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PR 69-25

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VELOCITY SURVEY

of

MAGELLAN TYLER NO. 1

for

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

by

UNITED GEOPHYSICAL CORPORATION

PARTY 141

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P00957

NORTHERN TERRITORY
GEOLOGICAL SURVEY



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WELL INFORMATION

NAME OF WELL	Magellan Tyler No. 1
DATE OF SURVEY	17th February, 1969
LOCATION	90 miles west of Alice Springs, southern central Northern Territory, in Oil Permit O.P. 43
CO-ORDINATES	Latitude 23 ^o 45' 23" S Longitude 132 ^o 24' 45" E
SEISMOGRAPH PROFILE	Line 2-48 Shotpoint No. 5
ELEVATION K.B.	+ 2545' above sea level
DATUM PLANE	+ 1800' A.S.L.
TOTAL DEPTH OF WELL	Intermediate Survey
CASING	804' below K.B.
INTERVAL SURVEYED	820' to 9800' below K.B.

OPERATIONS

1. Recording Equipment

Well Geophone	S.S.C. GCE-600 pressure sensitive well geophone with downhole pre-amplifier
Reference Geophones	United Model 4-16 (20Hz critically damped)
Camera	Electro Tech Model ER-62 (galvanometers 125Hz)
Amplifiers	United Model 1-27 refraction amplifiers

2. Amplifier Specifications

Frequency Response	3db attenuation at 1Hz. Phase characteristic linear $\pm 10^\circ$ from 7 to 70Hz
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: -55 db at 820 feet below K.B.
 -44 db at 9800 feet below K.B.
 Filters: 1KHz

Amplifier No 2 Downhole geophone
 Output: Single low output to trace No 3
 Attenuation: -40 db at 820 feet below K.B.
 -34 db at 9800 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 Reference geophone 150 feet north of
 the well
 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

Since surface shooting was employed for the Tyler velocity survey, shotpoints were located to minimise effects of air blast on the camp. A dry creek bed to the northeast of the well afforded the best protection to the camp. Offset distances were selected according to well depth and charge sizes, and ranged from 600 feet for shallow horizons to 2000 feet for the deepest horizon where a 750 lb charge was required.

Elevations and offset distances of shotpoints were later surveyed in relation to kelly bushing, using a K & E transit. Well deviation was taken into consideration when determining horizontal offsets.

Comments

Near surface conglomerate had made drilling of shotholes in the Tyler area extremely difficult in the past, and was the main reason for using the surface shooting technique.

These near surface conditions acted as a strong reflector to surface energy, greatly reducing effective penetration.

5. Operational Statistics

Surveyed interval	820' to 9800' below K.B.
Number of horizons surveyed	Eleven
Number of shots per horizon	One shot for 9 horizons 2 shots for 2 horizons
Maximum offset	2000 feet
Minimum offset	600 feet
Depth of shot	Surface
Maximum charge size	750 lbs (3 x 250 lbs)
Minimum charge size	100 lbs
Explosives	5850 lbs Geophex 30 x 100 ft. Caps
Observer	W.J. Larsen
Shooter	L.D. Moore

COMPUTING

1. Datum Plane

Well geophone arrival times were corrected to a +1800 feet datum plane using a reduction velocity of 13,340 feet per second. This velocity was determined from the time to the first geophone level, which was approximately at datum elevation.

2. Record Quality

Record quality is good to fair at all levels, and arrival times used for computation purposes are considered to be reliable. Two levels were reshot to improve record quality.

3. Horizon Arrival Times

The corrected arrival times to the principle horizons are as follows:

<u>Horizon</u>	<u>Depth below datum plane of +1800 feet A.S.L</u>	<u>Arrival Times (One way times)</u>
HERMANNSBURG	3605'	.218
PARKE	6385'	.371 ⁵
MEREENIE	6545'	.379 ⁵
WHITE SANDSTONE	7765'	.448

4. Function Computation

Nash Miller's method of computation was employed to determine the velocity function. All functions were computed with respect to a +1800 feet A.S.L. datum plane.

RESULTS

1. Velocity Function

Two functions were computed for Tyler No 1 to give an accurate fit to the time depth curve.

From datum to 7000 feet $V = 15,570 + 0.52Z$

From 7000 feet to total depth $V = 17,600$ feet per second (constant velocity).

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,

W. J. Larsen

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PARTY 141

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