WELL VELOCITY SURVEY

HINDHAUGH CREEK NO.1

P.E.P. 68
VICTORIA

for

PURSUIT OIL N.L.

Attachment to WCR

Well Velocity Survey

Hindhaugh Creek-1

(W562)

WELL VELOCITY SURVEY

of

HINDHAUGH CREEK No. 1

for

PURSUIT OIL N. L.

by

UNITED GEOPHYSICAL CORPORATION

Party 141

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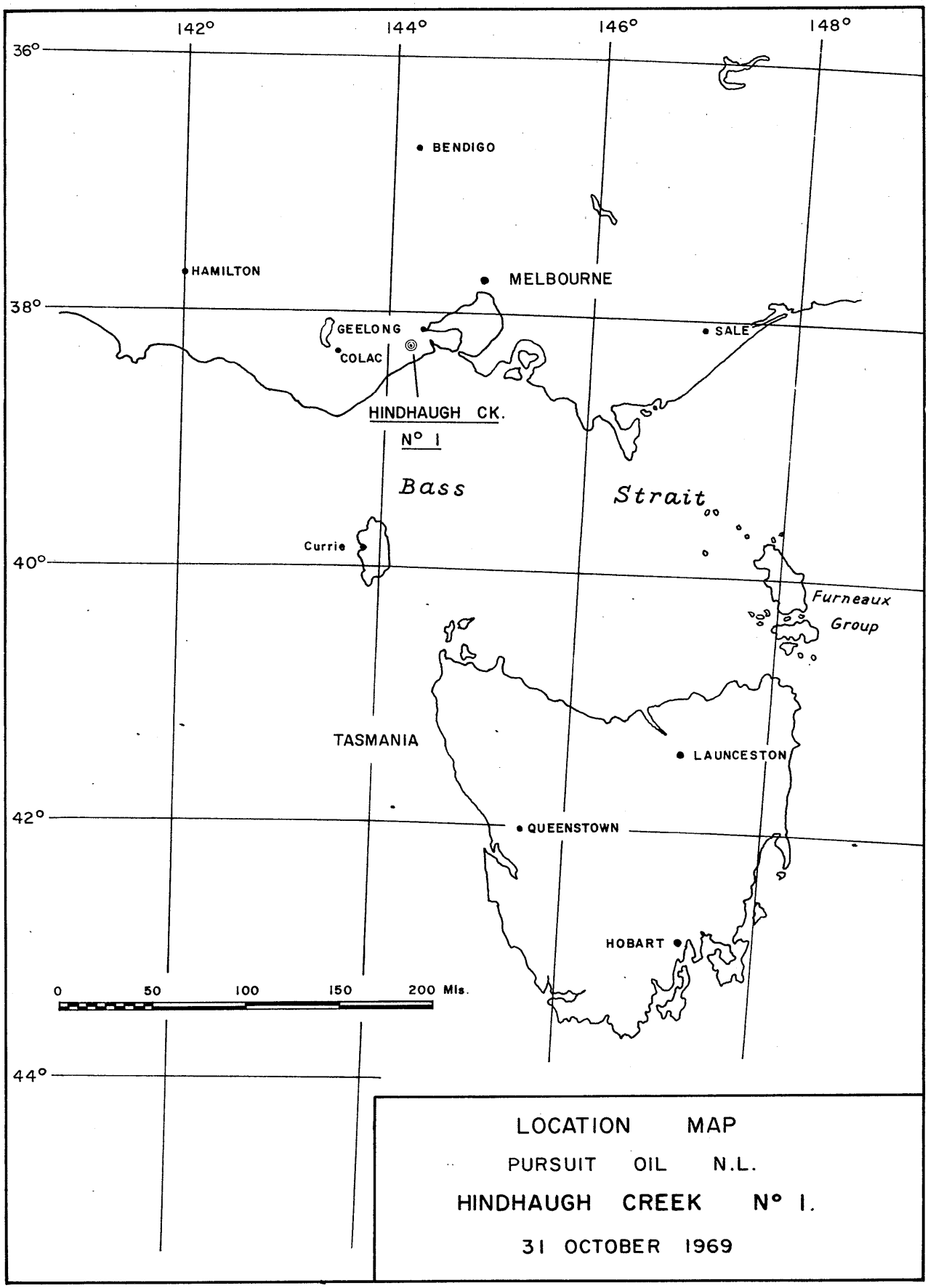
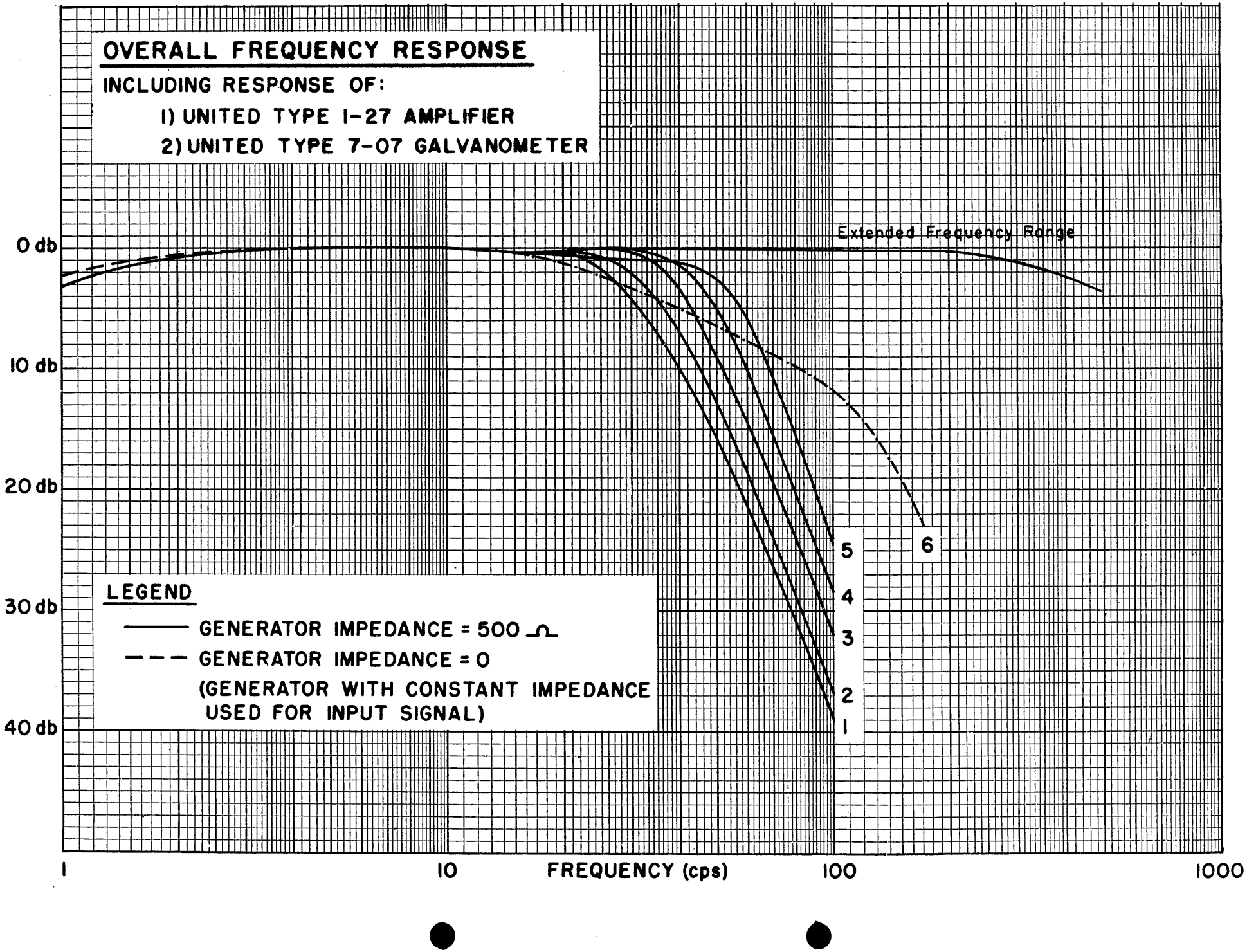

