

AGSO
RECORD
1999/54



1999 Cabgas Seismic Survey

Darling Basin

NSW

FIELD ACQUISITION AND OPERATIONS REPORT

FOR

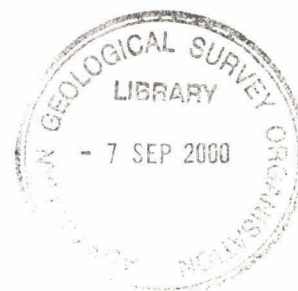
AUSTRALIAN NATIONAL SEISMIC IMAGING RESOURCE (ANSIR)

BY

TERRACORP PTY. LTD.

February-1999

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1999/54 C-1.



1999 CABGAS SEISMIC SURVEY

DARLING BASIN

NSW

FINAL REPORT – OPERATIONS

By

S.P.C. TOBIN and S.BARBOUR

Of

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FOR

ANSIR

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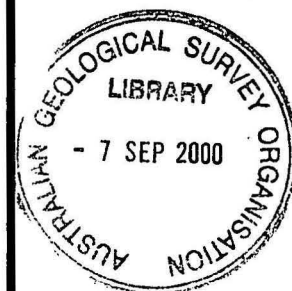
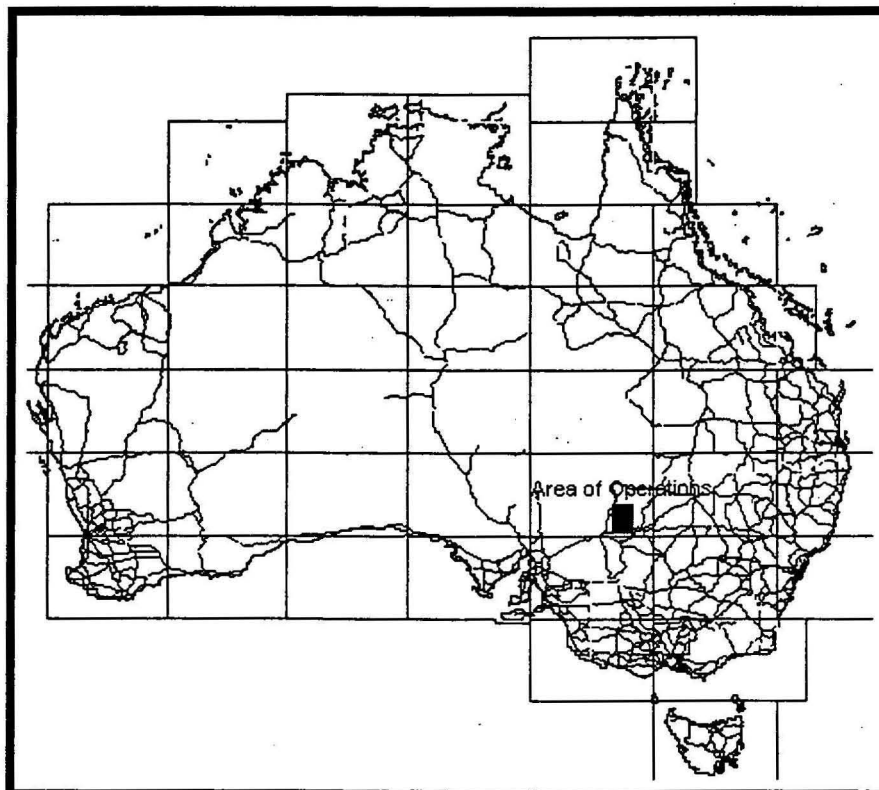
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1. INTRODUCTION

Terracorp was contracted by ANSIR of Canberra to conduct the 1999 Cabgas Seismic survey located in the Darling Basin. In total 160.02 of 120 fold, 240 channel data was recorded between 1st February and 18th February 1999.

This report covers various field operations relating to experimentals, line clearing, chaining, surveys, recording and field processing.

1.1 Geographical Area



The area of operation lies to the north east of Broken Hill. Line C99-01 was a SW – NE orientated profile that extended over several properties. The topography of the area varied considerable over the length of the seismic traverse. The country is predominantly semi arid sheep stations, serviced by a network of country roads. Line C99-01 started in the southwest end in rolling rocky hills. Vehicular access to the line was good. The line then crossed low-lying sand dune country, before once again crossing rolling rocky hills. Several dry creeks were crossed with no delays or detours. The condition of the tracks along the line deteriorated with use and became very dusty after vehicle movement. Visibility was reduced and vehicle movements slowed as a result of the bull dust conditions.

The line followed station tracks and country roads, minimising the amount of line clearing required.

1.2 Weather

The weather was fine to hot throughout the survey. High winds on the 6th to the 9th of February created dusty conditions. These conditions settled on the 9th when light rains fell. Generally the weather was good and favourable for seismic acquisition.

1.3 Logistics

The crew was accommodated at two locations during the survey. For access to the southwestern end of the line accommodation was arranged at Marrapina shearing quarters. This consisted of farm stay style rooms; accommodation and washing facilities were provided by the homestead, Terracorp supplemented the accommodation with 2 sleeper vans. Terracorp provided cable repair and office vans and workshop. The homestead provided cooking facilities for Terracorp's cook who, at both locations catered for the crew with breakfast, cut lunch and a cooked evening meal.

The second location for accommodation was at Wonnaminta shearing quarters. This provided the crew with good access to the northeastern section of the line. Again farm stay accommodation was provided supplemented with Terracorp's vans. The accommodation at both locations ensured good access and the minimum amount of travel to and from the lines and was a cost effective alternative to a full seismic camp facility.

1.4 Recording

Experimentals were conducted over 3 days. Spread was laid on the 1st February for the walk away noise analysis tests. The following 2 days were taken up with sweep and source array comparisons.

Production recording commenced on the 1st February 1999 ending on the 18th February 1999. A total of 160.02 kms of seismic data was recorded along 1 line.

2 SURVEYING

2.1 Surveying

All Field Surveying was contracted to Dynamic Satellite Surveys (DSS) of Adelaide, South Australia. See DSS Final Report Appendix "H".

2.2 Line Clearing

Line clearing was contracted to Tolbra Earthmovers of Tero Creek Station. A Komatsu D85 bulldozer (Cat D7G equivalent) was used together with a 740 grader and support vehicles. Ranging and line clearing were supervised by ANSIR.

2.3 Chaining

Terracorp's chaining crew carried out the chaining of the seismic line. Plastic pin markers were placed at 30 metre intervals along the seismic line. Even numbered pin markers were marked with the station number. Permanent markers were placed on fences as close to the start, end and intersections of lines as possible. The requirement was for a PM to be placed at least every 5 Kms. P.M.'s were also placed on road verges. The permanent marker consisted of a full star iron driven into the ground and concrete placed around the base. The PM was then fitted with a stamped aluminium tag bolted to the top. The tag was marked with the line number and closest VP number.

2.4 Permitting

David Johnstone of ANSIR conducted permitting.

3.0 Recording

3.1 Introduction

The first production profile was recorded on Line G99-01 on the 4th February 1999. The final day's production took place on the 18th February 1999.

Recording Parameter sheets are detailed in Appendix G of this report. These cover all aspects of the parameters for the line.

Details of recording equipment are detailed in appendix A of this report.

A list of tapes forms Appendix B of this report.

4. FIELD PROCESSING

4.1 Introduction.

ANSIR's Geophysicists handled all field processing.

4.2 Experimental Program

The Experimental Program for the 1999 CABGAS Seismic Survey was conducted from Monday 1st to Wednesday 3rd February 1999 on a portion of the seismic Line C99-01 overlying the Bancannia Trough in northwestern NSW.

Aim of the Experimental Program

The fundamental acquisition parameters of Group Interval, Number of Channels and Record Length were decided based on quality of data previously acquired in the area so that the main objective of this experimental was then to:

- Complete a Walkaway Noise Test over the full 3600m range of offsets.
- Point Source Test [all 4 vibes then repeat 1st vibe at the end].
- Determine Optimum:
 - No. of Vibrators (3 vs 4 Online)
 - Sweep Type (Varisweep vs Monosweep)
 - No. of Sweeps / Sweep Length (Source Effort per VP)
 - Sweep Frequencies (Bandwidth and Shape)
 - CDP Fold for optimum S/N

The location selected for testing was over the Bancannia Trough area, a known sedimentary sequence.

Startup Protocol Tests

- Prior to commencing the parameter testing the following ARAM 24 Startup Protocol Tests were completed:
- ARAM 24 CPU System Tests
- 3490E Cartridge Tape Drive tests.
- System tests on all 45 ARAM24Mark II Remote Acquisition Modules.
- System Pulse Tests on all Geospace Geophone strings connected to the seismic line.
- Radio similarities via Pelton VIBRA-SIG and then Hardwire similarities via ARAM24 System were completed on each of four IVI Hemi 60 Vibes to be used as a check that all vibrators are operating with the same phase, polarity and amplitude characteristics.

Details of the ARAM24 system Startup Protocol and Daily, Weekly and Monthly tests are attached in appendix J of this report.

Line C99-01A – Walkaway Noise Test Line:

The Walkaway Noise Test area was over the central part of the Bancanña Trough.

A section of 100 stations was chained at 5m GI from Station 2220 onwards.

Receiver Points: 100 (West) to 199 (East)

- 5.0 metre Group Interval
- (Coincident with Line C99-01 Stations 100 (C99-01A) = 2220(C99-01))
- 100 Live Channels – Fixed Spread
- 0-500 metre Offset Recording into receivers
- 12 x Geospace 10Hz Geophones bunched on Peg (Centred on Station Peg)

Source Points:

Line C99-01A Offsets

VP 200	5-500m
VP 300	505-1000m
VP 400	1005-1500m
VP 500	1505-2000m
VP 600	2005-2500m
VP 700	2505-3000m

500.0 metre VP Interval

Single Fold with 2.5 metre CDP Interval

1 Vibe Online centred on VP Peg
6x8.0sec Monosweeps Stacked
6-80Hz Bandwidth
Record Length: 6.0 seconds

Line C99-01 – Experimental Line:

The production line C99-01 was chained with 30m group interval from SP 1000 on the southwestern end to approximately SP 6350 in the northeast. The area selected for testing was SP 2220 to 2469, a 7.47km section over the central Bancannia Trough.

Receiver Points: 2220 (West) to 2469 (East)

- 30 metre Group Interval
- Pegs on North side of line for LHD vibrators
- 250 Live Channels (7.47 kms live) – Fixed Spread
- 3750-0-3750 metre maximum offset range
- 12 x Geospace 10Hz Geophones laid over 30 metres with 2.5m phone spacing. (Centred midway between stations +15m from peg, ie 1000 centred at 1000.5)
- Spread frozen – no roll-along for testing

Source Points: VP 2340 through to VP 2349

- 10 Consecutive VPs for each test.
- 30 metre VP Interval
- 10 Fold with 15.0 metre CDP Interval
- Vibe Array centred on VP Peg
- Record Length: 16.0 seconds

Crew Supervision

The seismic and experimental programs were designed and coordinated by Stephen Tobin whilst Systems Engineers Mike Bokor and James Butcher undertook all instrument testing and seismic observing. The seismic crew ran under the direction of Crew Managers Mr Bob Stephenson and Mr Kelvin Gadeke with Mr John Philippon as Senior Vibe Technician responsible for all Vibroseis and mechanical systems.

Vibro seis Similarities

The new Pelton Advance 2 Model 6 ESG – Encoder Sweep Generator and VCE - Vibe Control Electronics were installed and delivery testing conducted by Pelton Engineer Mr Elmo Christianson in November 1998. The VIBRA-SIG Radio Similarity QC system was used throughout the experimental program and then production to monitor the integrity of every sweep of each vibrator continuously throughout the day.

During the 1999 CABGAS Seismic Survey the output of the IVI Hemi 60 vibrators were set at 90% of the 62,000 lb Peak Force. Maximum acceptable phase error tolerance between the ESG Pilot and the Vibrator M5 Accelerometer signal was less than 5 degrees.

Prior to the commencement of production recording Radio Similarities via the Pelton VIBRA-SIG System were run followed by Hardwire Similarities via the ARAM24 acquisition system. These Startup Tests ensured that all vibrators used throughout the survey were operating with the same Polarity and within the same Similarity Phase error tolerances. Acceptable phase difference between machines was +/- 5 degrees.

After completion of the Walkaway Noise Test and before any further experimental, a Point Source Test (remote nest test) was conducted with all four vibrators sweeping individually at exactly the same VP location. The 1st vibe was then repeated at the end to compensate for any ground conditioning effects in the tests. This test is a definitive check of polarity between the machines, ensured that all four vibrators operated with the same polarity.

ANSIR - 1999 CABGAS SEISMIC SURVEY

EXPERIMENTAL PROGRAM

Experimental Program - Tuesday 2nd Feb 1999

Walkaway Noise Test

Record into Point Receiver Line C99-01A

Live Spread Stations: 100-199: 100 Stations @ 5m GI

VPs are referenced to 5m GI chaining / 6.0sec Record Length

All Tests with Point Source single IVI 60000lb Buggy Vibe

FILE NO.	RCVR LINE	V.P.	SWEEP FREQ	NO. SWEEPS	SWEEP LENGTH	SOURCE ARRAY	NO. VIBES
1	C99-01A	200	6-80 Hz	Mono. 6	8.0sec	Offsets 5-500m / Stacked	1
2	C99-01A	300	8-80 Hz	Mono 6	8.0sec	Offsets 505-1000m / Stacked	1
3	C99-01A	400	8-80 Hz	Mono 6	8.0sec	Offsets 1005-1500m / Stacked	1
4	C99-01A	500	8-80 Hz	Mono 6	8.0sec	Offsets 1505-2000m / Stacked	1
5	C99-01A	600	8-80 Hz	Mono 6	8.0sec	Offsets 2005-2500m / Stacked	1
6	C99-01A	700	8-80 Hz	Mono 6	8.0sec	Offsets 2505-3000m / Stacked	1

Point Source Test

Record Single VP into Receiver Line C99-01

Live Spread Stations: Numbered as Stations 2200-2419: 220 Stations @ 30m GI

Actual Stations 2220-2439

VPs are referenced to 30m VP chaining: VP 2390

VP 2370 is trace #171 of Files 7 through 11

6.0sec Record Length

7	C99-01	2370	8-100 Hz	1	8.0sec	Point Source - Single Vibe	#0
8	C99-01	2370	8-100 Hz	1	8.0sec	Point Source - Single Vibe	#1
9	C99-01	2370	8-100 Hz	1	8.0sec	Point Source - Single Vibe	#2
10	C99-01	2370	8-100 Hz	1	8.0sec	Point Source - Single Vibe	#3
11	C99-01	2370	8-100 Hz	1	8.0sec	Point Source - Single Vibe	#0

Experimental Program – Tuesday 2nd Feb 1999

Parameter Testing

Record into Receiver Line C99-01

Live Spread Stations 2220-2469: 250 Stations @ 30m GI

10 VPs are referenced to 30m VP chaining: VPs 2340-2349

Offsets VP 2340: 3600-0-3600m: Spread Fixed

16.0sec Record Length

FILE	RCVR	V.P.	SWEEP	NO.	SWEEP	SOURCE	NO.
NO.	LINE		FREQ	SWEEPS	LENGTH	ARRAY	VIBES

Source Array Length / No. Vibes Online

12-13	C99-01	2340-2349	8-100Hz	3	8.0sec	15mP-P/Stacked/45m Array	4
14-23	C99-01	2340-2349	8-100Hz	3	8.0sec	15mP-P/Stacked/30m Array	3
24-33	C99-01	2340-2349	8-100Hz	3	8.0sec	15mP-P/15mUp/60m Array	3
34-43	C99-01	2340-2349	8-100Hz	3	8.0sec	15mP-P/Stacked/15m Array	2
44-53	C99-01	2340-2349	8-100Hz	3	8.0sec	15mP-P/15mUp/45m Array	2
54-63	C99-01	2340-2349	8-100Hz	3	8.0sec	15mP-P/Stacked/Point Source	1
64-73	C99-01	2340-2349	8-100Hz	3	8.0sec	15mP-P/15mUp/30m Array	1
74-83	C99-01	2340-2349	8-100Hz	4	8.0sec	15mP-P/Stacked/30m Array	3
84-93	C99-01	2340-2349	8-100Hz	4	8.0sec	15mP-P/7.5mUp/52.5m Array	3

Vibrator Force

94-103	C99-01	2340-2349	8-100Hz	4	8.0sec	15mP-P/Stack/ 75% Force	3
104-113	C99-01	2340-2349	8-100Hz	4	8.0sec	15mP-P/Stack/ 90% Force	3

Experimental Program – Wednesday 3rd Feb 1999

All Tests now with Vibe Force at 90% of Peak Force

Phase Rotated Sweeps

114-123	C99-01	2340-2349	8-80Hz	4	8.0sec	15mP-P / Stack / 0,90,180,270Deg	3
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Sweep Length

124-133	C99-01	2340-2349	8-80Hz	4	4.0sec	15mP-P/Stack/ 16sec/VP	3
Done	C99-01	2340-2349	8-80Hz	4	8.0sec	15mP-P/Stack/ 32sec/VP	3
134-143	C99-01	2340-2349	8-80Hz	4	16.0sec	15mP-P/Stack/ 64sec/VP	3

No. Sweeps per VP

144-153	C99-01	2340-2349	8-80Hz	1	8.0sec	15mP-P/Stack/ 8sec/VP	3
154-163	C99-01	2340-2349	8-80Hz	2	8.0sec	15mP-P/Stack/ 16sec/VP	3
164-173	C99-01	2340-2349	8-80Hz	3	8.0sec	15mP-P/Stack/ 24sec/VP	3
Done	C99-01	2340-2349	8-80Hz	4	8.0sec	15mP-P/Stack/ 32sec/VP	3
174-183	C99-01	2340-2349	8-80Hz	8	8.0sec	15mP-P/Stack/ 64sec/VP	3

Low Frequency Sweeps

184-193	C99-01	2340-2349	7-28Hz	4	8.0sec	15mP-P/Stack/ 32sec/VP	3
194-203	C99-01	2340-2349	7-56Hz	4	8.0sec	15mP-P/Stack/ 32sec/VP	3
204-213	C99-01	2340-2349	7-28Hz	4	8.0sec	15mP-P/7.5mUp/52.5m 3	
214-223	C99-01	2340-2349	Varisweep A	4	8.0sec	15mP-P/Stack/ 32sec/VP	3
			7-28Hz				
			8-64Hz				
			8-80Hz				
			7-48Hz				

High Frequency Sweeps

224-233	C99-01	2340-2349	20-150Hz	4	8.0sec	15mP-P/Stack/ 32sec/VP	3
234-243	C99-01	2340-2349	20-220Hz	4	8.0sec	15mP-P/Stack/ 32sec/VP	3

Varisweep Tests

244-253	C99-01	2340-2349	Varisweep B	4	8.0sec	15mP-P/Stack/ 32sec/VP	3
			7-28Hz				
			12-80Hz				
			16-80Hz				
			7-56Hz				
254-263	C99-01	2340-2349	Varisweep C	3	8.0sec	15mP-P/Stack/ 24sec/VP	3
			7-56Hz				
			12-80Hz				
			8-72Hz				

Monosweep Tests

264-273	C99-01	2340-2349	7-80Hz	3	8.0sec	15mP-P/Stack/ 24sec/VP	3
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ANSIR - AUSTRALIAN GEOLOGICAL SURVEY ORGANISATION

"1999 CABGAS SEISMIC SURVEY"

BANCANNIA TROUGH AREA – BROKEN HILL, N.S.W.

ACQUISITION PARAMETERS

Acquisition Type: ARAM24 – 24 Bit Telemetry System

Energy Source: 3 x IVI Hemi 60 4x4 Buggy mounted Vibes Online

Vibrator Point Interval: 30.0 metres

Vibrator Array: 15.0m Pad-pad

Vibrator Array Location: Centred on Station Peg (Centred on SP 100.0)

Receivers: 12 x Geospace Type GS-32CT 10Hz Geophones/Group

Receiver Interval: 30.0 metres

Receiver Array: 30.0 metres (12 phones with 2.5m spacing)

Receiver Array Location: Centred +15.0m in direction of increasing station numbers, ie Centre of Receiver array at SP 100 is actually at 100.5

Sweep Length: 8.0 sec

Number of Composites: 3

Sweep Type: Varisweep

Sweep Frequencies: 7-56 Hz
12-80 Hz
8-72 Hz

Sweep Taper: 200 msec Taper

Sweep Control: Pelton Advance 2 Model 6

Accelerometers: Pelton M5I High Performance

Similarity System: Pelton VIB-SIG

Peak Force: 62,031 lbs

Hold Down Weight: 65,000 lbs

Vibrator Drive Level: Force Control On - 90% Peak Force

Phase Lock: Ground Force Phase Lock

No. of Channels: 240 Channels

Spread Geometry: * 3600m * 3600m *

Channel Geometry: TR 1 – (VP Location) – Tr 240
Rear Spread * Front Spread
1st Ch – Ch 121 – Last Ch 240
Check Observers Logs For Correct Geometry

Fold: 120 Fold with 15.0m CDP's

Record Length: 16.0 seconds

Correlation Sample Rate: 2 milliseconds

Written to Tape S.R.: 2 milliseconds

5. PERSONNEL

NAME	POSITION
R.STEPHENSON	CREW MANAGER
K.GADEKE	CREW MANAGER
M.BOKOR	INST.ENGEN.
N.GRAINGER	CABLEREPAIR
R.GREGG	HEALTH / SAFETY
J.PHILLIPSON	CHIEF MECHANIC
J.BUTCHER	OBSERVOR
R.BARNES	MECHANIC
B.HORSTEN	LINE BOSS
B.JANSEN	OBSERVOR
A.SYMLIE	CABLEREPAIR
P.MCKENZIE	MECHANIC T.A.
S.EBSWORTH	CHAINING
M.HUTCHISON	CHAINING
A.TANNER	LEAD VIB OPP.
S.GOSSSENS	VIB OPP.
T.HOYLE	VIB OPP.
G.GERATY	VIB OPP.
J.BRUMMEL	LINE CREW
L.GOOLD	LINE CREW
A.MEAD	LINE CREW
K.LYONS	LINE CREW
S.WOOD	LINE CREW
G.HEINIMAN	LINE CREW
N.DAVIS	LINE CREW
D.HOATH	LINE CREW
T.FILE	LINE CREW
D.GLEESON	LINE CREW
S.JONES	LINE CREW
M.JARDINE	TRUCK DRIVER
R.LYONS	CAMP ATT.
T.WALTERS	TRAINIE VIB OPP
D.WILLIAMS	TRAINIE VIB OPP
H.RUNDEL	COOK
K.RUNDEL	AST COOK
D.ENGLIS	DSS SURVEYOR
D.JOHNSTONE	ANSIR REP.
J.LEVEN	ANSIR PROCESSOR

APPENDIX "A"

Equipment Specifications

RECORDING EQUIPMENT

ARAM 24 Seismic Data Acquisition and Processing System including

- Real Time Parallel Processor Correlator
- One (1) 10 metre Radio Mast on Recorder with High Gain Antenna
- Forty Five (45) Remote Acquisition Modules [360 Channels]
- Forty Five (45) Telemetry Data Cables [360 channels], 348 metres long, with eight (8) takeouts spaced at 43 metres apart.
- Geospace DX4 10Hz High Specification Superphones
- [Broad Dynamic Range, High S/N, High Specification]
- Three Hundred and Sixty (360) geophone strings [360 Channels with 12 ph/group],
- Sensor SMT-200 Geophone Tester and QC System

SOURCE EQUIPMENT

Four (4) IVI Hemi 60 4x4 Articulated Buggy mounted Vibrators

- Peak force is 62,031 lbs per Vibe and
- Hold-Down weight is 63,000 lbs per Vibe
- One (1) Pelton Advance 2 Model 6 PC Based VIBRASIG
- Real Time Similarity System
- Five (5) Pelton Advance 2 Model 6 VCEs plus various spare boards.
- One (1) Pelton Advance 2 Model 6 ESG for Recording Truck plus spare boards.
- Three (3) Vibrators operating Online [186,093lbs Force] and One (1) on Standby.
- Vibrators are equipped with Force Control and Ground Force Phase Lock using
- M5 High Performance accelerometers.
- Electronics are capable of correlating various individual sweep frequencies and compositing any range or variation of Upsweeps or Downsweeps within the same VP location. This process is Trade Marked as Varisweep.

OFFICE EQUIPMENT AND COMMUNICATIONS

- One (1) PC based Crew Management and Information System complete with software, Laptop PC and printer
- Four (4) Mobile UHF Radios for Crew and Local Shire Communications.
- One (1) Optus Satellite Telephone in PMs Office or Toyota
- One (1) Motorola Syntrex or equivalent FM radio for Field Communications
- Assorted Daily, weekly and Monthly Operations forms, Safety and Environmental Incident report Forms, crew and System Technical Manuals and Maintenance Handbooks.

VEHICLES

- One (1) Mercedes 911 4WD Recording Truck equipped with an Airconditioned recording cab, Power generator and First Aid Kit

<u>No.</u>	<u>Year</u>	<u>Model</u>	<u>Type</u>
• One (1)	1996	HZJ75 Toyota 4x4	Party Manager
• Two (2)	1996	HZJ75 Toyota 4x4	ATU Line Unit
• One (1)	1996.	HZJ75 Toyota 4x4	Line Boss Unit
• Three (3)	1996	HZJ75 Toyota 4x4	Line Units
• One (1)	1995	HZJ75 Toyota 4x4	Chaining Unit
• One (1)	1995	HZJ75 Toyota 4x4	GPS Survey Unit
• One (1)	1995	HZJ75 Toyota 4x4	Mechanics Unit
• One (1)	1986	Isuzu 4x4	Vibrator Service Unit.
• One (1)	1982	Isuzu 4x4	Cable/Geophone Unit.
• One (1)	1986	Hino 4x4	Supply Truck.
• One (1)	1980	Kenworth 6x4	Water Truck.

CAMP EQUIPMENT

- One (1) Terracorp Office and Crew Manager's Accommodation caravan.
- One (1) Client Office and Accommodation caravan.
- Three (3) Accommodation caravans for 32 persons.
- One (1) Workshop/Parts Store Caravan equipped with power and hand tools, electric and oxy/acetylene welding equipment.
- One (1) Airconditioned ATU/Cable Repair Caravan.

OCCUPATIONAL HEALTH AND SAFETY STANDARDS

- Site Specific Safety Management Plan (SSSMP) written, published and implemented for each seismic survey undertaken with all site specific hazards examined along with medivac and emergency procedures summarised.
- Sunscreens and UV blockout creams will be supplied at no cost to all crew members with the wearing of creams being mandatory for all line personnel.
- Hats, shirts and covered safety footwear must be worn by field crew at all times.
- Reflective Orange Safety Vests for all Survey and Recording Crew personnel.
- Severe Disciplinary Procedures ensured Crew Members adhered to all company policies including the wearing of Seat Belts, Speed Limits etc.
- SSB and CB Radios along with Mobile Satellite Telephone and Fax machines are maintained on crew to assist with Safe Operations.
- Crew Manager's vehicle, fitted with Mobile telephone.
- One (1) Full International red Cross standard First Aid Kit was maintained at the Terracorp' crew office with a Basic Emergency Kit maintained in the crew Recording truck online.
- Pre-Survey Induction, Safety and Orientation meetings were conducted with all crew personnel and subcontractors. The appointed Safety Officer conducted a compulsory Weekly Environmental and Safety Meeting and the company Operational Health and Safety Policy was displayed and available for review by all crew members.

CHAINING / GPS SURVEY CREWS

Terracorp – Perth, Western Australia

Dynamic Satellite Surveys – Adelaide, South Australia

Survey Personnel

- Two (2) Chainpersons
- Two (2) GPS Survey Surveyor
- Total Four (4) Persons in the Field

Survey Equipment

- One (1) 1995 HZJ75 Toyota 4x4 Chaining Unit
- One (1) 1996 HZJ75 Toyota 4x4 Survey Unit
- Survey Data output in UKOOA Format

Services

- All messing, accommodation, fuels and lubricants.
- All Line positioning, Chaining, surveying and output of survey data in SEGP1 and UKOOA format on floppy disk.

APPENDIX "B"

Tape Listing

Line	Tape #	File #	VP
C99-01	99CO1F-004	1-107	1000-1106
C99-01	99CO1F-005	108-214	1107-1215
C99-01	99CO1F-006	215-321	1216-1306
C99-01	99CO1F-007	322-428	1307-1412
C99-01	99CO1F-008	429-535	1413-1519
C99-01	99CO1F-009	536-642	1520-1626
C99-01	99CO1F-010	643-749	1627-1734
C99-01	99CO1F-011	750-857	1735-1841
C99-01	99CO1F-012	858-964	1842-1948
C99-01	99CO1F-013	965-1070	1949-2055
C99-01	99CO1F-014	1071-1177	2056-2162
C99-01	99CO1F-015	1178-1274	2163-2260
C99-01	99CO1F-016	1275-1380	2261-2368
C99-01	99CO1F-017	1381-1487	2369-2478
C99-01	99CO1F-018	1488-1594	2479-2585
C99-01	99CO1F-019	1595-1701	2586-2692
C99-01	99CO1F-020	1702-1808	2693-2801
C99-01	99CO1F-021	1809-1915	2802-2908
C99-01	99CO1F-022	1916-2022	2909-3017
C99-01	99CQ1F-023	2023-2129	3018-3124
C99-01	99CO1F-024	2130-2236	3125-3232
C99-01	99CO1F-025	2237-2343	3233-3340
C99-01	99CO1F-026	2344-2450	3341-3447
C99-01	99CO1F-027	2451-2557	3448-3554
C99-01	99CO1F-028	2558-2664	3555-3663
C99-01	99CO1F-029	2665-2767	3664-3766
C99-01	99CO1F-030	2768-2841	3767-3840
C99-01	99CO1F-031	2842-2944	3841-3943
C99-01	99CO1F-032	2945-3047	3944-4048
C99-01	99CO1F-033	3048-3150	4049-4153
C99-01	99CO1F-034	3151-3253	4154-4256
C99-01	99CO1F-035	3254-3356	4257-4360
C99-01	99CO1F-036	3357-3459	4361-4464
C99-01	99CO1F-037	3460-3562	4465-4567
C99-01	99CO1F-038	3563-3665	4568-4674
C99-01	99CO1F-040	3666-3768	4675-4779
C99-01	99CO1F-041	3769-3871	4780-4884
C99-01	99CO1F-042	3872-3974	4885-4987
C99-01	99CO1F-043	3975-4077	4988-5090
C99-01	99CO1F-044	4078-4180	5091-5193
C99-01	99CO1F-045	4181-4283	5194-5296
C99-01	99CO1F-046	4284-4386	5297-5399
C99-01	99CO1F-047	4387-4489	5400-5502
C99-01	99CO1F-048	4490-4591	5503-5604
C99-01	99CO1F-049	4592-4694	5605-5707
C99-01	99CO1F-050	4695-4796	5708-5809
C99-01	99CO1F-051	4797-4899	5810-5912
C99-01	99CO1F-052	4900-5002	5913-6015
C99-01	99CO1F-053	5003-5105	6016-6118
C99-01	99CO1F-054	5106-5208	6119-6223
C99-01	99CO1F-055	5209-5302	6228-6334

1999 CABGAS Seismic Survey (L148) Tapelist
ARAM 24R-64 system, Correlated SEG Y, 3490E mag tapes

*Tape number (AGSO)	Field tape #	Line:	FFID Range:	VP Range	Traces/File:	Rate:	Record Length:	Date:
L14899001	99C01F-001	Test	1 - 106	200-2342	100,252	2 ms	6,16sec	2/02/99
L14899002	99C01F-002	Test	107-202	2343-2348	252	2 ms	16 sec	2/02/99
L14899003	99C01F-003	Test	203-273	2349-2349	252	2 ms	16sec	3/02/99
L14899004	99C01F-004	C99-01	1-107	1000-1106	242	2 ms	16 sec	4/02/99
L14899005	99C01F-005	C99-01	108-214	1107-1215	242	2 ms	16 sec	4/02/99
L14899006	99C01F-006	C99-01	215-321	1216-1306	242	2 ms	16 sec	4/02/99
L14899007	99C01F-007	C99-01	322-428	1307-1412	242	2 ms	16 sec	5/02/99
L14899008	99C01F-008	C99-01	429-535	1413-1519	242	2 ms	16 sec	5/02/99
L14899009	99C01F-009	C99-01	536-642	1520-1626	242	2 ms	16 sec	6/02/99
L14899010	99C01F-010	C99-01	643-749	1627-1734	242	2 ms	16 sec	6/02/99
L14899011	99C01F-011	C99-01	750-857	1735-1841	242	2 ms	16 sec	6/02/99
L14899012	99C01F-012	C99-01	858-964	1842-1948	242	2 ms	16 sec	6&7/02/1999
L14899013	99C01F-013	C99-01	965-1070	1949-2055	242	2 ms	16 sec	7/02/99
L14899014	99C01F-014	C99-01	1071-1177	2056-2162	242	2 ms	16 sec	7/02/99
L14899015	99C01F-015	C99-01	1178-1274	2163-2260	242	2 ms	16 sec	7/02/99
L14899016	99C01F-016	C99-01	1275-1380	2261-2368	242	2 ms	16 sec	8/02/99
L14899017	99C01F-017	C99-01	1381-1487	2369-2478	242	2 ms	16 sec	8/02/99
L14899018	99C01F-018	C99-01	1488-1594	2479-2585	242	2 ms	16 sec	8/02/99
L14899019	99C01F-019	C99-01	1595-1701	2586-2692	242	2 ms	16 sec	8/02/99
L14899020	99C01F-020	C99-01	1702-1808	2693-2801	242	2 ms	16 sec	8&9/02/1999
L14899021	99C01F-021	C99-01	1809-1915	2802-2908	242	2 ms	16 sec	9/02/99
L14899022	99C01F-022	C99-01	1916-2022	2909-3017	242	2 ms	16 sec	9/02/99
L14899023	99C01F-023	C99-01	2023-2129	3018-3124	242	2 ms	16 sec	10/02/99
L14899024	99C01F-024	C99-01	2130-2236	3125-3232	242	2 ms	16 sec	10/02/99
L14899025	99C01F-025	C99-01	2237-2343	3233-3340	242	2 ms	16 sec	10/02/99
L14899026	99C01F-026	C99-01	2344-2450	3341-3447	242	2 ms	16 sec	10/02/99
L14899027	99C01F-027	C99-01	2451-2557	3448-3554	242	2 ms	16 sec	11/02/99
L14899028	99C01F-028	C99-01	2558-2664	3555-3663	242	2 ms	16 sec	11/02/99
L14899029	99C01F-029	C99-01	2665-2767	3664-3766	242	2 ms	16 sec	11/02/99

L14899030	99C01F-030	C99-01	2768-2841	3767-3840	242	2 ms	16 sec	11/02/99
L14899031	99C01F-031	C99-01	2842-2944	3841-3943	242	2 ms	16 sec	12/02/99
L14899032	99C01F-032	C99-01	2945-3047	3944-4048	242	2 ms	16 sec	12/02/99
L14899033	99C01F-033	C99-01	3048-3150	4049-4153	242	2 ms	16 sec	12/02/99
L14899034	99C01F-034	C99-01	3151-3253	4154-4256	242	2 ms	16 sec	13/02/99
L14899035	99C01F-035	C99-01	3254-3356	4257-4360	242	2 ms	16 sec	13/02/99
L14899036	99C01F-036	C99-01	3357-3459	4361-4464	242	2 ms	16 sec	13/02/99
L14899037	99C01F-037	C99-01	3460-3562	4465-4567	242	2 ms	16 sec	13/02/99
L14899038	99C01F-038	C99-01	3563-3665	4568-4674	242	2 ms	16 sec	14/02/99
L14899039	99C01F-039	not recorded						
L14899040	99C01F-040	C99-01	3666-3768	4675-4779	242	2 ms	16 sec	14/02/99
L14899041	99C01F-041	C99-01	3769-3871	4780-4884	242	2 ms	16 sec	14/02/99
L14899042	99C01F-042	C99-01	3872-3974	4885-4987	242	2 ms	16 sec	14/02/99
L14899043	99C01F-043	C99-01	3975-4077	4988-5090	242	2 ms	16 sec	15/02/99
L14899044	99C01F-044	C99-01	4078-4180	5091-5193	242	2 ms	16 sec	15/02/99
L14899045	99C01F-045	C99-01	4181-4283	5194-5296	242	2 ms	16 sec	15/02/99
L14899046	99C01F-046	C99-01	4284-4386	5297-5399	242	2 ms	16 sec	16/02/99
L14899047	99C01F-047	C99-01	4387-4489	5400-5502	242	2 ms	16 sec	16/02/99
L14899048	99C01F-048	C99-01	4490-4591	5503-5604	242	2 ms	16 sec	16/02/99
L14899049	99C01F-049	C99-01	4592-4694	5605-5707	242	2 ms	16 sec	16/02/99
L14899050	99C01F-050	C99-01	4695-4796	5708-5809	242	2 ms	16 sec	16/02/99
L14899051	99C01F-051	C99-01	4797-4899	5810-5912	242	2 ms	16 sec	17/02/99
L14899052	99C01F-052	C99-01	4900-5002	5913-6015	242	2 ms	16 sec	17/02/99
L14899053	99C01F-053	C99-01	5003-5105	6016-6118	242	2 ms	16 sec	17/02/99
L14899054	99C01F-054	C99-01	5106-5208	6119-6223	242	2 ms	16 sec	17/02/99
L14899055	99C01F-055	C99-01	5209-5302	6228-6334	242	2 ms	16 sec	18/02/99

Appendix "C"

SAFETY MEETING REPORT

Date:	02/02/99
Client:	ANSIR
Prospect:	CABGAS
Area:	BROKEN HILL
State:	N.S.W.
Party Manager:	BOB STEPHENSON
Safety Officer:	ON LEAVE
Scribe:	BOB STEPHENSON
Client Rep:	DAVE JOHNSTONE

# Of Accidents Since Last Meeting. Vehicles	0
# Of Accidents Since Last Meeting. Employees	0
# Of Compensation Claims Since Last Meeting.	0
# Of LTI'S Since Last Meeting.	0

Details:

1. All personnel reminded of speeding on the lines and station roads.
2. All personnel reminded of the dusty conditions in the field and to slow down when passing the line crew.
3. All gates on the stations are to be left as they were found, either opened or closed. If any damage occurs to a gate or gate way please report it ASAP so repairs can be carried out ASAP.
4. Poly pipe has been laid on the edge of some of the tracks. Care must be taken so as not to damage the pipe. This also goes for the areas around the tanks and troughs.
5. If any stock needs to be shifted off the line, move them slowly, do not rush them. The same goes if the stock is on the road.
6. Seat belts are to be worn at all times.
7. Vehicles are to be parked in the parking area provided.
8. Care is to be taken of all the ANSIR equipment, which we are using for this prospect. It all has to be counted and returned on the completion of the prospect.

Terracorp personnel:

R.Stephenson-K.Gadeke-M.Bokor-J.Phillipson-J.Butcher-B.Jansen-A.Symlic-B.Horsten-
N.Grainger-A.Tanner-S.Goossens-T.Hoyle-G.Geraty-H.Rundell-K.Rundell-P.Mckenzie-
M.Hutchison-J.Brummel-L.Goold-A.Mead-M.Jardine-G.Heiniman-D.Hoath-S.Woods-S.Jones-
K.Lyons-R.Lyons-T.File-D.Gleeson-D.Englis Of Dss And S.Tobin From Terracorp Perth Office.

Appendix "C"

SAFETY MEETING REPORT

Date:	7/02/99
Client:	ANSIR
Prospect:	CABGAS
Area:	BROKEN HILL
State:	NSW
Party Manager:	R.STEPHENSON
Safety Officer:	R.GREGG
Scribe:	R.STEPHENSON
Client Rep:	D.JOHNSTONE

# Of Accidents Since Last Meeting. Vehicles	0
# Of Accidents Since Last Meeting. Employees	0
# Of Compensation Claims Since Last Meeting.	0
# Of LTI'S Since Last Meeting.	0

DETAILS:

1. We discussed the care that needed to be taken in windy and dusty conditions. The need to slow down when travelling past personnel and vibes on the line.
2. The Company policy is for 0% alcohol when working; you all the consequences if you abuse this.
3. The crew was informed of the importance of removing all pin flags, flagging and rubbish from the line and dispose of properly.
4. We discussed the need to take care when opening gates. Do not let them swing back on the post and damage the hinges.
5. We discussed the need to keep the area around the quarters clean and tidy, and to place rubbish in the receptacles provided.
6. The crew was informed of the next camp move on the 12th February.
7. The new vibes have difficulty reversing due to the obstruction in the mirrors caused by the rollover frame. All vehicles should park well away from the rear of the vibes to enable the operator to see the vehicles behind.

TERRACORP PERSONNEL:

R.Stephendson,K.Gadeke,J.Phillipson,R.Barnes,R.Gregg,B.Jansen,B.Horsten,A.Tanner,S,Goo
ssens,T.Hoyle,G.Geraty,P.Mckenzie,H.Rundell,K.Rundell,J.Brummel,L.Goold,N.Davis,T.File,S.
Woods,S.Jones,D.Gleeson,A.Mead,G.Heiniman,M.Jardine,S.Ebsworth,D.Hoath.D.Williams,T
Walters.

Appendix "C"

SAFETY MEETING REPORT

Date:	14/02/99
Client:	ANSIR
Prospect:	CABGAS
Area:	BROKEN HILL
State:	NSW
Party Manager:	K. GADEKE
Safety Officer:	R.GREGG
Scribe:	KELVIN GADEKE
Client Rep:	D.JOHNSTONE

# Of Accidents Since Last Meeting. Vehicles	0
# Of Accidents Since Last Meeting. Employees	0
# Of Compensation Claims Since Last Meeting.	0
# Of LTI'S Since Last Meeting.	0

DETAILS:

1. General hygiene was discussed and crew members were reminded of the need to maintain good health and hygiene practices.
2. Snakes and insects on line and in camp were highlighted, avoid contact where possible, and be careful not to be bitten .
3. Lifting large or heavy items was discussed, during the last camp move R. Barnes strained his back trying to lift something on his own rather than seeking assistance. All crewmembers were made aware of the risks of back strain from incorrect lifting methods and seeking assistance from others or lifting large items with mechanical means.
4. Lines crossing roads was raised and all were made aware to use the road signs so as to inform road users of our presence. Drivers were reminded not to park unnecessarily on or close to road crossings so as to lessen the risk to all parties.
5. Brendon Horsten warned line drivers not to use vehicles incorrectly on line , care should be taken not to abuse the equipment or endanger crewmembers.
6. A count of personnel having had any first aid training revealed only ten had attended any first aid training at all .Only two of those had achieved an advanced level. It was agreed that crew members need to undertake first aid training to ensure a higher degree of first aid awareness and assistance in these remote crew locations.
7. This situation needs to be monitored on a regular basis to provide some protection and assistance to crew members in the case of accident or injury.

TERRACORP PERSONNEL:

K.Gadeke,J.Phillipson,R.Barnes,R.Gregg,B.Jansen,B.Horsten,A.Tanner,S.Goossens,T.Hoyle, G.Geraty,P.Mckenzie,H.Rundell,K.Rundell,J.Brummel,L.Gould,N.Davis,T.File,S.Woods,S.Jones,D.Gleeson,A.Mead,G.Heiniman,M.Jardine,S.Ebsworth,D.Hoath.D.Williams,T.Walters.

APPENDIX "D"

Monthly Injury Summary Report

Month:	FEBRUARY 1999	
Year:	1999	
Client:	ANSIR	
Location:	BROKEN HILL. NSW	
Permit Area		DARLING BASIN
Total Personnel on Crew		38
Total Hours Worked	(a)	181
Total Exposure Hours	(b)	6697
No. Of Minor Injuries	(c)	0
No. Medical Treatments	(d)	0
No. of LTI's	(e)	0

- (a) Total Number of Hours worked in the permit area per person.
- (b) Total exposure hours = (a) x total number of personnel.
- (c) Number of injuries that required treatment by first aider/medic.
- (d) Number of injuries that required treatment by medical practitioner. Not LTI's
- (e) Number of LTI's as defined by Australian Standard 1885.

Appendix E -TERRACORP

CREW NO..... 205 **SEVEN DAY OPERATIONS SUMMARY** WEEK ENDING..... 7-Feb-99

Client.....ANSIR PARTY MANAGER BOB STEPHENSON
 Survey NameCABGAS CLIENT REP.....D.JOHNSTONE
 AreaBROKEN HILL CREW P/NUM..... 205
 StateNSW

RECORDING	1-Feb	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	7-Feb	WEEK	MONTH	JOB
Profiles.....	0	0	0	276	283	298	395	1252	1252	1252
Skips.....	0	0	0	2	2	1	2	7	7	7
Kms Acquired.....	0.000	0.000	0.000	8.310	8.490	9.000	12.000	37.800	37.800	37.800

CHARGE	1-Feb	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	7-Feb	WEEK	MONTH	JOB
Travel Hours.....	3.00	0.75	0.75	1.75	2.75	2.00	1.50	12.50	12.50	12.50
Test Hours.....	0.00	0.00	0.25	1.50	0.50	0.50	0.50	3.25	3.25	3.25
Recording Time.....	0.00	0.00	0.00	7.00	8.00	8.00	9.50	32.50	32.50	32.50
Line Change.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recorder Moves.....	0.00	0.00	0.00	1.75	0.00	1.50	0.50	3.75	3.75	3.75
Detours/Terrain.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Experimental.....	0.00	11.50	8.00	0.00	0.25	0.00	0.00	19.75	19.75	19.75
Other Charge.....	7.00	0.00	3.00	0.00	0.00	0.00	0.00	10.00	10.00	10.00
Wait on Spread.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Weather Time.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stock Damage.....	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25	0.25	0.25
Safety Meeting.....	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.25
Extra VibeHrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extra Detour ChargeHrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extra Washdowns...Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extra Other Charge.Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Processing.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DOWN TIME	1-Feb	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	7-Feb	WEEK	MONTH	JOB
Vibes.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recorder.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cables.....	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.50	0.50	0.50
ATU's.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Detours/Terrain.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wait on Spread.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stock Damage.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other.....	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.25	0.25	0.25
Total Down Time.....	0.00	0.00	0.00	0.00	0.75	0.00	0.00	0.75	0.75	0.75

SURVEY	1-Feb	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	7-Feb	WEEK	MONTH	JOB
Survey.....Kms	19.200	3.930	25.770	5.850	23.220	0.000	13.080	91.050	91.050	91.050
Chaining.....Kms	15.000	5.400	9.600	12.000	6.000	4.500	6.000	58.500	94.500	94.500
Ranging.....Kms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000

LINE CLEARING	1-Feb	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	7-Feb	WEEK	MONTH	JOB
Dozer No 1.....Kms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000
Dozer No 1.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dozer No 2.....Kms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000
Dozer No 2.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader No 1.....Kms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000
Grader No 1.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader No 2.....Kms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000
Grader No 2.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DRILLING	1-Feb	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	7-Feb	WEEK	MONTH	JOB
Drill # of Mtr.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Drill # of Holes.....	0	0	0	0	0	0	0	0	0	0.00
Drill # Total Hrs.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uphole rec # of Mtr.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Uphole rec # Logged.....	0	0	0	0	0	0	0	0	0	0.00
Uphole rec # of Hrs.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COMMENTS: Monday 1st February, mobilised Crew From Broken Hill to Marrapina station.
 Tuesday 2nd February Safety Meeting/experimentals
 Thursday 4th February Production commenced

Appendix E - TERRACORP

CREW NO..... 205 **SEVEN DAY OPERATIONS SUMMARY** WEEK ENDING..... 14-Feb-99

Client.....ANSIR PARTY MANAGER BOB STEPHENSON
 Survey Name.....CABGAS CREW ADDRESS D.JOHNSTONE
 Area.....BROKEN HILL CREW P/NUM..... 205
 State.....NSW

RECORDING	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	WEEK	MONTH	JOB
Profiles.....	449	352	397	370	371	381	391	2711	3963	3963
Skips.....	6	3	2	2	4	2	8	27	34	34
Kms Acquired.....	13.470	10.680	12.000	11.250	10.860	11.580	12.240	82.080	119.880	120

CHARGE	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	WEEK	MONTH	JOB
Travel Hours.....	1.00	0.75	1.50	2.00	1.50	1.00	1.25	9.00	21.50	21.50
Test Hours.....	0.50	0.50	0.50	0.50	0.50	0.50	0.75	3.75	7.00	7.00
Recording Time.....	9.50	8.50	9.00	8.75	8.75	9.00	9.00	62.50	95.00	95.00
Line Change.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recorder Moves.....	0.50	1.50	0.75	0.50	1.25	1.25	1.00	6.75	10.50	10.50
Detours/Terrain.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Experimental.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.75	19.75
Other Charge.....	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.25	10.25	10.25
Wait on Spread.....	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25	0.25	0.25
Weather Time.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stock Damage.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.25
Safety Meeting.....	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.50	0.50
Extra Vibe.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extra Detour ChargeHrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extra Washdowns...Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extra Other Charge..Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Processing.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DOWN TIME	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	WEEK	MONTH	JOB
Vibes.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recorder.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cables.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.50
ATU's.....	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50
Detours/Terrain.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wait on Spread.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stock Damage.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other.....	0.00	0.75	0.25	0.00	0.00	0.00	0.00	1.00	1.25	1.25
Total Down Time.....	0.50	0.75	0.25	0.00	0.00	0.00	0.00	1.50	2.25	2.25

SURVEY	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	WEEK	MONTH	JOB
Survey.....Km	0.000	0.000	14.070	0.000	23.700	31.200	0.000	68.970	160.020	160.020
Chaining.....Km	0.000	9.000	12.000	21.000	23.500	0.000	0.000	65.500	160.000	160.000
Ranging.....Km	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

LINE CLEARING	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	WEEK	MONTH	JOB
Dozer No 1.....Kms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer No 1.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer No 2.....Kms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer No 2.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader No 1.....Kms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader No 1.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader No 2.....Km	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader No 2.....Hrs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DRILLING	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	WEEK	MONTH	JOB
Drill # of Mtr.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drill # of Holes.....	0	0	0	0	0	0	0	0	0	0
Drill # Total Hrs.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uphole rec # of Mtr.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Uphole rec # Logged...	0	0	0	0	0	0	0	0	0	0
Uphole rec # of Hrs.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COMMENTS: Monday 8th February, Survey and Chaining Crew Move to Wonnaminta Stn
 Tuesday 9th, Light Rains
 Friday 12th Crew Move to Wonnaminta Stn
 Sunday 14th Safety Meeting

Appendix E - TERRACORP

CREW NO..... 205

SEVEN DAY OPERATIONS SUMMARY

WEEK ENDING..... 21-Feb-99

Client..... ANSIR

PARTY MANAGER BOB STEPHENSON

Survey Name CABGAS

CREW ADDRESS D.JOHNSTONE

Area BROKEN HILL

CREW P/NUM..... 205

State NSW

RECORDING	15-Feb	16-Feb	17-Feb	18-Feb	19-Feb	20-Feb	21-Feb	WEEK	MONTH	JOB
Profiles.....	366	446	404	80	0	0	0	1296	5259	5259
Skips.....	0	0	9	10	0	0	0	19	53	53
Kms Acquired.....	11.010	13.410	12.690	3.030	0.000	0.000	0.000	40.140	160.020	160.020

[illegible]

WEEK

MONTH

JOB

[illegible]

DOWN TIME

15-Feb

16-Feb

17-Feb

18-Feb

19-Feb

20-Feb

21-Feb

WEEK

MONTH

JOB

[illegible]

SURVEY

WEEK

MONTH

JOB

[illegible]

LINE CLEARING

WEEK

MONTH

JOB

[illegible]

DRILLING

WEEK

MONTH

JOB

[illegible]

COMMENTS:

Monday 15th, Very Windy Conditions

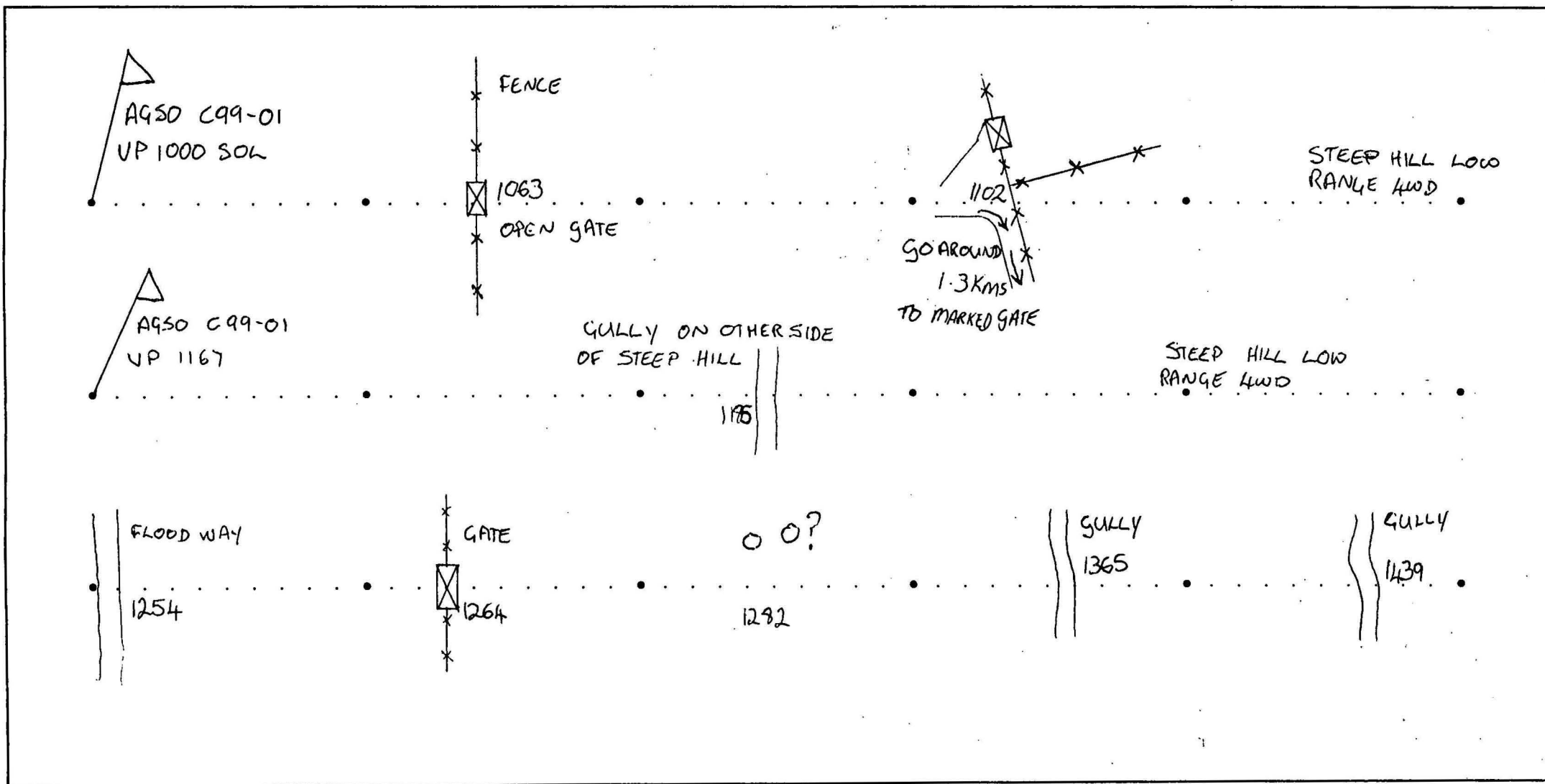
Thursday 18th February, Line Complete.

