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FIELD OPERATION REPORT

1985 WALLARA RANCH SEISMIC SURVEY

FOR

SYDNEY OIL COMPANY PTY LTD

AND PARTNERS

PERMIT OP 236

AMADEUS BASIN, NORTHERN TERRITORY, AUSTRALIA

BY

WESTERN GEOPHYSICAL COMPANY OF AMERICA

PARTY 785

FEBRUARY 7TH TO MARCH 3RD, 1985

ONSHORE

Litton WESTERN GEOPHYSICAL

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APPENDIXES

1. INTRODUCTION

WESTERN GEOPHYSICAL COMPANY OF AMERICA (WESTERN) was contracted by Sydney Oil Company Pty Limited and Partners, to conduct a Vibroseis seismic survey in OP 236, located South West of Alice Springs in the Amadeus Basin, Northern Territory, Australia. The survey is referred to as the 1985 WALLARA RANCH SEISMIC SURVEY.

Access was scouted, camp site located and line clearing operations commenced on January 26, 1985.

Surveying and chaining operations commenced on January 27th and on February 1st the drill crew arrived and started working.

The main crew arrived on February 7th, and camp was set up on line S85-WR06. Instrument test and noise analysis were completed on the same day, under the supervision of Sydney Oil Representative Mr. Richard Schroder.

Basic crew operations, commenced on February 8th and were completed on March 3rd, 1985 when the full contracted program was recorded.

The purpose of the survey was to locate structures favourable to the accumulation of hydrocarbons. During the survey, vibrator points were recorded with 1200 per cent coverage.
A total of 185.88 kilometers of surface coverage was obtained at of 7.65 kilometers per ten hour day.

2. PERSONNEL

Western's office personnel consisted of an Area Manager and and administrative staff based in Perth and a Field Supervisor and Instrument Supervisor who operated between the field and Perth.

Field Personnel

Management

1	Party Manager	:	Barry Williams
1	Seismologist	:	William Blacklock

Survey

1	Chief Surveyor	:	Bob McDonagh
1	Field Surveyor	:	David Wilson
3	Rodmen/Chainmen		

Recording

1	Observer	:	T. J. Lim
1	Assistant Observer	:	David Walker
1	Line Boss	:	H. Francis
12	Linemen		

Vibrators

1	Vibrator Technician/Mechanic	:	Robert Patterson
4	Vibrator Operators	:	Gordon Viney; P. McWaters
		:	W. Smith; T. Warry

Upholes

1	Weathering Observer	: Greg Hay; Robyn Smith
1	Shooter	: Dennis Tancabel
1	Preloader	

Drilling

1	Driller	: L. Mallett
1	Assistant Driller	: M. Gibbs
2	Helpers	

Camp

1	Cook	: William Hinds; Joan Nolan
1	Cook Helper	: W. Treadgold
1	Camp Attendant	: D. Harris
1	Mechanic	: L. Womersley
2	Supply/Water/Fuel truck drivers	: D. Viney

Additional field personnel were supplied to permit a leave rotation based on 3 weeks work 1 week rest.

3. EQUIPMENT - PARTY 785

3.1. Seismic Data Acquisition System

The main crew data acquisition system consisted of a 96 channel Texas Instruments DFS V Computer, IFP Digital Recording System interfaced with a Texas Instrument Field Timap System for field correlation and parameter test evaluation.

Cable inputs were through a Macha Service Continuity Checker and an Input/Output RLS 240M CDP Box. Communication was through a "Silent 700" terminal. A Kennedy 9100 tape transport was used for program loading.

Quality control monitors were output on an SIE ERC-10C electrostatic camera every fifth VP. A continuous data display was provided on the CRT of a Tektronix 465B Oscilloscope.

Line vibrators were under computer control via a Pelton Electronics Advance 1, Mod. 5 encoder. The recorder and vibrators were also equipped with Pelton Option 5, Pre-emphasis modules to provide a Non Linear Sweep to the vibrators.
The recording acquisition system was mounted on a Western AHR-3-4788 articulated buggy and instrument power delivered by a Lima generator coupled to an Isuzu QD 60 engine.

Main line cables consisted of 53 x 4 groups(212 groups) of LRS 105 pair cables with 55 meters group spacing. Terminations were LRS 5055/204 DATA MATE and takeouts LRS 5511 split/clip.

Three hundred and fifty GS 20D geophones strings were used with 12 geophones per string, 5 meters apart connected six series by two parallel. The elements had a natural frequency of 10 Hz and a coil resistance of 395 ohms. A 1000 ohm resistor was used for 70% damping. Landcases were used with 3 inch spikes.

3.2. Survey Data Acquisition System

Surveying in the area was done with two T1 Wild Theodolites and two AGA Geodimeters 122 EDM's. Field data was entered on a HP85 interfaced to a HP 82905B printer where processing was completed using WESTERN's software.

Printouts of elevations, northing, easting, sun shots and other data were made available as necessary on the HP 82905B printer.

Data was recorded in binary format on HP 3-1/2 inch disc. Survey data was transcribed onto Scotch DC100 "A" tapes in the field and forwarded to Autographic Computer Services of Perth, who ran a data integrity check, interpolated to every fifth VP and then transcribed to 9 track magnetic tape in UKOOA format to client specifications.

3.3. Energy Source

Five LRS 311 vibrators with a peak force of 27,240 pounds were used.

Vibrators were mounted on articulated buggies with 6V-71 210HP diesel engines. All units were equipped with 67 x 34 x 25 super terra, all terrain tyres.

The data was acquired using four vibrators with the fifth as a standby unit on the line. This allowed the organisation of vibrator service and maintenance on a rotational basis so that no production time was lost in the form of service days.