142°
144°
146°
148°
36°
38°
40°
42°
44°
BENDIGO
HAMILTON
MELBOURNE
GEELONG
COLAC
SALE
HINDHAUGH CK.
Nº 1
Bass
Strait
Currie
Furneaux
Group
TASMANIA
LAUNCESTON
QUEENSTOWN
HOBART
0
50
100
150
200 Mls.
LOCATION MAP
PURSUIT OIL N.L.
HINDHAUGH CREEK Nº 1.
31 OCTOBER 1969

Fig. 1

WELL INFORMATION

NAME OF WELL	Hindhaugh Creek No. 1
DATE OF SURVEY	1st November, 1969
LOCATION	10 miles south-west of Geelong, southern Victoria, in P. E. P. 68.
CO-ORDINATES	Latitude 38° 16'43"S
	Longitude 144° 12'07"E
ELEVATION K. B.	+244.5 feet Mean Sea Level
ELEVATION GROUND LEVEL	+232.0 feet Mean Sea Level
DATUM PLANE	0" Mean Sea Level
INTERVAL SURVEYED	750' to 7700' below K. B.
TOTAL DEPTH	7798 feet below K. B. (Schlumberger)
CASING	4240 feet below K. B. (Schlumberger)

(Fig 2)


OVERALL FREQUENCY RESPONSE
INCLUDING RESPONSE OF:
1) UNITED TYPE 1-27 AMPLIFIER
2) UNITED TYPE 7-07 GALVANOMETER
Extended Frequency Range
0 db
10 db
20 db
30 db
40 db
6
5
4
3
2
1
LEGEND
GENERATOR IMPEDANCE = 500 Ω
GENERATOR IMPEDANCE = 0
(GENERATOR WITH CONSTANT IMPEDANCE USED FOR INPUT SIGNAL)
1
10
FREQUENCY (cps)
100
1000

OPERATIONS

1. Recording Equipment

Well geophone	S. S. C. GCE-600 pressure sensitive well geophone
Cable	Schlumberger cable and reel
Reference geophones	United Model 4-16 (20 Hertz) Electro Tech EVS-2 (20 Hertz)
Camera	Electro Tech Model ER-62 (galvanometers 125 Hz)
Amplifiers	United Model 1-27 (refraction amplifiers)

2. Amplifier Specifications

United Model 1-27

Frequency response	3db attenuation at 1Hz. Phase characteristic linea $\pm 10^{o}$ from 7 to 70 Hz
Filters	Six low pass filter selections with cut-off frequencies of 28, 34, 40, 47, 55 and 100 Hz 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 100 db 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:	-40 db at 750 feet below K. B. -20db at 7700 feet below K. B.
	Filters:	1KHz
Amplifier No. 2		Downhole geophone.
	Output:	Divided output to traces 3 and 4 (fixed at the ratio of 6 to 1)
	Attenuation:	-66 db at 750 feet below K. B. -36 db at 7700 feet below K. B.
	Filters:	100 Hz
Amplifier No. 3		Reference geophone adjacent to well
	Output:	Single low output to trace No. 5
	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. 6
	Attenuation:	-30 db for all shots
	Filters:	100 Hz

Time Break to trace No. 7 (not amplified)

4. Shotpoint Location

Shotpoint locations were selected for maximum distance from a nearby farmhouse, as well as an accessible drilling site. A north-south layout would have given a greater distance from shotholes to the house, however the southern group of holes would have been in an unpermitted property. As well as this surface conditions were boggy and inaccessible to drilling equipment.

For this reason an east-west layout was decided upon, and although nearer to the house than a north-south layout, the closest set of holes was still sufficiently distant as to satisfy safety requirements.

Shotholes were surveyed relative to kelly bushing by United Geophysical Party 141.

5. Drilling

Thirteen shotholes were drilled initially by Sides & Sons from Melbourne, and were completed on October 4th. The well drilled longer than expected, and the drillers had to clean out the shotholes again on October 30th, just prior to well completion.

COMMENTS

As a safety precaution the original shotholes were not preloaded, since the charge sizes required were unknown at that time.