CHAINING MAP

LINE C99-01

PROSPECT CABGAS CLIENT AGSO PARTY 205 COMPLETED BY MARK DATE 30.1.99 PAGE 1

DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m

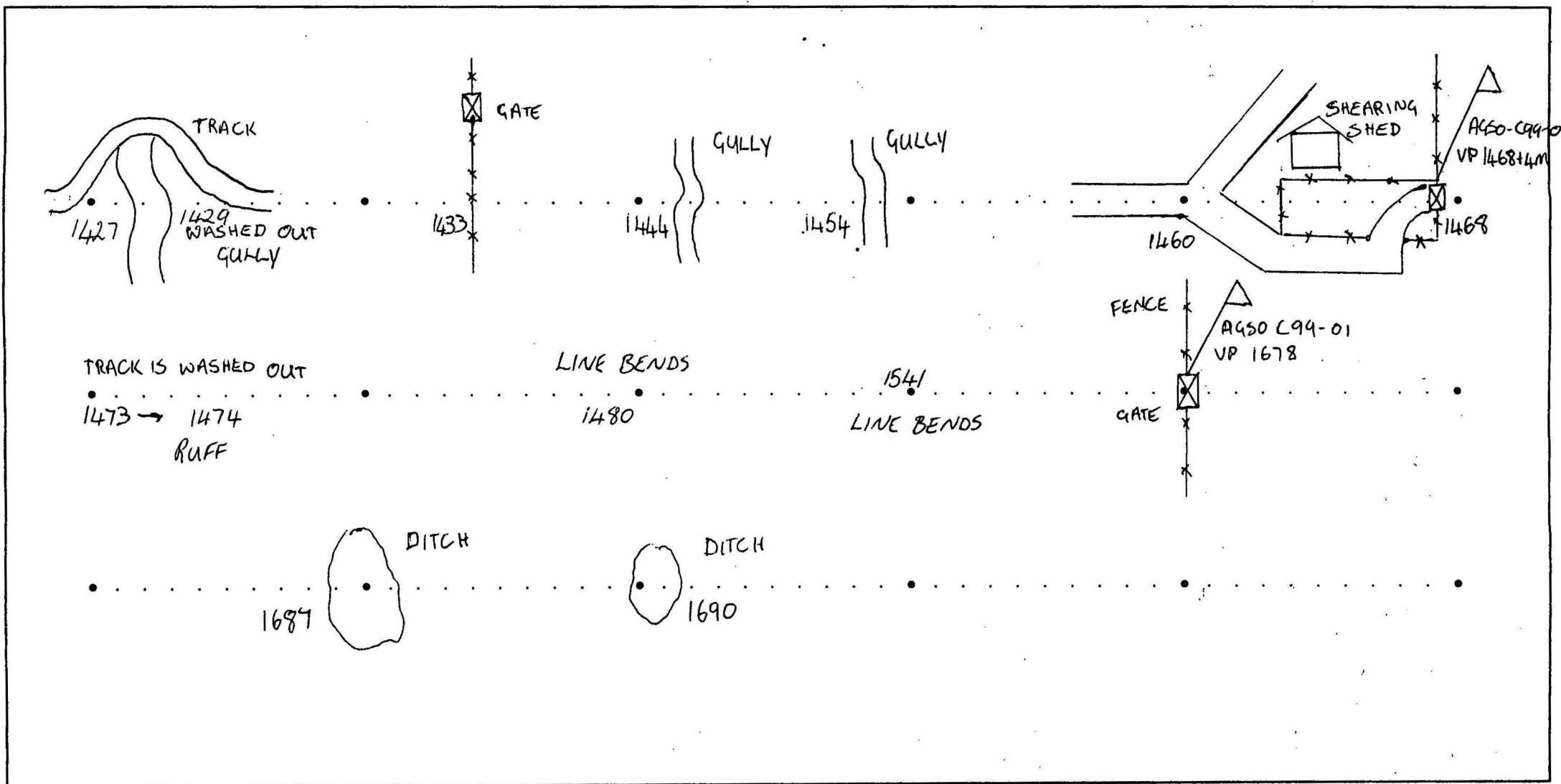


CHAINING MAP

LINE C99-01

PROSPECT CABGAS CLIENT AGSO PARTY 205 COMPLETED BY MARK DATE 30-1-99 PAGE 2

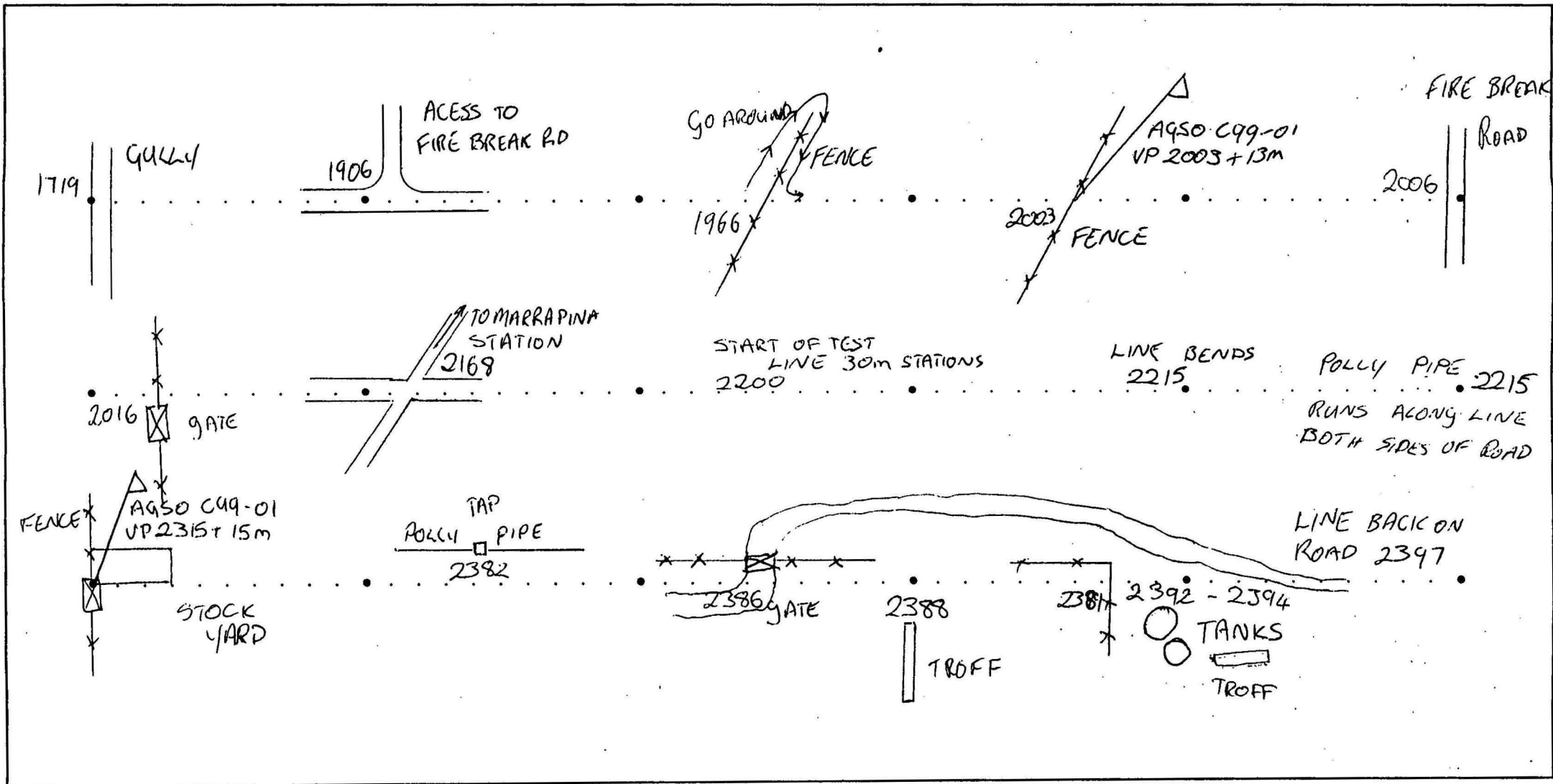
DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m



CHAINING MAP

LINE C99-01

PROSPECT CAB GAS CLIENT AGSO PARTY 205 COMPLETED BY MARK T. DANIEL DATE 1.2.99 PAGE 3
 DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m

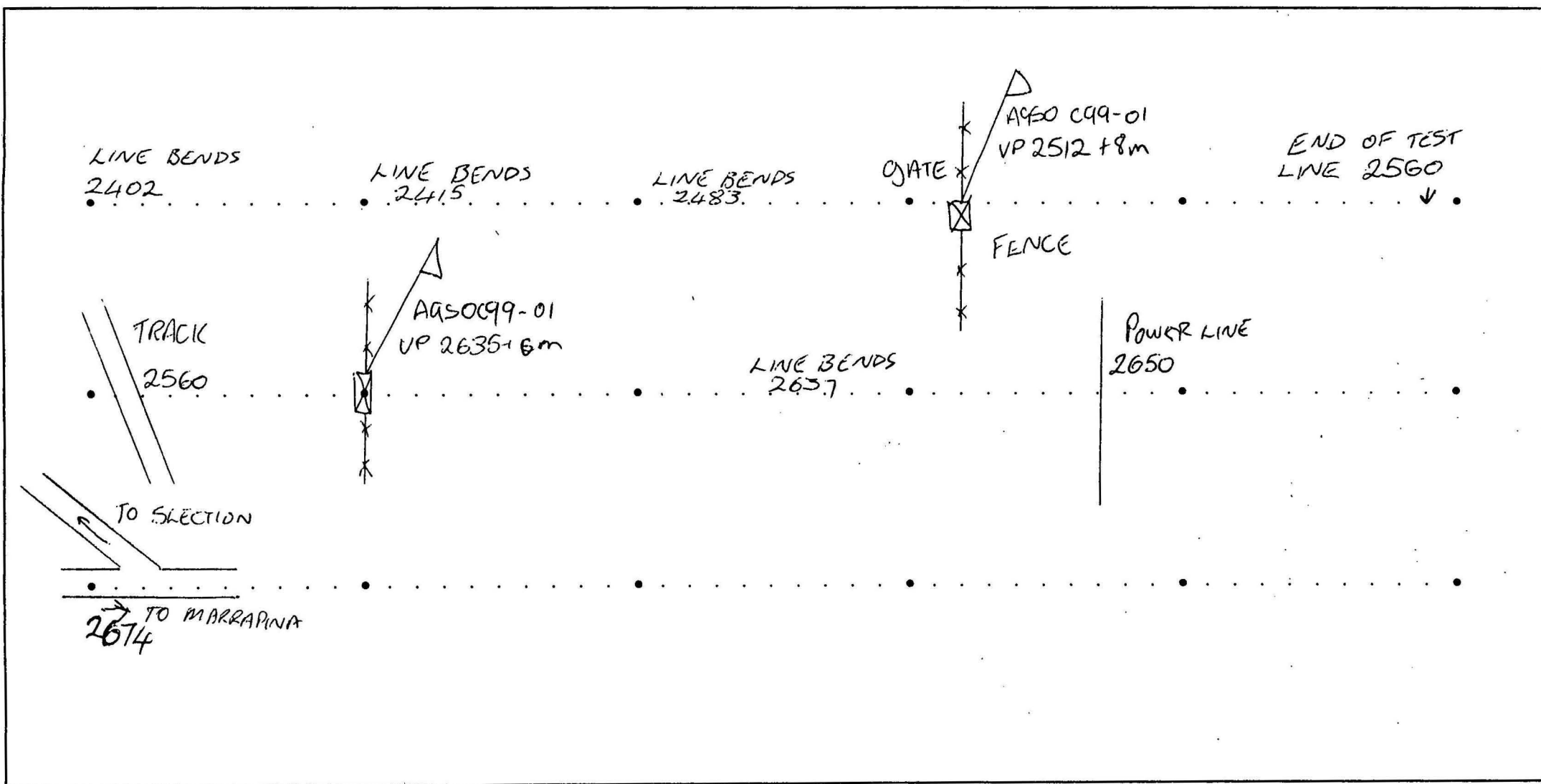


CHAINING MAP

LINE C99-01

PROSPECT CAB GAS CLIENT AGSO PARTY 205 COMPLETED BY MARK + DANIEL DATE 1.2.99 PAGE 4

DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m

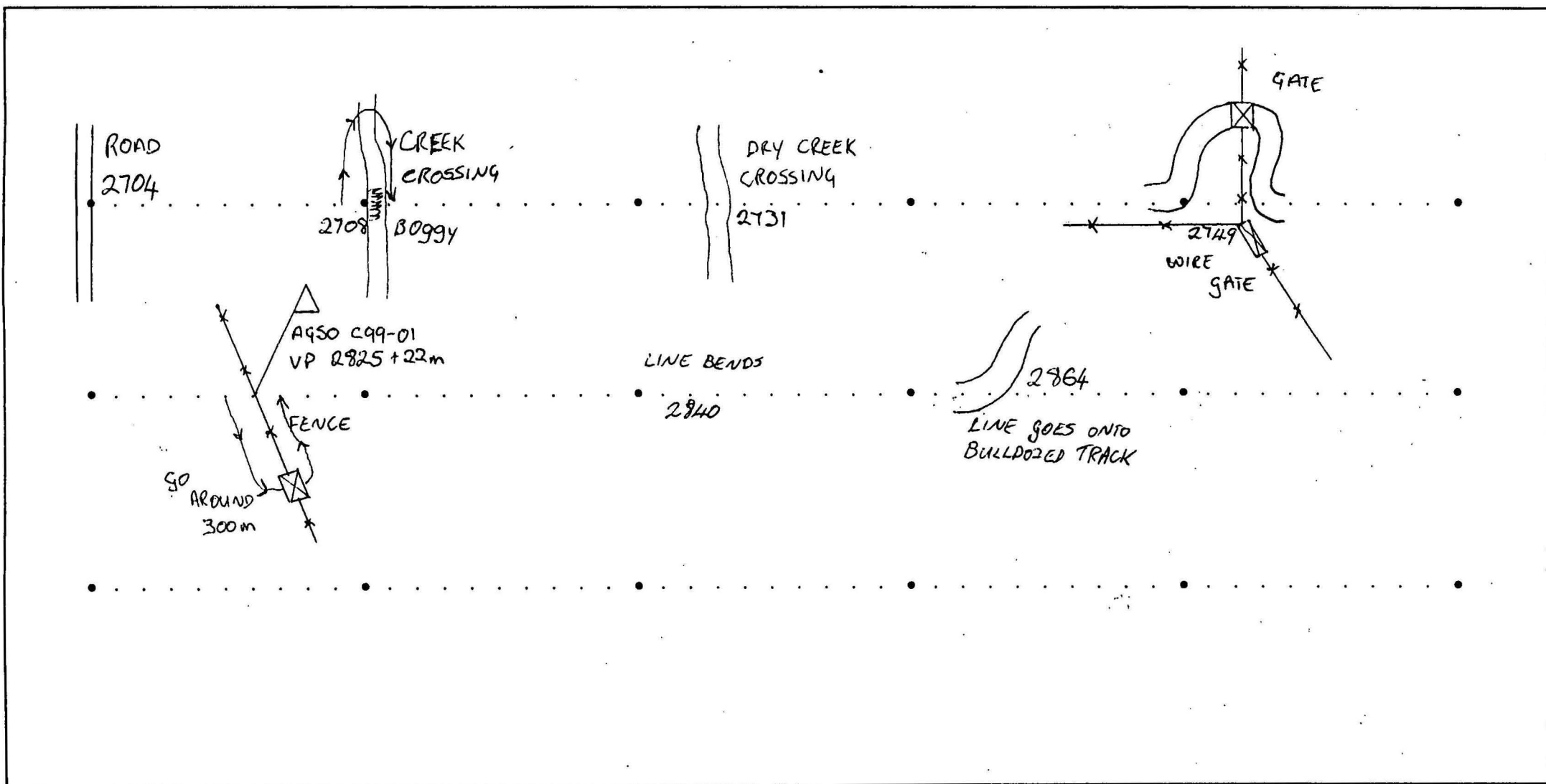


CHAINING MAP

LINE C99-01

PROSPECT CABGAS CLIENT AQSO PARTY 205 COMPLETED BY MARK DATE 2.2.99 PAGE 5

DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m

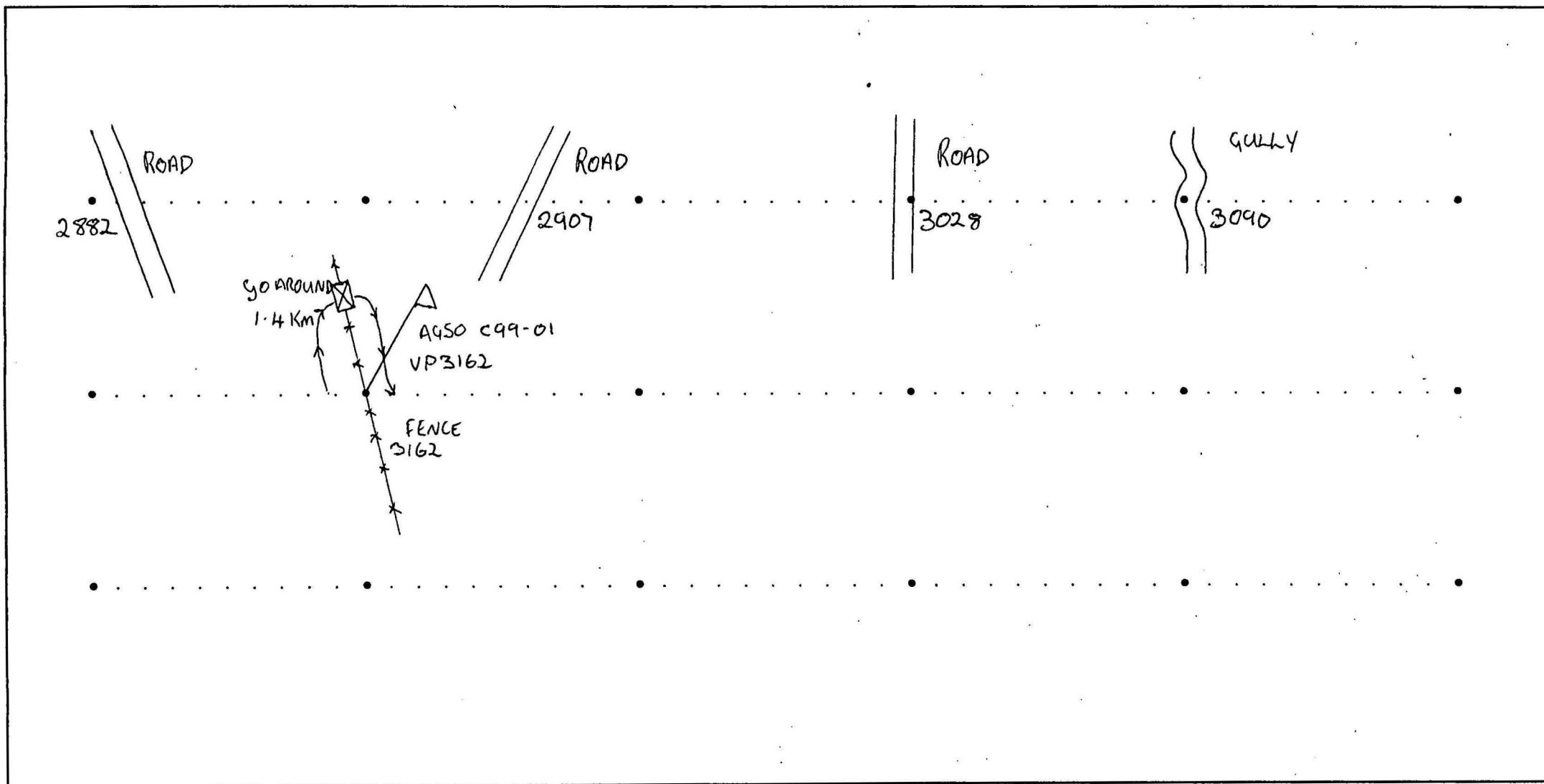


CHAINING MAP

LINE C99-01

PROSPECT CABGAS CLIENT AGSO PARTY 205 COMPLETED BY MARK DATE 3.2.99 PAGE 6

DIRECTION SW - NE STATION SPACING 30m VP SPACING 30m

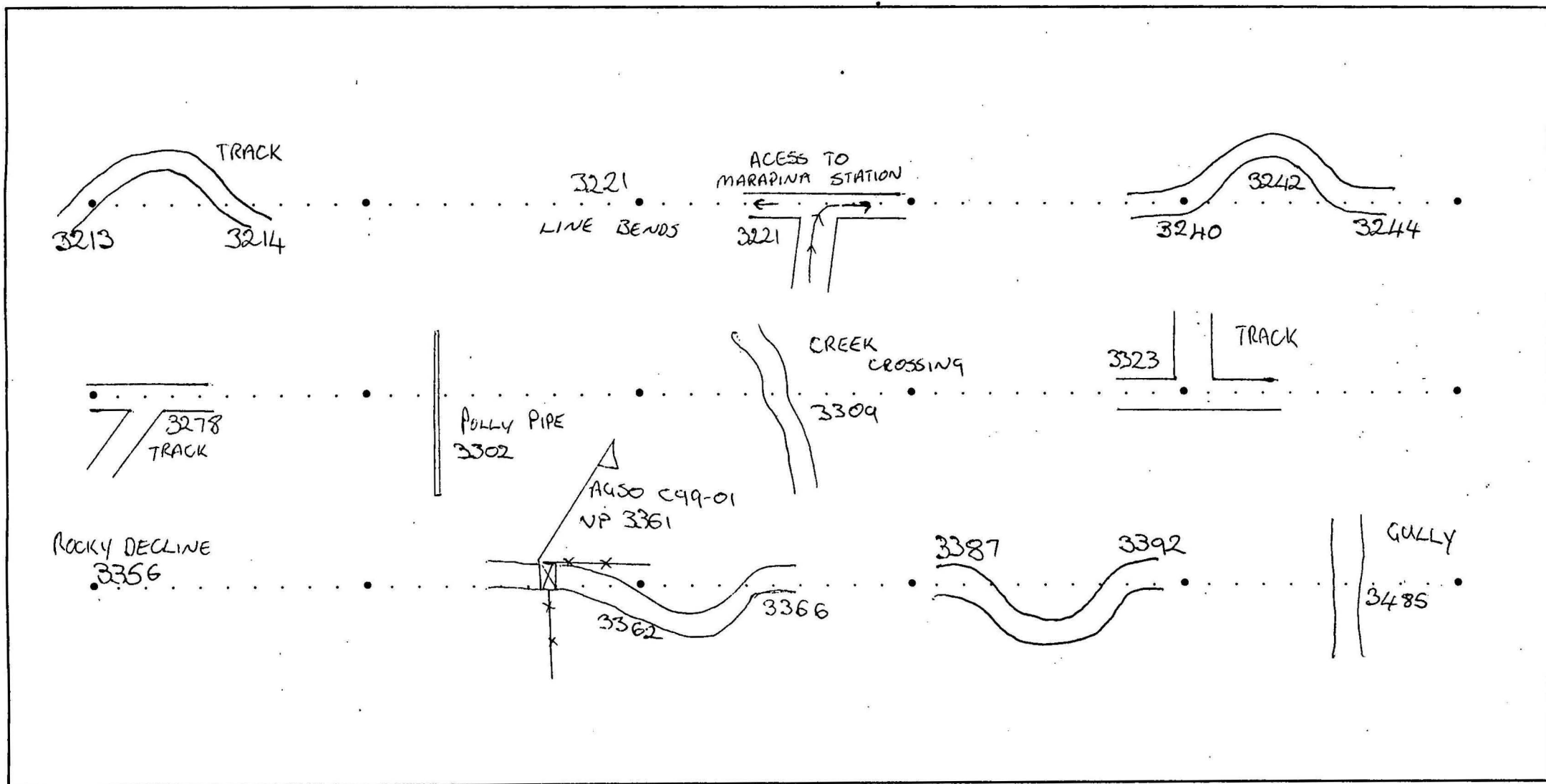


CHAINING MAP

LINE C99-01

PROSPECT CARGAS CLIENT AGSO PARTY 205 COMPLETED BY MARK DATE 4-2-99 PAGE 7

DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m

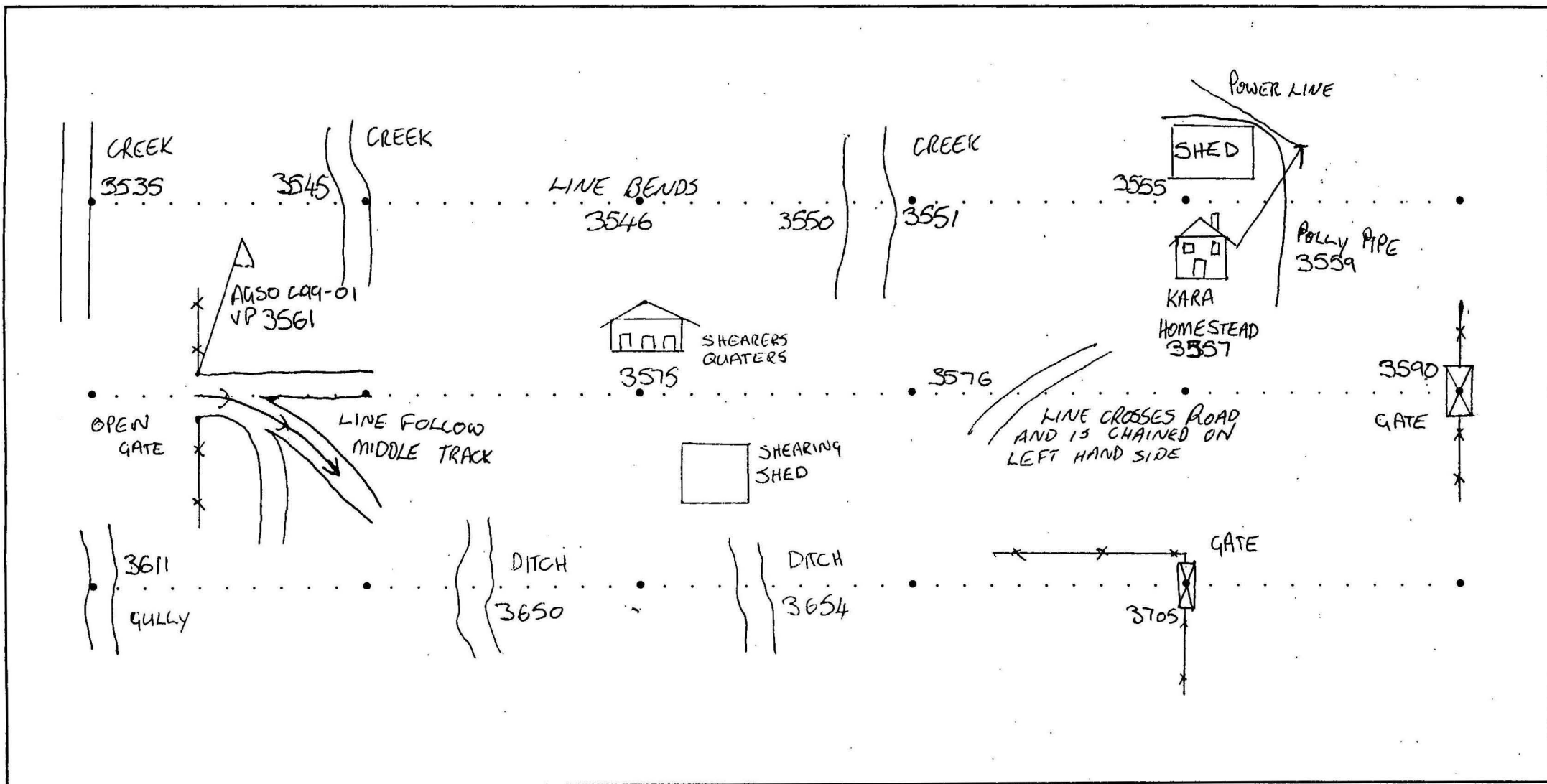


CHAINING MAP

LINE C99-01

PROSPECT CABGAS CLIENT AGSO PARTY 205 COMPLETED BY MARK DATE 5-2-99 PAGE 8

DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m

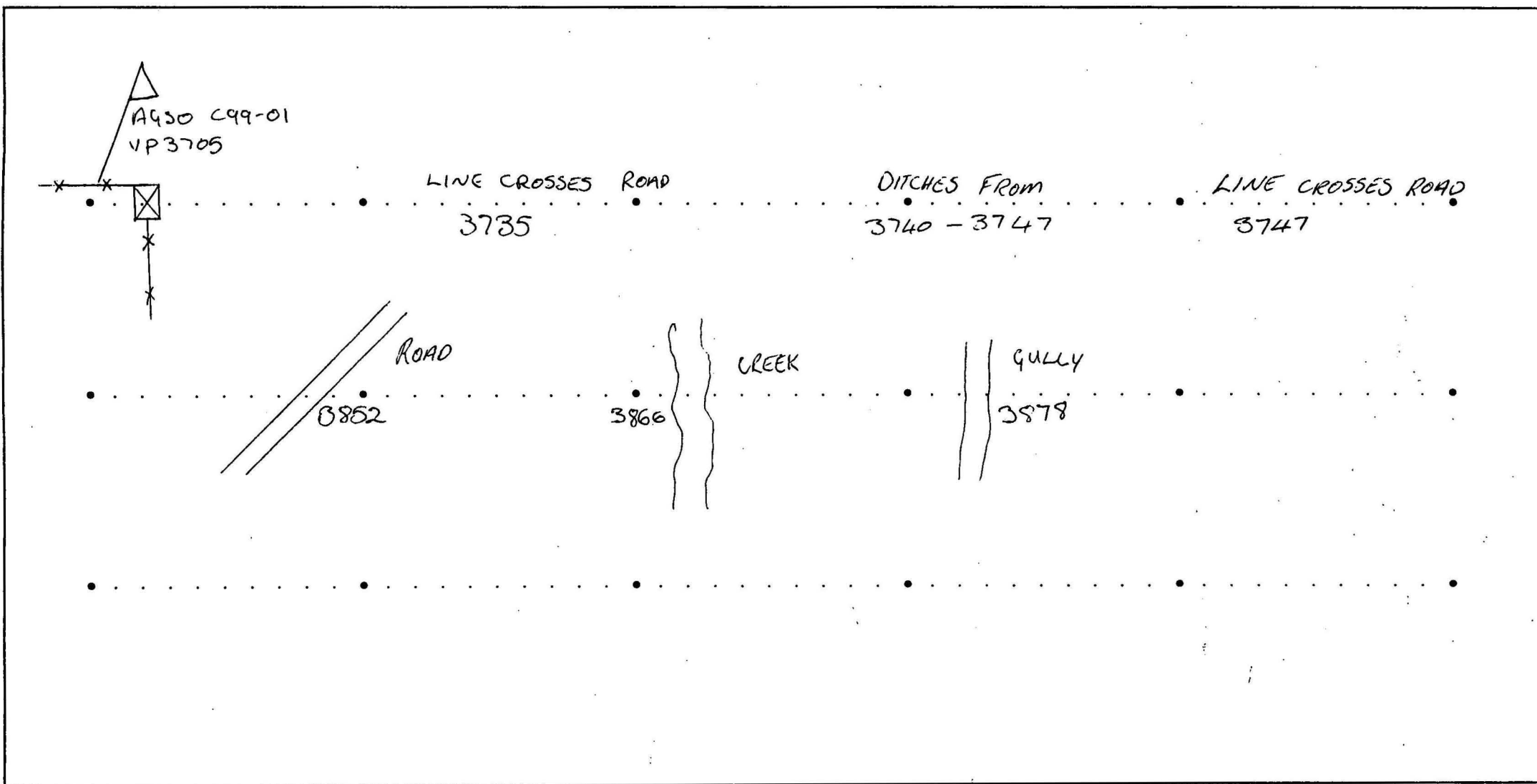


CHAINING MAP

LINE C99-01

PROSPECT CABGAS CLIENT AGSO PARTY 205 COMPLETED BY MARK DATE 6-2-99 PAGE 9

DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m

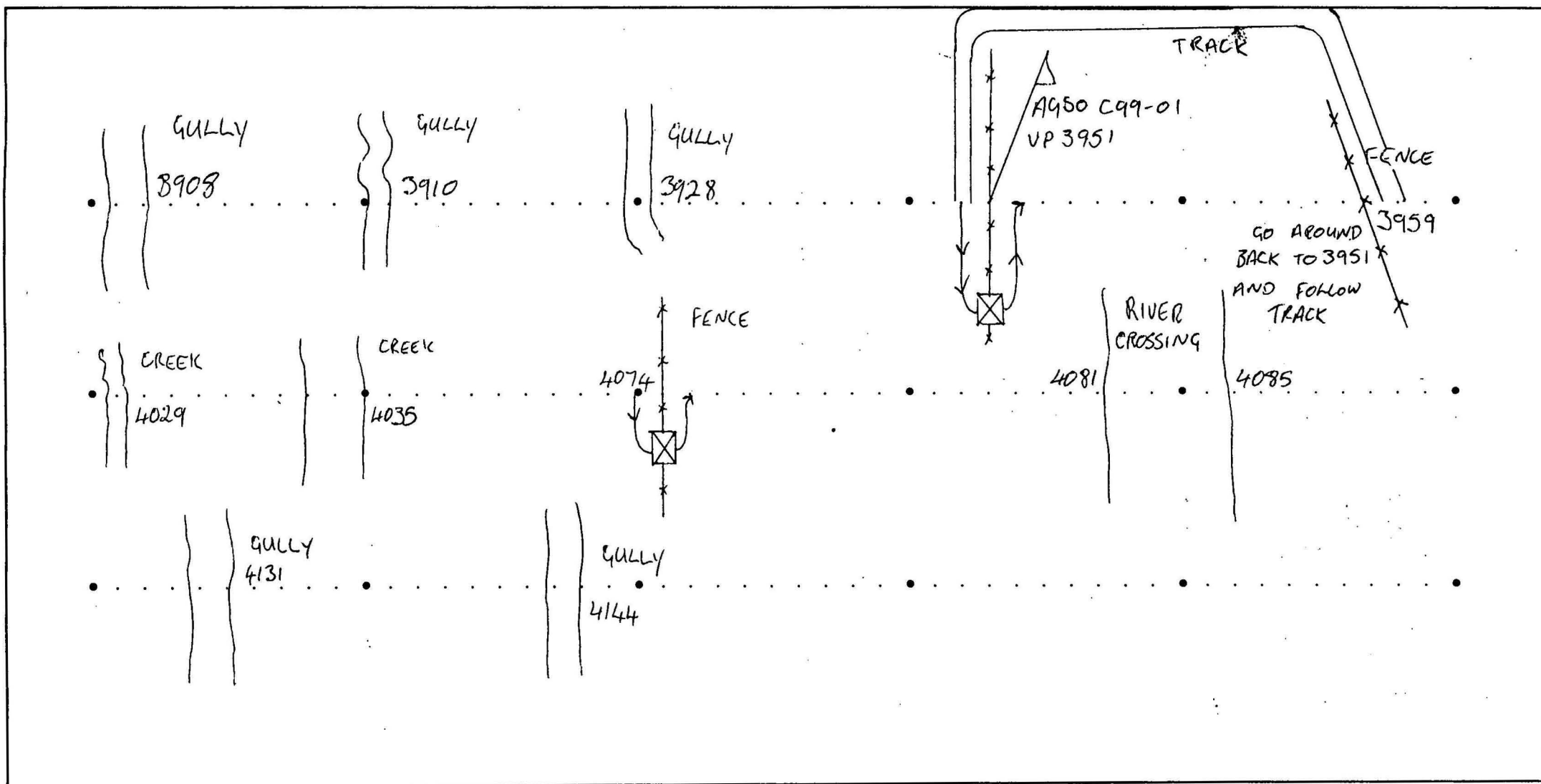


CHAINING MAP

LINE C99-01

PROSPECT CABGAS CLIENT A950 PARTY 205 COMPLETED BY MARK DATE 7-2-99 PAGE 10

DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m

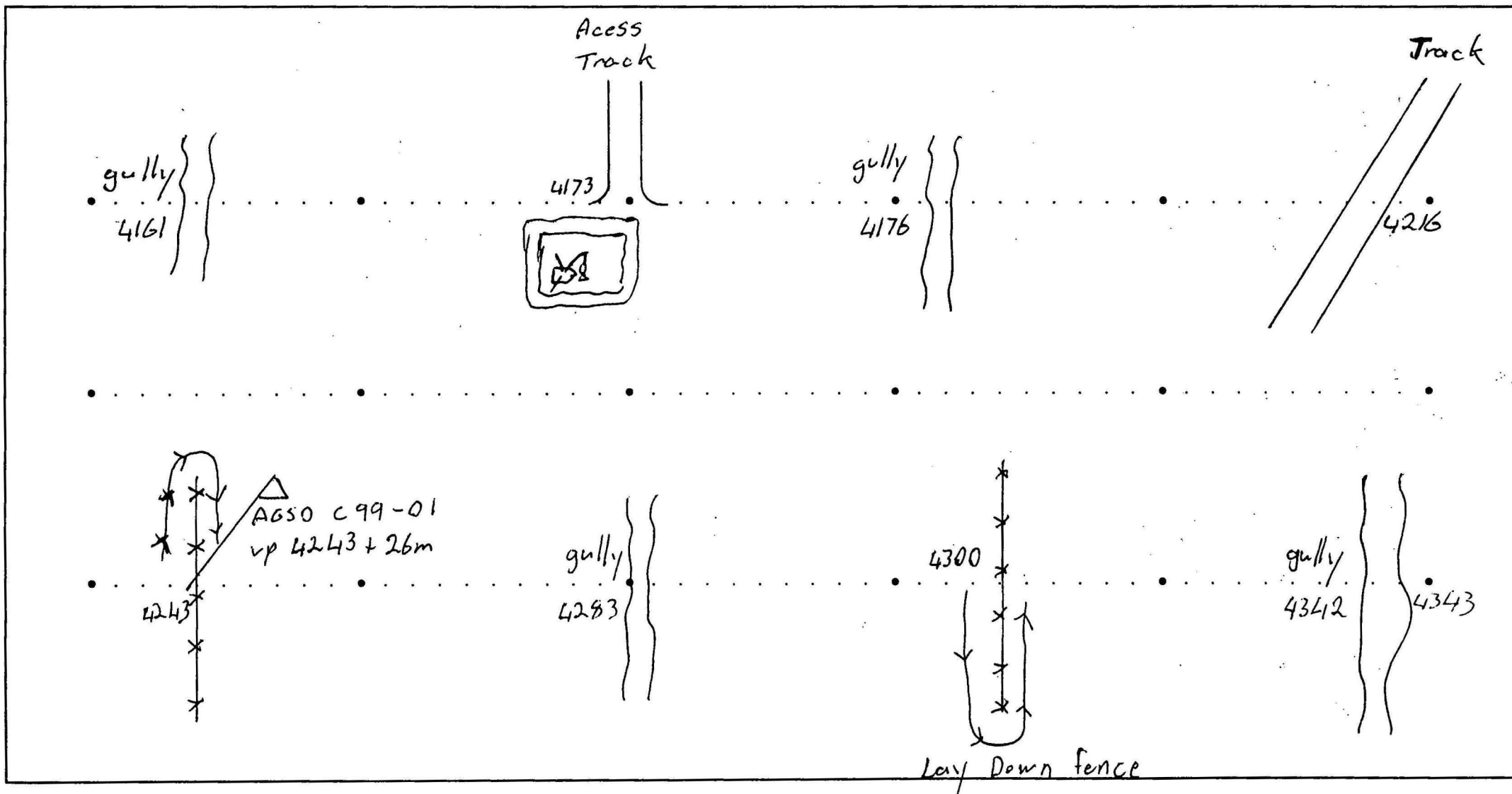


CHAINING MAP

LINE C 99-01

PROSPECT CAB GAS CLIENT AGSO PARTY 205 COMPLETED BY Tex + Daniel DATE 9-02-99 PAGE 11

DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m

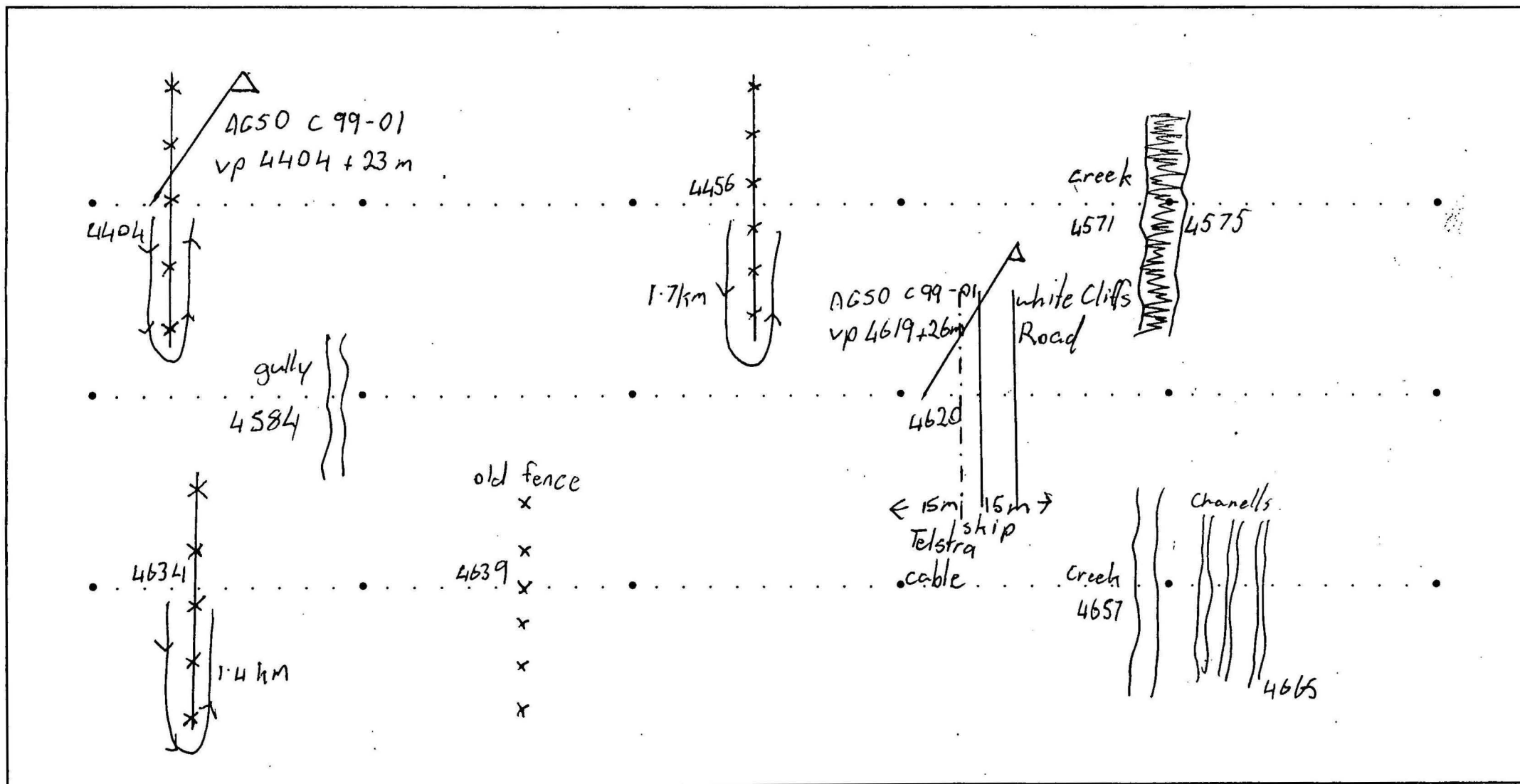


CHAINING MAP

LINE C 99-01

PROSPECT CABGAS CLIENT AGSO PARTY 205 COMPLETED BY Tex + Denise DATE 9.02.99 PAGE 12

DIRECTION SW - NE STATION SPACING 30m VP SPACING 30m

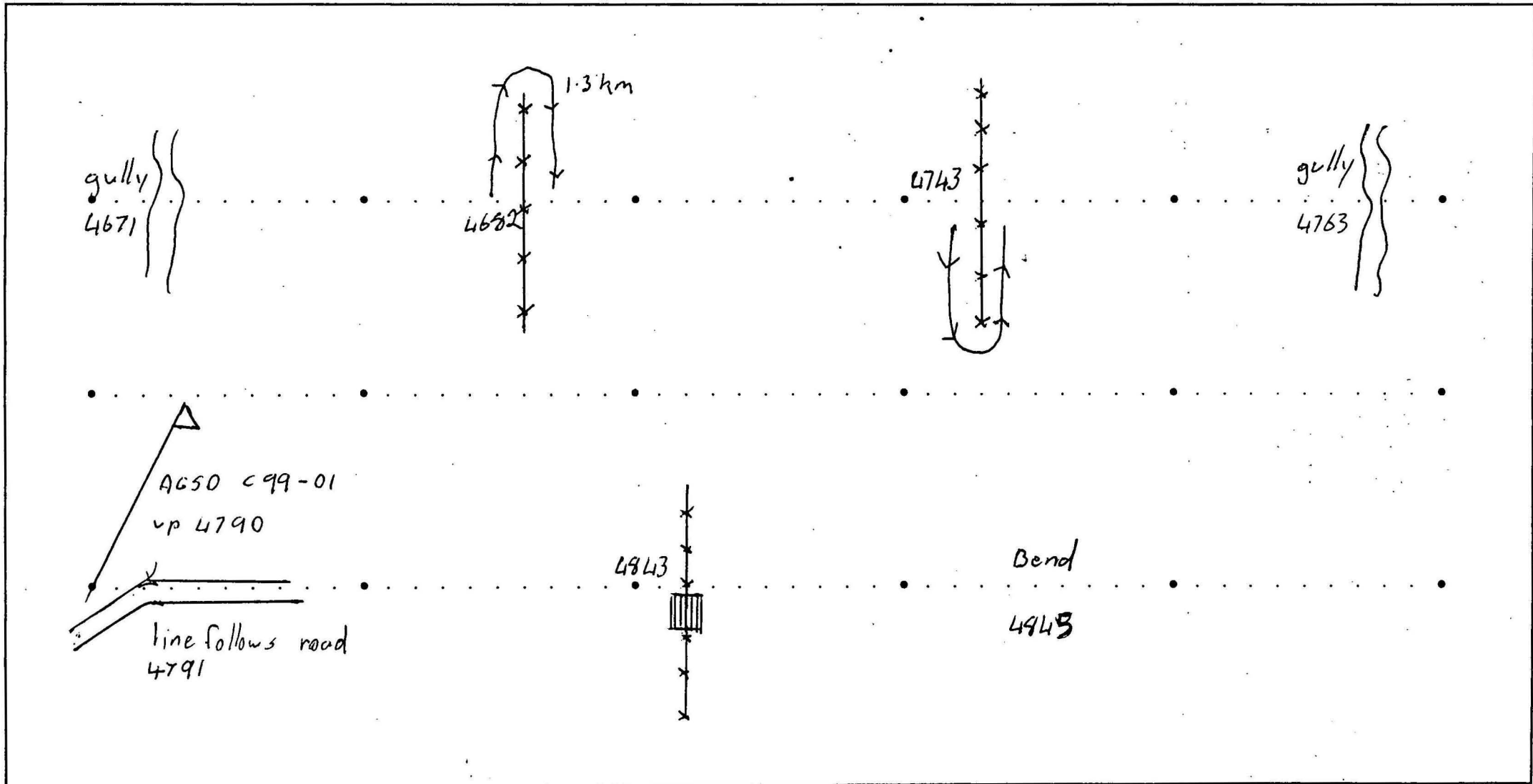


CHAINING MAP

LINE C99-01

PROSPECT CABGAS CLIENT AGSO PARTY 205 COMPLETED BY Tex & Daniel DATE 10.02.99 PAGE 13

DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m

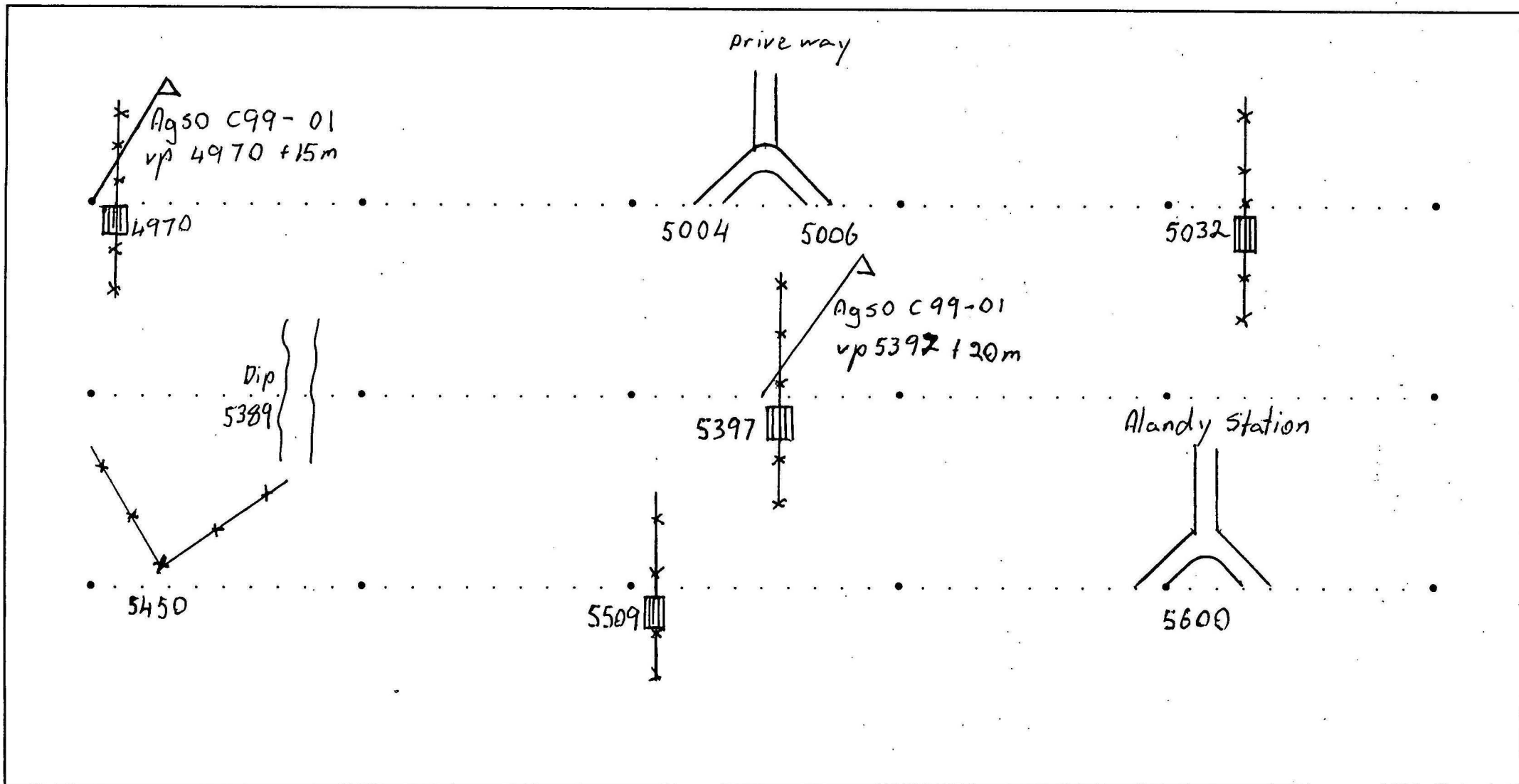


CHAINING MAP

LINE C 99-01

PROSPECT CABGAS CLIENT AG50 PARTY 205 COMPLETED BY Tex + Daniel DATE 11.02.99 PAGE 14

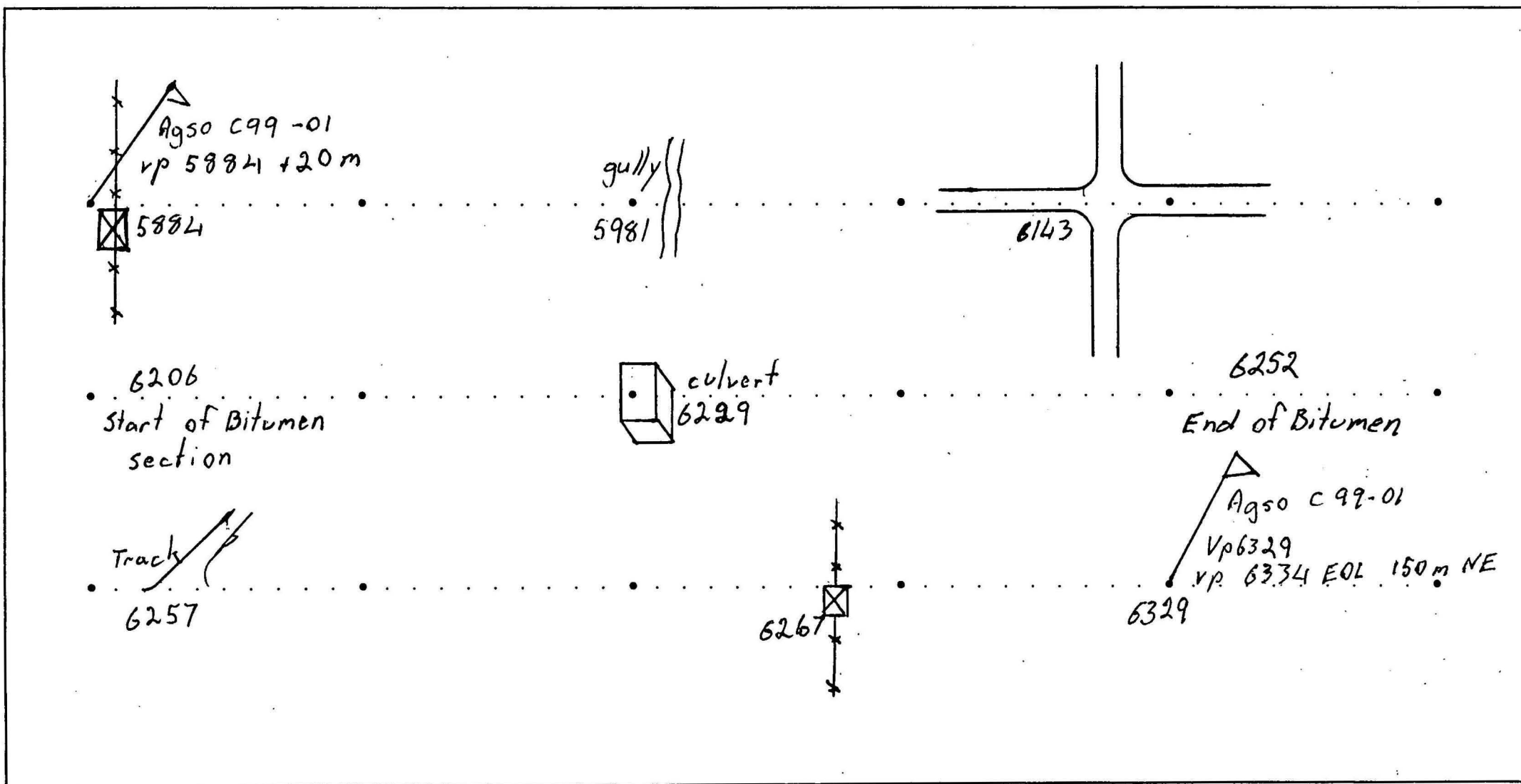
DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m



CHAINING MAP

LINE C99-01

PROSPECT CABGAS CLIENT Agso PARTY 205 COMPLETED BY Tex + Daniel DATE 12.02.99 PAGE 15
 DIRECTION SW-NE STATION SPACING 30m VP SPACING 30m





23 Felspar Street
Welshpool, Western Australia

Appendix G

RECORDING PARAMETER SHEET

Client:	ANSIR	Line:	C99-01
Crew:	205	Prospect:	CABGAS
Survey	1999DARLING BASIN	Date Recorded	1 ST FEB-18TH FEBRUARY 1999
Instrument	ARAM24	Weather:	FINE HOT WINDY

Recording parameters

Traces per File	240
Record Length	16
Sample Rate:	2 mil
Tape Format	3490
Files	1 to 5302
Reels	99CO1F-004 to 99CO1F-055

Sweep Frequency:

Swp 1	07-56 HZ
Swp 2	12-80 HZ
Swp 3	08-72 HZ
Swp 4	
Swp 5	
Swp 6	
Swp 7	
Swp 8	

Receiver Parameters

Station Interval	30M
Geophone Array Length	30
Geophone Array Centre	Midway
Geophone Type	Geospace DX4
Geophones Per String	12
Strings Per Station	1
Connection	Series

Source Parameters

No. of Sweeps per VP	3
Sweep Length:	8
Sweep Type	Linear
Sweep Type Mono / Vari	Vari
VP Interval	30M
Source Array Length	30M
Vibe Spacing Pad to Pad	15M
Vibe Move Up Distance	5 M
No of Move ups	3
VP Source Centre	ON PEG
Vib Electronics	Pelton Adv II Model 6
Vibrator QC	Vibra sig
Force Control	Peak and Trough
Phase Lock	Ground Force
High Force Output	90%
Pelton Rev. Level	5E

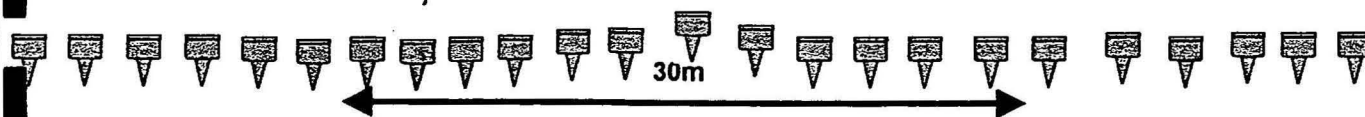
Tape Copy Listing

1st Tape No	99CO1F-004	
Files	1-107	
Sp to Sp	1000 to 1106	
Last Tape No	99CO1F-055	
Files	5209 to 5302	
Sp to Sp	6224 to 6334	

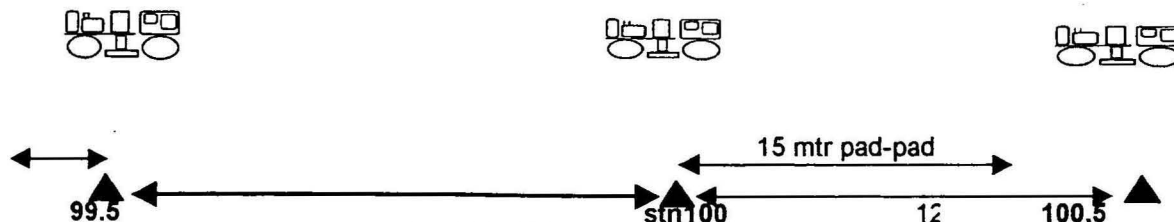
Receiver Diagram- 12 geophones over 30 mtrs centred 15 mtrs from peg

Stn 100 $\longleftrightarrow$ 2m

Stn 101



Source Array - 1st Sweep Source Diagram





Dynamic

Satellite

Surveys

99-02

*Final Operations Report
on the
Australian National Seismic Imaging Resource
1999 CABGAS 2D Seismic Survey
for
TERRACORP PTY LTD
January - February 1999*

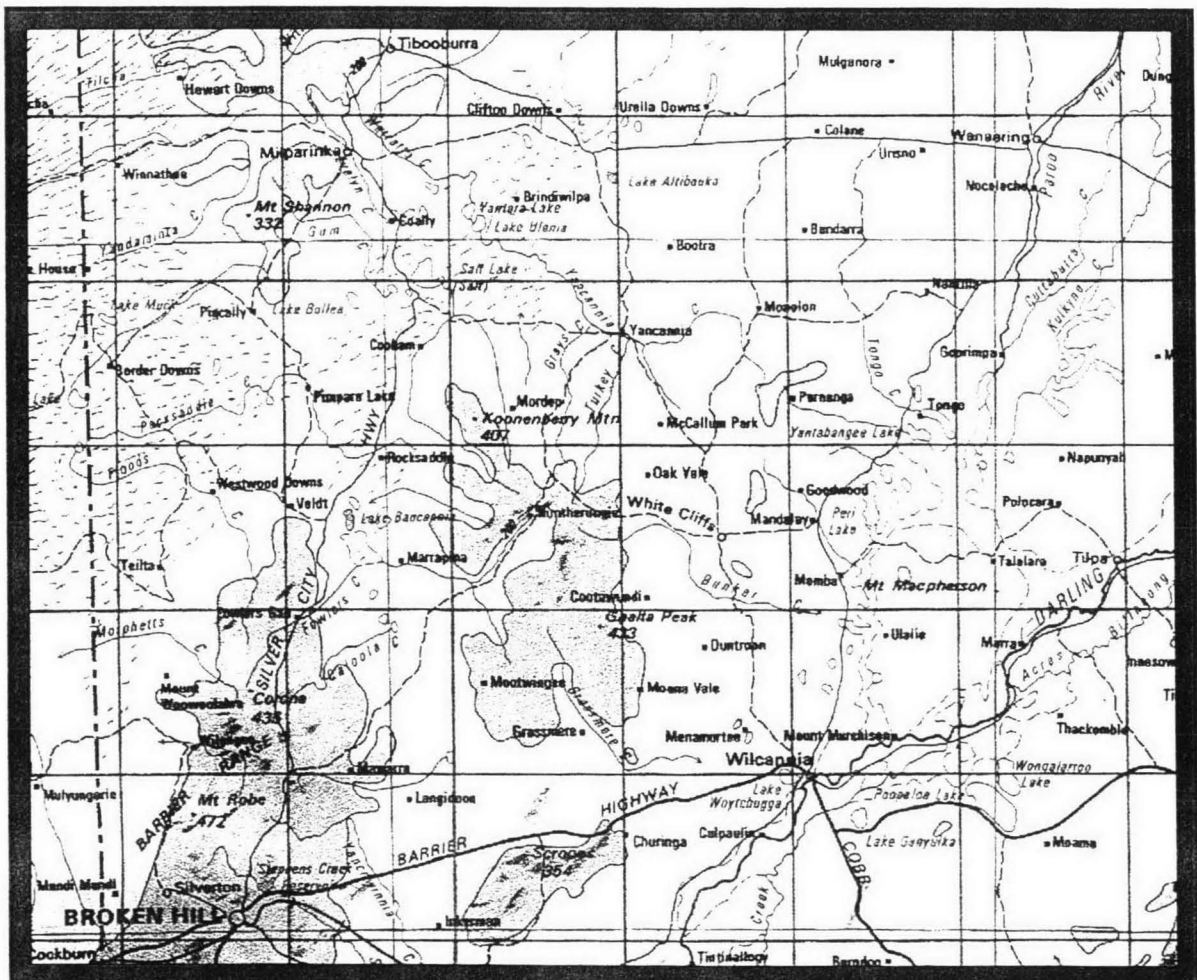


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1



INTRODUCTION

The following report covers the **1999 CABGAS 2D Seismic Survey** operations performed by Dynamic Satellite Surveys Pty Ltd (DSS) whilst contracted to Terracorp Pty Ltd for Australian National Seismic Imaging Resource (ANSIR).

The survey operation consisted of 160 kilometres of seismic line in the unassigned acreage of the Darling Basin area, located approximately 150 kilometres north east of Broken Hill in western New South Wales.

The survey commenced in late January and continued until mid February, with demobilisation in mid February.

The prospect consisted of only one (1) seismic line, one hundred and sixty (160) kilometres long with a thirty (30) metre station interval.

NAME	START	END	LENGTH
C99-01	1000	6334	160.02 km
TOTAL DSS Surveying:			160.02 km

2

**INSTRUMENTATION AND PERSONNEL****2.1 Personnel**

DSS personnel involved in the survey were as follows:

Senior Surveyors:

- Dan Inglis - Bachelor of Surveying - QUT
- Bill Hedditch - Director of Dynamic Satellite Surveys

2.2 Equipment

Equipment provided by DSS and used on this project:

	Description	Quantity
Vehicles	Toyota Landcruiser Traybacks	1
	DSS mobile caravans	1
GPS receivers	NovAtel 3151R/RT20 c/w VHF telemetry	2
	NovAtel 2151R c/w VHF telemetry	2
Computers	Acer 486 Portable PC	1
	Grid 386 Field PC	3
	MiniNote 386 Notebooks	1
Software	DSS graphical navigation	2

	Description	Quantity
	Waypoint GPS post-processing	1
	DSS MIB seismic QC	1
Printer	Hewlett Packard DeskJet 340	1
Survey Instruments	Suunto Clinometer	1
	Suunto Compass	1
Miscellaneous	Sundry office and support equipment	
	Field and Office Consumables	
	Westinghouse Satellite Phone - 0145 111 527	

2.3 Logistics

Personnel and equipment were supported by the DSS Yeppoon and Adelaide offices.