3.4. Radio Communications

Inter-camp, vibrator and recorder communications were facilitated with the provision of twenty four General Electric Custom MVP UHF radios, operating on a frequency of 485.050 MHz to 485.100 MHz.

Five SSB radios fitted with frequencies in the 4,6,7,9 and 13 MHz bands were used in the field and a Codan 7727 radio interfaced with computer controlled teletype equipment was used for voice and teletype communications with Perth Office. Camp radios were fitted with relative R.F.D.S. frequencies.

3.5. Vehicles

Seismic

1 Articulated Recording Buggy AHR-4788

5 Articulated Vibrator Buggies AHV12-LRS311-4780/84

1 Service Truck Isuzu 4 x 4 Model TSD 45

1 Supply Truck Isuzu 4 x 4 Model TSD 45

4 Cable Trucks Isuzu 4 x 4 Model TSD 45

1 Water Truck Isuzu with 1600 gallon tank

1 Fuel Truck Isuzu with 1600 gallon tank

1 P.M. Toyota S.W. 4 x 4 Model HJ60

3 Toyota Personnel Carriers 4 x 4 Model HJ47

4 Toyota Pickups 4 x 4 Model HJ47

All line vehicles were equipped with front mounted winches. The Isuzu trucks were provided with 900x20 tyres.

Drilling

1 Mayhew 1000 combination air and water drill with 300 gallon water injection tank and 23ft kelly mounted on a Nissan 4x4 truck fitted with 18x22.5 super singles tyres.

1 White 6 x 6 Water truck fitted with 2000 gallon water tank mounted on 18 x 22.5 super singles tyres.

1 Isuzu 4 x 4 Water truck fitted with a 1500 gallon water tank mounted on 15 x 22.5 super singles tyres.

1 Toyota FJ-47 support vehicle fitted with two way radio.

1 Self contained camp.

Drilling services were subcontracted to Whiteland Drilling Pty Ltd of Perth.

Line Clearing

2 Caterpillar D7 Bulldozers

1 Caterpillar 12G Grader

1 Toyota pickup

1 Complete independant camp.

Line clearing equipment was contracted to Clan Contracting of Derby. Overall quality of cutting was generally good.

3.6. Camp Equipment

The main camp consisted of:

1 Office/2 man sleeper trailer

5 8 men sleeper trailer

1 Shower/Laundry/Lab trailer

1 Diner trailer

1 Kitchen trailer

1 Store trailer

1 Workshop trailer

1 Fuel trailer 1600 imp. gallons

1 Water trailer 1600 imp. gallons

1 Toilet trailer with 4 chemical toilets

1 Generator trailer with two 85 kw (100kva) Caterpillar generators and motors.

Flycamp consisted of:

1 Self contained Office/Kitchen/Shower trailer with Dining/Sleeper annexes.

1 Box trailer equipped with 600 gallon water bladder.

1 8 kVa Generator.

4 General

4.1. Weather

During February the weather was hot and humid. A rainstorm on February 7th caused a half hour delay due to cable leakage.

4.2. Campsite

One campsite was used to cover the 1985 OP 236 Wallara Ranch Seismic Survey.

Camp No. 1

Latitude	24 Deg	33 min	30 sec	
Longitude	122 Deg	16 min	00 sec	

located three kilometers west of Wallara Ranch Motel.

4.3. Water Location

A bore was drilled at the Wallara Ranch Motel to a depth of three hundred feet and delivered approximately 700 gallons of water per hour.

Latitude	24 Deg	37 min	30 sec	
Longitude	132 Deg	19 min	50 sec	

4.4. Permits

Permitting was carried out by Sydney Oil's representative Mr Bob Liddle.

With the co-operation of aboriginal elders, sites of cultural significance were avoided.

4.5. Food Supplies

Camp stores were purchased from various suppliers and delivered to the campsite on a weekly basis by Western's suppply truck.

4.6. Fuel Supplies

Diesel fuel was trucked to the campsite by B.P. Alice Springs with twenty four hour notice.

4.7. Spare Parts

All vibrator/recorder parts were purchased in America by Western and airfreighted to Perth. They were then either road freighted by Gascoyne Trading Company to Alice Springs taking seven days to arrive or air-freighted via Ansett. All freight on arrival was picked up by the supply truck and delivered to camp.

4.8. Crew Rotation

Personnel were transported to Alice Springs via toyota Personnel Carriers. Staff personnel were then flown by commercial TAA aircraft to Perth for break.

4.9. Explosives

Explosives were purchased through Centralian Industries Alice Springs and were delivered on site to Western's licensed shooter for storage in Western's licensed magazines on the prospect area. Sufficient quantities for each days operation was drawn from the field magazines.

5. Survey

5.1. Introduction

The survey crew scouted the area on January 27th, 1985 the first line S85-WR07 being set out the same day. The dozing crew arrived January 26th, and line cutting started on January 28th.

Sand dunes were a minor problem during the survey, as was the travel time to some of the lines. The Wallara Ranch road however provided good access.

Line S85-WR01 was slower than usual to survey, but this was unavoidable due to the necessity of leaving the large trees untouched in the National Park.

One campsite only was used for the entire survey and this was located approximately three kilometers west of Wallara Ranch.

5.2. Line Clearing

The clearing of lines and access was sub-contracted to Clan Contracting of Derby who supplied two Caterpillar D7G bulldozers, a 12G Grader and operators along with a support vehicle (Toyota 4WD Utility) driver, cook and camp facilities for this operation.

The lines were cut to a width of approximately 6 meters and the depth kept as shallow as possible except where sand dunes had to be cut down to allow easier access.

Lines were set off for the dozers by a surveyor with at least three sighter pegs to established the correct bearing. Operators then maintained their own direction with the assistance from a surveyor when necessary.

