



OPERATIONS REPORT
MARINE SEISMIC SURVEY
BASS STRAIT
T-13-P

FOR

OTTER EXPLORATION N.L.,
169 MILLER STREET,
NORTH SYDNEY, NSW. 2060

CLIENT REPRESENTATIVE : J. NEEDHAM

BY

GEOPHYSICAL SERVICE INTERNATIONAL,
P.O. BOX 106, NORTH RYDE, N.S.W., 2113.

PARTY 2931 : M.V. "EUGENE McDERMOTT II"
OPERATIONS SUPERVISOR : R. MILES

6TH MAY 1980 TO 8TH MAY 1980

JOF.

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SECTION IINTRODUCTION

A marine seismic reflection survey was conducted by the M.V. "EUGENE McDERMOTT II" in the Bass Strait area of Tasmania on the T-13-P Prospect for Otter Exploration N.L., between 6th May 1980 and 8th May 1980.

400.475 Kilometres of 48 fold reflection coverage was shot utilizing a 2400 metre streamer under continuous tow in conjunction with a Pneumatic Acoustic Energy Source (Airguns) generally operating 24 hours a day.

Recordings were made using one set of DFS V with 2 tape transports recording on 12.7mm magnetic tape in 9 track 1600 BPI Seg. B Digital Format. A record length of 4 sec with a sample rate of 2 msec was used.

The ship's location was determined by Maxiran, a precise radio-location system, owned and operated by Offshore Navigation Inc., of New Orleans, U.S.A. The network consisted of three fixed base stations with a mobile unit on the survey vessel.

SECTION IIOPERATION PROCEDURESA. RECORDING

One Texas Instruments Digital Field System V (DFS V) with two tape transports was used for all recordings. A Servo Writer Profiler was utilized to obtain 100% (Near Trace Gather) subsurface coverage (uncorrected section) of 4 seconds duration directly from monitor recording of trace #94.

Direct Read After Write (RAW) monitors were generated approximately every 50 shotpoints for quality control purposes. In making these displays the instantaneous gain was removed and programmed gain control was applied so that relative amplitude variations between traces could be observed.

B. STREAMER

The 2400 metre, neutrally buoyant, continuous two streamer consisted of 48 'live' sections each 50 metres in length. Seven nylon stretch sections each 50 metres in length were placed between Group 96 and the recording vessel to attenuate ship generated noise.

Six waterbreak/depth transducer sections each 4 metres in length were placed in the streamer between the front stretch and group 96 and between groups 81/80, 61/60, 41/40, 21/20 and 5/4. Six remote control 'Cole' cable depth controllers were placed on the streamer at the same positions as the depth transducers except instead of placing one between groups 5/4, it was placed between group one and the tail stretch.



Two waterbreaks, one between the front stretch and Group 96 and the other between groups 81 and 80 were used.

Tail buoy bearings were checked at regular intervals to ensure the feathering angle did not exceed specified limits during recording. Occasionally, tail buoy bearings were not recorded due to sea clutter on the radar.

C. ENERGY SOURCE (AIRGUNS)

An Electro-Pneumatic Acoustic Energy Source known as "Airguns" was used for reflection work. The Airgun has basically two moving parts, the shuttle and solenoid. Compressed air is supplied to this unit at a pressure of 13789 kPa (2000 psi). The shuttle is forced to close on initial application of pressure. Compressed air fills the reservoir chamber through a central orifice in the shuttle. To discharge the gun an electrical current activates the solenoid and retracts a plunger, thus enabling compressed air to pass through a port hole to the underside of a flange at the top of the shuttle. The pressure difference above and below the shuttle then thrusts it open. The air from the chamber then escapes through four port holes near the centre of the gun and expands rapidly through the water, producing a single bubble and resultant shock wave. The air bubble collapses in a manner similar to that caused by explosives with one notable exception in that its period is controllable and is placed in the desired seismic frequency band.

There are three variables used to control the frequency content of the shock waves. These are:

- i) depth of the airgun in the water
- ii) pressure at which the gun is operated
and
- iii) size of the chambers used on the gun



Using different guns of various chamber sizes broadens and flattens the frequency spectrum of the pulse (plate 3).

The depth of the airguns was 7 - 8 metres and they were operated at a pressure of 13789 kPa (2000 psi) with the pressure never falling below 12755 kPa (1850 psi).

The individual airguns were arranged to produce a 1450 cu. in. array. This array consisted of:

- i) 5 x 100 cu. in. guns = 5 x 1.640 litres
- ii) 6 x 80 cu. in. guns = 6 x 1.312 litres
- iii) 2 x 60 cu. in. guns = 2 x 0.984 litres
- iv) 4 x 40 cu. in. guns = 4 x 0.656 litres
- v) 3 x 30 cu. in. guns = 3 x 0.492 litres
- vi) 2 x 20 cu. in. guns = 2 x 0.328 litres
- vii) 2 x 15 cu. in. guns = 2 x 0.246 litres
- viii) 2 x 10 cu. in. guns = 2 x 0.164 litres
- ix) 2 x 5 cu. in. guns = 2 x 0.082 litres

These guns were arranged and spaced (see plate 4) so as to operate as a tuned array which yields a flat frequency spectrum.

N.B. 280 cu. in. (4.592 litres) of airgun volume was available in the form of spare guns

1 psi = 6.8945 kPa

1 cu. in. = 0.0164 litres

The theoretical power output of the energy source is in excess of 35 bar metres.

The shotpoint interval was 25 metres with the airguns being fired every 25 metres to give a 48 fold coverage.



D. INSTRUMENT AND NOISE TESTS

Instrument tests were carried out each day and the results were examined in an analog form in the field. These tests consisted of Dynamic Range Determination, Amplifier Noise Test and Automatic Gain Control (AGC) Test. Frequent checks on tape speed and skew were made. Tapes from each system were read on other transports as a check to confirm readability.

A set of monthly tests were carried out on 23rd April 1980. These tests included Harmonic Distortion, Gain Linearity, Periodic Calibration checks, skew checks, and the above-mentioned tests. These tests were analysed in the Sydney, Australia, Processing Centre using TIAC routine, and found to be up to Texas Instruments standards.

The instruments performed without malfunction throughout the survey.

E. AIRGUN CONTROLLER

The Texas Instruments Automatic Airgun Controller (TIGER*) can be controlled:

i) COMPUTER MODE

In Computer Mode the CMS II Navigation Computer sets and monitors the last eight firing times of the individual guns in the array and keeps them to within 1 ms.

The firing instant is sensed directly from the initial shuttle movement and the array is consistently tuned.

It is also noted that there is a 51 ms delay from SOD, on tape, to the time the airguns are fired.



ii) STAND ALONE MODE

In this mode, which is independent of the CMS Navigation Computer, it sets and monitors only the last two firing times of the guns, and does essentially the same as in Computer Mode.

This detection system also provides a direct monitoring of the performance of each gun with an automatic display indicating a no-fire or self-fire for each individual gun.

F. FATHOMETER

A Simrad Model EA fathometer with an operating frequency of 38 kHz was used.

Each fathogram was identified by line number, direction shot, time and date of first shotpoint and scale. The fathograms were marked and labelled every 50 shotpoints.

This unit has an operating range of 0-1700 metres with a digital readout and paper record. A wide selection of ranges are available and the instrument is corrected for draft.

No malfunctions of this equipment occurred during the survey period.

G. SURVEY

Navigation

The prime navigation used was Maxiran. The raw Maxiran ranges were interfaced into the CMS-II, so that all production recording was computer controlled. Recording was done in 'distance' mode, that is by indicating a shotpoint at every 25 metres of travel along a pre-plotted line. Occasional changes to 'time' mode were made when real time shotpoints became displaced with respect to the



pre-plotted shotpoint.

The required course of the vessel was displayed on centre-line trace plotters. All survey data was recorded on magnetic tape by the CMS-II for post processing, with periodic printouts for onboard monitoring.

The Maxiran equipment was calibrated onshore, then the accuracy of the survey net was verified by the M/V "McDERMOTT" in good angle from all 3 shore stations.

Offshore Navigation Inc., will submit a separate full report.

CMS software programme 404.71 was used for the survey with velocities from Maxiran or Doppler Sonar while azimuth was derived from the vessel's gyro compass.

Primary navigation was constantly checked by the CMS Satellite option and by three way fixes calculated using the TI-59 "Three Way Fix by Iteration" programme.

Prior to starting the survey, the co-ordinates for line 80F-1 were altered but labelling remained the same.

Unstable and weak Maxiran signals occasionally caused problems with navigation. On line 80F-4, signals from Cape Portland were lost and eleven shotpoints were missed while corrective action was being taken. Both lines 80F-11 and 11A were terminated due to weak or non-existent Maxiran signals causing shotpoints to be missed and erratic track plotter movements.

Line 80F-13 was terminated when unstable Maxiran signals caused the CMS to start the line well before schedule.



At shotpoint 377 of line 80F-13, the CMS CPU idled and a reset and re-initialization was necessary and another turn around resulted.

Magnetics

Magnetometer data was collected on all lines during the prospect with the exception of the period between shotpoints 75 and 106 of line 80F-11. During this period, the plug was removed from the magnetometer cable reel to enable moisture to be displaced from the connector.

Data was recorded on both CMS Magnetic tape and on paper rolls. These paper rolls have one minute markers along the right hand side while every tenth shotpoint is marked along the left hand side. Shotpoint numbers and GMT are annotated on the roll approximately every one hundred shotpoints to assist interpretation during processing.

MAGNETOMETER DETAILS

Manufacturer	:	Varian
Model	:	V4970
Serial No.	:	229259
Distance to Sensor	:	513 feet (from stern)
Paper Drive Speed	:	0.75 in/min.

G. SURVEY (cont.)SURVEY DETAILS

PRIMARY SYSTEM

Type	:	Maxiran
Survey Company	:	Offshore Navigation Inc.
Operating Frequency	:	transmit 441 mHz receive 429 mHz
Antenna height, from sea level	:	Fwd - 21.2 metres Aft - 23.1 metres
Antenna location from stern of vessel	:	25.3 metres (aft) 40 metres (Fwd.)
Shore Stations Locations		<u>Lat.</u> <u>Long.</u>
BLACKWARRI	:	038 ^o 24'15.07"S 146 ^o 38'49.24"E
MT. CANN	:	037 ^o 38'54.13"S 148 ^o 58'39.72"E
MT. TAYLOR OFFSET	:	037 ^o 42'26.75"S 147 ^o 33'33.08"E
CAPE PORTLAND	:	040 ^o 45'18.1 "S 147 ^o 58'09.14"E



H. PERMITTING

The Marine Operations Centre, Canberra, was advised as to the ship's location throughout the survey to enable the necessary navigation warning to mariners to be issued.



J. OPERATIONS

This survey commenced on 6th May 1980 without the seismic cable being brought onboard after completion of the previous survey. The cable continued to ride well, but traces #14 and #34 had to be killed on a number of lines.

Trace #34 first went dead at the start of line 80F-6 and was subsequently killed and remained killed for the duration of this and the following lines (80F-3 and 2). This fault proved intermittent and did not recur. At shot-point 173 of line 80F-7, leakage was observed on trace #14. Trace #14 was then killed for the rest of the line and the whole of lines 80F-9, 10, 11, 11A, 13, 13A and 8.

Interference from other shipping was not a problem and no noise problems were experienced.

The quality of the data collected was maintained at or above client specifications and any deviation from these specifications was immediately brought to the attention of the onboard client representative. Frequent monitoring of RAW data during production ensured that the high standard of data recorded was maintained.

Weather conditions throughout the survey period were excellent with sea states of 2 - 3 and this contributed significantly to the timely and successful completion of the survey on 8th May 1980.



APPENDICES

APPENDIX AKEY PERSONNEL

J. STANTON	BOAT MANAGER
C. ORR	PARTY MANAGER
N. McGOWAN	ADMINISTRATOR
C. GRUBBA	CAPTAIN
A. WELFARE	INSTRUMENT ENGINEER
I. JOHNSON	INSTRUMENT ENGINEER
P. HUTCHINSON	INSTRUMENT ENGINEER TRAINEE
L. KAUFMAN	QUALITY CONTROL SEISMOLOGIST
S. JOYCE	QUALITY CONTROL SEISMOLOGIST
T. MANNING	AIR GUN MECHANIC
S. MANNING	AIR GUN MECHANIC
J. SIMMONS	AIR GUN MECHANIC
B. GILBERT	NAVIGATOR CMS II
P. MILLER	NAVIGATOR CMS II
R. CAMPBELL	COMPRESSOR ENGINEER
N. DOWDESWELL	VESSEL CONTROLLER
J. NEEDHAM	CLIENT REPRESENTATIVE

APPENDIX BEQUIPMENT1. 2400 METRE STREAMER

Type Cable A.C.H. : 96 trace neutrally buoyant
universal gland streamer

Length of Live Section : 50 metres

Length of Depth

Transducer Sections : 4 metres

Distance Group 1 to 96
(Centre to Centre) : 2395 metres

Group Intervals : 25

Seismometer Types : T.I. Flatpack Acceleration
cancelling

Seismometer/Group : 15

Seismometer Interval : 1.67 m linear

Sensitivity : 5.15 uv/uBar \pm 2DB

2. RECORDING PARAMETERS

Amplifier : TI DFS

Gain Mode : IFP

Tape Speed : 79.38 ips

Record Length : 4 sec

Sample Rate : 2 m sec

Gain Constant : 24 db

Final Gain : 108 db

Filter -

Low Cut : 8 Hz @ 18 db/octave

High Cut : 128 Hz @ 72 db/octave

3. DATA CHANNEL ALLOCATIONS

<u>FUNCTION</u>	<u>MONITOR TRACE NUMBER</u>	<u>TAPE CHANNEL</u>
Traces 1-96	1-48	1-96
Field Time Break	4	Not Recorded
DFS Time Break	8	Time Word Zero
Water Breaks	53	AUX 1

APPENDIX CSURVEY VESSELM.V. "EUGENE McDERMOTT II"

Flag	:	Panama
Homeport	:	Panama
Trade	:	Foreign Going-Seismic Exploration
Owners	:	Geophysical Service Inc.
Call Sign	:	HO 9376
Length	:	52.73 metres L.O.A.
Breadth	:	12.19 metres
Depth	:	4.27 metres
Draft	:	3.05-3.24 metres
Official Number	:	7062-pevt-1
Gross Tonnage	:	929.89 tonnes
Net Tonnage	:	249.09 tonnes
Engine Power	:	2 x 839.25 HP Engines

APPENDIX DOPERATION STATISTICSFOR PERIOD 6TH MAY 1980 TO 8TH MAY 1980.