One survey vehicle mobilised from Narrabri to Broken Hill in late January. In early February one caravan mobilised from Eromanga, Queensland after the work had commenced.

Survey operations were based from "Marrapina" and "Wonnaminta" stations which were situated roughly a third and two thirds respectively along the line. Accommodation and a temporary office were set up in the shearers quarters of "Marrapina" station until the caravan arrived.

At the completion of the job, the vehicle and caravan demobilised to Alice Springs, for the next seismic job for Terracorp.

3

***SURVEY REFERENCE SYSTEMS******3.1 Survey Datum******3.1.1 Geodetic Datum***

Raw GPS data is acquired on the WGS 84 datum, described by the following parameters:

<i>Datum:</i>	WGS 84 (World Geodetic System 1984)
<i>Spheroid:</i>	WGS 84
<i>Semi-Major Axis Length:</i>	6 378 137.0
<i>Inverse Flattening:</i>	298.257223563
<i>The Unit of Measure:</i>	International Metre

Coordinate sets were transformed directly to the Australian Map Grid (AMG) based on the Australian Geodetic Datum 1966 (AGD 66):

<i>Datum:</i>	AGD 66 (Australian Geodetic Datum 1966)
<i>Spheroid:</i>	ANS (Australian National Spheroid)
<i>Semi-Major Axis Length:</i>	6 378 160.0
<i>Inverse Flattening:</i>	298.25
<i>The Unit of Measure:</i>	International Metre

Coordinate conversions from WGS 84 to AGD 66 were performed using the following seven transformation parameters:

<i>Translations:</i>	ΔX :	116.00 m	ΔY :	50.47 m	ΔZ :	-141.69 m
<i>Rotations:</i>	$R\Omega$:	0.230"	$R\phi$:	0.390"	$\Delta\kappa$:	0.344"
<i>Scale:</i>	.bs :	-0.0983 ppm				

3.1.2 Map Projection

Rectangular coordinates provided were based on the Australian Map Grid (AMG).

Parameters for this projection are:

<i>Projection:</i>	AMG Zone 54
<i>Latitude of Origin:</i>	0°
<i>Central Meridian (CM):</i>	141° E
<i>Scale Factor at CM:</i>	0.9996
<i>False Easting:</i>	500 000
<i>False Northing:</i>	10 000 000
<i>The Unit of Measure:</i>	International Metre

Final data was presented as AMG66 and AHD coordinates as requested by the client.

3.1.3 Height Datum

GPS observations are made on the WGS84 datum. The height associated with this datum is an ellipsoidal height (h). The Australian Height Datum (AHD), the height datum usually associated with the Australian Map Grid (AMG), is an orthometric height, which is measured as the height above mean sea level or the geoid (H).

The OSU-89A geoid spheroid model was used to reduce the GPS elevations to orthometric heights relative to AHD.

A least square's interpolation model of separations was formed using values calculated from the "GEOID HEIGHTS - OSU89A" software developed by Hirsch and Rizos, University of New South Wales and data compiled by Ohio State University.

This model was used for automatic determination of N at each point, so that orthometric heights within the survey area could be readily derived. For the survey area the model's residuals indicated a good fit reflecting an undulating geoid slope within the extents of the model.

The function that defines the relationship between the ellipsoidal and orthometric heights is:

$$H = h - N$$

Or

AHD = WGS84 - Geoid-Ellipsoid Separation.

3.2 Map Sheets Covering Job

1:250 000 maps

SH54-8	-	Urisino
SH54-11	-	Cobham Lake
SH54-12	-	White Cliffs
SH54-15	-	Broken Hill
SH54-16	-	Wilcannia

1:100 000 maps

7235	-	Fowlers Gap
7335	-	Nuchea
7336	-	Wonnaminta
7436	-	Kayrunnera
7437	-	Yancannia

4

***SURVEY CONTROL***

The datum for the prospect was based upon a New South Wales State Survey Mark (SSM) 31900. This station consists of a brass plaque set in concrete and is located approximately 2.5 kilometres north of the University of New South Wales Research Station at Fowlers Gap along the Silver City Highway between Broken Hill and Tibooburra. The station coordinates are listed as AMG66 Zone 54 and AHD:

Station	Easting	Northing	Elevation
SSM31900	567905.209	6561888.660	237.440

It is quoted as a third order station for both horizontal and vertical accuracy.

Static GPS ties to BM 26460 and BM 26456, confirmed the vertical coordinate used from SSM 31900 having a misclose of 0.003 m and 0.129 m respectively.

A control survey of ten (10) stations constituted the survey bases used for the real-time surveying on all lines and this network can be seen in **Appendix B - Control Network Diagram and Coordinate Listing**.

This network was tied to a number of Main Roads bench marks in and around the "Wonnaminta" property along the road from "Nundora" to "Wonnaminta". The survey closed off onto SSM3453 in the north which was previously used in another DSS Job 98-79. Government Survey Marks tied to for the 99-02 job are listed in **Appendix A - Control Survey, Miscloses and Ties**.

The ten base stations used, closed to within the accuracy standards as required and as such a survey network adjustment was not necessary. Checks were made to previously

surveyed VP's and/or Main Roads bench marks whenever a new base station was set up. This confirmed that no errors were made during the survey in setting up base station files.

The control survey from SSM 31900 to SSM 3453 and encompassing base stations BH1 to BH10 had a horizontal precision of about 1 in 500 000 and a vertical precision of about 1 in 2 000 000. Due to the precision of this network, the base station positions will not be adjusted, so that only one data set exists for the survey.

The Control Stations used, were third order in vertical accuracy and varied in horizontal accuracy from 9th to 3rd order. The station descriptions for these marks can be found in **Appendix B - Control Network Diagram and Coordinate Listing**.

The horizontal misclose of the raw (unadjusted) network was in the order of 0.65 metres or the equivalent to 1:250 000 and the vertical misclose was 0.35 metres that is in the order of 1:600 000.

Where possible, survey stations were situated on high dunes or on any high outcrop of rock to achieve a good signal, for GPS satellite signals and also to transmit good corrections to the roving GPS unit to achieve real-time surveying coordinates to record and locate the position of the line. These stations consisted of a star picket driven firmly into the ground or in one instance a railway line set in concrete.

5



MONUMENTATION

Permanent markers for the line C99-01 consisted of a steel star picket with aluminium tags attached and set in concrete. These were placed at appropriate points along each line approximately every 5 kilometres, at start and end of the line, and close to fence lines where possible. The aluminium tags contained relevant information such as line name, station number, and start and end of line numbers. The permanent markers were placed by the Terracorp chaining crew.

A listing of PM coordinates are contained in **Appendix D - Permanent Markers Listing**.

Pink pinflags were placed every 30 metres along the entire line with the VP number written on one side of the pin flag denoting every station along the line. These pinflags were removed once the line had been recorded by Terracorp to be recycled for future work.

Existing State Survey Markers were a brass plaque set in concrete and Main Roads bench marks were deep driven steel rods with a concrete collar. Both types of marks were accompanied by star pickets for location purposes.

6



METHOD OF SURVEY

Survey operations consisted of two stages, survey control as previously discussed and RT20 surveying. Line ranging is often carried out by DSS but for this job, ANSIR determined the position of the seismic line.

6.1 Line Ranging - Dozing

Line ranging was completed by ANSIR prior to DSS' arrival. The line was either cleared by dozer or, where the line followed a road, was left untouched.

6.2 RT20 Surveying

The line was chained at 30 metre station intervals, from VP 1000 to VP 6334 giving a total length of 160.02 kilometres.

The prospect was surveyed using DSS's RT20 real-time differential kinematic surveying technique. RT20 enables both position and elevation coordinates to be acquired in real-time and on a datum appropriate to the clients wishes.

The survey method utilised phase data received from US Navy NAVSTAR Satellites to provide three dimensional positioning. One receiver was set up as a base station at a known location (as per the survey network shown in **Appendix B**), while another receiver was used as a rover.

All base station coordinates were obtained by GPS static sessions and comprised a survey control network that is located in **Appendix B**.

NovAtel real-time kinematic can achieve accuracies of better than $\pm 0.3\text{m}$ in position and elevation depending on base line length. The expected precision for locating pegged positions is better than 0.3 metres in both elevation and height relative to the base station used and is generally better than 0.2 metres.

Initialisation of the RT20 rover GPS usually takes as little as 2-3 minutes, although this is greatly dependant on satellite geometry, availability, and baseline length.

Checks and ties were examined in both real-time operation and through the control network using the static technique, to assess coordinate integrity. A number of existing survey stations were surveyed and the miscloses are listed in **Appendix A**.

Every time a new base station was set up, or even set up for a second or third time, several check shots onto previously recorded stations or onto Main Roads Bench marks were recorded to confirm the integrity of the data. These checks form a section in DSS's quality assurance for the job and are kept with the raw data, at the Yeppoon office.

The field data was edited into line files and examined for quality control.

6.3 GPS Processing and Quality Control

When using RT20, all data is recorded internally in GRiD palmtop data-loggers and then downloaded to the office computer each evening. Quality of the satellite data was monitored by careful examination of the various on-screen quality control statistics produced by DSS's software. These checks on data integrity are in the form of standard deviation (or sigma) values for latitude, longitude, and height and are generally better than 0.2 metres.

The coordinates were then checked using a chaining check routine developed by DSS which calculates line bearing and compares calculated peg distance with actual peg distance. Points outside specified distance and azimuth tolerances are flagged for further

investigation and rechained as necessary.

Profile plots were examined to identify any height anomalies.

Coordinates were then finalised by interpolating intermediate stations using software developed by DSS and handed to Jim Leven of ANSIR. Any anomalies found such as a rapid change in height or a long or short station interval in the file was highlighted and brought to DSS's attention to confirm that it was the actual true position of the VP and not an incorrectly observed VP. It was found that these points were correctly observed as the residuals of the recordings prove that the data was valid and also notes made whilst recording the line state that the line may have deviated or dropped or risen sharply, for example; through a creek crossing.

The line consisted of a .CRD file which is the Surveyor's recordings along a line, an .INT file which is a complete listing of Easting, Northing and Elevation for every station along a line and a .CHK file which is a chaining check along the line.

A PMS.CRD file lists all the permanent markers placed throughout the prospect area.

6.4 Line Deviations

Only small line deviations were encountered such as around a small clump of trees or through a creek crossing. These deviations were treated just as a normal part of the line and were recorded where the pin flags marked the seismic line.

6.5 Uphole Locations

No upholes were drilled for the 1999 CABGAS Seismic Survey at the time of recording.

7



DATA PRESENTATION

Data was presented in digital format as requested by the client. Files produced were:

File	Description
C99-01.CRD	Coordinates and elevations of all stations surveyed.
C99-01.CHK	Chaining check file for each surveyed station.
C99-01.UKA	A list of offsets stating station and offset from line.
PMS.CRD	A listing of all new Permanent Markers.

C99-01.UKA was given to the client on 14 February prior to demobilising.

These files are all backed up on digital disks in the Yeppoon office for future reference.

Horizontal and vertical profiles of the line may be seen in **Appendix C**.

8



SAFETY

DSS personnel are aware of safety conditions governing mining and exploration leases. DSS safety guidelines were followed at all times.

A Safety Manual for the job was kept on the crew at all times.

Each DSS vehicle was fitted with, UHF radio, HF radio, fire extinguisher, first-aid kit, vehicle recovery equipment and daily vehicle check lists.

DSS staff attended a safety meeting weekly, with Terracorp personnel whilst in camp.

No LTIs (Lost Time Incidents), no near misses and no accidents were reported for the survey. DSS continue to perform high quality work with an exceptional safety record.

9

**CHRONOLOGICAL SUMMARY OF
SURVEY**

DATE	SURVEY OPERATIONS
January 29	Dan Inglis mobilised Narrabri to Broken Hill in one vehicle. Met client David Johnstone, planned control along the line.
January 30	Established base stations BH1 and BH2 from SSM 31900.
January 31	Established base stn BH3 and moved to "Marrapina" shearers quarters.
February 1-4	RT20 surveying and base BH4 established. Bill Hedditch mobilised with van on the 3rd and carried out some RT20 surveying. Bill Hedditch demobilised to Adelaide on the 4th.
February 5-7	RT20 surveying and bases stn's BH6 and BH7 established.
February 8	Camp move to "Wonnaminta" station.
February 9-10	RT20 surveying and base stn's BH8, BH9 and BH10 established.
February 11	Tied off control to SSM 3453.
February 12-13	RT20 surveying, line complete. Toby Milburn mobilised Adelaide - Wonnaminta arriving 1900 hrs.
February 14	Dan Inglis demobilise to Adelaide. Toby Milburn demobilised to Alice Springs with caravan.

10



OPERATIONAL ASPECTS

The survey progressed steadily throughout the entire job. A total of 160 kilometres was surveyed in approximately 14 days, giving an average daily production rate of about 11-12 kilometres per day.

Access throughout the prospect was cut by the dozers and allowed good driving between most of the line. There were two sections of rough line. One being in crabhole country and could not be helped and the other through rocky country with many small dry creeks. In some places it was much smoother to drive beside the line untouched by the dozer. This area proved to be very time consuming to drive over and should have perhaps been left untouched by the dozer blade. The dozer tracks were sufficient to mark the line.

11



CONCLUSION AND RECOMMENDATIONS

The survey proceeded relatively smoothly with no major problems being encountered. The level of production varied depending on survey control being established and on camp moves, especially so with only one surveyor. This did not affect the seismic crew catching up as a sufficient lead over the recorder was maintained at all times.

The RT20 GPS system works extremely well in these open areas where least obstructions such as thick bush and trees occur. There were only occasional down times to GPS due to satellite availability and these were in the order of twenty minutes during the day.

The survey control network tied in well with the surrounding survey marks and all points of survey meet standard survey requirements.

No near misses nor accidents were reported for the surveyors during the project. The weekly safety meetings kept a high standard of safety throughout the camp.

One of the main problems for survey during the job was the drivetime between base stations. This could not be helped in most instances, however along one section of line the dozed line was extremely bumpy and even driving very slowly took its toll on both the vehicle and the passenger/s.

In some sections gates were in very poor condition and also a fence had to be laid down to gain access to the next paddock. This can be a lengthy task when there is only one person on the job and spare tyres have to be unloaded and laid on the fence to drive over it. Perhaps a little amount of time spent maintaining and creating new gates could save

time in the long run.

By maintaining a comfortable lead and not being under pressure from recording, the potential for accidents and errors is decreased. Forward planning can limit the stress and pressure on all seismic personnel.

Submitted by,

Dan MGLIS

12



APPENDICES

Control Survey, Miscloses and Ties

CONTROL POINTS AND TIES FOR SURVEY

Coordinates are AMG66 Zone 54 Central Meridian 141°

Heights are AHD, using OSU89 N-value model

Revision 0, 28 January 1999

DATUM:

Station	Easting	Northing	Elevation
SSM 31900	567905.209	6561888.660	237.440

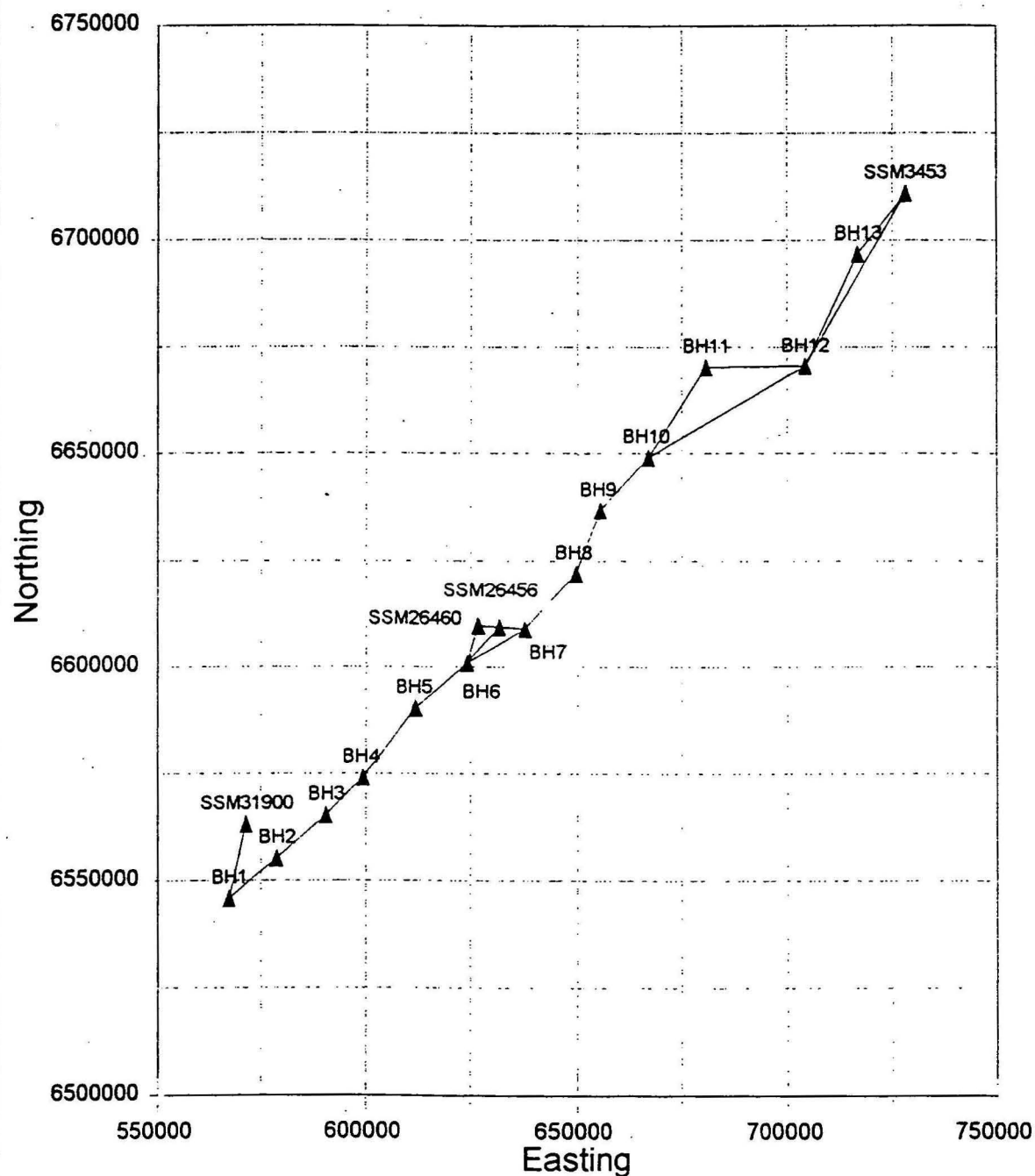
TIES:

Station	Easting	Northing	Elevation	Comments
SSM31901	571382.425	6563259.031	165.481	Published H3, V3
	571382.437	6563259.057	165.619	Observed
	0.012	0.026	0.138	Misclosure
SSM3453	728277.12	6711102.16	137.80	Published H1, V3
	728277.74	6711101.81	137.45	Observed
	0.62	-0.35	-0.35	Misclosure
BM26460	Scaled coords only		179.540	Published H9, V3
			179.537	Observed
			-0.003	Misclosure
BM26456	Scaled coords only		203.911	Published H9, V3
			203.782	Observed
			-0.129	Misclosure

The misclosures reflect the integrity of the survey network observed.

Control Network Diagram and Coordinate Listing

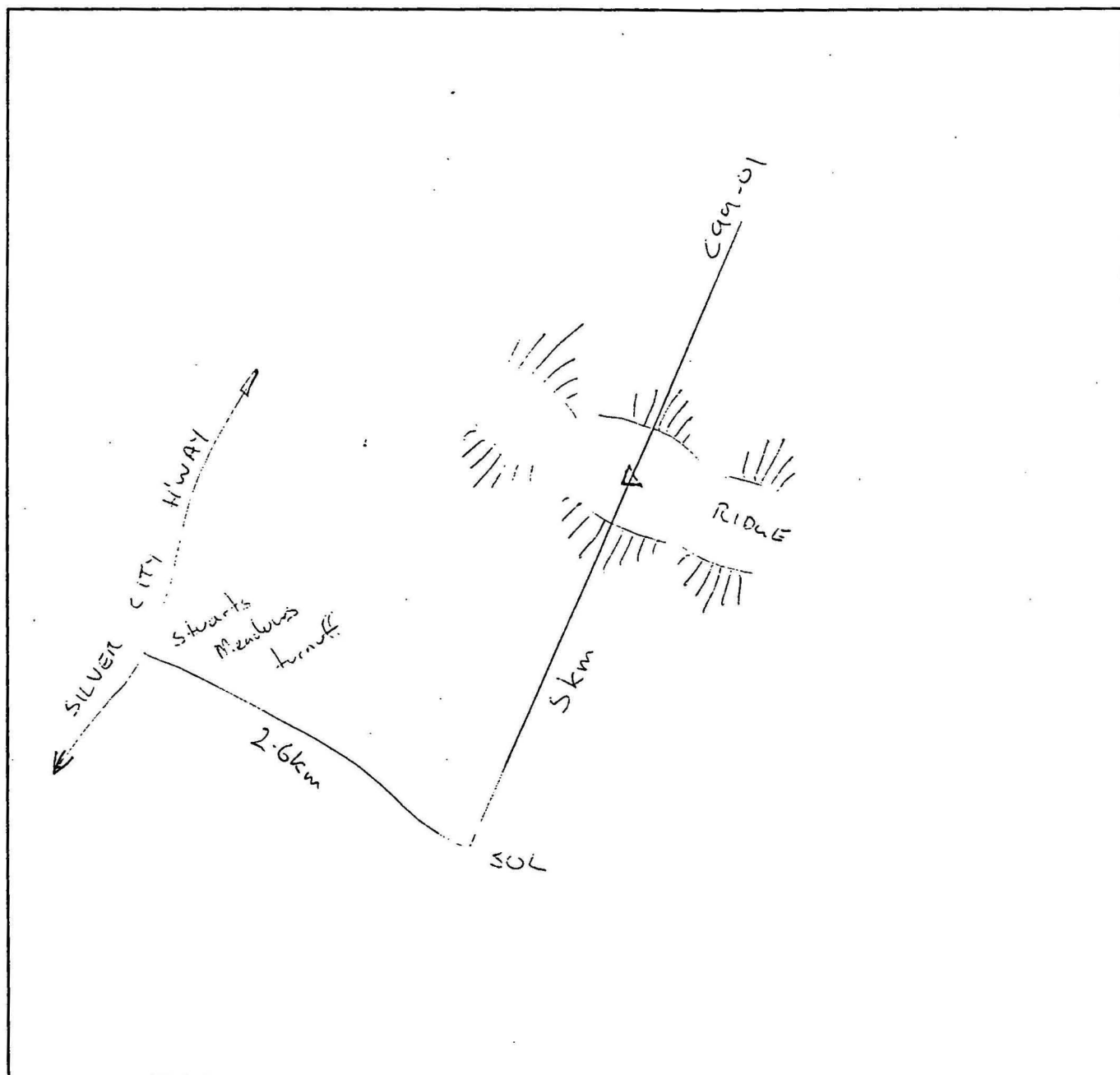
Control Network Diagram



CONTROL BASE STATIONS**Coordinates are AMG66 Zone 54 Central Meridian 141°****Heights are AHD, using OSU89 N-value model****Revision 0, 28 January 1999**

Station	Easting	Northing	Height
BH1	567311.643	6545844.829	267.355
BH2	578704.860	6555397.238	150.179
BH3	590453.986	6565439.953	133.540
BH4	599373.203	6574154.934	140.306
BH5	612099.056	6590455.120	255.866
BH6	624269.386	6600983.232	272.995
BH7	637765.125	6608968.547	183.415
BH8	649703.876	6622012.713	159.907
BH9	655536.192	6636915.071	136.315
BH10	667194.487	6649376.296	110.186
BH11	680899.564	6670484.687	121.991
BH12	704340.444	6670743.424	153.764
BH13	716857.355	6697019.416	144.112

Note: BH11, BH12 and BH13 were not used for survey of line.



Dynamic

Satellite

Surveys

STATION LOCATION DIAGRAM

DSS-FF-15

REV 4.0

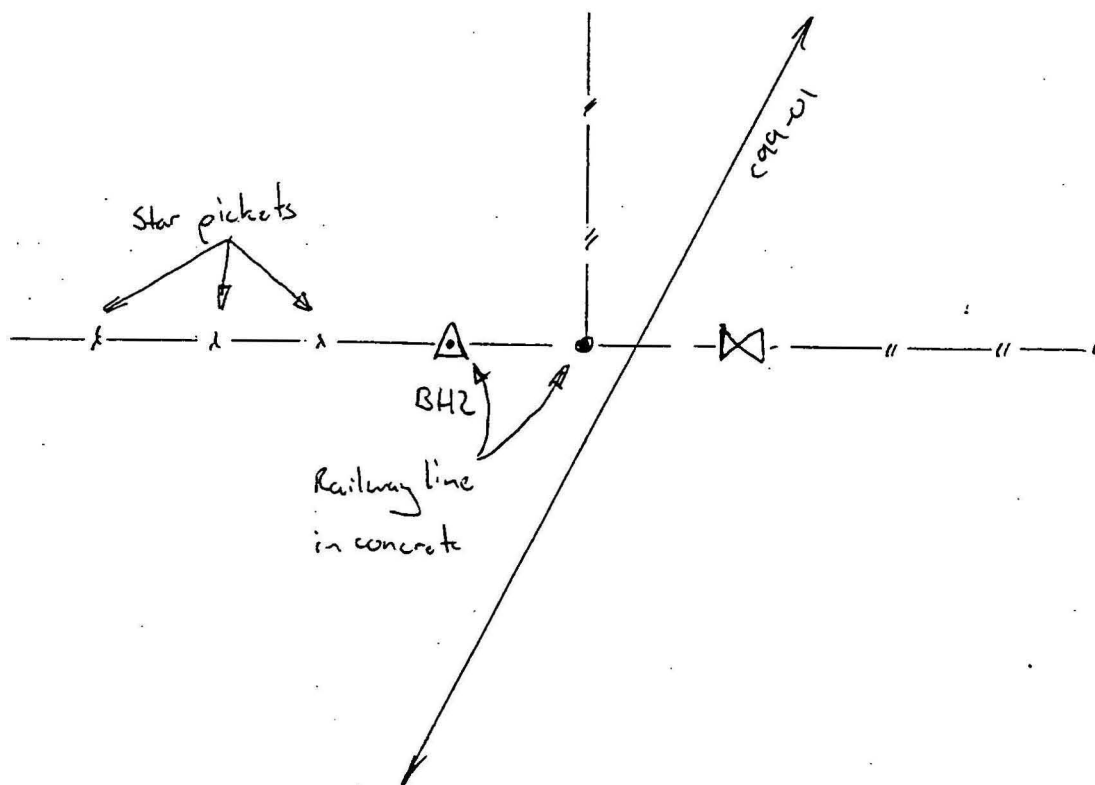
Nov 1995

PROJECT / JOB # 99-02 CLIENT ACSODAY/DATE 030STATION NAME: BH2AREA: Broken HillMAP REFERENCE: SH 54-15Horizontal Control Data

Easting	578 704.86
Northing	6 555 397.24
Datum	AMG 66
Origin	SSM 31900

Vertical Control Data

RL	150.18
Datum	SEAHD
Origin	SSM 31900

Mark Type Railway Line fence post set in concrete

Dynamic

STATION LOCATION DIAGRAM

DSS-FF-15

REV 4.0

Nov 1995

Satellite

Surveys

PROJECT / JOB # 99-02 CLIENT AGSO

DAY/DATE 031

STATION NAME: BH3

AREA: Broken Hill

MAP REFERENCE: SH54-15

Horizontal Control DataVertical Control Data

Easting 590 453.98

RL 133.54

Northing 6 565 439.95

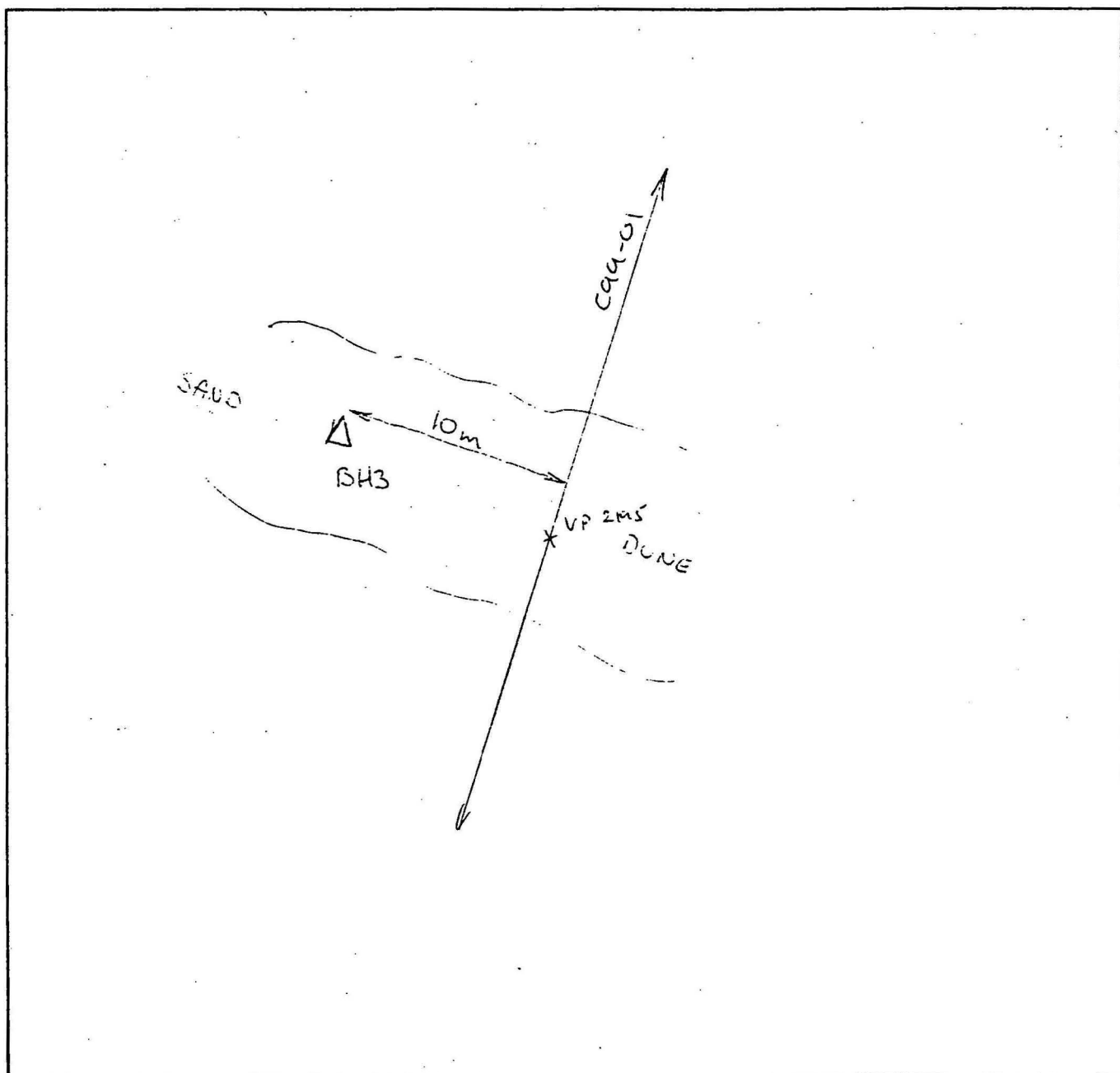
Datum AHD

Datum AMG66

Origin SSM 31900

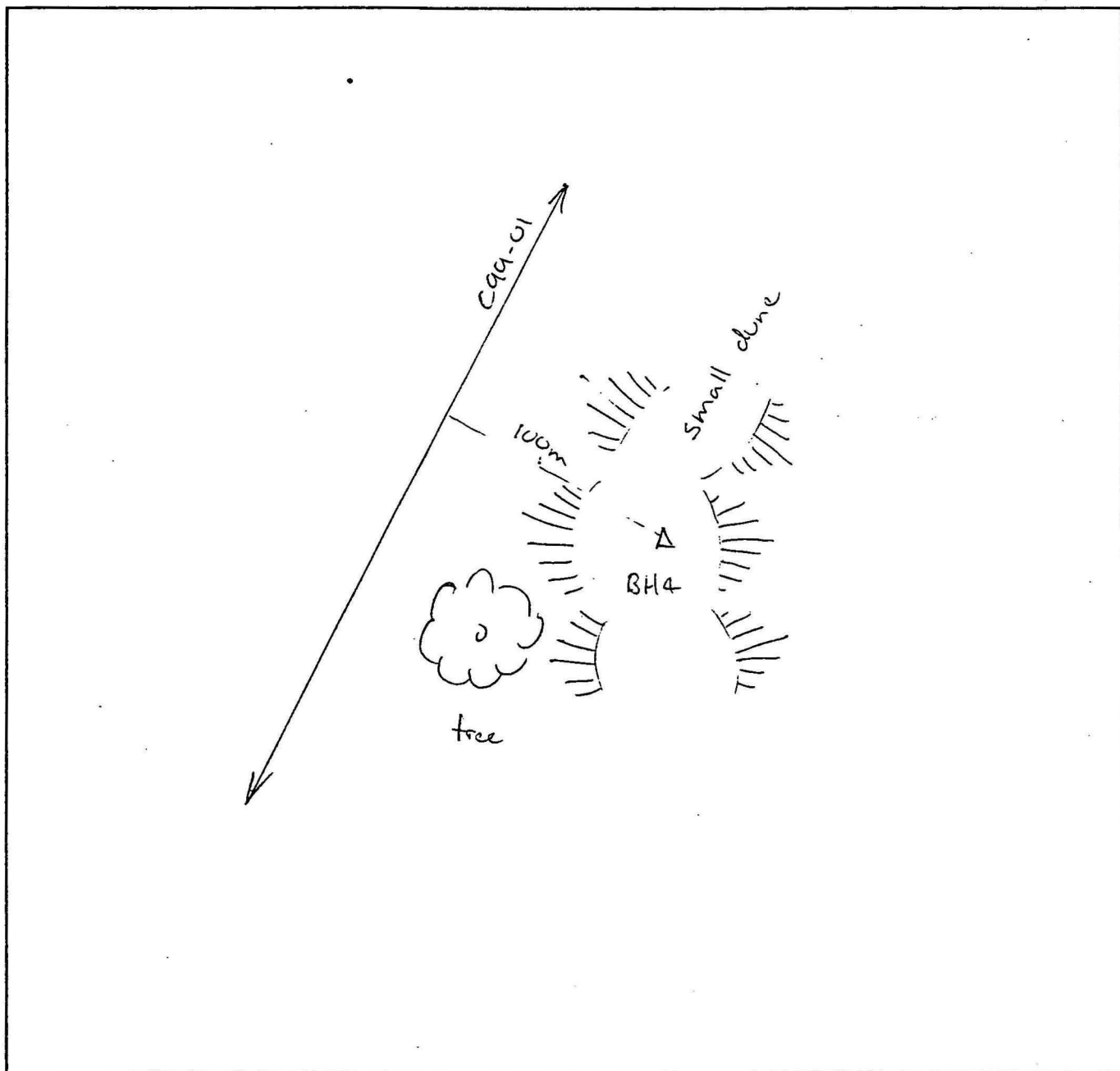
Origin SSM 31900

Mark Type Star Picket



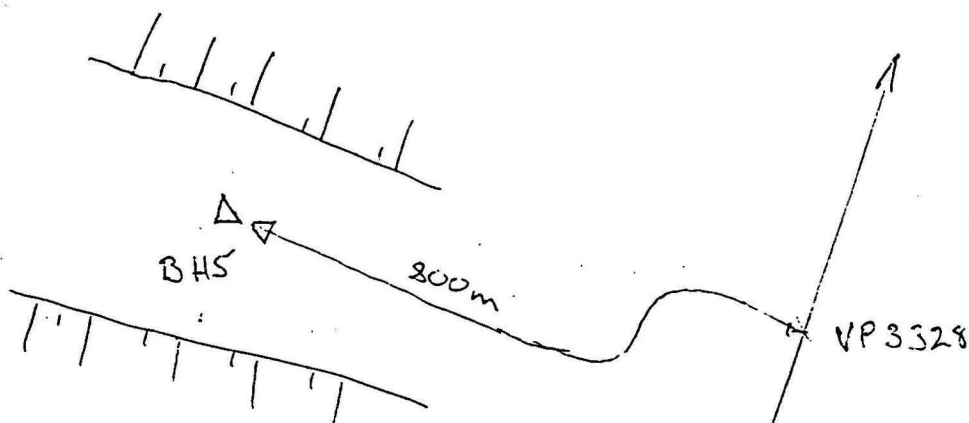
Satellite

Surveys

PROJECT / JOB # 99-02 CLIENT ACSODAY/DATE 032STATION NAME: BH4AREA: Broken HillMAP REFERENCE: SH54-11Horizontal Control DataEasting 599 373.20Northing 6574 154.93Datum AM066Origin SSM 31900Vertical Control DataRL 140.31Datum AHDOrigin SSM 31900Mark Type Star Picket

PROJECT / JOB # 99-02 CLIENT AGSODAY/DATE 035STATION NAME: BHSAREA: Broken HillMAP REFERENCE: SH54-11Horizontal Control DataVertical Control Data

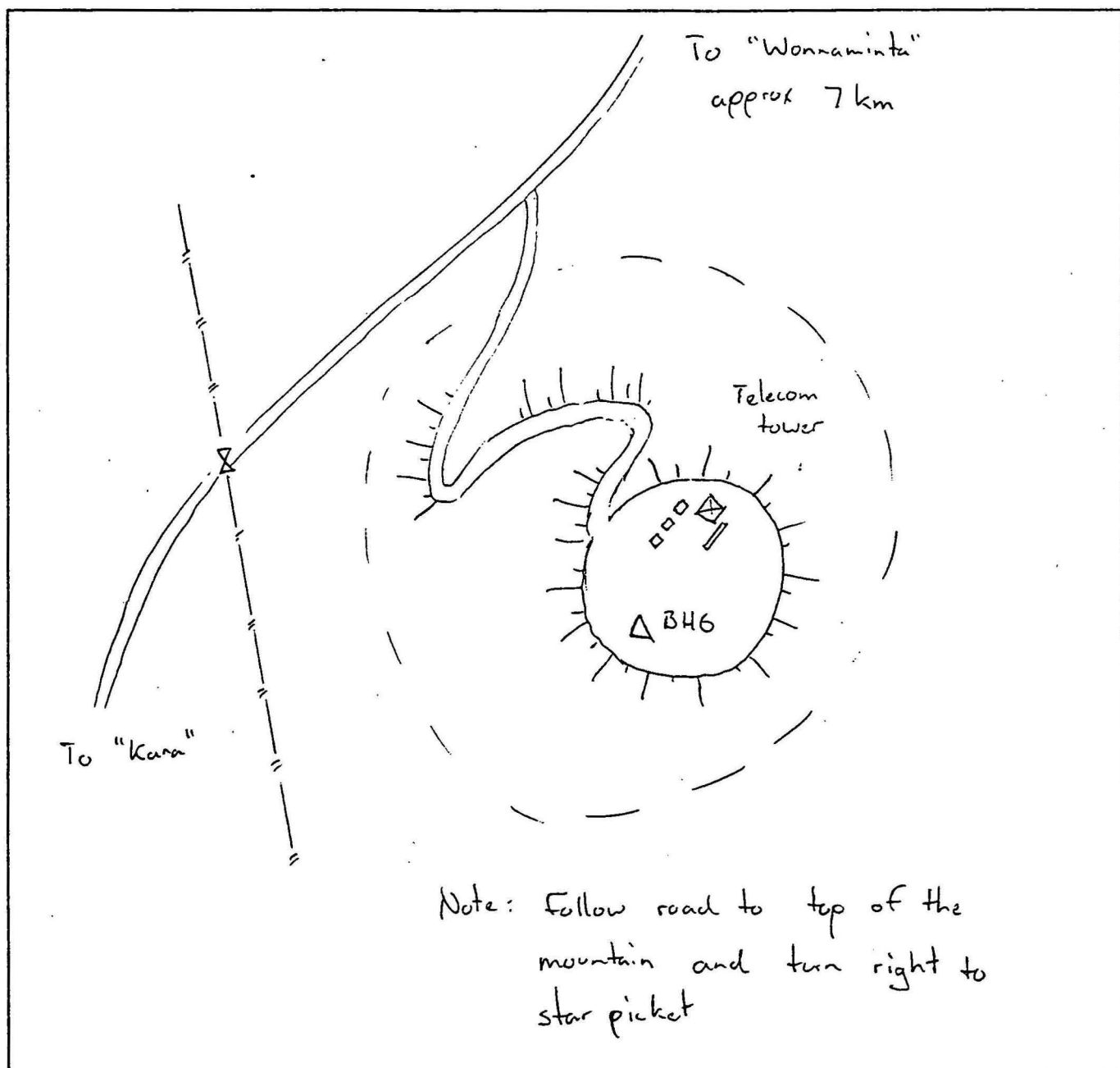
Easting	612 099.06	RL	255.87
Northing	6 590 455.12	Datum	AHD
Datum	AMG66	Origin	SSM 31900
Origin	SSM 31900		

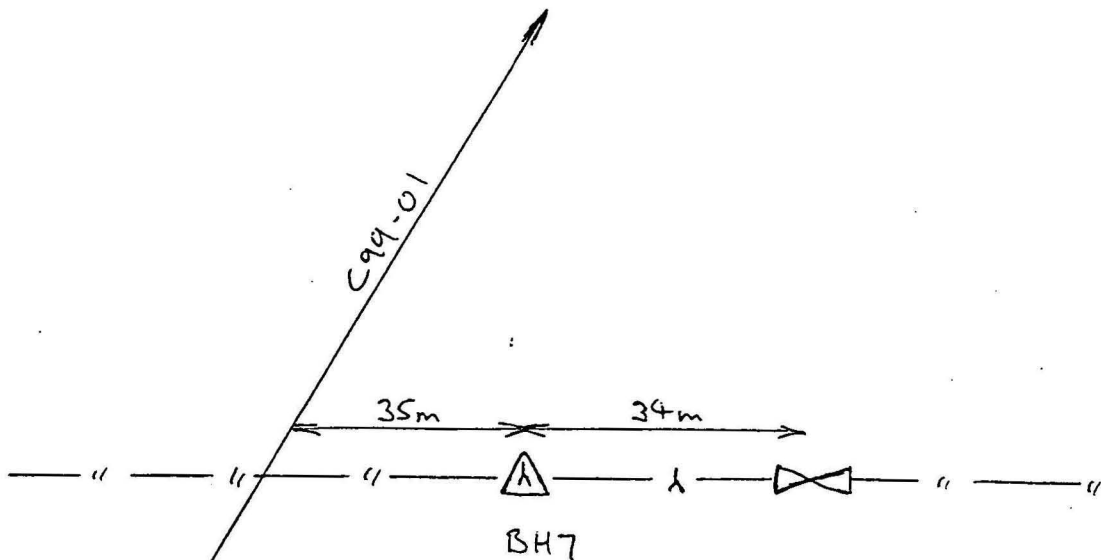
Mark Type Star Picket in Cañon of Rocks

Note: Follow track along
rocky ridge for approximately
800m to BHS
in cañon of rocks.

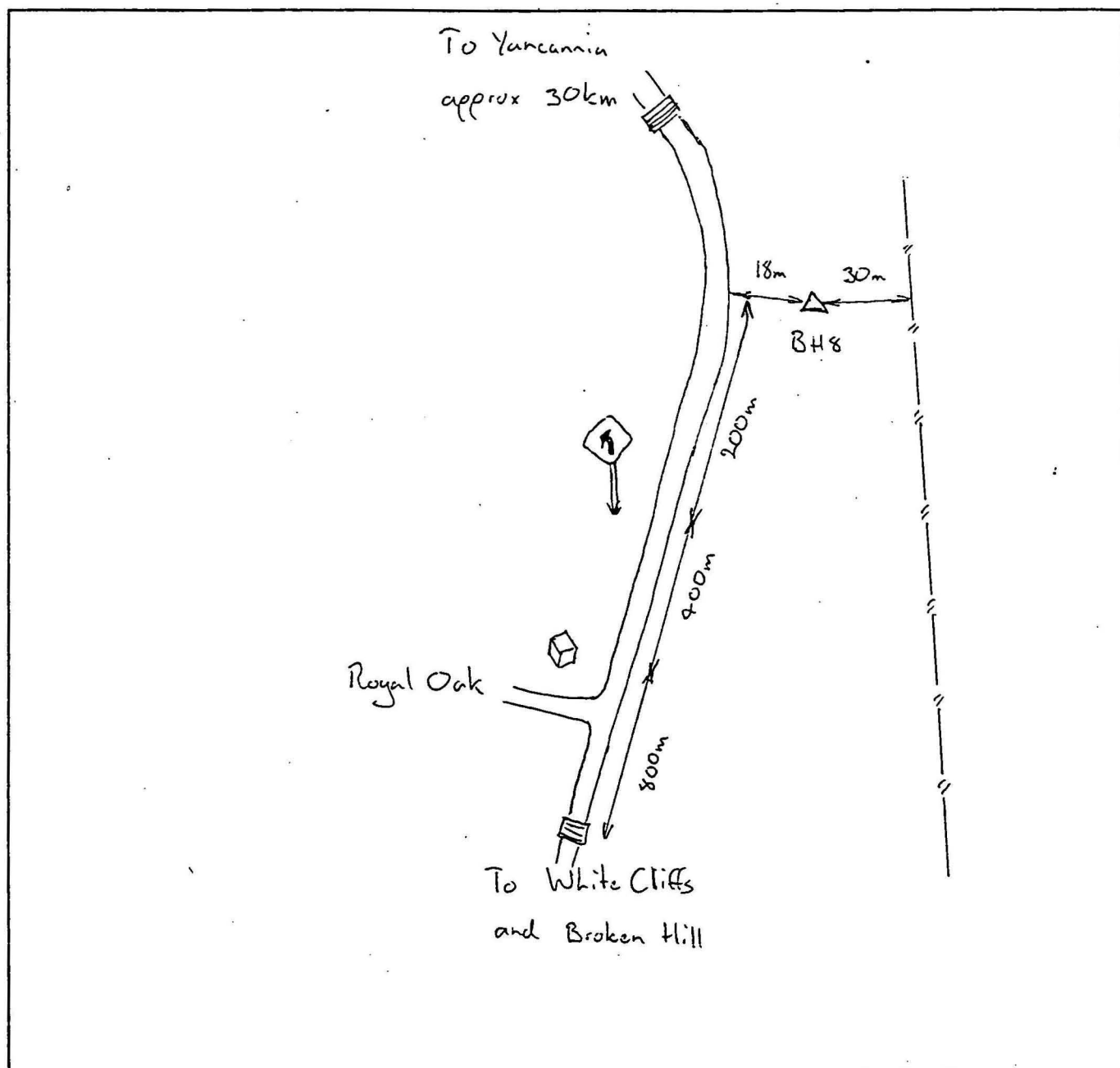
Satellite

Surveys

PROJECT / JOB # 99-02 CLIENT AGSODAY/DATE 037STATION NAME: BH6AREA: Broken HillMAP REFERENCE: SH54-11Horizontal Control DataEasting 624 269.39Northing 6 600 983.23Datum AMG 66Origin SSM 31900Vertical Control DataRL 272.99Datum AHDOrigin SSM 31900Mark Type Star Picket

PROJECT / JOB # 99-02 CLIENT AGSODAY/DATE 037STATION NAME: BH7AREA: Broken HillMAP REFERENCE: SH54-11Horizontal Control DataVertical Control DataEasting 637 765.12RL 183.41Northing 6 608 968.55Datum AHDDatum AMG66Origin SSM 31900Origin SSM 31900Mark Type Star Picket on fence line

Station is the 2nd star picket
along fence from the gate, heading west.

PROJECT / JOB # 99-02 CLIENT AGSODAY/DATE 040STATION NAME: BH8AREA: Broken HillMAP REFERENCE: 7436 KayrunneraHorizontal Control DataEasting 649 703.88Northing 6622 012.71Datum AMG66Origin SSM 31900Vertical Control DataRL 159.91Datum AHDOrigin SSM 31900Mark Type Star Picket

Dynamic

STATION LOCATION DIAGRAM

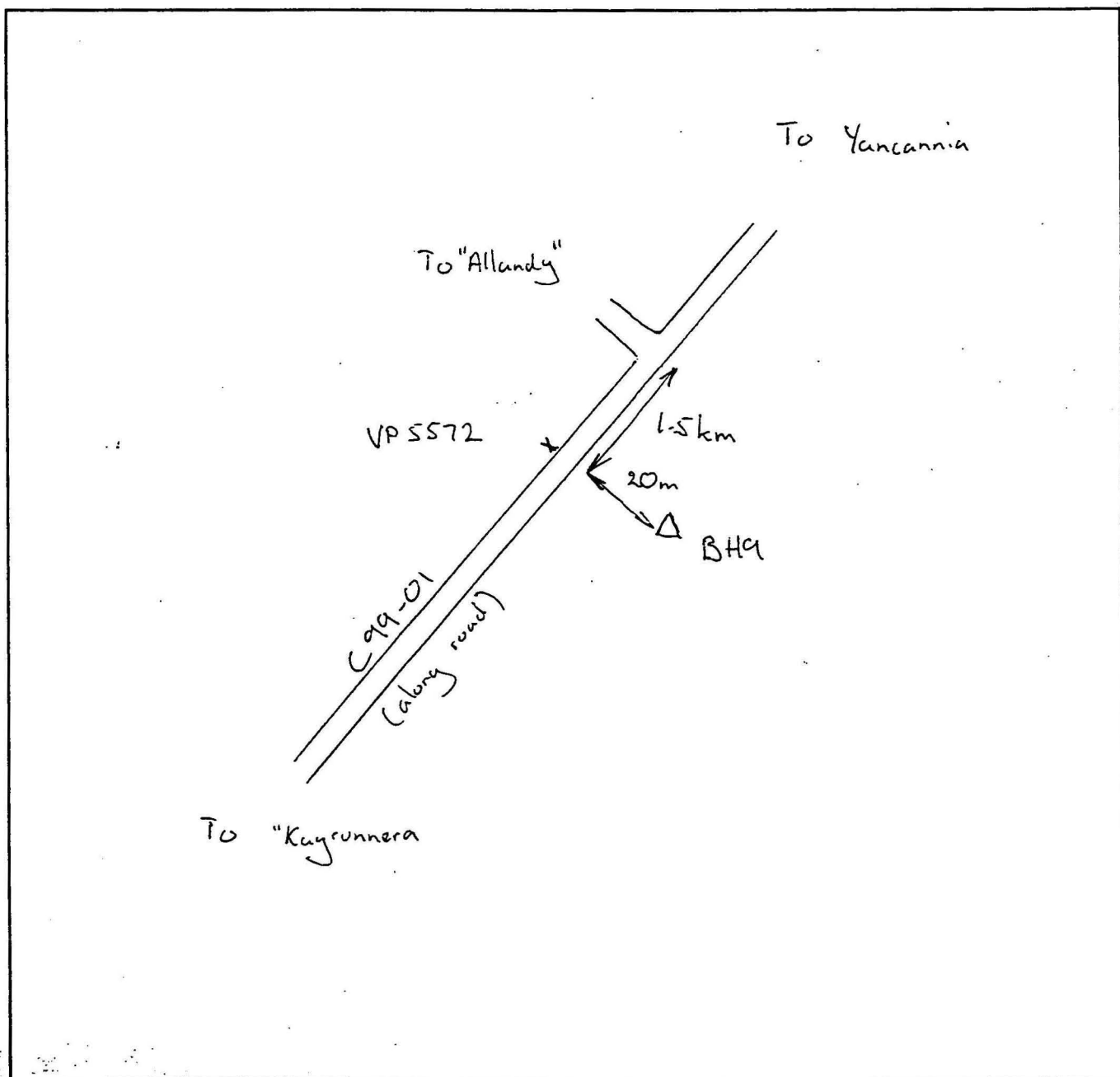
DSS-FF-15

REV 4.0

Nov 1995

Satellite

Surveys

PROJECT / JOB # 99-02 CLIENT AGSODAY/DATE 040STATION NAME: BH9AREA: Broken HillMAP REFERENCE: 7437 YANCANNIAHorizontal Control DataEasting 655 536.19Northing 6 636 915.07Datum AMG66Origin SSM 31900Vertical Control DataRL 136.32Datum AHDOrigin SSM 31900Mark Type Star Picket

Dynamic

Satellite

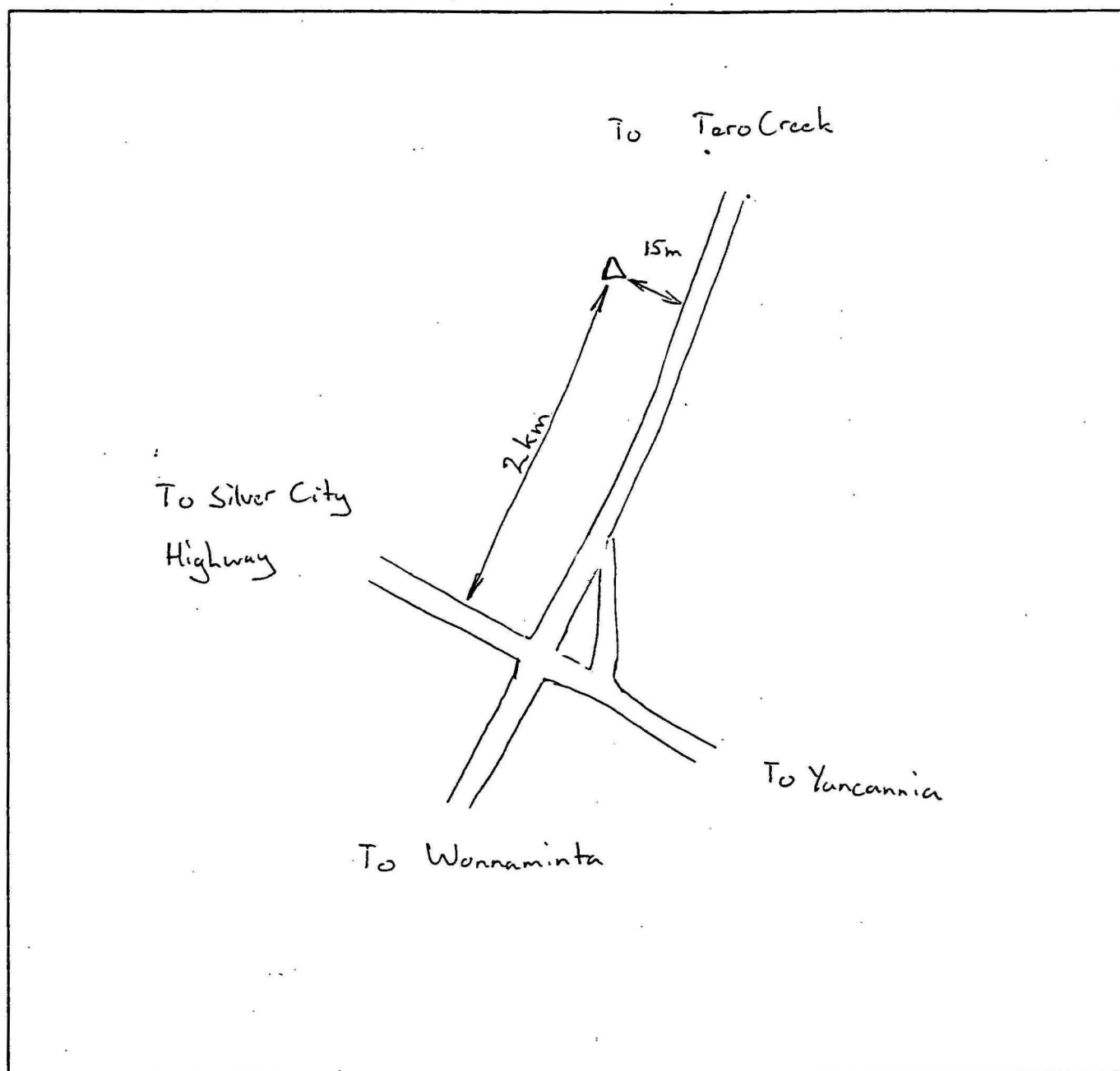
Surveys

STATION LOCATION DIAGRAM

DSS-FF-15

REV 4.0

Nov 1995

PROJECT / JOB # 99-02 CLIENT AUSODAY/DATE 040STATION NAME: BH10AREA: Broken HillMAP REFERENCE: 7437 YancanniaHorizontal Control DataEasting 667 194.49Northing 6 649 376.30Datum AMG66Origin SSM 31900Vertical Control DataRL 110.19Datum AHDOrigin SSM 31900Mark Type Star Picket

Dynamic

Satellite

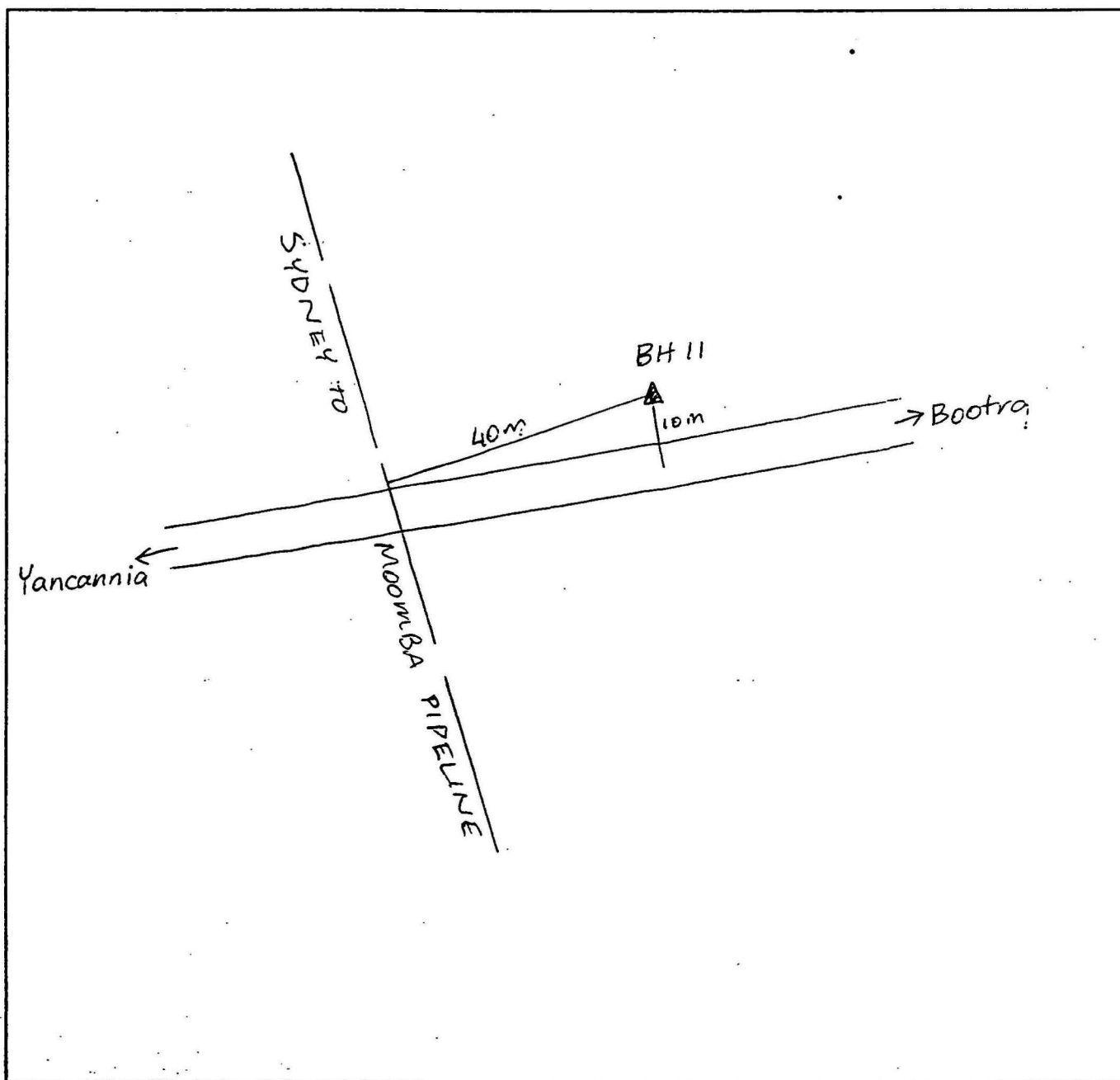
Surveys

STATION LOCATION DIAGRAM

DSS-FF-15

REV 4.0

Nov 1995

PROJECT / JOB # 99-02 CLIENT AGSODAY/DATE 042STATION NAME: BH 11AREA: White CliffsMAP REFERENCE: SH54-12Horizontal Control DataEasting 680 899.564Northing 6 670 484.687Datum AMG 66Origin SSM 31900Vertical Control DataRL 121.991Datum AHDOrigin SSM 31900Mark Type Star Picket