Line S85-WR01 was cut only one and a half blade widths at the reques of the Conservation Commission. This line was also re-habilitated b the grader after crew completion, and the access track was re-graded

5.3. Survey of Seismic Lines

Equipment

2 Theodolites Wild T1

2 Geodimeters AGA 122

2 Roelof prisms (for solar observations)

1 Hand held radio

1 50m fibre-glass tape

2 Toyota 4WD Utilities (with radios)

Line Setout

Line bearings were calculated from scaled coordinates of the ends of lines or protracted from the program map. The setout points were determined by scaled distances from the known points on the program map. In the field the setouts were effected by measured distances from a known VP or PM and bearings established from a known bearing or sunshot.

Survey

Instrument points were established at vantage points along the lines and sights kept to a maximum of 3 kilometers. In many cases, due to terrain, line of sight was reduced to under 1 km.

Field operations were invariably suspended during the middle of the day to avoid heat haze conditions caused by extreme temperatures.

Vertical control was maintained by reciprocal trigonometric levelling procedures. This involves the reading of face left and right vertical angles observed from each direction with a time lapse of not more than twenty minutes.

Horizontal control was achieved by observing face left and right horizontal angles between backsights and foresights with solar observations taken at take-off points, start and end of lines and convenient instrument points not more than 15 kilometers apart. Distances were measured with the E.D.M. and compared against the chained distances at every instrument point.

Intermediate observations were made at every 5th V.P. maximum, or at grade changes or notable features including P.M.'s. With the exception of the P.M.'s, these observations consisted of a face left vertical angle and observations height only as these were assumed to be on line and at the chained distance from the preceding instrument point. Double face vertical and horizontal angles and E.D.M. distances were observed to P.M.'s. These were observed to the dumpy at the base of the P.M. Mathematical checks are applied to the double face vertical and horizontal angles to eliminate reading errors.

Control

Line S85-WR01, both horizontal and vertical control was from a Satellite Navigation Station.

Line S85-WR05 horizontal control was from Yowa Bluff Beacon. Vertical control was from a Bench Mark. The number on the Bench Mark however is doubtful. The Bench Mark was put in place by the Northern Territory Surveys (NTS) and they assured us that there is no other Bench Marks in that immediate vicinity except for 7517. This is not the number on the Bench Mark. We have assumed the number on the plaque is incorrect and have adopted the elevation as that of 7517. S85-WR06 and 07, both horizontal and vertical control is from Ayers Lookout Beacon. A Sat. Nav.stn was placed on S85-WR06, PM380+20 and misties by:E=+4.25,N=-3.20, and Elev=-0.61. A Sat. Nav. Stn was placed on S85-WR07,PM 1052 and misties by:E=-2.7(N=-0.01, and Elev=-1.39.

Chaining

White topped 0.6 meter high wooden pegs were placed at every station along the line. The station interval was 30 meters for all lines. These stations were numbered consecutively from 100 at the start of each line in the south or west. The station interval was measured with a plastic coated steel cable calibrated regularly to a fibreglass tape.

Chaining notes were compiled for each line showing all features and existing lines that intersect the line. These were done in triplicate, one copy for the recording crew, one for the weathering crew and a copy retained in the survey office.

Permanent Markers

Star iron pickets with aluminium tags attached stating line number and station numbers, were used as witness marks. A dumpy peg cemented at the base served as the instrument station and bench mark for the permanent marks. Permanent markers were placed at the end of lines, existing and new line intersections and at least every five kilometers.

Computations

The following equipment was used for computations:

HP85A Mini Computor plus 16K Memory Module,Advance Program Rom, Matrix Rom, Plotter/Printer Rom.

Lewis and Lewis Software

HP 82905B Printer

HP 11C and 41C Calculators

In almost all cases, computations were carried out on the HP 85 Mini Computor. The software is set up in such a way that the field notes are transposed through the Entry File and each VP., instrument point or survey connection is displayed on a single page and stored on tape as a single page entry. This meant that at any time, one point could be viewed and all angles and distances observed to fix that point, edited or deleted if required. This flexibility is one of the main advantages of the system.

The calculation mode of the software reads the pages of the field data, selects proper routines, reduces the distances to UTM datums, applies scale factor,corrects the trig elevation for curvature and refraction and prints a full or partial listing of the computation.

The edit file assigns name and describes X,Y and Z coordinates of the data points. Any name point may be modified by re-entering parameters. Known points with their parameters are entered in this file as take-off information.

Once calculated, the points can be stored into numerical and alphabetical order and used to print vertical profiles at designated scale, plot horizontal positions at a designated scale and make listings of all stations on the printer.

Standalone programs were also available on the software. They include UTM conversion to geographic coordinates and vice-versa, sun observations by altitude or hour angle method and closure programs for adjustment of traverses.

All information was stored on magnetic tape with one line per tape. Line listings were compiled showing X,Y and Z coordinates and relevant header information.

Comments

No major problems were encountered during the course of the survey. A comparatively large amount of traversing was required to bring control into the lines due to the nature of the survey. This was unavoidable. Although there are no loops, the Satellite Navigation stations and the checking procedures employed verify the accuracy of the survey. The survey will provide a good reliable base for future work.

All lines were calculated in Zone 53 coordinates of the Australian Map Grid even though lines S85-WR01 and 02, are both in Zone 52. This is for consistency.

All elevations were calculated on the Australian Height Datum (AHD).

A file for each line containing field notes, coordinates and elevation list, horizontal plot, vertical profile and line sketch was presented to the client on completion of the survey.

There were no intersections on the program and hence no intersection diagrams or intersection lists.

A permanent marker list has been compiled and included in the report.

6. Weathering Report

6.1. Introduction

The weathering program for OP236 commenced on February 2nd, 1985. The drilling services were sub-contracted to Whiteland Drilling of Perth.

