

PR 66-32

AUSTRALIAN OCEANIC PETROLEUM  
PTY. LTD.

MOYLE No. 1

VELOCITY SURVEY - SINE CALIBRATION  
AUGUST 1966



PR 66-32

OPEN FILE

LE GENERALE DE GEOPHYSIQUE

D.P. = GROUND LEVEL

Sect.

1

COORDINATES OF THE WELL LOCATION

LONGITUDE X : 129° 46' 27" EAST

LATITUDE Y : 14° 19' 12" SOUTH

Z KB : 193 ft

Z GL : 180 ft

DEPTH OF WELL : 1767 ft

DEPTH OF CASING : 1012 ft

MEASUREMENT RECORDED BY : N. 6526

COMPAGNIE GENERALE DE GEOPHYSIQUE

**D.P.** = GROUND LEVEL

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# LOCATION MAP

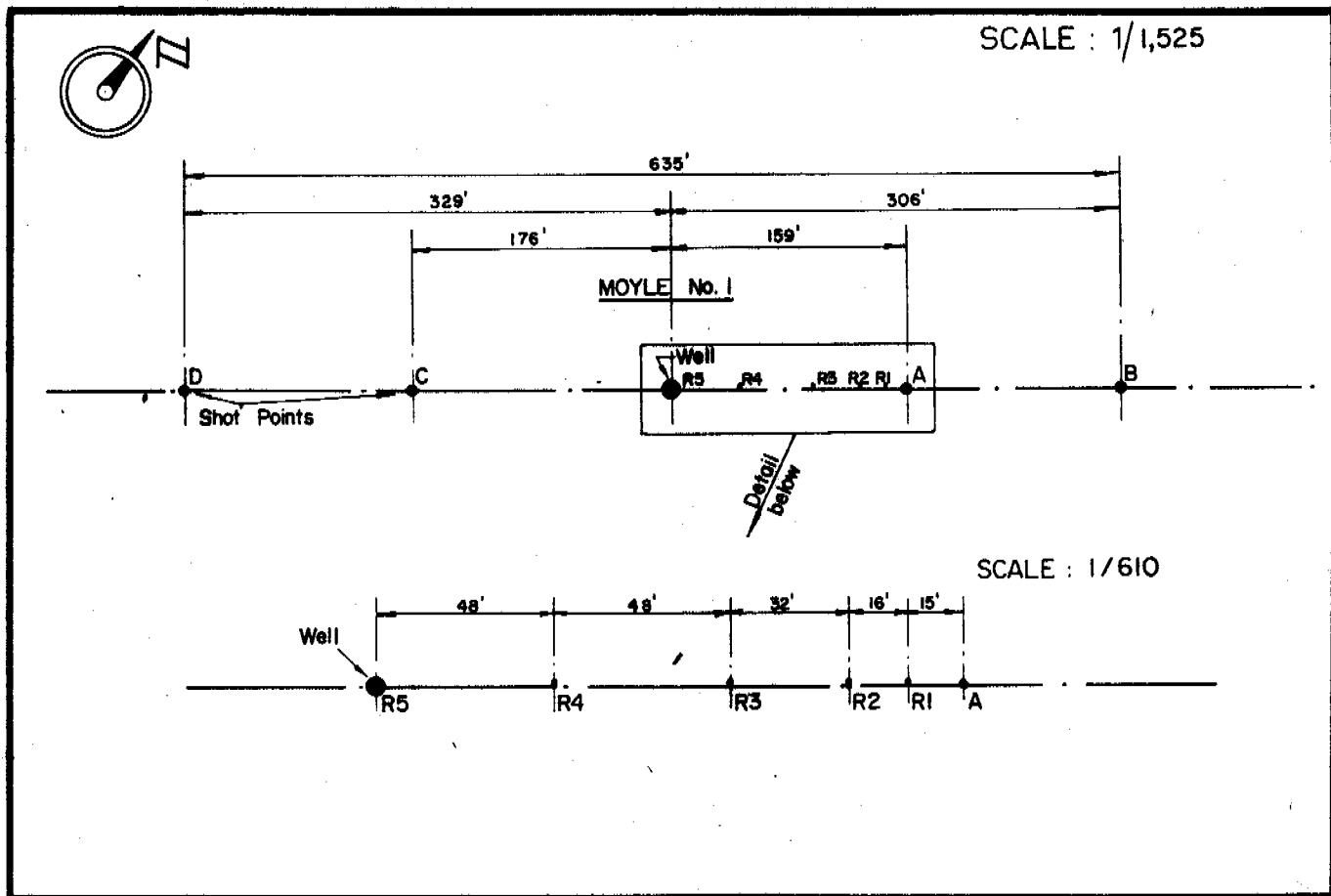
Tb. 2

Z KB : 193 ft

WELL : MOYLE NO. 1

Z GL : 180 ft

Shot point	Number	Distance ft	Z ft	$\Delta Z$ ft	Shot point	Number	Distance	Z	$\Delta Z$
A		159	185	+5					
B		306	184	+4					
C		176	189	+9					
D		329	190	+10					
Reference Geophones									
1		144	185	+5					
2		128	184	+4					
3		96	183	+3					
4		48	182	+2					
5		0	180	0					





(CONT.)

## MEASUREMENTS

### a) Recording Conditions

The weather was fine throughout the survey, which was carried out by day.

All shots were on surface. Some difficulty was experienced with a strong cross feed from the air shooting, causing several shots to be done again with varying charges and gains.

The weathering zone (sandy and thick) is believed to be the cause of a loss of energy necessitating the use of larger than normal charges.

The HSJ-K Well and reference geophones are breaking downwards while the Gulf Well geophone breaks are upwards. The recording equipment was housed in the geologists trailer which was found preferable to setting up in a land-rover. However, to do this the observer had to use extension cables made on the spot, from the Schlumberger truck.

The insulation of both Gulf and HSJ-K Well geophones was good before, during and after the survey.