TRAVEL	:	4.92 HOURS
CABLE HANDLING & FAILURE	:	1.17 HOURS
SOURCE HANDLING & FAILURE	:	0.5 HOURS
SHOOTING & LINE CHANGES (INCLUDING OVERLAPS)	:	55.81 HOURS
EQUIPMENT FAILURE	:	1.67 HOURS
NAVIGATION SYSTEM FAILURE	:	6.11 HOURS
DOWN FOR WEATHER	:	0.0 HOURS
VESSEL DOWNTIME	:	1.83 HOURS

KILOMETRES RECORDED	:	400.475
TOTAL SHOT POINTS	:	16019
FIELD TAPES USED	:	220

APPENDIX EFIELD TAPE INVENTORY

<u>DATE</u>	<u>TAPE NO.</u>	<u>LINE NO.</u>	<u>SHOTPOINTS</u>
6 May 1980	597626	80F-1	0001 - 0075
	597627	"	0076 - 0155
	597628	"	0156 - 0235
	597629	"	0236 - 0315
	597630	"	0316 - 0395
	597631	"	0396 - 0475
	597632	"	0476 - 0555
	597633	"	0556 - 0635
	597634	"	0636 - 0715
	597635	"	0716 - 0795
	597636	"	0796 - 0875
	597637	"	0876 - 0955
	597638	"	0956 - 1035
	597639	"	1036 - 1115
	597640	"	1116 - 1195
	597641	"	1196 - 1275
	597642	"	1276 - 1342
	597643	"	1343 - 1380
	597644	80F-5	0001 - 0076
	597645	"	0077 - 0156
	597646	"	0157 - 0235
	597647	"	0236 - 0315
	597648	"	0316 - 0395
	597649	"	0396 - 0475
	597650	"	0476 - 0555
	597651	"	0556 - 0635
	597652	"	0636 - 0715
	597653	"	0716 - 0777



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<u>DATE</u>	<u>TAPE NO.</u>	<u>LINE NO.</u>	<u>SHOTPOINTS</u>
6 May 1980	597654	80F-5	0778 - 0795
	597655	80F-6	0001 - 0075
	597656	"	0076 - 0153
	597657	"	0154 - 0232
	597658	"	0233 - 0310
	597659	"	0311 - 0389
	597660	"	0390 - 0467
	597661	"	0468 - 0546
	597662	"	0547 - 0597
	597663	80F-3	0001 - 0076
	597664	"	0077 - 0155
	597665	"	0156 - 0234
	597666	"	0235 - 0312
	597667	"	0313 - 0391
	597668	"	0392 - 0470
	597669	"	0471 - 0549
	597670	"	0550 - 0627
	597671	"	0628 - 0706
	597672	"	0707 - 0785
	597673	"	0786 - 0864
	597674	"	0865 - 0942
	597675	"	0943 - 1022
	597676	"	1023 - 1100
	597677	"	1101 - 1180
	597678	"	1181 - 1259
	597679	"	1260 - 1502
	597680	80F-2	0001 - 0076
	597681	"	0077 - 0155
	597682	"	0156 - 0234
	597683	"	0235 - 0314
	597684	"	0315 - 0393
	597685	"	0394 - 0473



<u>DATE</u>	<u>TAPE NO.</u>	<u>LINE NO.</u>	<u>SHOTPOINTS</u>
6 May 1980	597686	80F-2	0474 - 0552
	597687	"	0553 - 0632
	597688	"	0633 - 0706
	597689	"	0707 - 0724
7 May 1980	597690	80F-4	0001 - 0075
	597691	"	0076 - 0166
	597692	"	0167 - 0245
	597693	"	0246 - 0325
	597694	"	0326 - 0405
	597695	"	0406 - 0485
	597696	"	0486 - 0565
	597697	"	0566 - 0645
	597698	"	0646 - 0725
	597699	"	0726 - 0805
	597700	"	0806 - 0885
	597701	"	0886 - 0965
	597702	"	0966 - 1021
	597703	"	1022 - 1059
	597704	80F-7	0001 - 0075
597705	"	0076 - 0155	
597706	"	0156 - 0235	
597707	"	0236 - 0315	
597708	"	0316 - 0395	
597709	"	0396 - 0475	
597710	"	0476 - 0555	
597711	"	0556 - 0635	
597712	"	0636 - 0702	
597713	"	0703 - 0764	
597714	80F-8	0001 - 0074	
597715	"	0075 - 0082	



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<u>DATE</u>	<u>TAPE NO.</u>	<u>LINE NO.</u>	<u>SHOTPOINTS</u>
7 May 1980	597716	80F-8	0083 - 0160
	597717	"	0161 - 0240
	597718	"	0241 - 0319
	597719	"	0320 - 0401
	597720	"	0402 - 0480
	597721	"	0481 - 0561
	597722	"	0562 - 0639
	597723	"	0640 - 0720
	597724	"	0721 - 0799
	597725	"	0800 - 0879
	597726	"	0880 - 0958
	597727	"	0959 - 1038
	597728	"	1039 - 1118
	597729	"	1119 - 1198
	597730	"	1199 - 1278
	597731	"	1279 - 1358
	597732	"	1359 - 1430
	597733	"	1439 - 1518
	597734	"	1519 - 1598
	597735	"	1599 - 1678
	597736	"	1679 - 1758
	597737	"	1759 - 1838
	597738	"	1839 - 1881
	597739	80F-9	0001 - 0077
	597740	"	0078 - 0156
	597741	"	0157 - 0236
	597742	"	0237 - 0315
	597743	"	0316 - 0395
	597744	"	0396 - 0474
	597745	"	0475 - 0554



<u>DATE</u>	<u>TAPE NO.</u>	<u>LINE NO.</u>	<u>SHOTPOINTS</u>
7 May 1980	597746	80F-9	0555 - 0633
	597747	"	0634 - 0713
	597748	"	0714 - 0792
	597749	"	0793 - 0872
	597750	"	0873 - 0951
	597751	"	0952 - 1031
	597752	"	1032 - 1110
	597753	"	1111 - 1190
	597754	"	1191 - 1269
	597755	"	1270 - 1349
	597756	"	1350 - 1428
	597757	"	1429 - 1508
	597758	"	1509 - 1565
	597759	80F-10	0001 - 0077
	597760	"	0078 - 0156
	597761	"	0157 - 0236
	597762	"	0237 - 0315
	597763	"	0316 - 0395
	597764	"	0396 - 0475
	597765	"	0476 - 0555
	597766	"	0556 - 0635
	597767	"	0636 - 0715
	597768	"	0716 - 0795
	597769	"	0796 - 0875
	597770	"	0876 - 0954
	597771	"	0955 - 1035
	597772	"	1036 - 1113
	597773	"	1114 - 1193
	597774	"	1194 - 1272
	597775	"	1273 - 1352



<u>DATE</u>	<u>TAPE NO.</u>	<u>LINE NO.</u>	<u>SHOTPOINTS</u>
7 May 1980	597776	80F-10	1353 - 1385
	597777	80F-11	0001 - 0076
	597778	"	0077 - 0088
	597779	"	0090 - 0170
	597780	"	0171 - 0248
	597781	"	0249 - 0308
8 May 1980	597782	80F-11A	0101 - 0176
	597783	"	0177 - 0255
	597784	"	0256 - 0334
	597785	"	0335 - 0414
	597786	"	0415 - 0494
	597787	"	0495 - 0574
	597788	"	0475 - 0653
	597789	"	0654 - 0733
	597790	"	0734 - 0812
	597791	"	0813 - 0892
	597792	"	0893 - 0972
	597793	"	0973 - 1052
	597794	"	1053 - 1137
	597795	"	1138 - 1216
	597796	"	1217 - 1296
	597797	"	1297 - 1319
	597798	80F-11B	0973 - 1047
	597799	"	1054 - 1058
	597800	"	1062 - 1142
	597801	"	1143 - 1221
597802	"	1222 - 1299	
597803	"	1300 - 1356	
597804	80F-12	0001 - 0075	
597805	"	0076 - 0155	



<u>DATE</u>	<u>TAPE NO.</u>	<u>LINE NO.</u>	<u>SHOTPOINTS</u>
8 May 1980	597806	80F-12	0156 - 0232
	597807	"	0233 - 0310
	597808	"	0311 - 0391
	597809	"	0392 - 0471
	597810	"	0472 - 0553
	597811	"	0554 - 0631
	597812	"	0632 - 0710
	597813	"	0711 - 0790
	597814	"	0791 - 0869
	597815	"	0870 - 0949
	597816	"	0950 - 1029
	597817	"	1030 - 1109
	597818	"	1110 - 1188
	597819	"	1189 - 1268
	597820	"	1269 - 1348
	597821	"	1349 - 1428
	597822	"	1429 - 1508
	597823	"	1509 - 1588
	597824	"	1589 - 1662
	597825	"	1663 - 1709
	597826	80F-13	0001 - 0077
	597827	"	0078 - 0157
	597828	"	0158 - 0236
	597829	"	0237 - 0316
	597830	"	0317 - 0377
	597831	80F-13A	0321 - 0396
	597832	"	0397 - 0475
	597833	"	0476 - 0555
	597834	"	0556 - 0634
	597835	"	0635 - 0714



<u>DATE</u>	<u>TAPE NO.</u>	<u>LINE NO.</u>	<u>SHOTPOINTS</u>
8 May 1980	597836	80F-13A	0715 - 0794
	597837	"	0795 - 0874
	597838	"	0875 - 0953
	597839	"	0954 - 1033
	597840	"	1034 - 1112
	597841	"	1113 - 1192
	597842	"	1193 - 1272
	597843	"	1273 - 1352
	597844	"	1353 - 1433
	597845	"	1434 - 1502

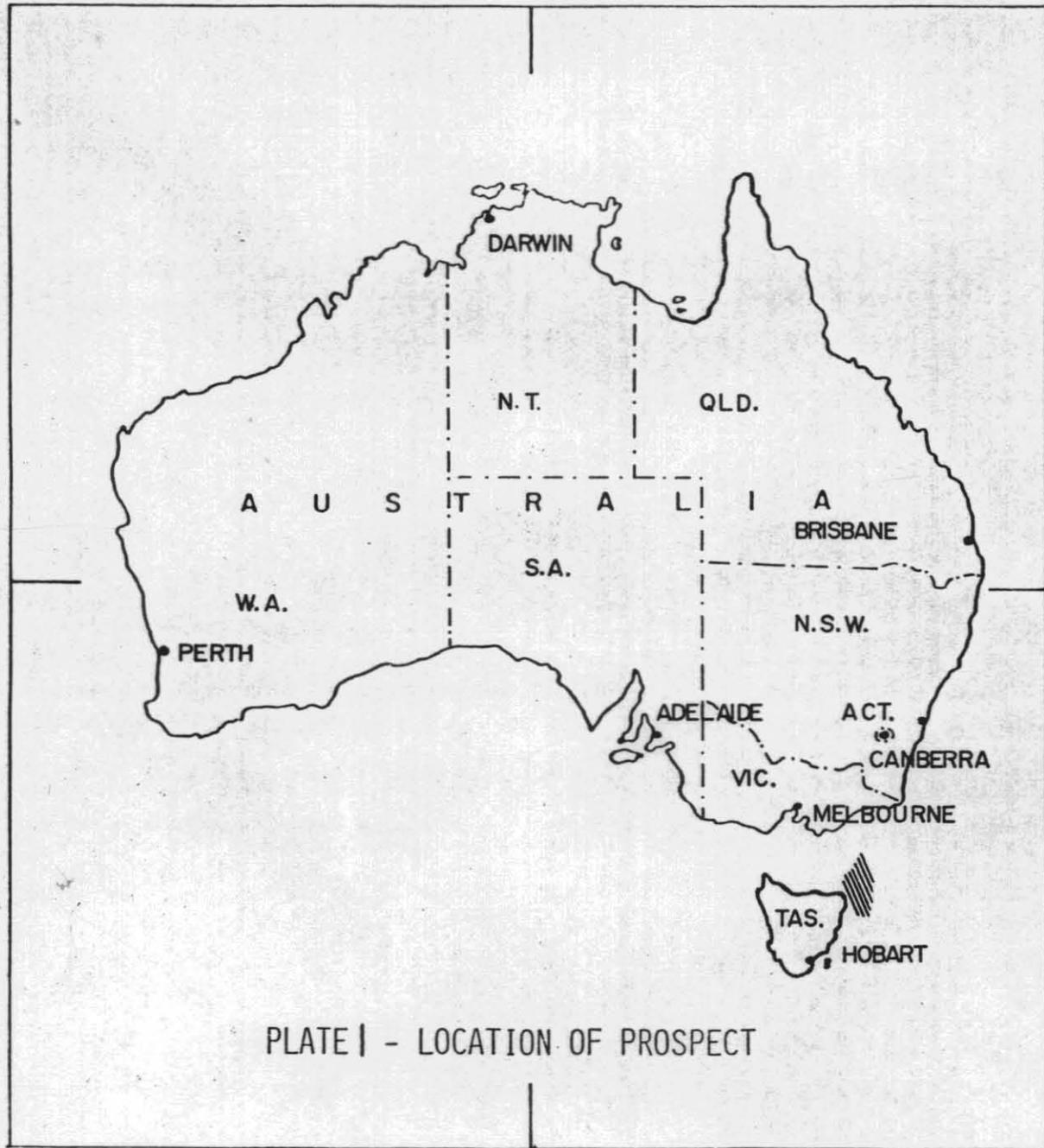
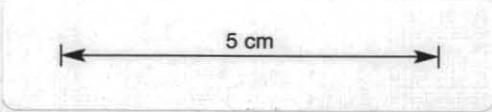
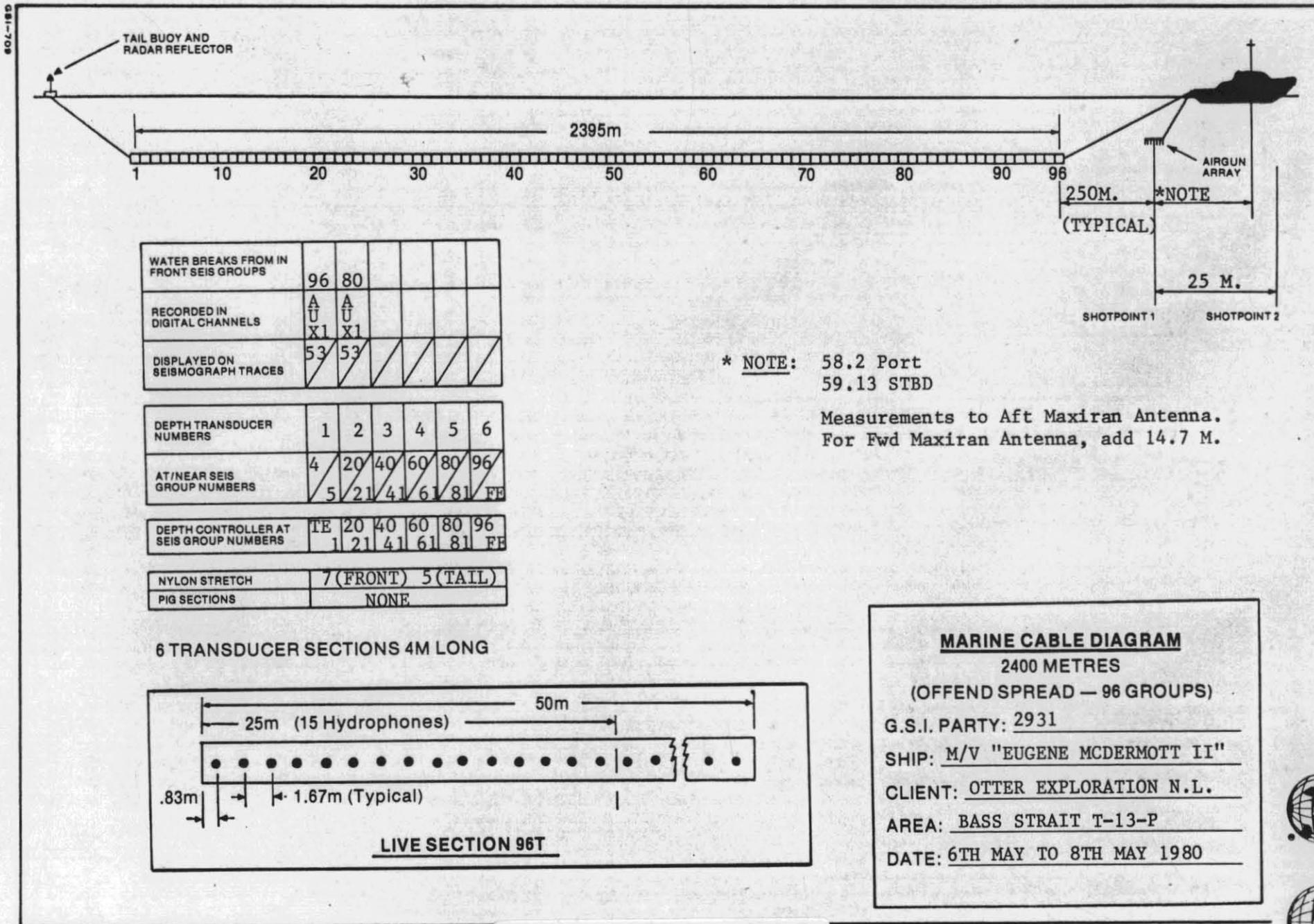


PLATE I - LOCATION OF PROSPECT





WATER BREAKS FROM IN FRONT SEIS GROUPS	96	80				
RECORDED IN DIGITAL CHANNELS	A U X1	A U X1				
DISPLAYED ON SEISMOGRAPH TRACES	53	53				

DEPTH TRANSDUCER NUMBERS	1	2	3	4	5	6
AT/NEAR SEIS GROUP NUMBERS	4 5	20 21	40 41	60 61	80 81	96 FF

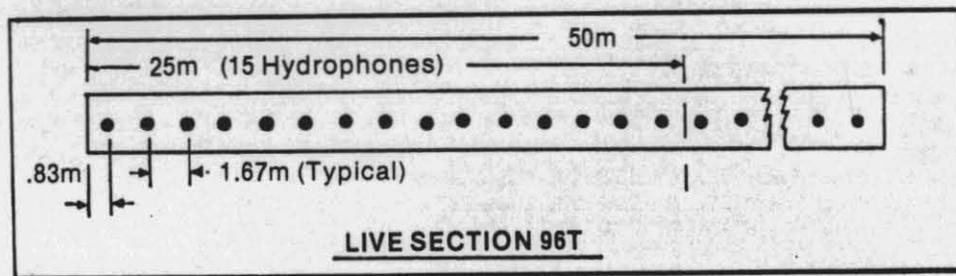
DEPTH CONTROLLER AT SEIS GROUP NUMBERS	TE	20	40	60	80	96
	1	21	41	61	81	FF

NYLON STRETCH	7 (FRONT)	5 (TAIL)
PIG SECTIONS	NONE	

* NOTE: 58.2 Port
59.13 STBD

Measurements to Aft Maxiran Antenna.
For Fwd Maxiran Antenna, add 14.7 M.