The Uphole Crew consisted of one Toyota Personnel Carrier with Oyo instruments mounted in the back, a licensed Explosives Toyota Pick-up, two observers and a licensed pre-loader.

6.2. Field Method

Instrumentation consisted of an Oyo TR7 System. Four geophones connected to separate traces were offset 1 meter from the top of the hole.

The holes were loaded with one detonator at 2.5 meters, "A" boosters from 5 meters to 45 meters at 4 meter interval and "2A" boosters at every 5 meters from 50 meters down to the bottom of the hole. All holes were picked and plotted in the field to detect any deepening of the weathering base and drilling depths altered accordingly.

6.3. Computations

The uphole monitors were picked in the field and plotted on a time versus depth graph from which the sub-weathering velocities were determined. The datum static was determined by calculating the distance from the bottom of the uphole to datum, divided by the sub-weathering velocity and adding it to the uphole time as measured at the bottom of the hole.

Datum used for the prospect area was 500m A.H.D. and using these graphs a datum static was obtained.

On line S85-WR06 and 07, where the base of the weathering was below datum, the static value was obtained by calculating the distance from the weathering base back up to datum, dividing this by the replacement velocity, 2200m/sec, giving a positive time. This time was then added to the negative time from the surface to the weathering base.

For the remainder of the prospect datum was in the sub-weathering and the static was time from surface to datum.

6.4. Discussion

For the majority of the prospect a two layered weathering model was evident with the first two layers consisting mostly of sand and gravel with a velocity of 600-800m/sec. The second layer consisted mainly of soft sandstone and sand with a velocity of 1400-1600m/sec.

The sub-weathering layer was a mixture of sandstone with clay bands with a velocity of 2000-2500m/sec. The average sub-weathering velocity was found to be 2300m/sec at an average depth of 45 meters.

On the South of lines S85-WR02,03 and 04 there was evidence of a hard layer of sandstone with a velocity of 3000m/sec. This high velocity layer was proven to be a stringer on line S85-WR03 at VP124 where is was measured at 5-15m below surface, with a mixture of sand and clay below it with a velocity of 2000m/sec.

The majority of the holes were drilled with either air or water injection, apart from the deeper holes on lines S85-WR06 and 07, where drilling mud was used.

