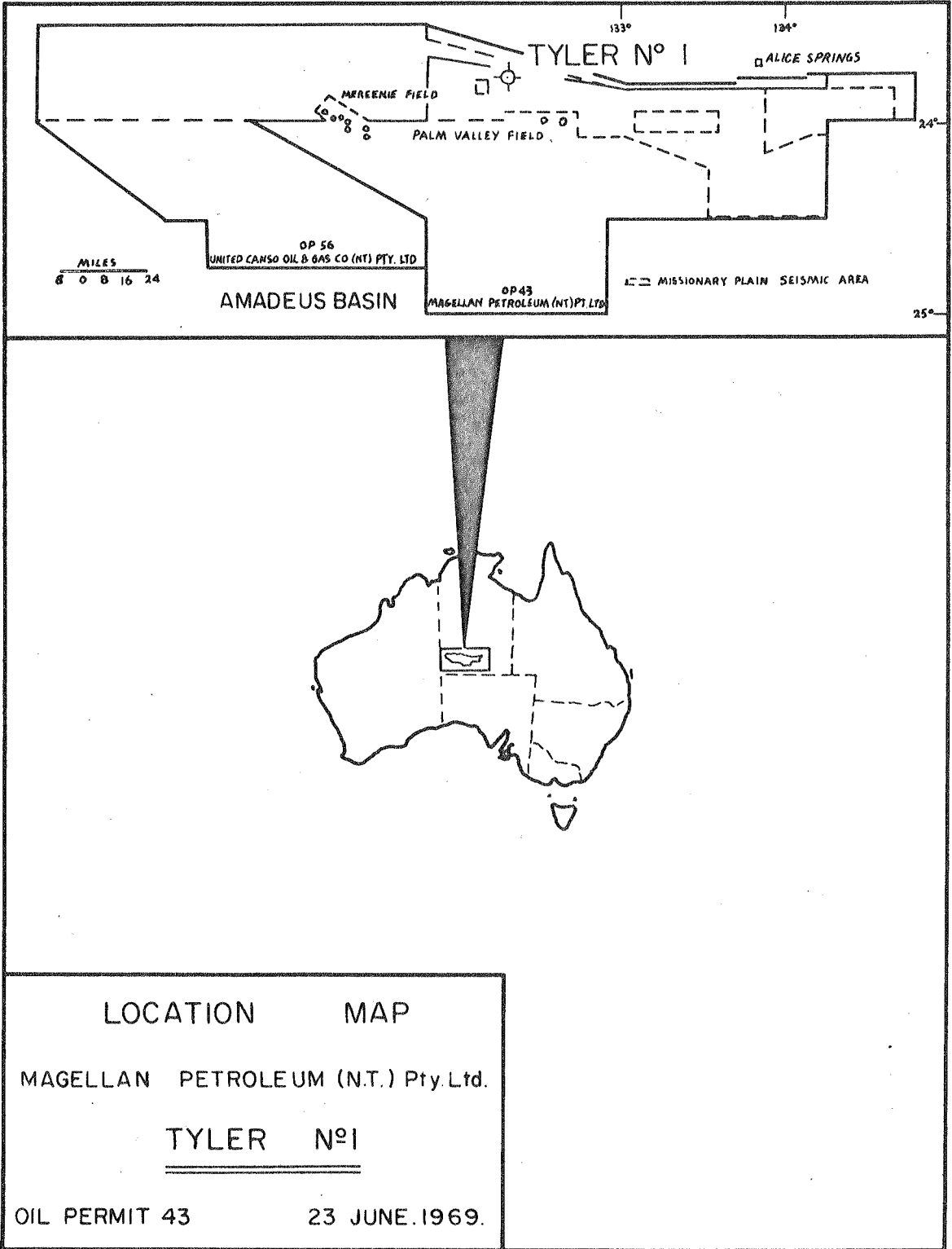
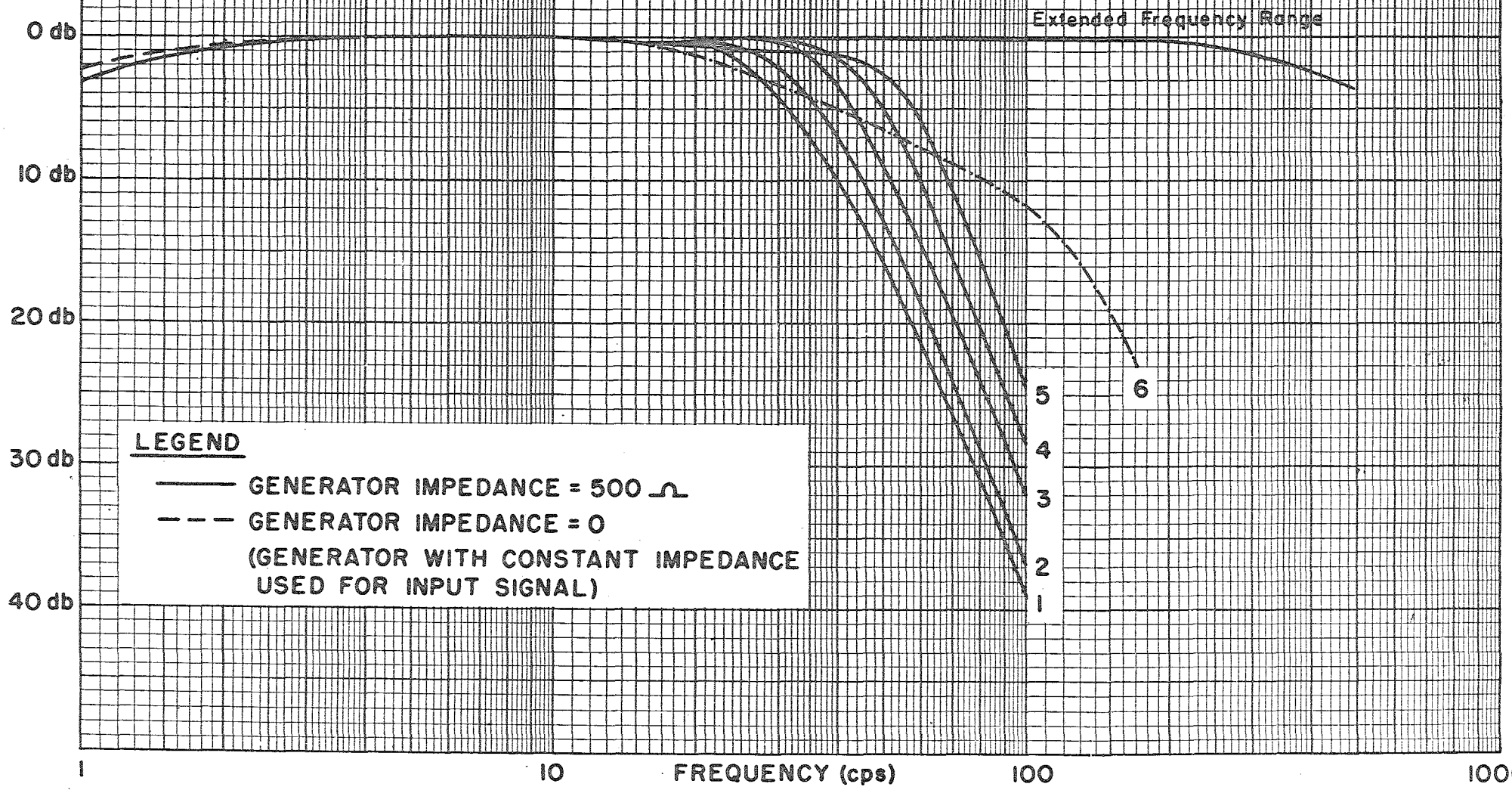