6 TRANSDUCER SECTIONS 4M LONG



MARINE CABLE DIAGRAM
2400 METRES
(OFFEND SPREAD — 96 GROUPS)
G.S.I. PARTY: 2931
SHIP: M/V "EUGENE MCDERMOTT II"
CLIENT: OTTER EXPLORATION N.L.
AREA: BASS STRAIT T-13-P
DATE: 6TH MAY TO 8TH MAY 1980

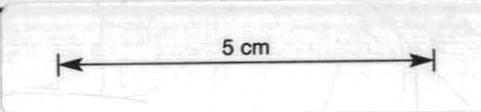
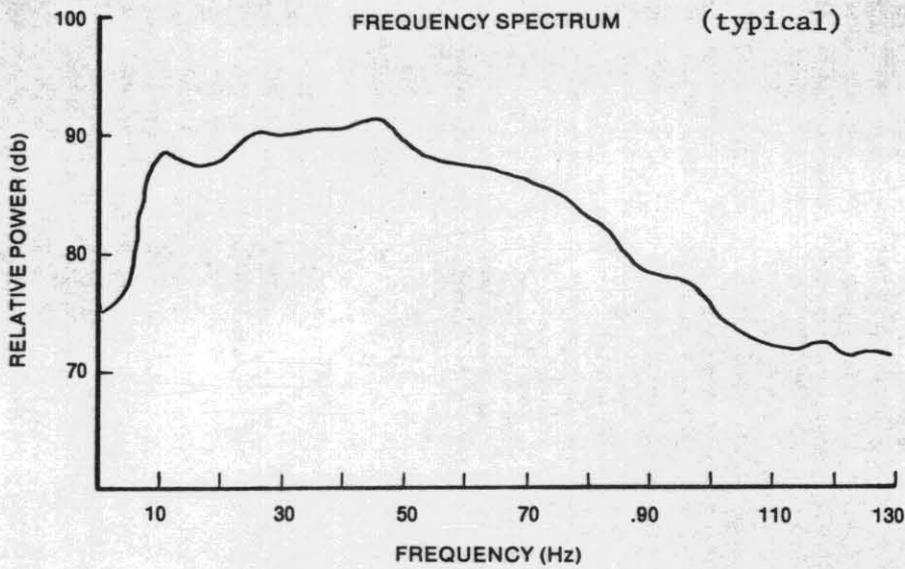
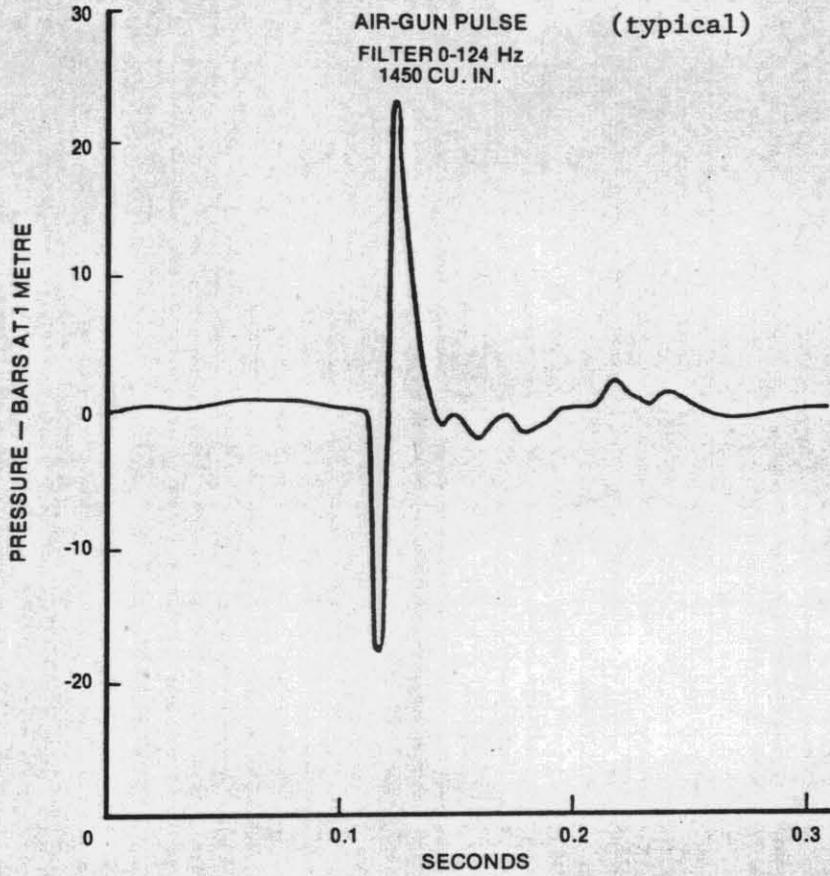
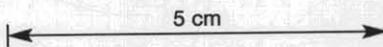


PLATE 2 - LIVE SECTION





Airgun Pulse Form and Frequency Spectrum





STERN OF VESSEL

2000 Cu In TUNED AIR GUN ARRAY

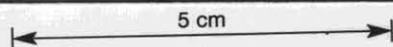
PORT STRING

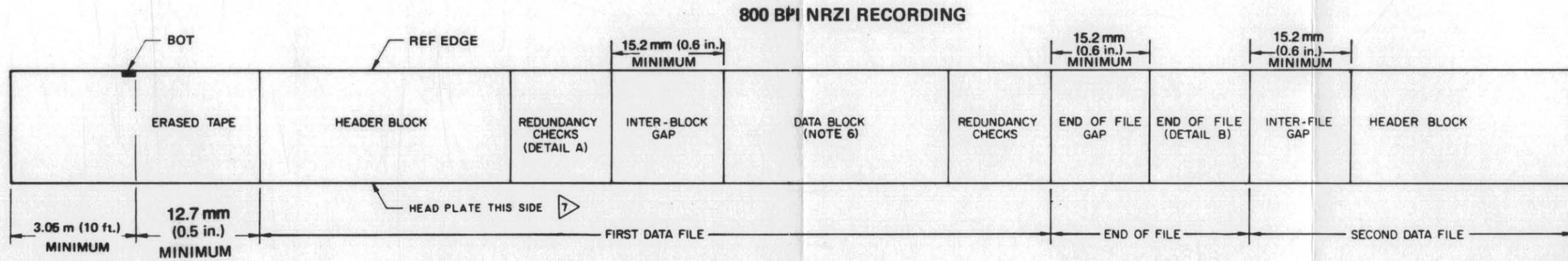
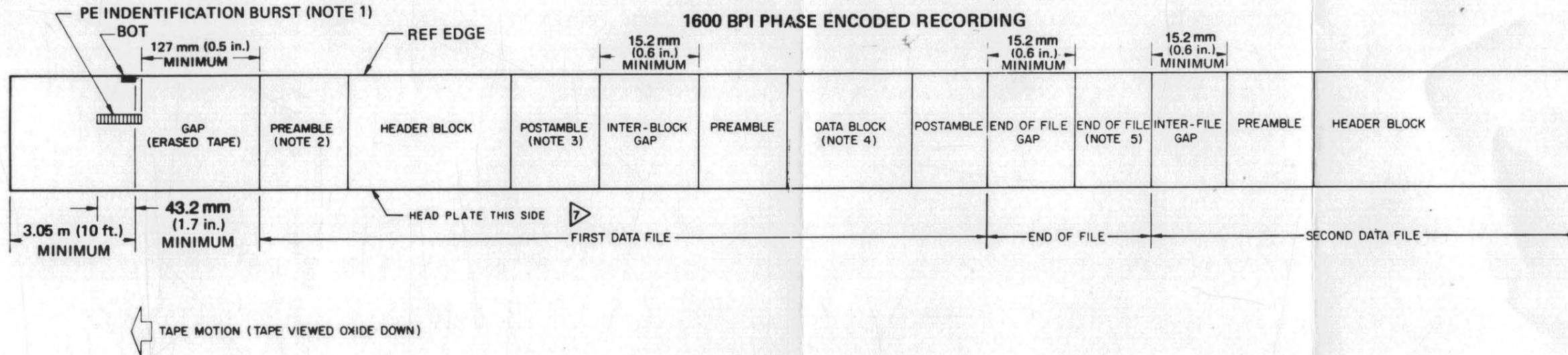
STARBOARD STRING

<u>GUN No.</u>	<u>SIZE (Cu in)</u>	<u>SEPARATION (In)</u>	<u>GUN No.</u>	<u>SIZE (Cu in)</u>	<u>SEPARATION (in)</u>
1.	120	● 18	19.	120	● 18
2.	120	● 18	20.	120	● 18
3. (spare)	120	○ 18	21.	120	● 18
		65	22. (spare)	120	○ 18
					65
4.	100	● 18	23.	100	● 18
5.	100	● 18	24. (spare)	100	○ 18
6. (spare)	100	○ 18			62
		62			
7.	80	● 18	25.	100	● 62
8.	80	● 18			
9. (spare)	80	○ 18	26.	80	● 58
		65			
10.	120	● 65	27.	40	● 51
11.	100	● 62	28.	40	● 51
12.	80	● 58	29.	40	● 51
13.	40	● 51	30.	40	● 51
14.	40	● 51	31.	20	● 41
15.	40	● 51	32.	20	● 41
16.	40	● 51	33.	20	● 41
17.	20	● 41	34.	20	● 41
18.	20	● 41	35.	10	● 33
			36.	10	● 33

TOTAL LENGTH 60ft 10 in

TOTAL LENGTH 60ft





A NRZI REDUNDANCY CHECKS

P	X		X		X		
0	X		X		X		
1	X		X		X		
2	X		X		X		
3	X		X		X		
4	X		X		X		
5	X		X		X		
6	X		X		X		
7	X		X		X		

GAP

CRC LRC
LAST BYTE OF BLOCK. X INDICATES BINARY VARIABLE AND MAY BE ONE OR ZERO, DEPENDING UPON DATA

BIT NUMBER

B. NRZI END OF FILE

0							0
0							0
0							0
0							0
1							1
0							0
0							0
1							1
1							1

GAP

C.

P			4	
0			7	
			6	
P			5	
3			3	
4			9	
5			1	
5			8	
7			2	

BIT NO. TRACK NO.

NOTES

- 1 - PE identification burst consists of 1600 flux reversals per inch in track P, all other tracks dc-erased.
- 2 - Preamble consists of forty characters with 0-bits in all tracks followed by one character with 1-bits in all tracks. (Includes the parity track.)
- 3 - Postamble consists of one character with 1-bits in all tracks followed by forty characters with 0-bits in all tracks. (Includes the parity track.)
- 4 - Synchronous recording, inter-block gap is extended until timebreak is received. Data is stored in a buffer memory while the preamble is being written. First start of scan is written immediately after the preamble.

- 5 - PE end of file consists of 80 flux reversals at 3200 FCI in bits P, 0, 2, 5, 6, and 7. Bits 1, 3, and 4 are dc-erased.
 - 6 - Synchronous data recording: inter-block gap is erased until timebreak. First start of scan is then written.
- Order and location of tracks on tape, direction of magnetization and all other applicable specifications in accordance with IBM file S360-19, form A22-6862-4. The track number for each bit is shown in detail C. Track numbers are the same for 800 BPI NRZI and 1600 BPI PE. Tracks are numbered consecutively with track 1 the maximum distance from the head plate and track 9 adjacent to the head plate. See C below.

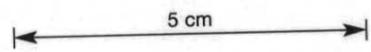


PLATE 5 - TAPE FORMAT (cont.)

LEGEND

F₁-F₄ File number - 4 BCD digits
Y₁-Y₄ Format Code - 4 BCD digits 0200 for SEG-B (with no header extension)
K₁-K₂ General constants entered from panel switches - 12 BCD digits
B₁-B₃ Bytes per multiplexer scan in data block - 3 BCD digits. Bytes per scan = 2.5 x no. of channels + 14
M₃-M₆ Instrument serial number - 6 BCD digits.
R₁,R₂ Record length in multiples of 1.024 seconds. 00 if manual stop is selected.
J Amplifier gain control mode -1001 is recorded to designate floating point gain control system.
LC₁,LC₂ Low-cut filter frequency (Hz) - 2 BCD digits. 00 (out), 03, 05, 08, 12, 18, or 27.
 NOTE: 03 is actually 3.56Hz.
 05 is actually 5.33Hz.
LS Low-cut filter slope in multiples of 6 dB/octave - 1 BCD digit. Normally 3, (18dB octave) for DFS-V.
S₁,S₂ Notch (rejection) filter frequency - 2 BCD digits. 00 (out) 50, or 60 (for 60 or 16 2/3).
A Alias filter frequency:
 1 - 256Hz 4 - 64Hz
 2 - 128Hz 8 - 32Hz
D Channel identification code:

BIT			TYPE
0	1	2	CHANNEL
0	0	0	Unused channel
1	0	0	Waterbreak channel
0	1	0	Timebreak channel
0	0	1	Seis channel
0	1	1	Uphold channel
1	0	1	Time counter
1	1	1	Other

Z Record type:
 8 - normal shot 4 } Not used
 2 - test record 1 }
W_N Ones recorded for normal field timebreak recording. Zeros record if system operated from internal timebreak.

T₁-T₁₄ 14 bit binary timing word
T₁₄ - 1 millisecond
T₁ - 8,192 seconds
Q_N Digitized output of A/D converter
Q₅ - sign (note 4)
Q₁ - 4096 millivolts
Q₁₄ - 0.50 millivolt
G_N Binary gain code for channel N. Least significant bit (6dB) is always 0 for quaternary coded I/P gain.
P Vertical (byte) parity. Bit P is one if bits 0 - 7 of the same byte contains an even number of ones.
CH Number of channels. Bit 6 of the four sync group bytes, indicates number of seismic data channels.

BYTE	1	2	3	4
24 CH	0	0	0	0
36 CH	0	1	0	0
48 CH	0	0	0	1
Other	1	1	1	1

 See B, bytes per scan.
 No. of data channels =

$$\frac{\text{Bytes per scan}-14}{2.5}$$

Format conforms to the SEG standard specific values shown, such as filter settings, etc, are those of the DFS-V.

I Sample interval recorded according to the following table:

BIT				SAMPLE
4	5	6	7	INTERVAL
0	0	0	1	1 millisecond
0	0	1	0	2 milliseconds
0	1	0	0	4 milliseconds
1	0	0	0	8 milliseconds
1	0	0	1	0.5 milliseconds
1	0	1	0	1 millisecond
1	1	0	0	2 milliseconds

 All zeros for other sample intervals
GC Gain constant (fixed gain) recorded as a 4-bit binary code. The most significant bit has a gain value of 2³ (48dB); the least significant bit has a gain value of 2¹ (6dB). The least significant bit is recorded as a zero for the DFS-V.
GW Gain word recorded as a 4-bit binary code. 0000 is recorded when operating in floating point gain control. When operating in manual gain control, the most significant bit has a gain value of 2 (48dB) and the least significant bit has a gain value of 2¹ (6dB). The least significant bit is recorded as a zero for the DFS-V.

NOTES

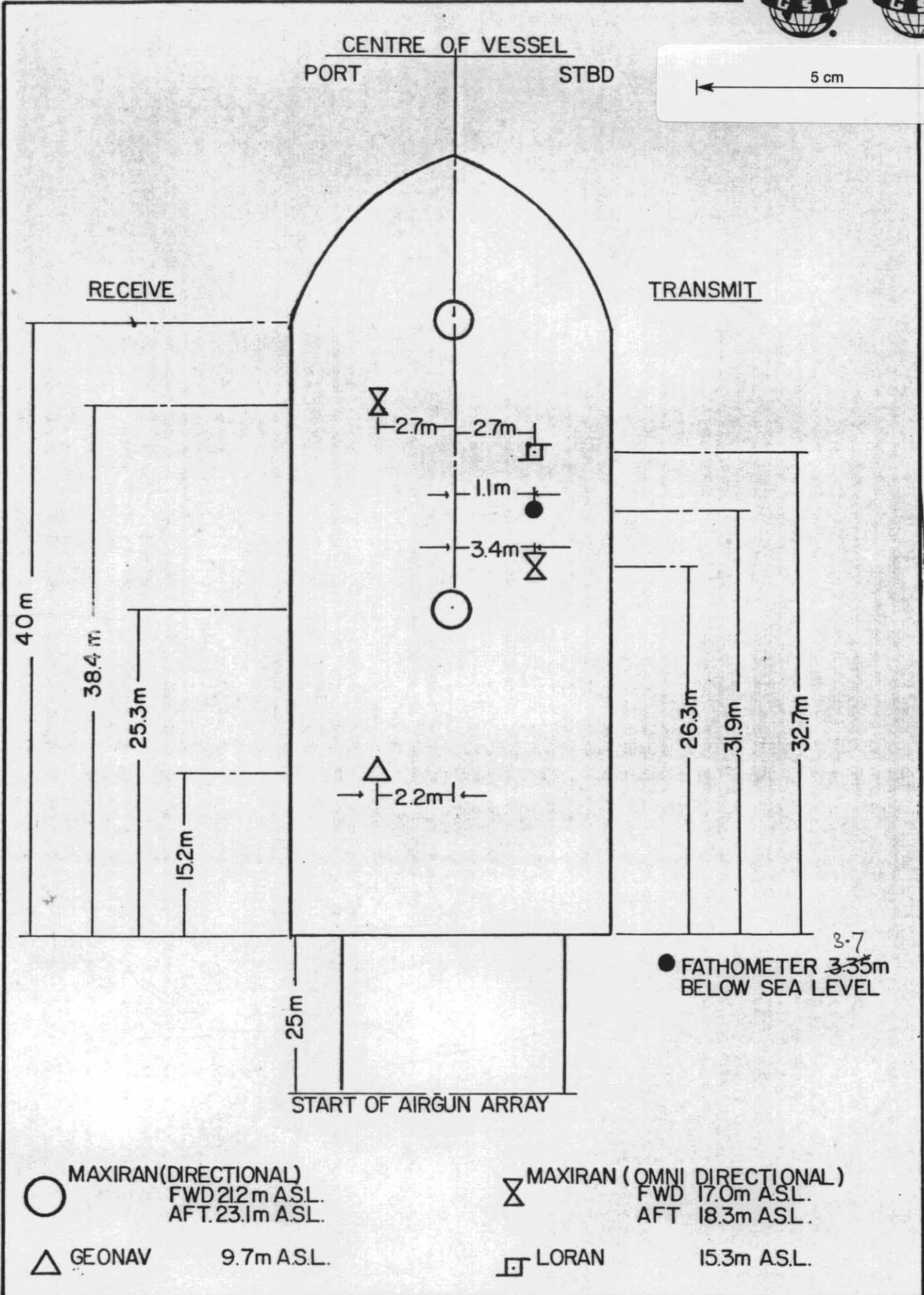
1 - Auxiliary channel identification code assignments are as follows unless otherwise specified:
 AUX 1 will always be the timing counter.

