ONSHORE

PR83-18

NOISE STUDY AND EXPERIMENTAL WORK

WEST DINGO AREA,

CREW 6824

PANCONTINENTAL PETROLEUM 24TH/25TH NOVEMBER, 1983.

Prior to the commencement of production in the West Dingo Area in central Northern Territory, Petty-Ray Crew 6824 conducted a noise study and experimental programme near the midpoint of line P83-WD2 starting at station 300 to the South.

24TH NOVEMBER 1983

The noise study consisted of standing sweeps at 4 vibrator points spaced at 600 metre intervals into an off end spread over a further 600 metres (FIG. 1). The spread comprised of 60 groups of 12 geophones podded at 10 metre intervals as well as 30 groups of 12 geophones in line at 1.8 metre element separation and 30 groups of 24 geophones in line at 0.8 metre element separation. (FIGS. 2 & 3). All the geophones were MD 79's, 10 Hz natural frequency, with 70% damping. A single stationary vibrator was used as the energy source, eight standing sweeps was found to produce sufficient energy for the first V.P. This was increased to 10, 12 and 16 for VP's 2, 3 and 4 respectively. A sweep frequency of 10 to 40 Hz and a sweep length of 8 seconds was chosen for the walkaway noise study.

Analysis of the monitor records (FIG. 6) shows a strong single ground roll component, the velocity of which is as follows.

Velocity:	1678 metres per second
Frequency:	14.2 Hz
Wave length:	118 metres

Also present is an airwave of Velocity 340 metres per second. Experimentation was concluded for the day to allow a detailed examination of the monitor records and computations of the theoretical array length overnight.

25TH NOVEMBER 1983

The theoretical ideal array length was calculated using the formula:-

$$L = \frac{Q.Vrl}{fq}$$

Where L = Array length
Vrl = Velocity of guided wave
Q = L/ value of the Q point (1.2 nominally)
fq = Lowest required frequency

Using this formula the ideal source array is one of 167.8 m or a submultiple thereof.

The days experimental programme commenced with a series of source array comparisons using four vibrators. In order to make a valid comparison into the receiver array the vibrator sweep range was left at 10-40 Hz with an eight second sweep.

The following records were recorded during this phase of experimentation.

RECORD NO.	STN. NO.	ARRAY
5	330	4 Vibs in line, 12m pad spacing
6	360	2 m. Move up giving 58m array
7	390	
8	330	4 Vibs in line 12m pad spacing
9	360	6m Move up giving 102m array
10	390	

A comparison between the monitor records showed that the 58m. array gave the best indication of noise cancellation and it was decided to utilise this length for subsequent production.

The experimental programme was concluded at this time. The total suite of experimental recordings having taken some 11 hours.

The parameters decided upon were:-

Source Array (FIG. 4)	4 vibrators in line, 2m move up 12m pad separation. Giving a 30 Element array over 58m.
Receiver Array (FIG. 5)	24 geophones in line centred about the station with 3m separation giving an array length of 69m.
Vibrator Settings	Sweep Length - 16 secs. Sweep Freq. - 12-90 Hz/Up Sweep - Logarithmic 15dB boost
Recorder Settings	Sample Rate - 2 m/sec. Anti Alias - 125 Hz Lo-Cut - Out Rec-Length - 20 secs. No. of Sums - 12 CDP Gap - 11 stns.

Respectfully submitted,
PETTY-RAY GEOPHYSICAL

D.V. HOSKINS
Area Supervisor.

The following phase of the experimental programme was a vibrator sweep length comparison. The following records were recorded with the 58m. array length.

RECORD NO.	RECORD LENGTH	SWEEP
11	8 secs.	4 secs. 10 - 40 Hz
12	20 secs.	16 secs. 10 - 40 Hz

Examination of the monitor records showed that the 16 second sweep with a 4 second listen time produced the desired quality of record. It was decided to adopt a 20 second record length for production.

The following phase of experimentation was used to determine the correct number of sweeps, sweep frequency and instrument filter settings. The following records were recorded using the 58m. array with a 16 second sweep and 4 sec. listen.