A number of records were adversely affected by electrical interference, as instruments and cables became wet from frequent rain showers.

6. Operational Statistics

Surveyed interval	750' to 7700' below K. B.
Number of horizons surveyed	Fifteen
Number of shots per horizon	One shot for 13 horizons Two shots for 2 horizons
Maximum offset	548 feet
Minimum offset	464 feet
Maximum Depth of Shot	105 feet (Bottom of Charge)
Minimum Depth of Shot	62 feet
Maximum charge size	20 lbs
Minimum charge size	5 lbs.
Explosives	Geophex ($2\frac{1}{2}$" x 5) = 212 lbs
	Caps x 150 feet = 25 only
	Seismic Boosters = 50 only
Observer	R. J. Thorn
Shooter	L. D. Moore

COMPUTING

1. Uphole Survey

A plot of the uphole times recorded gave a weathering velocity of 2500 feet per second from surface to 20 feet, and a datum reduction velocity of 5200 feet per second.

2. Datum Plane

Well geophone arrival times were corrected to a sea level datum plane using a reduction velocity of 5200 feet per second.

3. Record Quality

The quality of geophone arrivals is generally fair, although superimposed with noise in some cases. Arrival times are considered reliable.

One record at 5700 feet was disregarded since it appears likely that the Schlumberger depth was incorrect.

Seismic time intervals and sonic log intervals are in close agreement at most levels.

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.

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

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

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 sea level datum plane.

RESULTS

1. Velocity Function

The following functions were computed for the Hindhaugh Creek well.

Datum to 2500 feet	V = 8,570 + 2.40 Z
2500 feet to 4500 feet	V = 14,000 feet per second (constant velocity)
4500 feet to total depth	V = 14,800 feet per second (constant velocity)

2. Function Plots

A plot of the velocity functions computed for the Hindhaugh Creek well is included in the appendix of this report for comparison purposes.

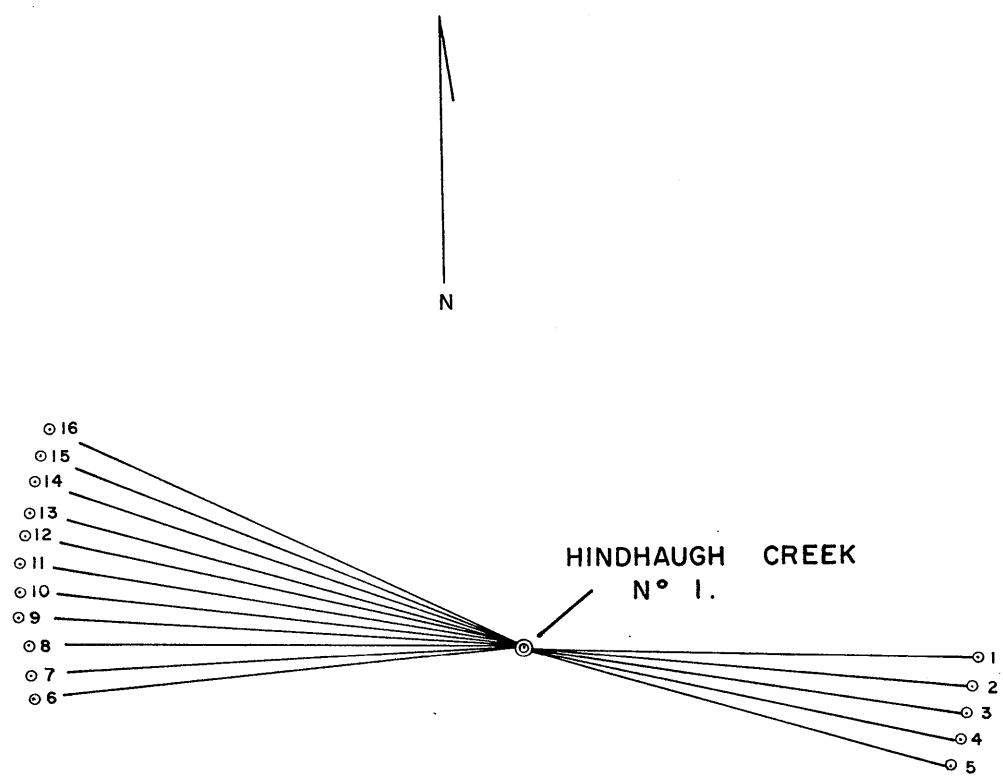
Respectfully submitted,

W. J. Larsen

UNITED GEOPHYSICAL CORPORATION

Party 141

Supervisor



SURVEY PLAT

VELOCITY SURVEY

PURSUIT OIL N.L.

HINDHAUGH CREEK N° 1.

BY

PARTY 141 UNITED GEOPHYSICAL CORP.

SCALE : 1 inch = 200 ft.	
DATE : 31 Oct. 1969.	