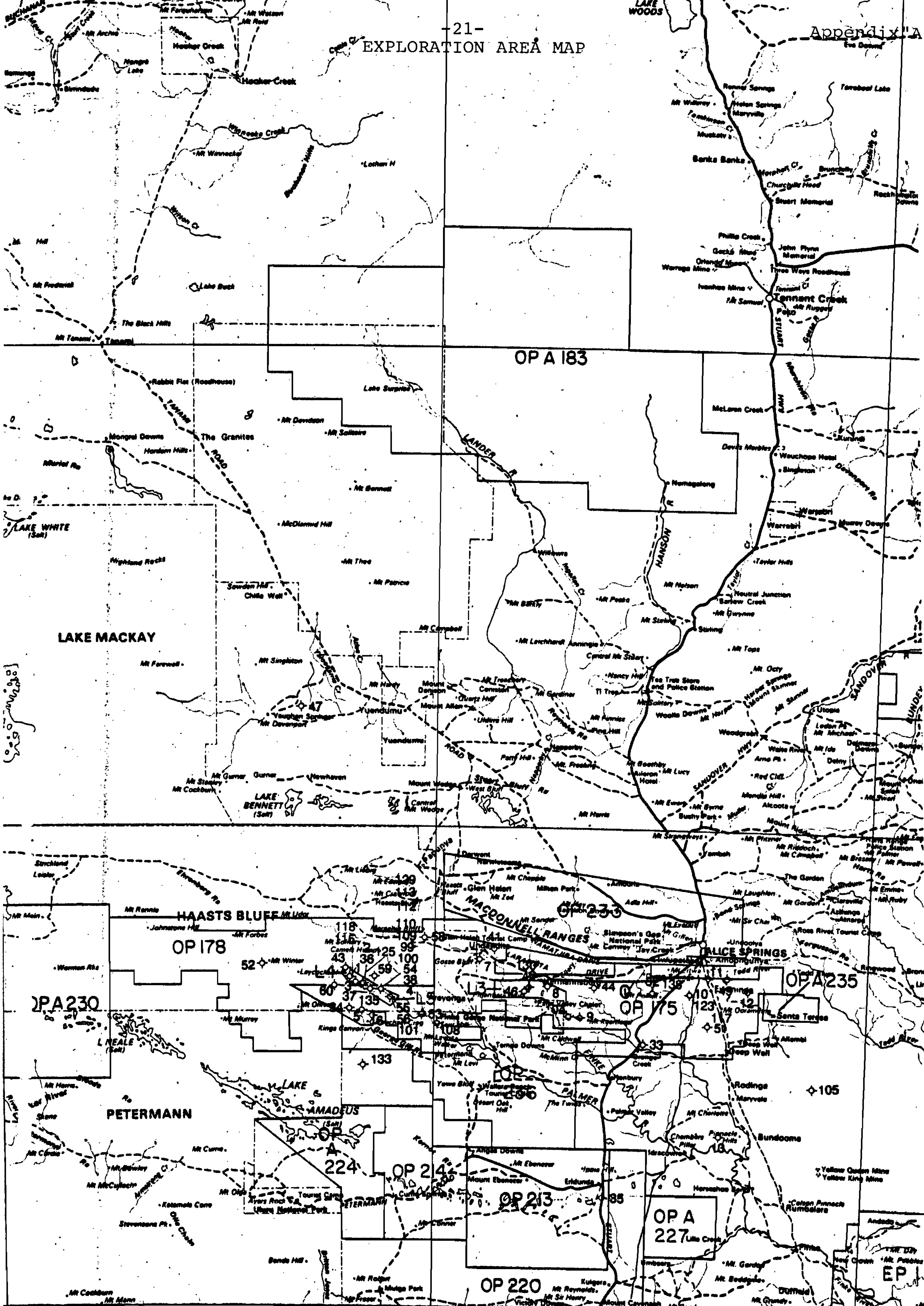
6.5

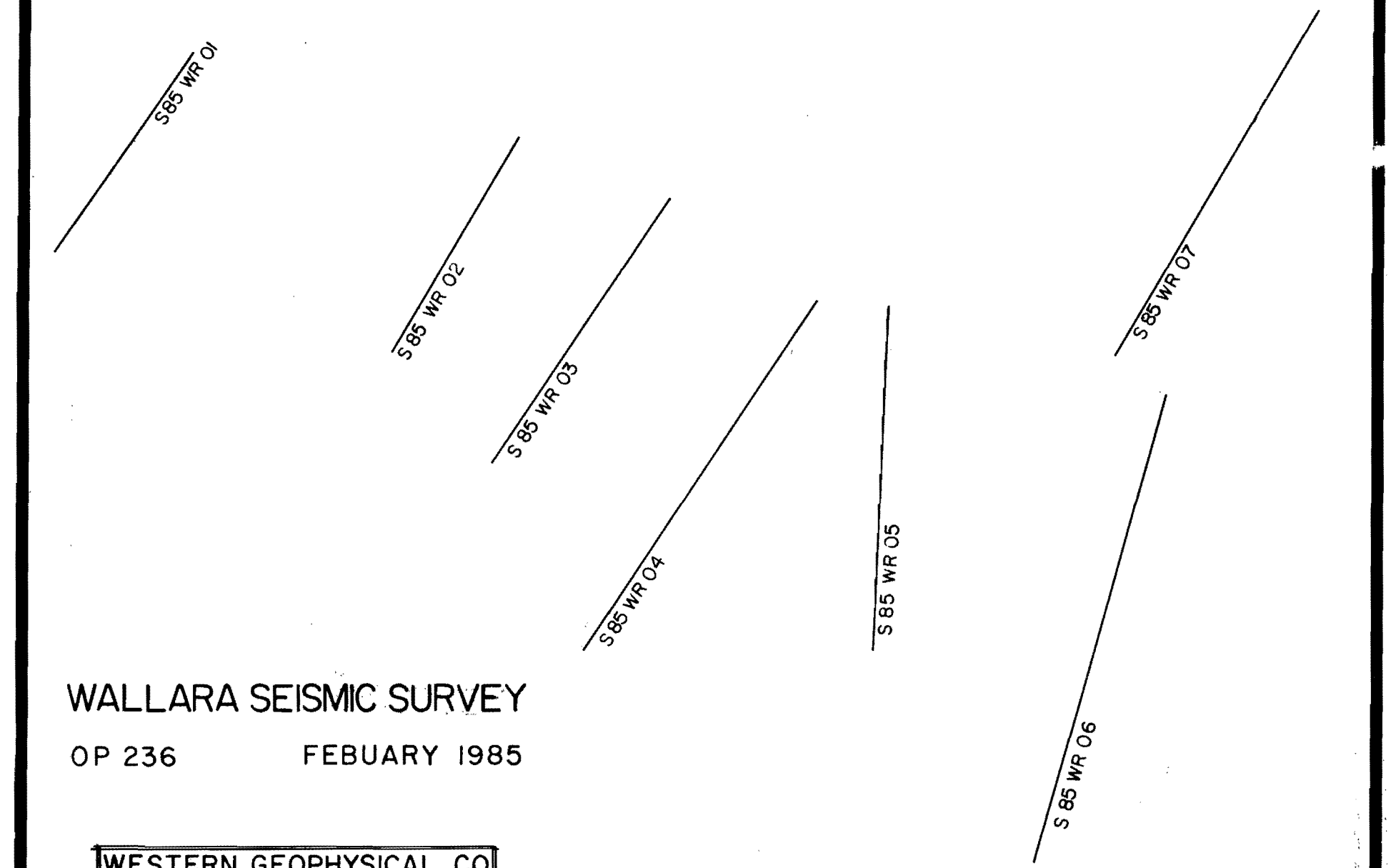
UPHOLE LISTING OP 236

LINE#	V.P.	DEPTH IN METERS	STATIC
S85-WR07	126	60	-38
	290	70	-18
	456	75	-6
	573	75	-6
	660	41	0
	756	54	-8
	835	95	-16
	925	75	-40
	1046	80	-41
	1200	65	-19
	1340	50	-10
S85-WR06	122	95	-34
	264	70	-13
	430	45	-28
	600	70	-24
	766	95	-1
	930	95	-15
	1100	95	-31
	1270	95	-12
S85-WR05	124	60	-32
	290	45	-30
	460	60	-24
	612	70	-20
	770	51	-23
	934	70	-13
S85-WR04	130	40	-18
	270	75	-28
	427	60	-27
	600	60	-25
	770	60	-29
	925	55	-30
	1096	45	-41
S85-WR03	124	50	-25
	304	60	-36
	459	54	-45
	636	95	-49
	794	74	-46
	961	70	-52
S85-WR02	130	39	-46
	270	95	-47
	430	50	-48
	592	60	-69
S85-WR01	124	60	-44
	294	60	-52
	400	40	-51
	536	60	-68

EXPLORATION AREA MAP

Appendix "A"