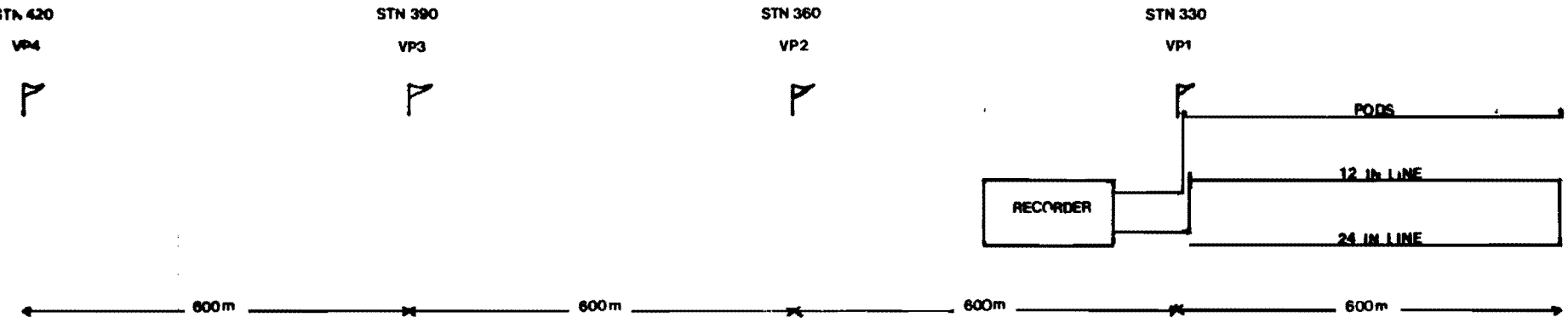
RECORD NO.	NO. OF SWEEPS	SWEEP FREQ.	FILTER
13		16-90 Hz linear	Lo cut out
14	12	16-90 Hz linear	Lo cut 15/36
15	12	15-80 Hz linear	Lo cut out
16	12	12-90 Hz linear	Lo cut out
17	12	12-90 Hz log - 15dB boost	Lo cut out

Appraisal of the monitor records caused the selection of 12, 12-90 Hz logarithmic sweeps with 15dB boost utilising no instrument lo-cut filtering. (see FIG. 4 for SOURCE ARRAY).

The final phase of experimentation was to re-lay thirty stations changing the receiver array to 24 geophones in line with a 3 metre element separation (FIG. 5). Three more records were recorded and the final parameters decided upon.