FIG. 3

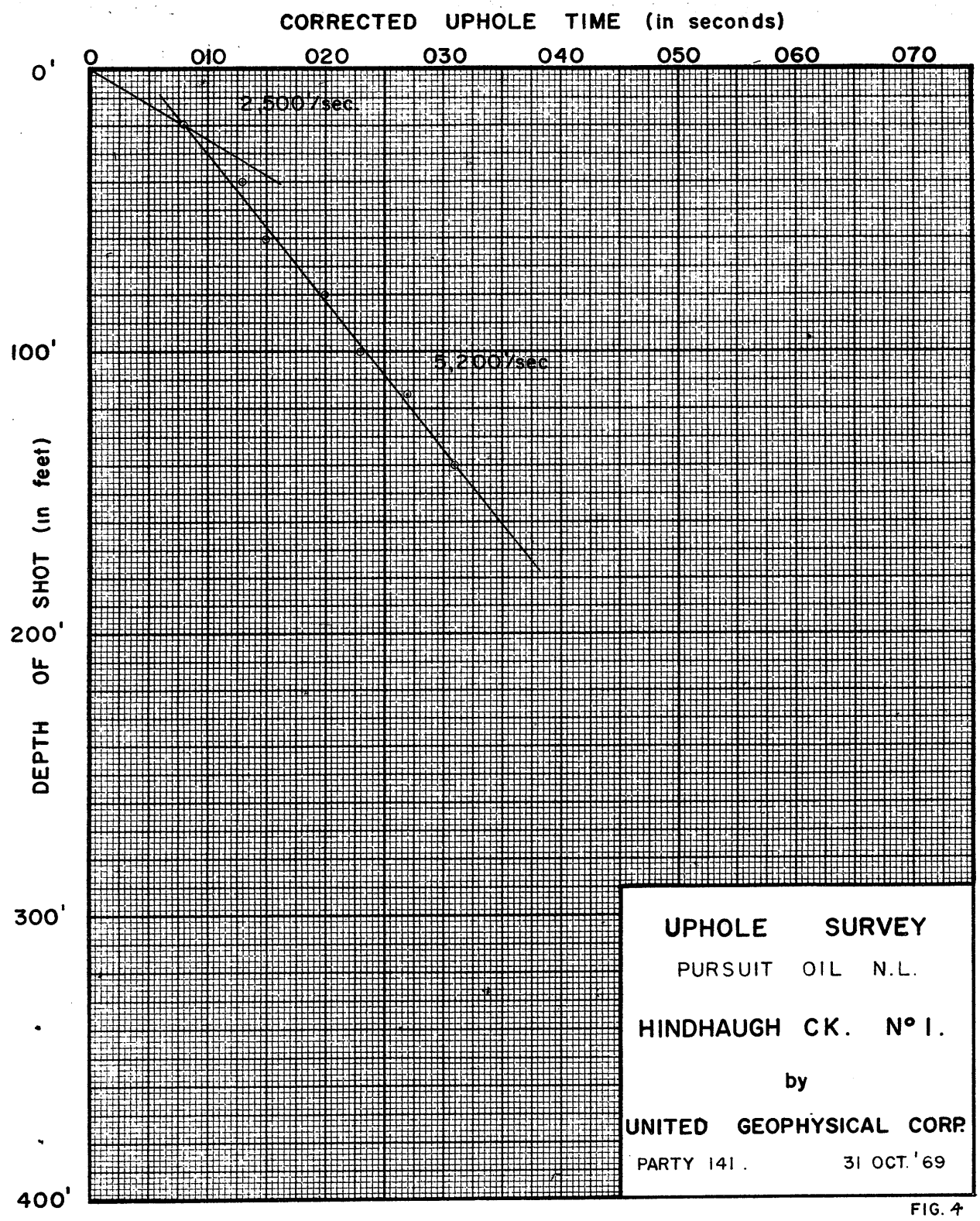

CORRECTED UPHOLE TIME (in seconds)
0
010
020
030
040
050
060
070
0'
100'
200'
300'
400'
DEPTH OF SHOT (in feet)
2,500'/sec.
5,200'/sec
UPHOLE SURVEY
PURSUIT OIL N.L.
HINDHAUGH CK. N° 1.
by
UNITED GEOPHYSICAL CORP.
PARTY 141.
31 OCT. '69

FIG. 4

PE907706

This is an enclosure indicator page.
The enclosure PE907706 is enclosed within the container PE907705 at this location in this document.

The enclosure PE907706 has the folllowing characteristics:

ITEM_BARCODE	= PE907706
CONTAINER_BARCODE	= PE907705
NAME	= Velocity Data Table
BASIN	=
PERMIT	=
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Velocity Data Table, (Enclosure from Well Velocity Survey Report), by Pursuit Oil NL, for Hindhaugh Creek-1.
REMARKS	=
DATE_CREATED	= 31/10/1969
DATE_RECEIVED	=
WELL_NO	= W562
WELL_NAME	= HINDHAUGH CREEK-1
CONTRACTOR	=
CLIENT_OP_CO	= PURSUIT OIL NL

(Inserted by DNRE - Vic Govt Mines Dept)

WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CK N° 1

Record No.

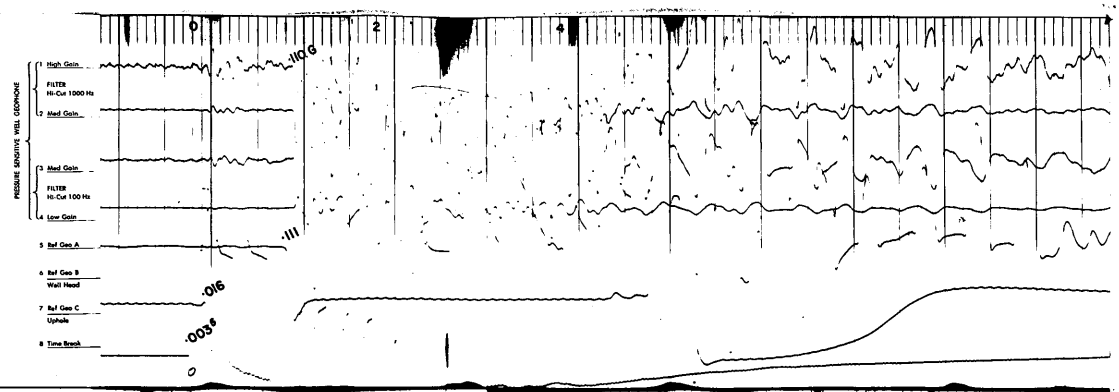
Shot Hole No. 16
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 750'

Below Datum 00ft. (A.S.L.) 505'

Charge 5 lbs. Depth of Shot 60'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CK N° 1

Record No.