### b) Quality of the records

Obtaining good records was difficult possibly due to the cross feed from the surfaces shooting techniques or to the shallowness of the levels tested.

The quality of the records is as following :

Shots 1, 2, 3, 4, 5, 8	:	nil
6	:	Doubtful
7	:	Poor
9, 13, 14, 15	:	Fair
10, 11, 12	:	Good

# INTERPRETATION of the RESULTS Tb.4

## COMPUTATION AND CORRECTIONS

### 1) DATUM PLANE

Times and velocities are computed from the ground level of the Well (180 ft above m. s. l.)

### 2) WEATHERING ZONE ( see Tb 6)

- Determined at shot points A and B on the north side of the Well, using the reference geophones (traces 8 to 12 of the records).
- Results obtained from shot points C and D are not reliable and were not taken into account.
- It was assumed that the weathering zone had the same thickness at all shot points and the well locations.
- Results are :
  - 4 feet at 1,200 ft / sec
  - 67 feet at 3,150 ft / sec
  - Horizontal velocity below the weathering : 7,500 ft/sec.

### 3) CORRECTIONS

- The second case of Index of Corrections (Tb 5) was used for all shots.
- The weathering zone correction is :

$$- \frac{4}{1.2} - \frac{67}{3.15} + \frac{71}{7.5} = - 15 \text{ milliseconds}$$

- It was not taken into account in the computation of the corrected times.
- Elevation corrections to the ground level of the Well were calculated with a velocity of 7,500 ft / second.

## SONIC CALIBRATION

### 1) INTEGRATOR CALIBRATION COEFFICIENT Q

First run      from 100 to 1016 feet

before survey	Q = 1.000
after survey	Q = 0.998

Second run      from 810 to 1756 feet

before and after survey	Q # 1.000
-------------------------	-----------

Q is the average value for 50 and 100 microseconds per foot interval transit time and represents the value in milliseconds read on the sonic log.