A P P E N D I X

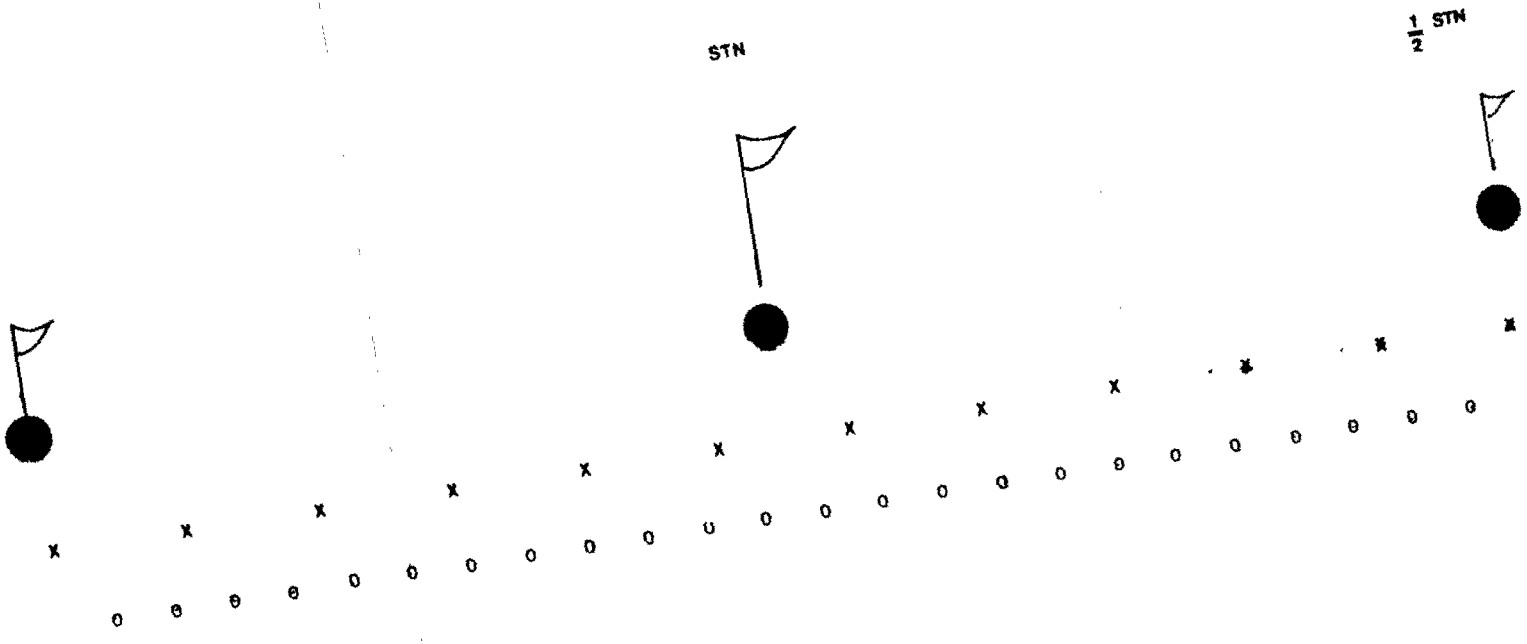
FIGURE



VIBRATOR LOCATION

PARTY 6824

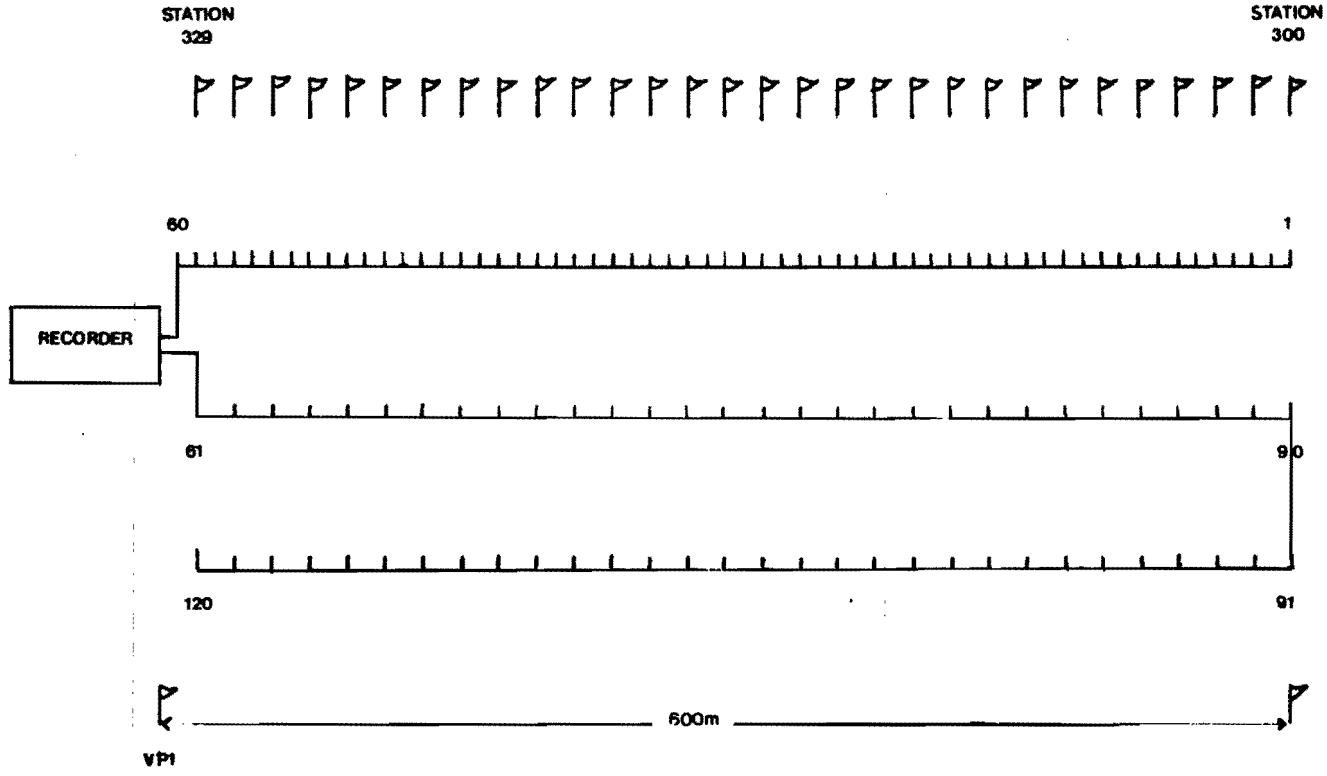
GEOSOURCE



RECEIVER ARRAY

6824

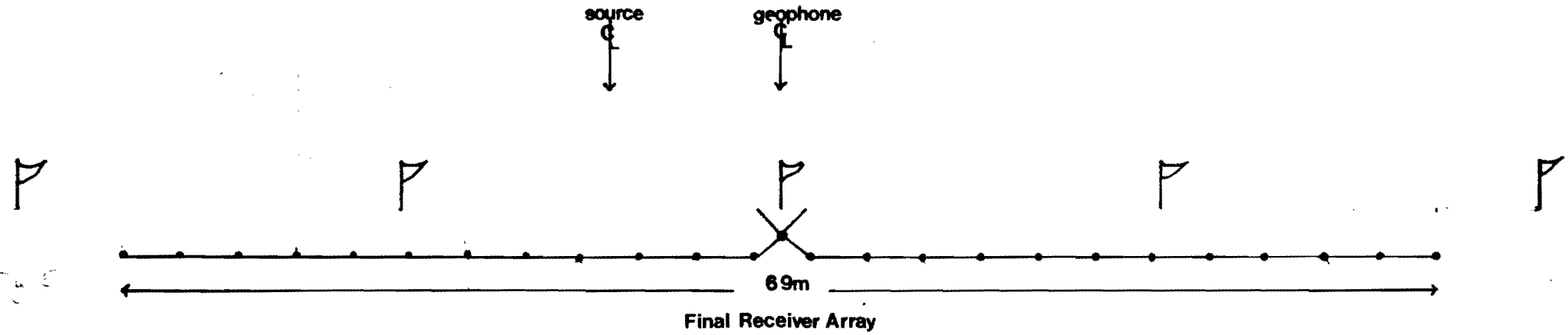