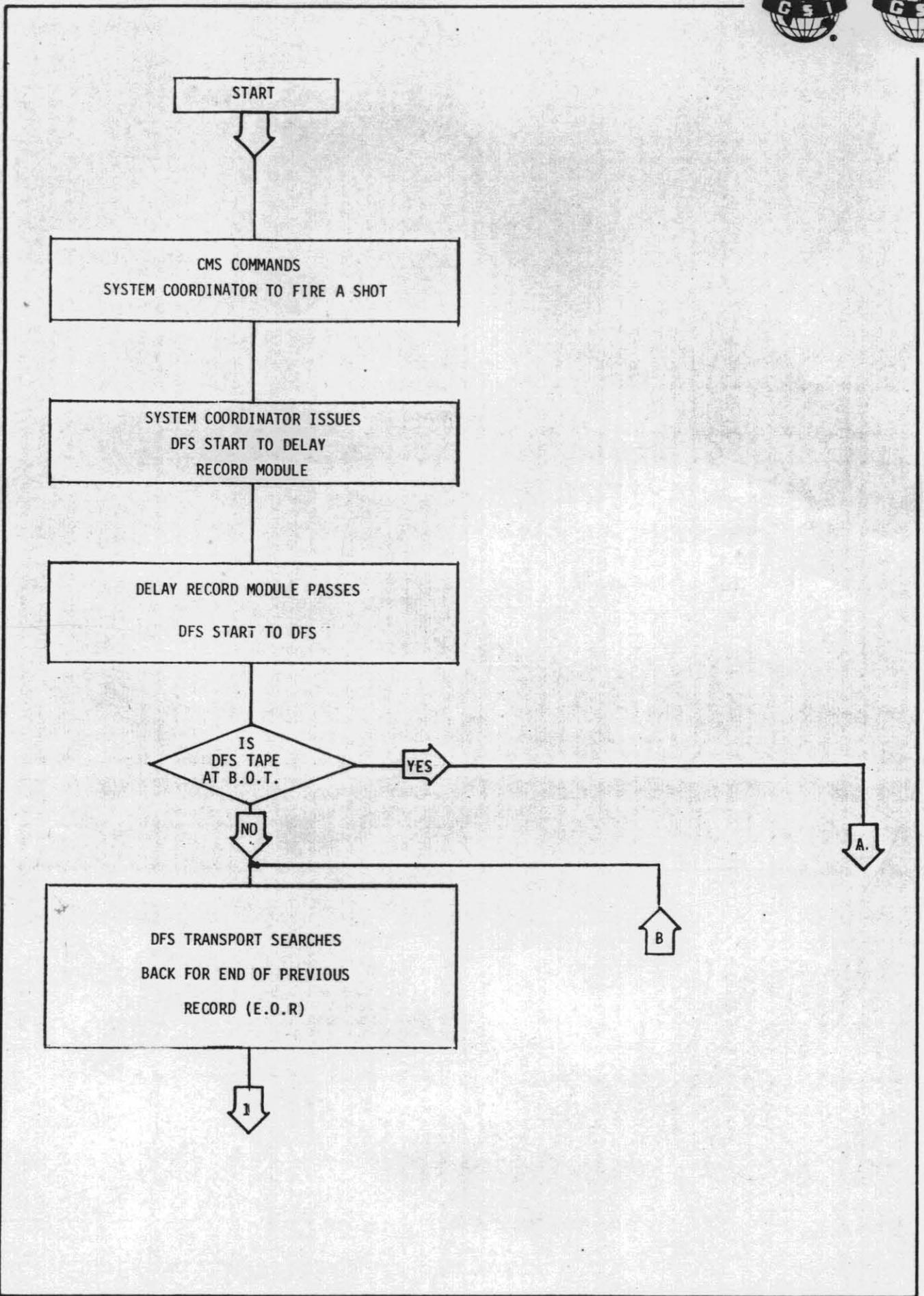
28 or 60	Number of seis
Seis channels	Channels other than 28 or 60
AUX 2 unused •	AUX 2 uphold
AUX 3 unused •	AUX 3 timebreak
AUX 4 uphold	AUX 4 unused
AUX 5 timebreak	AUX 5 unused

• These AUX channels are not available for data and will always be recorded as zero in the data record.

2 - Additional externally supplied digital data may be recorded in the header block following byte 36+2n.

3 - Negative values are recorded in 1's complement code (standard) or 2's complement (optional).

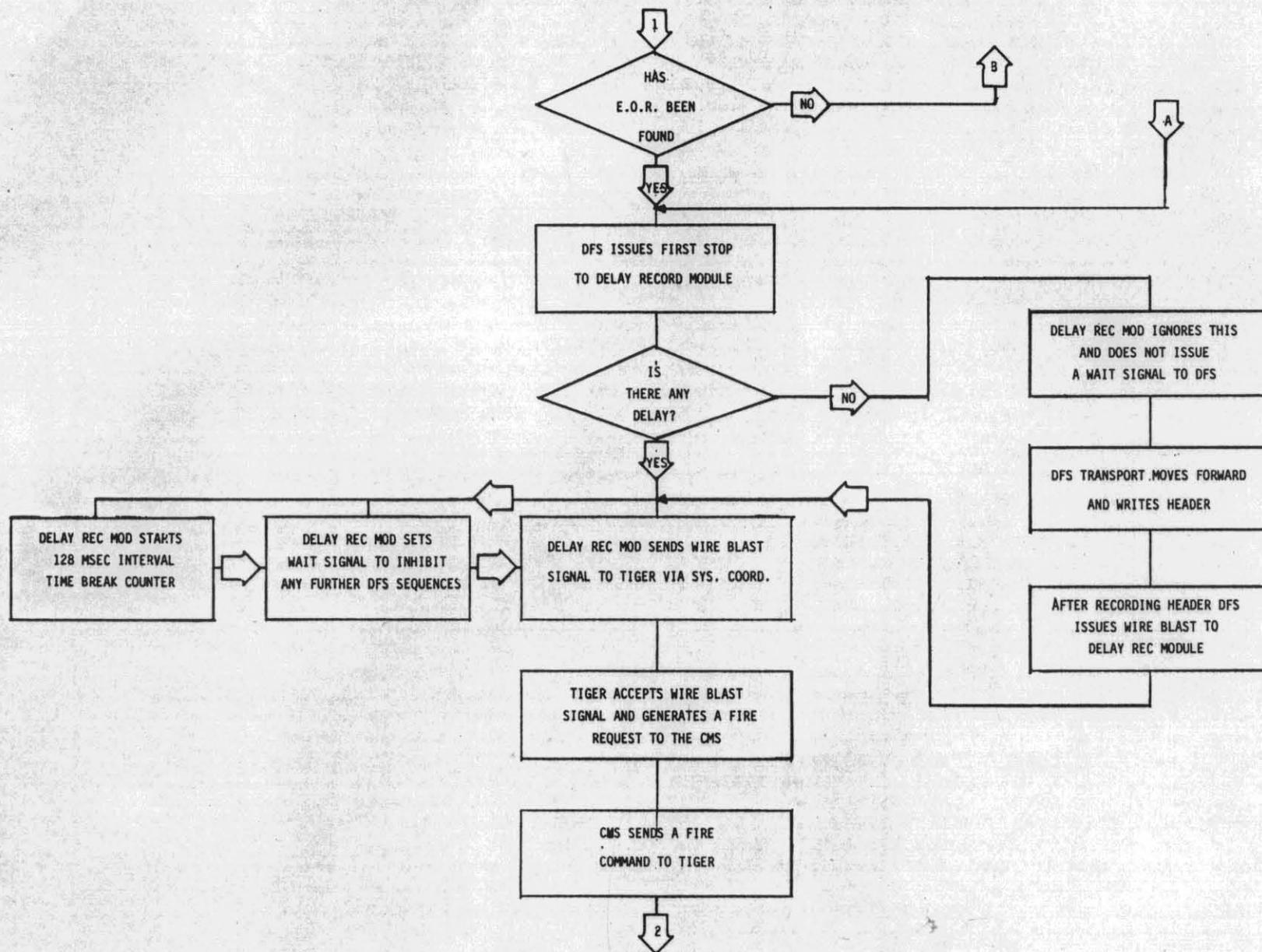






094039

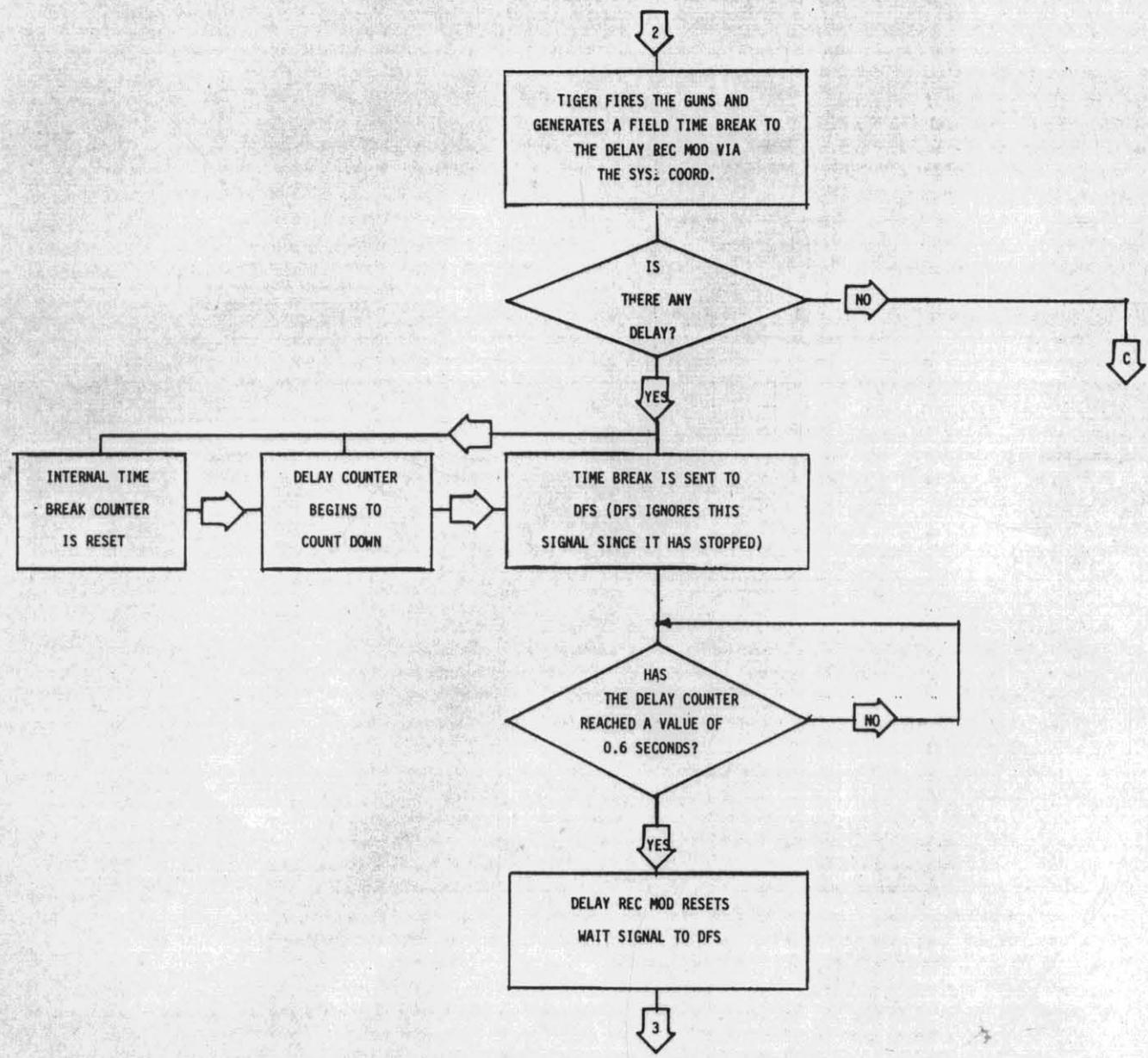
PLATE 7 - SYSTEM SET UP (cont.)