### 2) SONIC CALIBRATION

First and second runs	C = -5 milliseconds
	K = +10 microseconds / foot

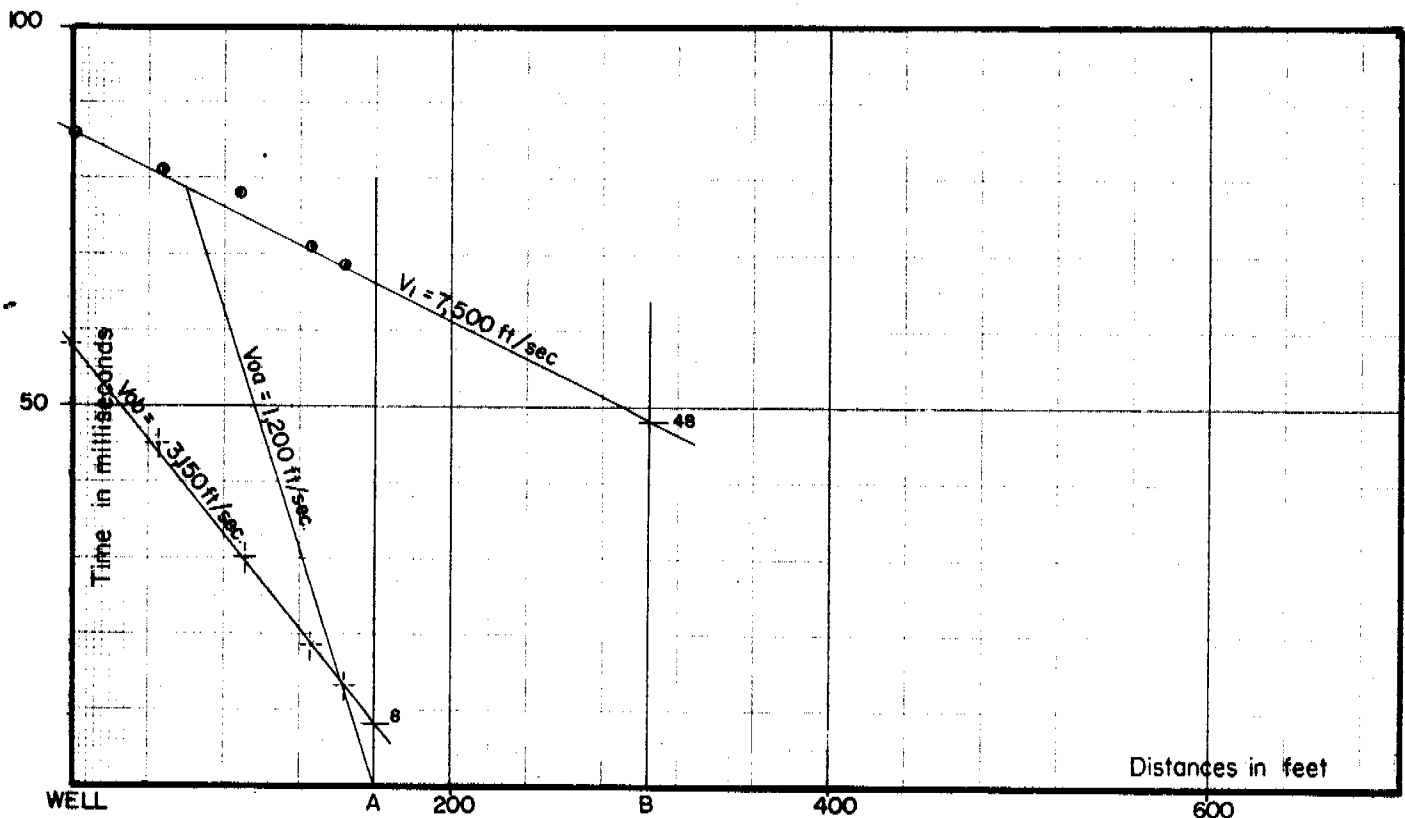




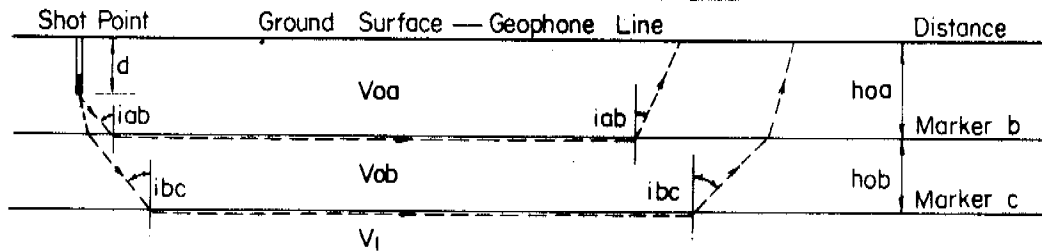
# WEATHERED ZONE

Tb. 6

## (Velocity and Depth Determination)



### PRINCIPLE AND ABBREVIATIONS



### COMPUTATION

$$hoa = \frac{d}{2} + \frac{Ta}{2} \times \frac{Voa}{\cos iab} \quad \text{where } \cos iab \text{ is determined by } \sin iab = \frac{Voa}{Vob}$$

$$hob = \frac{Tb}{2} \times \frac{Vob}{\cos ibc} - hoa \times \frac{Vob}{Voa} \times \frac{\cos iac}{\cos ibc} \quad \text{with } \sin ibc = \frac{Vob}{V1} \text{ and } \sin iac = \frac{Voa}{V1}$$

$Ta = 8$	$Voa = 1,200 \text{ ft/sec.}$	] on the time distance curve
$Tb = 48$	$Vob = 3,150 \text{ ft/sec.}$	
$Tc =$	$V1 = 7,500 \text{ ft/sec.}$	

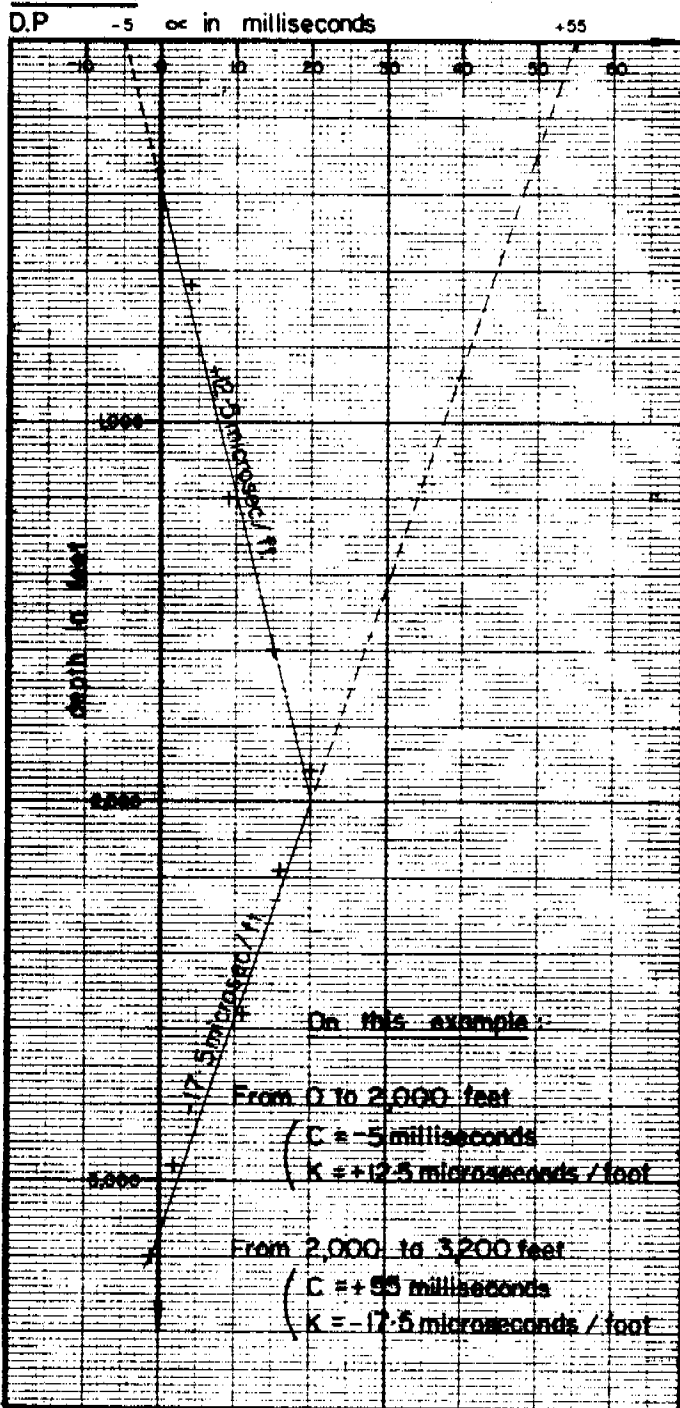
$hoa = 4$	feet at 1,200	feet per second
$hob = 67$	feet at 3,150	feet per second



# SONIC CALIBRATION

## Principle and Abbreviations

### EXAMPLE



b: Seismic corrected times  
 a: Times read on the sonic log from an arbitrary origin. This origin is chosen so that the difference  $\alpha = b - a$  is small

-The value of  $\alpha$  (positive or negative for each calibration point is plotted on a diagram, in relation to the depth D in feet .

-The points are joined with segments of a straight line the breaks of which must correspond to layer changes and / or to noticeable velocity contrasts .

- The equations of these segments determine :-

1- the ordinate of the origin : Calibration constant C in msec.

2- the gradient: Calibration factor K in microsec / foot .

- Thus ,C and  $K \times D$  are algebraically added to each raw sonic time (a) to obtain the corresponding sonic corrected time .

NOTE : Ideal conditions of calibration :

$\alpha$  = Constant for all calibration points, whence:  $C = \alpha$  and  $K = 0$ .