GEOSOURCE



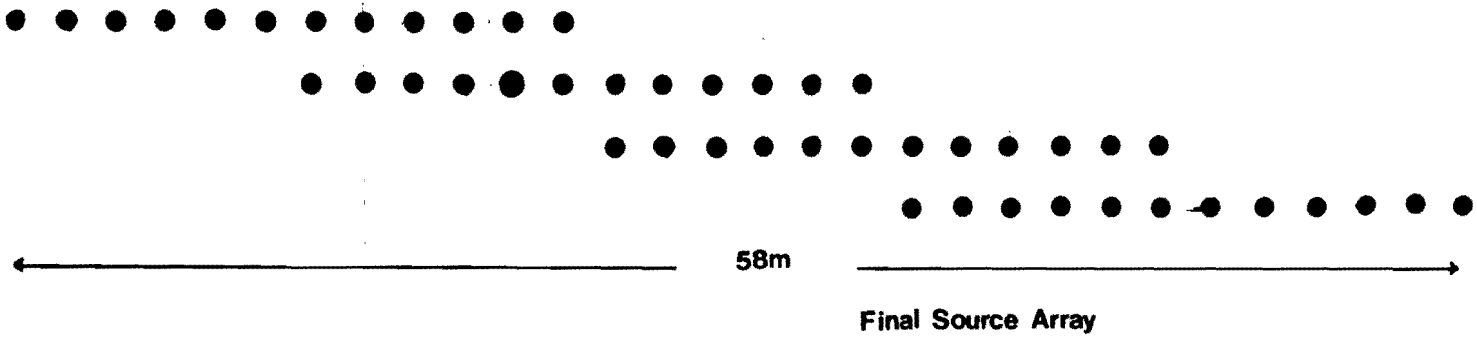
SPREAD DIAGRAM

PARTY 6824

GEOSOURCE



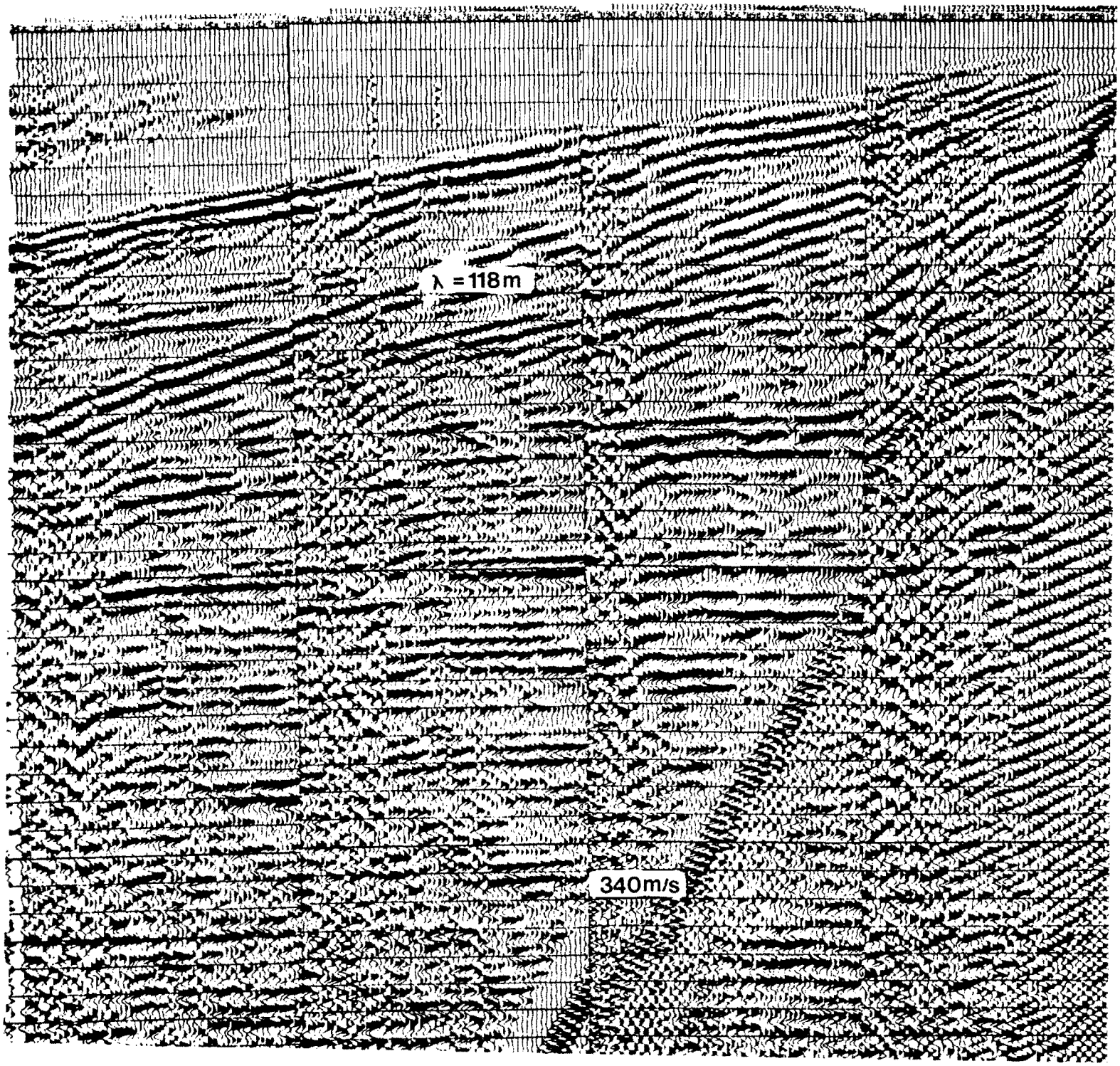
Final Receiver Array



Final Source Array

6824

GEOSOURCE



WALKAWAY NOISE STUDY RECORDED 24-11-83

PANCONTINENTAL'S W. DINGO SEISMIC SURVEY

LINE P83-WD 2 by PETTY-RAY CREW 6824

GEOSOURCE

Fig 6

12/02/83 VERSION 18 30SEPT83

Petty-Kay
Brisbane D.P.C.