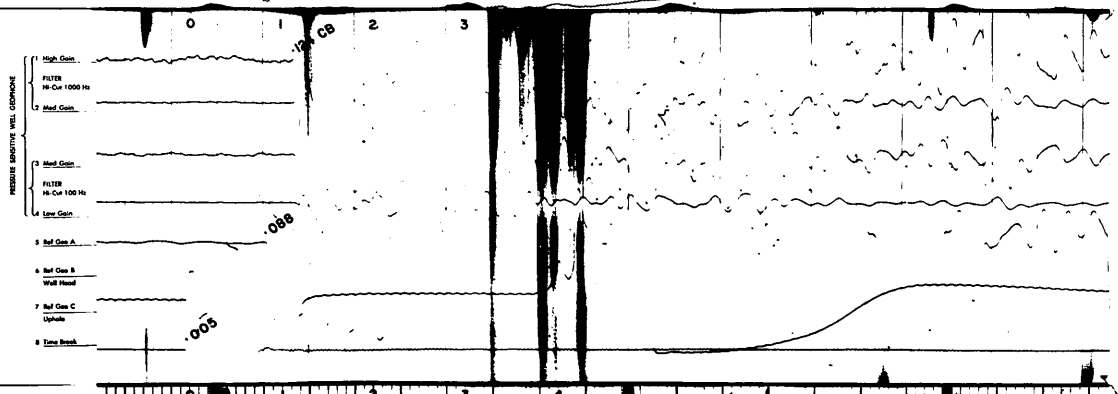
Shot Hole No. 5
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1000'

Below Datum 00ft. (A.S.L.) 755'

Charge 12 lbs. Depth of Shot 73'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CK N° 1

Record No.

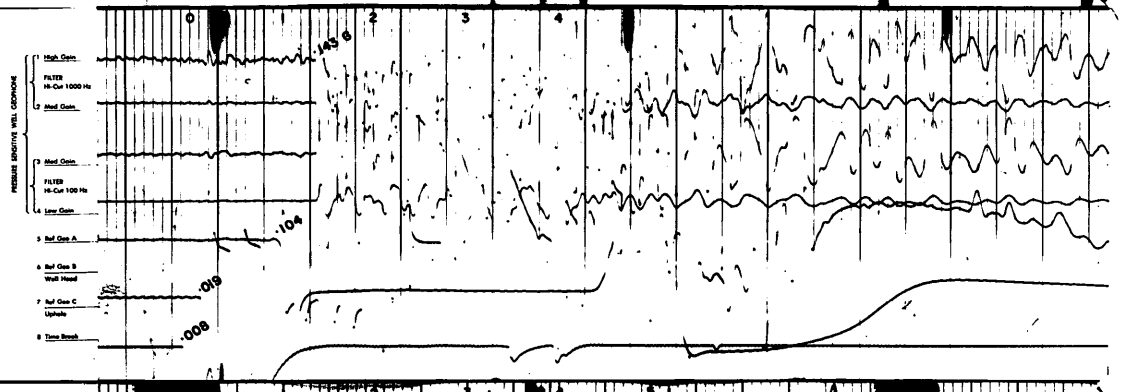
Shot Hole No. 15
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1200'

Below Datum 00ft. (A.S.L.) 955'

Charge 5 lbs. Depth of Shot 73'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N°1

Record No.

Shot Hole No. 14
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 1700'

Below Datum 00ft. (A.S.L.) 1455'

Charge 5 lbs. Depth of Shot 98'

WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N°1

Record No.

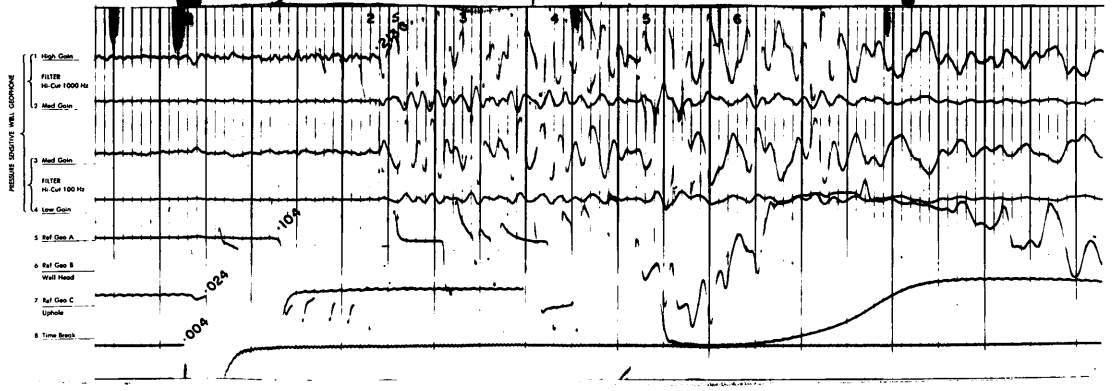
Shot Hole No. 14
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 2200'

Below Datum 00ft. (A.S.L.) 1955'

Charge 5 lbs. Depth of Shot 98'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N° 1

Record No

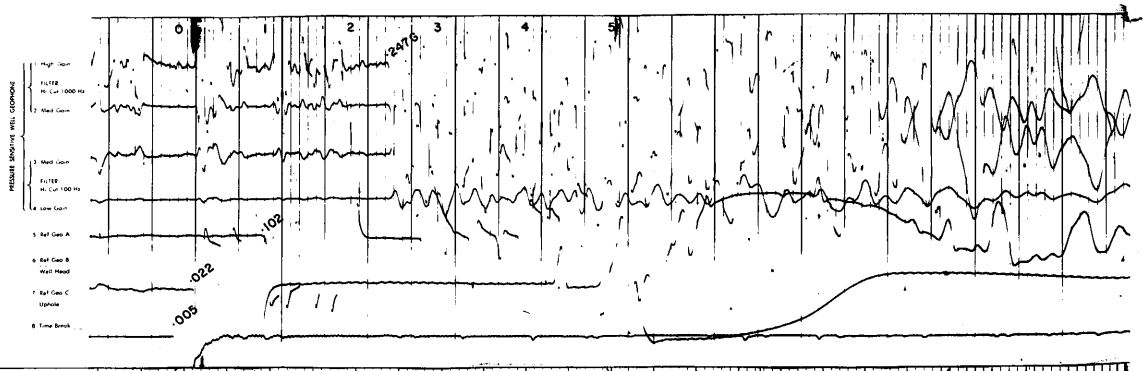
Shot Hole No 13
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 2700'

Below Datum 00ft (A.S.L.) 2455'

Charge 10 lbs. Depth of Shot 94'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N° 1