# SONIC INTERVAL VELOCITIES

Tb. 10

Z KB: 193

ORIGIN: Ground Level

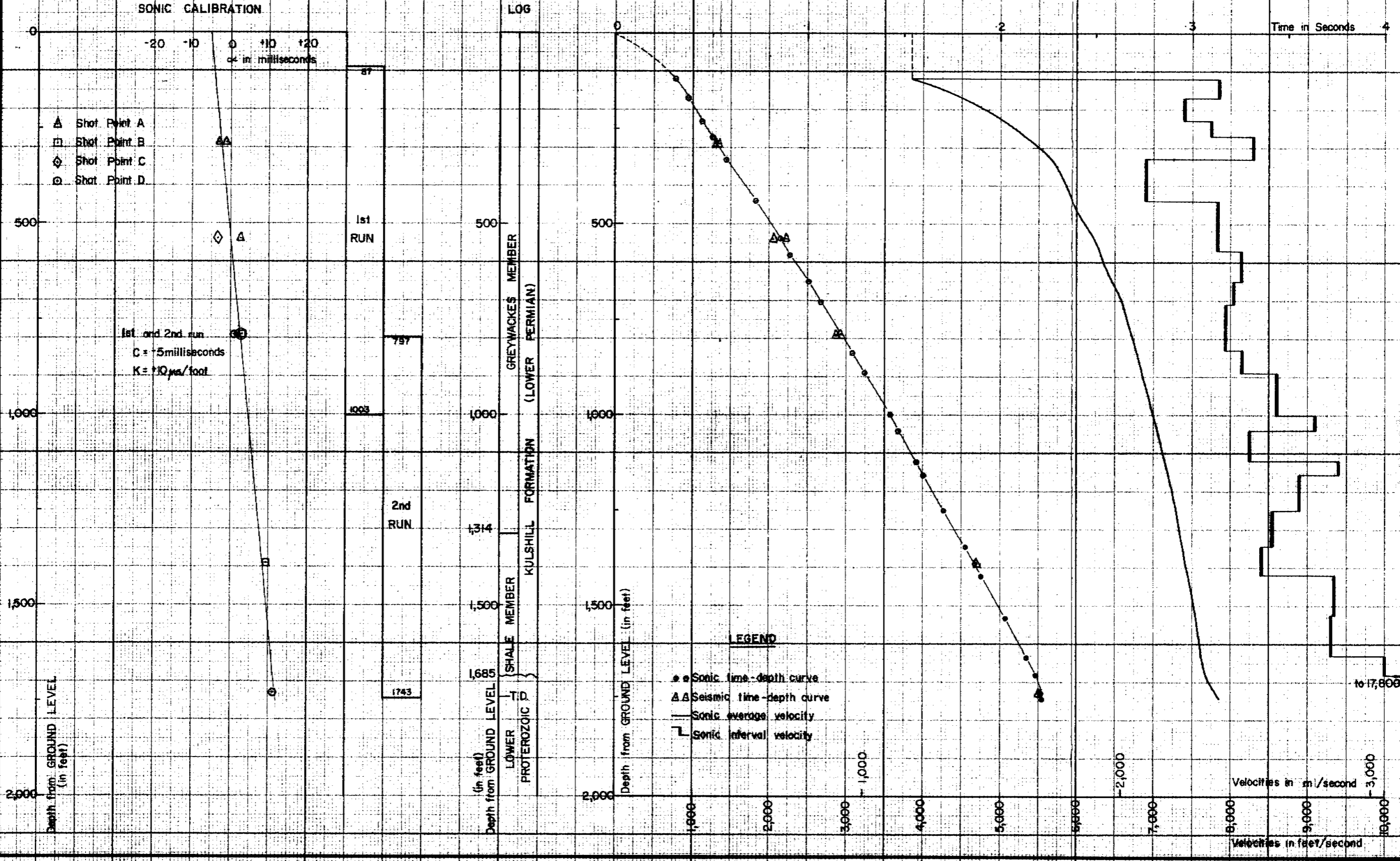
Z GL: 180

Depth in feet from K.B.	Depth in feet from D.P.	Sonic corrected time in milliseconds.	Interval depth	Interval time	Interval velocity in feet/second
133	120	31.2			
			52	6.5	7,850
185	172	37.7			
			56	7.6	7,400
241	228	45.3			
			42	5.4	7,750
283	270	50.7			
			63	7.6	8,300
346	333	58.3			
			104	15.1	6,900
450	437	73.4			
			136	17.3	7,850
586	573	90.7			
			80	9.8	8,150
666	653	100.5			
			53	6.6	8,050
719	706	107.1			
			130	16.3	7,950
849	836	123.4			
			53	6.5	8,150
902	889	129.9			
			113	13.1	8,600
1015	1002	143			
			40	4.4	9,100
1055	1042	147.4			
			81	9.8	8,250
1136	1123	157.2			
			31	3.3	9,400
1167	1154	160.5			
			98	11.0	8,900
1265	1252	171.5			
			94	11.0	8,550
1359	1346	182.5			
			73	8.7	8,400
1432	1419	191.2			
			113	12.1	9,350
1545	1532	203.3			
			103	11.1	9,300
1648	1635	214.4			
			44	4.4	10,000
1692	1679	218.8			
			64	3.6	17,800
1756	1743	222.4			

# MOYLE No. 1

Weathering zone correction (-15 ms) was not taken into account on this plate.