TEMPUS

Geoscience Operations
Exploration Services Division

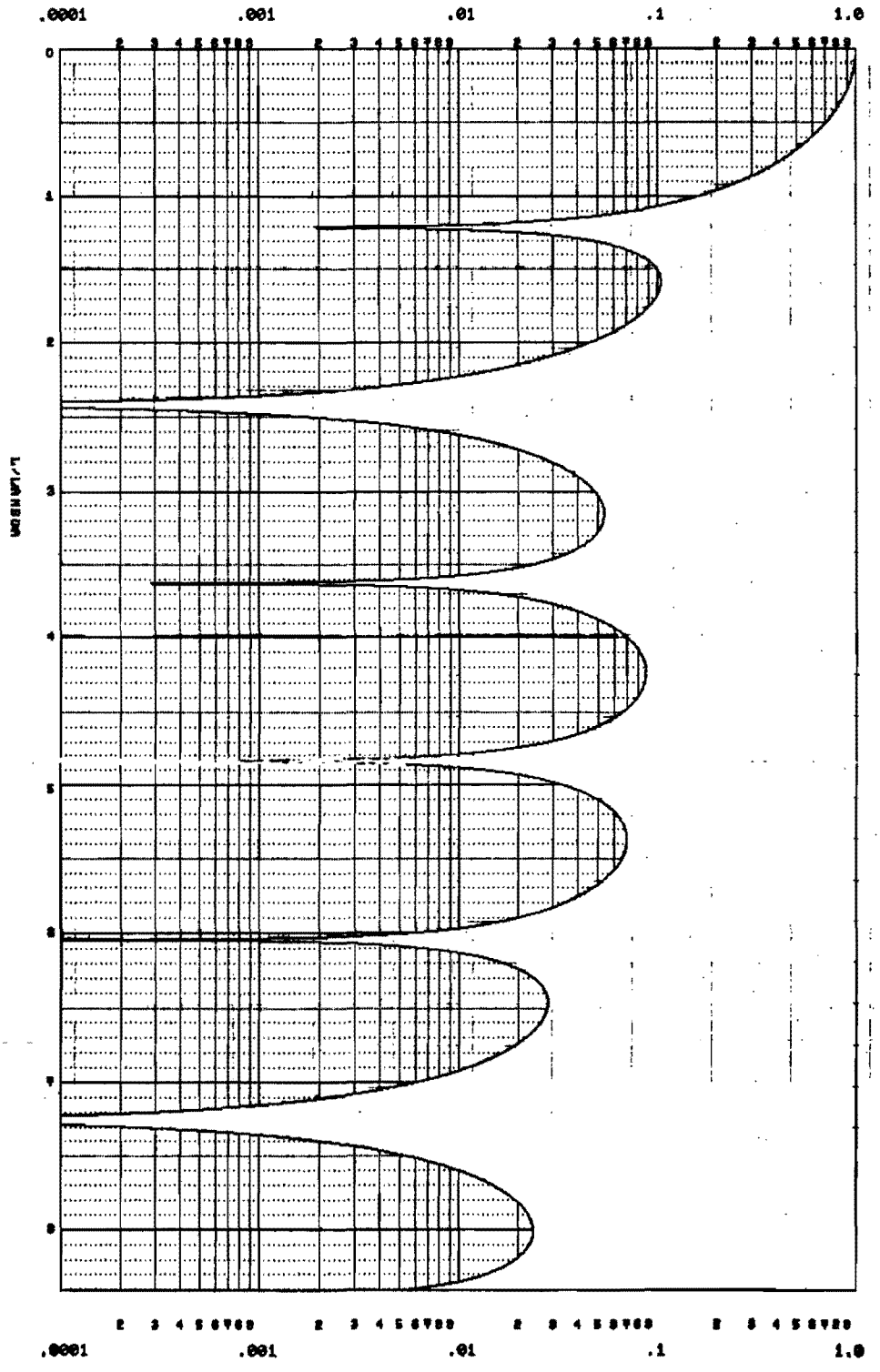
GEOSOURCE

SOURCE,RECIEVER AND COMBINED ARRAY RESPONSES

20 ELEMENT TYPE 2 SOURCE ARRAY

WEIGHTS —
2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 1.0
1.0 1.0 1.0 1.0 1.0