Record No

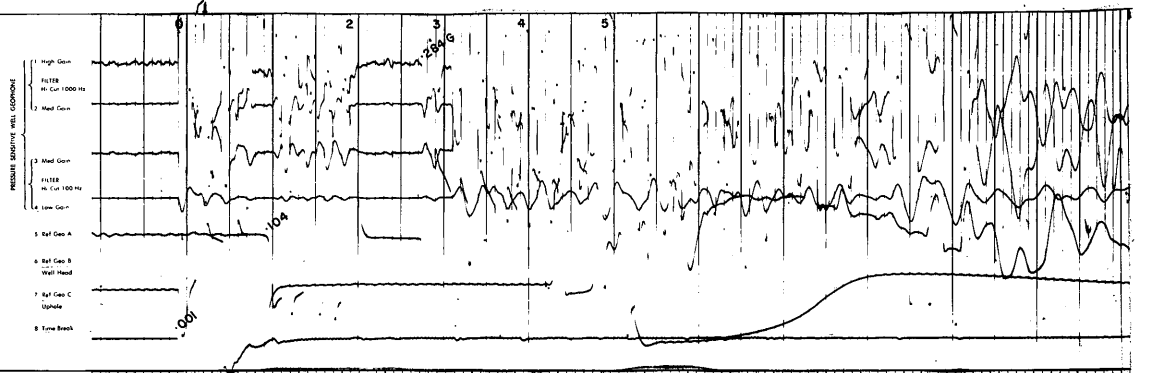
Shot Hole No 13
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3200'

Below Datum 00ft (A.S.L.) 2955'

Charge 10 lbs. Depth of Shot 90'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N° 1

Record No

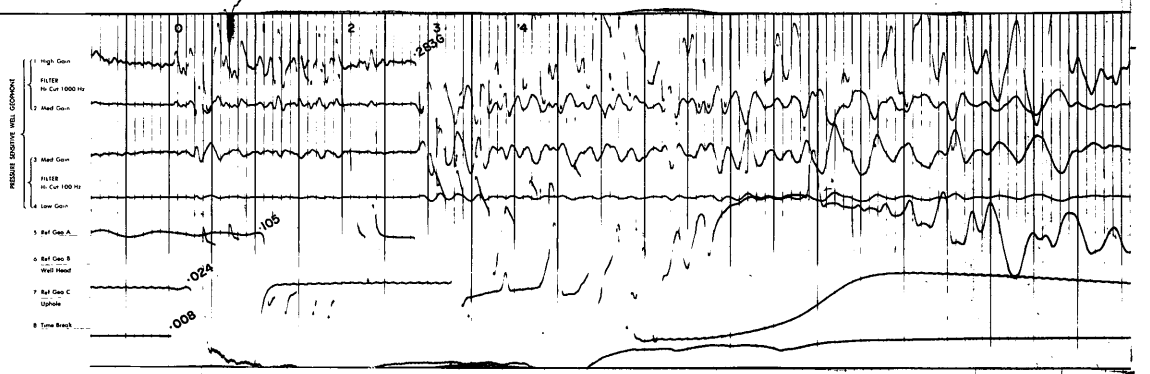
Shot Hole No 13
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 3200'

Below Datum 00ft (A.S.L.) 2955'

Charge 10 lbs Depth of Shot 91'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N° 1

Record No

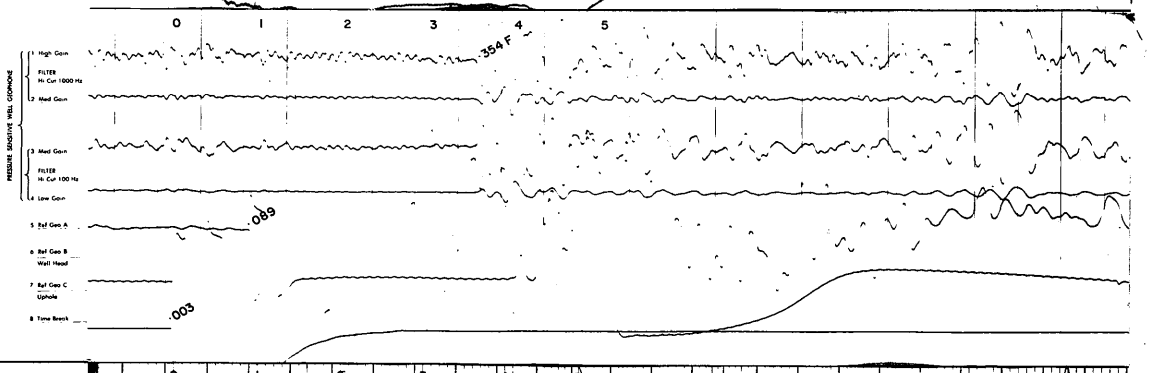
Shot Hole No 5
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 4200'

Below Datum 00ft (A.S.L.) 3955'

Charge 10.1lbs. Depth of Shot 88'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N° 1

Record No

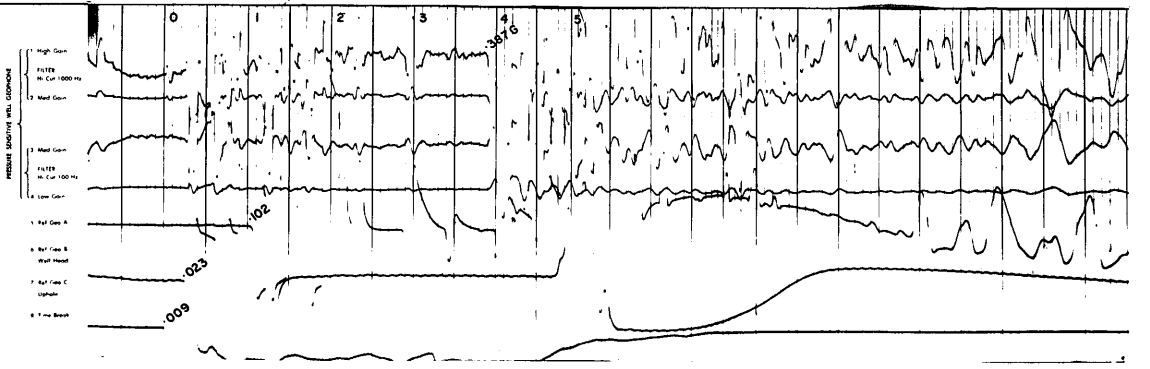
Shot Hole No 12
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 4700'

Below Datum 00ft (A.S.L.) 4455'

Charge 15 lbs. Depth of Shot 96'



WELL VELOCIT TERMINATION

PURSUIT ...L ...