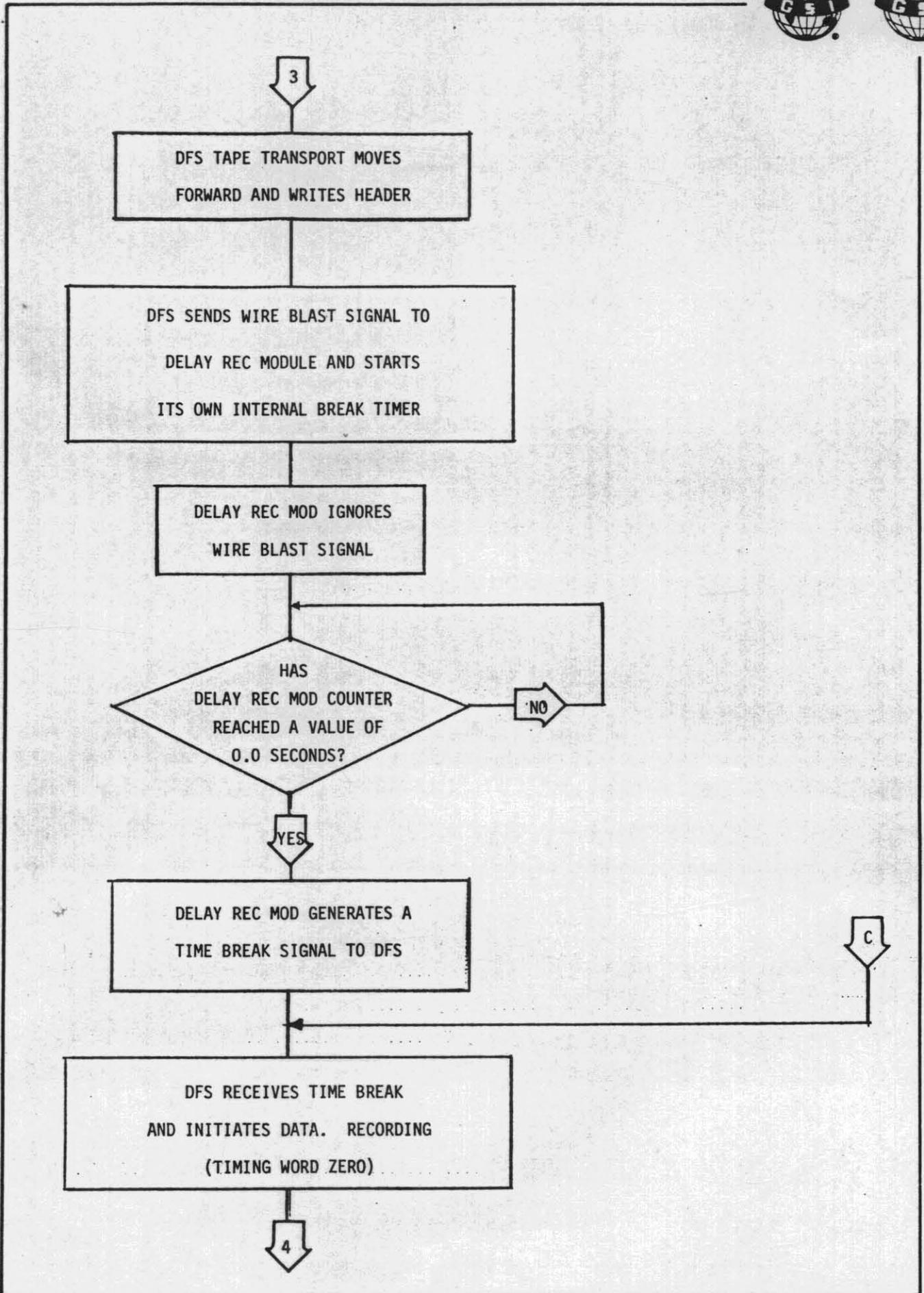


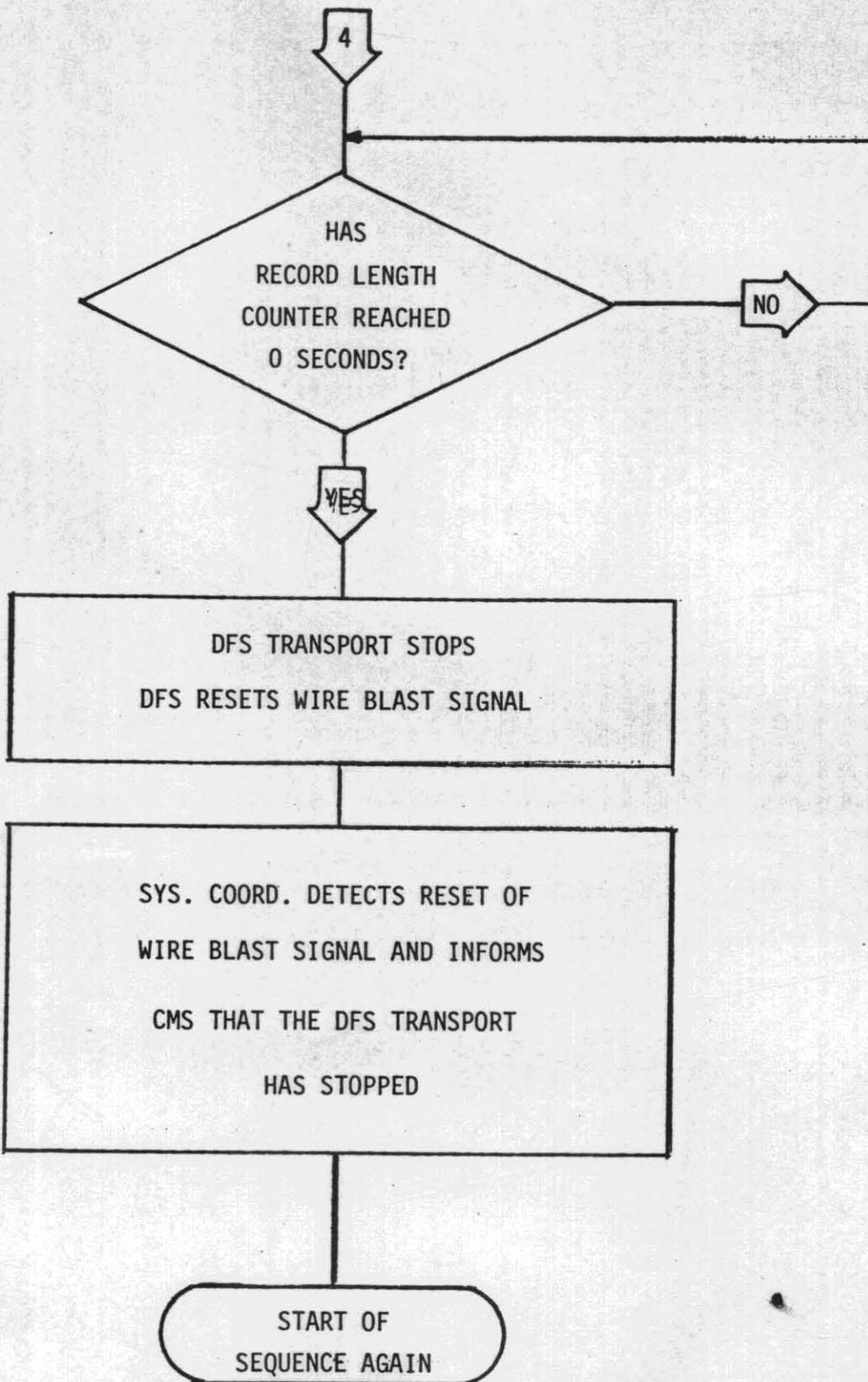
094040



PLATE 7 - SYSTEM SET UP (cont.)







094043



DATA PROCESSING REPORT

BASS STRAIT T/13P

COMPANY:- OTTER EXPLN.

COMPANY ADDRESS:- SUITE 4,2ND FLOOR,

NORPLAZA BUILDING

169 MILLER STREET

NORTH SYDNEY. N.S.W. 2060

BY

GEOPHYSICAL SERVICE INTERNATIONAL

UNIT D, 8 BYFIELD STREET,

NORTH RYDE. N.S.W. 2113

PARTY 6854

C. WILKINS

DATE:MARCH,1981

POF

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II	EXPERIMENTAL WORK	2
III	PRODUCTION PROCESSING	5
IV	COMMENTS	7

APPENDIX

A	PROCESS DESCRIPTIONS	A-1 - A-11
B	STACK TAPE INVENTORY	B-1 - B-3

PLATES

I	LOCATION MAP
II	PROCESSING FLOW DIAGRAM



SECTION I.

INTRODUCTION

A seismic reflection survey was conducted by the M/V Eugene McDermott, party 2931 in Bass Strait off the North West Coast of Tasmania in permit T13/P (see Plate 1) between the 6th and 8th of May.

The survey covered approximately 400KM using the following shooting parameters:-

- Streamer configuration - 2424m cable with 96 groups equally spaced.
- Group Length - 25m (15 hydrophones at 1.67 m spacing)
- Shot interval - 25m (48 fold)
- Depth Point Interval - 12.5m
- Record length - 4/5 secs
- Sample period - 2 ms
- cable depth - 11m average
- Filter settings - High cut and slope 128hz @ 72db/oct
- Low cut and slope 8 hz @ 18db/oct
- Navigation - Maxiran by O.N.I. Primary
Geonav by G.S.I. Secondary
- Airguns - 1450 cu.in. operating at 2000 p.s.i.
(-51ms Tiger delay)
- Instruments - DFS V 1 system -tape format SEGB

Processing was carried out in G.S.I.'s Sydney office on TIMAP* 980 computers.

* Trademark of Texas Instruments.



SECTION II

EXPERIMENTAL WORK

Field data was received in June soon after which analytical work commenced. The standard suite of tests as listed below were conducted on Line 80F-2, approx. SP Range 400-600.

PREPROCESSING TESTS:

- True Amplitude Recovery Test on 2 field records with 3 recovery rates - 4,6 and 8 db/sec with cut off time of 4.0 secs.
 - F-K Noise Analysis on two records with TAR only using 96 traces.
 - F-K Noise Analysis on field records with TAR and Pre Deconvolution ramping using 96 traces.
 - F-K Noise Analysis on field record with TAR + Pre Deconvolution Ramping + Velocity Filtering. (+8ms/trace, -5ms/trace) using 96 traces.
 - F-K Noise Analysis on 2 records with TAR + Velocity Filtering as above followed by decimation.
 - F-K Noise Analysis on 2 records with TAR + Velocity Filtering using 96 traces.
- (Up to this stage tests were run at SP400 and SP600)
- Comparison over a 100 depthpoints using 96 traces to determine deconvolution pre stack between:-
 - A. Signature
 - B. Whitening Deconvolution 2 gates, 50 points, designed from 0.3 secs. to 2.5 secs.
 - C. Gapped Deconvolution 2 gates 50 points 32ms gap designed from 0.3 secs to 2.5 secs.
 - D. No deconvolution.



POST PROCESSING TESTS

- Post Stack Deconvolution comparison over 100 Depthpoints between
 - A. No deconvolution
 - B. 24ms Gapped deconvolution, 196 ms operator, 3 gates
 - C. 64ms " " " " " " "
- Filter Analyses over 50 depthpoints with the following passbands(in Hz.).

10 - 60	25 - 50
OUT - OUT	30 - 60
5 - 10	40 - 80
10 - 20	50 - 100
20 - 40	60 - 120

- Scaling test with 3 sets of parameters of over 50 depthpoints.
 - A. 200 ms gates 10% overlap, regular scalers
 - B. 500 ms gates 10% overlap " "
 - C. 1000 ms gates 10% overlap " "
 - D. No TVS

In addition, the following tests were conducted:

DEMULT TEST

- A. Stack inputting CDPS to which DSG and 15% DMT were applied.
- B. Stack inputting CDPS to which DSG and 20% DMT were applied.
- C. Stack inputting CDPS to which DSG and 25% DMT were applied.



REPLACEMENT STATICS

Velscan Velocity analyses were produced on Line 80F-1 at SP 175, 475 and 1100 after applying relative replacement statics of:-

- A. 1800 m/sec
- B. 2100 m/sec
- C. 2400 m/sec
- D. No replacement statics



SECTION III

PRODUCTION PROCESSING

TAR α Inelastic attenuation parameter
(exponential factor)
= 6.0 db/sec.
T2 (cut off time for α) = 4.0 secs.

RESAMPLE 2ms to 4ms with antialias filter.

STATIC - 51ms airgun delay

PDR TDR (start time of ramp at offset zero)- 192 msec
LDR (length of ramp at offset zero) 87 msec
VDR (velocity used in computation of
ramp times with increasing offset) 1032 m/sec
KPR (percentage offset factor for
increasing ramp length) 4%

VEF Velocity Filtering +ve cut 2.8km/sec, -ve cut
5km/sec. (+9,-5 ms/trace)

DSG Designature

CDP Gather 48 trace 48 fold (25m depthpoint interval)

DEC Field Trace decimation 2:1

VELSCANS 11 Depthpoint Velocity Analyses to determine the
stacking function (1 per 3 KM with extra locations at
intersections thus totalling 156 velscans for the
project).

NMO Normal Moveout application using stacking functions
derived from 11 depthpoint velscans.

RAMP First break suppression application



RAMP ON

<u>Time (secs.)</u>	<u>Offset (metres)</u>
0	250
0.1	300
1.0	850
2.7	2600

TVF Time Variant Filtering

All lines were filtered with the following 69 point filter:-

<u>Time(secs)</u>	<u>Passband(hz)</u>
0.0	10-70
4.0/5.0	10-70

TVS Time Variant Scaling

All lines were scaled with 200 msec gates using 10% overlap, regular scalars.

DISPLAY Three displays were produced:

- a. Raw stack at fixed gain on gould paper
- b. Single fold coverage on gould paper with NMO and filter applied.
- c. Final stack on film (TVF/TVS applied)

Horiz. Scale 10 T.P.cm

Vert. Scale 10 cm/sec

Mode VA/WT 20% bias

Polarity Normal

TAPES Field tapes and Raw Stack Purchase tapes were shipped to Geomagnetics.

FIELD DATA Field monitors, shipboard sections, QC Report, observers' logs, fathograms, were shipped to Otter's Sydney Office.



SECTION IV.

COMMENTS

The water bottom in this area was quite irregular in many places. In an attempt to cope with this problem, the replacement statics tests were produced. However, they showed no discernable improvement and were not used.

An addition, GSI's software of velocity filtering prior to decimation was opted for as it enables greater attenuation of inline noise. This method utilises all 96 traces with the smaller group interval of 25 metres. The traces are then decimated after application of the velocity filtering providing the economy of 48 trace processing but making maximum use of 96 traces recorded. In this manner aliasing of the inline noise does not overlap the signal frequency domain as much as it would if decimation were applied prior to velocity filtering.

Demult velscans were attempted on this survey but were unsuccessful owing to an annotation software problem when inputting gathers processed via velocity filter followed by decimation. When this becomes available in the future Otter may consider some reprocessing.

Respectfully submitted.

Cherry Wilkins

Processing Party Chief



APPENDIX A
PROCESS DESCRIPTIONS

TRUE AMPLITUDE RECOVERY(TAR)

The TAR process is applied to digital field records to produce output records on which relative amplitudes of reflections on each trace are approximately true and traces evenly modulated. This consists of removing the gain imposed on the field record during recording and correcting for inelastic attenuation and spherical divergence losses.

VELOCITY FILTERING (VEF)

Velocity filtering is a multichannel process. Multichannel filtering is a two-dimensional frequency-wavenumber filtering operation that can be used to discriminate against specified velocities on pre-stacked data or against specified dips on stacked data.

Velocity filtering processes transform the data from the space time (X-T) domain to the frequency-wavenumber (F-K, where K = reciprocal of wavelength) domain where the filter is applied. After filter application the process transforms back to the X-T domain for further conventional process applications.



The apparent velocity of noise must be adequately separated from the primary signal for the process to be effective. Examples of noise alignment that can be removed are hard bottom refraction, mud roll and cable jerk. These types of noise alignments have a velocity slower than primary signal or have a dip opposite from the primary.

A window of primary dip zones to keep is specified and dips outside this window are rejected.

A linear event in the X-T domain (implying constant velocity) appear as a linear event in the F-K domain where lines of constant velocity pass through the origin. Thus, a multitude of noise events, with the same velocity, at various times on the input record join on the F-K plane into a single event. In general seismic reflections (signal) have higher apparent velocities than noise propagating horizontally in a direct path from source to receiver; therefore, recorded signal appears in a different region of the F-K plane from the noise.

This provides the basis for signal-to-noise enhancement used in velocity filtering. The process is analogous to muting in X-T.



Aliasing both in the frequency and wavenumber axes can be predicted from the time sampling period and the spatial sampling (or group interval) of the input data. Spatial sampling determines, to a large extent, the effectiveness of the process. Velocity filtering attenuates some portions of aliased events. However, when aliased noise overlays signal, velocity filtering loses its discriminating power.

DESIGNATURE (DESIG 1*)

Designature is a generic name for processes which attempt to replace an arbitrary source wavelet convolved with the reflection sequence with a shorter wavelet of improved resolving capability.

DESIG 1 is the particular designature process in the current VEILFIT program and provides an alternative to conventional pre-CDP stack deconvolution (TVD). DESIG 1 is a multichannel process, like VEILFIT that can use the entire record to estimate the wavelet, whereas TVD is a single channel process that only uses a portion of a trace to design an operator. While TVD is time and offset-variant DESIG 1 is not time-variant.

* Trademark of Texas Instruments inc.



DESIG 1 can better account for the source and receiver ghosts found in marine data than TVD can.

Once the signal-to-noise ratio of the primary events is improved by velocity filtering, designation is applied in the common source point domain. Designation estimates the source wavelet from the seismic traces and attempts to collapse it to a zero phase pulse. The source domain is chosen since all traces originate from the same source.

PREDECONVOLUTION RAMP (PDR)

PDR is the process whereby first arrival unwanted noise at the front end of seismic records is removed. This is applied prior to deconvolution design.

VELOCITY ANALYSIS

As part of any velocity analysis routine, static corrections to compensate for shot and cable depth, and multiplexor delays are applied.



DISCRETE (VELSCAN)

GSI's VELSCAN Velocity Module is a discrete Velocity Analysis mode making use of advanced picking logic to generate events as functions of time, amplitude, moveout and dip. The event picking proceeds in the following manner:

- NMO corrections corresponding to a series of moveout functions are applied to a set of depth point traces. For each moveout function, the NMO-corrected traces are stacked. The resulting traces consist of amplitudes as functions of time and moveout.
- Identical operations are applied to adjacent depth points, adding the dimension of space.
- Dip is applied and for each value of dip, the traces are stacked across depth points. The result is a set of amplitudes as functions of time, moveout and dip.
- An event is located by searching for an amplitude extremum in the time, moveout and dip domains. An extremum may be either a maximum or minimum; that is, both peaks and troughs are picked. The event attributes of time, amplitude, moveout and dip are assigned to the centre depth point.



NORMAL MOVEOUT CORRECTIONS (NMO)

Reflection arrival times at the surface, from a horizontal reflecting interface, increase with offset from seismic source in a predictable manner known as the normal moveout effect. NMO at a given location is a function of offset, depth to the reflector and the velocity of the medium between the reflector and the surface.

NMO corrections remove the NMO increase in reflection times with offset (or spread geometry) and reduce all reflection times to the value they would have if source and receiver were coincident.



NMO corrections involve some stretching of the data. This is greatest at early record times but decreases with increasing record time. In order to avoid gross distortion at early record times ramps are applied to zero out the early part of the traces where NMO is excessive and to phase in the NMO corrections gradually.

COMMON DEPTH POINT STACK (CDP)

The common depth-point stack is the summation of all the traces with a common depth point into one stacked output trace for each depth point. This summation is performed after the application of NMO and static corrections to each of the individual traces. If these corrections are appropriate then trace signals will reinforce whilst random noise will fail to reinforce. The improvement in signal-to-noise (S/N) ratio of a stacked trace compared to the input traces is theoretically equal to the square root of N, where N is the number of traces summed together. Thus, if the fold of stack is 48 fold, then the improvement is approximately 7.



In addition to improving the S/N ratio, stacking can also attenuate or suppress undesired reflection events such as multiple reflections. This is because an appropriately applied NMO correction will only partially correct multiple reflections so that they will not reinforce when summed but will suffer destructive interference to some degree.

In practice, the early live portion of the NMO output traces have more distortion than is acceptable. For this and possibly other reasons, a ramp function is applied to the input traces before summation. Each trace may have up to three ramps applied to it to accept or reject portions of the input trace as desired. Quite commonly short offset traces are rejected at depth to improve multiple attenuation.