Dynamic

Satellite

Surveys

STATION LOCATION DIAGRAM

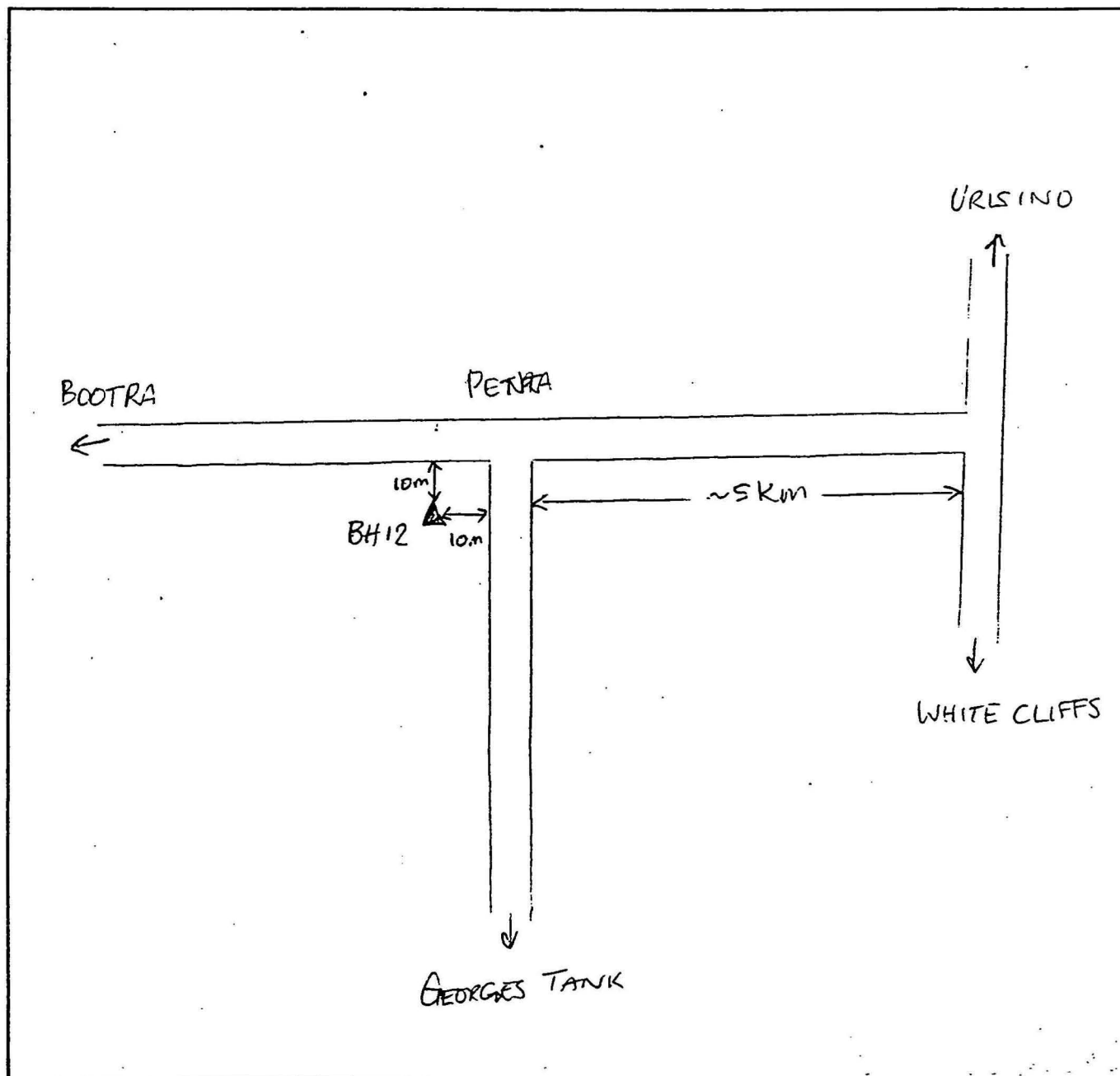
DSS-FF-15

REV 4.0

Nov 1995

PROJECT / JOB # 99-02 CLIENT AGSODAY/DATE 042STATION NAME: BH 12

AREA:

MAP REFERENCE: SH54-12Horizontal Control DataEasting 704 340.444Northing 6670 743.424Datum AMG66Origin SSM 31900Vertical Control DataRL 153.764Datum AHDOrigin SSM 31900Mark Type Star Picket

Dynamic

STATION LOCATION DIAGRAM

DSS-FF-15

REV 4.0

Nov 1995

Satellite

Surveys

PROJECT / JOB # 99-02 CLIENT AGSO

DAY/DATE 042

STATION NAME: BH 13

AREA: White Cliffs

MAP REFERENCE: SH54-8

Horizontal Control Data

Vertical Control Data

Easting 716857.355

RL 144.112

Northing 6697019.416

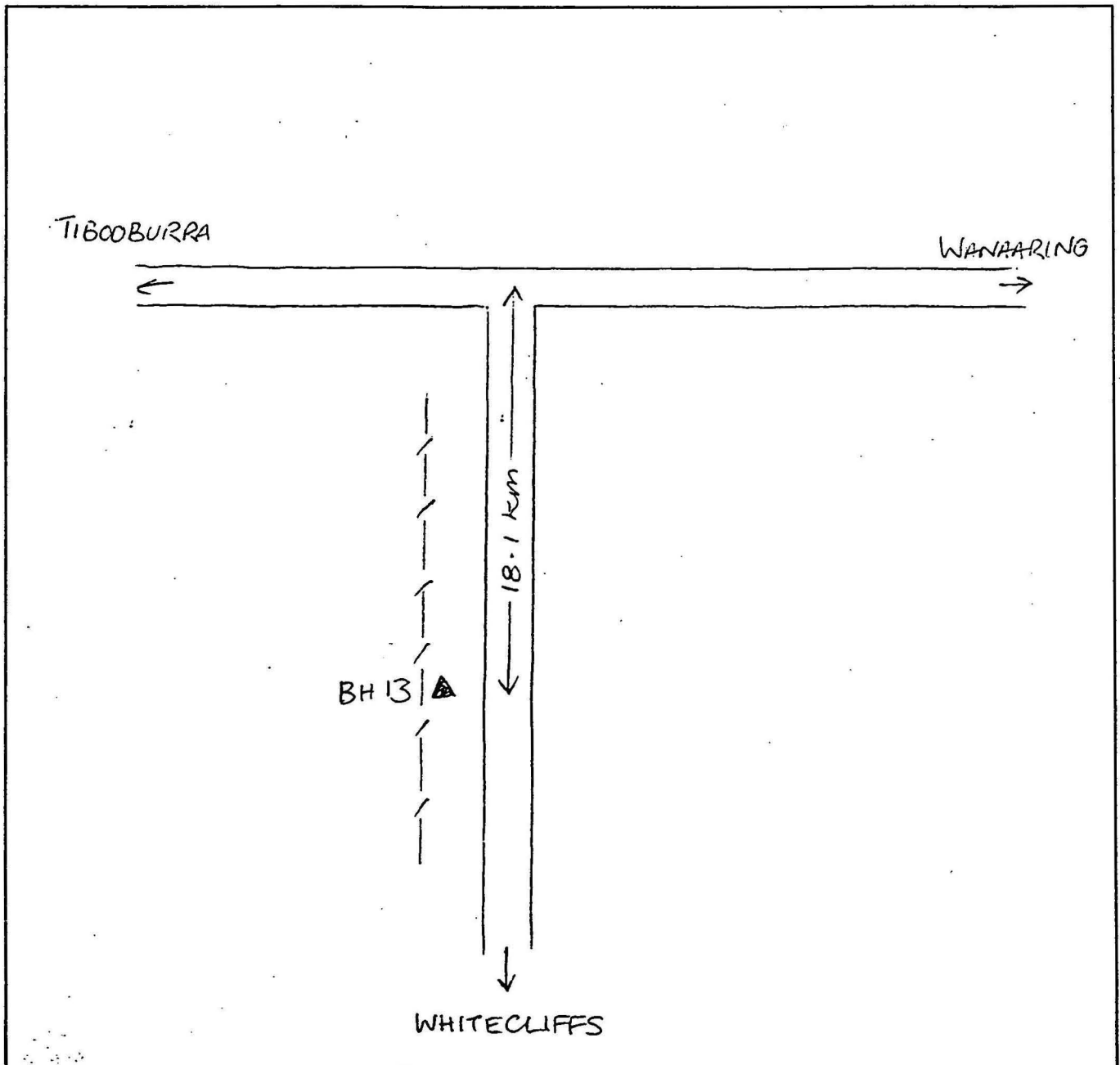
Datum AHD

Datum AMIG 66

Origin SSM 31900

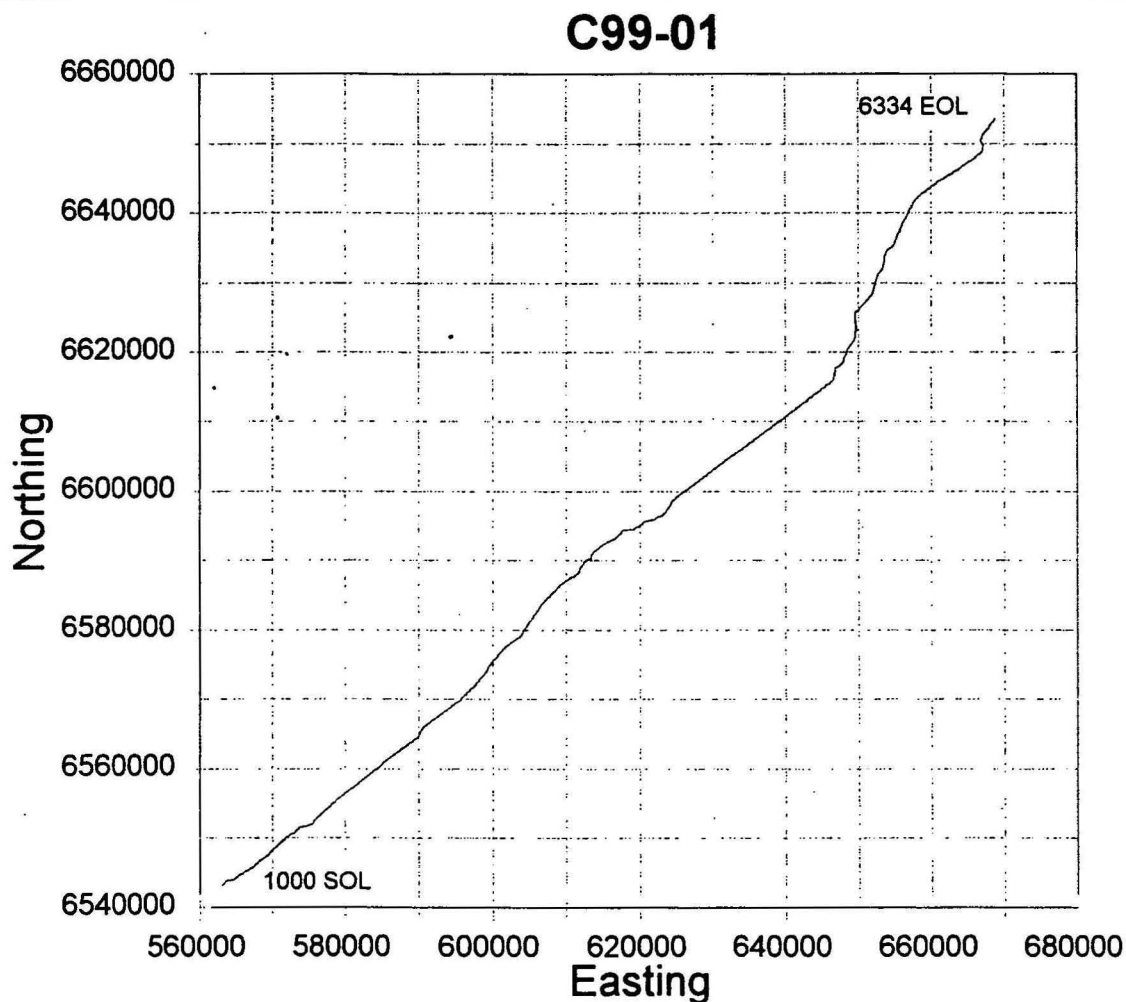
Origin SSM 31900

Mark Type Star Picket

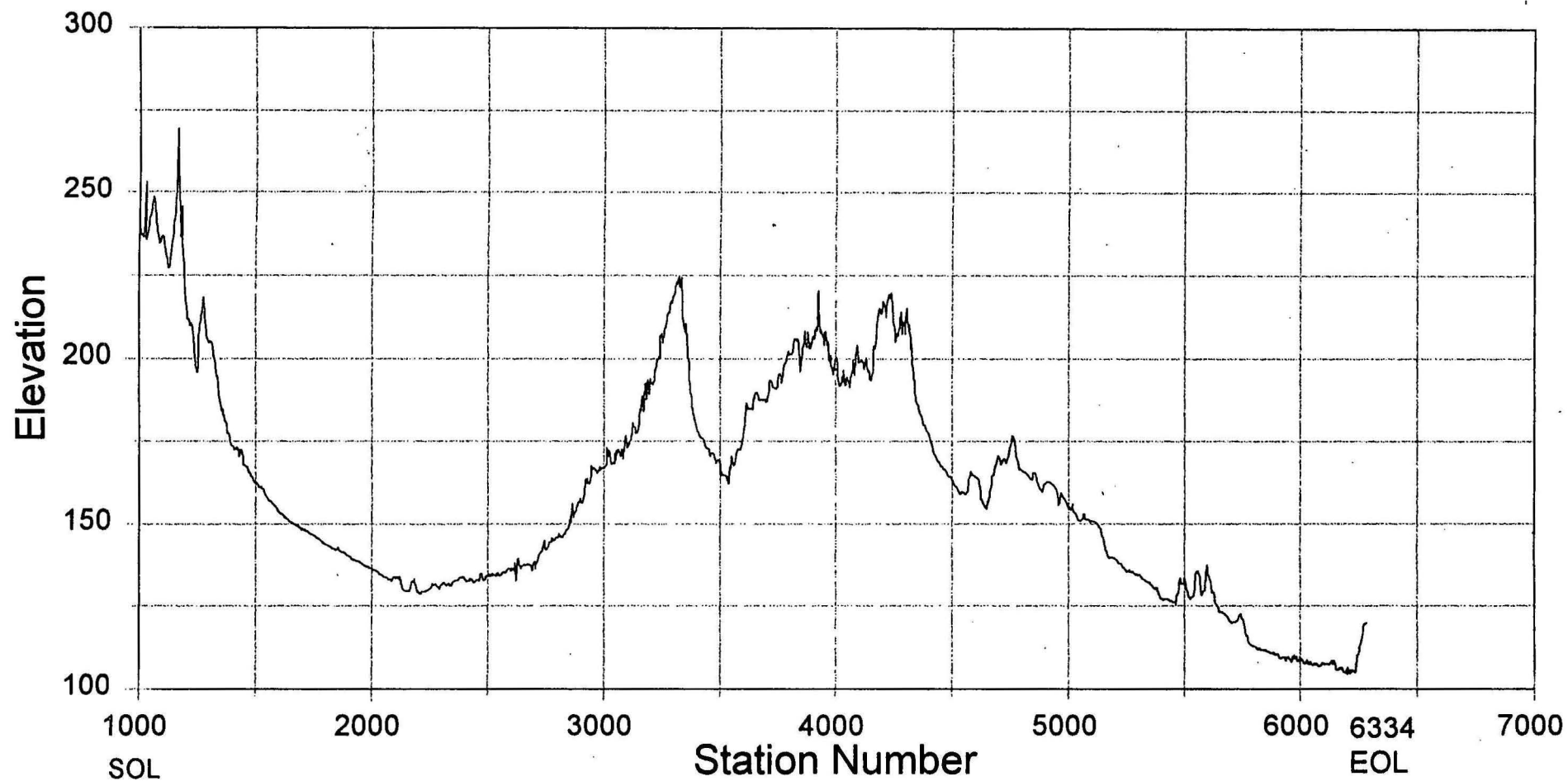


Horizontal and Vertical Profile Plots

Horizontal Plot AMG66 Zone 54



Vertical Plot, AHD
C99-01



Permanent Marker Listing

PERMANENT MARKERS**Coordinates are AMG66 Zone 54 Central Meridian 141°****Heights are AHD, using OSU89 N-value model****Revision 0, 28 February 1999**

Line name	Stn No.	Easting	Northing	Elev.	Comments
C99-01	1000	563172.8	6543310.2	244.3	SOL
C99-01	1167	567311.6	6545844.8	267.4	BH1
C99-01	2315+15	593053.4	6567876.5	130.6	
C99-01	2512+8	597378.0	6571781.4	134.4	
C99-01	2630+6	599421.2	6574600.0	136.5	
C99-01	2825+22	603351.1	6578797.4	145.1	
C99-01	3162	609468.0	6586683.9	177.6	
C99-01	3361	613422.6	6590619.9	208.6	
C99-01	3705	621642.7	6595855.3	187.3	
C99-01	3951	626962.2	6600673.9	210.6	
C99-01	4243+26	633931.6	6605999.3	213.1	
C99-01	4404+23	637729.8	6608970.8	183.4	
C99-01	4619+26	642795.7	6612965.8	165.4	
C99-01	4790	646769.5	6616160.7	176.5	
C99-01	4970+15	648914.5	6620813.0	162.0	
C99-01	5397+20	653479.9	6632178.4	130.6	
C99-01	5854+20	660720.7	6644299.6	111.7	
C99-01	6329	668852.5	6653537.8	119.5	EOL 150M NE

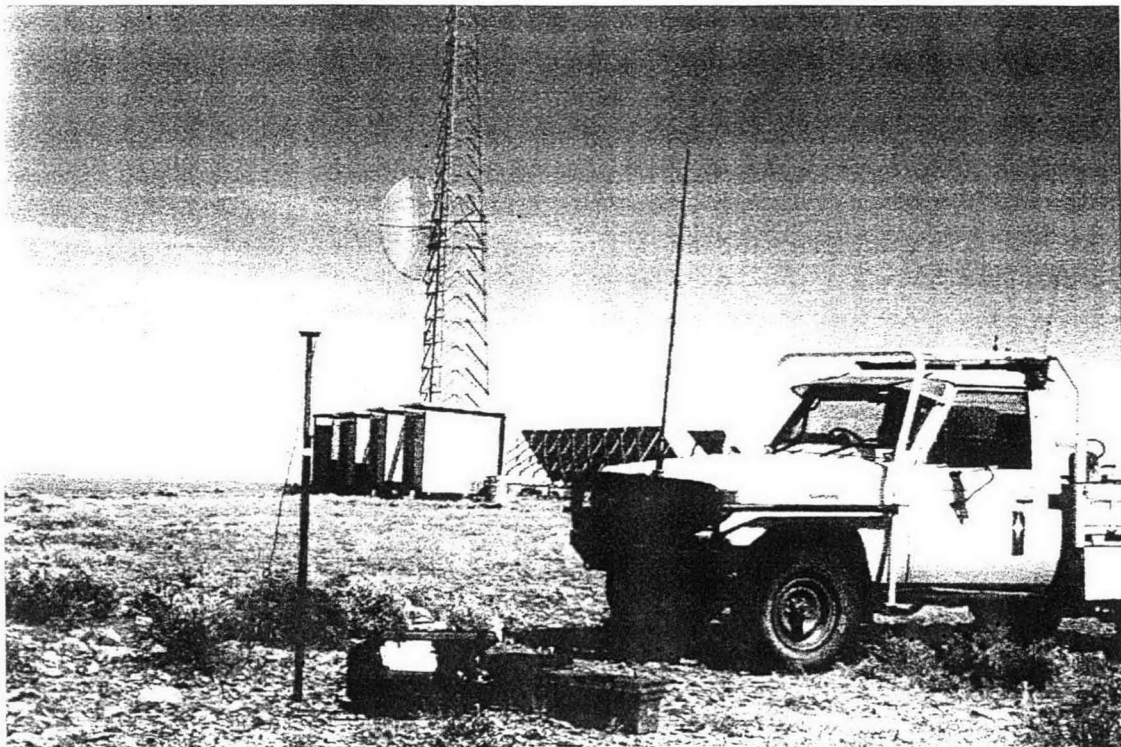
Photographs



BH1



99-02



BH6 and Telstra Tower



DSS Camp

Version: 1.221.

```
----- ARAM24  REPORT -----
System S/N : CRU03809
Client : A.G.S.O.
Contractor : TERRACORP PTY LTD
Crew : 205
Project Name : 1999 CABGAS S.S.
Area Name : BROKEN HILL, N.S.W.
Observer : JAMES BUTCHER
```

LEGEND:

```
----- LEGEND -----
R-Line Receiver line name
RAM Location Remote unit located between the two field flag numbers listed
Batt Volts Current battery voltage
S/N Remote unit's serial number
LIU System LIU or line interface to which the RAM is connected
RAM Remote unit's logical sequence # on this LIU starting at the CRU
TAP Line Tap unit's logical sequence # on this LIU starting at the CRU
Flag Field flag number

Median Median Value of 'Measurements', not including 'N/A', 'OPEN' or 'SHORT'
Tolerance Minimum or Maximum Acceptable Value or Allowable (%) Variation about Median Value
```

```
----- Channel Tests -----
MK Ram Type (#) as per Serial Number
dc DC Offset of Full Band Noise Test (nV)
Full Full Band EIN <3 Hz -> Nyquist (uV) (Evaluated for s/n 4437 and above)
EIN Channel Equivalent Input Noise <5 -> 130 Hz (uV)
L/C Attenuation at Analog Low cut Frequency (dB)
High Impulse Response Highcut Frequency (Hz)
Pass Band Maximum Pass Band Variance from model (dB)
Roll Percent Variation of Roll-Off in Transition Region
Gain Percent Variation of Gain Accuracy Test (%) (Calculated for Low Gain and s/n 4437 and above)
THD Total Harmonic Distortion (%) Internal Source
Clock Combined Accuracy of LDO & RAM Clocks (ppm)
XFD Cross Feed Rejection Ratio (dB)
CMR Common Mode Rejection Ratio (dB)
```

```
----- Phone Tests -----
TP Phone Type (#) as per the Phone Allocations
Noise Phone Noise (uV)
Resis Geophone ARRAY Resistance (ohm), may show as 'OPEN' or 'SHORT'
Pulse Percent Variation of Phone Pulse from Pulse Average
Freq Geophone ELEMENT Natural Frequency (Hz)
Damp Geophone ELEMENT Open Circuit Damping (%)
Sens Geophone ELEMENT Open Circuit Sensitivity (V/M/S) or (V/in/S)
Leak Leakage to Ground (M Ohms)
THD Total Harmonic Distortion (%)
XFD Cross Feed Rejection Ratio (dB)
Imped Geophone ARRAY Impedance (Ohm)
```

```
----- RECORDING PARAMETERS -----
Date and Time: Tue Feb 02 09:58:04 1999
```

```
Project File C9901A.BIN
MKII RAMS
Gain 24 dB
Low Cut Filter 3 Hz
High Cut Filter 205 Hz
Input Sample Rate 500 Hz
Output Sample Rate 500 Hz
Max RAMS per LIU 48
```

----- CHANNEL PARAMETERS -----

```
THD Frequency (Hz) & Attenuation (dB) 11.0 ( 2.0)
CMR Frequency (Hz) & Attenuation (dB) 11.0 ( 2.0)
XFD Frequency (Hz) & Attenuation (dB) 40.0 ( 2.0)
```

Analog Line Report				CHANNEL INFORMATION													
R-Line	RAM Location	Battery V	S/N LIU RAM	Flag	MK	dc nV	Fu1 uV	EIN uV	L/C dB	High Hz	Pass Hz	Roll X	Gain X	THD X	Clock ppm	CMR dB	XFD dB
Tolerance: 2		24.0			2	N/A	<0.36	<0.30	<5%	<1x	<0.200	<1x	<1x	<0.00060x	<10.0	>85	>100
Median		25.2				0.5	0.24	0.19		204.3	0.001	0.01	0.11	0.00011	0.7	106	127
/C99-01A	-/100	25.3	5598L 1	1	100	1.0	0.24	0.20		204.3	0.001	0.01	0.01	0.00012	0.6	102	129
					101	0.1	0.24	0.20		204.3	0.001	0.01	0.01	0.00010	0.6	107	125
					102	1.5	0.24	0.19		204.3	0.001	0.00	0.08	0.00010	0.6	110	128
					103	0.0	0.23	0.18		204.3	0.001	0.00	0.21	0.00012	0.6	111	126
C99-01A	107/108	25.3	5611R 1	2	104	0.3	0.25	0.21		204.3	0.001	0.01	0.00	0.00012	0.7	107	128
					105	1.1	0.25	0.21		204.3	0.001	0.01	0.17	0.00012	0.7	107	124
					106	0.8	0.25	0.20		204.3	0.001	0.01	0.11	0.00013	0.7	113	128
					107	0.1	0.25	0.20		204.3	0.001	0.00	0.14	0.00012	0.7	100	126
					108	0.3	0.24	0.19		204.3	0.001	0.01	0.16	0.00010	0.7	108	127
					109	2.4	0.24	0.20		204.3	0.001	0.01	0.33	0.00011	0.7	96	126
					110	0.8	0.24	0.20		204.3	0.001	0.01	0.01	0.00011	0.7	111	130
C99-01A	115/116	25.3	5590L 1	3	111	0.4	0.24	0.20		204.3	0.001	0.01	0.01	0.00010	0.7	107	133
					112	0.6	0.23	0.19		204.3	0.001	0.01	0.03	0.00010	0.8	102	128
					113	0.4	0.25	0.20		204.3	0.001	0.00	0.09	0.00012	0.8	100	128
					114	0.3	0.24	0.19		204.3	0.001	0.00	0.14	0.00010	0.8	101	127
					115	0.9	0.24	0.19		204.3	0.001	0.01	0.10	0.00010	0.8	106	121
					116	0.4	0.24	0.19		204.3	0.001	0.00	0.08	0.00009	0.8	111	129
					117	0.0	0.23	0.19		204.3	0.001	0.00	0.21	0.00009	0.8	105	124
					118	1.0	0.23	0.18		204.3	0.001	0.02	0.06	0.00012	0.8	106	127
C99-01A	123/124	25.3	5589R 1	4	119	0.0	0.23	0.18		204.3	0.001	0.00	0.04	0.00010	0.8	102	128
					120	1.2	0.23	0.19		204.3	0.001	0.01	0.00	0.00012	0.4	103	128
					121	0.3	0.25	0.20		204.3	0.001	0.01	0.03	0.00012	0.4	103	127
					122	0.1	0.23	0.19		204.3	0.001	0.01	0.17	0.00013	0.4	96	128
					123	0.9	0.23	0.19		204.3	0.001	0.01	0.04	0.00012	0.4	104	130
					124	0.1	0.23	0.18		204.3	0.001	0.00	0.04	0.00013	0.4	107	124
					125	0.8	0.24	0.19		204.3	0.001	0.01	0.05	0.00013	0.4	101	128
					126	0.3	0.22	0.18		204.3	0.001	0.01	0.06	0.00013	0.4	99	128
C99-01A	131/132	25.3	5612L 1	5	127	0.4	0.23	0.19		204.3	0.001	0.01	0.02	0.00012	0.4	109	131
					128	1.1	0.26	0.21		204.3	0.001	0.00	0.38	0.00010	1.5	94	132
					129	1.4	0.25	0.20		204.3	0.001	0.01	0.28	0.00010	1.5	106	137
					130	0.2	0.24	0.20		204.3	0.001	0.00	0.02	0.00010	1.5	101	134
					131	0.3	0.25	0.20		204.3	0.001	0.01	0.12	0.00011	1.5	103	133
					132	0.6	0.24	0.19		204.3	0.001	0.01	0.09	0.00010	1.5	109	127
					133	1.1	0.24	0.20		204.3	0.001	0.03	0.05	0.00011	1.5	105	127
					134	0.4	0.24	0.20		204.3	0.001	0.00	0.11	0.00009	1.5	106	122
C99-01A	139/140	25.2	5588L 1	6	135	1.0	0.24	0.20		204.3	0.001	0.00	0.00	0.00011	1.5	111	127
					136	0.7	0.24	0.20		204.3	0.001	0.01	0.23	0.00011	0.7	102	133
					137	0.3	0.23	0.19		204.3	0.001	0.01	0.10	0.00011	0.7	102	127
					138	0.7	0.23	0.18		204.3	0.001	0.00	0.01	0.00011	0.7	99	130
					139	0.5	0.24	0.19		204.3	0.001	0.01	0.20	0.00010	0.7	102	124
					140	1.2	0.25	0.20		204.3	0.001	0.00	0.03	0.00010	0.7	112	130
					141	0.4	0.24	0.19		204.3	0.001	0.01	0.02	0.00011	0.7	111	125
					142	0.1	0.24	0.19		204.3	0.001	0.01	0.07	0.00010	0.7	109	124
C99-01A	147/148	25.2	5613R 1	7	143	0.3	0.24	0.20		204.3	0.001	0.01	0.05	0.00010	0.7	103	126
					144	0.6	0.24	0.20		204.3	0.001	0.01	0.12	0.00013	1.0	109	127
					145	0.3	0.25	0.19		204.3	0.001	0.01	0.36	0.00011	1.0	112	122
					146	0.7	0.25	0.21		204.3	0.001	0.01	0.19	0.00013	1.0	102	124
					147	1.0	0.25	0.21		204.3	0.001	0.01	0.07	0.00013	1.0	108	128
					148	1.0	0.25	0.21		204.3	0.001	0.00	0.14	0.00014	1.0	102	125
					149	1.3	0.25	0.20		204.3	0.001	0.01	0.14	0.00012	1.0	109	127
					150	0.7	0.25	0.21		204.3	0.001	0.00	0.12	0.00013	1.0	102	137
C99-01A	155/156	25.1	5587R 1	8	151	0.4	0.24	0.20		204.3	0.001	0.02	0.01	0.00011	0.8	103	128
					152	1.3	0.24	0.20		204.3	0.001	0.01	0.13	0.00011	0.8	105	124
					153	0.8	0.23	0.17		204.3	0.001	0.01	0.18	0.00011	0.8	107	128
					154	0.0	0.25	0.19		204.3	0.001	0.00	0.25	0.00012	0.8	100	122
					155	0.0	0.23	0.19		204.3	0.001	0.00	0.10	0.00010	0.8	102	124
					156	0.0	0.23	0.18		204.3	0.001	0.00	0.02	0.00010	0.8	109	126
					157	0.3	0.24	0.20		204.3	0.001	0.01	0.02	0.00010	0.8	107	128
					158	0.4	0.24	0.20		204.3	0.001	0.01	0.22	0.00012	0.8	105	122
C99-01A	163/164	25.3	5583R 1	9	159	0.0	0.24	0.19		204.3	0.001	0.00	0.05	0.00010	0.8	100	122
					160	0.0	0.24	0.19		204.3	0.001	0.00	0.02	0.00009	0.4	100	124
					161	0.0	0.24	0.19		204.3	0.001	0.01	0.31	0.00009	0.4	102	124
					162	1.1	0.25	0.21		204.3	0.001	0.01	0.20	0.00010	0.4	108	125
					163	2.0	0.24	0.19		204.3	0.001	0.01	0.37	0.00010	0.4	97	127
					164	0.0	0.24	0.19		204.3	0.001	0.00	0.05	0.00009	0.4	98	125
					165	0.0	0.24	0.19		204.3	0.001	0.00	0.19	0.00009	0.4	108	127
					166	1.2	0.24	0.19		204.3	0.001	0.00	0.33	0.00009	0.4	104	128
					167	0.9	0.25	0.20		204.3	0.001	0.01	0.40	0.00010	0.4	103	128

C99-01A	171/172	25.2	5586R	1	10
C99-01A	179/180	25.2	5593R	1	11
C99-01A	187/188	25.3	5584R	1	12
C99-01A	195/196	25.3	5594R	1	13
C99-01A	203/204	25.3	5581R	1	14
AUX	-/-	24.9	5600R	5	1
AUX	-/-	24.9	5600R	5	1
AUX	-/-	24.9	5600R	5	1
AUX	-/-	24.9	5600R	5	1
AUX	-/-	24.9	5600R	5	1

[illegible]

Version: 1.221.

```
----- ARAM24  REPORT -----
System S/N : CRU03809
Client : A.G.S.O.
Contractor : TERRACORP PTY LTD
Crew : 205
Project Name : 1999 CABGAS S.S.
Area Name : BROKEN HILL, N.S.W.
Observer : JAMES BUTCHER
```

LEGEND:

```
----- LEGEND -----
R-Line Receiver line name
RAM Location Remote unit located between the two field flag numbers listed
Batt Volts Current battery voltage
S/N Remote unit's serial number
LIU System LIU or line interface to which the RAM is connected
RAM Remote unit's logical sequence # on this LIU starting at the CRU
TAP Line Tap unit's logical sequence # on this LIU starting at the CRU
Flag Field flag number

Median Median Value of 'Measurements', not including 'N/A', 'OPEN' or 'SHORT'
Tolerance Minimum or Maximum Acceptable Value or Allowable (X) Variation about Median Value
```

```
----- Channel Tests -----
MK Ram Type (#) as per Serial Number
dc DC Offset of Full Band Noise Test (nV)
Full Full Band EIN <3 Hz -> Nyquist (uV) (Evaluated for s/n 4437 and above)
EIN Channel Equivalent Input Noise <5 -> 150 Hz (uV)
L/C Attenuation at Analog Low cut Frequency (dB)
High Impulse Response Highcut Frequency (Hz)
Pass Band Maximum Pass Band Variance from model (dB)
Roll Percent Variation of Roll-Off in Transition Region
Gain Percent Variation of Gain Accuracy Test (X) (Calculated for Low Gain and s/n 4437 and above)
THD Total Harmonic Distortion (X), Internal Source
Clock Combined Accuracy of LDO & RAM Clocks (ppm)
XFD Cross Feed Rejection Ratio (dB)
CMR Common Mode Rejection Ratio (dB)
```

```
----- Phone Tests -----
TP Phone Type (#) as per the Phone Allocations
Noise Phone Noise (uV)
Resis Geophone ARRAY Resistance (ohm), may show as 'OPEN' or 'SHORT'
Pulse Percent Variation of Phone Pulse from Pulse Average
Freq Geophone ELEMENT Natural Frequency (Hz)
Damp Geophone ELEMENT Open Circuit Damping (X)
Sens Geophone ELEMENT Open Circuit Sensitivity (V/M/S) or (V/in/S)
Leak Leakage to Ground (M Ohms)
THD Total Harmonic Distortion (X)
FD Cross Feed Rejection Ratio (dB)
ped Geophone ARRAY Impedance (Ohm)
```

----- RECORDING PARAMETERS -----
Date and Time: Wed Feb 03 15:58:20 1999

```
Project File: EXPL.BIN
MKII RAMS
Gain 30 dB
Low Cut Filter 3 Hz
High Cut Filter 205 Hz
Input Sample Rate 500 Hz
Output Sample Rate 500 Hz
Max RAMS per LIU 48
```

----- CHANNEL PARAMETERS -----

```
THD Frequency (Hz) & Attenuation (dB) 11.0 ( 2.0)
CMR Frequency (Hz) & Attenuation (dB) 11.0 ( 2.0)
XFD Frequency (Hz) & Attenuation (dB) 40.0 ( 2.0)
```


Analog Line Report				(CHANNEL INFORMATION)															
R-Line	RAM Location	Battery V	S/N LIU RAM	Flag	MK	dc nV	Full uV	EIN uV	L/C dB	High Hz	Pass Hz	Roll %	Gain %	THD %	Clock ppm	CMR dB	XFD dB		
Tolerance: 2		24.0			2	N/A	<0.28	<0.20	<5%	<1%	<0.200	<1%	<1%	<0.00060X	10.0	>85	>100		
Median		25.2				0.3	0.19	0.16		204.3	0.001	0.00	0.09	0.00015	1.1	107	125		
C99-01	-/2220	25.0	5604R.1	1	2220	0.6	0.19	0.15		204.3	0.001	0.01	0.02	0.00015	0.1	108	122		
					2221	0.5	0.20	0.16		204.3	0.001	0.01	0.07	0.00017	0.1	114	123		
					2222	0.4	0.18	0.15		204.3	0.001	0.01	0.11	0.00015	0.1	109	126		
					2223	0.1	0.19	0.15		204.3	0.001	0.00	0.02	0.00015	0.1	102	128		
					2224	0.6	0.20	0.16		204.3	0.001	0.01	0.07	0.00015	1.6	113	126		
					2225	0.1	0.20	0.16		204.3	0.001	0.00	0.12	0.00016	1.6	117	128		
					2226	0.7	0.20	0.16		204.3	0.001	0.01	0.00	0.00013	1.6	101	128		
					2227	0.1	0.21	0.16		204.3	0.001	0.01	0.12	0.00016	1.6	102	129		
					2228	1.1	0.20	0.16		204.3	0.001	0.00	0.09	0.00013	1.6	105	129		
					2229	0.9	0.21	0.16		204.3	0.001	0.00	0.09	0.00015	1.6	113	126		
					2230	0.4	0.20	0.16		204.3	0.001	0.00	0.14	0.00013	1.6	107	121		
C99-01	2235/2236	25.2	5572R.1	3	2231	0.8	0.19	0.15		204.3	0.001	0.00	0.06	0.00017	1.6	106	124		
					2232	0.4	0.19	0.15		204.3	0.001	0.00	0.01	0.00014	1.9	102	127		
					2233	0.1	0.20	0.16		204.3	0.001	0.00	0.16	0.00013	1.9	115	123		
					2234	0.6	0.19	0.16		204.3	0.001	0.00	0.06	0.00013	1.9	115	127		
					2235	0.3	0.19	0.16		204.3	0.001	0.01	0.11	0.00014	1.9	107	127		
					2236	0.4	0.20	0.16		204.3	0.001	0.01	0.11	0.00013	1.9	118	127		
					2237	1.1	0.19	0.16		204.3	0.001	0.00	0.06	0.00015	1.9	104	127		
					2238	0.2	0.20	0.16		204.3	0.001	0.00	0.16	0.00018	1.9	115	124		
C99-01	2243/2244	25.2	5603R.1	4	2239	0.7	0.20	0.15		204.3	0.001	0.00	0.04	0.00014	1.1	106	129		
					2240	1.1	0.21	0.17		204.3	0.001	0.00	0.29	0.00015	0.0	105	105		
					2241	0.9	0.19	0.16		204.3	0.001	0.00	0.10	0.00015	0.0	110	120		
					2242	0.4	0.20	0.16		204.3	0.001	0.00	0.04	0.00014	0.0	121	121		
					2243	0.3	0.20	0.16		204.3	0.001	0.00	0.01	0.00014	0.0	100	121		
					2244	0.4	0.19	0.16		204.3	0.001	0.00	0.21	0.00015	0.0	105	105		
					2245	0.5	0.20	0.16		204.3	0.001	0.00	0.18	0.00014	0.0	114	114		
					2246	0.2	0.20	0.16		204.3	0.001	0.01	0.16	0.00016	0.0	103	111		
C99-01	2251/2252	25.2	5582R.1	5	2247	0.1	0.20	0.16		204.3	0.001	0.00	0.16	0.00014	0.0	111	111		
					2248	0.8	0.20	0.16		204.3	0.001	0.00	0.04	0.00013	0.0	103	103		
					2249	0.2	0.19	0.16		204.3	0.001	0.00	0.03	0.00014	0.0	116	116		
					2250	0.0	0.20	0.16		204.3	0.001	0.00	0.37	0.00014	0.0	105	105		
					2251	1.1	0.20	0.16		204.3	0.001	0.01	0.04	0.00014	0.0	103	103		
					2252	0.3	0.19	0.16		204.3	0.001	0.00	0.05	0.00014	0.0	118	118		
					2253	0.5	0.19	0.16		204.3	0.001	0.00	0.03	0.00014	0.0	115	115		
					2254	0.0	0.19	0.16		204.3	0.001	0.01	0.05	0.00014	0.0	102	102		
C99-01	2259/2260	25.3	5591R.1	6	2255	0.2	0.19	0.16		204.3	0.001	0.00	0.45	0.00014	0.0	104	104		
					2256	0.0	0.19	0.16		204.3	0.001	0.00	0.14	0.00016	1.7	104	104		
					2257	0.7	0.19	0.16		204.3	0.001	0.00	0.04	0.00014	1.7	112	112		
					2258	0.6	0.19	0.16		204.3	0.001	0.00	0.03	0.00014	1.7	104	104		
					2259	0.4	0.19	0.16		204.3	0.001	0.01	0.03	0.00014	1.7	97	97		
					2260	0.0	0.21	0.17		204.3	0.001	0.00	0.22	0.00014	1.7	102	102		
					2261	0.1	0.20	0.16		204.3	0.001	0.00	0.08	0.00014	1.7	98	98		
					2262	0.1	0.19	0.16		204.3	0.001	0.01	0.03	0.00014	1.7	105	105		
C99-01	2267/2268	25.2	5573R.1	7	2263	0.6	0.19	0.16		204.3	0.001	0.00	0.05	0.00014	1.7	103	103		
					2264	0.3	0.19	0.16		204.3	0.001	0.01	0.04	0.00014	1.7	106	106		
					2265	0.1	0.20	0.16		204.3	0.001	0.01	0.24	0.00017	1.7	103	103		
					2266	0.3	0.19	0.16		204.3	0.001	0.00	0.10	0.00016	1.7	100	100		
					2267	0.1	0.19	0.16		204.3	0.001	0.01	0.07	0.00015	1.7	108	108		
					2268	0.0	0.19	0.16		204.3	0.001	0.00	0.18	0.00016	1.7	114	114		
					2269	0.6	0.20	0.16		204.3	0.001	0.00	0.03	0.00015	1.7	109	109		
					2270	0.2	0.20	0.16		204.3	0.001	0.01	0.09	0.00016	1.7	110	110		
C99-01	2275/2276	25.3	5592R.1	8	2271	0.4	0.19	0.16		204.3	0.001	0.00	0.10	0.00016	1.7	111	111		
					2272	0.0	0.18	0.16		204.3	0.001	0.00	0.00	0.00016	1.7	115	115		
					2273	0.7	0.19	0.16		204.3	0.001	0.00	0.02	0.00014	1.7	99	99		
					2274	0.0	0.20	0.16		204.3	0.001	0.00	0.03	0.00014	1.7	105	105		
					2275	0.5	0.18	0.16		204.3	0.001	0.01	0.05	0.00012	1.7	110	110		
					2276	0.9	0.19	0.16		204.3	0.001	0.00	0.02	0.00013	1.7	119	119		
					2277	0.1	0.18	0.16		204.3	0.001	0.00	0.12	0.00013	1.7	99	99		
					2278	0.0	0.19	0.16		204.3	0.001	0.00	0.04	0.00013	1.7	118	118		
C99-01	2283/2284	25.3	5577R.1	9	2279	0.5	0.19	0.16		204.3	0.001	0.00	0.09	0.00015	1.2	101	101		
					2280	1.1	0.19	0.16		204.3	0.001	0.00	0.02	0.00015	1.2	98	98		
					2281	0.0	0.19	0.16		204.3	0.001	0.01	0.07	0.00016	1.2	110	110		
					2282	0.0	0.20	0.16		204.3	0.001	0.00	0.01	0.00016	1.2	97	97		
					2283	0.0	0.19	0.16		204.3	0.001	0.01	0.15	0.00016	1.2	101	101		
					2284	0.0	0.20	0.16		204.3	0.001	0.01	0.11	0.00016	1.2	105	105		
					2285	0.0	0.20	0.16		204.3	0.001	0.00	0.01	0.00018	1.2	116	116		
					2286	0.7	0.20	0.16		204.3	0.001	0.01	0.13	0.00017	1.2	104	104		

[illegible]

C99-01	2363/2364	25.1	5606L	1	19	2360	0.1	0.19	0.15	204	0.001	0.00	0.02	0.000	0.7	12	30
						2361	0.0	0.18	0.14	204	0.001	0.01	0.05	0.000	0.7	12	30
						2362	0.0	0.19	0.15	204	0.001	0.01	0.05	0.000	0.7	102	99
						2363	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.7	107	7
						2364	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.7	18	33
						2365	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.7	14	4
						2366	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.7	108	4
C99-01	2371/2372	25.3	5571R	1	20	2367	0.0	0.20	0.16	204	0.001	0.01	0.01	0.000	0.5	102	2
						2368	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.5	102	4
						2369	0.0	0.19	0.15	204	0.001	0.00	0.01	0.000	0.5	98	2
						2370	0.0	0.19	0.15	204	0.001	0.00	0.05	0.000	0.5	113	3
						2371	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.5	100	3
						2372	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.5	109	4
						2373	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.5	100	3
						2374	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.5	102	6
C99-01	2379/2380	25.2	5614R	1	21	2375	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.4	101	3
						2376	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.4	108	9
						2377	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.4	108	5
						2378	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.4	119	2
						2379	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.4	105	3
						2380	0.0	0.20	0.16	204	0.001	0.01	0.00	0.000	0.4	118	2
C99-01	2387/2388	25.2	5575R	1	22	2381	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.4	104	2
						2382	0.0	0.19	0.15	204	0.001	0.00	0.01	0.000	0.5	98	3
						2383	0.0	0.20	0.16	204	0.001	0.01	0.00	0.000	0.5	110	0
						2384	0.0	0.18	0.14	204	0.001	0.01	0.00	0.000	0.5	105	6
						2385	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.5	102	2
						2386	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.5	96	9
						2387	0.0	0.20	0.16	204	0.001	0.00	0.01	0.000	0.5	107	7
						2388	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.5	102	4
C99-01	2395/2396	25.1	5585R	1	23	2390	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.7	107	2
						2391	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.7	107	2
						2392	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.7	107	2
						2393	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.7	107	2
						2394	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.7	115	2
						2395	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.7	103	2
						2396	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.7	117	2
						2397	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.7	108	8
						2398	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.7	110	2
						2399	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.7	99	2
C99-01	2403/2404	25.3	5596R	1	24	2400	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.3	101	2
						2401	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.3	104	2
						2402	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.3	99	2
						2403	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.3	118	2
						2404	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.3	111	2
						2405	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.3	117	2
						2406	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.3	104	1
						2407	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.3	110	2
C99-01	2411/2412	25.3	5578R	1	25	2408	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.3	112	2
						2409	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.3	110	2
						2410	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.3	105	2
						2411	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.3	102	2
						2412	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.3	101	2
						2413	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.3	99	2
						2414	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.3	102	2
						2415	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.3	118	2
C99-01	2419/2420	25.2	5580R	1	26	2416	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.4	102	2
						2417	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.4	111	2
						2418	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.4	107	2
						2419	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.4	111	2
						2420	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.4	97	2
						2421	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.4	107	2
						2422	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.4	114	2
						2423	0.0	0.20	0.16	204	0.001	0.01	0.00	0.000	0.4	106	2
C99-01	2427/2428	25.2	5579R	1	27	2424	0.0	0.19	0.15	204	0.001	0.01	0.00	0.000	0.4	109	2
						2425	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.4	114	2
						2426	0.0	0.21	0.17	204	0.001	0.00	0.00	0.000	0.4	103	2
						2427	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.4	98	2
						2428	0.0	0.20	0.16	204	0.001	0.01	0.00	0.000	0.4	107	2
						2429	0.0	0.19	0.15	204	0.001	0.00	0.00	0.000	0.4	111	2
						2430	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.4	104	2
						2431	0.0	0.20	0.16	204	0.001	0.00	0.00	0.000	0.4	112	2

C99-01	2435/2436	25.1	5601R 1	28	2432	0.0	0.19	0.15	204.3	0.001	0.01	0.22	0.00017	1.2	112	125
					2433	0.1	0.20	0.16	204.3	0.001	0.01	0.32	0.00017	1.2	103	123
					2434	0.2	0.19	0.16	204.3	0.001	0.00	0.00	0.00014	1.1	113	125
					2435	0.0	0.19	0.15	204.3	0.001	0.00	0.23	0.00015	1.1	108	125
					2436	0.2	0.19	0.15	204.3	0.001	0.00	0.03	0.00015	1.1	113	125
					2437	0.3	0.18	0.15	204.3	0.001	0.00	0.24	0.00016	1.1	112	125
					2438	1.0	0.18	0.14	204.3	0.001	0.00	0.01	0.00014	1.1	98	124
					2439	0.5	0.19	0.15	204.3	0.001	0.01	0.31	0.00016	1.1	100	125
C99-01	2443/2444	25.1	5581R 1	29	2440	0.1	0.20	0.16	204.3	0.001	0.00	0.01	0.00014	0.0	115	125
					2441	0.0	0.19	0.16	204.3	0.001	0.00	0.21	0.00015	0.0	102	125
					2442	0.2	0.20	0.16	204.3	0.001	0.01	0.04	0.00017	0.0	105	125
					2443	1.0	0.18	0.15	204.3	0.001	0.00	0.06	0.00014	0.0	116	125
					2444	0.5	0.19	0.15	204.3	0.001	0.00	0.24	0.00014	0.0	105	125
					2445	0.5	0.19	0.15	204.3	0.001	0.00	0.05	0.00015	0.0	111	125
					2446	0.5	0.19	0.15	204.3	0.001	0.01	0.10	0.00014	0.0	107	125
C99-01	2451/2452	25.3	5594R 1	30	2447	0.5	0.19	0.15	204.3	0.001	0.00	0.31	0.00016	0.0	111	125
					2448	0.0	0.19	0.16	204.3	0.001	0.00	0.03	0.00018	1.1	107	125
					2449	0.5	0.19	0.16	204.3	0.001	0.00	0.17	0.00016	1.1	104	125
					2450	0.3	0.19	0.16	204.3	0.001	0.01	0.08	0.00018	1.1	101	125
					2451	0.3	0.19	0.16	204.3	0.001	0.01	0.23	0.00016	1.1	106	125
					2452	0.1	0.20	0.16	204.3	0.001	0.00	0.19	0.00014	1.1	110	125
					2453	0.7	0.19	0.16	204.3	0.001	0.00	0.06	0.00014	1.1	114	125
					2454	0.2	0.19	0.16	204.3	0.001	0.01	0.15	0.00015	1.1	109	125
C99-01	2459/2460	25.2	5576R 1	31	2455	0.6	0.19	0.15	204.3	0.001	0.01	0.24	0.00016	1.1	114	125
					2456	0.1	0.20	0.17	204.3	0.001	0.00	0.51	0.00016	1.1	119	125
					2457	0.6	0.18	0.15	204.3	0.001	0.00	0.05	0.00014	1.1	110	125
					2458	1.1	0.20	0.16	204.3	0.001	0.00	0.01	0.00015	1.1	115	125
					2459	0.3	0.19	0.16	204.3	0.001	0.00	0.07	0.00014	1.1	101	125
					2460	0.0	0.20	0.16	204.3	0.001	0.01	0.28	0.00018	1.1	101	125
					2461	0.2	0.19	0.16	204.3	0.001	0.01	0.04	0.00015	1.1	98	124
					2462	0.1	0.20	0.16	204.3	0.001	0.00	0.05	0.00015	1.1	111	125
					2463	0.3	0.19	0.15	204.3	0.001	0.00	0.09	0.00016	1.1	110	125
C99-01	2467/2468	25.3	5584R 1	32	2464	0.1	0.19	0.16	204.3	0.001	0.00	0.22	0.00014	1.0	117	125
					2465	0.7	0.21	0.17	204.3	0.001	0.01	0.03	0.00013	1.1	106	125
					2466	0.2	0.18	0.14	204.3	0.001	0.01	0.11	0.00014	1.1	116	125
					2467	0.9	0.19	0.16	204.3	0.001	0.00	0.27	0.00016	1.1	113	125
					2468	0.2	0.18	0.15	204.3	0.001	0.01	0.01	0.00014	1.1	100	125
					2469	0.4	0.20	0.16	204.3	0.001	0.00	0.15	0.00014	1.0	101	125
AUX	-/-	24.7	5600R 5	1	1	0.4	0.18	0.14	204.3	0.001	0.00	0.13	0.00015	0.6	109	125
AUX	-/-	24.7	5600R 5	1	2	0.2	0.19	0.15	204.3	0.001	0.00	0.04	0.00013	0.6	112	125

Test File		SGY File	GAIN	HighCut	Output	Date	
chan	Full Band	P0000274.SGY	30 dB	205 Hz	500 Hz	Wed	Feb 03 1999
chan	EIN	P0000275.SGY	30 dB	205 Hz	500 Hz	Wed	Feb 03 1999
chan	Impulse	P0000276.SGY	30 dB	205 Hz	500 Hz	Wed	Feb 03 1999
chan	Gain	P0000277.SGY	30 dB	205 Hz	500 Hz	Wed	Feb 03 1999
chan	THD	P0000278.SGY	30 dB	205 Hz	500 Hz	Wed	Feb 03 1999
chan	CMR	P0000279.SGY	30 dB	205 Hz	500 Hz	Wed	Feb 03 1999
chan	XFD Even	P0000280.SGY	30 dB	205 Hz	500 Hz	Wed	Feb 03 1999
chan	XFD Odd	P0000281.SGY	30 dB	205 Hz	500 Hz	Wed	Feb 03 1999

Version: 1.221.