DISTANCES FROM CENTRE —
1.0 3.0 5.0 7.0 9.0 11.0 13.0 15:0 17:0 19.0
21.0 23.0 25.0 27.0 29.0

AMPLITUDE RESPONSE



AMPLITUDE RESPONSE

Petty-Ray
Brisbane D.P.C.

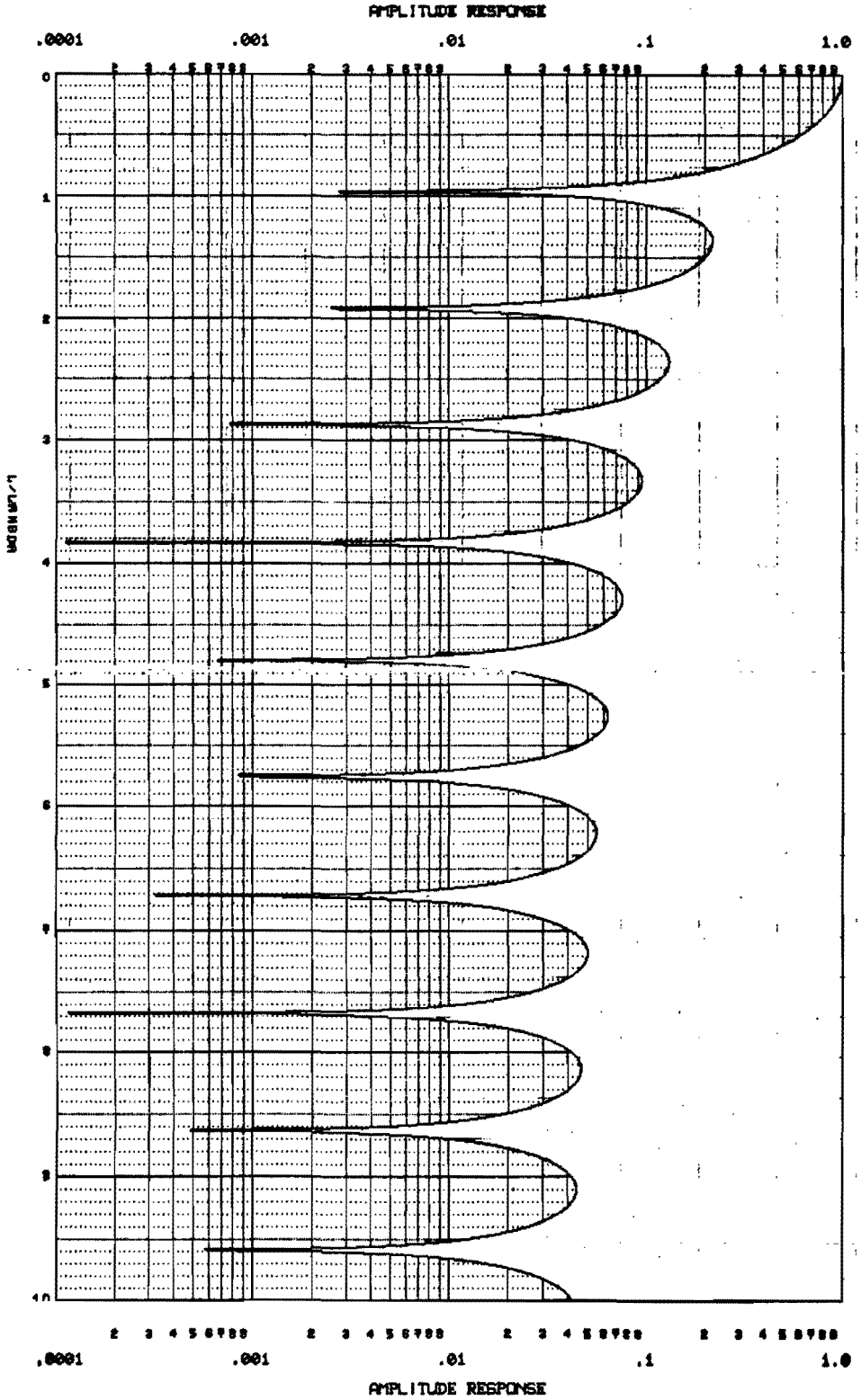
TEMPUS
Geoscience Operations
Exploration Services Division