WALLARA SEISMIC SURVEY

OP 236 FEBUARY 1985

WESTERN GEOPHYSICAL CO
PARTY 785

NOT TO SCALE

FIELD RECORDING PARAMETERS

APPENDIX C- FIELD RECORDING PARAMETERS

1200% STACK

CREW : PARTY 786

CLIENT : SYDNEY OIL

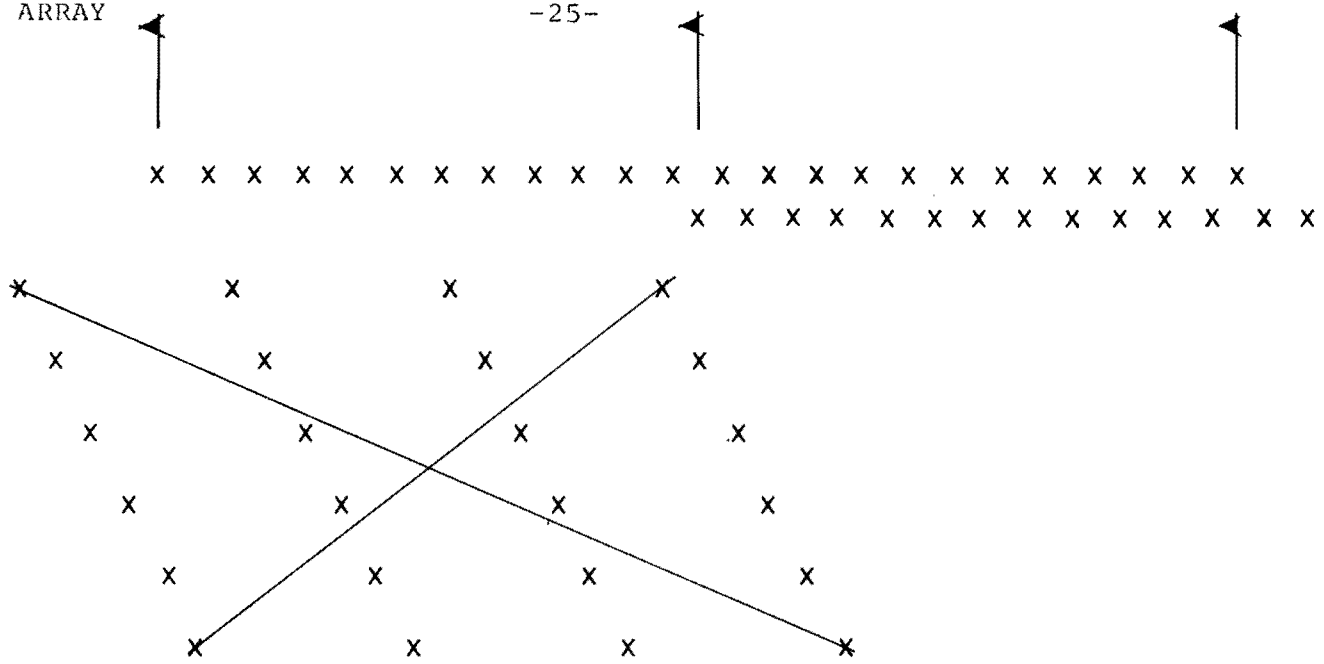
AREA : OP236

1985 WALLARA RANCH SEISMIC SURVEY

SPREAD	:	SPREAD GEOMETRY	:	1515-105-0-105-1515
INSTRUMENT	:	INSTRUMENT TYPE	:	DFSV/FT1
	:	NO. OF CHANNELS	:	96
	:	SAMPLE RATE	:	2 MSEC
	:	RECORD LENGTH	:	12 SEC
	:	TAPE FORMAT	:	SEG B
	:	PACKING DENSITY	:	1600 BPI
	:	LO-CUT FILTERS	:	8Hz,18db/oct
	:	HI-CUT FILTERS	:	128Hz,72db/oct
	:	DIVERSITY/VERTICAL SUM	:	DIVERSITY
	:	PRE-AMP GAIN	:	48db/oct
SOURCE	:	SOURCE TYPE	:	VIBROSEIS LRS 311
	:	SOURCE PATTERN	:	4 IN-LINE
	:	SOURCE LENGTH	:	46m
	:	SOURCE SPACING	:	12m(4 VIBRATORS)
	:	SOURCE MOVE UP	:	2m
	:	NO. OF SWEEPS	:	6
	:	SWEEP START FREQUENCY	:	12Hz
	:	SWEEP END FREQUENCY	:	96Hz
	:	SWEEP LENGTH	:	8 SEC, TAPER 200msec
	:	UNSUMMED SWEEP CHANNEL	:	AUX CH 2

RECEIVER & SOURCES ARRAY
RECEIVER 30 METERS

Appendix "D"



SYDNEY OIL COMPANY
OP 236

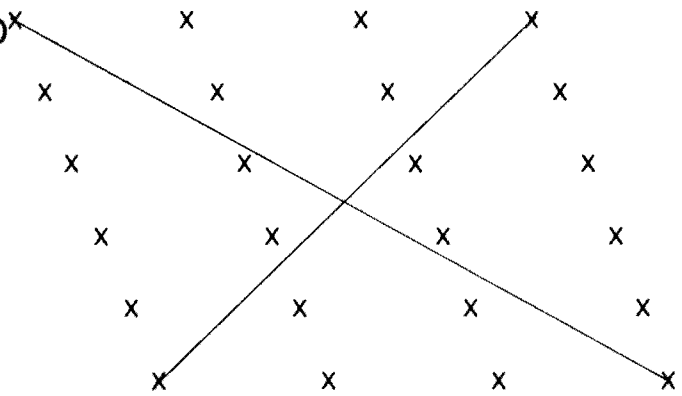
WESTERN GEOPHYSICAL
PARTY 785

SWEEP	12 96 Hz
SWEEP LENGTH	8 seconds
No. of SWEEPS	6
VIB SPACING	12 M
MOVE UP	2 M
VP INT	120 M
SOURCE LENGTH	46 M

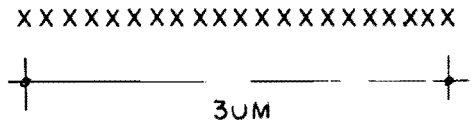
GEOPHONE	GS 200
NATURAL	10 Hz
GROUP INT	30M
GROUP LENGTH	60M
PHONES GROUP	24
PHONES SPACING	2·61