----- RECORDING PARAMETERS -----

Date and Time:

Wed Feb 03 15:59:22 1999

Project File EXP1.BIN
 MKII RAMS
 Gain 30 dB
 Low Cut Filter 3 Hz
 High Cut Filter 205 Hz
 Input Sample Rate 500 Hz
 Output Sample Rate 500 Hz
 Max RAMS per LIU 48
 Analog Line Report

Analog Line Report				(GEOPHONE INFORMATION)															
R-Line	RAM Location	Battery V	S/N	LIU	RAM	Flag	TP	Noise uV	Resis Ohm	Pulse %	Freq Hz	Damp %	Sens V/M/S	Leak Mohm	THD %	Vel cm/s	Imped Ohm	XFD dB	
Tolerance: 1		24.0					1	<10X	<10X	<5X	<10X	<10X	>1.00	<0.0500X	N/A	<10X	>50		
Median		0.0						900	1.8	10.0	67	0.172	1.40	0.0038	0.013	2184	104		
/C99-01	-/2220	25.0	5604R	1	1	2220	----	898	3.6	10.0	67	0.174	1.40	0.0071	0.013	2170	101		
						2221	----	904	2.2	10.0	67	0.173	1.40	0.0079	0.013	2184	104		
						2222	----	900	0.4	10.0	67	0.171	1.40	0.0108	0.013	2186	93		
						2223	----	902	1.5	10.0	67	0.170	1.40	0.0069	0.013	2210	91		
C99-01	2227/2228	25.3	5569R	1	2	2224	----	901	2.5	10.0	67	0.169	1.40	0.0035	0.013	2192	92		
						2225	----	907	0.7	10.0	67	0.171	1.40	0.0046	0.013	2188	100		
						2226	----	1046	8.5	10.0	68	0.172	1.40	0.0031	0.013	2248	102		
						2227	----	895	2.8	10.0	66	0.174	1.40	0.0020	0.013	2161	107		
						2228	----	900	2.9	10.0	66	0.174	1.40	0.0027	0.013	2170	100		
						2229	----	901	1.3	10.1	66	0.172	1.40	0.0450	0.013	2183	71		
						2230	----	900	0.6	10.0	66	0.171	1.40	0.0034	0.013	2193	111		
						2231	----	900	2.5	10.0	67	0.169	1.40	0.0038	0.013	2203	99		
C99-01	2235/2236	25.2	5572R	1	3	2232	----	906	2.2	10.0	67	0.169	1.40	0.0045	0.013	22197	93		
						2233	----	906	0.7	10.0	67	0.171	1.40	0.0023	0.013	22195	100		
						2234	----	900	1.7	10.0	67	0.173	1.40	0.0023	0.013	22179	101		
						2235	----	901	2.2	10.0	66	0.173	1.40	0.0029	0.013	22170	113		
						2236	----	903	2.7	10.1	66	0.174	1.40	0.0046	0.013	2162	103		
						2237	----	903	1.7	10.1	66	0.174	1.40	0.0075	0.013	2194	109		
						2238	----	902	0.8	10.0	67	0.171	1.40	0.0256	0.013	21191	106		
						2239	----	905	1.9	10.1	67	0.170	1.40	0.0039	0.013	22110	98		
C99-01	2243/2244	25.2	5603R	1	4	2240	----	904	2.3	10.0	67	0.169	1.40	0.0032	0.013	2201	121		
						2241	----	903	0.8	10.0	67	0.171	1.40	0.0043	0.013	2187	105		
						2242	----	897	1.8	10.0	67	0.173	1.40	0.0032	0.013	2177	100		
						2243	----	894	3.6	10.0	67	0.175	1.40	0.0137	0.013	2166	89		
						2244	----	897	2.9	10.2	66	0.175	1.40	0.0107	0.013	2166	98		
						2245	----	895	6.1	10.0	67	0.165	1.40	0.0044	0.013	22069	96		
						2246	----	900	0.2	10.0	67	0.171	1.40	0.0037	0.013	22190	105		
						2247	----	901	3.8	10.1	67	0.170	1.40	0.1152	0.013	22184	94		
C99-01	2251/2252	25.1	5582R	1	5	2248	----	899	2.2	10.0	67	0.170	1.40	0.0027	0.013	2200	110		
						2249	----	903	0.2	10.0	67	0.172	1.40	0.0027	0.013	22196	111		
						2250	----	889	1.5	10.0	67	0.173	1.40	0.0061	0.013	2166	105		
						2251	----	897	2.5	10.0	67	0.174	1.40	0.0021	0.013	21599	112		
						2252	----	896	2.9	10.0	67	0.174	1.40	0.0037	0.013	2166	96		
						2253	----	896	0.4	10.0	66	0.172	1.40	0.0430	0.013	2171	106		
						2254	----	909	0.9	10.1	66	0.172	1.40	0.0130	0.013	2198	104		
						2255	----	900	7.9	10.2	66	0.168	1.40	0.0243	0.013	2207	100		
C99-01	2259/2260	25.3	5591R	1	6	2256	----	901	2.2	10.0	66	0.172	1.40	0.0068	0.013	2207	101		
						2257	----	898	0.9	10.1	66	0.172	1.40	0.0068	0.013	2198	110		
						2258	----	895	1.1	10.1	66	0.173	1.40	0.0030	0.013	2186	102		
						2259	----	897	2.2	10.1	66	0.174	1.40	0.0030	0.013	2167	94		
						2260	----	904	3.0	10.0	66	0.174	1.40	0.0020	0.013	2200	97		
						2261	----	900	1.1	10.0	66	0.170	1.40	0.0130	0.013	2200	94		
						2262	----	903	0.7	10.0	66	0.169	1.40	0.0044	0.013	2211	95		
						2263	----	898	0.2	10.0	66	0.169	1.40	0.0044	0.013	2211	102		
C99-01	2267/2268	25.2	5573R	1	7	2264	----	895	0.9	10.0	67	0.171	1.40	0.0035	0.013	2196	101		
						2265	----	902	0.2	10.0	67	0.171	1.40	0.0035	0.013	2191	101		
						2266	----	902	0.9	10.0	67	0.172	1.40	0.0106	0.013	2167	102		
						2267	----	897	3.2	10.0	66	0.174	1.40	0.0027	0.013	2175	106		
						2268	----	902	3.3	10.0	66	0.175	1.40	0.0035	0.013	2187	98		
						2269	----	899	6.6	10.0	67	0.174	1.40	0.0030	0.013	2194	113		
						2270	----	898	0.2	10.0	67	0.172	1.40	0.0022	0.013	2207	101		
						2271	----	904	1.8	10.0	67	0.170	1.40	0.0013	0.013	2207	117		

C99-01	2275/2276	25.3	5592R 1	8	2272	904	1.7	10.0	67	0.170	1.40	0.0015	0.013	2213	114
					2273	901	0.7	10.1	67	0.172	1.40	0.0036	0.013	2193	114
					2274	904	1.7	10.0	67	0.174	1.40	0.0431	0.013	2186	108
					2275	902	3.1	10.1	66	0.175	1.40	0.0027	0.013	2172	105
					2276	897	3.9	10.0	67	0.174	1.40	0.0023	0.013	2168	105
					2277	901	1.1	10.1	66	0.173	1.40	0.0032	0.013	2180	105
					2278	903	0.4	10.0	67	0.171	1.40	0.0069	0.013	2194	111
C99-01	2283/2284	25.3	5577R 1	9	2279	900	1.7	10.0	67	0.170	1.40	0.0018	0.013	2204	107
					2280	902	1.7	10.0	67	0.170	1.40	0.0019	0.013	2202	107
					2281	906	1.0	10.1	67	0.171	1.40	0.0058	0.013	2189	101
					2282	903	0.8	10.0	67	0.173	1.40	0.0026	0.013	2170	110
					2283	897	4.5	10.0	67	0.175	1.40	0.0023	0.013	2172	105
					2284	897	2.6	10.1	66	0.174	1.40	0.0020	0.013	2154	120
					2285	902	1.4	10.1	66	0.174	1.40	0.0019	0.013	2176	117
					2286	899	0.9	10.0	67	0.171	1.40	0.0017	0.013	2182	110
C99-01	2291/2292	25.2	5597L 1	10	2287	908	1.9	10.0	67	0.170	1.40	0.0037	0.013	2207	106
					2288	906	2.3	10.0	67	0.170	1.40	0.0015	0.013	2200	116
					2289	894	1.1	10.1	67	0.171	1.40	0.0031	0.013	2180	108
					2290	898	1.2	10.1	66	0.173	1.40	0.0022	0.013	2177	107
					2291	903	2.9	10.0	67	0.174	1.40	0.0029	0.013	2171	112
					2292	899	3.0	10.0	66	0.174	1.40	0.0044	0.013	2166	117
					2293	903	1.6	10.0	66	0.173	1.40	0.0032	0.013	2189	103
					2294	903	1.2	10.1	66	0.171	1.40	0.0037	0.013	2194	104
C99-01	2299/2300	25.2	5574R 1	11	2295	904	2.3	10.0	67	0.169	1.40	0.0018	0.013	2208	115
					2296	901	1.6	10.0	67	0.170	1.40	0.0013	0.013	2210	108
					2297	898	0.4	10.0	67	0.171	1.40	0.0012	0.013	2193	105
					2298	898	2.0	10.0	67	0.173	1.40	0.0018	0.013	2189	114
					2299	891	2.8	10.0	67	0.174	1.40	0.0058	0.013	2163	109
					2300	896	2.9	10.0	66	0.174	1.40	0.0015	0.013	2169	104
					2301	902	2.1	10.2	66	0.173	1.40	0.0600	0.013	2184	122
					2302	904	0.5	10.0	67	0.171	1.40	0.0028	0.013	2198	110
C99-01	2307/2308	25.1	5608R 1	12	2303	902	2.7	10.1	66	0.170	1.40	0.0017	0.013	2201	113
					2304	904	1.8	10.0	67	0.170	1.40	0.0171	0.013	2202	106
					2305	901	0.5	10.0	67	0.171	1.40	0.0014	0.013	2188	108
					2306	901	1.4	10.1	67	0.173	1.40	0.0027	0.013	2188	106
					2307	895	3.0	10.0	66	0.174	1.40	0.0031	0.013	2160	98
					2308	895	3.6	10.0	66	0.174	1.40	0.0057	0.013	2166	100
					2309	896	1.5	10.0	67	0.173	1.40	0.0216	0.013	2173	92
					2310	901	0.4	10.0	67	0.172	1.40	0.0118	0.013	2195	93
C99-01	2315/2316	25.3	5610R 1	13	2311	901	1.7	10.0	67	0.170	1.40	0.0031	0.013	2205	96
					2312	900	2.3	10.0	67	0.170	1.40	0.0031	0.013	2205	101
					2313	900	0.1	10.0	67	0.172	1.40	0.0053	0.013	2200	98
					2314	897	1.1	10.0	67	0.173	1.40	0.0042	0.013	2172	99
					2315	896	3.4	10.0	67	0.175	1.40	0.0233	0.013	2173	95
					2316	893	2.9	10.0	66	0.174	1.40	0.0074	0.013	2163	84
					2317	895	1.5	10.0	67	0.173	1.40	0.0294	0.013	2180	97
					2318	898	0.4	10.0	67	0.171	1.40	0.0032	0.013	2191	109
C99-01	2323/2324	25.1	5595R 1	14	2319	898	2.0	10.0	67	0.170	1.40	0.0049	0.013	2200	95
					2320	895	2.4	10.0	67	0.169	1.40	0.0032	0.013	2198	98
					2321	898	0.8	10.0	67	0.171	1.40	0.0125	0.013	2179	102
					2322	897	0.9	10.0	67	0.172	1.40	0.0253	0.013	2172	108
					2323	901	3.5	10.0	67	0.174	1.40	0.0027	0.013	2170	95
					2324	896	2.7	10.0	66	0.174	1.40	0.0024	0.013	2164	101
					2325	900	0.8	10.0	67	0.173	1.40	0.0056	0.013	2170	118
					2326	904	0.5	10.0	67	0.171	1.40	0.0045	0.013	2190	107
C99-01	2331/2332	24.9	5602L 1	15	2327	902	1.4	10.0	66	0.170	1.40	0.0072	0.013	2214	109
					2328	908	2.3	10.0	67	0.169	1.40	0.0032	0.013	2207	108
					2329	901	0.8	10.0	67	0.171	1.40	0.0044	0.013	2185	102
					2330	897	1.9	10.0	66	0.173	1.40	0.0052	0.013	2181	103
					2331	895	4.6	10.0	67	0.166	1.40	0.0034	0.013	2051	102
					2332	894	2.5	10.0	67	0.174	1.40	0.0033	0.013	2154	100
					2333	904	1.2	10.0	67	0.173	1.40	0.0998	0.013	2178	102
					2334	906	0.5	10.0	67	0.172	1.40	0.0084	0.013	2200	100
C99-01	2339/2340	25.2	5605L 1	16	2335	905	3.3	10.1	66	0.169	1.40	0.0021	0.013	2203	102
					2336	905	2.5	10.0	67	0.169	1.40	0.0034	0.013	2202	103
					2337	903	0.6	10.0	66	0.171	1.40	0.0056	0.013	2190	110
					2338	903	5.4	10.0	67	0.166	1.40	0.0074	0.013	2079	95
					2339	905	3.3	10.0	67	0.175	1.40	0.0080	0.013	2172	95
					2340	906	2.8	10.0	66	0.174	1.40	0.0063	0.013	2169	95
					2341	905	2.2	9.9	67	0.172	1.40	0.0034	0.013	2182	94
					2342	903	0.9	10.0	67	0.171	1.40	0.0045	0.013	2182	93
					2343	904	8.5	10.0	67	0.162	1.40	0.0057	0.013	2101	107

C99-01	2347/2348	25.3	5609R 1	17	2344	----	8998	1.0	10.0	67	0.170	1.40	0.0183	0.013	2212	83
					2345		9000	0.9	9.9	67	0.171	1.40	0.0183	0.013	2212	83
					2346		9001	0.9	10.1	67	0.172	1.40	0.0183	0.013	2212	83
					2347		9002	0.9	10.1	67	0.173	1.40	0.0183	0.013	2212	83
					2348		9003	0.9	10.0	67	0.174	1.40	0.0183	0.013	2212	83
					2349		9004	0.9	10.0	67	0.175	1.40	0.0183	0.013	2212	83
					2350		9005	0.9	10.0	67	0.176	1.40	0.0183	0.013	2212	83
					2351		9006	0.9	10.0	67	0.177	1.40	0.0183	0.013	2212	83
					2352		9007	0.9	10.0	67	0.178	1.40	0.0183	0.013	2212	83
					2353		9008	0.9	10.0	67	0.179	1.40	0.0183	0.013	2212	83
					2354		9009	0.9	10.0	67	0.180	1.40	0.0183	0.013	2212	83
					2355		9010	0.9	10.0	67	0.181	1.40	0.0183	0.013	2212	83
C99-01	2355/2356	25.2	5570R 1	18	2356	----	9011	0.9	10.0	67	0.182	1.40	0.0183	0.013	2212	83
					2357		9012	0.9	10.0	67	0.183	1.40	0.0183	0.013	2212	83
					2358		9013	0.9	10.0	67	0.184	1.40	0.0183	0.013	2212	83
					2359		9014	0.9	10.0	67	0.185	1.40	0.0183	0.013	2212	83
					2360		9015	0.9	10.0	67	0.186	1.40	0.0183	0.013	2212	83
					2361		9016	0.9	10.0	67	0.187	1.40	0.0183	0.013	2212	83
					2362		9017	0.9	10.0	67	0.188	1.40	0.0183	0.013	2212	83
					2363		9018	0.9	10.0	67	0.189	1.40	0.0183	0.013	2212	83
					2364		9019	0.9	10.0	67	0.190	1.40	0.0183	0.013	2212	83
C99-01	2363/2364	25.1	5606L 1	19	2365	----	9020	0.9	10.0	67	0.191	1.40	0.0183	0.013	2212	83
					2366		9021	0.9	10.0	67	0.192	1.40	0.0183	0.013	2212	83
					2367		9022	0.9	10.0	67	0.193	1.40	0.0183	0.013	2212	83
					2368		9023	0.9	10.0	67	0.194	1.40	0.0183	0.013	2212	83
					2369		9024	0.9	10.0	67	0.195	1.40	0.0183	0.013	2212	83
					2370		9025	0.9	10.0	67	0.196	1.40	0.0183	0.013	2212	83
					2371		9026	0.9	10.0	67	0.197	1.40	0.0183	0.013	2212	83
					2372		9027	0.9	10.0	67	0.198	1.40	0.0183	0.013	2212	83
					2373		9028	0.9	10.0	67	0.199	1.40	0.0183	0.013	2212	83
					2374		9029	0.9	10.0	67	0.200	1.40	0.0183	0.013	2212	83
					2375		9030	0.9	10.0	67	0.201	1.40	0.0183	0.013	2212	83
					2376		9031	0.9	10.0	67	0.202	1.40	0.0183	0.013	2212	83
					2377		9032	0.9	10.0	67	0.203	1.40	0.0183	0.013	2212	83
					2378		9033	0.9	10.0	67	0.204	1.40	0.0183	0.013	2212	83
					2379		9034	0.9	10.0	67	0.205	1.40	0.0183	0.013	2212	83
					2380		9035	0.9	10.0	67	0.206	1.40	0.0183	0.013	2212	83
C99-01	2379/2380	25.2	5614R 1	21	2381	----	9036	0.9	10.0	67	0.207	1.40	0.0183	0.013	2212	83
					2382		9037	0.9	10.0	67	0.208	1.40	0.0183	0.013	2212	83
					2383		9038	0.9	10.0	67	0.209	1.40	0.0183	0.013	2212	83
					2384		9039	0.9	10.0	67	0.210	1.40	0.0183	0.013	2212	83
					2385		9040	0.9	10.0	67	0.211	1.40	0.0183	0.013	2212	83
					2386		9041	0.9	10.0	67	0.212	1.40	0.0183	0.013	2212	83
					2387		9042	0.9	10.0	67	0.213	1.40	0.0183	0.013	2212	83
					2388		9043	0.9	10.0	67	0.214	1.40	0.0183	0.013	2212	83
					2389		9044	0.9	10.0	67	0.215	1.40	0.0183	0.013	2212	83
					2390		9045	0.9	10.0	67	0.216	1.40	0.0183	0.013	2212	83
					2391		9046	0.9	10.0	67	0.217	1.40	0.0183	0.013	2212	83
					2392		9047	0.9	10.0	67	0.218	1.40	0.0183	0.013	2212	83
					2393		9048	0.9	10.0	67	0.219	1.40	0.0183	0.013	2212	83
					2394		9049	0.9	10.0	67	0.220	1.40	0.0183	0.013	2212	83
					2395		9050	0.9	10.0	67	0.221	1.40	0.0183	0.013	2212	83
					2396		9051	0.9	10.0	67	0.222	1.40	0.0183	0.013	2212	83
					2397		9052	0.9	10.0	67	0.223	1.40	0.0183	0.013	2212	83
					2398		9053	0.9	10.0	67	0.224	1.40	0.0183	0.013	2212	83
					2399		9054	0.9	10.0	67	0.225	1.40	0.0183	0.013	2212	83
					2400		9055	0.9	10.0	67	0.226	1.40	0.0183	0.013	2212	83
					2401		9056	0.9	10.0	67	0.227	1.40	0.0183	0.013	2212	83
					2402		9057	0.9	10.0	67	0.228	1.40	0.0183	0.013	2212	83
					2403		9058	0.9	10.0	67	0.229	1.40	0.0183	0.013	2212	83
					2404		9059	0.9	10.0	67	0.230	1.40	0.0183	0.013	2212	83
					2405		9060	0.9	10.0	67	0.231	1.40	0.0183	0.013	2212	83
					2406		9061	0.9	10.0	67	0.232	1.40	0.0183	0.013	2212	83
					2407		9062	0.9	10.0	67	0.233	1.40	0.0183	0.013	2212	83
					2408		9063	0.9	10.0	67	0.234	1.40	0.0183	0.013	2212	83
					2409		9064	0.9	10.0	67	0.235	1.40	0.0183	0.013	2212	83
					2410		9065	0.9	10.0	67	0.236	1.40	0.0183	0.013	2212	83
					2411		9066	0.9	10.0	67	0.237	1.40	0.0183	0.013	2212	83
					2412		9067	0.9	10.0	67	0.238	1.40	0.0183	0.013	2212	83
					2413		9068	0.9	10.0	67	0.239	1.40	0.0183	0.013	2212	83
					2414		9069	0.9	10.0	67	0.240	1.40	0.0183	0.013	2212	83
					2415		9070	0.9	10.0	67	0.241	1.40	0.0183	0.013	2212	83
C99-01	2395/2396	25.1	5585R 1	23	2397	----	9071	0.9	10.0	67	0.242	1.40	0.0183	0.013	2212	83
					2398		9072	0.9	10.0	67	0.243	1.40	0.0183	0.013	2212	83
					2399		9073	0.9	10.0	67	0.244	1.40	0.0183	0.013	2212	83
					2400		9074	0.9	10.0	67	0.245	1.40	0.0183	0.013	2212	83
					2401		9075	0.9	10.0	67	0.246	1.40	0.0183	0.013	2212	83
					2402		9076	0.9	10.0	67	0.247	1.40	0.0183	0.013	2212	83
					2403		9077	0.9	10.0	67	0.248	1.40	0.0183	0.013	2212	83
					2404		9078	0.9	10.0	67	0.249	1.40	0.0183	0.013	2212	83
					2405		9079	0.9	10.0	67	0.250	1.40	0.0183	0.013	2212	83
					2406		9080	0.9	10.0	67	0.251	1.40	0.0183	0.013	2212	83
					2407		9081	0.9	10.0	67	0.252	1.40	0.0183	0.013	2212	83
					2408		9082	0.9	10.0	67	0.253	1.40	0.0183	0.013	2212	83
					2409		9083	0.9	10.0	67	0.254	1.40	0.0183	0.013	2212	83
					2410		9084	0.9	10.0	67	0.255	1.40	0.0183	0.013	2212	83
					2411		9085	0.9	10.0	67	0.256	1.40	0.0183	0.013	2212	83
					2412		9086	0.9	10.0	67	0.257	1.40	0.0183	0.013	2212	83
					2413		9087	0.9	10.0	67	0.258	1.40	0.0183	0.013	2212	83
					2414		9088	0.9	10.0	67	0.259	1.40	0.0183	0.013	2212	83
					2415		9089	0.9	10.0	67	0.260	1.40	0.0183	0.013	2212	83
					2416		9090	0.9	10.0	67	0.261	1.40	0.0183	0.013	2212	83
					2417		9091	0.9	10.0	67	0.262	1.40	0.0183	0.013	2212	83
					2418		9092	0.9	10.0	67	0.263	1.40	0.0183	0.013	2212	83
					2419		9093	0.9	10.0	67	0.264	1.40	0.0183	0.013	2212	83
					2420											

C99-01	2419/2420	25.2	5580R 1	26	2416	897	1.0	67	0.170	1.40	0.0408	0.013	2188	96
					2417	899	1.0	67	0.172	1.40	0.0042	0.013	2193	97
					2418	899	1.0	67	0.166	1.40	0.0040	0.013	2169	97
					2419	895	1.0	67	0.175	1.40	0.0027	0.013	2162	95
					2420	893	1.0	67	0.175	1.40	0.0030	0.013	2158	96
					2421	897	1.0	67	0.173	1.40	0.0040	0.013	2164	107
					2422	907	1.0	66	0.172	1.40	0.0535*	0.013	2186	107
					2423	900	1.0	67	0.170	1.40	0.0044	0.013	2199	103
C99-01	2427/2428	25.2	5579R 1	27	2424	895	1.0	67	0.169	1.40	0.0190	0.013	2192	107
					2425	900	1.0	67	0.171	1.40	0.0054	0.013	2191	112
					2426	897	1.0	67	0.173	1.40	0.0020	0.013	2178	117
					2427	896	1.0	67	0.175	1.40	0.1061*	0.013	2158	119
					2428	897	1.0	67	0.174	1.40	0.0024	0.013	2167	109
					2429	895	1.0	67	0.173	1.40	0.0029	0.013	2179	98
					2430	895	1.0	67	0.171	1.40	0.0024	0.013	2191	107
					2431	896	1.0	67	0.170	1.40	0.0028	0.013	2200	103
C99-01	2435/2436	25.1	5601R 1	28	2432	897	1.0	67	0.170	1.40	0.0168	0.013	2198	93
					2433	895	1.0	67	0.171	1.40	0.0032	0.013	2186	106
					2434	895	1.0	66	0.172	1.40	0.0068	0.013	2179	118
					2435	894	1.0	67	0.174	1.40	0.0030	0.013	2165	107
					2436	893	1.0	67	0.175	1.40	0.0570*	0.013	2148	108
					2437	900	1.0	67	0.173	1.40	0.0017	0.013	2182	110
					2438	901	1.0	67	0.172	1.40	0.0027	0.013	2195	105
					2439	893	1.0	67	0.169	1.40	0.0115	0.013	2187	106
C99-01	2443/2444	25.1	5581R 1	29	2440	901	1.0	67	0.170	1.40	0.0063	0.013	2205	101
					2441	896	1.0	67	0.171	1.40	0.0071	0.013	2195	109
					2442	907	1.0	67	0.173	1.40	0.0017	0.013	2200	117
					2443	899	1.0	66	0.175	1.40	0.0026	0.013	2179	109
					2444	895	1.0	67	0.175	1.40	0.0057	0.013	2170	105
					2445	898	1.0	67	0.173	1.40	0.0016	0.013	2191	111
					2446	892	1.0	67	0.171	1.40	0.0023	0.013	2193	107
					2447	896	1.0	67	0.169	1.40	0.0039	0.013	2199	110
C99-01	2451/2452	25.3	5594R 1	30	2448	902	1.0	67	0.170	1.40	0.0037	0.013	2201	105
					2449	897	1.0	67	0.171	1.40	0.0032	0.013	2187	109
					2450	901	1.0	67	0.173	1.40	0.0036	0.013	2176	99
					2451	899	1.0	66	0.175	1.40	0.0029	0.013	2174	105
					2452	899	1.0	67	0.166	1.40	0.0060	0.013	2153	106
					2453	900	1.0	67	0.173	1.40	0.0058	0.013	2178	105
					2454	906	1.0	66	0.171	1.40	0.0018	0.013	2195	112
					2455	906	1.0	67	0.170	1.40	0.0037	0.013	2199	109
C99-01	2459/2460	25.2	5576R 1	31	2456	895	1.0	66	0.169	1.40	0.0018	0.013	2192	100
					2457	904	1.0	67	0.172	1.40	0.0812*	0.013	2184	110
					2458	899	1.0	67	0.175	1.40	0.0017	0.013	2173	114
					2459	902	1.0	67	0.175	1.40	0.0019	0.013	2167	110
					2460	898	1.0	67	0.174	1.40	0.0016	0.013	2163	100
					2461	896	1.0	67	0.173	1.40	0.0043	0.013	2182	94
					2462	897	1.0	69	0.170	1.40	0.0052	0.013	2187	92
					2463	908	1.0	67	0.163	1.40	0.0023	0.013	2104	92
C99-01	2467/2468	25.3	5584R 1	32	2464	900	1.0	67	0.169	1.40	0.0042	0.013	2199	100
					2465	896	1.0	67	0.171	1.40	0.0051	0.013	2192	112
					2466	898	1.0	67	0.174	1.40	0.0032	0.013	2181	107
					2467	895	1.0	67	0.175	1.40	0.0056	0.013	2164	117
					2468	895	1.0	66	0.175	1.40	0.0045	0.013	2166	109
					2469	896	1.0	67	0.174	1.40	0.0047	0.013	2180	95

Test File	SGY File	GAIN	HighCut	Output	Date
phone Resistance	P0000282.SGY	30 dB	205 Hz	500 Hz	Wed Feb 03 15:59:20 1999
phone Pulse	P0000283.SGY	30 dB	205 Hz	500 Hz	Wed Feb 03 15:59:20 1999
phone Leakage	P0000284.SGY	30 dB	205 Hz	500 Hz	Wed Feb 03 15:59:20 1999
phone THD	P0000285.SGY	30 dB	205 Hz	500 Hz	Wed Feb 03 15:59:20 1999
phone Impedance	P0000286.SGY	30 dB	205 Hz	500 Hz	Wed Feb 03 15:59:20 1999
phone XFD Even	P0000287.SGY	30 dB	205 Hz	500 Hz	Wed Feb 03 15:59:20 1999
phone XFD Odd	P0000288.SGY	30 dB	205 Hz	500 Hz	Wed Feb 03 15:59:20 1999

Version: 1.221, Wed Feb 03 15:58:20 1999, Gain: 30, Low Cut: 3, High Cut: 205, Output: 500

***** CHANNEL PARAMETERS *****

THD Frequency (Hz) & Attenuation (dB) 11.0 (2.0)
 CMR Frequency (Hz) & Attenuation (dB) 11.0 (2.0)
 XFD Frequency (Hz) & Attenuation (dB) 40.0 (2.0)

Analog Line Report
 R-Line RAM Location Battery S/N LIU RAM
 Tolerance: 2 24.0
 Median 25.2

(CHANNEL INFORMATION)
 Flag MK dc Full EIN L/C High Pass Roll Gain THD Clock CMR XFD
 uV uV dB Hz Hz % ppm dB dB
 2 N/A <0.28 <0.20 <5% <1% <0.200 <1% <1% <0.00060 <10.0 >85 >100
 0.3 0.19 0.16 204.3 0.001 0.00 0.09 0.00015 1.1 107 125

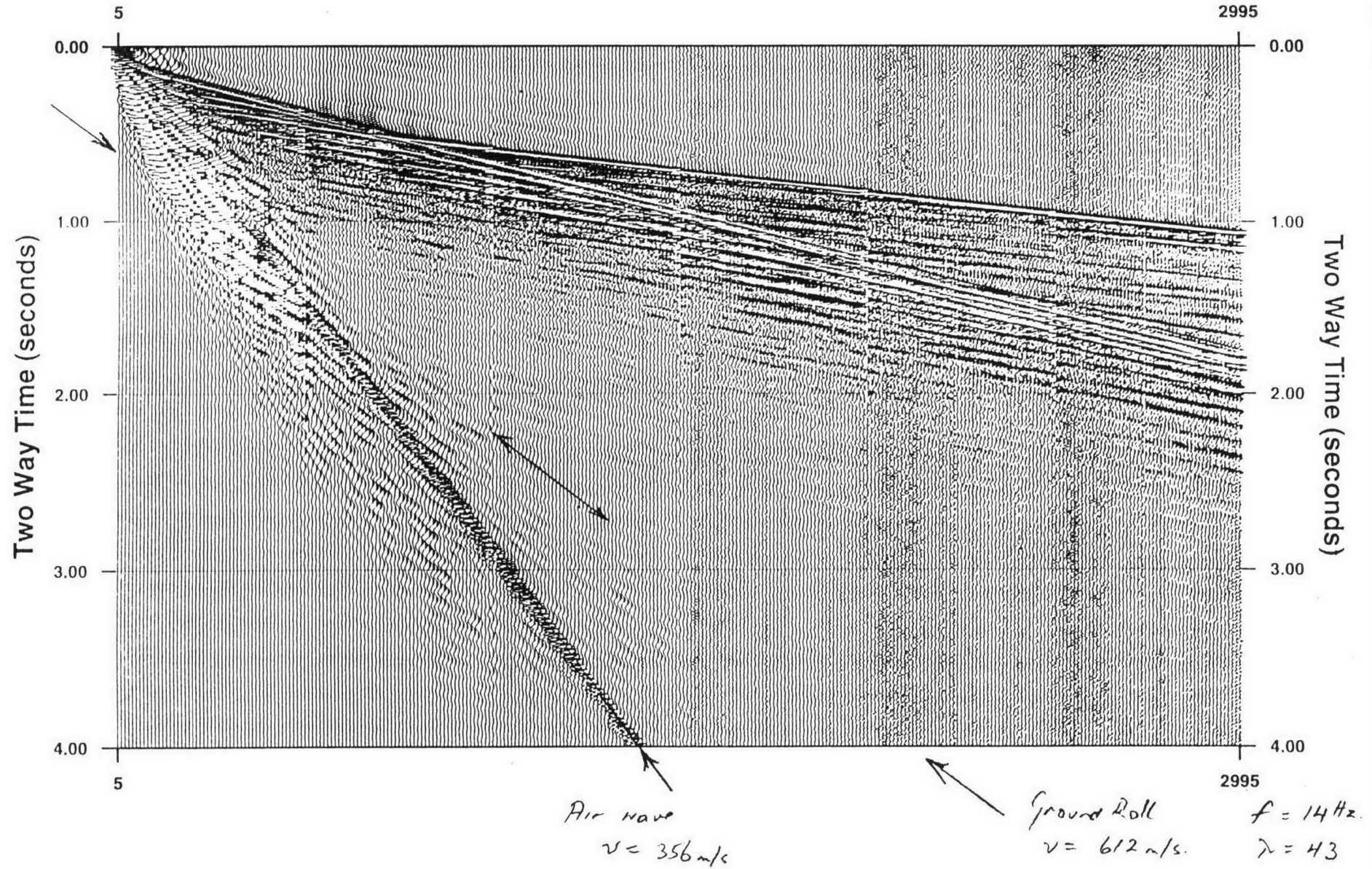
Version: 1.221, Wed Feb 03 15:59:22 1999, Gain: 30, Low Cut: 3, High Cut: 205, Output: 500

Analog Line Report
 R-Line RAM Location Battery S/N LIU RAM
 Tolerance: 1 24.0
 Median 0.0
 C99-01 2227/2228 25.3 5569R 1 2
 C99-01 2243/2244 25.2 5603R 1 4
 C99-01 2259/2260 25.3 5591R 1 6
 C99-01 2299/2300 25.2 5574R 1 11
 C99-01 2331/2332 24.9 5602L 1 15
 C99-01 2347/2348 25.3 5609R 1 17
 C99-01 2363/2364 25.1 5606L 1 19
 C99-01 2371/2372 25.3 5571R 1 20
 C99-01 2379/2380 25.2 5614R 1 21
 C99-01 2387/2388 25.2 5575R 1 22
 C99-01 2395/2396 25.1 5585R 1 23
 C99-01 2403/2404 25.3 5596R 1 24
 C99-01 2419/2420 25.2 5580R 1 26
 C99-01 2427/2428 25.2 5579R 1 27
 C99-01 2435/2436 25.1 5601R 1 28
 C99-01 2459/2460 25.2 5576R 1 31

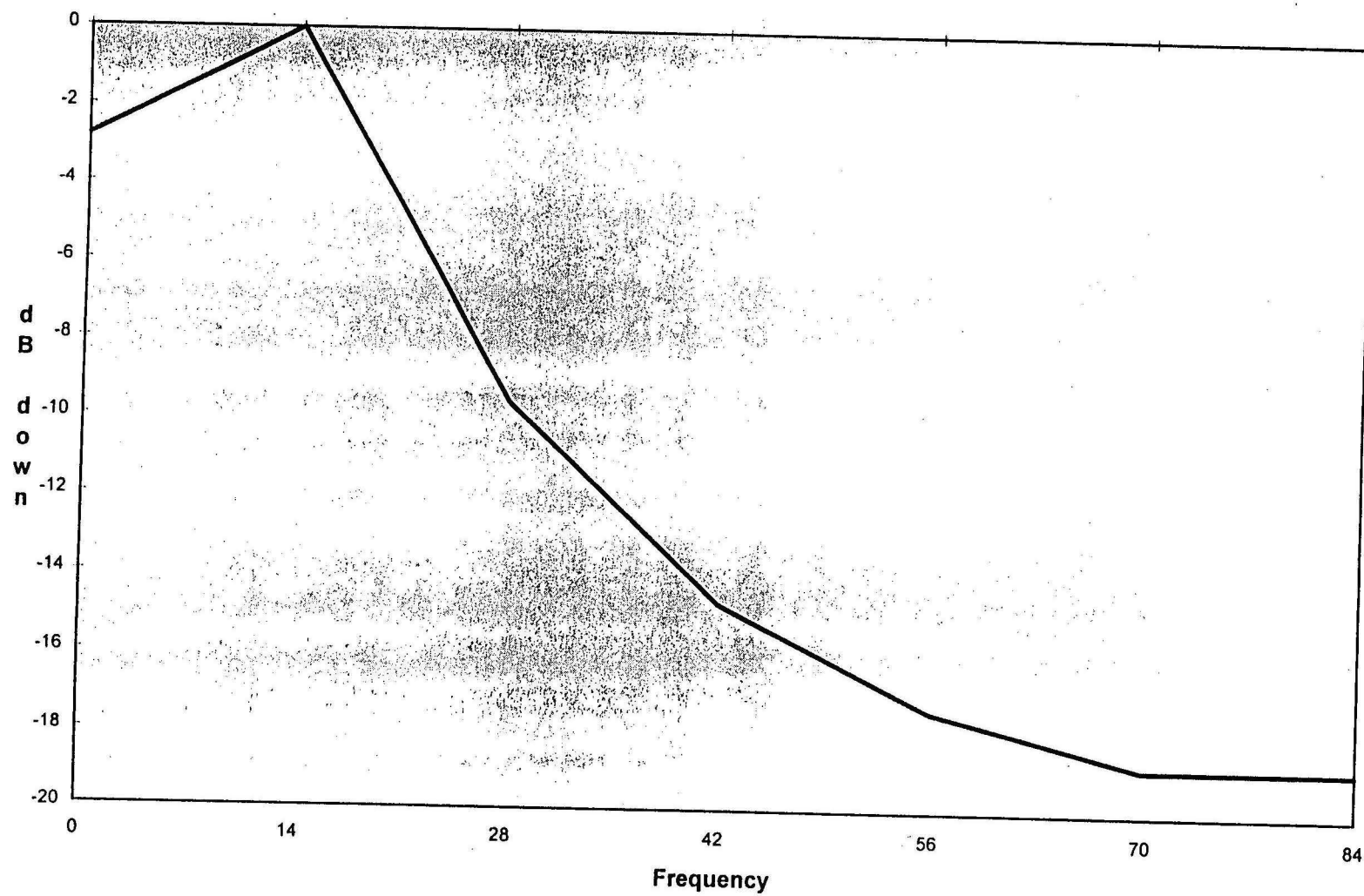
(GEOPHONE INFORMATION)
 Flag TP Noise Resis Pulse Freq Damp Sens Leak THD Vel Imped XFD
 uV Ohm % Hz % V/M/S Mohm % cm/s Ohm dB
 1 <10% <10% <5% <10% <10% >1.00 <0.0500% N/A <10% >50
 900 1.8 10.0 67 0.172 1.40 0.0038 0.013 2184 104
 1046 8.5 10.0 68 0.172 1.40 0.0031 0.013 2248 102
 901 3.8 10.1 67 0.170 1.40 0.1152 0.013 2184 94
 901 3.3 10.0 67 0.169 1.40 0.0676 0.013 2207 101
 902 3.1 10.2 66 0.173 1.40 0.0500 0.013 2084 122
 904 1.0 10.0 67 0.173 1.40 0.0998 0.013 2178 103
 901 1.0 10.1 67 0.171 1.40 0.1432 0.013 2189 78
 900 0.0 10.0 67 0.171 1.40 0.9847 0.013 2182 56
 901 0.0 10.1 67 0.173 1.40 0.5631 0.013 2160 79
 898 1.0 10.0 66 0.263 1.40 0.0533 0.020 4162 1
 1782 91.0 10.0 66 0.263 1.40 0.0531 0.021 4183 1
 1786 76.1 10.1 66 0.263 1.40 0.0032 0.020 4002 3
 1787 74.7 10.1 66 0.249 1.40 0.0032 0.020 4043 2
 1782 87.7 10.0 66 0.259 1.40 0.0014 0.021 4257 2
 1796 87.7 10.0 66 0.260 1.40 0.0014 0.021 4257 2
 1793 91.0 10.0 66 0.263 1.40 0.0029 0.021 4269 1
 1790 91.0 10.0 66 0.264 1.40 0.0029 0.021 4235 1
 601 33.5 10.2 66 0.135 1.40 0.0030 0.010 1473 92
 904 22.5 10.1 66 0.139 1.40 0.0043 0.011 1799 96
 726 35.6 9.9 68 0.098 1.40 0.0021 0.008 1201 104
 1779 92.6 10.0 66 0.265 1.40 0.0013 0.021 4205 1
 1771 91.0 10.0 66 0.264 1.40 0.0013 0.021 4204 1
 907 1.7 10.1 66 0.172 1.40 0.0535 0.013 2186 107
 896 3.8 10.0 67 0.175 1.40 0.1061 0.013 2158 119
 893 3.0 10.0 67 0.175 1.40 0.0570 0.013 2148 108
 904 1.3 10.1 67 0.172 1.40 0.0812 0.013 2184 110

Walkaway noise test

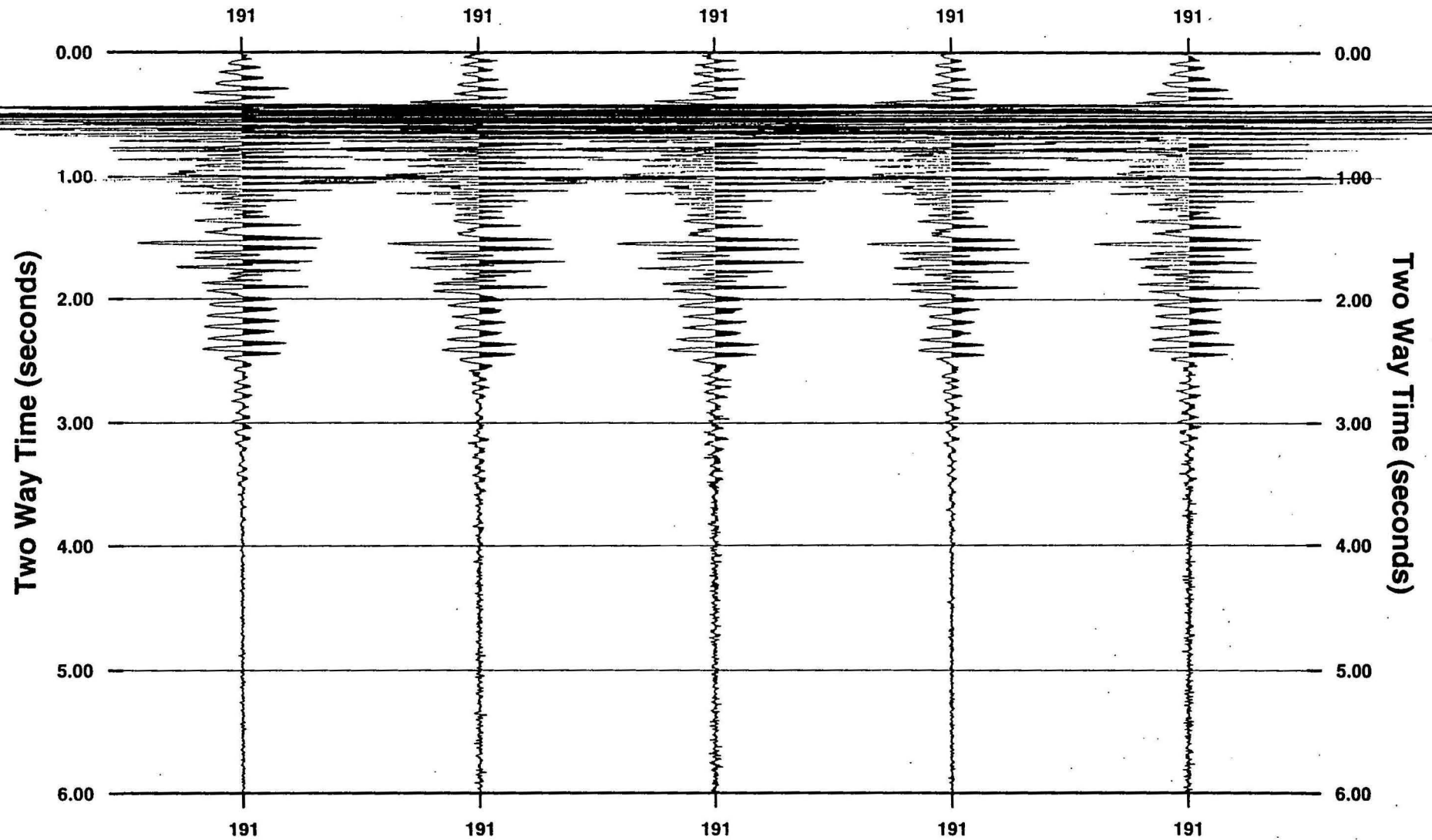
FFID 1 to 6



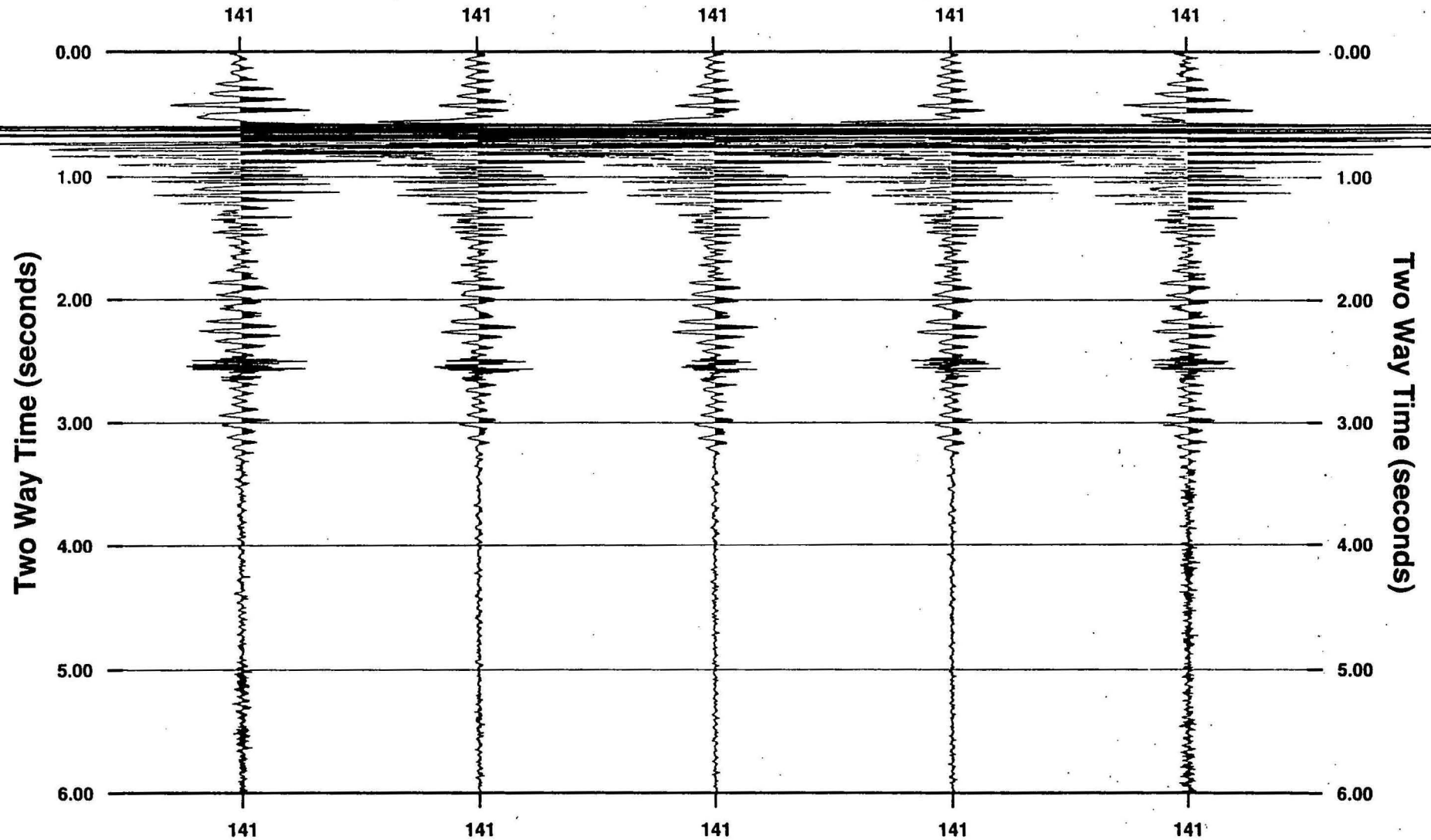
Walkaway Noise Tests
FFID 1 - 6
Spectral analysis of ground roll



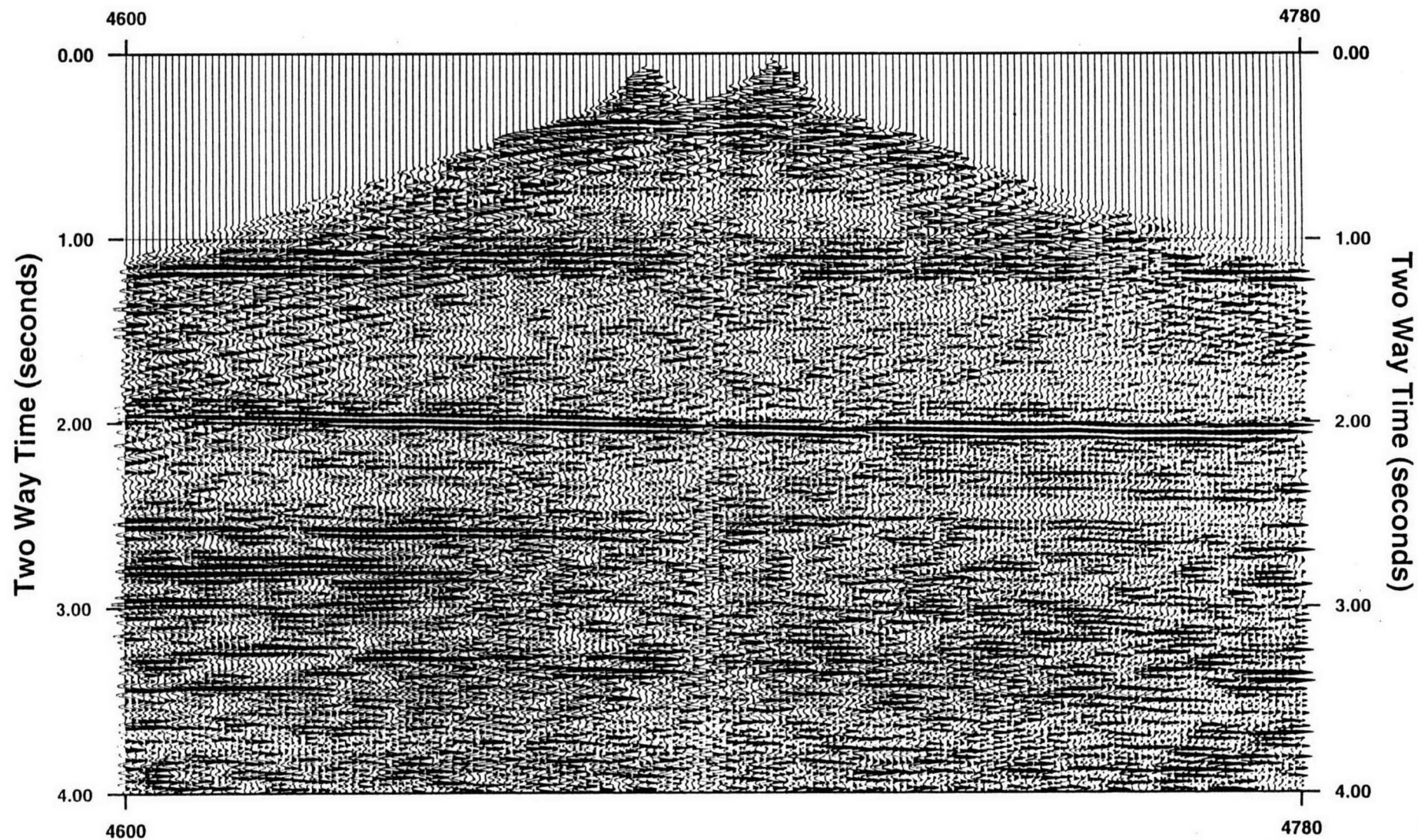
Remote Nest Test CABGAS
Vibes 0, 1, 2, 3, 0 using Channel 191



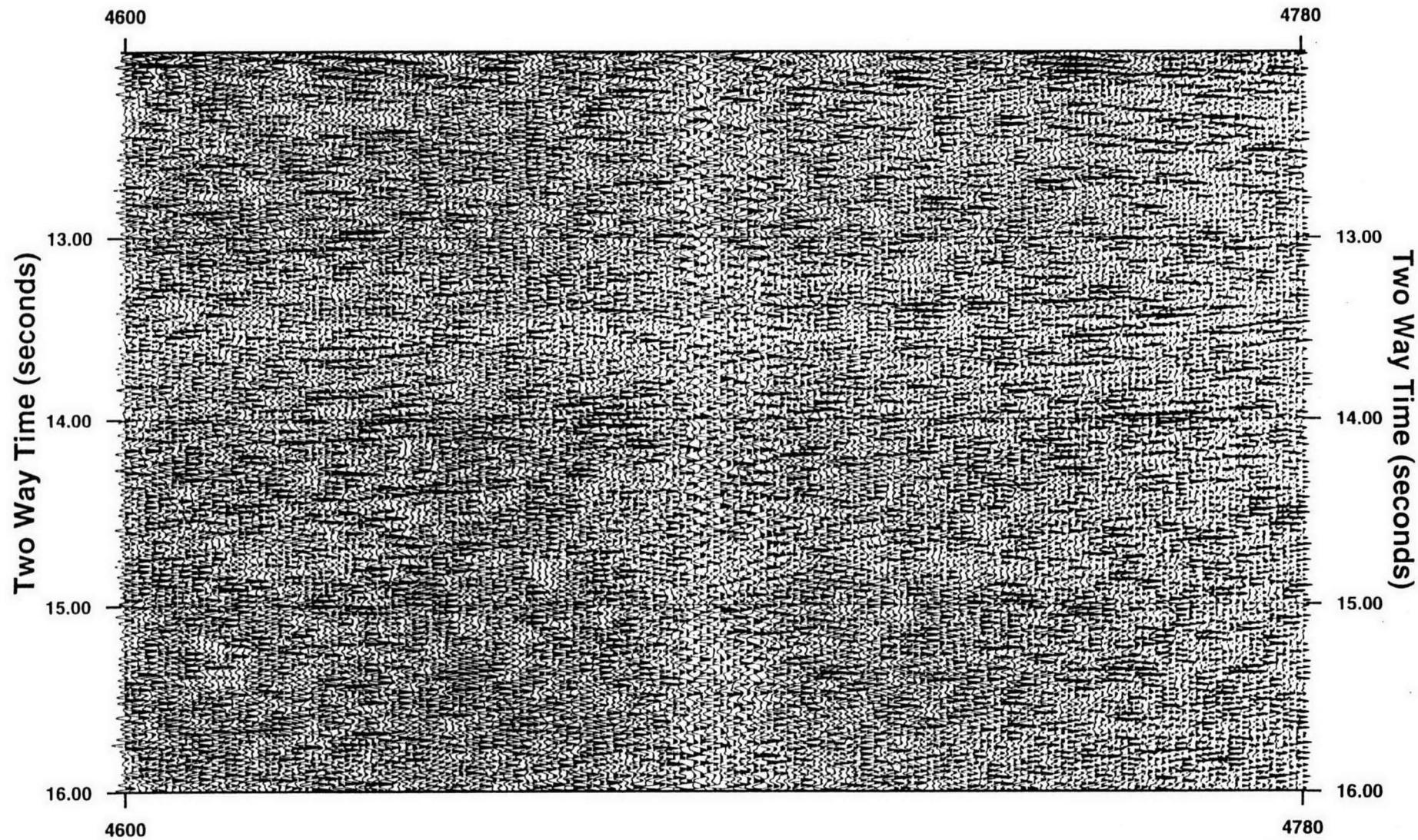
Remote Nest Test CABGAS
Vibes 0, 1, 2, 3, 0 using Channel 141



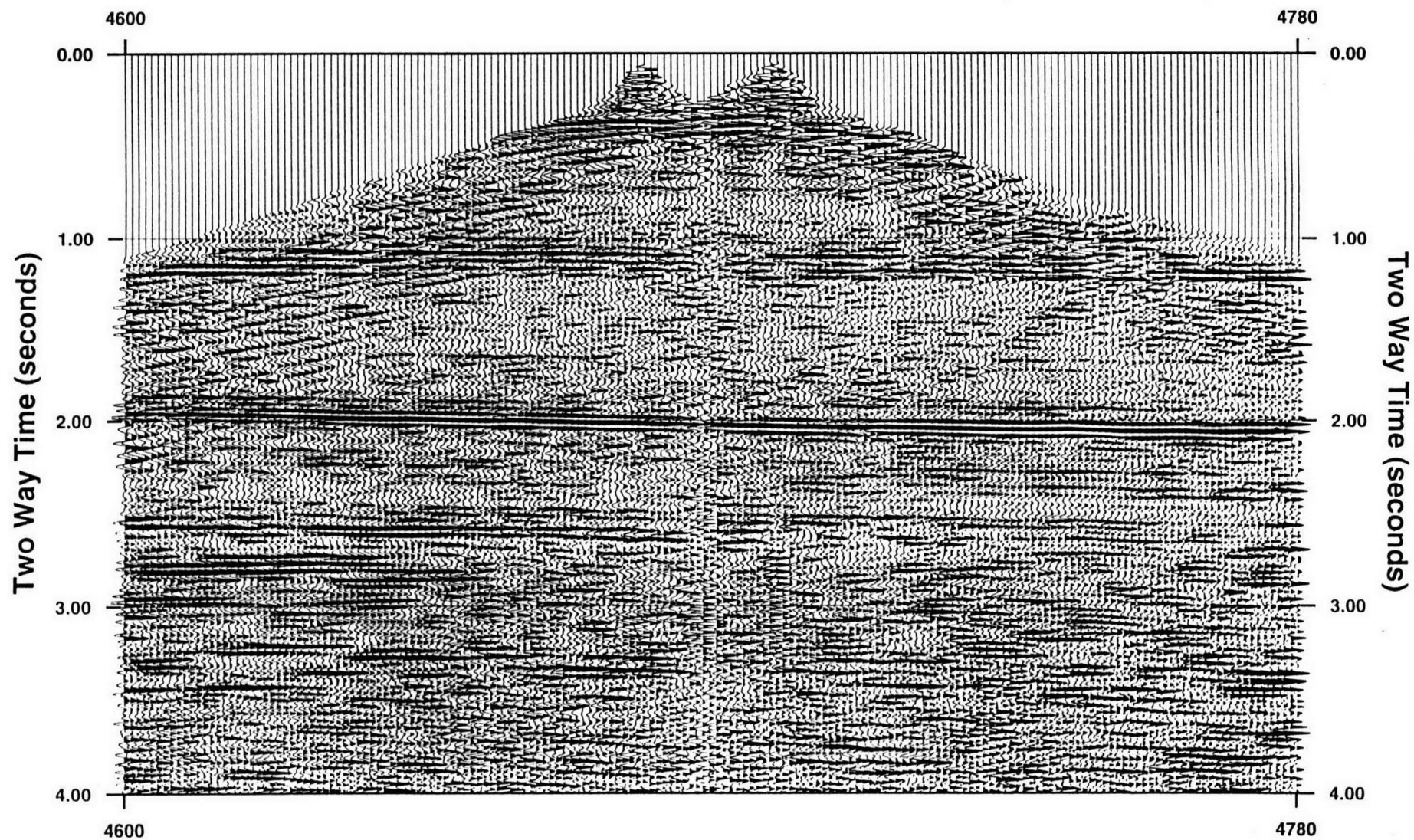
15m pad to pad 10 fold stack 30 m Vibrator array
FFID 14 to 23
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 3 Vibes



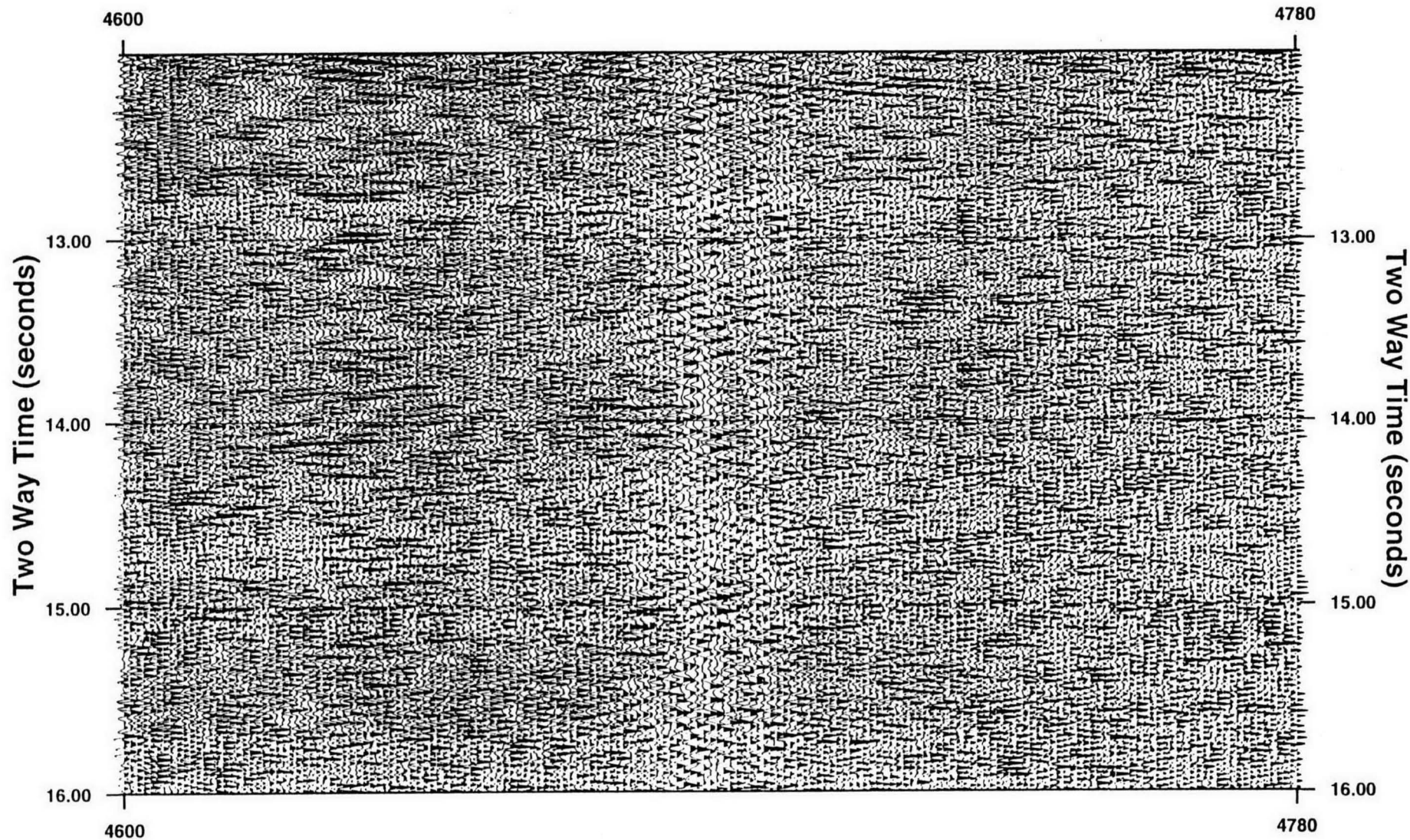
15m pad to pad 10 fold stack 30 m Vibrator array
FFID 14 to 23
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 3 Vibes