Fig. 1

WELL INFORMATION

NAME OF WELL	Magellan Tyler No. 1
DATE OF SURVEY	23rd June, 1969
LOCATION	90 miles west of Alice Springs, Southern Central Northern Territory in Oil Permit O. P. 43.
CO-ORDINATES	Latitude $23^{\circ} 45' 23''$ S. Longitude $132^{\circ} 24' 45''$ E.
ELEVATION K. B.	+2545' Mean Sea Level
ELEVATION GROUND LEVEL	+2528' Mean Sea Level
DATUM PLANE	+1800' Mean Sea Level
INTERVAL SURVEYED	745' to 12,405' below K. B.
SEISMOGRAPH PROFILE	Line 2-48 Shotpoint No. 6

OVERALL FREQUENCY RESPONSE
INCLUDING RESPONSE OF:
1) UNITED TYPE 1-27 AMPLIFIER
2) UNITED TYPE 7-07 GALVANOMETER



OPERATIONS

1. Recording Equipment

Well geophone	S. S. C. GCE-600 pressure sensitive well geophone with downhole pre-amplifier
Cable	Welex cable and reel
Reference geophones	United Model 4-16 (20 Hertz)
Camera	Electro Tech Model ER-62 (galvanometers 125Hz)
Amplifiers	United Model 1-27 (refraction amplifiers)

2. Amplifier Specifications

United Model 1-27

Frequency response	3db attenuation at 1Hz. Phase characteristic linear $\pm 10^\circ$ from 7 to 70 Hz
Filters	Six low pass filter selections with cut-off frequencies of 28, 34, 40, 47, 55 and 100Hz An additional filter position for the high and medium sensitivity well geophone traces (amp No. 1), extends the hi-cut range to 1KHz
Gain	Total of 100db gain from input to plate of final stage
Input Impedance	6000 ohms



3. Recording Operations

Amplifier No. 1	Downhole geophone
Output:	Divided output to traces No. 1 and No. 2 (fixed at the ratio of 3 to 1)
Attenuation:	-66 db at 745 feet below K. B. -56 db at 12,405 feet below K. B.
Filters	1KHz
Amplifier No. 2	Downhole geophone
Output:	Single low output to trace No. 3
Attenuation:	-76 db at 745 feet below K. B. -56 db at 12,405 feet below K. B.
Filters:	100 Hz
Amplifier No. 3	Reference geophone adjacent to well
Output:	Single low output to trace No. 4
Attenuation	-30 db for all shots
Filters:	100 Hz
Amplifier No. 4	Uphole geophone 10 feet from shothole
Output:	Single low output to trace No. 5
Attenuation:	-30 db for all shots
Filters :	100 Hz
Time Break to trace No. 6 (not amplified)	



4. Shotpoint Location

Shotpoints were staked in two groups to the east, and in one group to the west of the well by the Bureau of Mineral Resources. Distances and elevations were later surveyed in relation to kelly bushing by United Geophysical Party 141. An additional position for surface shots was located in a dry creek bed to the north of the well.