To accommodate the varying summation, or fold, implicit in this ramping a recovery scaler is applied to normalise the energy output level to that of the full fold stack.



TIME VARIANT FILTERING (TVF)

Filtering is commonly applied in a time variant manner to take account of the higher frequency content of the shallow seismic signal and the lower frequency content at depth when rejecting unwanted frequencies, or noise.

By appropriate filter design, unwanted frequencies may be attenuated, or removed, the most common application is the band-pass filter which discriminates against the high and low frequency spectrum of the input trace where no significant signal energy is present.

TIME VARIANT SCALING (TVS)

Time Variant Scaling (TVS) produces amplitude equalisation in a time variant manner down the seismic trace as well as from trace to trace. Up to twenty time gates with variable overlap can be used to compute time variant scalars for each gate to raise all gates to the same energy level.

Scalars computed for each gate are applied at the gate centre, with linear interpolation between gate centres.



Gate amplitudes are measured for a set of continuous gates on each trace and scalers are computed for each gate to make the amplitude constant or proportional to the amplitudes. The scalers are applied in a continuously time-variant manner.

TIME VARIANT DECONVOLUTION (TVD)

The purpose of TVD is to take reverberating series of wavelets and reduce them to the time domain spike and this implies normalising the frequency spectrum. At the same time TVD is desirable to collapse and stabilise wavelet shapes from broad or variable input wavelets.

TVD is accomplished by the application of one or more filters designed from individual data trace autocorrelation functions.

Gapped TVD is the process of deconvolution without total spectral whitening. This differs from Spike TVD which gives total spectral whitening. This means the frequency spectrum in gapped deconvolution will show that the high frequency noise area is not amplified



MIXING

This involves combining energy from adjacent trace of the same record. In a 2 on 1 MIX, traces are summed as follows:-

<u>Input trace</u>	<u>Output trace</u>
1	
2	1
3	
4	2
etc.	etc.

Some noise cancellation is achieved by mixing.

RESAMPLE

This process changes the input field sample period to a larger sample period, say 2ms to 4ms, for processing. Anti-alias filters are applied prior to the resampling.



APPENDIX B

OTTER TASMANIA T/13P STACK PURCHASE TAPE INVENTORY

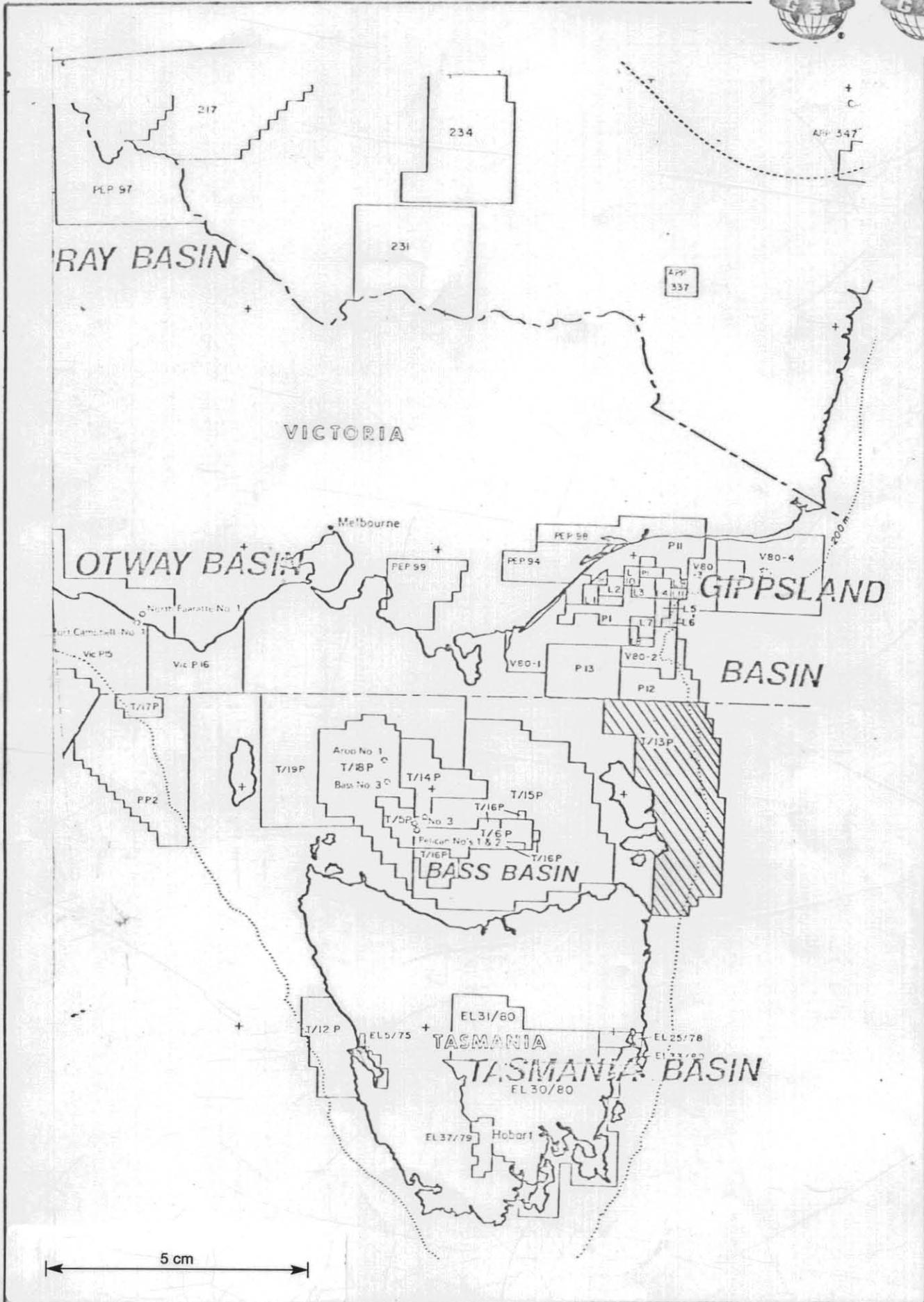
HOLD TAPE	IDRD	DP RANGE	SP RANGE	MFR	PRNS
G-499	80F-T-1A	1-547	1-500	BOT	21020
	"	"	"	OC4259A0	23420
	80F-T-1B	1-548	450-950	OC425CD7	21020
	"	"	"	OC4260D9	23420
	80F-T-1C	1-528	900-1380	OC4263C2	21020
	"	"	"	OC4264C2	23420
	80F-T-2B	1-392	380-724	OC4268D5	21020
	80F-T-3A	1-723	1-676	OC440C29	21020
	"	"	"	OC4418D4	23420
	80F-T-3B	1-724	626-1302	OC441A08	21020
	"	"	"	OC441B34	23420
	80F-T-2A	1-477	1-430	OC441C88	21020, 23420
	80F-T-2B	1-392	380-724	OD18E1D1	23420
G-1902	80F-T-4A	1-597	1-550	BOT	21020
	"	"	"	OC40E128	23420
	80F-T-5A	1-447	1-400	OC40E208	21020
	"	"	"	OC410395	23420
	80F-T-5B	1-493	350-795	OC410434	21020
	"	"	"	OC410854	23420
	80F-T-6A	1-644	1-597	OC4109D0	21020
	"	"	"	OC410BA5	23420
	80F-T-7A	1-447	1-400	OC410C85	21020
	"	"	"	OC411897	23420
	80F-T-7B	1-462	350-764	OC411A27	21020
	"	"	"	OC486484	23420
	80F-T-4B	1-607	500-1059	OC486818	21020, 23420



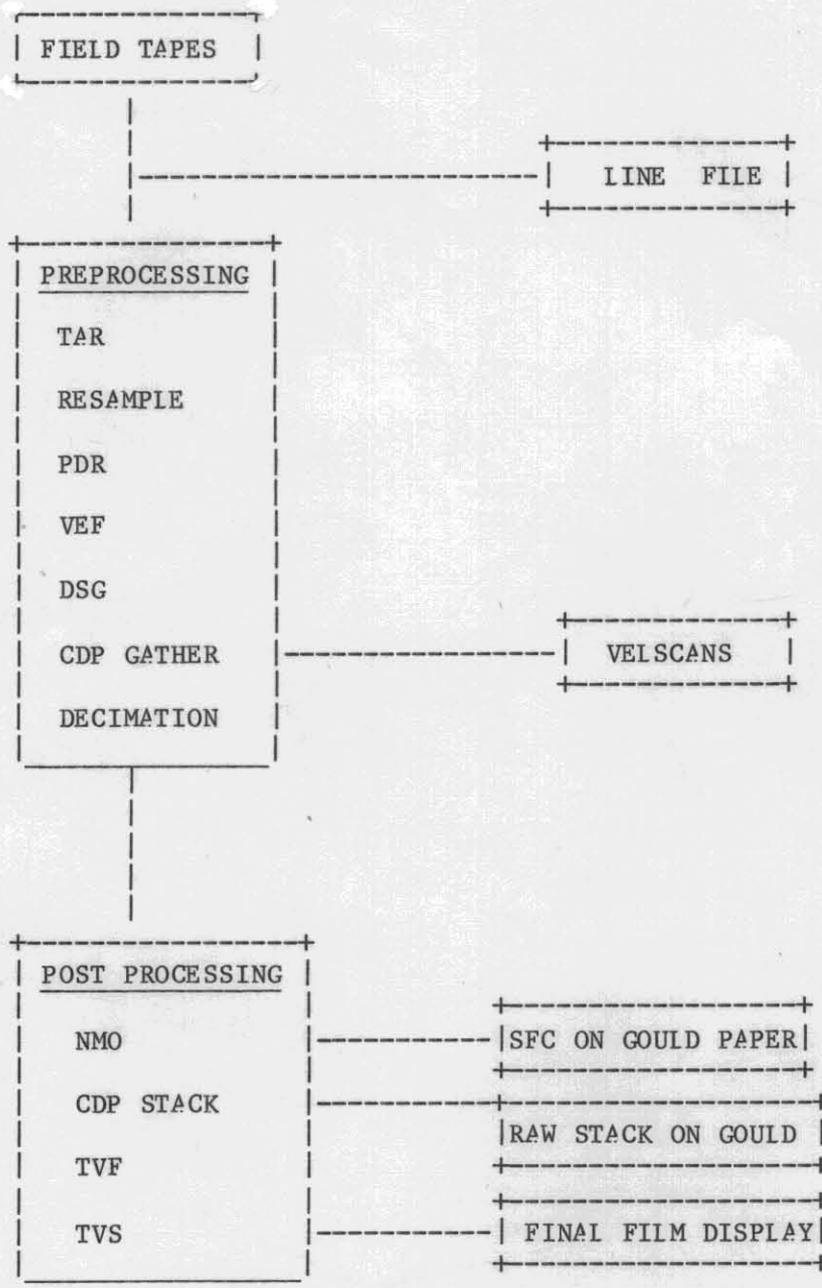
G-760	80F-T-8A	1-747	1-700	BOT	21020
	"	"	"	OC414919	23420
	80F-T-8B	1-748	650-1350	OC416250	21020
	"	"	"	OC4164A0	23420
	80F-T-8C	1-629	1300-1881	OC416895	21020
	"	"	"	OC416AC3	23420
	80F-T-9B	1-648	550-1150	OC416BA3	23420
	80F-T-9C	1-513	1100-1565	OC41A0D8	21020
	"	"	"	OC41A4C4	23420
	80F-T-9A	1-647	1-600	OC41AA50	21020
	"	"	"	OC4859B2	23420
	80F-T-9B	1-648	550-1150	OC485B41	21020
G-664	80F-T10B	1-598	400-950	BOT	21020
	"	"	"	OC41E1D2	23420
	80F-T10C	1-533	900-1385	OC4202C9	21020
	"	"	"	OC4209D6	23420
	80F-T-11	1-204	1-157	OC421489	21020
	"	"	"	OC422248	23420
	80F-T11A	1-651	101-704	OC422498	21020
	"	"	"	OC422A98	23420
	80F-TA11	1-713	654-1319	OC422C12	21020
	"	"	"	OC424193	23420
	80F-T11B	1-431	973-1356	OC424354	21020
	"	"	"	OC424896	23420
	80F-T10A	1-497	1-450	OC424A57	21020
	"	"	"	OC761B11	23420



G-2399	80F-T12A	1-697	1-650	BOT	21020
	"	"	"	OC408C02	23420
	80F-T12B	1-748	600-1300	OC408CD3	21020
	"	"	"	OC409435	23420
	80F-T12C	1-507	1250-1709	OC40A018	21020
	80F-T-13	1-424	1-377	OC40ACC8	21020
	80F-T-12C	1-501	1250-1709	OC40C084	23420
	80F-T-13	1-424	1-377	OC40C3C4	23420
	80F-T13A	1-652	321-925	OC40C894	21020
	"	"	"	OC40C957	23420
	80F-TA13	1-675	875-1502	OC40CA36	21020
	"	"	"	OC40CB93	23420



PROCESSING FLOW CHART



094068

FINAL REPORT
OFFSHORE NAVIGATION, INC.
PROJECT 1201

GEOPHYSICAL SERVICE INTERNATIONAL
PARTY 2931

FOR

OTTER EXPLORATION

TASMANIA, AUSTRALIA
BASS STRAIT SURVEY

MAY 1980

POF-

OFFSHORE NAVIGATION, INC.

A B S T R A C T

Offshore Navigation, Inc. (ONI) provided a Maxiran Radiopositioning System to a marine seismic operation that was conducted in Bass Strait, off the coast of Tasmania, Australia.

The Maxiran system provided ranges to a C.M.S. Navigation System that was provided and operated by the prime contractor and operator, Geophysical Service International (GSI).

The principal was Otter Exploration (OTTER).

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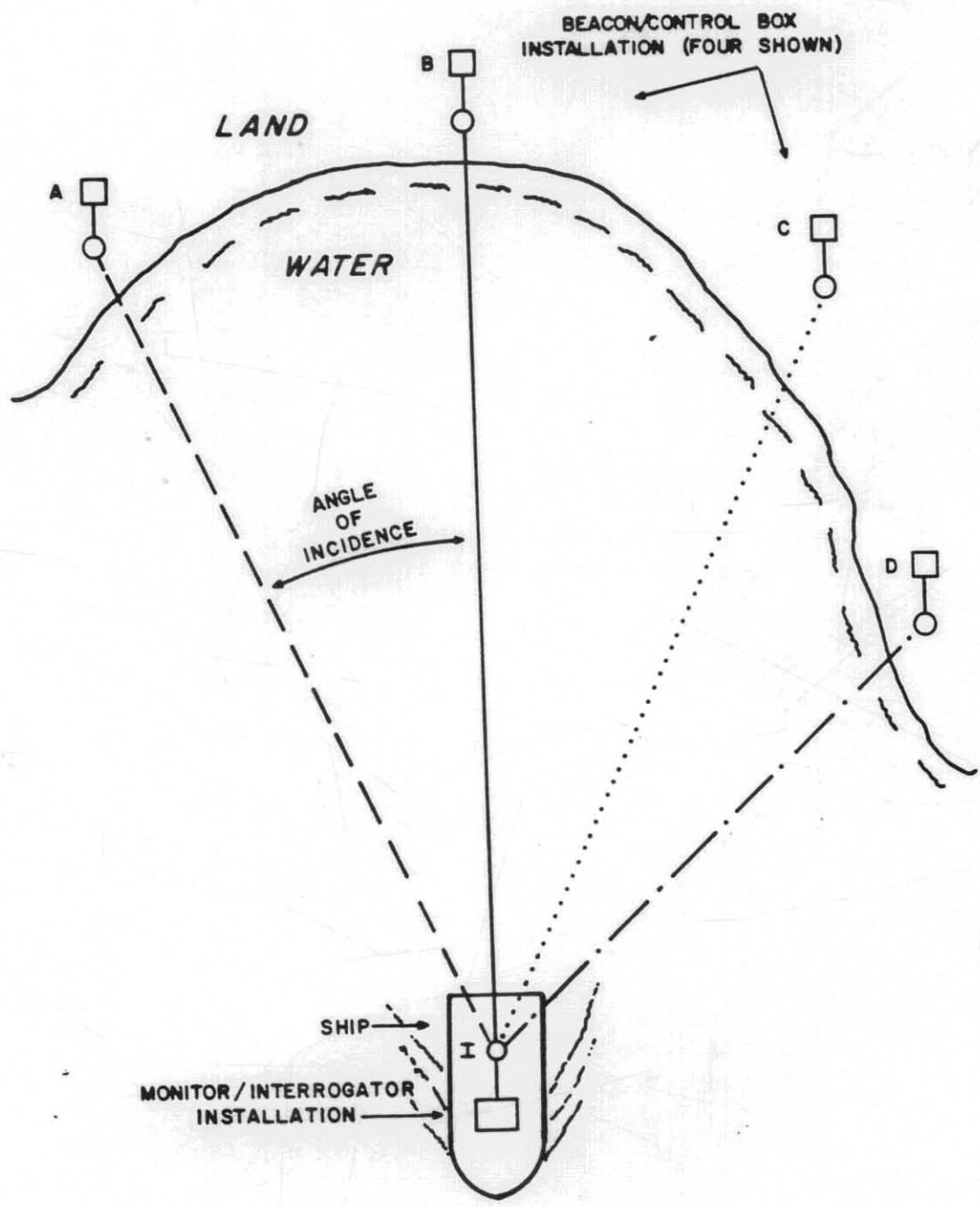
I. THE MAXIRAN RADIOPOSITIONING SYSTEM

The Maxiran Radiopositioning System is a precision electronic ranging system capable of both manual and automatic tracking of range. It is especially useful for measuring distances across bodies of water.