WELL HINDHAUGH CREEK N° 1

Record No.

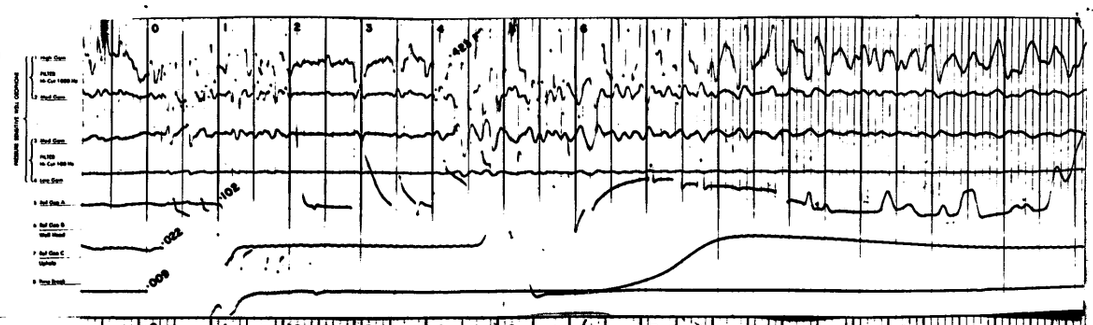
Shot Hole No. 12
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 5200'

Below Datum 00ft. (A.S.L.) 4955'

Charge 10 lbs. Depth of Shot 90'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N° 1

Record No.

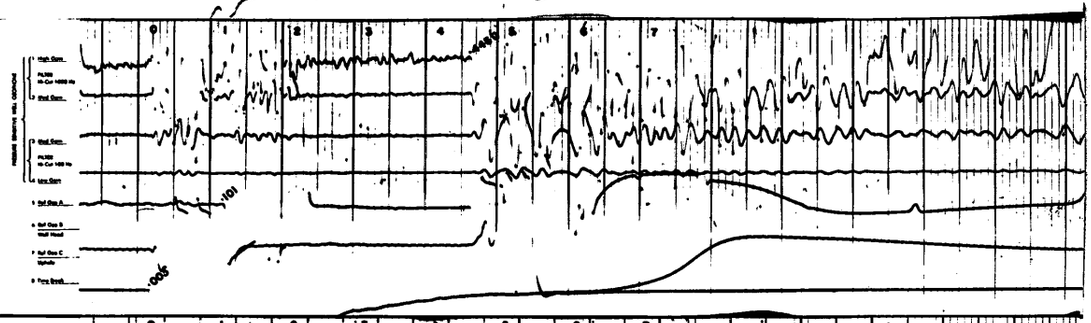
Shot Hole No. 10
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 5700'

Below Datum 00ft. (A.S.L.) 5455'

Charge 20 lbs. Depth of Shot 98'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N° 1

Record No.

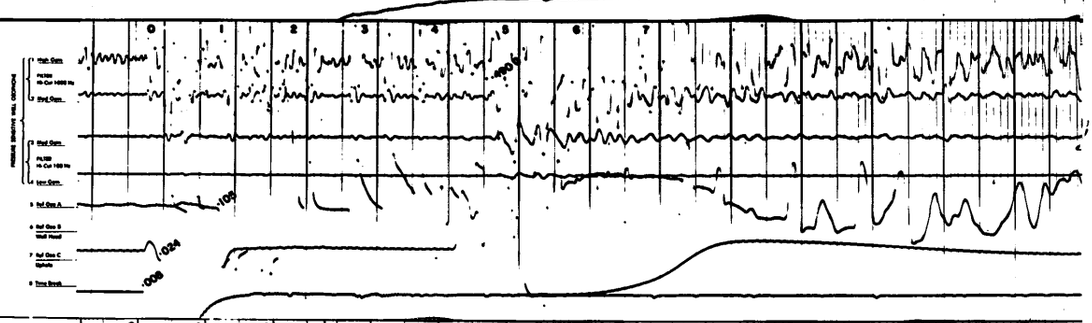
Shot Hole No. 10
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 6200'

Below Datum 00ft. (A.S.L.) 5955'

Charge 10 lbs Depth of Shot 98'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N° 1

Record No.

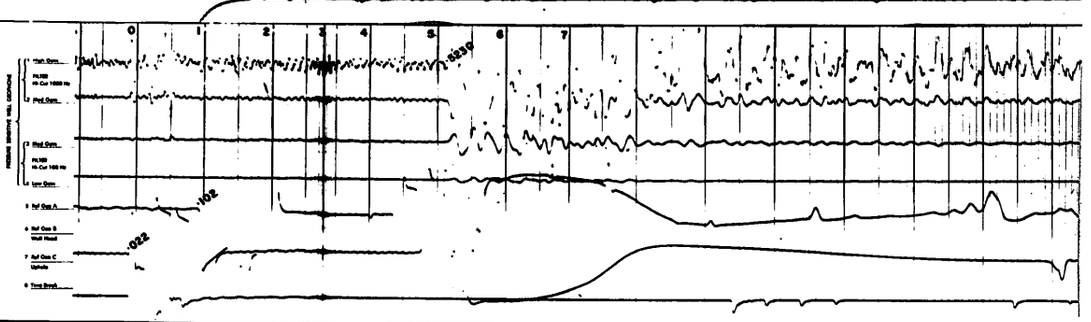
Shot Hole No. 9
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 6700'

Below Datum 00ft. (A.S.L.) 6455'

Charge 20 lbs. Depth of Shot 98'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N° 1

Record No.