DATUM PLANE : WELL GROUND LEVEL



Client A A P  
Well MOYLE No 1

C.G.G. PARTY X 6526

Date D 12 M 8 Y 66  
Hour H 3 M 50 pm

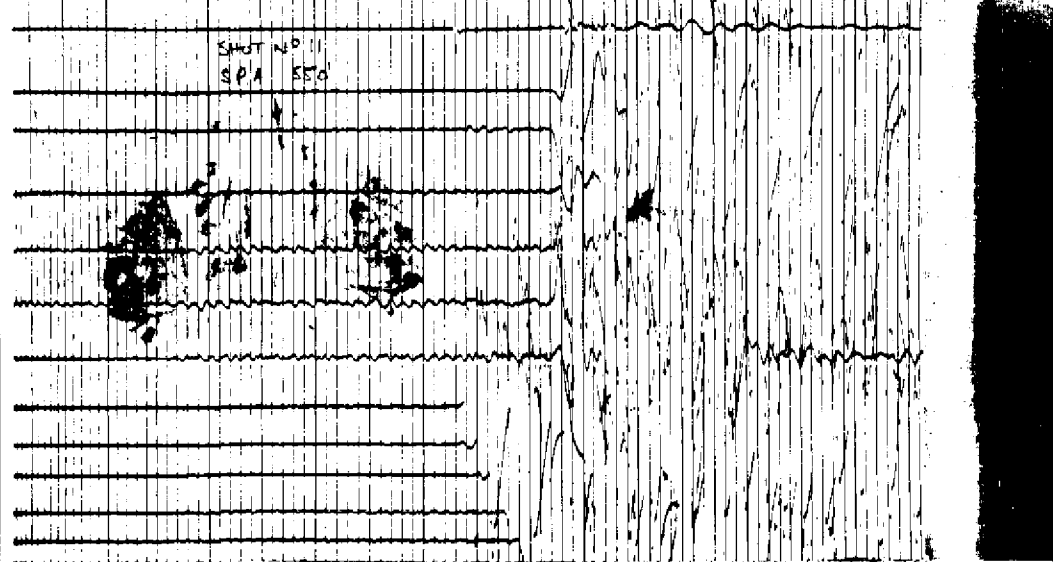
No of Shot 11  
Shot Point A

Shot Point to well distance in feet  
Depth of charge in feet SURFACE  
Charge in lbs 10 - 1 DETD

Well geophone GULF  
Pressure geophone G.C.E. 101  
Ref geophones HALL SEARS

Equipment SIE  
Amplifiers PII SIE  
Camera PRO II SIE

No of trace	DESIGNATION	GAIN		FILTER		A G C
		Input	Output	L F	H F	
1	Time break					
2	H.S.J well geophone	30	50	out	92	off
3	H.S.J well geophone	40				
4	Gulf well geophone	30				
5	Gulf well geophone	40				
6	Gulf well geophone	50	60			off
7	Gulf well geophone	40	50			on
8	Reference 1	30				off
9	2	30				
10	3	30				
11	4	30				
12	5	30	50	out	92	off



Client A A P  
Well MOYLE No 1

C.G.G. PARTY X 6526

Date D 12 M 8 Y 66  
Hour H 3 M 45 pm

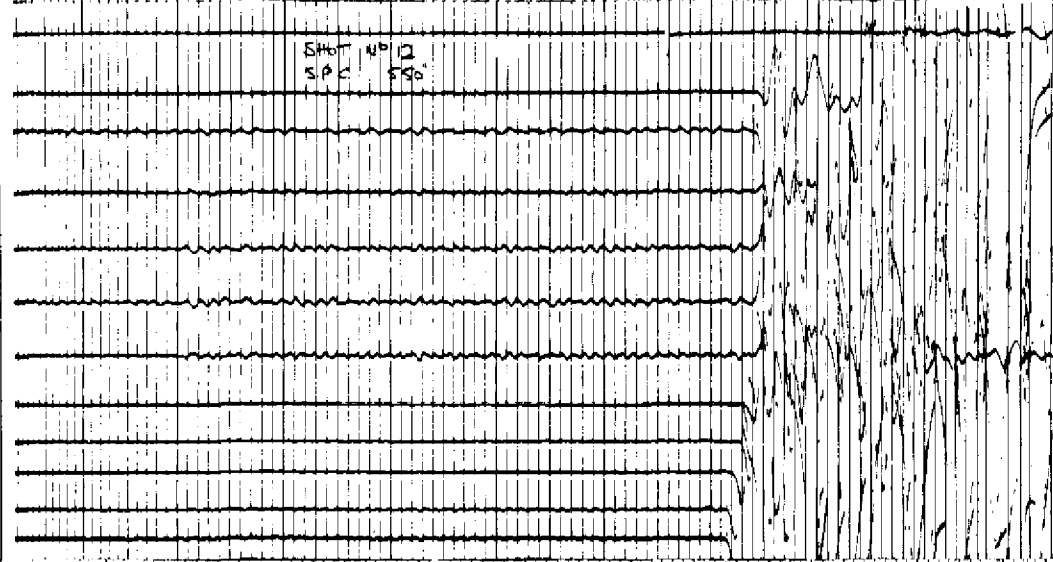
No of Shot 12  
Shot Point C

Shot Point to well distance in feet  
Depth of charge in feet SURFACE  
Charge in lbs 15 - 1 DETD

Well geophone GULF  
Pressure geophone G.C.E. 101  
Ref geophones HALL SEARS

Equipment SIE  
Amplifiers PII SIE  
Camera PRO II SIE

No of trace	DESIGNATION	GAIN		FILTER		A G C
		Input	Output	L F	H F	
1	Time break					
2	H.S.J well geophone	30	50	out	92	off
3	H.S.J well geophone	40				
4	Gulf well geophone	30				
5	Gulf well geophone	40				
6	Gulf well geophone	50	60			off
7	Gulf well geophone	40	50			on
8	Reference 1	30				off
9	2	30				
10	3	30				
11	4	30				
12	5	30	50	out	92	off