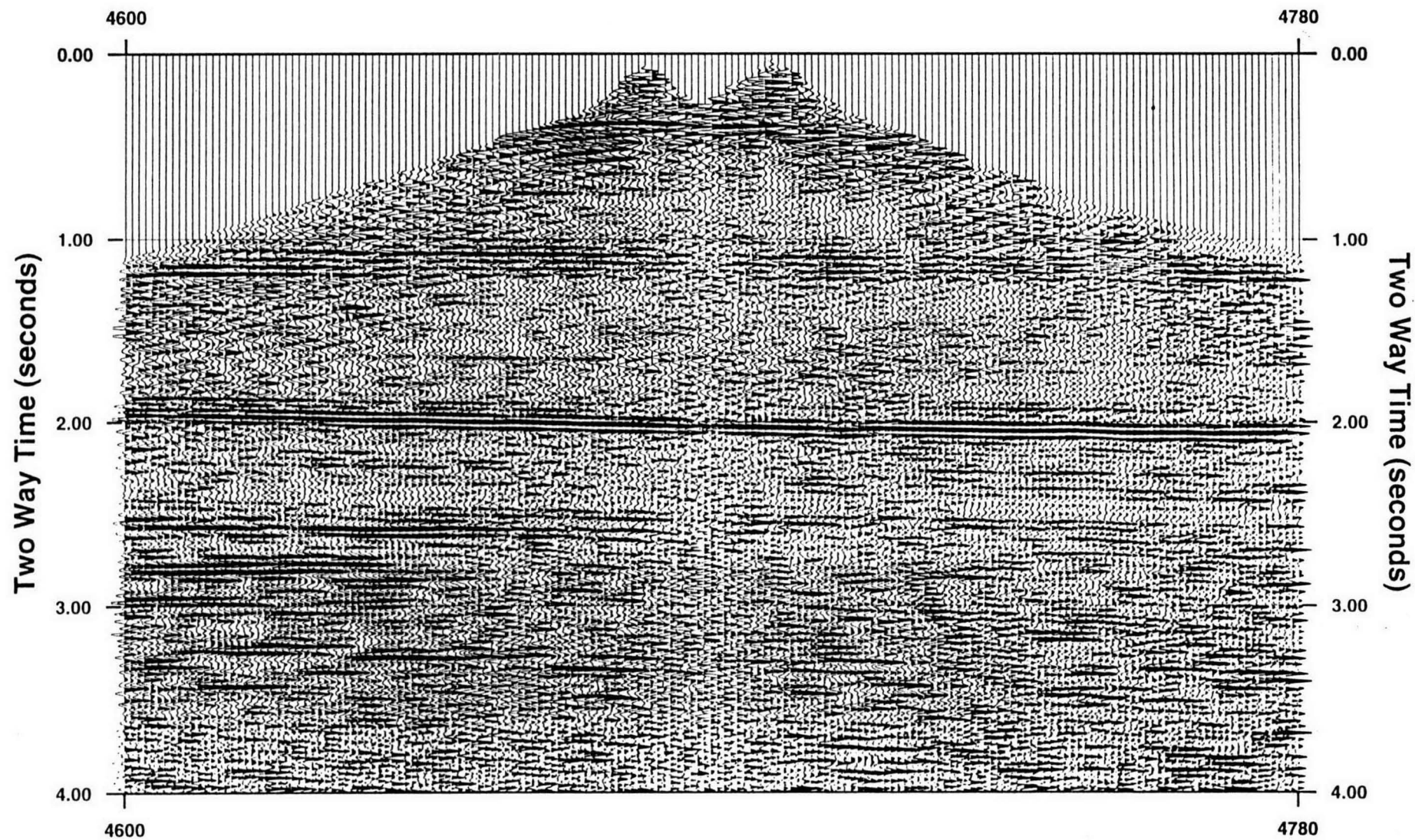
15m pad to pad 10 fold stack 15m moveup 60m Vibrator array
FFID 24 to 33
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 3 Vibes



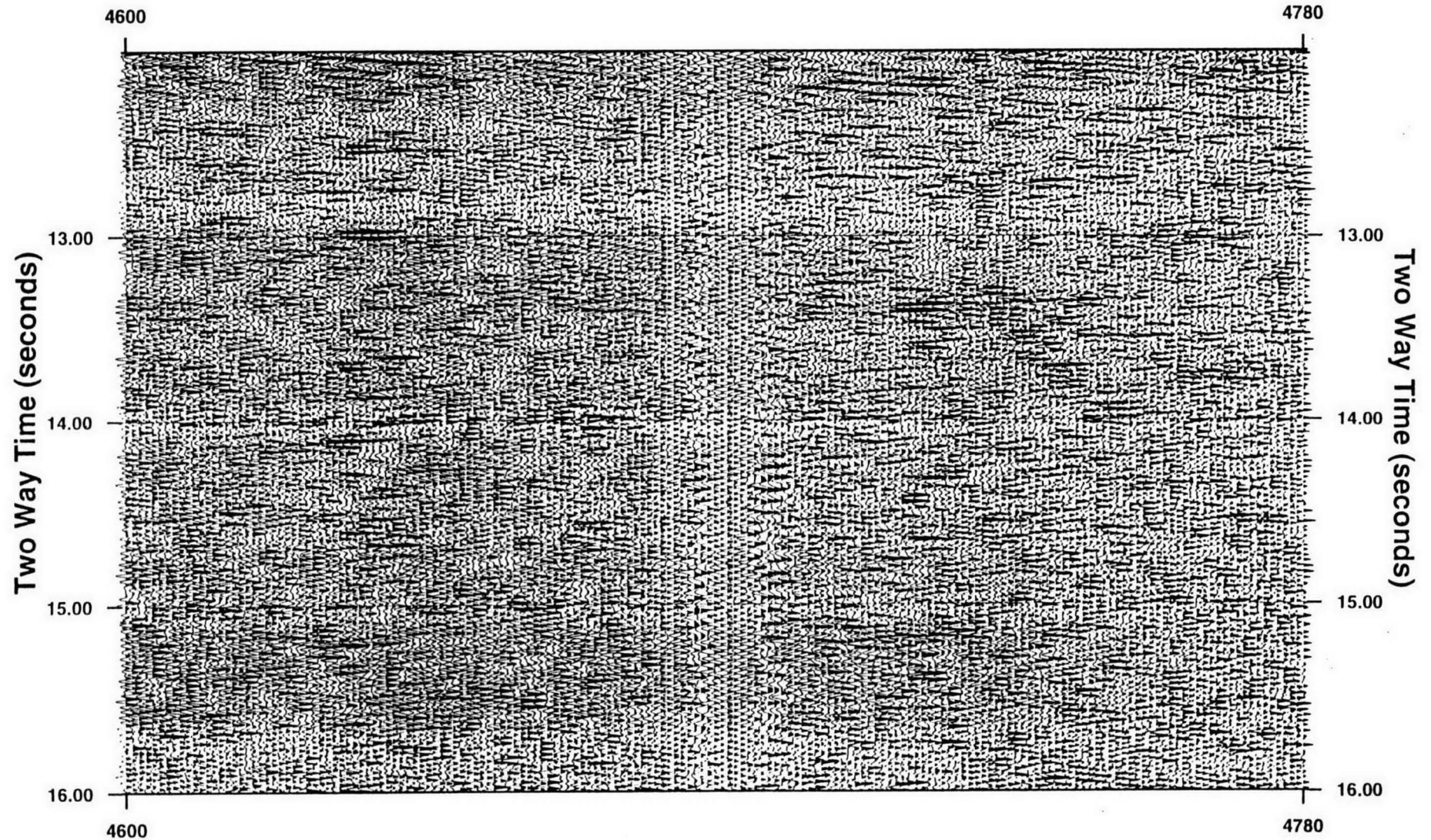
15m pad to pad 10 fold stack 15m moveup 60m Vibrator array
FFID 24 to 33
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 3 Vibes



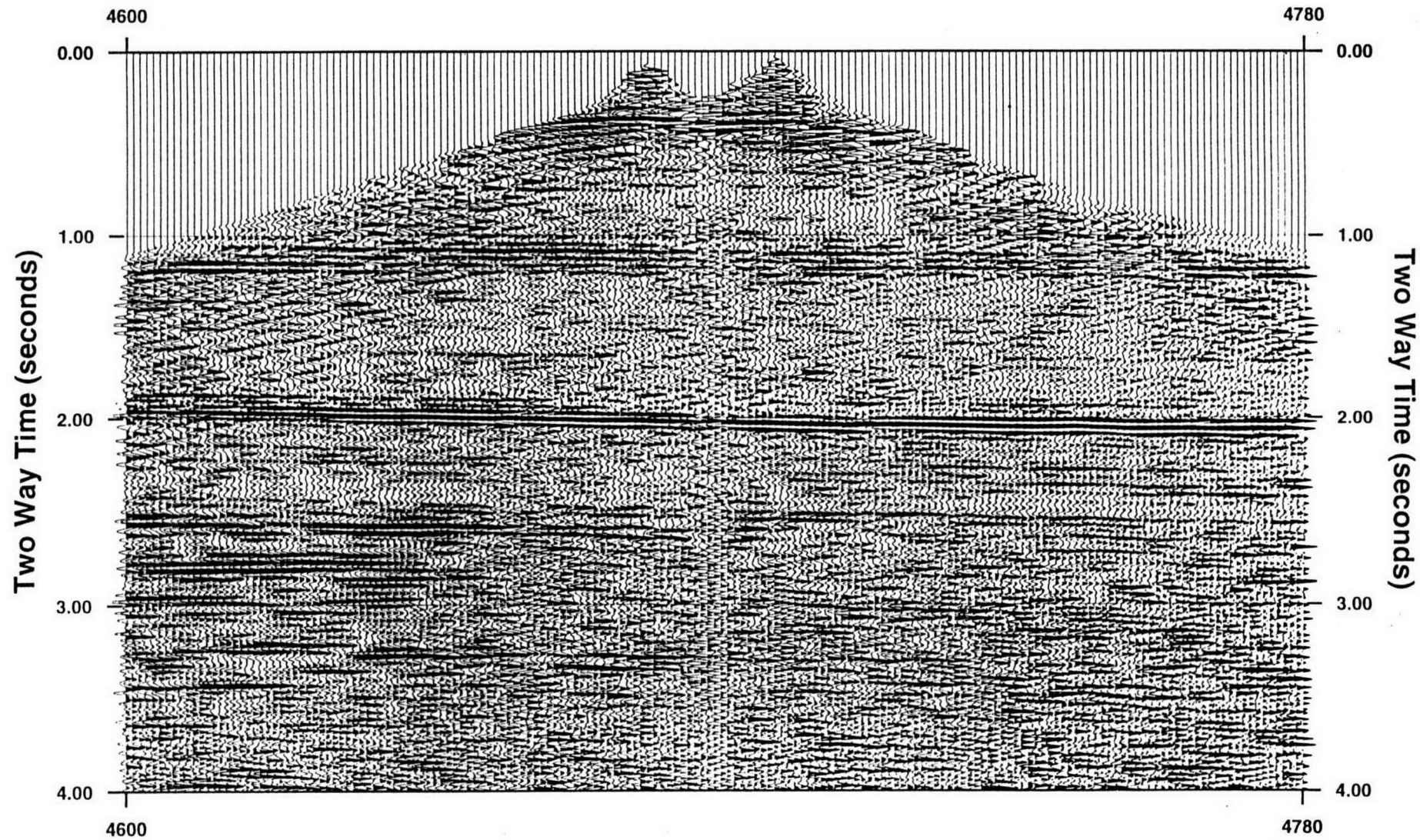
15m pad to pad 10 fold stack no moveup 15m Vibrator array
FFID 34 to 43
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 2 Vibes



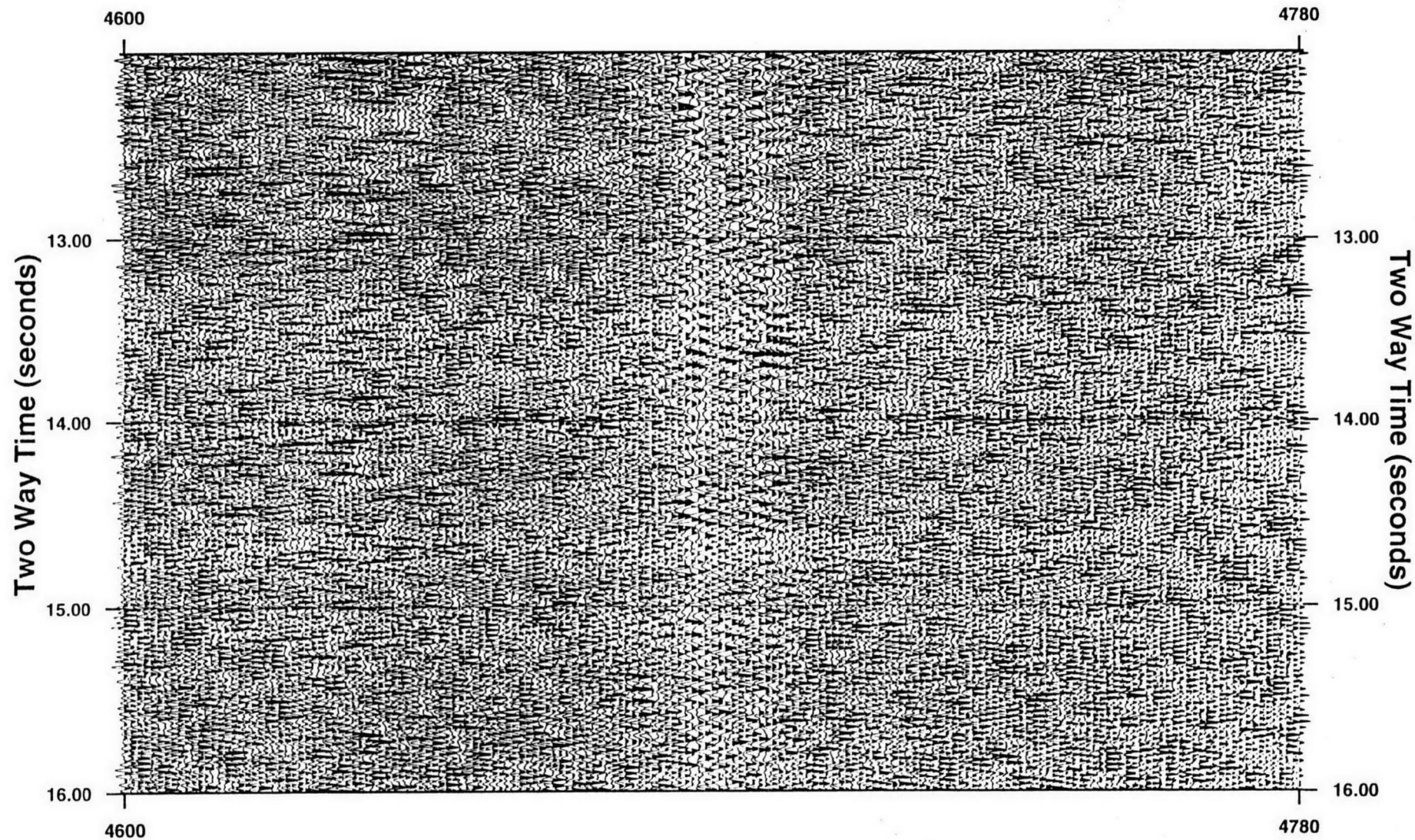
15m pad to pad 10 fold stack no moveup 15m Vibrator array
FFID 34 to 43
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 2 Vibes



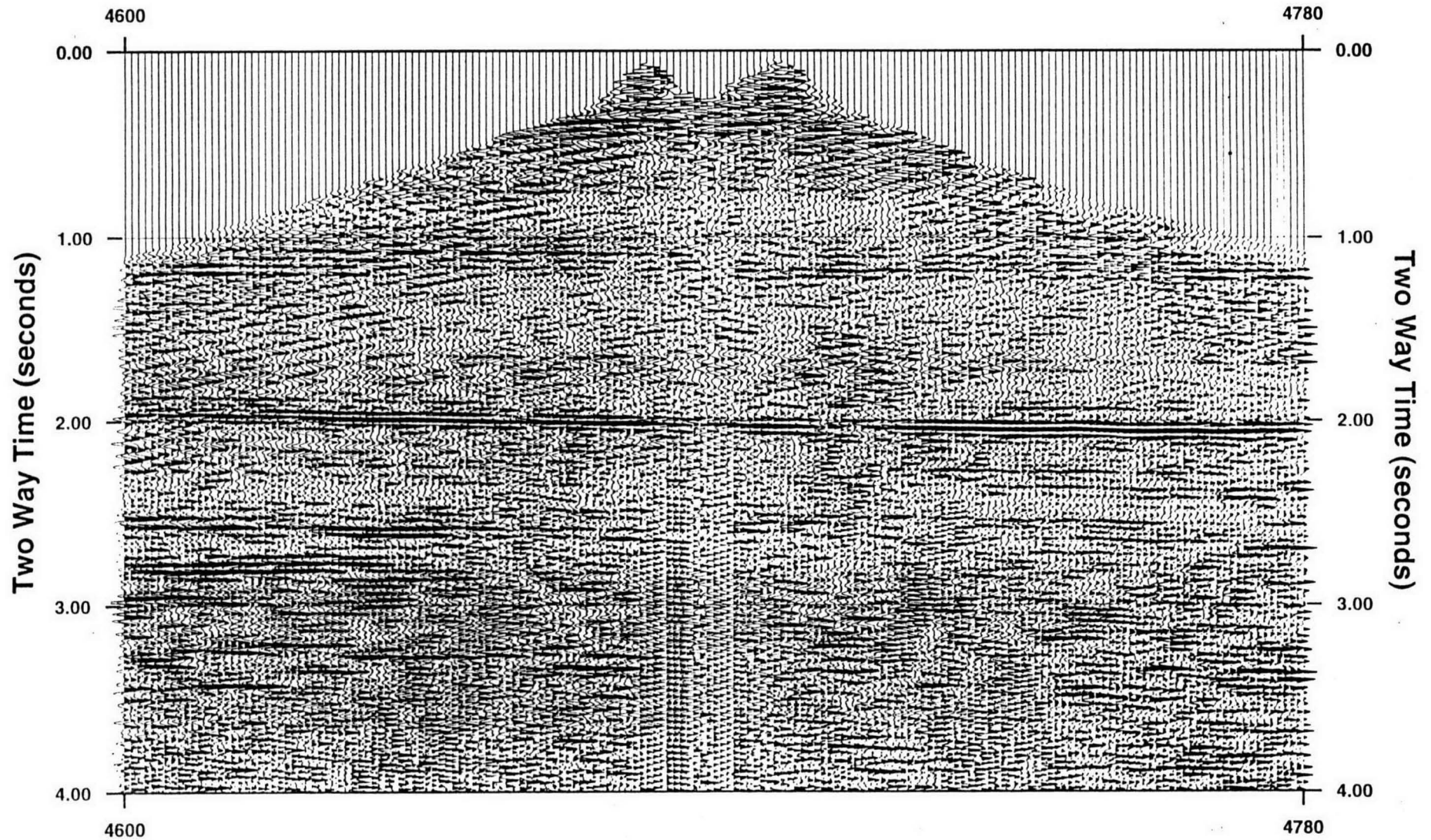
15m pad to pad 10 fold stack 15m moveup 45m Vibrator array
FFID 44 to 53
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 2 Vibes



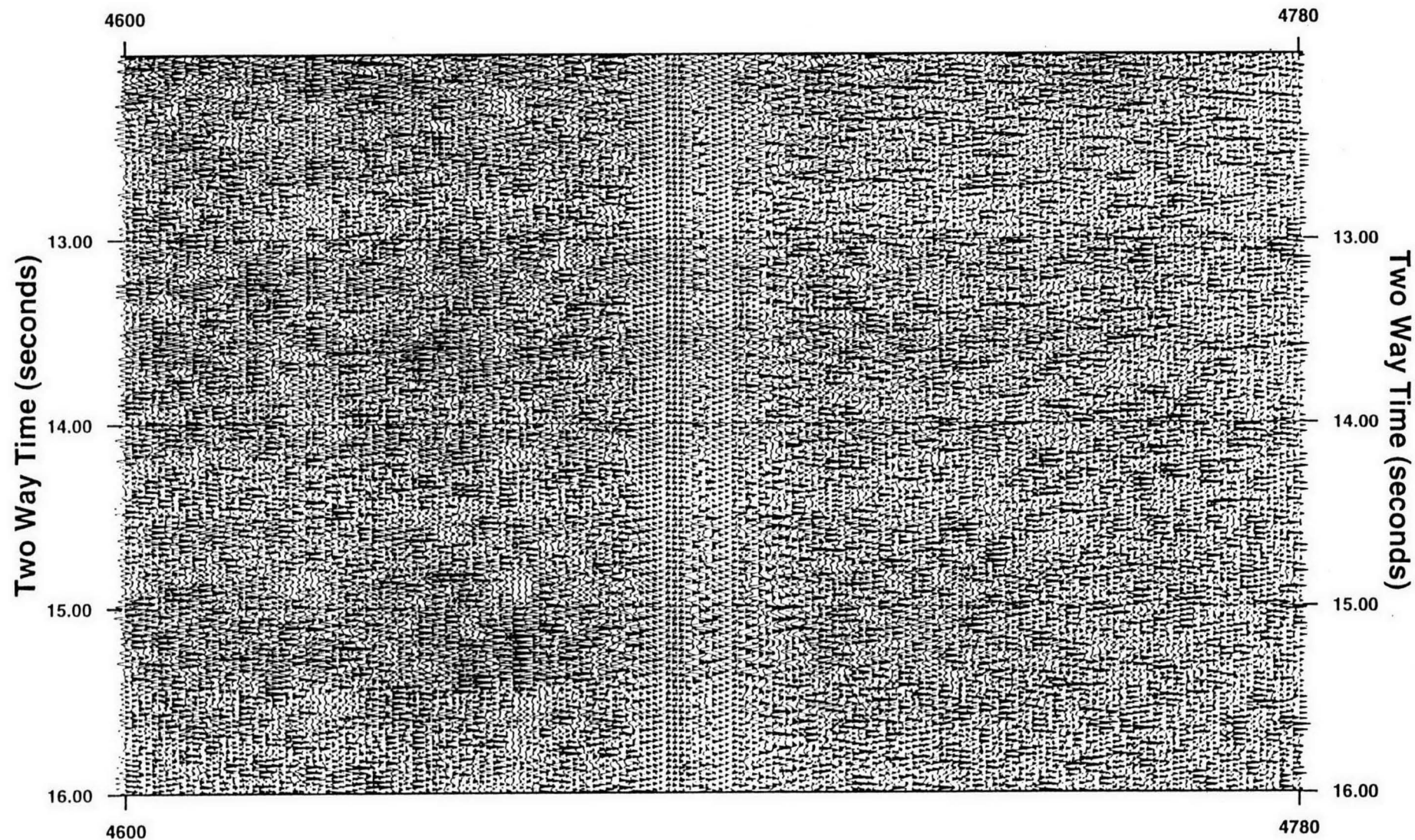
15m pad to pad 10 fold stack 15m moveup 45m Vibrator array
FFID 44 to 53
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 2 Vibes



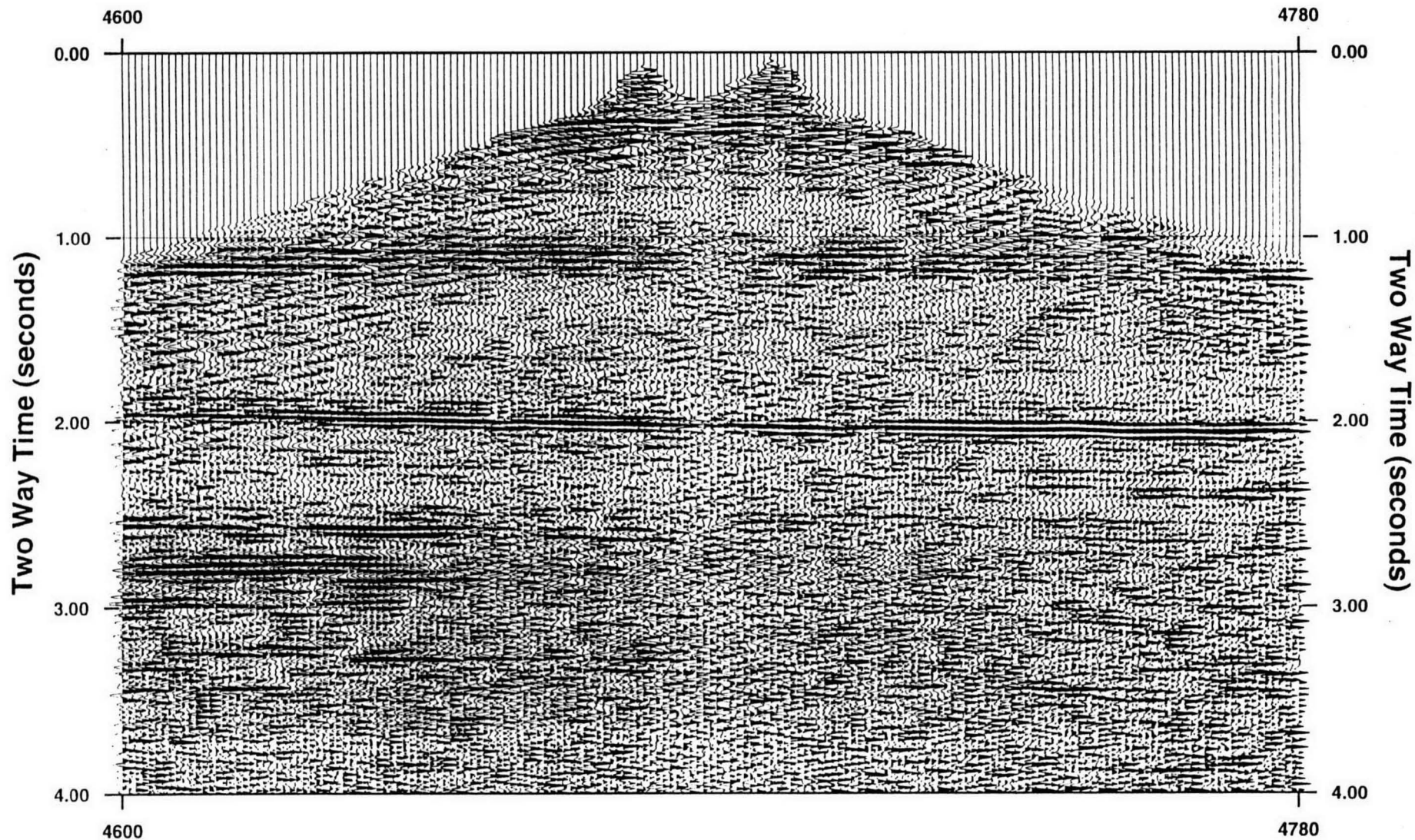
15m pad to pad 10 fold stack point source
FFID 54 to 63
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 1 Vibes



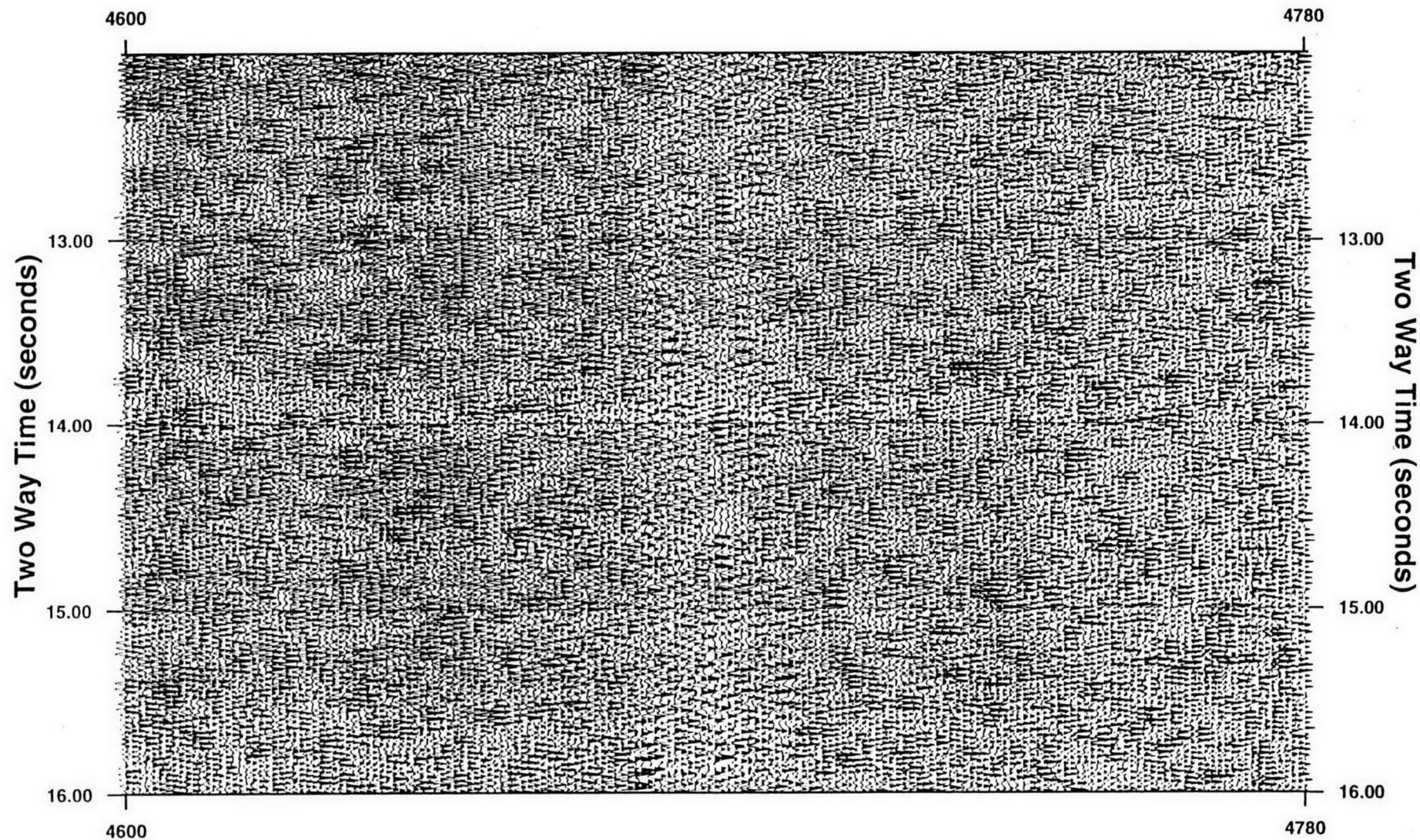
15m pad to pad 10 fold stack point source
FFID 54 to 63
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 1 Vibes



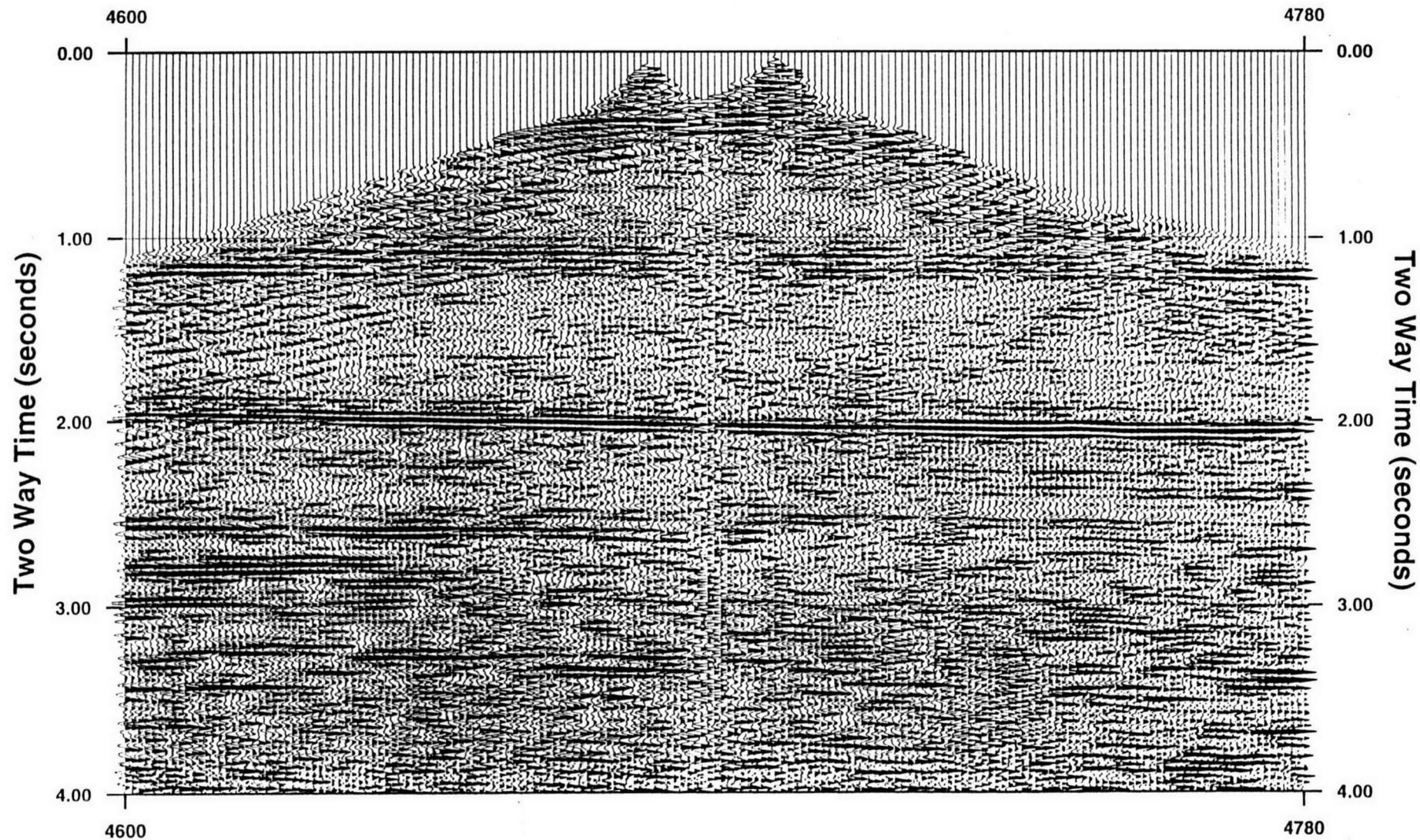
15m pad to pad 10 fold stack 15m moveup 30m Vibrator array
FFID 64 to 73
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 1 Vibe



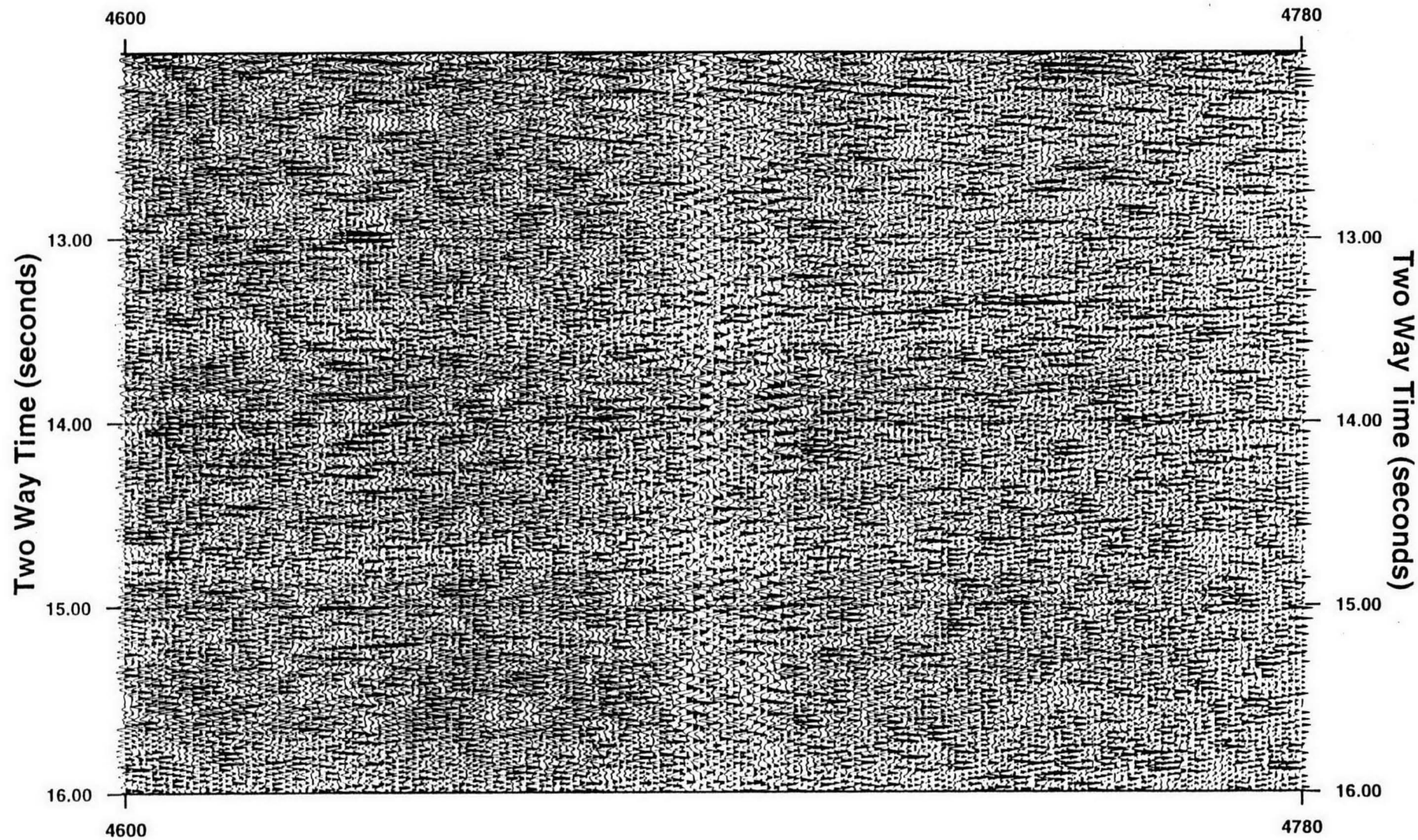
15m pad to pad 10 fold stack 15m moveup 30m Vibrator array
FFID 64 to 73
Sweep freq 8-100Hz 3 sweeps sweep length 8secs 1 Vibe



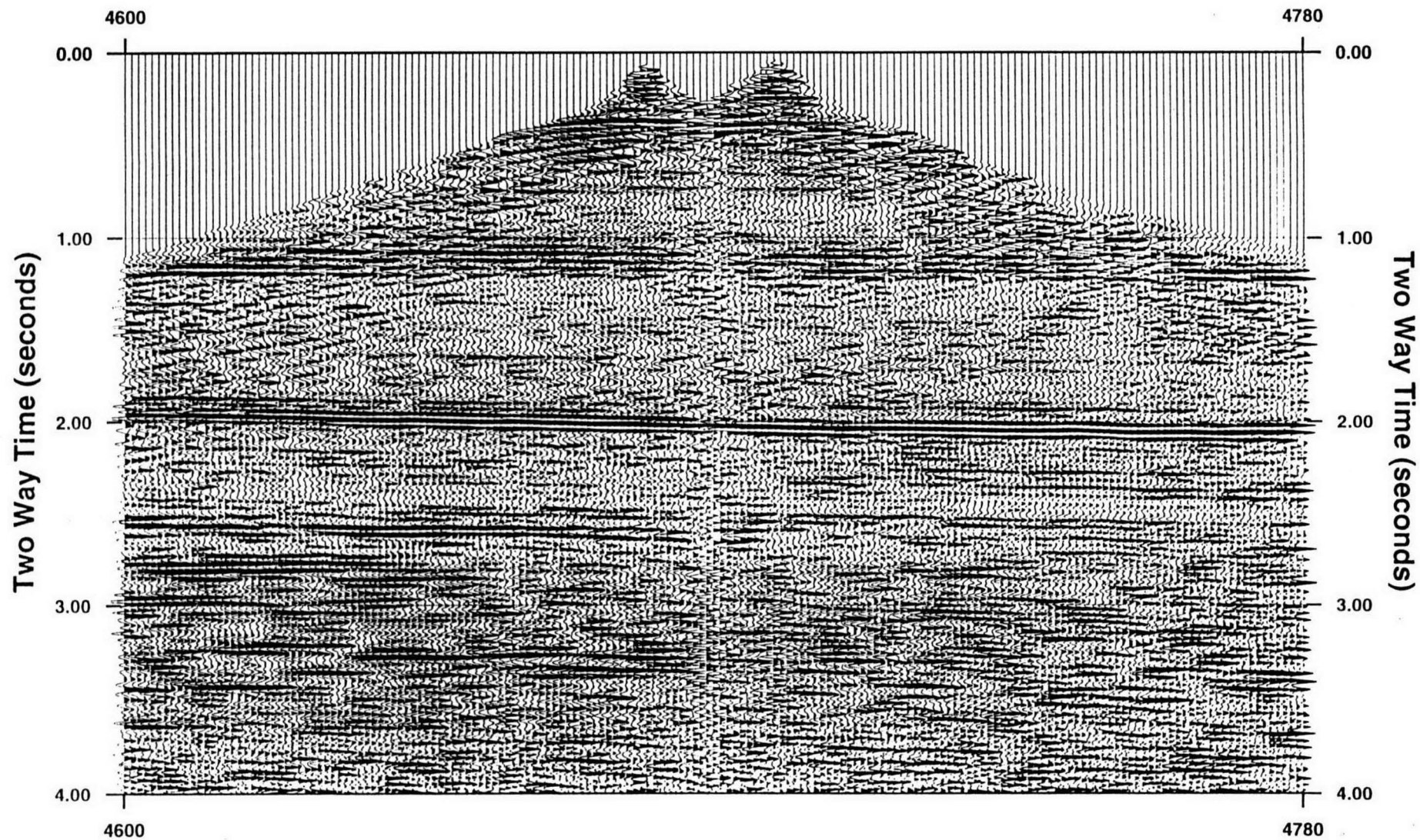
15m pad to pad 10 fold stack 30m Vibrator array
FFID 74 to 83
Sweep freq 8-100Hz 4 sweeps sweep length 8secs 3 Vibes



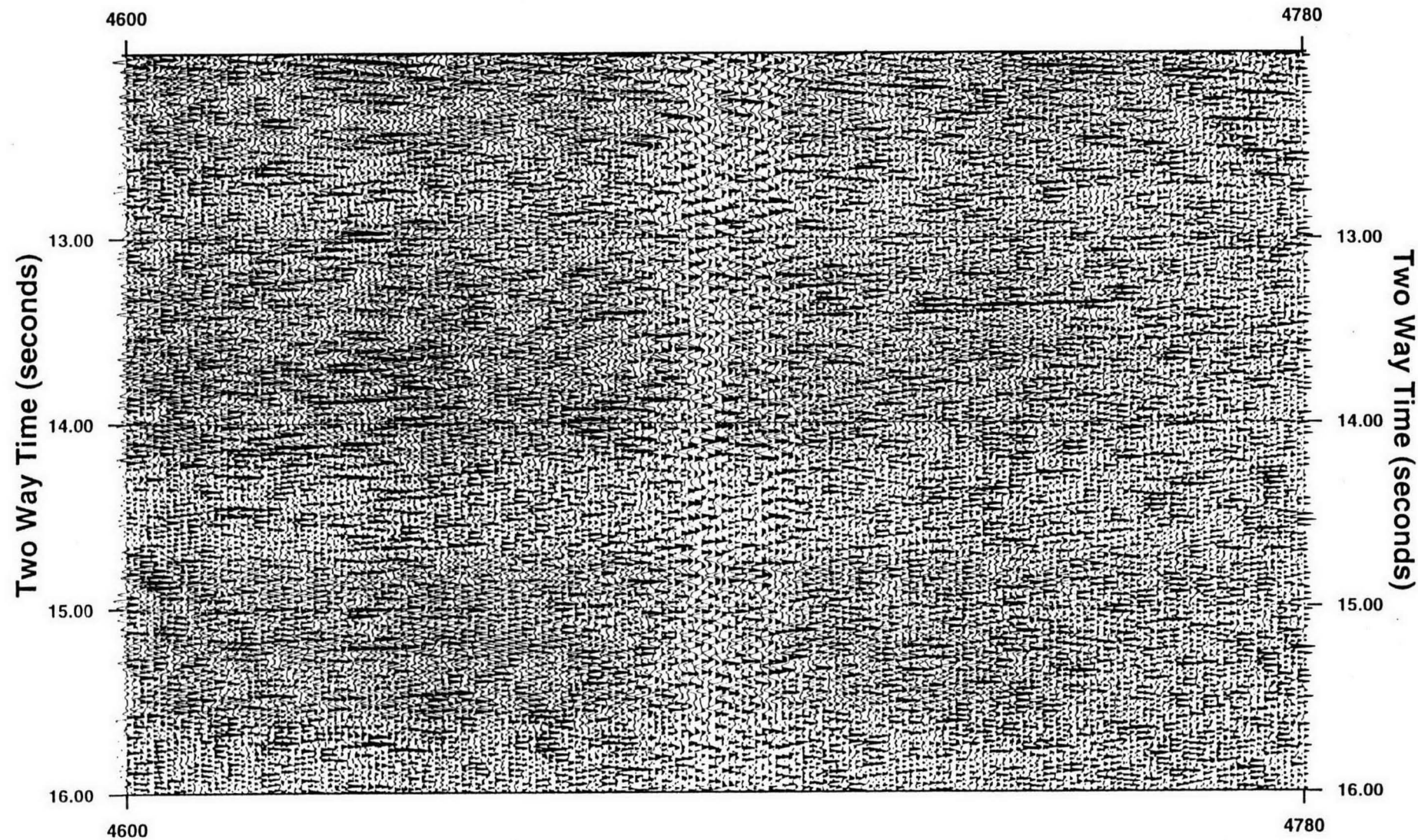
15m pad to pad 10 fold stack 30m Vibrator array
FFID 74 to 83
Sweep freq 8-100Hz 4 sweeps sweep length 8secs 3 Vibes



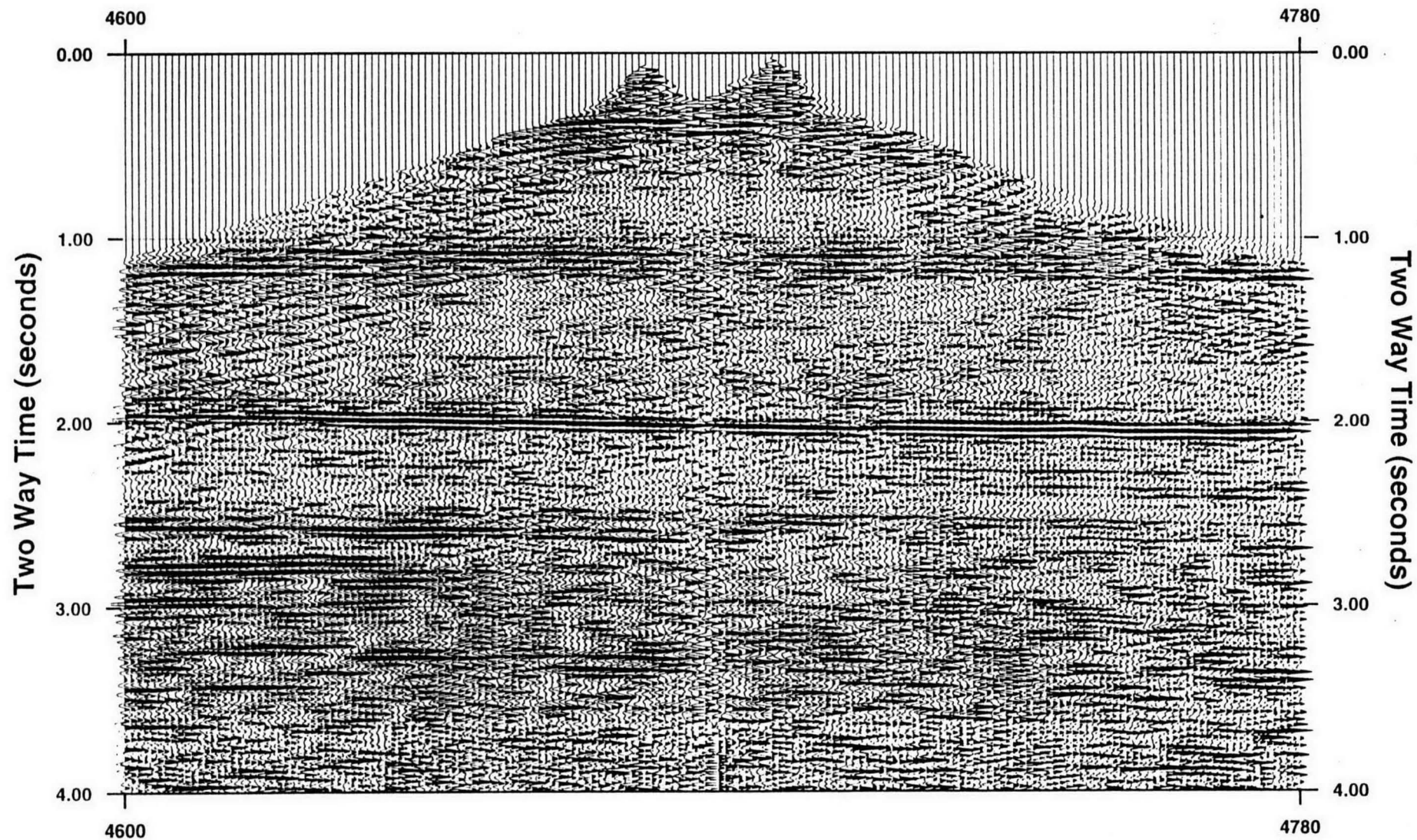
15m pad to pad 10 fold stack 7.5m moveup 52.5m Vibrator array
FFID 84 to 93
Sweep freq 8-100Hz 4 sweeps sweep length 8secs 3 Vibes



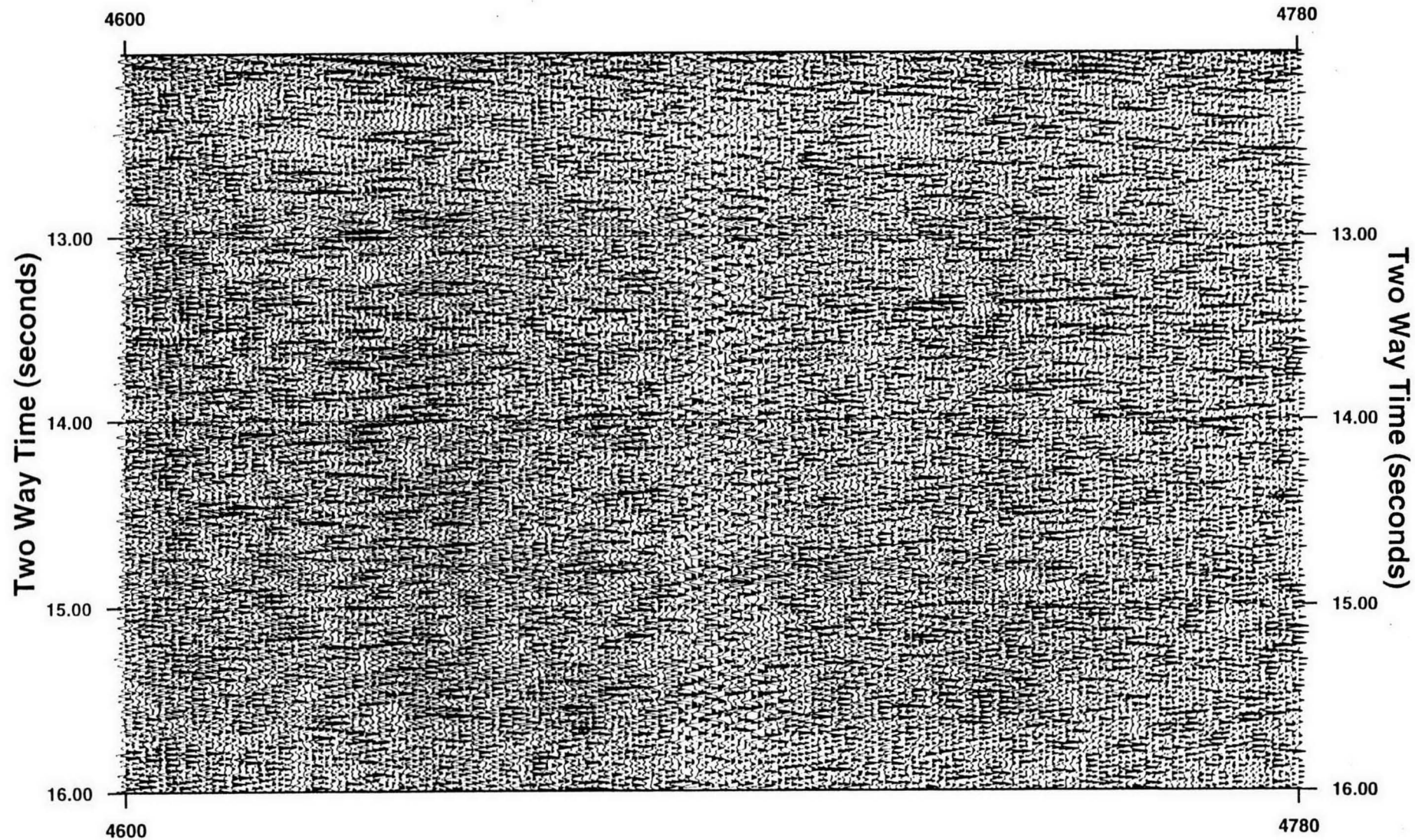
15m pad to pad 10 fold stack 7.5m moveup 52.5m Vibrator array
FFID 84 to 93
Sweep freq 8-100Hz 4 sweeps sweep length 8secs 3 Vibes



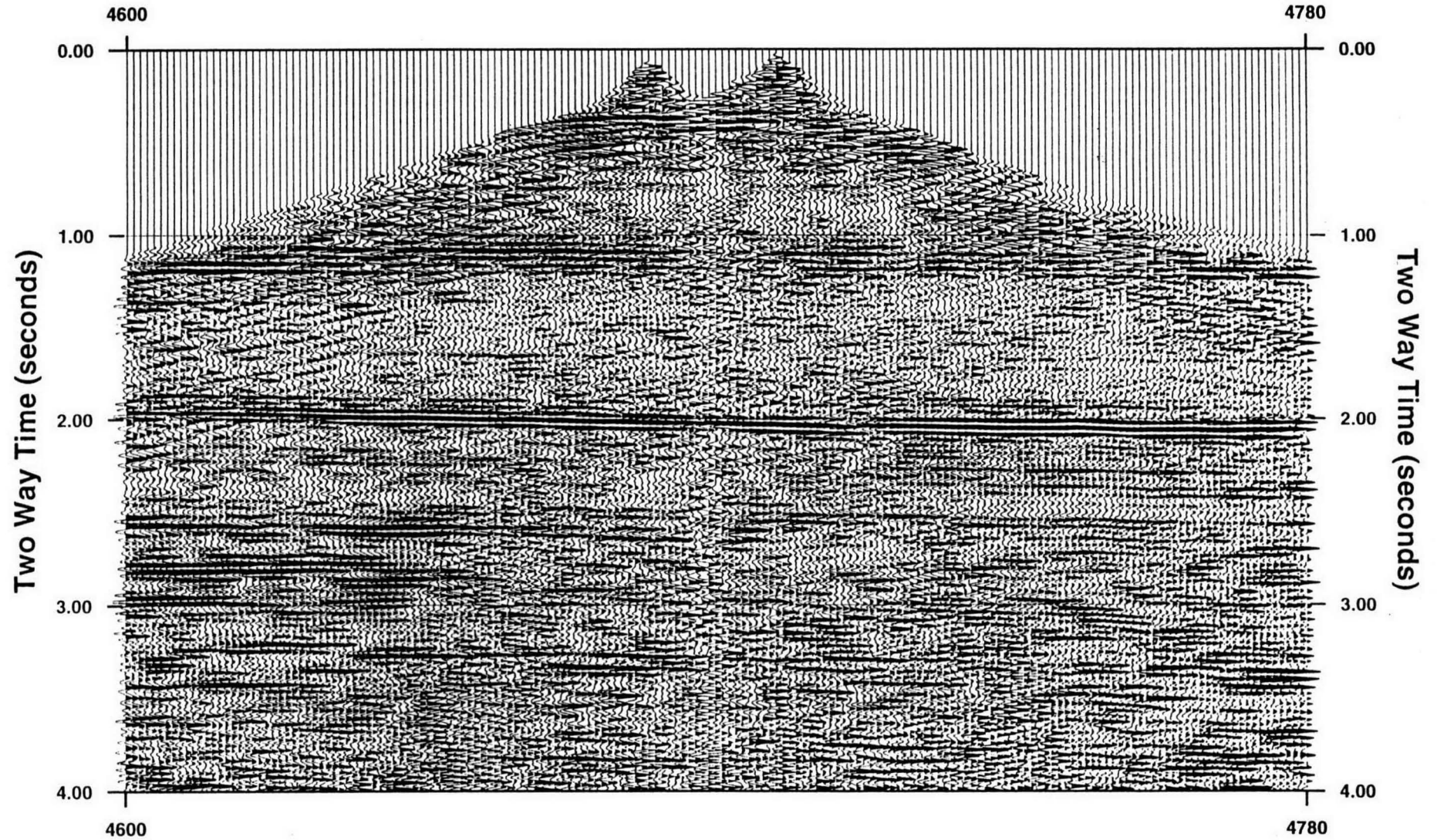
15m pad to pad 10 fold stack 75% force
FFID 94 to 103
Sweep freq 8-100Hz 4 sweeps sweep length 8secs 3 Vibes



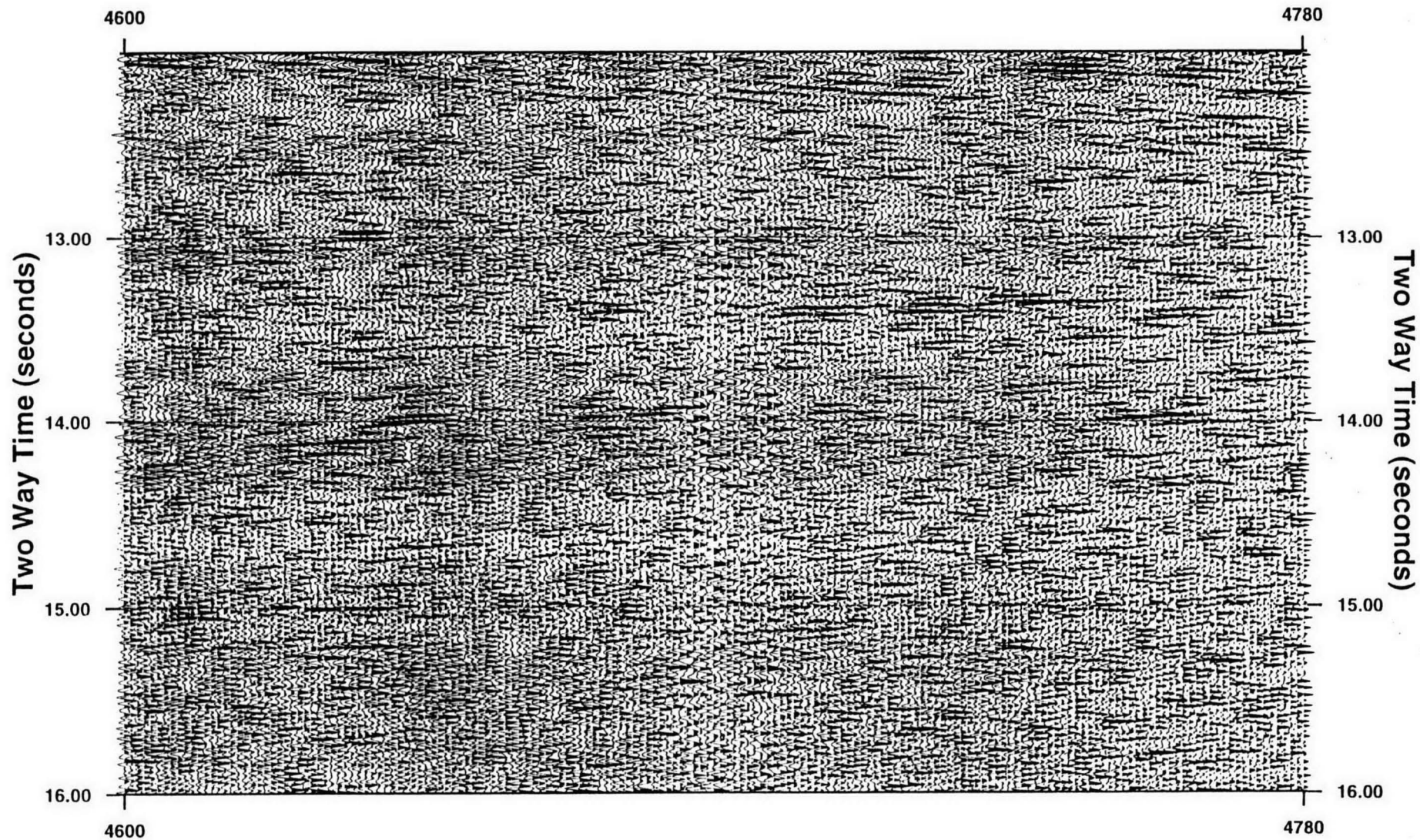
15m pad to pad 10 fold stack 75% force
FFID 94 to 103
Sweep freq 8-100Hz 4 sweeps sweep length 8secs 3 Vibes



15m pad to pad 10 fold stack 90% force
FFID 104 to 113
Sweep freq 8-100Hz 4 sweeps sweep length 8secs 3 Vibes