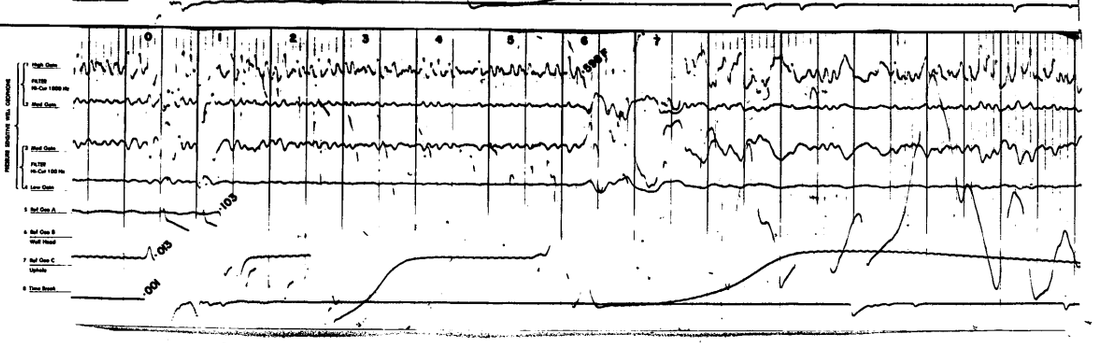
Shot Hole No. 8
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 7700'

Below Datum 00ft. (A.S.L.) 7455'

Charge 20 lbs Depth of Shot 71'



WELL VELOCITY DETERMINATION

PURSUIT OIL N.L.

WELL HINDHAUGH CREEK N° 1

Record No.

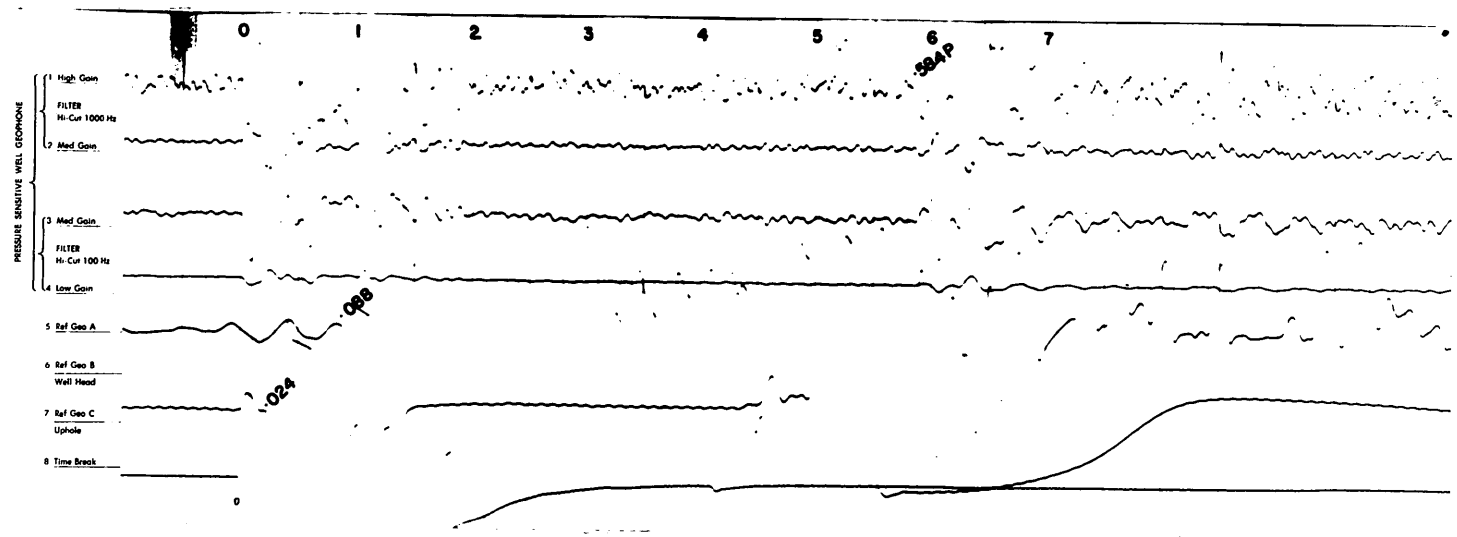
Shot Hole No. 5
Offset & Bearing

Depth of Well Seismometer

Below Kelly Bushing 7700'

Below Datum 00ft. (A.S.L.) 7455'

Charge 10 lbs Depth of Shot 92'



PE907707

This is an enclosure indicator page.
The enclosure PE907707 is enclosed within the container PE907705 at this location in this document.

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CONTAINER_BARCODE	= PE907705
NAME	= Well Velocity Determination Chart
BASIN	=
PERMIT	=
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Well Velocity Determination, (Enclosure from Well Velocity Survey Report), by United Geophysical Corporation for Pursuit Oil NL, 31 October 1969, for Hindhaugh Creek-1.
REMARKS	=
DATE_CREATED	= 31/10/1969
DATE_RECEIVED	=
WELL_NO	= W562
WELL_NAME	= HINDHAUGH CREEK-1
CONTRACTOR	= UNITED GEOPHYSICAL CORPORATION
CLIENT_OP_CO	= PURSUIT OIL NL

(Inserted by DNRE - Vic Govt Mines Dept)

PE907708

This is an enclosure indicator page.
The enclosure PE907708 is enclosed within the container PE907705 at this location in this document.

The enclosure PE907708 has the folllowing characteristics:

ITEM_BARCODE	= PE907708
CONTAINER_BARCODE	= PE907705
NAME	= Well Velocity Function Chart
BASIN	=
PERMIT	=
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Well Velocity Determination, Velocity Function Chart, (Enclosure from Well Velocity Survey Report), by United Geophysical Corporation for Pursuit Oil NL, 31 October 1969, for Hindhaugh Creek-1.
REMARKS	=
DATE_CREATED	= 31/10/1969
DATE_RECEIVED	=
WELL_NO	= W562
WELL_NAME	= HINDHAUGH CREEK-1
CONTRACTOR	= UNITED GEOPHYSICAL CORPORATION
CLIENT_OP_CO	= PURSUIT OIL NL

(Inserted by DNRE - Vic Govt Mines Dept)