Client A A P  
Well MOYLE No 1

C.G.G. PARTY X 6526

Date D 12 M 8 Y 66  
Hour H 3 M 50 pm

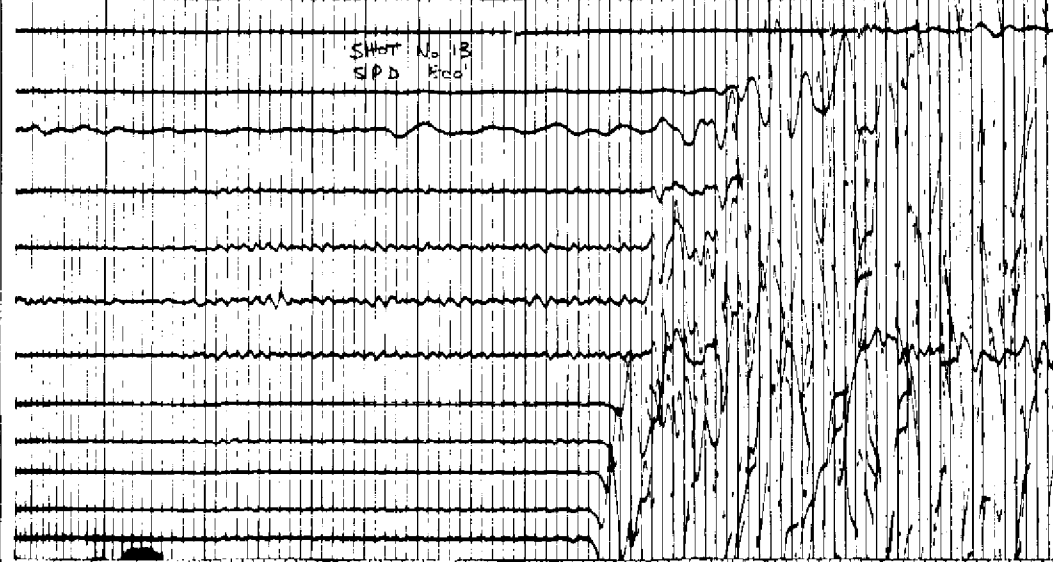
No of Shot 13  
Shot Point D

Shot Point to well distance in feet  
Depth of charge in feet SURFACE  
Charge in lbs 40 - 1 DETD

Well geophone GULF  
Pressure geophone G.C.E. 101  
Ref geophones HALL SEARS

Equipment SIE  
Amplifiers PII SIE  
Camera PRO II SIE

No of trace	DESIGNATION	GAIN		FILTER		A G C
		Input	Output	L F	H F	
1	Time break					
2	H.S.J well geophone	30	50	out	92	off
3	H.S.J well geophone	40				
4	Gulf well geophone	30				
5	Gulf well geophone	40				
6	Gulf well geophone	50	60			off
7	Gulf well geophone	40	50			on
8	Reference 1	30				off
9	2	30				
10	3	30				
11	4	30				
12	5	30	50	out	92	off



Client A A P  
Well MOYLE No 1

C.G.G. PARTY X 6526

Date D 12 M 8 Y 66  
Hour H 4 M 05 pm

No of Shot 14  
Shot Point A

Shot Point to well distance in feet  
Depth of charge in feet 3'  
Charge in lbs 2 1/2 - 1 DETD

Well geophone GULF  
Pressure geophone G.C.E. 101  
Ref geophones HALL SEARS

Equipment SIE  
Amplifiers PII SIE  
Camera PRO II SIE

No of trace	DESIGNATION	GAIN		FILTER		A G C
		Input	Output	L F	H F	
1	Time break					
2	H.S.J well geophone	30	50	out	92	off
3	H.S.J well geophone	40				
4	Gulf well geophone	30				
5	Gulf well geophone	40				
6	Gulf well geophone	50	60			off
7	Gulf well geophone	40	50			on
8	Reference 1	30				off
9	2	30				
10	3	30				
11	4	30				
12	5	30	50	out	92	off



Client A A P  
Well MOYLE No 1

C.G.G. PARTY X 6526

Date D 12 M 8 Y 66  
Hour H 4 M 15 pm

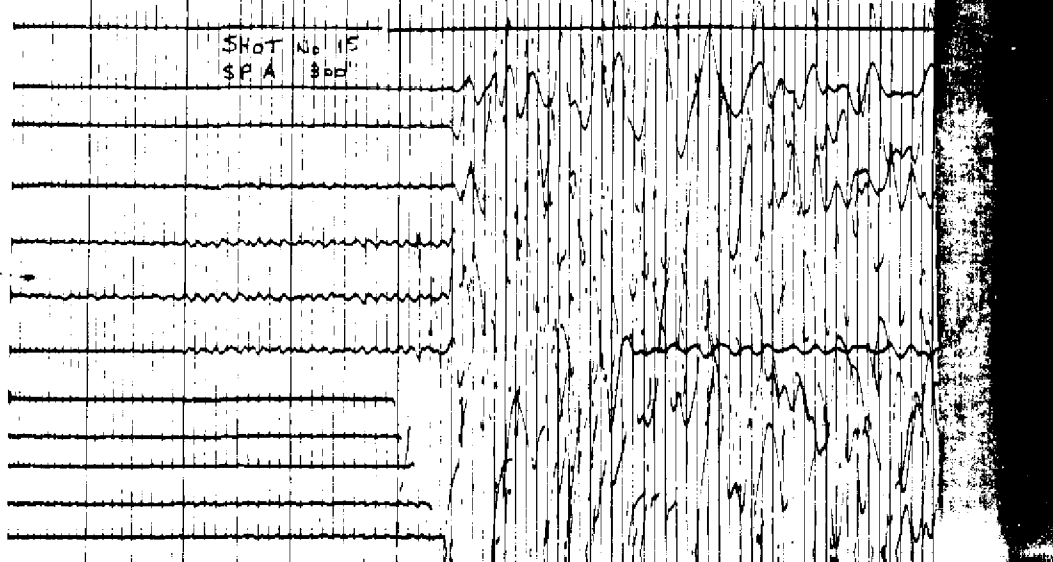
No of Shot 15  
Shot Point A

Shot Point to well distance in feet  
Depth of charge in feet 3'  
Charge in lbs 2 1/2 - 1 DETD