GEOSOURCE

SOURCE, RECIEVER AND COMBINED ARRAY RESPONSES

- 24 ELEMENT TYPE 1 RECEIVER ARRAY

WEIGHTS ---
1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
1.0 1.0
DISTANCES FROM CENTRE ---
1.5 4.5 7.5 10.5 13.5 16.5 19.5 22.5 25.5 28.5
31.5 34.5



12/02/83

VERSION 10 30SEPT83

Petty-Ray Brisbane D.P.C.

TEMPUS

Geoscience Operations
Exploration Services Division

GEOSOURCE

SOURCE/TOWLEVER AND COMBINED ARRAY RESPONSES

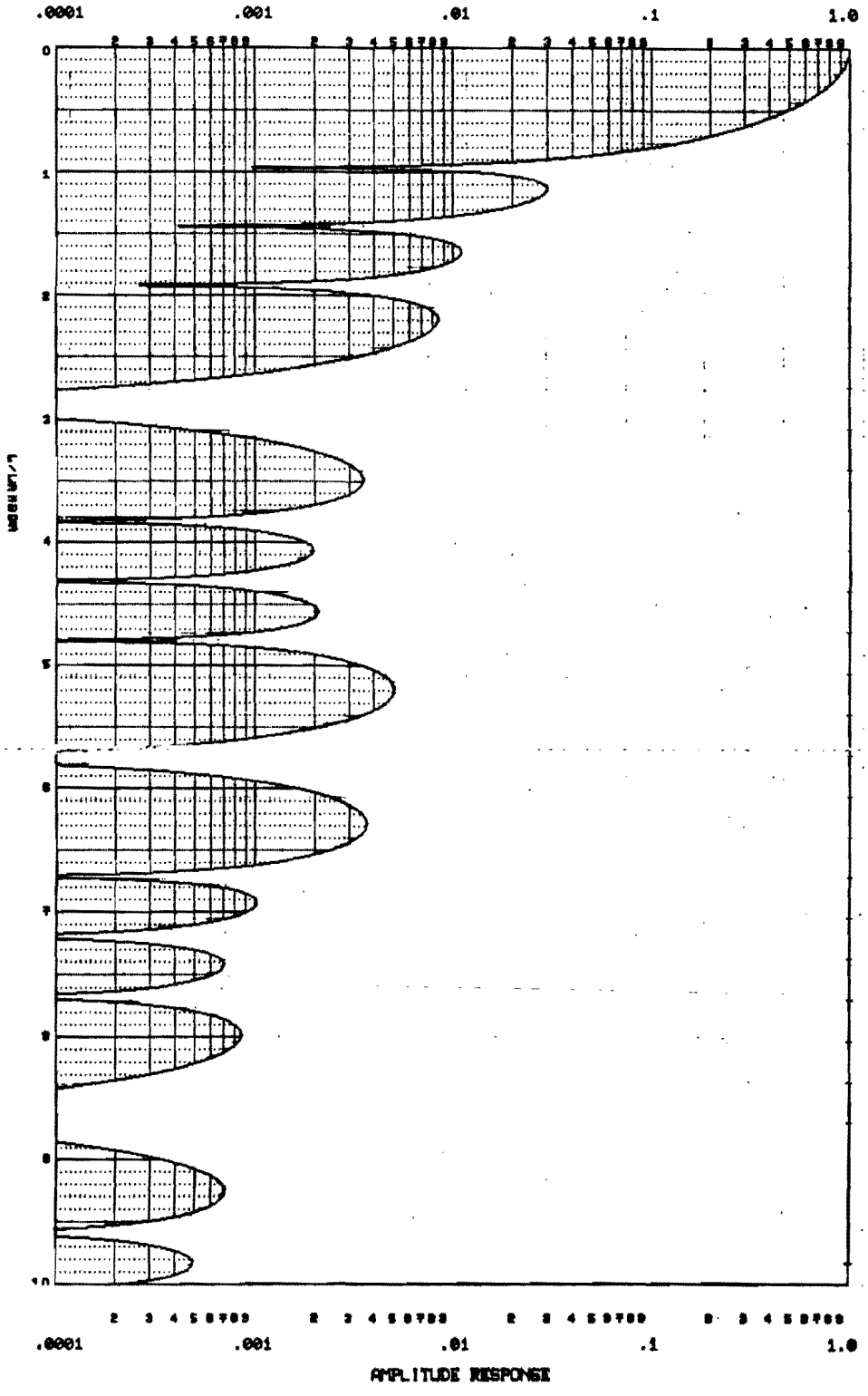
SOURCE/DETECTOR LENGTH RATIO = .841
20 ELEMENT TYPE 2 SOURCE ARRAY

WEIGHTS ---
2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 1.0
1.0 1.0 1.0 1.0 1.0
DISTANCES FROM CENTRE ---
1.0 3.0 5.0 7.0 9.0 11.0 13.0 15.0 17.0 19.0
21.0 23.0 25.0 27.0 29.0

24 ELEMENT TYPE 1 RECEIVER ARRAY

WEIGHTS ---
1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
1.0 1.0
DISTANCES FROM CENTRE ---
1.5 4.5 7.5 10.5 13.5 16.5 19.5 22.5 25.5 28.5
31.5 34.5

AMPLITUDE RESPONSE



AMPLITUDE RESPONSE

CREW NO. [illegible]

PROSPECT [illegible] DINGO — REC. LENGTH 12s — GEOPHONES TYPE MD 7-1 FREQ 10

CLIENT BHPCEN — SAMPLE RATE 2 ms — No. PER STATION 12 / 24

COUNTRY [illegible] STATE NT — FORMAT SEG E — STATION INTERVAL 10m / 20m

DATE 24 Nov 1983 DIRECTION SHOT — (OUT) LO◄ RECORD FILTERS ►HI◄ 125 A/ALIAS –NOTCH+ — ARRAY

Profile	Rec. No.	S.P.	Traces No. 1	Traces No.	Traces No.	Traces No. 120	C.D.P. 25	Depth Charge	Charge Size	No. of Holes	~~Uph~~ Time	Reel No.			Remarks
	1	330	300									1			125ms TAPE 8 SWPS 10-90 HZ 85 LINEAR
	2	360	300												ALL RECEIVERS SHOT WITH STN 312
	3	390	300												(24 TRACE ROLL) DEAD
	4	420	300												ALSO S-N 301 300 1/2 300 (24 TRACE)
	933 - 953			DAILY TESTS											DEAD
	952			SIMILARITY											START ARRAY HERE
	5														12 SWPS X 2m PICK UP
	6														58 m ARRAY
	7														
	8														12 SWPS X 6m MOVE UP
	9														102 m ARRAY
	10														
	11		2	STN 307			4 secs		10-40	HZ		58 m			
	12			–			16 s		–			–			
	13						16 s		10-90						

Geosource Company - Petty-Ray Geophysical

GEOSOURCE

LINE 122.2 — SYSTEM MDS

CREW No. 6574 — No. OF CHANNELS 120

PROSPECT WEST DARLING — REC. LENGTH

CLIENT PANCONTINENTAL — SAMPLE RATE 2mS

COUNTRY AUSTRALIA — STATE NT — FORMAT SEG B

DATE 25 NOV 83 — DIRECTION SHOT

RECORD FILTERS LO ◄ ► HI ◄ 125 A/ALIAS — NOTCH +

GEOPHONES TYPE MD 71 — FREQ. 10

No. PER STATION 12/24

STATION INTERVAL 20m

ARRAY —

Profile	Rec. No.	S.P.	Traces No.	Traces No.	Traces No.	Traces No.	C.D.P.	Depth Charge	Charge Size	No. of Holes	U/H Time	Reel No.			Remarks
	14	367				LO	CUT	15	12	36	6/OUT.		12 SWPS	16 + 4 S	58m ARRAY 10-90Hz
	15					LO	OUT		15-90 HZ			12 SWPS	16 S + 4 S		
	16					~			12-90			~	~		
	17					NON LINEAR - LOG			12-90		16 S		15dB BOOST.		
															EOF TAPE 001
	18	REC 18 DUMPED TWICE													START 002
	19														LAY OUT 30 STNS NEW SPREAD
	20														24 PHONES 3m APART CENTRED ON FOR.
		EOF TAPE 002													REC 18 THRU 20
		FINISH 6:00 PM.													