RECEIVER & SOURCE ARRAY
RECEIVER 60 METERS

GEOPHONE	GS200
NATURAL	10Hz
GROUP INT	30M
GROUP LENGTH	30M
PHONES GROUP	24
PHONES SPACING	1·30 M



SWEEP	12 96 Hz
SWEEP LENGTH	8 seconds
No of SWEEPS	6
VIB SPACING	12M
MOVE UP	2M
VP INT	120M
SOURCE LENGTH	46M



SYDNEY OIL COMPANY
OP 236

WESTERN GEOPHYSICAL
PARTY 785

PRODUCTION LINE LISTING

OP-236

LINE NO.	START VP	END VP	START DATE	END DATE	TOTAL VPS	ACC. VPS	TOTAL KM.	ACC. KM.	DIRECT -ION
S85-WR06	100	1292	FEB 9	FEB 13	298	298	35.76	35.76	S-N
S85-WR07	100	1364	FEB 14	FEB 18	316	614	37.92	73.68	S-N
S85-WR05	960	100	FEB 18	FEB 21	215	829	25.80	99.48	N-S
S85-WR04	1120	100	FEB 21	FEB 24	255	1084	30.60	130.08	N-S
S85-WR01	100	560	FEB 25	FEB 26	115	1199	13.80	143.88	S-N
S85-WR02	616	100	FEB 27	FEB 28	129	1328	15.48	159.36	N-S
S85-WR03	984	100	FEB 28	MAR 03	221	1549	26.52	185.88	N-S

REEL/FILE LISTING

OP-236

LINE NO.	REEL NO.	FILE NO.	VP TO VP	DESCRIPTION
S85-WR06	155266	1-27		EXPERIMENTAL
	155267	28-37		EXPERIMENTAL
	155268	1-28	100-208	
	155269	30-63	212-340	NO FILE 29
	155270	64-79	344-396	
	155271	83-124	400-560	NO FILES 80,81,82
	155272	125-161	564-692	NO FILE 151
	155273	162-202	696-856	
	155274	203-240	860-1000	
	155275	242-283	1012-1172	NO FILE 241
	155276	284-314	1176-1292	
S85-WR07	155277	1-39	100-248	
	155278	40-80	252-404	
	155279	81-119	408-552	
	155280	120-159	556-704	
	155281	160-200	709-869	
	155282	202-238	864-1004	NO FILE 201
	155283	239-281	1000-1160	
	155284	283-317	1172-1308	NO FILE 282
	155285	318-331	1312-1364	
S85-WR05	155286	1-38	960-820	NO FILE 38
	155287	39-80	816-660	NO FILES 55,76
	155288	81-119	656-508	NO FILE 97
	155289	120-161	504-348	NO FILES 131,140
	155290	162-189	344-240	NO FILE 166
	155291	190-225	236-100	NO FILE 190
S85-WR04	155292	1-38	1120-972	
	155293	39-80	968-816	NO FILES 45,66,77
	155294	81-122	812-656	NO FILES 98,115
	155295	123-161	652-508	NNO FILES 131,152
	155296	162-203	504-348	NO FILES 173,189
	155297	204-242	344-200	NO FILES 210,234
	155298	243-267	196-100	
S85-WR01	155299	1-39	100-248	NO FILE 37
	155300	40-79	252-396	NO FILE 58
	155301	79-120	400-560	NO FILE 90
S85-WR02	155302	1-39	616-464	
	155303	40-81	460-304	NO FILE 58,79
	155304	82-119	300-156	NO FILE 100
	155305	120-133	154-100	
S85-WR03	155306	1-41	994-828	
	155307	42-75	824-688	
	155308	76-112	684-540	
	155309	113-151	536-384	
	155310	152-187	380-240	
	155311	188-222	236-100	

PERMANENT MARKER LIST OP 236 FEB 1985

NAME	DESCRIPTION	EAST(X)	NORTH(Y)	ELEV(Z)
S85 WR-01				
100	SOL	133440.95	7297112.03	574.34
220		135501.62	7300057.81	596.56
382		138269.33	7304045.58	597.75
560	EOL	141208.95	7308497.04	601.78
S85 WR-02				
100	SOL	189091.43	7277309.04	608.05
268		191246.83	7281856.19	587.05
442		193480.91	7286566.31	606.10
616	EOL	195723.56	7291275.22	633.68
S85 WR-03				
100	SOL	196753.63	7263867.74	541.69
286	DUNE TOP	200109.65	7268315.07	567.04
432+24	DUNE TOP	202761.29	7271823.25	573.02
632+9	FENCE NEARBY	206370.57	7276584.44	579.96
808	DUNE TOP	209546.20	7280779.86	581.90
984	EOL	212729.58	7284983.86	597.49
S85 WR-04				
100	SOL	207395.61	7251313.78	548.06
206		209175.13	7253939.41	550.12
251		209931.83	7255053.10	552.77
431		212969.05	7259500.30	553.89
620+16		216228.58	7264140.32	546.01
777+10		218939.86	7267971.66	547.39
938		221718.02	7271899.89	564.31
1120	EOL	224865.96	7276351.51	568.67
S85 WR-05				
100	SOL	233876.60	7251199.40	533.59
321		234122.60	7257809.24	549.75
477+11		234290.12	7262479.50	519.29
633		234452.66	7267143.83	516.03
812		234663.95	7273161.81	521.38
960	EOL	234798.97	7276941.22	537.93
S85 WR-06				
100	SOL	252652.67	7233049.54	543.12
288		254004.72	7238517.26	537.97
380+20	SATNAV STN, HILL	254671.27	7241207.85	574.37
460+12		255249.85	7243526.30	550.11
641		256558.79	7248775.93	528.16
834		257961.00	7254381.66	540.43
957+9		258853.63	7257962.33	548.94
1128+15		260092.67	7262933.53	550.91
1258+14	ACCESS TRACK	261037.84	7266708.31	537.47
1292	EOL	261281.85	7267684.91	541.28