The use of the Maxiran requires three or more electronic installations. For the purposes of this discussion, one of these installations is assumed to be aboard a ship (see Figure 1). This installation consists of the Maxiran Monitor and Interrogator. The other installations are located on shore. Each of these installations consist of a Maxiran Beacon and a Control Box. There are two or more of the Beacon Control Box installations situated at appropriate locations on shore.

In operation, the Monitor/Interrogator installation transmits a radio signal (containing a Beacon-Select code which addresses a selected Beacon) which is picked up by all of the Beacon/Control Box installations. Each Beacon decodes the received signal and decides whether the Beacon-Select code transmitted corresponds to that Beacon. If the Beacon-Select code is correct for a Beacon, it responds

FIGURE-1. TYPICAL MAXIRAN SYSTEM



I. THE MAXIRAN RADIOPOSITIONING SYSTEM (continued)

by transmitting a radio signal reply. The Monitor measures the amount of time elapsed between the Interrogator's transmission and the received reply sent by the Beacon. Since, for all practical purposes, radio signals travel at a known speed, the time elapsed between transmission and response is a measure of the distance the radio signal travelled. The elapsed time is converted by the Monitor into distance and then displayed. By knowing the location of the land stations and the current distance from the ship to each of them, the position of the ship can be readily calculated.

For the purposes of this discussion, let us first assume that only two Beacons are being utilized. These are the Beacons marked "A" and "B" in Figure 1. Since the distance from Beacon "A" to the Interrogator (call it distance A_1) and the distance from Beacon "B" to the Interrogator (call it distance B_1) are now known (these distances are the distances displayed on the Monitor front panel), we can use some geometry to calculate the position of the ship with reference to Beacons "A" and "B".

I. THE MAXIRAN RADIOPOSITIONING SYSTEM (continued)

As illustrated in Figure 2, the distances of A1 and B1 define two intersecting circles, one with a radius of length A1 centered about Beacon "A", the other with radius of length B1 centered about Beacon "B". These two circles intersect at two points (marked I and I' in Figure 2). Obviously, the ship can only be located at one of these points. Since point I' happens to be located on land, we can safely assume that the ship is located at Point I.

There is always some uncertainty associated with the exact measurements of the Beacons. This is illustrated in Figure 3. Figure 3 illustrates an enlarged view of the intersection of the circles shown in Figure 2. If the tolerance of the measurements of Beacon "B" is plus-or-minus 5 meters, then the two solid lines in Figure 3 are 10 meters apart. The tolerance of the measurements of Beacon "A" should be the same as that of Beacon "B", but this is not always the case due to differences in geographical location. Under the above conditions, we only know that the ship is located somewhere in the shaded area of Figure 3.

FIGURE-2. SYSTEM WITH TWO BEACONS

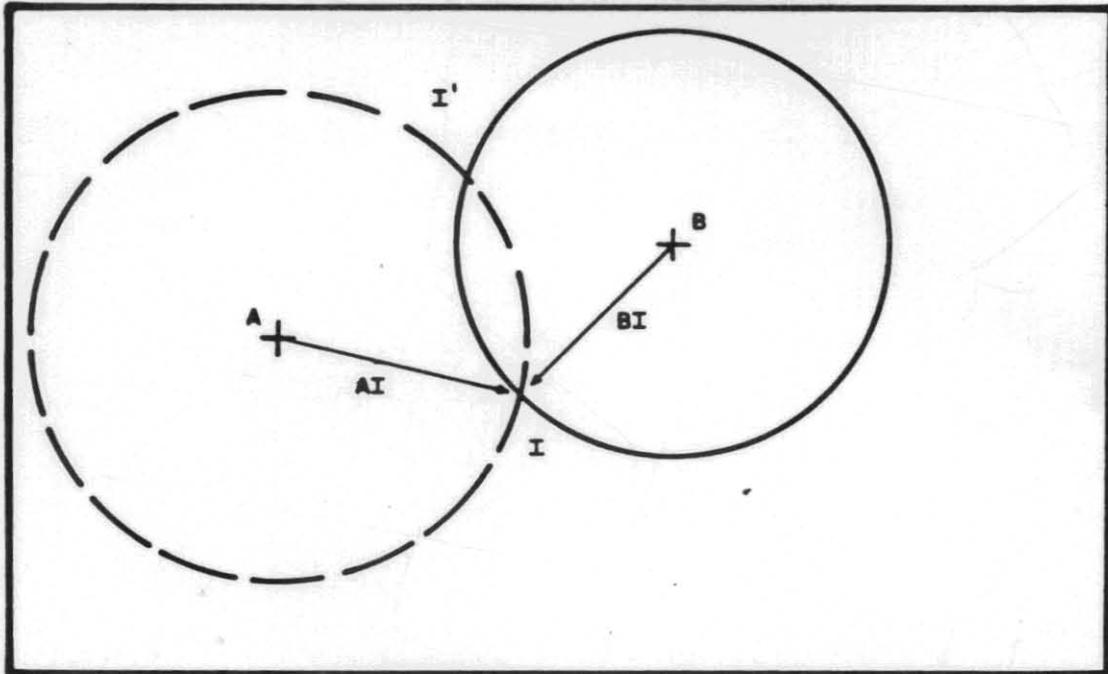
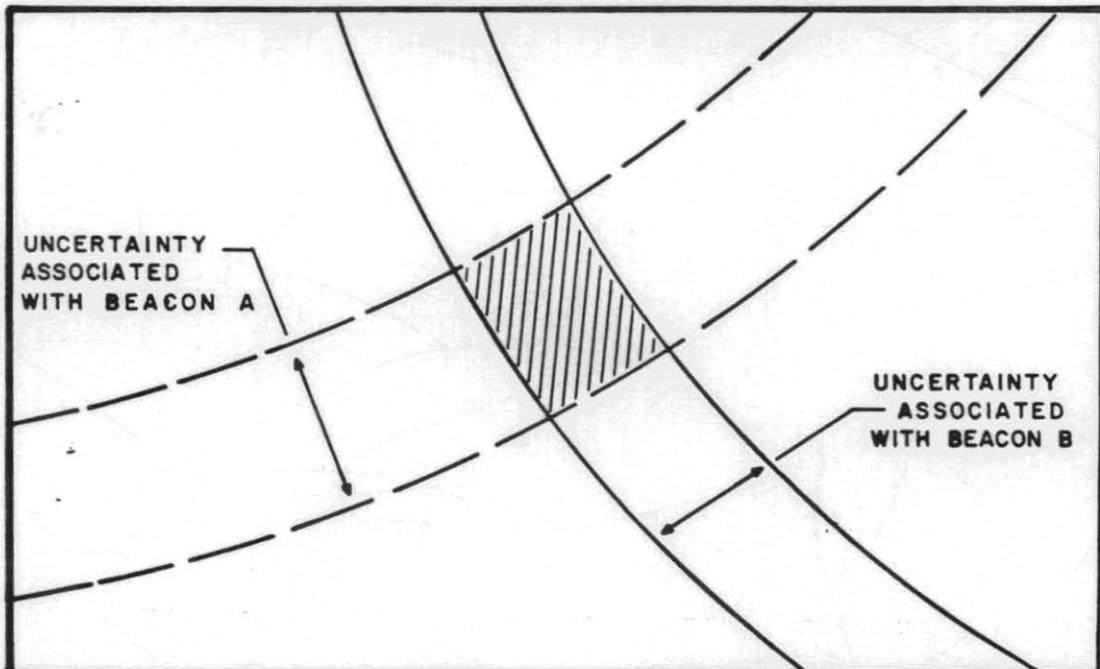


FIGURE-3. UNCERTAINTY WITH TWO BEACONS



I. THE MAXIRAN RADIOPOSITIONING SYSTEM (continued)

For the purposes of the following discussion, it is assumed that there are now three Beacons utilized. Now three circles are defined instead of the two from the discussion above. The third distance, from Beacon "C" to the Interrogator (call it distance C_1), defines a circle of radius length C_1 centered about Beacon "C". The new situation is illustrated in Figure 4. Notice that with the three circles, there is only one location where all three circles can intersect. This eliminates the ambiguity associated with using only two Beacons. Now there is no I' to worry about. An additional advantage of using three Beacons is illustrated in Figure 5. Now the area of uncertainty has been reduced even though the tolerance of Beacon "C"'s measurement is no better than that of the other Beacons.

As the ship moves along, one or more of the Beacons may become unusable for various reasons (out of range, too small or too great an operating angle, etc.), if additional Beacons are situated on shore, they may be interrogated as desired to greatly expand the range and usability of the system.

FIGURE-4. SYSTEM WITH THREE BEACONS

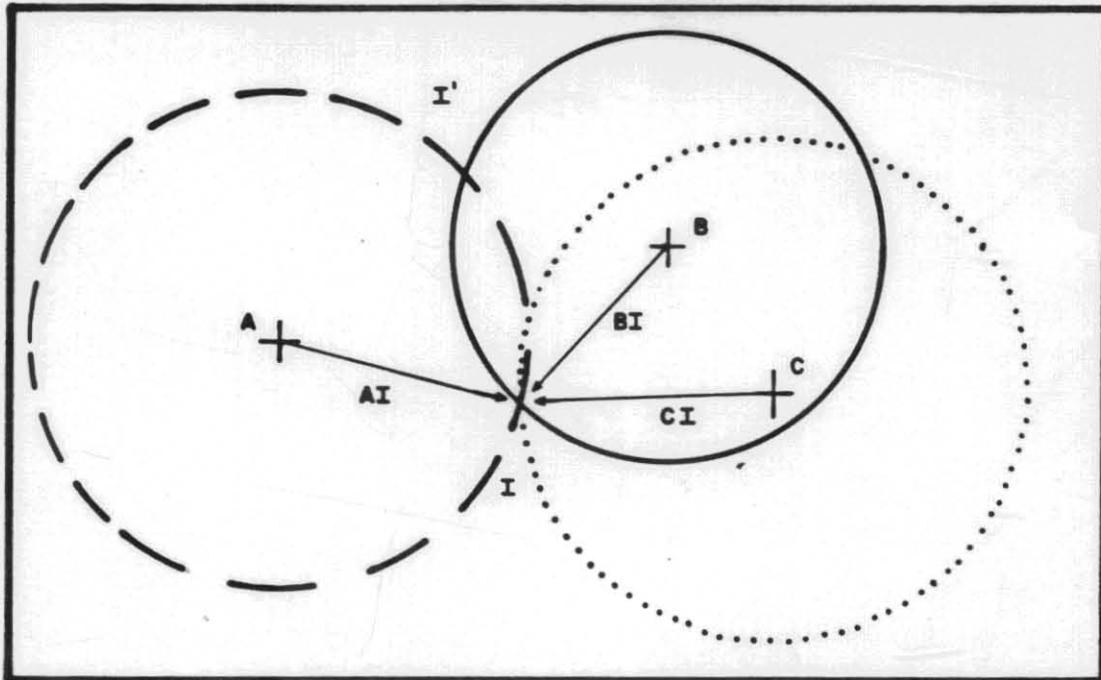
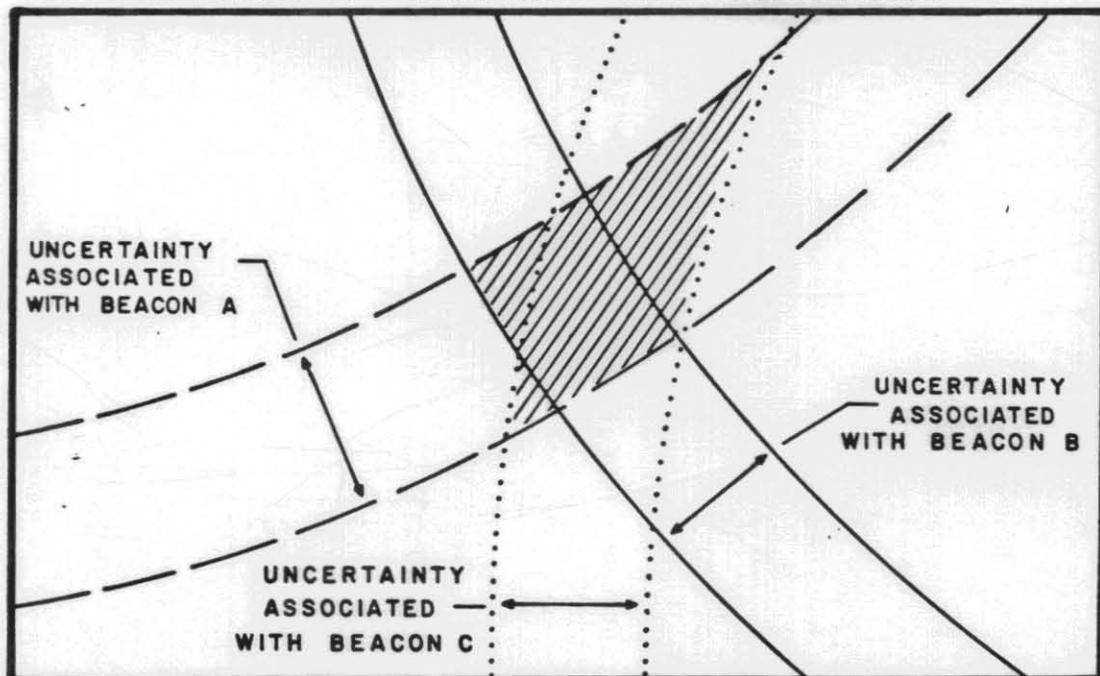


FIGURE-5. UNCERTAINTY WITH THREE BEACONS



I. THE MAXIRAN RADIOPOSITIONING SYSTEM (continued)

As many as three different Beacons may be selected at one time by the proper setting of the Monitor's Beacon Select switches.

II. AREA OF OPERATIONS

Operations, conducted during the period covered by this report, were located off the coast of Tasmania, Australia in Bass Strait. The work area extended up to approximately 100 kilometers offshore.

The ONI base of operation for this survey was established at Lakes Entrance, Victoria on 5 May, 1980.

III. FIELD OPERATIONS RECAP

ONI personnel and the Maxiran system were in the operational area prior to the commencement of this survey for another operation that was conducted under GSI control. Maxiran Stations Mount Taylor (Offset), Mt. Cann, Blackwarri, and Cape Portland (ST 770) were erected, manned and operational for this other operation. The Maxiran mobile indicating equipment and ONI mobile operating personnel were on board the recording vessel, M/V EUGENE McDERMOTT II.

The M/V EUGENE McDERMOTT II completed a prospect on 5 May 1980 and proceeded to the OTTER prospect area.

III. FIELD OPERATIONS RECAP (continued)

Geophysical operations in the OTTER Bass Strait Survey Area began at 0255 hours 6 May and were completed at 2200 hours 8 May 1980. See Appendix A of this report for details of operations.

The Maxiran base station equipment and operators remained at their respective sites on completion of this survey for another operation to be conducted under GSI control. The Maxiran mobile equipment and operators remained on board the M/V EUGENE McDERMOTT II at the request of GSI.

IV. GENERAL INFORMATION

A. Maxiran frequencies used were:

Mobile Transmitter	441 MHz
Base Transmitter	429 MHz

B. Satisfactory radiotelephone communications between all Maxiran installations were maintained on the frequencies of 7840 and 4637.5 (SSB) kilocycles.

C. The Maxiran field data was turned over to Mr. P.R. Miller, the GSI representative, on 8 May 1980.

D. Four Maxiran base station installations were provided by ONI for this survey.

E. Four Maxiran base station sites were occupied during this operation. They were:

STATION BLACKWARRI
STATION CAPE PORTLAND (ST 770)
STATION MOUNT CANN
STATION MOUNT TAYLOR (OFFSET)

F. Maximum Maxiran range observed during the survey was 250 kilometers.

IV. GENERAL INFORMATION (continued)

- G. The Maxiran mobile indicating unit was checked daily during the operation for proper zero set. The equipment was zero checked at a setting of 000.000 kilometers and fixed tested with calibration cable.
- H. ONI provided a Dual Antenna System to the Maxiran mobile equipment.

V. MAPPING

Maxiran preplots of the survey were provided to the field operations by GSI. The interval between shot-point locations was constant at 25 meters.

No final mapping was accomplished by ONI on this survey. All Maxiran field data was turned over to Mr. P.R. Miller, the GSI representative, on 8 May 1980.