Well geophone GULF  
Pressure geophone G.C.E. 101  
Ref geophones HALL SEARS

Equipment SIE  
Amplifiers PII SIE  
Camera PRO II SIE

No of trace	DESIGNATION	GAIN		FILTER		A G C
		Input	Output	L F	H F	
1	Time break					
2	H.S.J well geophone	30	50	out	92	off
3	H.S.J well geophone	40				
4	Gulf well geophone	30				
5	Gulf well geophone	40				
6	Gulf well geophone	50	60			off
7	Gulf well geophone	40	50			on
8	Reference 1	30				off
9	2	30				
10	3	30				
11	4	30				
12	5	30	50	out	92	off



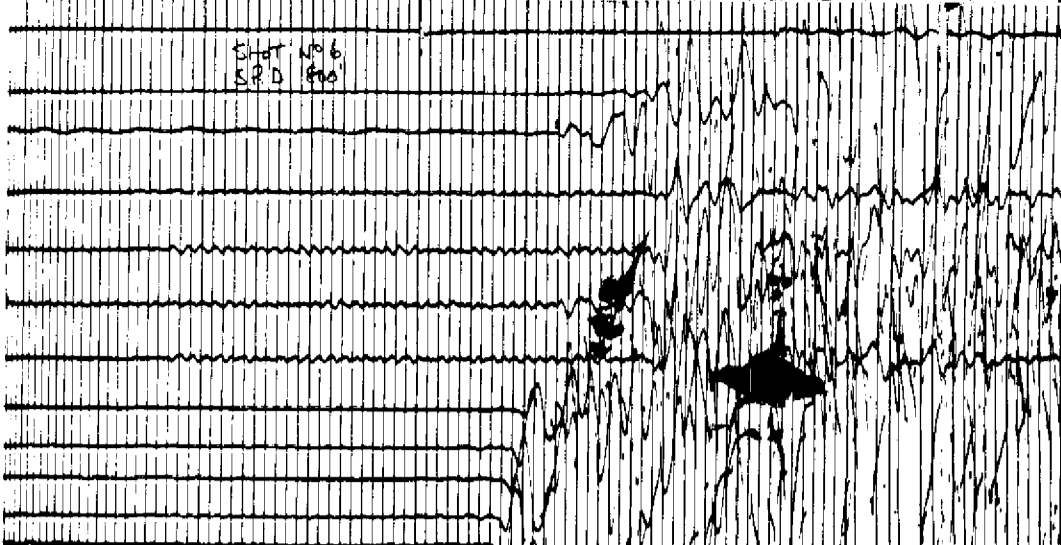


CGG PARTY X 6526 Client: A A P Well: MOYLE No 1

Date D 12 M 8 Y 66  
 Hour H 2 M 30 pm  
 No of Shot 6  
 Shot Point B  
 Shot Point to well distance in feet SURFACE  
 Depth of charge in feet SURFACE  
 Charge in lbs 35 - 1000  
 Perturbations  
 Observations

Depth of well geophone in feet below KB 800  
 Down  
 Well geophone GULF  
 Pressure geophone G.C.E. IO  
 Ref geophones HALL SEARS  
 Equipment SIE  
 Amplifiers PII SIE  
 Camera PRO II SIE

No of trace	DESIGNATION	GAIN		FILTER		A B C
		Input	Output	L F	H F	
1	Time break					
2	H.S.J well geophone	30	50	out	92	off
3	H.S.J well geophone	40				
4	Gulf well geophone	30				
5	Gulf well geophone	40				
6	Gulf well geophone	50	60			off
7	Gulf well geophone	40	50			on
8	Reference 1	30				off
9	2	30				
10	3	30				
11	4	30				
12	5	30	50	out	92	off

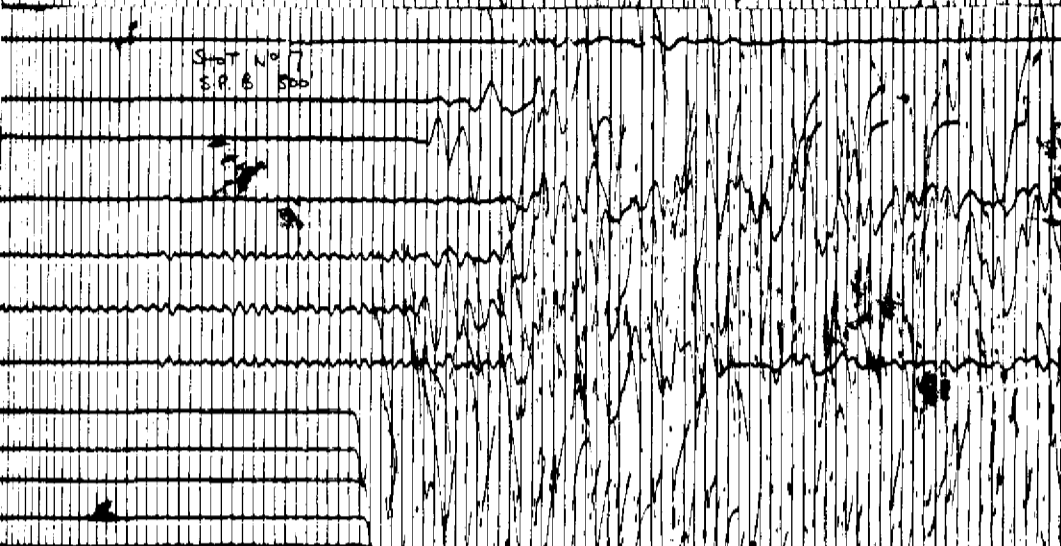


CGG PARTY X 6526 Client: A A P Well: MOYLE No 1

Date D 12 M 8 Y 66  
 Hour H 2 M 40 pm  
 No of Shot 7  
 Shot Point B  
 Shot Point to well distance in feet SURFACE  
 Depth of charge in feet SURFACE  
 Charge in lbs 30 - 1000  
 Perturbations  
 Observations