PERMANENT MARKER LIST(Cont)

S85 WR-07				
100	SOL	257045.42	7272064.64	551.73
285		259667.56	7276951.83	513.72
441	WALLERA ROAD	261883.63	7281074.66	484.51
625	TEMPE DOWNS ROAD	264496.85	7285935.50	478.92
850		267703.00	7291877.97	512.14
1052		270576.97	7297212.70	541.38
1222		272991.66	7301703.80	503.45
1364	EOL	275000.54	7305459.18	495.11

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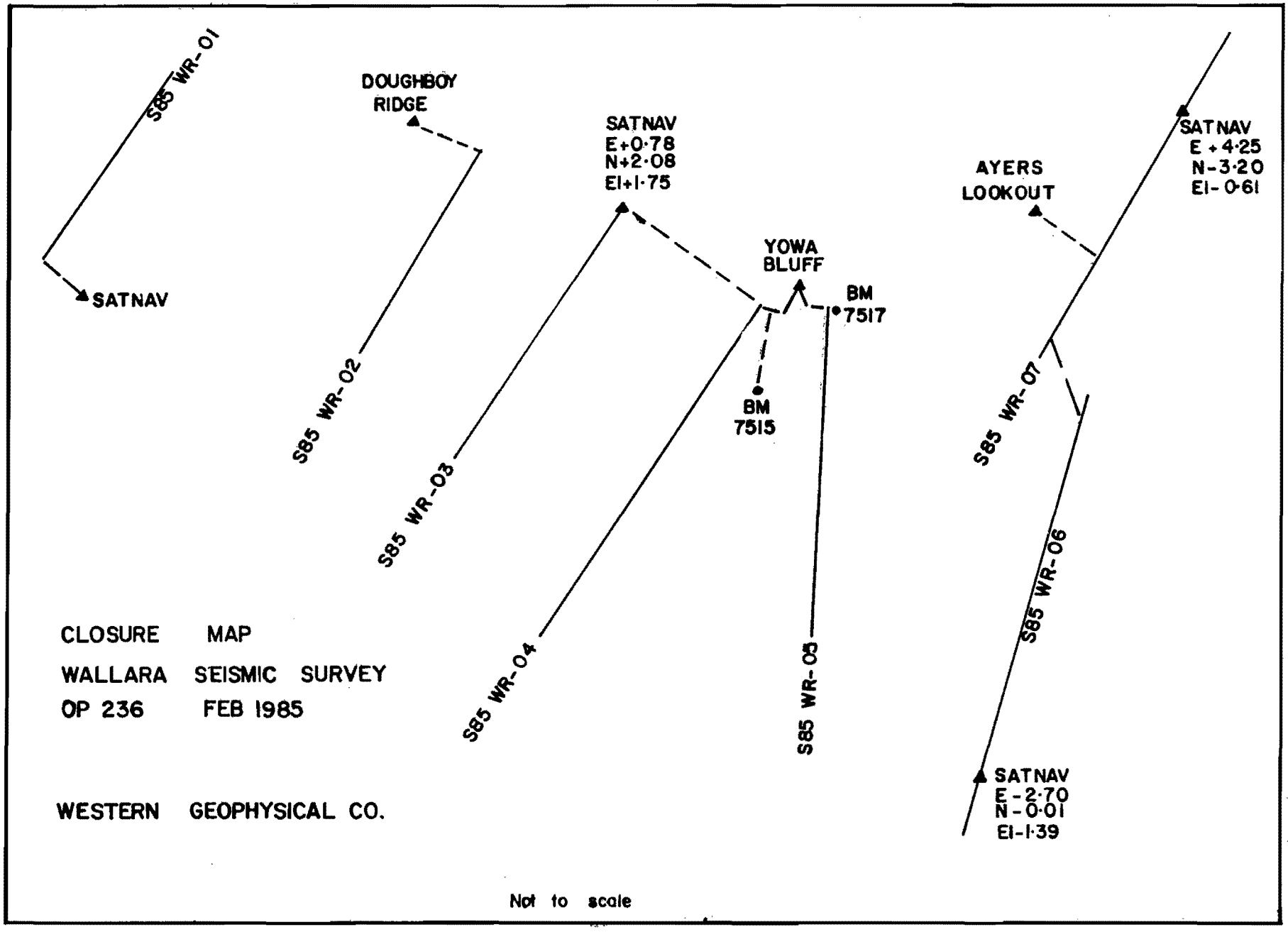
S85 WR-01
SATNAV
DOUGHBOY RIDGE
S85 WR-02
SATNAV
E+0·78
N+2·08
El+1·75
S85 WR-03
YOWA BLUFF
BM 7517
BM 7515
S85 WR-04
S85 WR-05
AYERS LOOKOUT
SATNAV
E+4·25
N-3·20
El-0·61
S85 WR-07
S85 WR-06
SATNAV
E-2·70
N-0·01
El-1·39
CLOSURE MAP
WALLARA SEISMIC SURVEY
OP 236 FEB 1985
WESTERN GEOPHYSICAL CO.
Not to scale