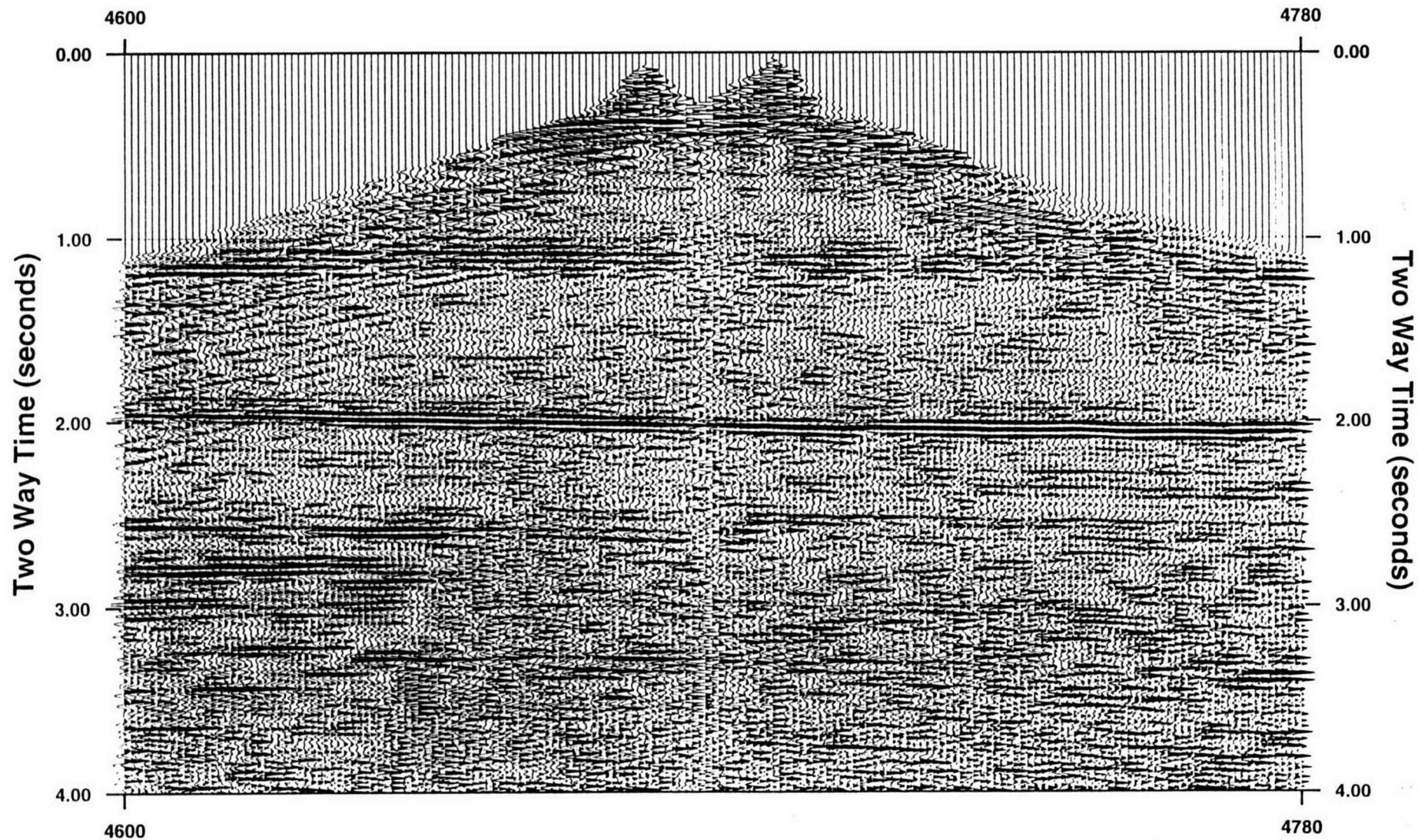
15m pad to pad 10 fold stack 90% force
FFID 104 to 113
Sweep freq 8-100Hz 4 sweeps sweep length 8secs 3 Vibes



15m pad to pad 10 fold stack phase rotated sweep 0,90,180,270

FFID 114 to 123

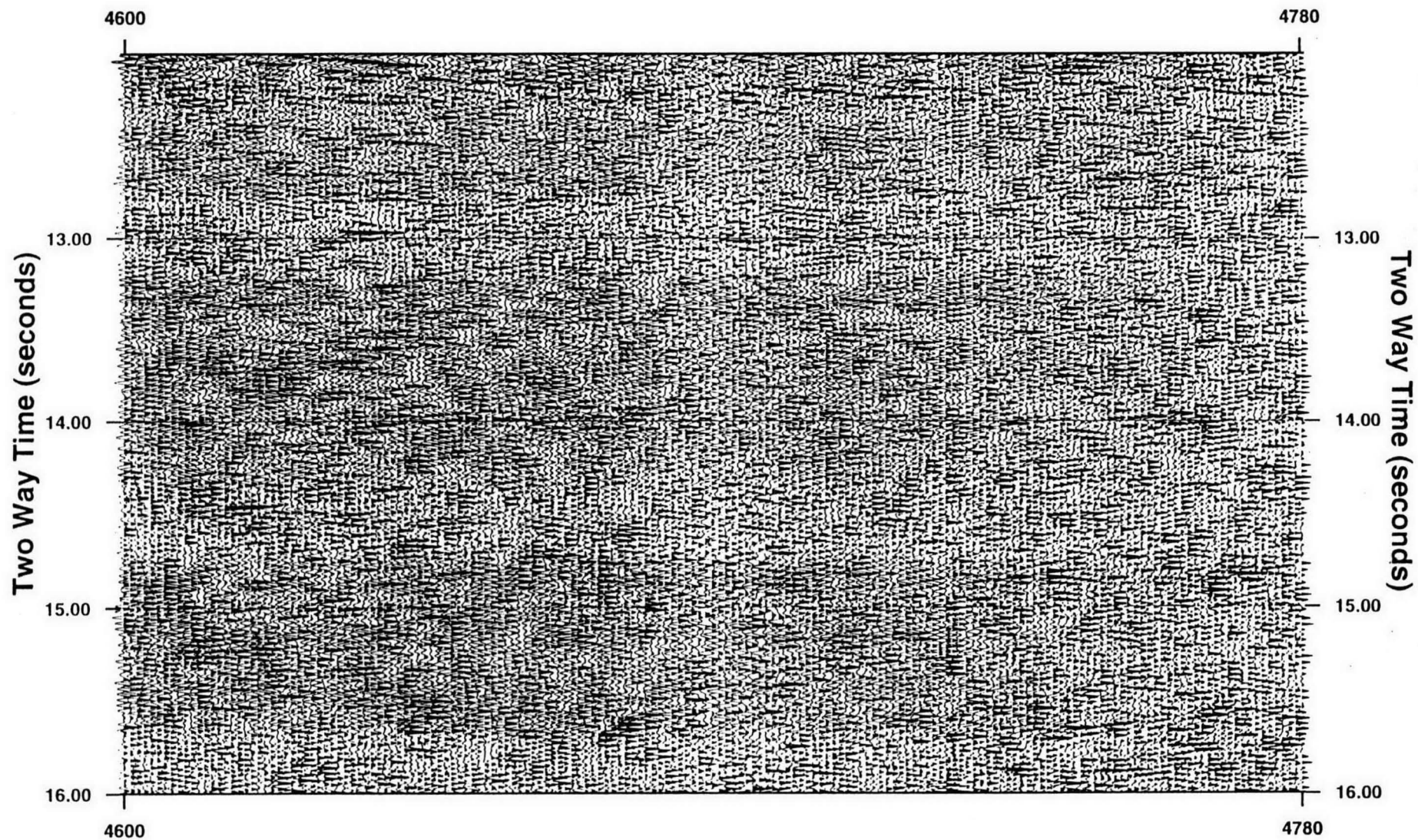
Sweep freq 8-80 Hz 4 sweeps sweep length 8secs 3 Vibes



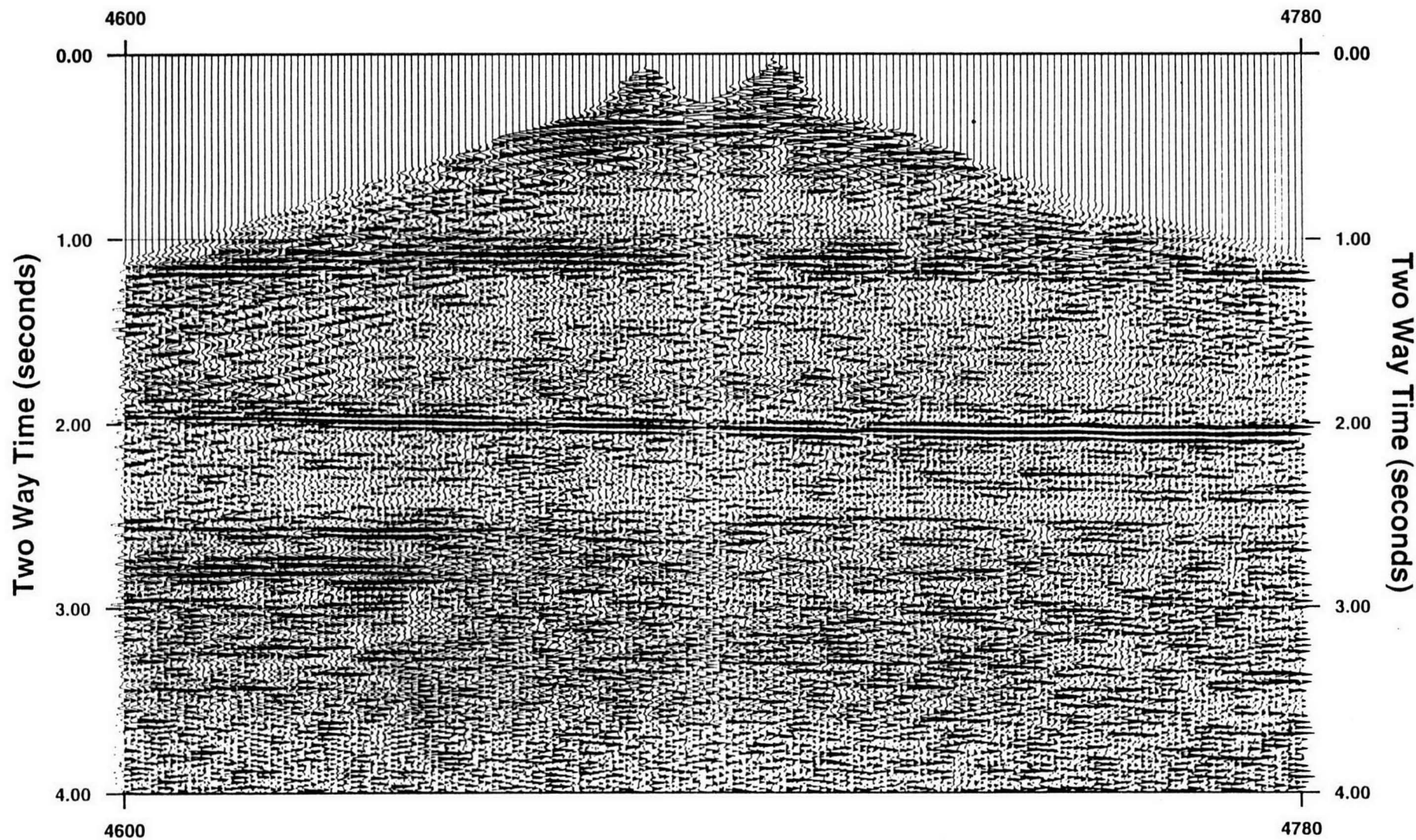
15m pad to pad 10 fold stack phase rotated sweep 0,90,180,270

FFID 114 to 123

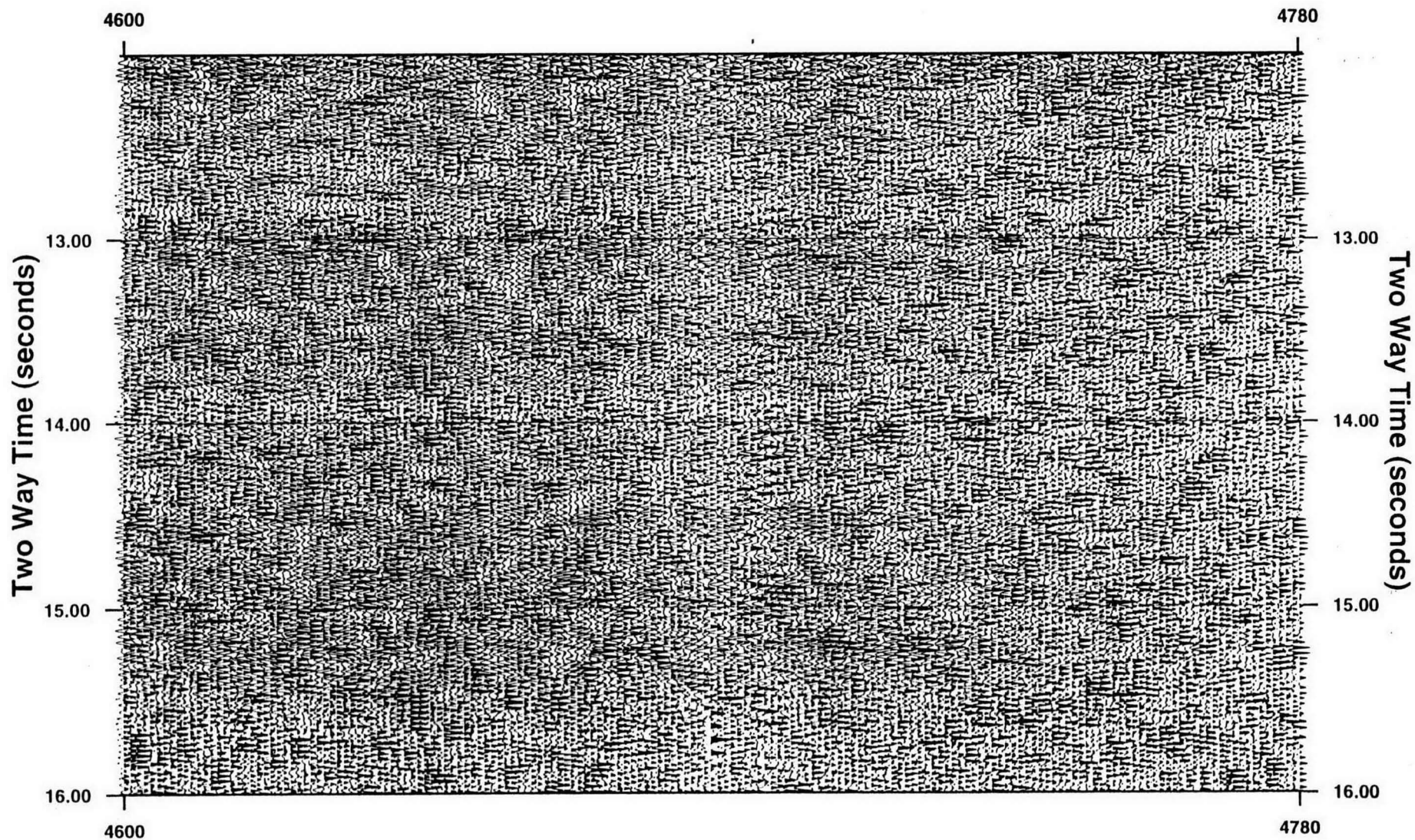
Sweep freq 8-80 Hz 4 sweeps sweep length 8secs 3 Vibes



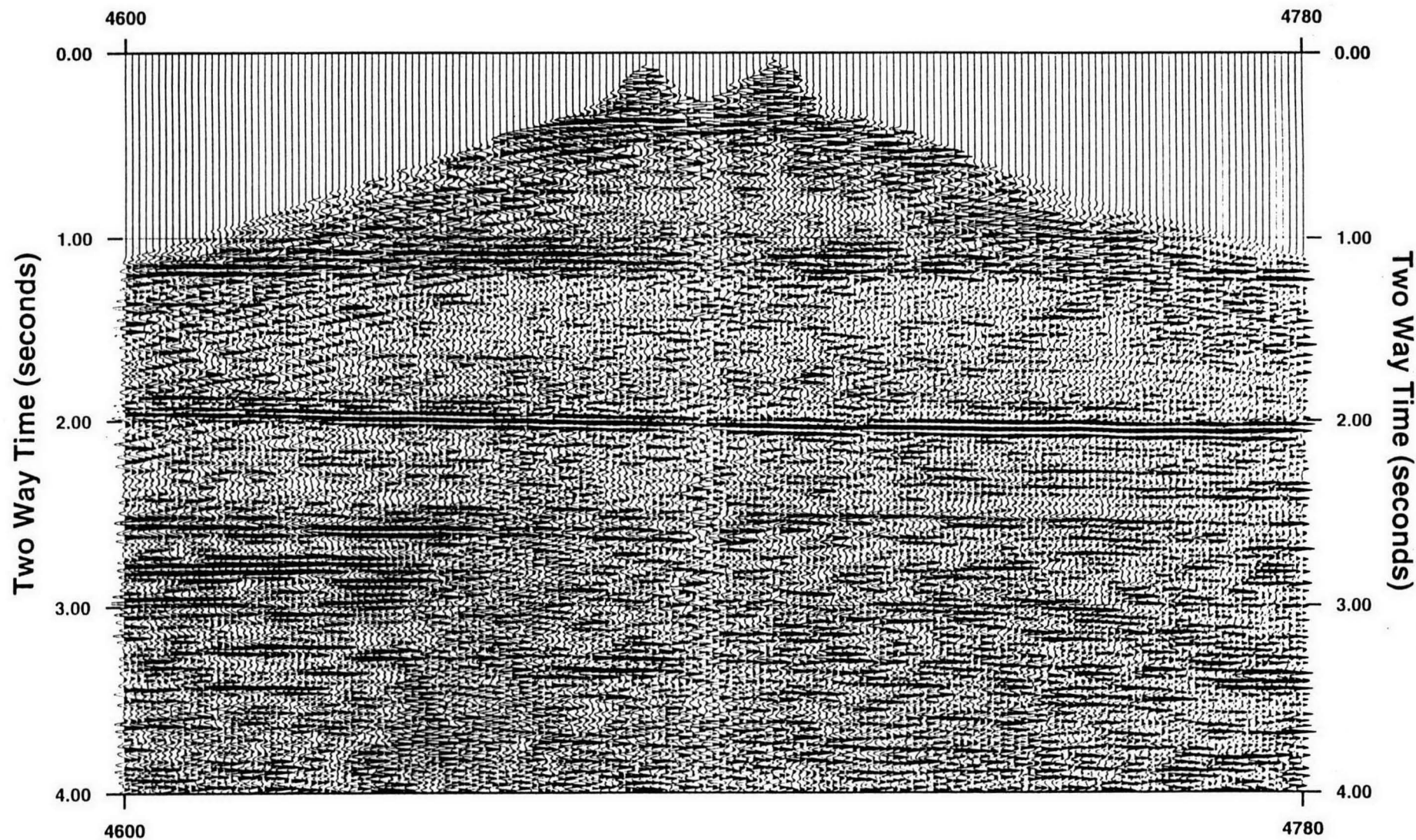
15m pad to pad 10 fold stack 16 sec ie 4, 4 sec sweeps
FFID 124 to 133
Sweep freq 8-80 Hz 4 sweeps sweep length 4secs 3 Vibes



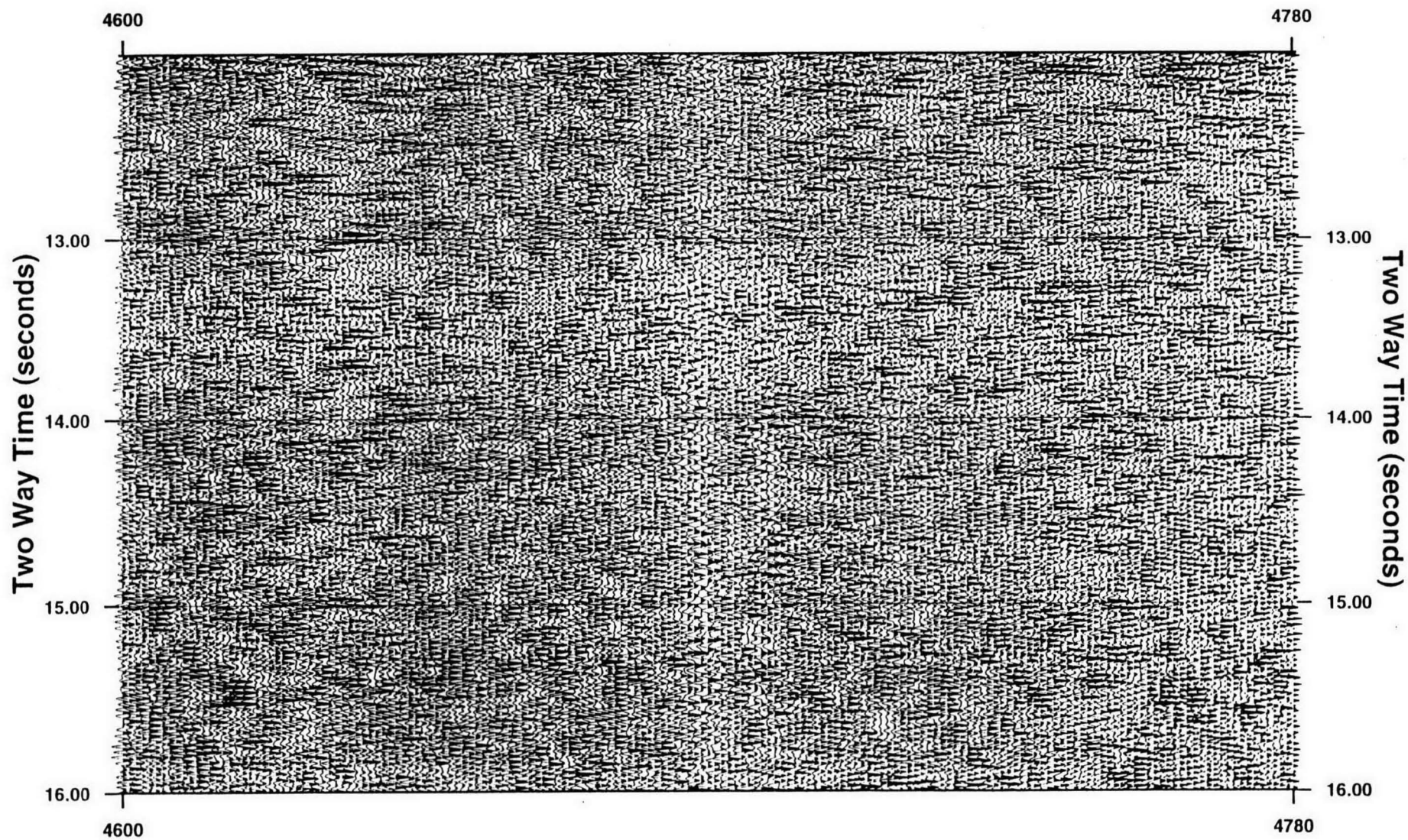
15m pad to pad 10 fold stack 16 sec ie 4 x 4 sec sweeps
FFID 124 to 133
Sweep freq 8-80 Hz 4 sweeps sweep length 4secs 3 Vibes



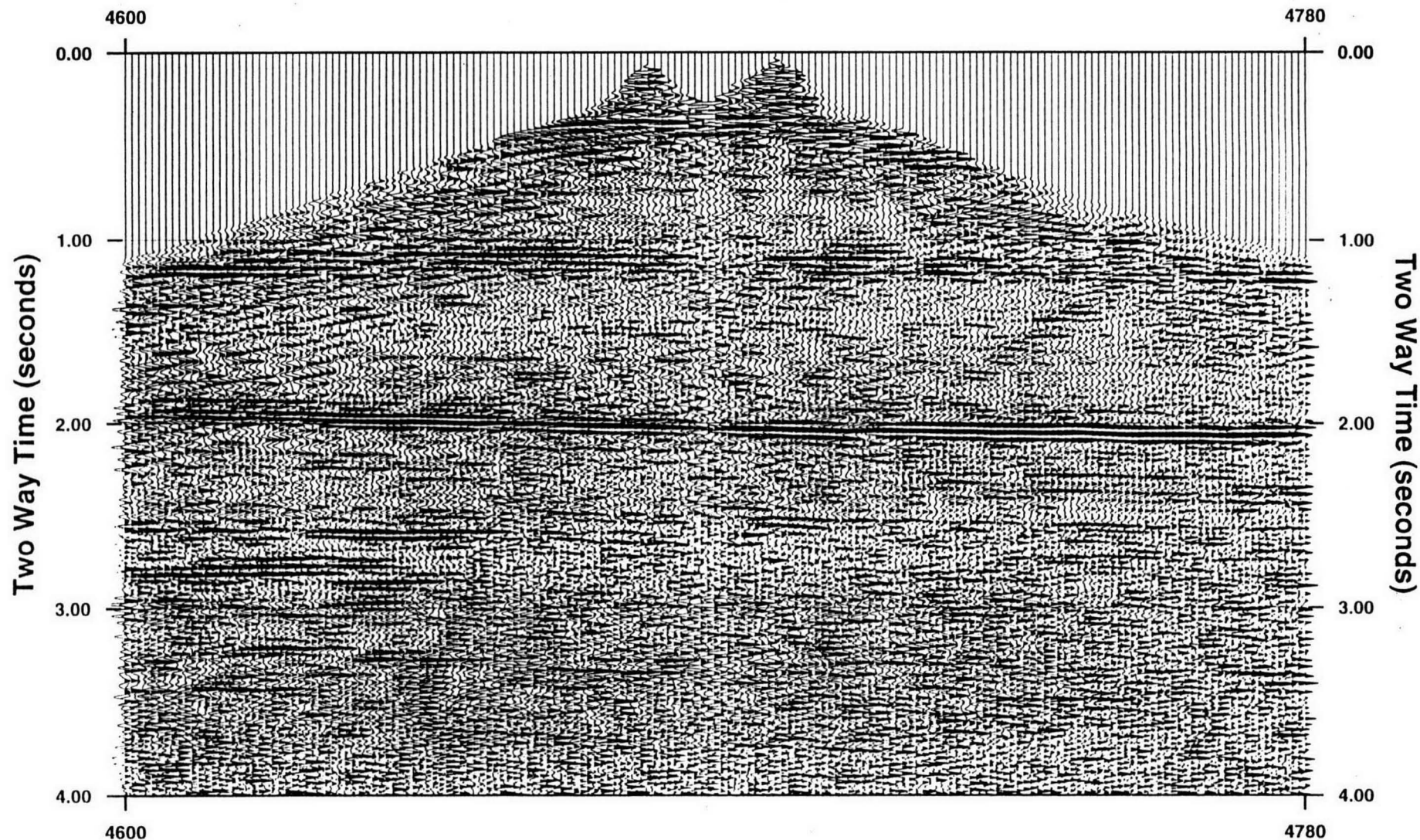
15m pad to pad 10 fold stack 64 sec ie 4 x 16 sec sweeps
FFID 134 to 143
Sweep freq 8-80 Hz 4 sweeps sweep length 16secs 3 Vibes



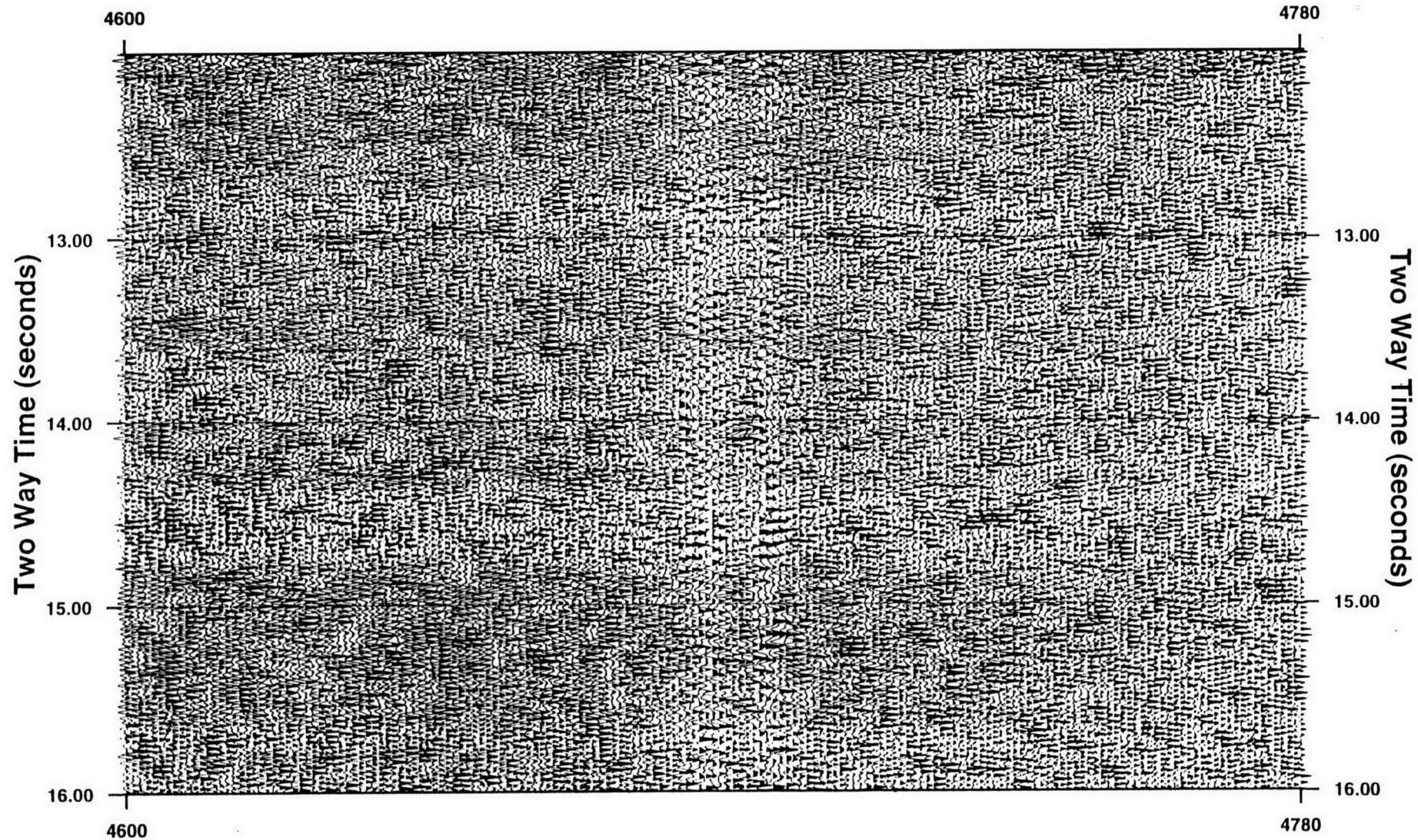
15m pad to pad 10 fold stack 64 sec ie 4 x 16 sec sweeps
FFID 134 to 143
Sweep freq 8-80 Hz 4 sweeps sweep length 16secs 3 Vibes



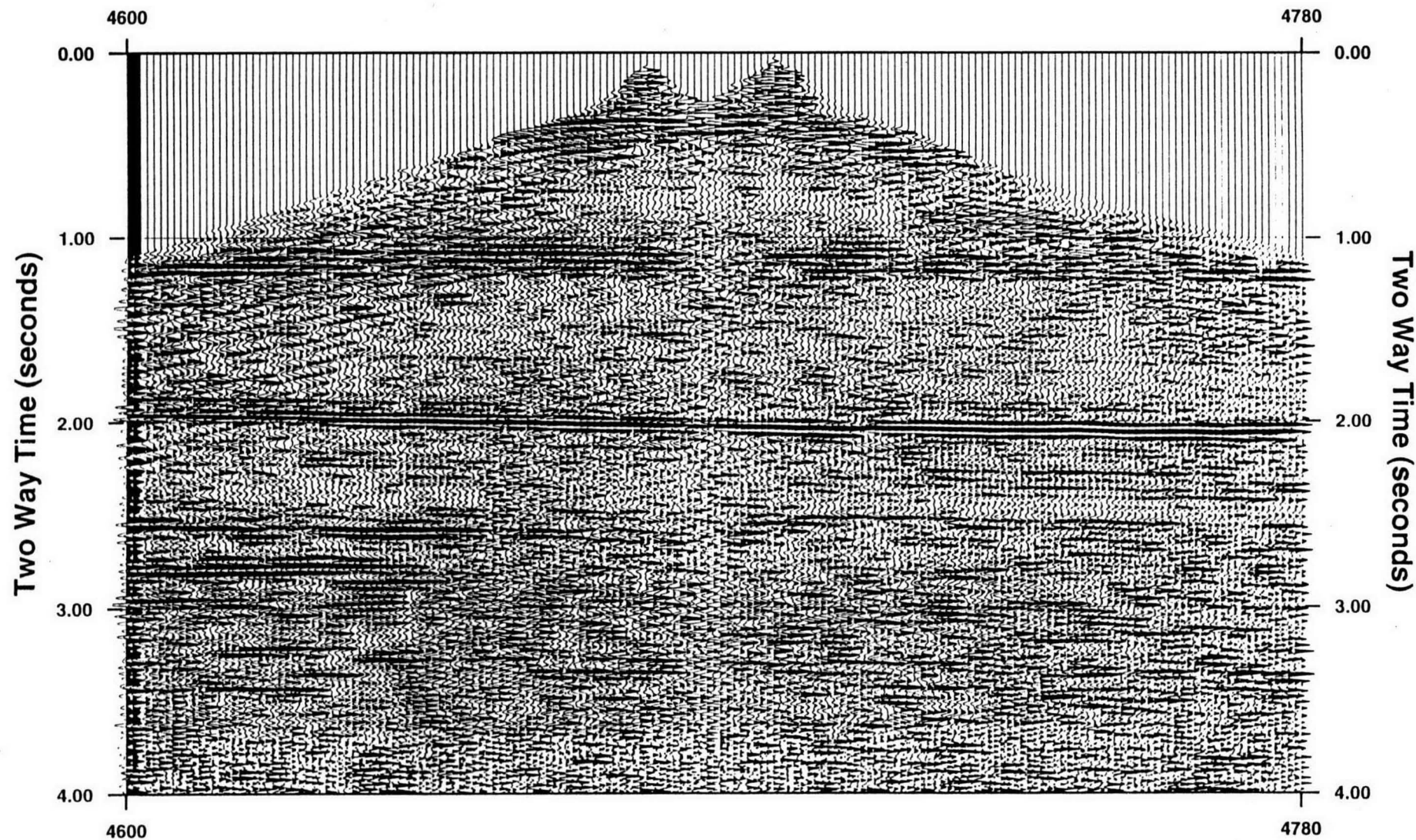
15m pad to pad 10 fold stack 8 sec ie 1 x 8 sec sweep
FFID 144 to 153
Sweep freq 8-80 Hz 1 sweep sweep length 8 secs 3 Vibes



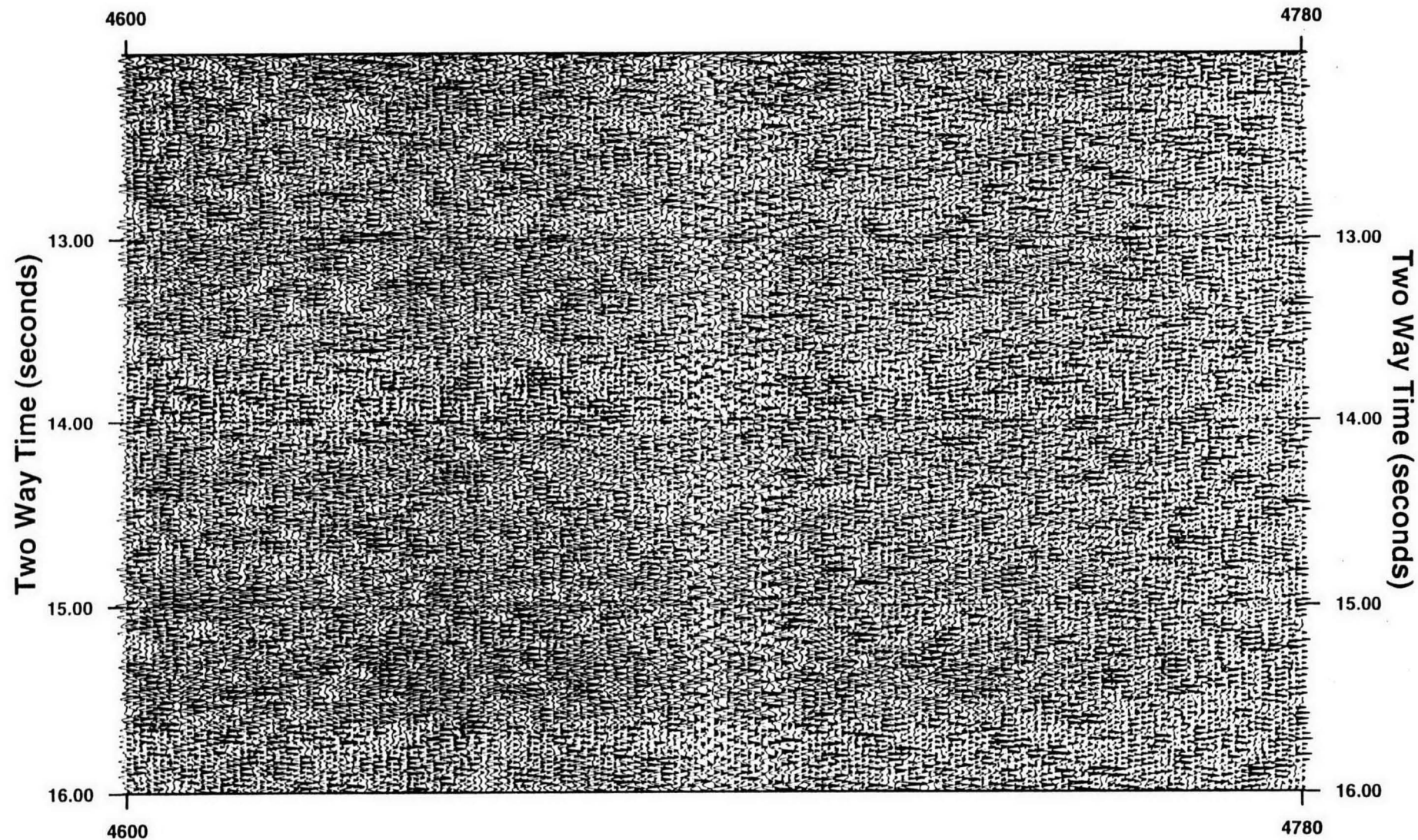
15m pad to pad 10 fold stack 8 sec ie 1 x 8 sec sweep
FFID 144 to 153
Sweep freq 8-80 Hz 1 sweep sweep length 8 secs 3 Vibes



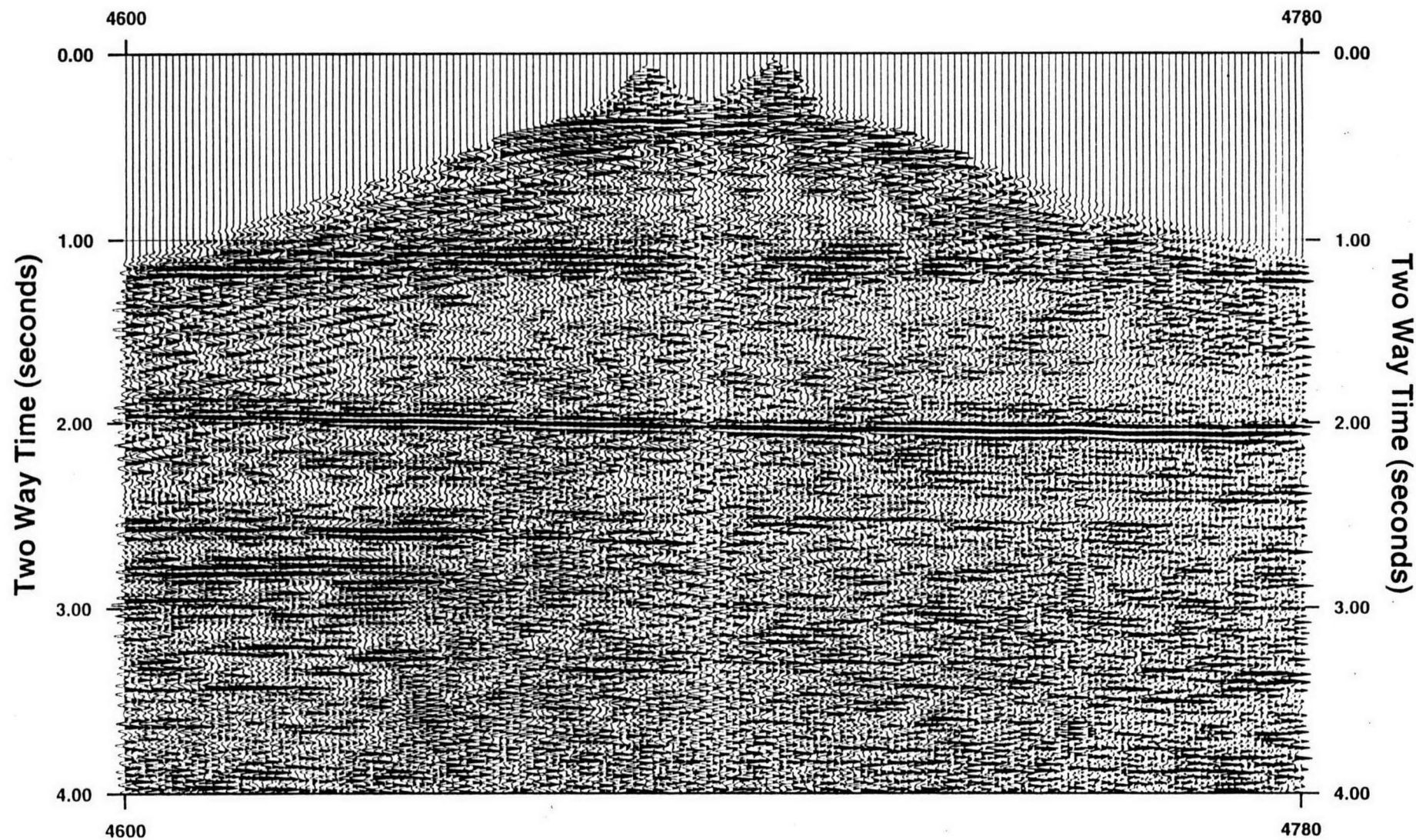
15m pad to pad 10 fold stack 16 sec ie 2 x 8 sec sweeps
FFID 154 to 163
Sweep freq 8-80 Hz 2 sweeps sweep length 8 secs 3 Vibes



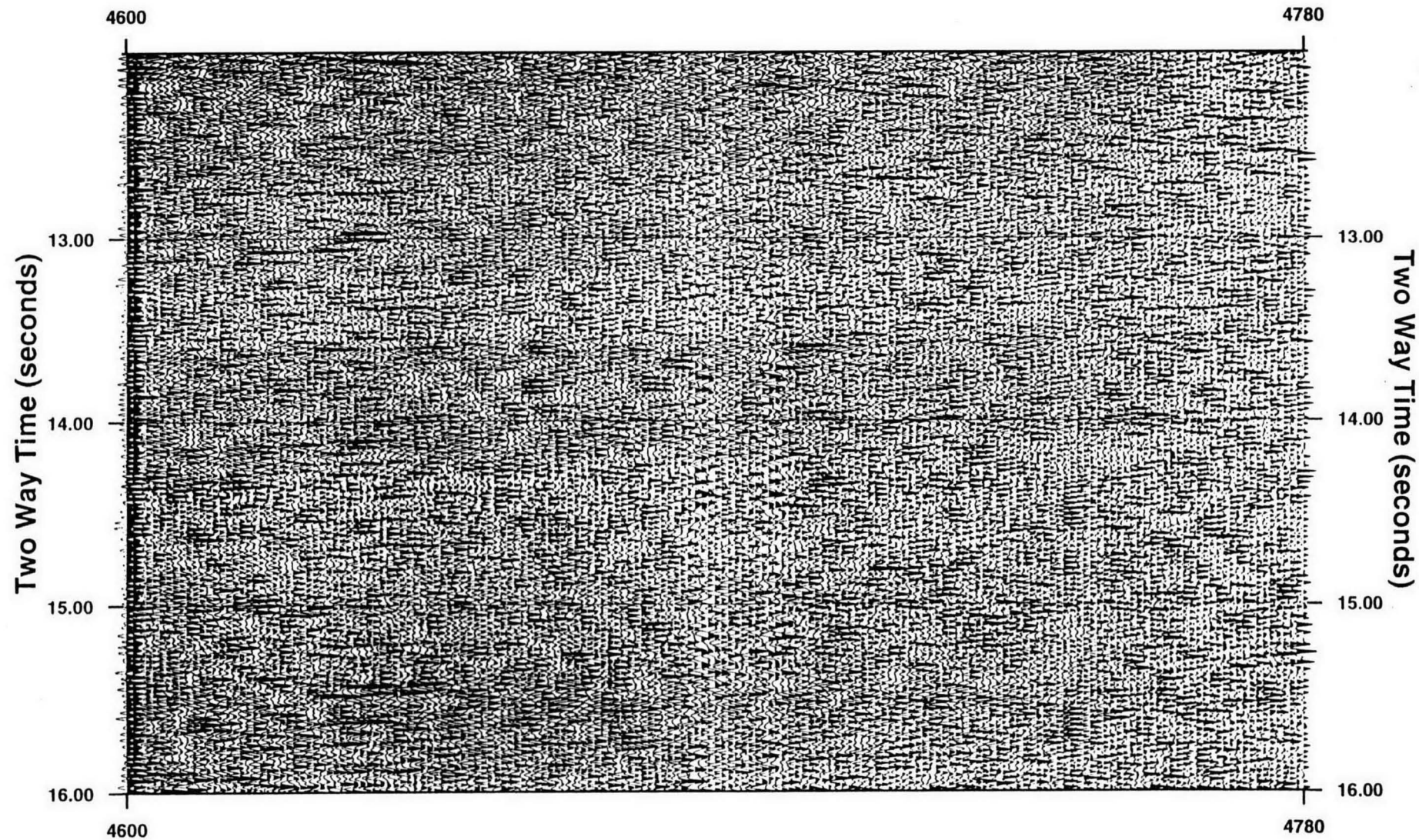
15m pad to pad 10 fold stack 16 sec ie 2 x 8 sec sweeps
FFID 154 to 163
Sweep freq 8-80 Hz 2 sweeps sweep length 8 secs 3 Vibes



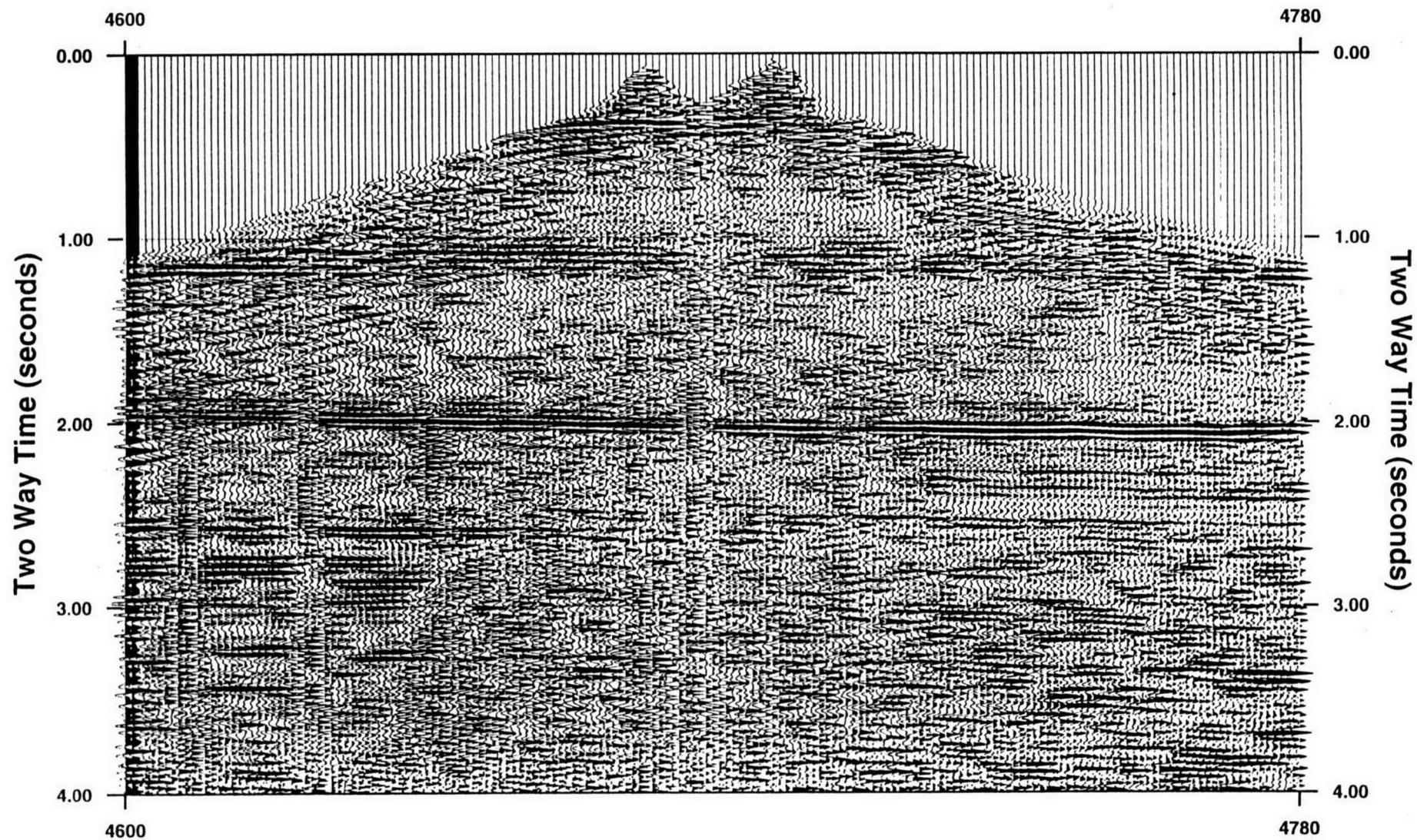
15m pad to pad 10 fold stack 24 sec ie 3 x 8 sec sweeps
FFID 164 to 173
Sweep freq 8-80 Hz 3 sweeps sweep length 8 secs 3 Vibes



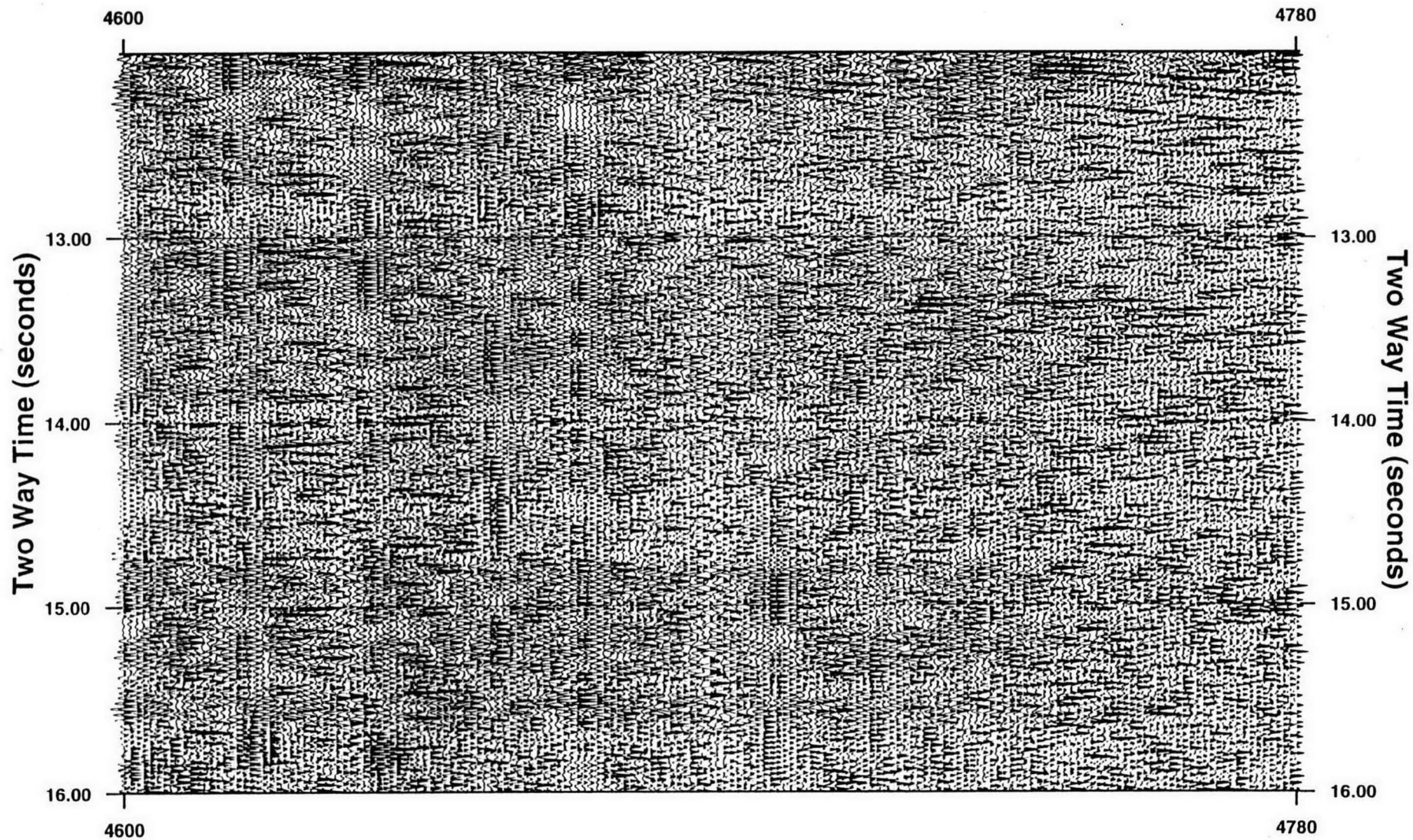
15m pad to pad 10 fold stack 24 sec ie 3 x 8 sec sweeps
FFID 164 to 173
Sweep freq 8-80 Hz 3 sweeps sweep length 8 secs 3 Vibes



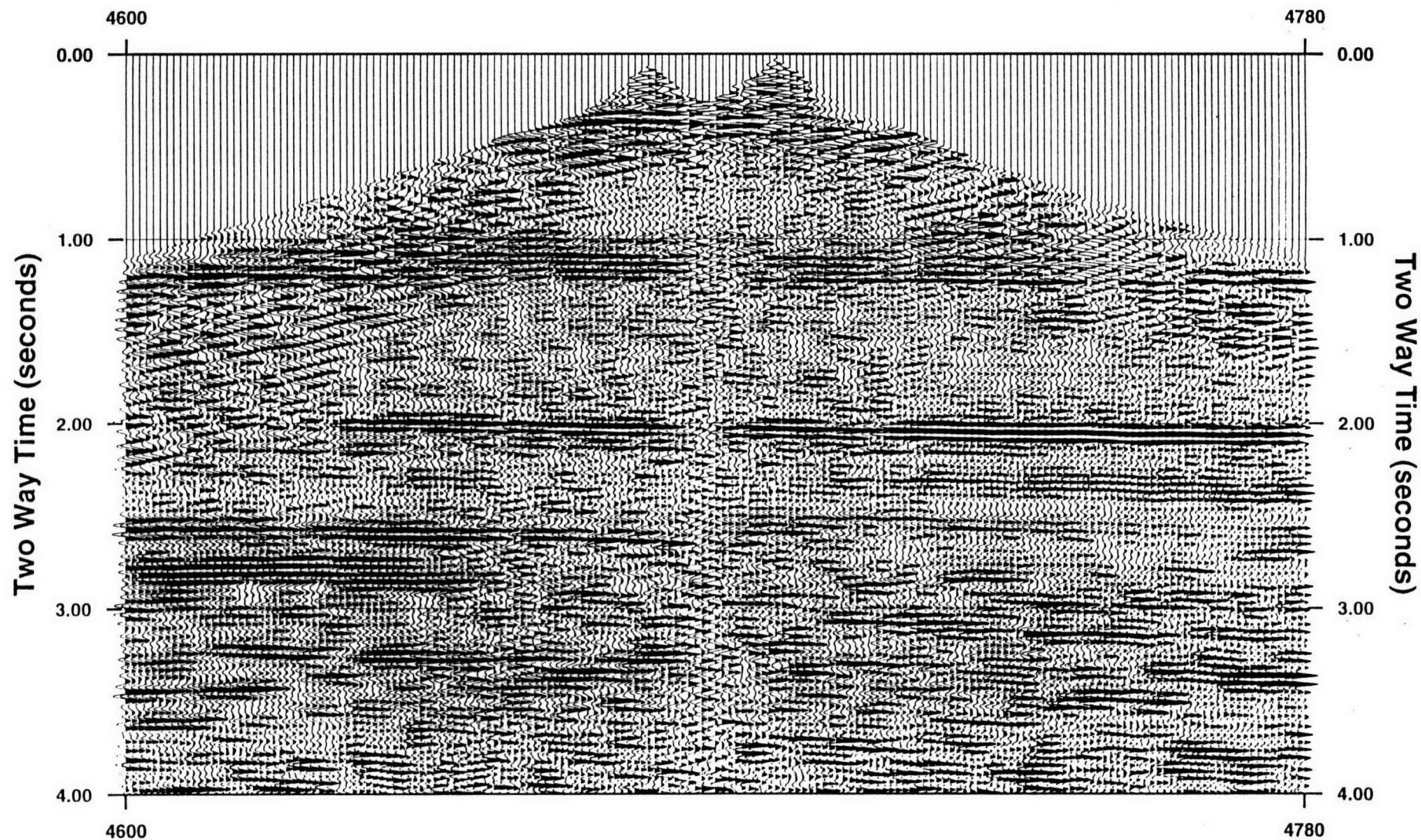
15m pad to pad 10 fold stack 64 sec ie 8 x 8 sec sweeps
FFID 174 to 183
Sweep freq 8-80 Hz 8 sweeps sweep length 8 secs 3 Vibes



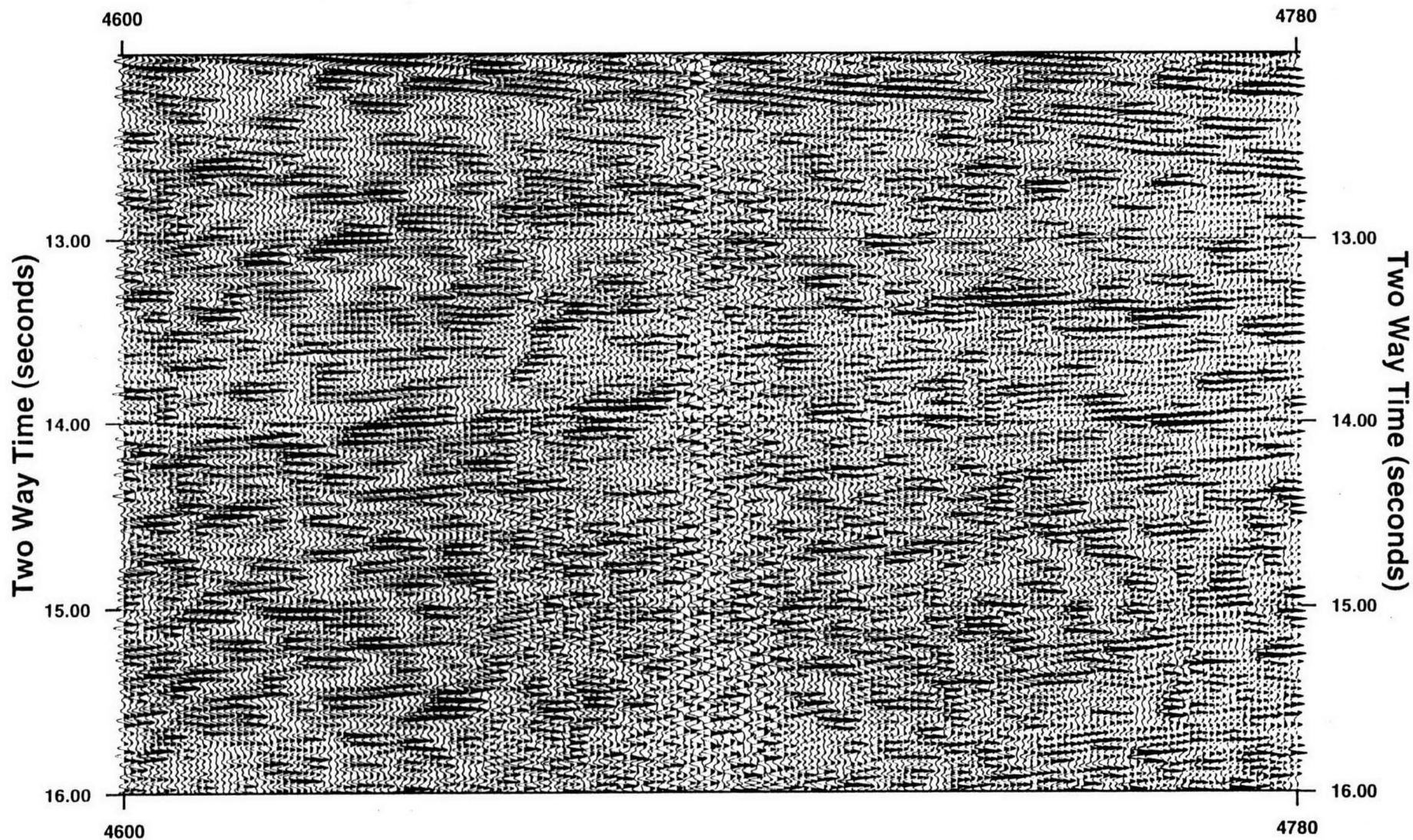
15m pad to pad 10 fold stack 64 sec ie 8 x 8 sec sweeps
FFID 174 to 183
Sweep freq 8-80 Hz 8 sweeps sweep length 8 secs 3 Vibes