Depth of well geophone in feet below KB 800  
 Down  
 Well geophone GULF  
 Pressure geophone G.C.E. IO  
 Ref geophones HALL SEARS  
 Equipment SIE  
 Amplifiers PII SIE  
 Camera PRO II SIE

No of trace	DESIGNATION	GAIN		FILTER		A B C
		Input	Output	L F	H F	
1	Time break					
2	H.S.J well geophone	30	50	out	92	off
3	H.S.J well geophone	40				
4	Gulf well geophone	30				
5	Gulf well geophone	40				
6	Gulf well geophone	50	60			off
7	Gulf well geophone	40	50			on
8	Reference 1	30				off
9	2	30				
10	3	30				
11	4	30				
12	5	30	50	out	92	off



CGG PARTY X 6526 Client: A A P Well: MOYLE No 1

Date D 12 M 8 Y 66  
 Hour H 2 M 55 pm  
 No of Shot 8  
 Shot Point B  
 Shot Point to well distance in feet SURFACE  
 Depth of charge in feet SURFACE  
 Charge in lbs 30 - 1000  
 Perturbations  
 Observations

Depth of well geophone in feet below KB 1740  
 Down  
 Well geophone GULF  
 Pressure geophone G.C.E. IO  
 Ref geophones HALL SEARS  
 Equipment SIE  
 Amplifiers PII SIE  
 Camera PRO II SIE

No of trace	DESIGNATION	GAIN		FILTER		A B C
		Input	Output	L F	H F	
1	Time break					
2	H.S.J well geophone	35	50	out	92	off
3	H.S.J well geophone	30				
4	Gulf well geophone	35				
5	Gulf well geophone	50				
6	Gulf well geophone	60	60			off
7	Gulf well geophone	50	50			on
8	Reference 1	30				off
9	2	30				
10	3	30				
11	4	30				
12	5	30	50	out	92	off

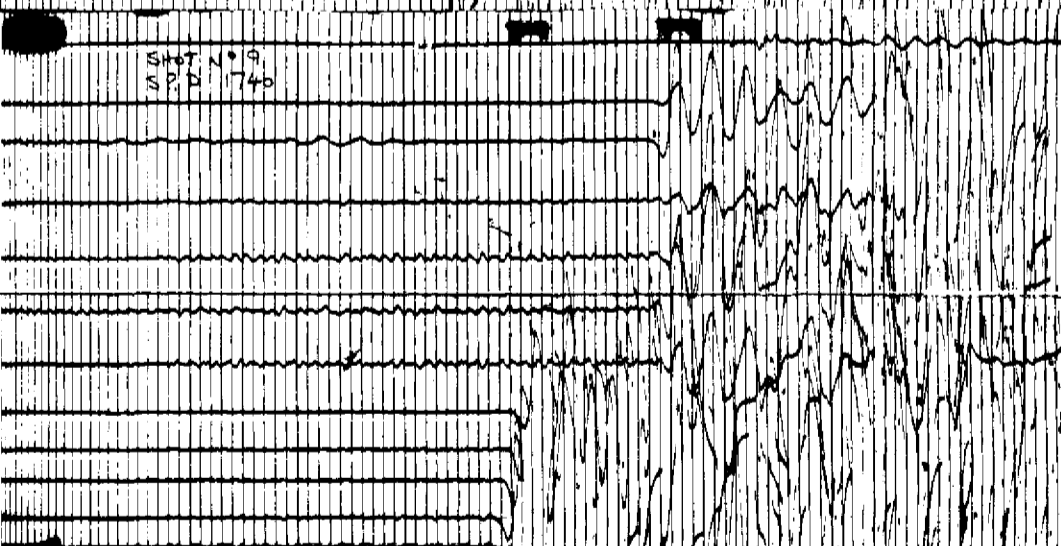


CGG PARTY X 6526 Client: A A P Well: MOYLE No 1

Date D 12 M 8 Y 66  
 Hour H 3 M 10 pm  
 No of Shot 9  
 Shot Point B  
 Shot Point to well distance in feet SURFACE  
 Depth of charge in feet SURFACE  
 Charge in lbs 35 - 1000  
 Perturbations  
 Observations

Depth of well geophone in feet below KB 1740  
 Down  
 Well geophone GULF  
 Pressure geophone G.C.E. IO  
 Ref geophones HALL SEARS  
 Equipment SIE  
 Amplifiers PII SIE  
 Camera PRO II SIE

No of trace	DESIGNATION	GAIN		FILTER		A B C
		Input	Output	L F	H F	
1	Time break					
2	H.S.J well geophone	30	50	out	92	off
3	H.S.J well geophone	40				
4	Gulf well geophone	30				
5	Gulf well geophone	40				
6	Gulf well geophone	50	60			off
7	Gulf well geophone	40	50			on
8	Reference 1	30				off
9	2	30				
10	3	30				
11	4	30				
12	5	30	50	out	92	off



CGG PARTY X 6526 Client: A A P Well: MOYLE No 1

Date D 12 M 8 Y 66  
 Hour H 3 M 25 pm  
 No of Shot 10  
 Shot Point B  
 Shot Point to well distance in feet SURFACE  
 Depth of charge in feet SURFACE  
 Charge in lbs 30 - 1000  
 Perturbations  
 Observations

Depth of well geophone in feet below KB 1400  
 Down  
 Well geophone GULF  
 Pressure geophone G.C.E. IO  
 Ref geophones HALL SEARS  
 Equipment SIE  
 Amplifiers PII SIE  
 Camera PRO II SIE

No of trace	DESIGNATION	GAIN		FILTER		A B C
		Input	Output	L F	H F	
1	Time break					
2	H.S.J well geophone	30	50	out	92	off
3	H.S.J well geophone	40				
4	Gulf well geophone	30				
5	Gulf well geophone	40				
6	Gulf well geophone	50	60			off
7	Gulf well geophone	40	50			on
8	Reference 1	30				off
9	2	30				
10	3	30				
11	4	30				
12	5	30	50	out	92	off