5. Drilling

In the vicinity of the well, outcrops of the Brewer Conglomerate formation made drilling of shotholes extremely difficult. A maximum practical limit at the shot positions proved to be 60 feet depth of shot. A total of ten shotholes had been completed by B. M. R. at the time of the survey.

COMMENTS:

Penetration of seismic energy was poor especially within the well casing. Two hole shot patterns were needed to obtain sufficient energy at deeper levels. Additional surface shots were recorded when the shotholes could not be reloaded.

Reflection spreads were recorded from the same energy source as velocity survey records by a seismic recording crew from the Bureau of Mineral Resources.



6. Operational Statistics

Surveyed interval	745' to 12,405' below K. B.
Number of horizons surveyed	Eight
Number of shots per horizon	One shot for 6 horizons Two shots for 2 horizons
Maximum offset	1,542 feet
Minimum offset	592 feet
Maximum Depth of Shot	60 feet (Bottom of Charge)
Minimum Depth of Shot	Surface
Maximum charge size	1,000 lbs
Minimum charge size	40 lbs.
Explosives	3,700 lbs. Geophex 40 x 100 ft. Caps
Observer	W. J. Larsen
Shooter	L. D. Moore

COMPUTING

1. Datum Plane

Well geophone arrival times from surface shots were corrected to a +1800 feet datum plane using a reduction velocity of 13,340 feet per second. This velocity was determined from a surface shot to datum on the initial velocity survey.

Arrival times from shotholes were reduced to the same datum plane using a velocity of 15,990 feet per second. This was the first interval velocity computed from times within a section of the conglomerate formation from datum to -1255 feet on the initial survey.

With two exceptions, all charges were loaded into the conglomerate formation. In these two cases weathering corrections have been applied.

2. Record Quality

Record quality is generally fair considering the amount of well casing, and the poor energy penetration in this area. One arrival at 11,600 feet below kelly bushing is questionable.

3. Horizon Arrival Times

The corrected arrival times from +1800 feet datum to the principal horizons are as follows:

<u>HORIZON</u>	<u>DEPTH BELOW DATUM</u> <u>(+1800 A. S. L.)</u>	<u>ARRIVAL TIMES</u> <u>(One Way Times)</u>
HERMANNSBURG SANDSTONE	-3605'	.218 ⁵
PARKE SILTSTONE	-6395'	.372
MEREENIE	-6554'	.380
STOKES SILTSTONE	-9315'	.533 ⁵
STAIRWAY SANDSTONE	-10,868'	.627 ⁵



3. Horizon Arrival Times (contd.)

Corrected arrival times from surface at well (2528' A. S. L.) to the principal horizons are as follows:

<u>HORIZON</u>	<u>DEPTH BELOW SURFACE</u> <u>(+2528' A. S. L.)</u>	<u>ARRIVAL TIMES</u> <u>(One Way Times)</u>
HERMANNSBURG SANDSTONE	-4333'	.273
PARKE SILTSTONE	-7123'	.426 ⁵
MEREENIE	-7282'	.434 ⁵
STOKES SILTSTONE	-10,043'	.588
STAIRWAY SANDSTONE	-11,596'	.682

4. Function Computation

Nash Miller's method of computation was employed to determine the velocity function. This function was determined by using the following expressions and information from the plot of vertical time against depth.

$$a = \frac{4.605}{t_1} \log_{10} \left(\frac{Z_1 - Z_2}{Z_2} \right)$$

$$Vd = \frac{aZ_1}{e^{\frac{at_1}{2}} - 1}$$

where Z_1 & t_1 are corresponding depth and one way time at a deeper point in the section and Z_2 is the depth corresponding to one way time of $\frac{t_1}{2}$ secs. All functions were computed with respect to a +1800 feet datum plane.

RESULTS

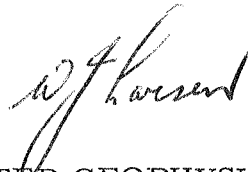
1. Velocity Function

From datum to 7000 feet $V = 15,570 + 0.52 Z$. From 7000 feet to total depth $V =$ constant velocity of 17,400 feet per second.

2. Function Plots

A plot of the functions computed for Tyler No. 1 is included in the appendix of this report for comparison purposes.

Respectfully submitted,



UNITED GEOPHYSICAL CORPORATION
PARTY 141



SUPERVISOR