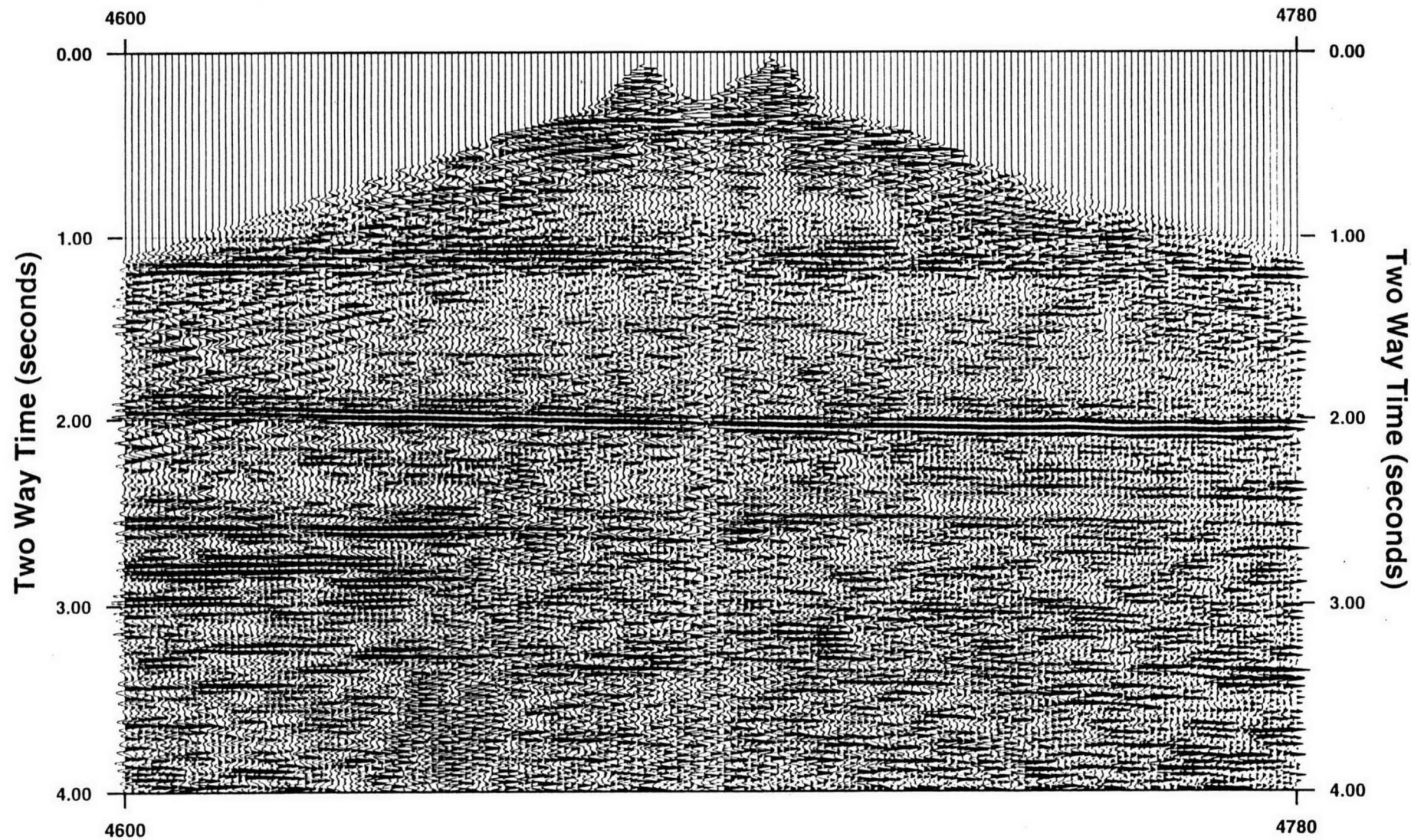
15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps
FFID 184 to 193
Sweep freq 7-28 Hz 4 sweeps sweep length 8 secs 3 Vibes



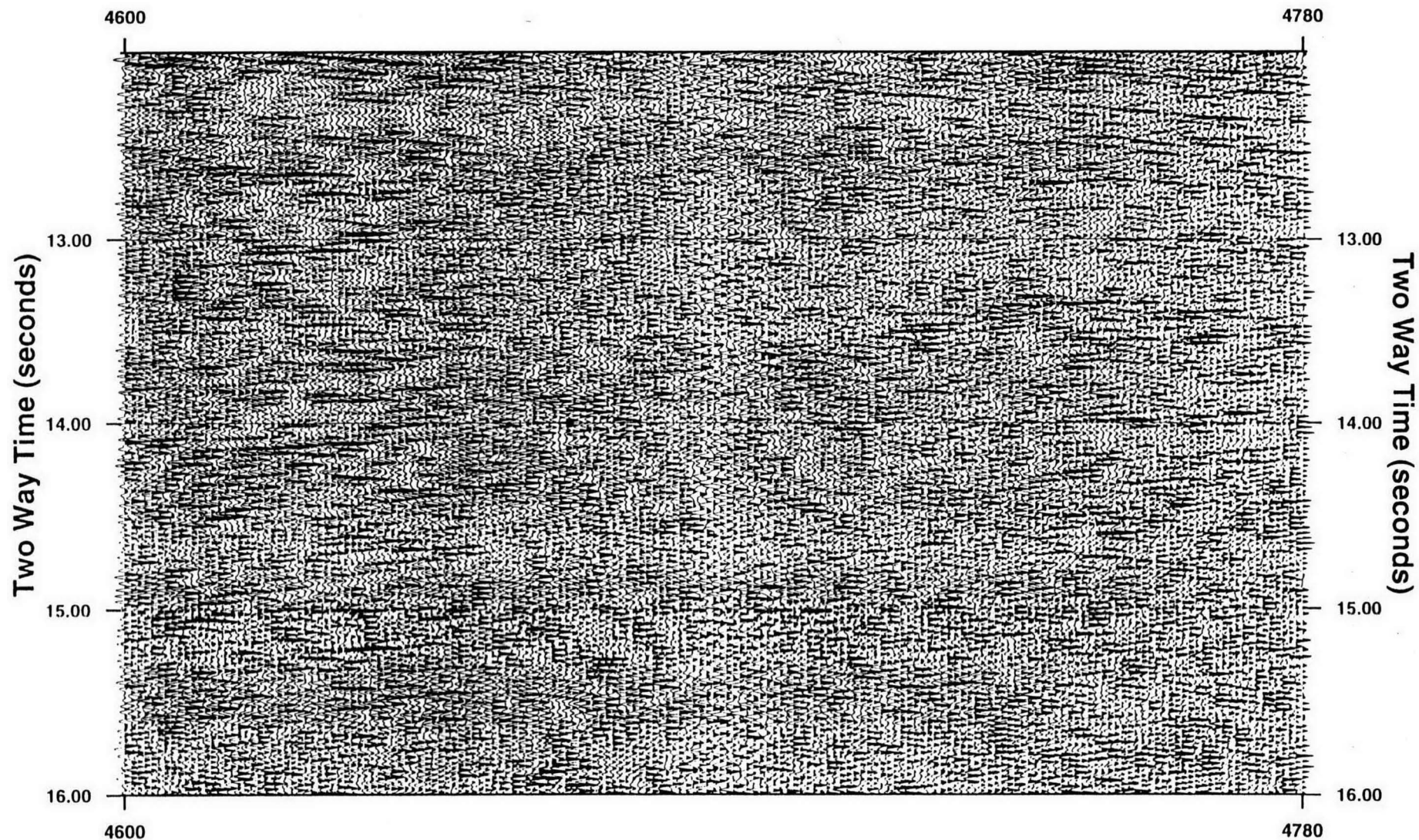
15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps
FFID 184 to 193
Sweep freq 7-28 Hz 4 sweeps sweep length 8 secs 3 Vibes



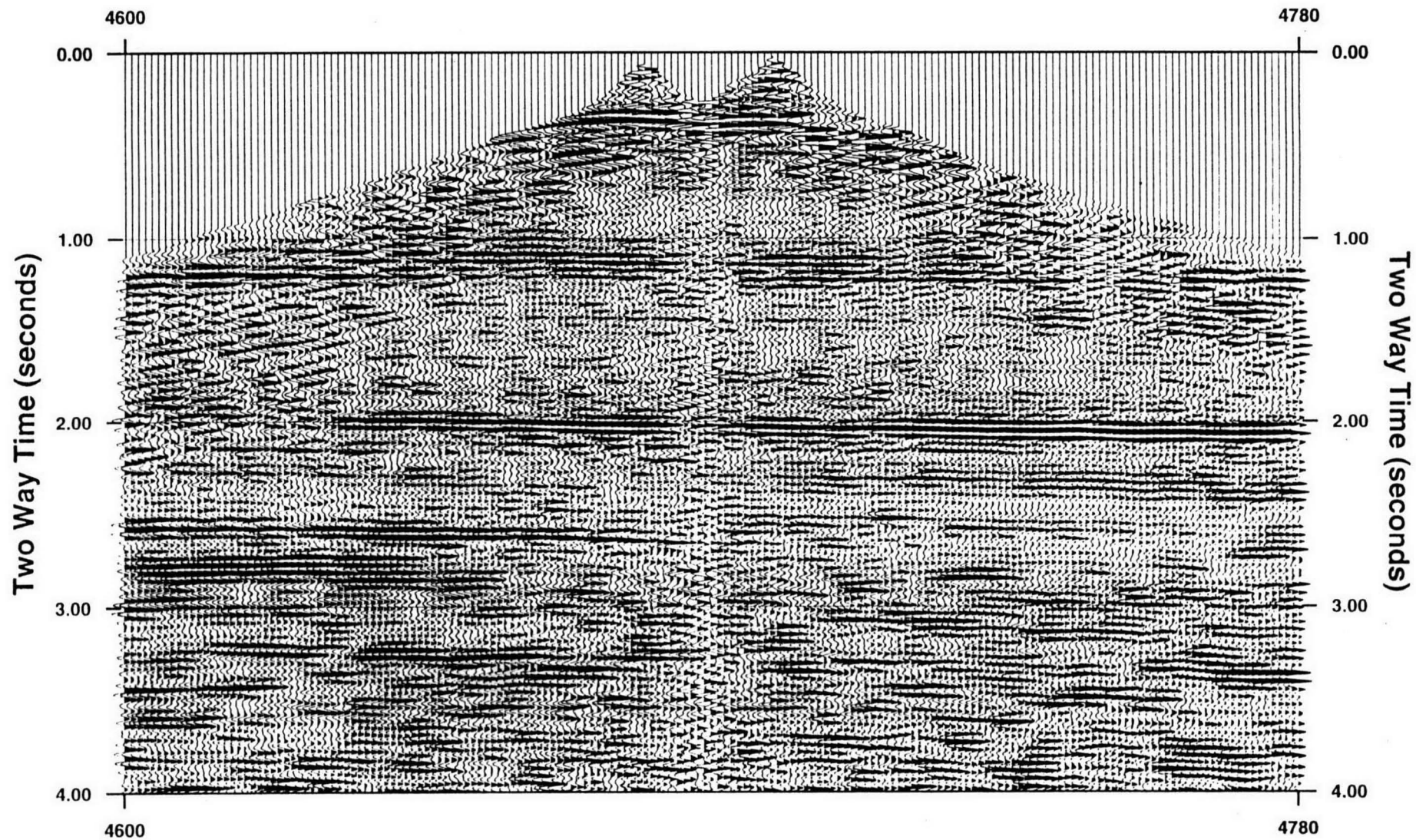
15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps
FFID 194 to 203
Sweep freq 7-56 Hz 4 sweeps sweep length 8 secs 3 Vibes



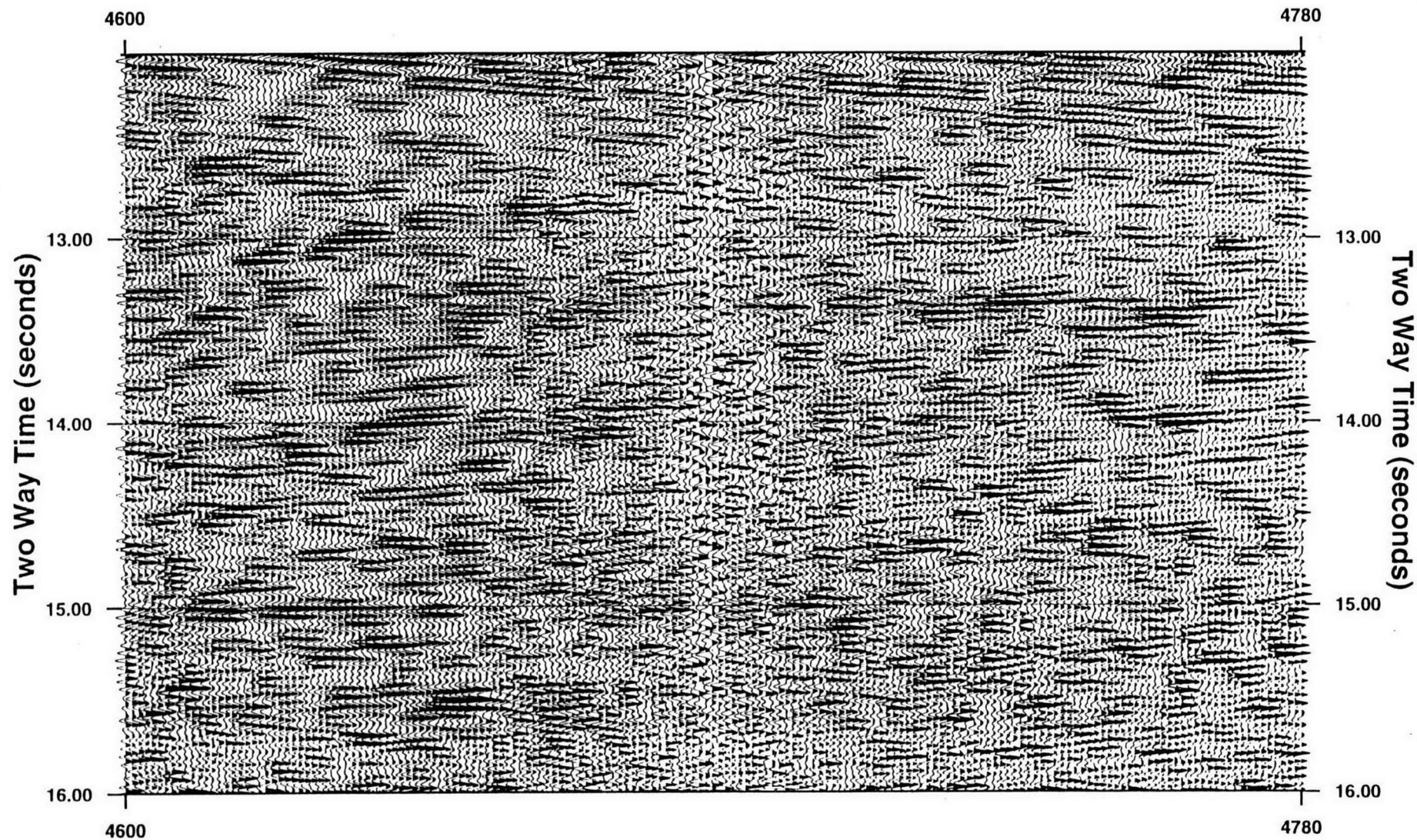
15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps
FFID 194 to 203
Sweep freq 7-56 Hz 4 sweeps sweep length 8 secs 3 Vibes



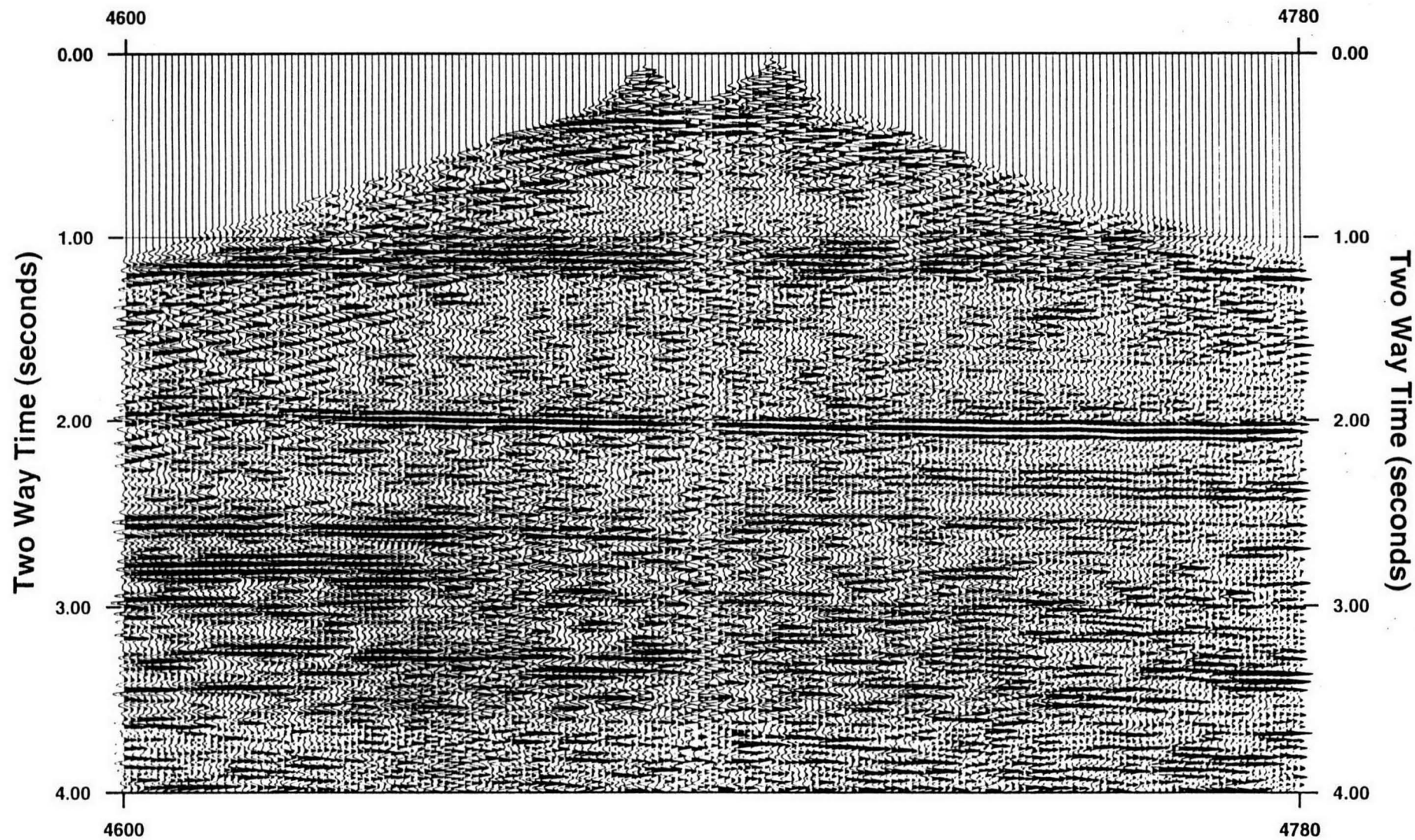
15m pad to pad 10 fold stack 7.5 m moveup 52.5 m array
FFID 204 to 213
Sweep freq 7-28 Hz 4 sweeps sweep length 8 secs 3 Vibes



15m pad to pad 10 fold stack 7.5 m moveup 52.5 m array
FFID 204 to 213
Sweep freq 7-28 Hz 4 sweeps sweep length 8 secs 3 Vibes



15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps
FFID 214 to 223
Varisweep A (7-28, 8-64, 8-80, 7-48)Hz 3 Vibes

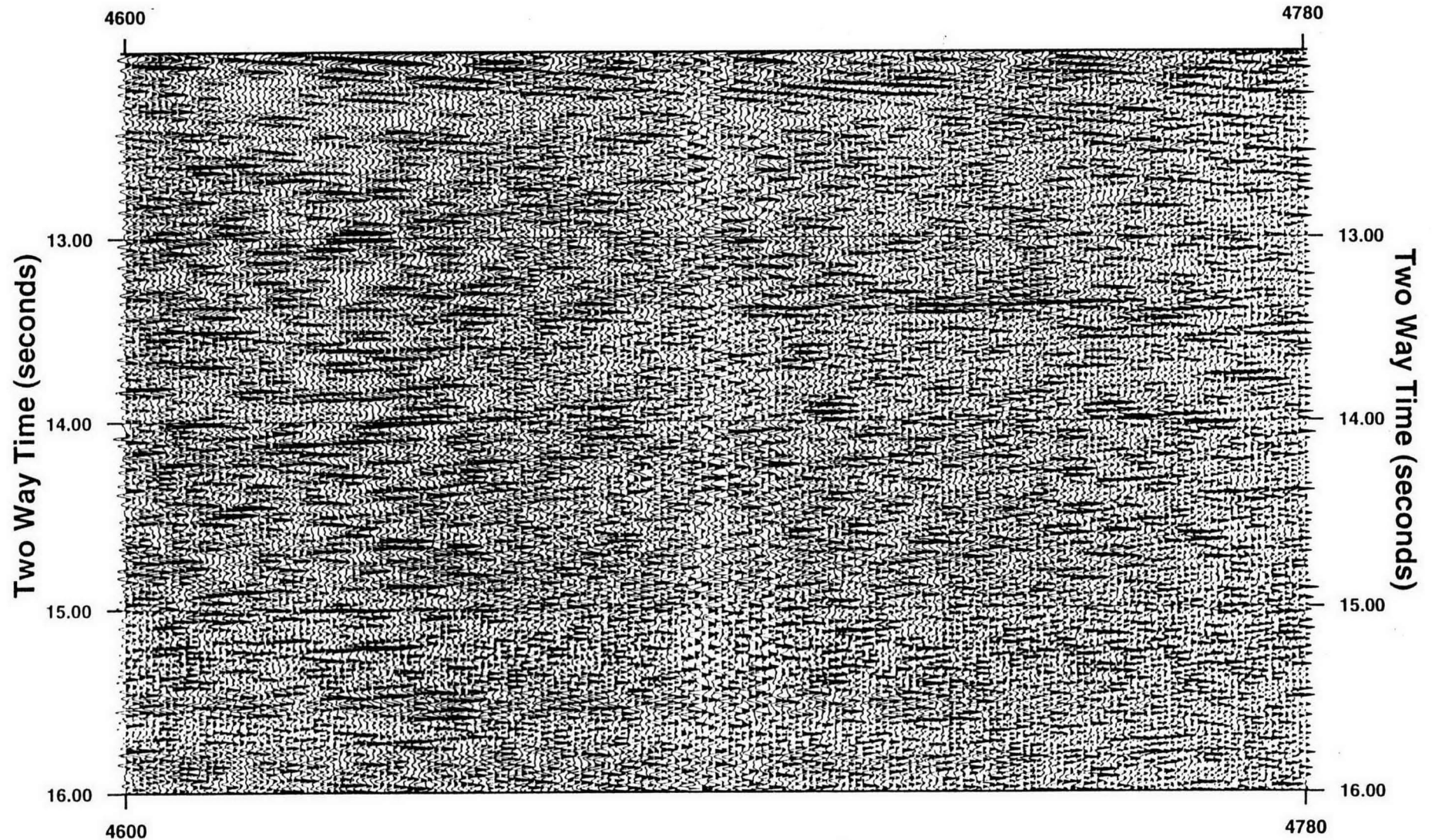


15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps

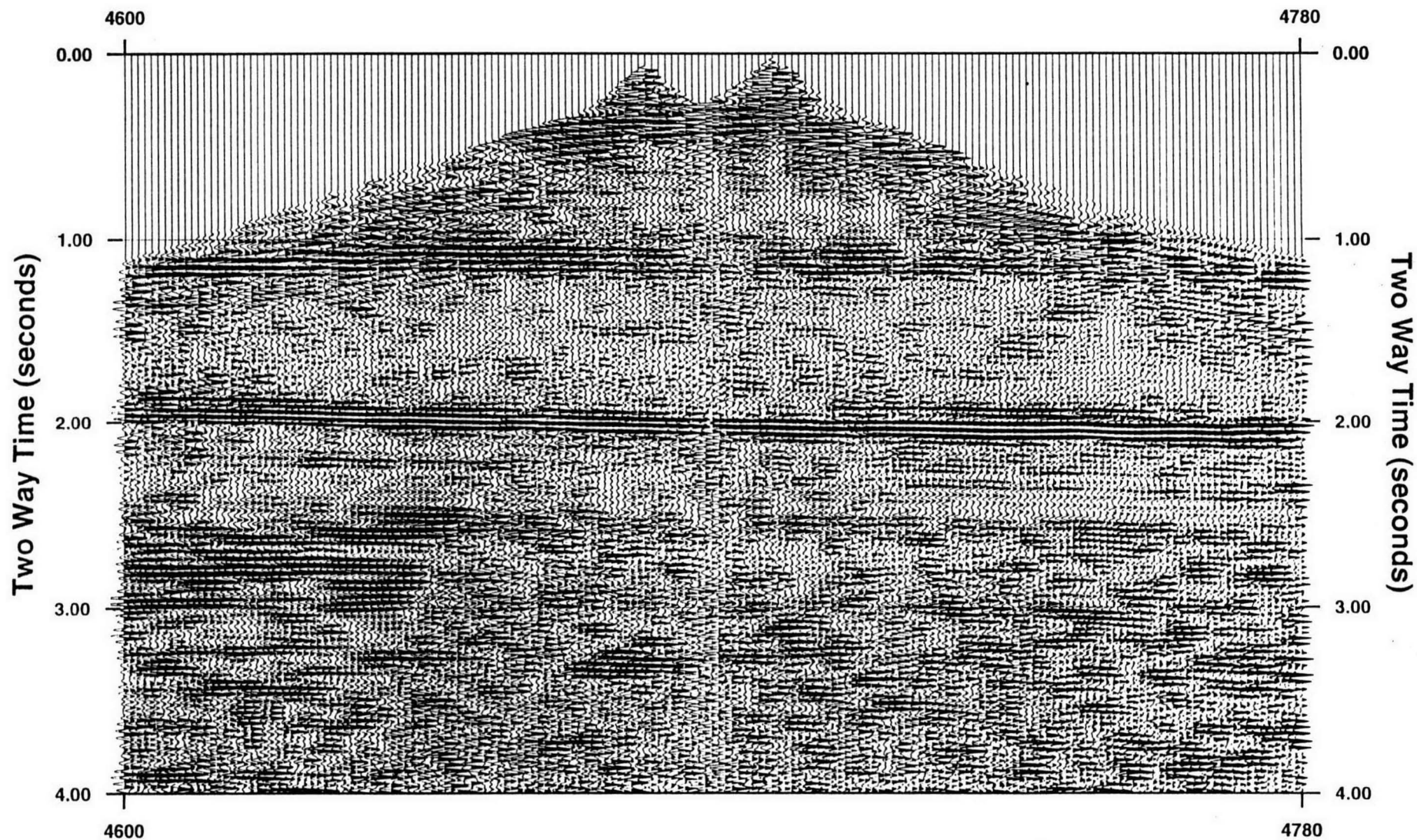
FFID 214 to 223

Varisweep A (7-28, 8-64, 8-80, 7-48)Hz

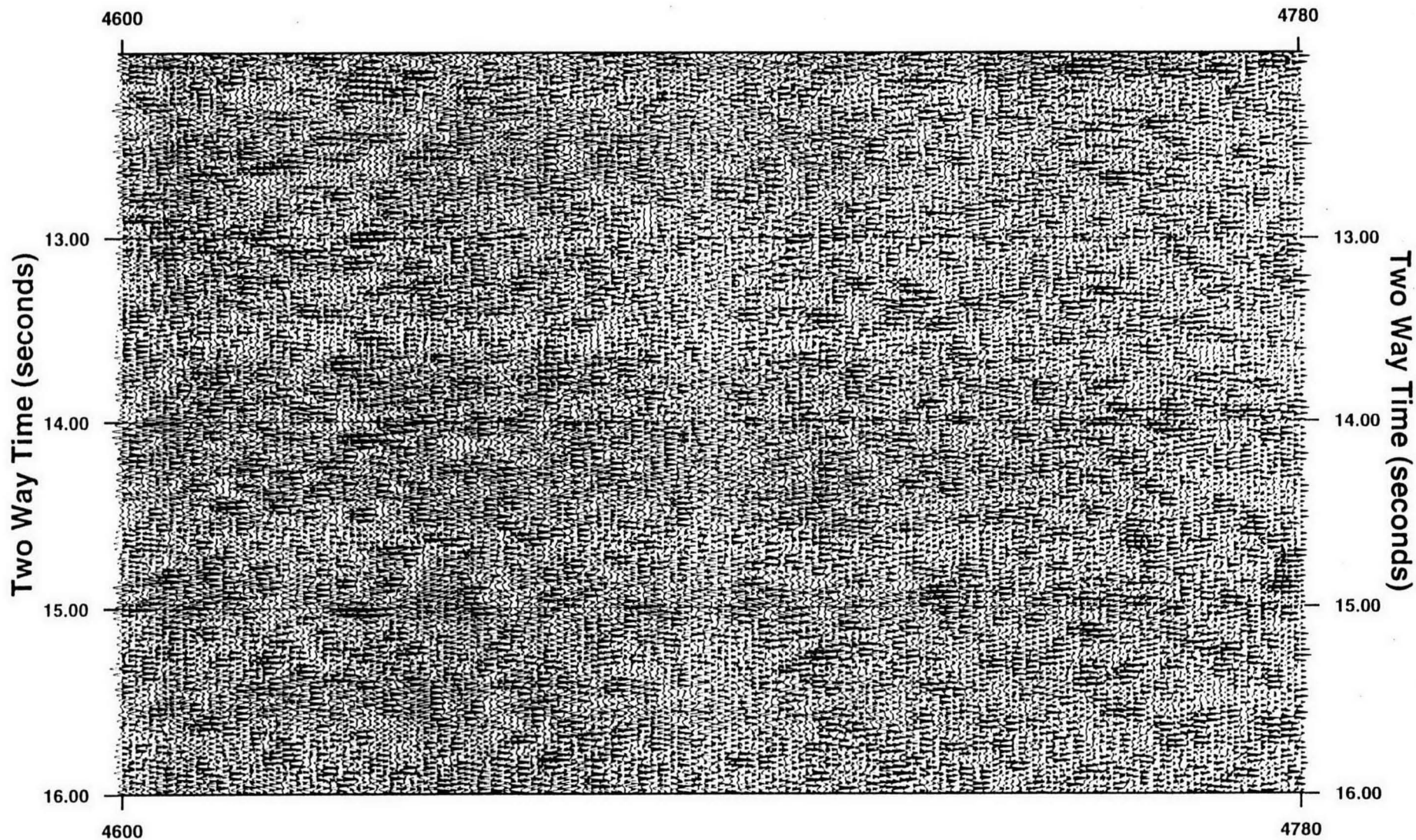
3 Vibes



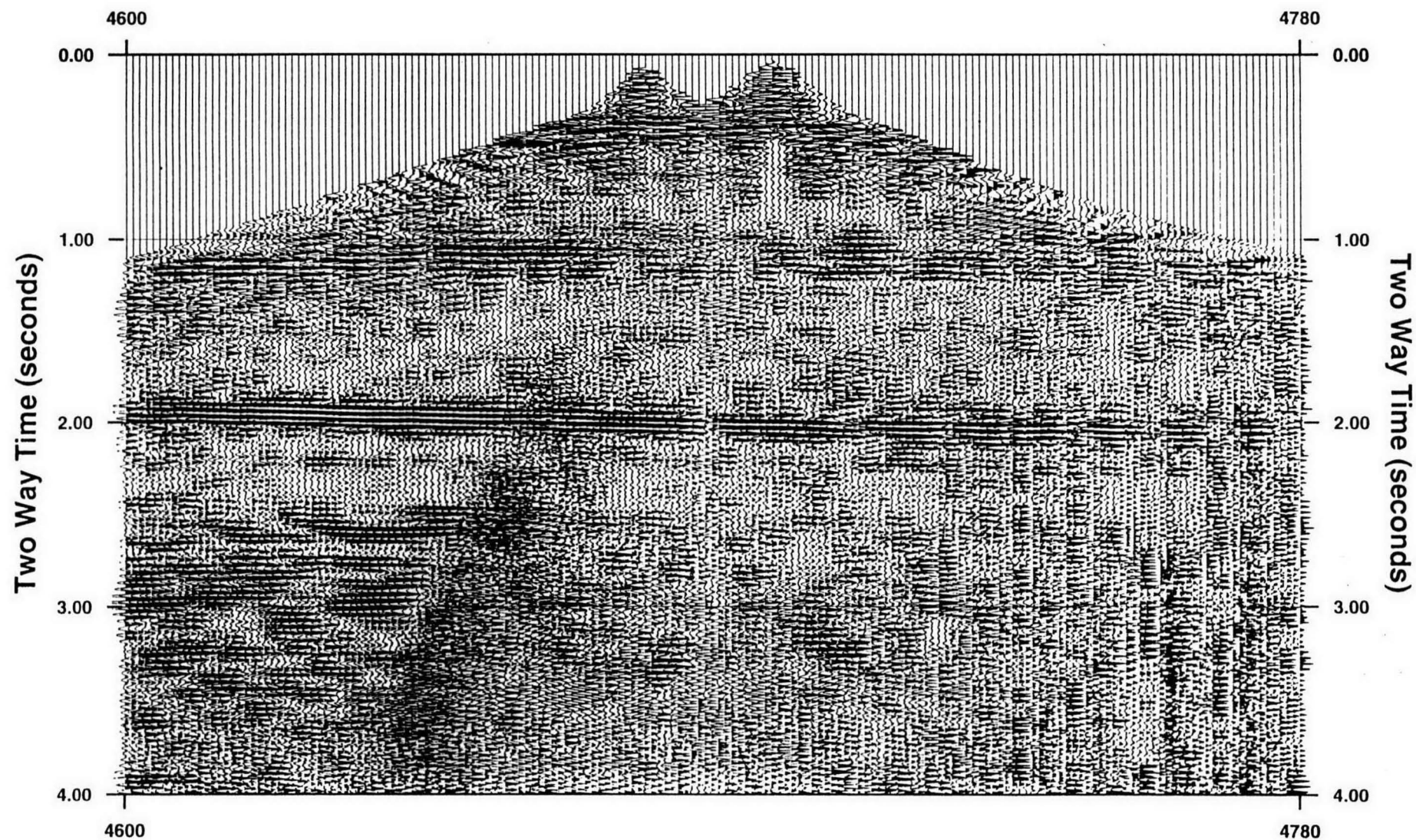
15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps
FFID 224 to 233
Sweep freq 20-150Hz 4 sweeps sweep length 8 secs 3 Vibes



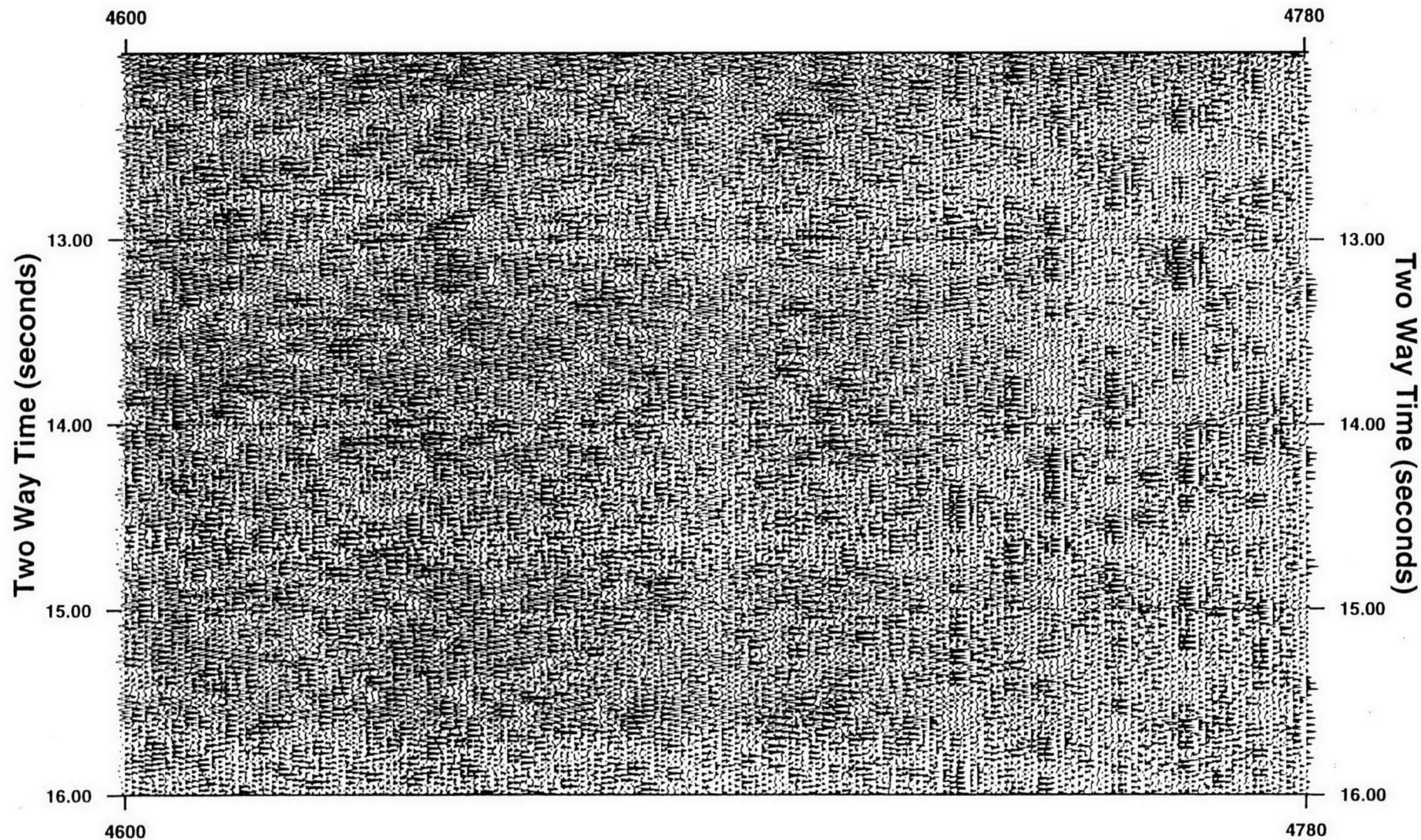
15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps
FFID 224 to 233
Sweep freq 20-150Hz 4 sweeps sweep length 8 secs 3 Vibes



15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps
FFID 234 to 243
Sweep freq 20-220Hz 4 sweeps sweep length 8 secs 3 Vibes



15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps
FFID 234 to 243
Sweep freq 20-220Hz 4 sweeps sweep length 8 secs 3 Vibes

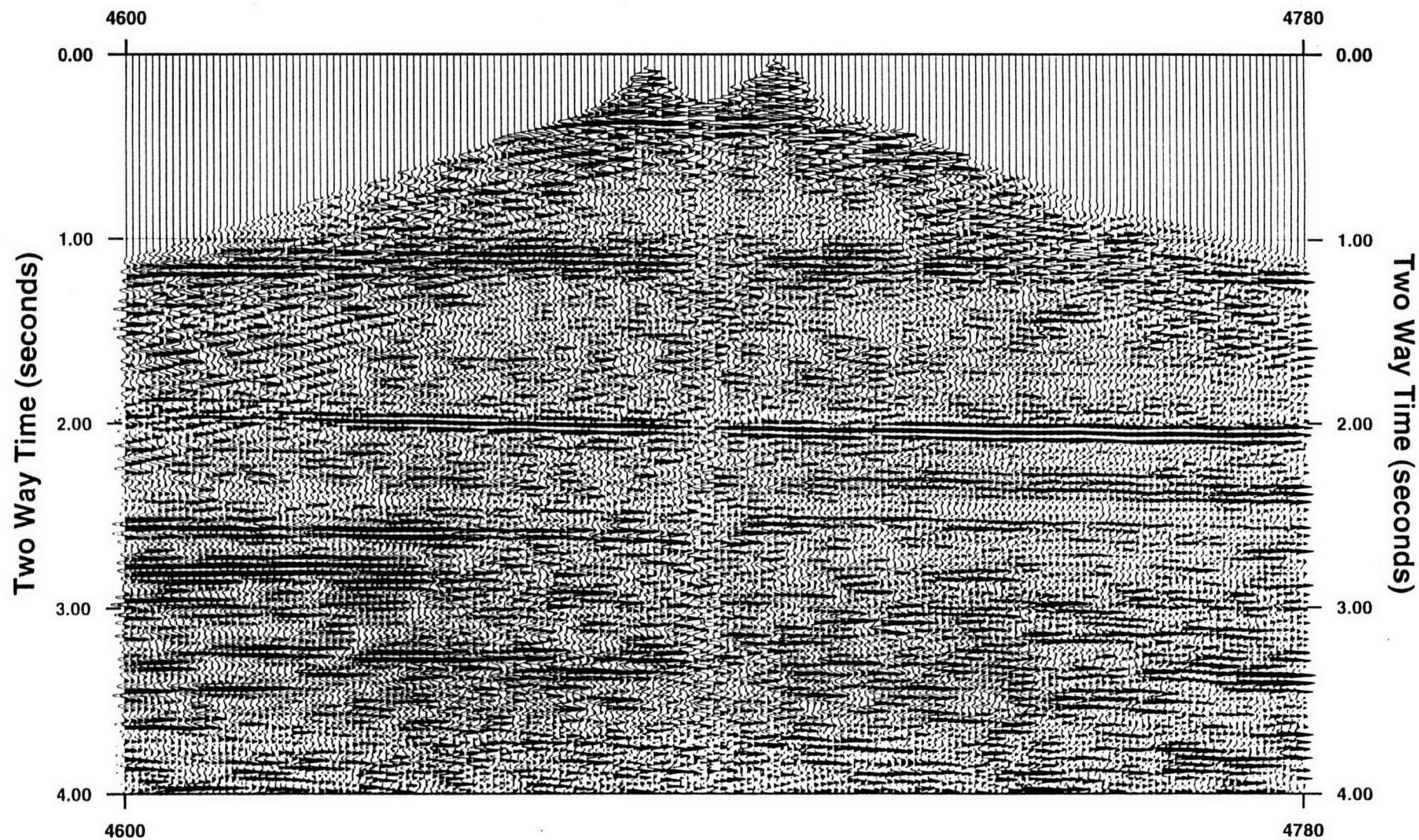


15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps

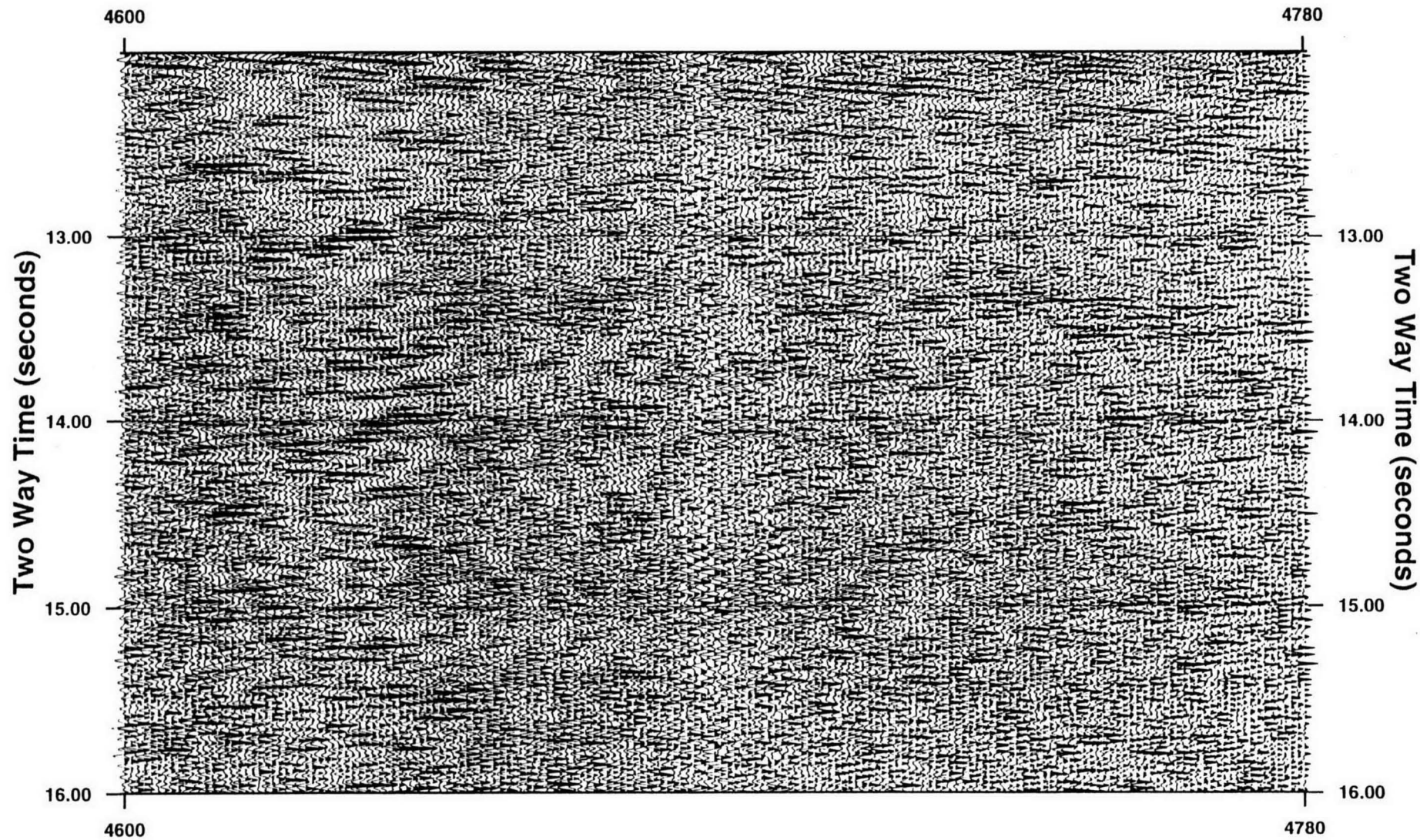
FFID 244 to 253

Varisweep B(7-28, 12-80, 16-80, 7-56)Hz

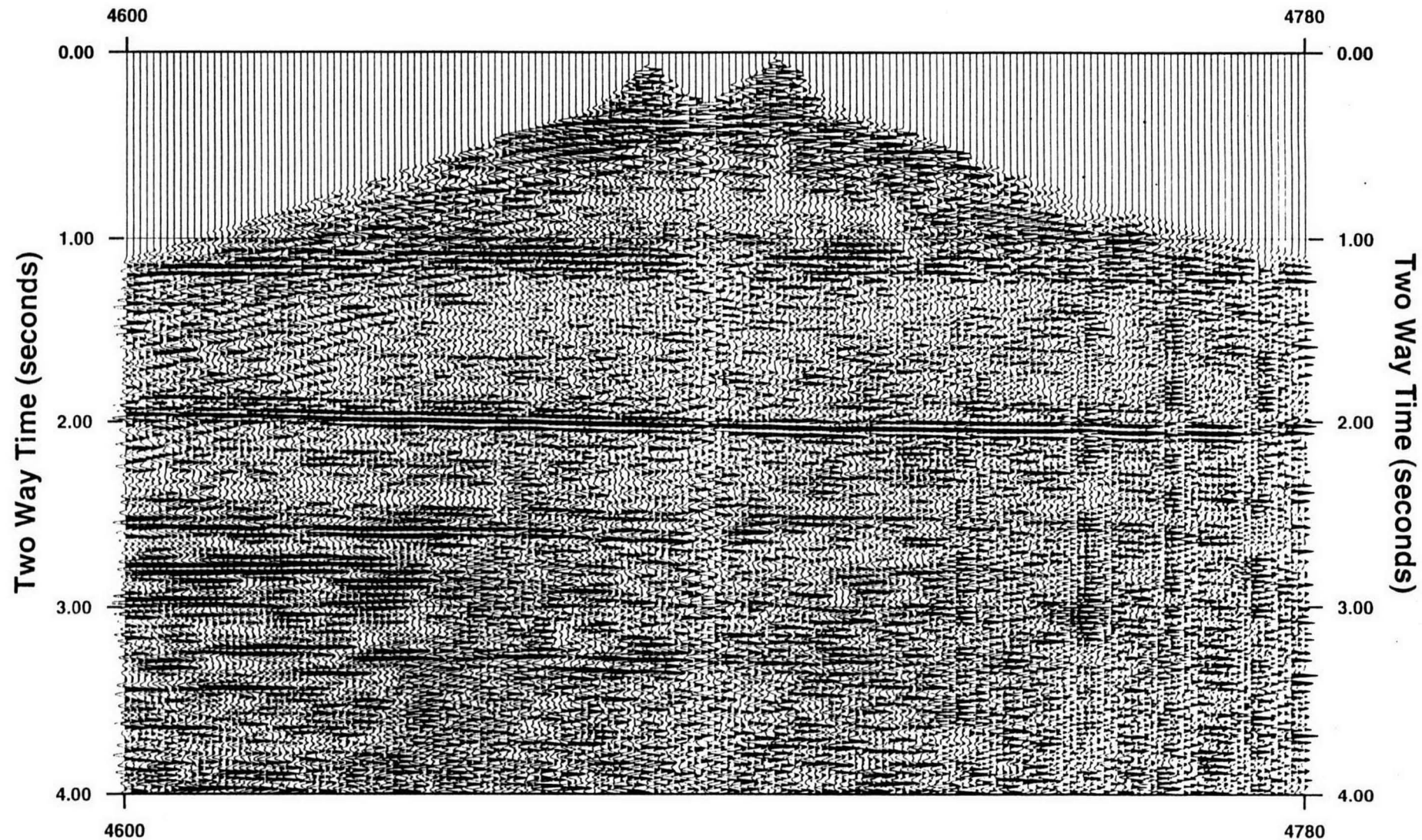
3 Vibes



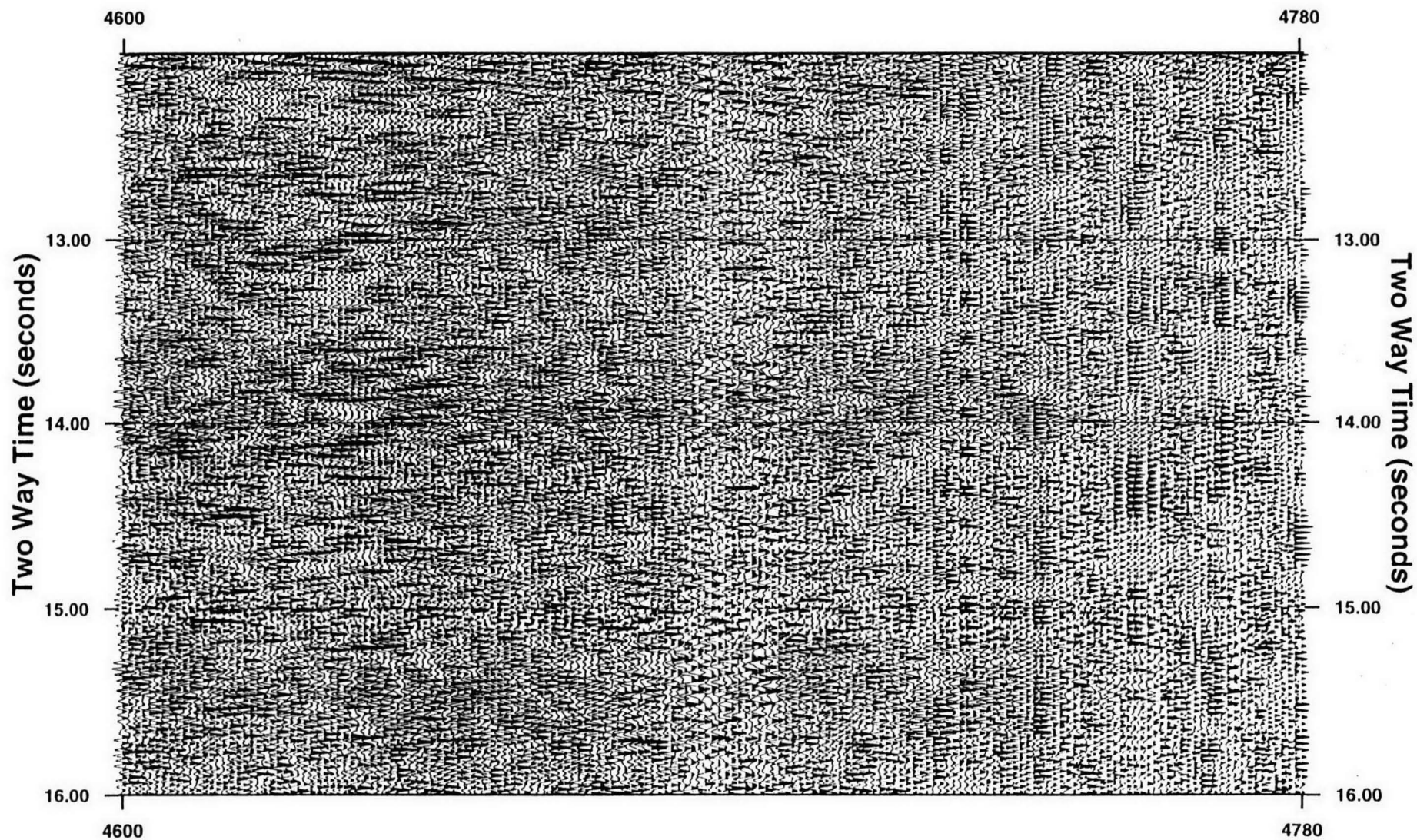
15m pad to pad 10 fold stack 32 sec ie 4 x 8 sec sweeps
FFID 244 to 253
Varisweep B(7-28, 12-80, 16-80,7-56)Hz 3 Vibes



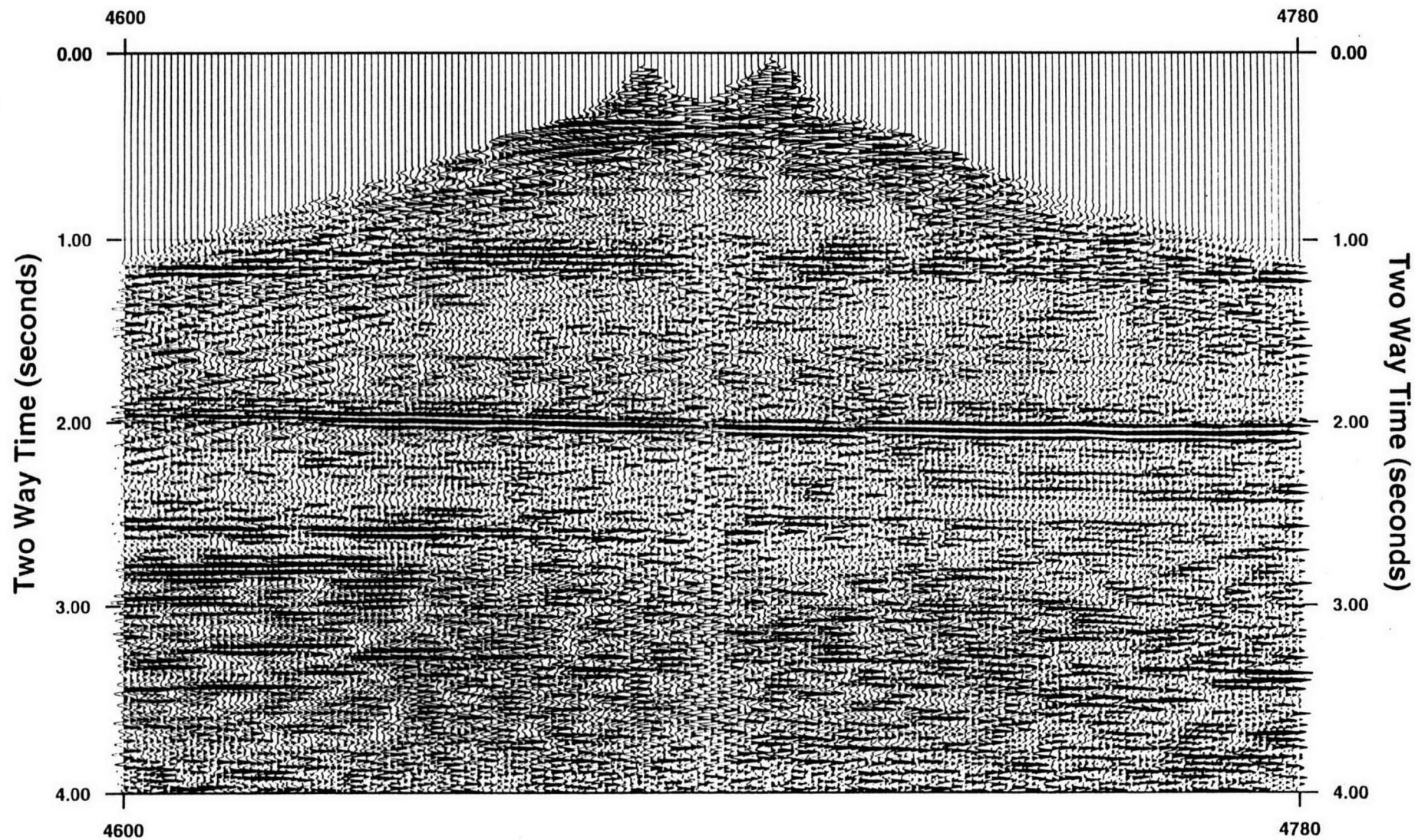
15m pad to pad 10 fold stack 24 sec ie 3 x 8 sec sweeps
FFID 254 to 263
Varisweep C(7-56, 12-80, 8-72)Hz 3 sweeps 3 Vibes



15m pad to pad 10 fold stack 24 sec ie 3 x 8 sec sweeps
FFID 254 to 263
Varisweep C(7-56, 12-80, 8-72)Hz 3 sweeps 3 Vibes



15m pad to pad 10 fold stack 24 sec ie 3 x 8 sec sweeps
FFID 264 to 273
Monosweep 7-80Hz 8 sec sweep 3 sweeps 3 Vibes



15m pad to pad 10 fold stack 24 sec ie 3 x 8 sec sweeps
FFID 264 to 273
Monosweep 7-80Hz 8 sec sweep 3 sweeps 3 Vibes