VI. MAXIRAN CALIBRATION

The Maxiran system was checked for proper calibration on 8 February 1980. For this calibration check, the Maxiran mobile equipment was erected at Station Mt. Nowa Nowa, and the Maxiran base station equipment was erected at Station Mt. Taylor (Offset). The Maxiran equipment was checked over a computed slant range of 46.832 kilometers.

The following pages consist of a field report of this calibration check.

OFFSHORE NAVIGATION, INC.

High Power

MAXIRAN CALIBRATION REPORT

DATE: Feb. 8th, 1980

MOBILE STATION

BASE STATION

LOCATION: - NOWA NOWA

LOCATION: MT TAYLOR -

OPERATOR: D. Taylor

OPERATOR: R. Molloy

UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	MTL 01	076 CODE 1
INTERROGATOR	NTM 01	044	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER	NTU 01	011
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S	NPU 01	011
PREAMP	SAU 12	109	PREAMP	SAU 12	108
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft		Andrews RG 8	82 ft
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft		4 LPL's	60 ft
INPUT VOLTAGE	119		INPUT VOLTAGE	114	
TX. FREQUENCY	441		TX. FREQUENCY	429	
RX. FREQUENCY	429		RX. FREQUENCY	441	
RX. GAIN SETTING	1/3		RX. GAIN SETTING	normal	
WEATHER CONDITIONS	sunny, light cloud		WEATHER CONDITIONS	sunny, light cloud	
	wind 7-8 kts			wind 7-8 kts	

OBSERVED RANGE IN CALIBRATE: 51.814 KM

COMPUTED SLANT RANGE: 46.832 KM

MOBILE ZERO SETTING IS: 4.982 KM

OBSERVED RANGE IN OPERATE: 46.832 KM

TIME: 1645

SIGNED: *D. Heaverlo*

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
2. All readings entered hereon will be final readings for the item in question, not preliminary or intermediate readings.
3. Each report will be complete in itself. Do not refer to other reports for information.
4. Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

OFFSHORE NAVIGATION, INC.

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High Power

MAXIRAN CALIBRATION REPORT

DATE: Feb. 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION: NOWA NOWA			LOCATION: MT TAYLOR		
OPERATOR: D. Taylor			OPERATOR: R. Molloy		
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NTL 01	035 CODE 1
INTERROGATOR	NTM 01	044	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER	NTU 01	011
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S	NPU 01	011
PREAMP	SAU 12	109	PREAMP	SAU 12	108
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft		Andrews RG 8	82 ft
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft		4 LPL's	60 ft
INPUT VOLTAGE		119	INPUT VOLTAGE		114
TX. FREQUENCY		441	TX. FREQUENCY		429
RX. FREQUENCY		429	RX. FREQUENCY		441
RX. GAIN SETTING		1/3	RX. GAIN SETTING		normal
WEATHER CONDITIONS		sunny, light cloud	WEATHER CONDITIONS		sunny, light cloud
		wind 7-8 kts			wind 7-8 kts

OBSERVED RANGE IN CALIBRATE: 51.814 KM
 COMPUTED SLANT RANGE: 46.832 KM
 ∴ MOBILE ZERO SETTING IS: 4.982 KM
 OBSERVED RANGE IN OPERATE: 46.832 KM

TIME: 1700

SIGNED: _____

D. Heavels

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
2. All readings entered hereon will be final readings for the item in question, not preliminary or intermediate readings.
3. Each report will be complete in itself. Do not refer to other reports for information.
4. Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

High Power

MAXIRAN CALIBRATION REPORT

DATE: Feb. 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION: NOWA NOWA			LOCATION: MT TAYLOR		
OPERATOR: D. Taylor			OPERATOR: R. Molloy		
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NEL 01	023 CODE 3
INTERROGATOR	NTM 01	044	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER	NTU 01	011
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S	NPU 01	011
PREAMP	SAU 12	109	PREAMP	SAU 12	108
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft		Andrews RG 8	82 ft
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft		4 LPL's	60 ft
INPUT VOLTAGE		119	INPUT VOLTAGE		114
TX. FREQUENCY		441	TX. FREQUENCY		429
RX. FREQUENCY		429	RX. FREQUENCY		441
RX. GAIN SETTING		1/3	RX. GAIN SETTING		normal
WEATHER CONDITIONS		sunny, light cloud	WEATHER CONDITIONS		sunny, light cloud
		wind 7-8 kts			wind 7-8 kts

OBSERVED RANGE IN CALIBRATE: 51.814 KM

COMPUTED SLANT RANGE: 46.832 KM

∴ MOBILE ZERO SETTING IS: 4.982 KM

OBSERVED RANGE IN OPERATE: 46.832 KM TIME: 1715

SIGNED: *D. Heavels*

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
2. All readings entered hereon will be final readings for the item in question, not preliminary or intermediate readings.
3. Each report will be complete in itself. Do not refer to other reports for information.
4. Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

OFFSHORE NAVIGATION, INC.

094088
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High Power

MAXIRAN CALIBRATION REPORT

DATE: Feb. 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION: NOWA NOWA			LOCATION: MT TAYLOR		
OPERATOR: D. Taylor			OPERATOR: R. Molloy		
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NTL 01	031 CODE 3
INTERROGATOR	NTM 01	044	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER	NTU 01	011
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S	NPU 01	011
PREAMP	SAU 12	109	PREAMP	SAU 12	108
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft		Andrews RG 8	82 ft
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft		4 LPL's	60 ft
INPUT VOLTAGE		119	INPUT VOLTAGE		114
TX. FREQUENCY		441	TX. FREQUENCY		429
RX. FREQUENCY		429	RX. FREQUENCY		441
RX. GAIN SETTING		1/3	RX. GAIN SETTING		normal
WEATHER CONDITIONS		sunny, light cloud	WEATHER CONDITIONS		sunny, light cloud
		wind 7-8 kts			wind 7-8 kts

OBSERVED RANGE IN CALIBRATE: 51.814 KM

COMPUTED SLANT RANGE: 46.832 KM

∴ MOBILE ZERO SETTING IS: 4.982 KM

OBSERVED RANGE IN OPERATE: 46.832 KM TIME: 1730

SIGNED: *D. Heaverlo*

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
2. All readings entered hereon will be final readings for the item in question, not preliminary or intermediate readings.
3. Each report will be complete in itself. Do not refer to other reports for information.
4. Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

OFFSHORE NAVIGATION, INC.

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High Power

MAXIRAN CALIBRATION REPORT

DATE: Feb. 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION: NOWA NOWA			LOCATION: MT TAYLOR		
OPERATOR: D. Taylor			OPERATOR: R. Molloy		
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NTL 01	029 CODE 5
INTERROGATOR	NTM 01	044	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER	NTU 01	011
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S	NPU 01	011
PREAMP	SAU 12	109	PREAMP	SAU 12	108
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft		Andrews RG 8	82 ft
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft		4 LPL's	60 ft
INPUT VOLTAGE		119	INPUT VOLTAGE		114
TX. FREQUENCY		441	TX. FREQUENCY		429
RX. FREQUENCY		429	RX. FREQUENCY		441
RX. GAIN SETTING		1/3	RX. GAIN SETTING		normal
WEATHER CONDITIONS		sunny, light cloud		WEATHER CONDITIONS	
		wind 7-8 kts		sunny, light cloud	
				wind 7-8 kts	

OBSERVED RANGE IN CALIBRATE: 51.814 KM
 COMPUTED SLANT RANGE: 46.832 KM
 MOBILE ZERO SETTING IS: 4.982 KM
 OBSERVED RANGE IN OPERATE: 46.832 KM

TIME: 1745

SIGNED: *D. Heaverlo*

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
2. All readings entered hereon will be final readings for the item in question, not preliminary or intermediate readings.
3. Each report will be complete in itself. Do not refer to other reports for information.
4. Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

High Power

MAXIRAN CALIBRATION REPORT

DATE: Feb. 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION: NOWA NOWA			LOCATION: MT TAYLOR		
OPERATOR: D. Taylor			OPERATOR: R. Molloy		
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NTL 01	082 CODE 5
INTERROGATOR	NTM 01	044	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER	NTU 01	011
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S	NPU 01	011
PREAMP	SAU 12	109	PREAMP	SAU 12	108
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft		Andrews RG 8	82 ft
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft		4 LPL's	60 ft
INPUT VOLTAGE		119	INPUT VOLTAGE		114
TX. FREQUENCY		441	TX. FREQUENCY		429
RX. FREQUENCY		429	RX. FREQUENCY		441
RX. GAIN SETTING		1/3	RX. GAIN SETTING		normal
WEATHER CONDITIONS		sunny, light cloud	WEATHER CONDITIONS		sunny, light cloud
		wind 7-8 kts			wind 7-8 kts

OBSERVED RANGE IN CALIBRATE: 51.814 KM

COMPUTED SLANT RANGE: 46.832 KM

∴ MOBILE ZERO SETTING IS: 4.982 KM

OBSERVED RANGE IN OPERATE: 46.832 KM TIME: 1800

SIGNED: *J Heaverlo*

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
2. All readings entered hereon will be final readings for the item in question, not preliminary or intermediate readings.
3. Each report will be complete in itself. Do not refer to other reports for information.
4. Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

OFFSHORE NAVIGATION, INC.

LOW POWER

MAXIRAN CALIBRATION REPORT

DATE: Feb 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION: NOWA NOWA			LOCATION: Mt TAYLOR		
OPERATOR: D. Taylor			OPERATOR: R. Molloy		
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NTL 01	082 CODE 5
INTERROGATOR	NTM 01	038	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER		
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S		
PREAMP	SAU 12	109	PREAMP		
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft			
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft			4 LPL's
INPUT VOLTAGE		119	INPUT VOLTAGE		
TX. FREQUENCY		441	TX. FREQUENCY		429
RX. FREQUENCY		429	RX. FREQUENCY		441
RX. GAIN SETTING		1/3	RX. GAIN SETTING		normal
WEATHER CONDITIONS		sunny, light cloud wind 7-8 kts	WEATHER CONDITIONS		Sunny, light cloud wind 7-8 kts

OBSERVED RANGE IN CALIBRATE: 51.764 KM
 COMPUTED SLANT RANGE: 46.832 KM
 ∴ MOBILE ZERO SETTING IS: 4.932 KM
 OBSERVED RANGE IN OPERATE: 46.832 KM

TIME: 1815

SIGNED: *D. Heaverlo*

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
2. All readings entered hereon will be final readings for the item in question, not preliminary or intermediate readings.
3. Each report will be complete in itself. Do not refer to other reports for information.
4. Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

OFFSHORE NAVIGATION, INC.

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LOW POWER

MAXIRAN CALIBRATION REPORT

DATE: Feb 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION: NOWA NOWA			LOCATION: Mt TAYLOR		
OPERATOR: D. Taylor			OPERATOR: R. Molloy		
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NTL 01	029 CODE 5
INTERROGATOR	NTM 01	038	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER		
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S		
PREAMP	SAU 12	109	PREAMP		
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft			
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft			4 LPL's
INPUT VOLTAGE		119	INPUT VOLTAGE		
TX. FREQUENCY		441	TX. FREQUENCY		429
RX. FREQUENCY		429	RX. FREQUENCY		441
TX. GAIN SETTING		1/3	RX. GAIN SETTING		normal
WEATHER CONDITIONS		sunny, light cloud	WEATHER CONDITIONS		Sunny, light cloud
		wind 7-8 kts			wind 7-8 kts

SERVED RANGE IN CALIBRATE: 51.764 KM

COMPUTED SLANT RANGE: 46.832 KM

MOBILE ZERO SETTING IS: 4.932 KM

SERVED RANGE IN OPERATE: 46.832 KM

TIME: 1830

SIGNED: *D. Heavens*

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
2. All readings entered hereon will be final readings for the item in question, not preliminary or intermediate readings.
3. Each report will be complete in itself. Do not refer to other reports for information.
4. Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

OFFSHORE NAVIGATION, INC.

094093

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LOW POWER

MAXIRAN CALIBRATION REPORT

DATE: Feb 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION: NOWA NOWA			LOCATION: Mt TAYLOR		
OPERATOR: D. Taylor			OPERATOR: R. Molloy		
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NTL 01	031 CODE 3
INTERROGATOR	NTM 01	038	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER		
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S		
PREAMP	SAU 12	109	PREAMP		
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft			
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft		4 LPL's	60 ft
INPUT VOLTAGE		119	INPUT VOLTAGE		
TX. FREQUENCY		441	TX. FREQUENCY		429
RX. FREQUENCY		429	RX. FREQUENCY		441
TX. GAIN SETTING		1/3	RX. GAIN SETTING		normal
WEATHER CONDITIONS		sunny, light cloud	WEATHER CONDITIONS		Sunny, light cloud
		wind 7-8 kts			wind 7-8 kts

SERVED RANGE IN CALIBRATE: 51.764 KM

COMPUTED SLANT RANGE: 46.832 KM

MOBILE ZERO SETTING IS: 4.932 KM

SERVED RANGE IN OPERATE: 46.832 KM TIME: 1845

SIGNED: *D. Heavels*

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
2. All readings entered hereon will be final readings for the item in question, not preliminary or intermediate readings.
3. Each report will be complete in itself. Do not refer to other reports for information.
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OFFSHORE NAVIGATION, INC.

LOW POWER

MAXIRAN CALIBRATION REPORT

DATE: Feb 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION:	NOWA NOWA		LOCATION:	Mt TAYLOR	
OPERATOR:	D. Taylor		OPERATOR:	R. Molloy	
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NTL 01	023 CODE 3
INTERROGATOR	NTM 01	038	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER		
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S		
PREAMP	SAU 12	109	PREAMP		
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft			
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft			4 LPL's
INPUT VOLTAGE	119		INPUT VOLTAGE		
TX. FREQUENCY	441		TX. FREQUENCY	429	
RX. FREQUENCY	429		RX. FREQUENCY	441	
TX. GAIN SETTING	1/3		RX. GAIN SETTING	normal	
WEATHER CONDITIONS	sunny, light cloud		WEATHER CONDITIONS	Sunny, light cloud	
	wind 7-8 kts			wind 7-8 kts	

SERVED RANGE IN CALIBRATE: 51.764 : KM

PUTED SLANT RANGE: 46.832 KM

MOBILE ZERO SETTING IS: 4.932 KM

SERVED RANGE IN OPERATE: 46.832 KM

TIME: 1900

SIGNED: *D. Heaverlo*

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
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3. Each report will be complete in itself. Do not refer to other reports for information.
4. Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

OFFSHORE NAVIGATION, INC.

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LOW POWER

MAXIRAN CALIBRATION REPORT

DATE: Feb 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION:	NOWA NOWA		LOCATION:	Mt TAYLOR	
OPERATOR:	D. Taylor		OPERATOR:	R. Molloy	
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NTL 01	035 CODE 1
INTERROGATOR	NTM 01	038	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER		
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S		
PREAMP	SAU 12	109	PREAMP		
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft			
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft		4 LPL's	60 ft
INPUT VOLTAGE	119		INPUT VOLTAGE		
FREQUENCY	441		TX. FREQUENCY	429	
FREQUENCY	429		RX. FREQUENCY	441	
GAIN SETTING	1/3		RX. GAIN SETTING	normal	
WEATHER CONDITIONS	sunny, light cloud		WEATHER CONDITIONS	Sunny, light cloud	
	wind 7-8 kts			wind 7-8 kts	

RECEIVED RANGE IN CALIBRATE: 51.764 KM
 MEASURED SLANT RANGE: 46.832 KM
 MOBILE ZERO SETTING IS: 4.932 KM
 RECEIVED RANGE IN OPERATE: 46.832 KM TIME: 1915

SIGNED: *A. Heaverlo*

NOTES REGARDING CALIBRATION PROCEDURES:

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- Each report will be complete in itself. Do not refer to other reports for information.
- Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

OFFSHORE NAVIGATION, INC.

094096

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LOW POWER

MAXIRAN CALIBRATION REPORT

DATE: Feb 8th, 1980

MOBILE STATION			BASE STATION		
LOCATION: NOWA NOWA			LOCATION: Mt TAYLOR		
OPERATOR: D. Taylor			OPERATOR: R. Molloy		
UNIT	MODEL	SERIAL No.	UNIT	MODEL	SERIAL No.
MONITOR	NMM 01	004	BEACON	NTL 01	076 CODE 1
INTERROGATOR	NTM 01	038	CONTROL BOX	NCL 02	021
AMPLIFIER	NTU 03	009	AMPLIFIER		
AMPLIFIER P/S	NPU 03	009	AMPLIFIER P/S		
PREAMP	SAU 12	109	PREAMP		
COAX	TYPE	LENGTH	COAX	TYPE	LENGTH
	Andrews RG 8	82 ft			
ANTENNA	TYPE	HEIGHT	ANTENNA	TYPE	HEIGHT
	4 LPL's	60 ft			4 LPL's
INPUT VOLTAGE		119	INPUT VOLTAGE		
FREQUENCY		441	TX. FREQUENCY		429
FREQUENCY		429	RX. FREQUENCY		441
GAIN SETTING		1/3	RX. GAIN SETTING		normal
OTHER CONDITIONS		sunny, light cloud wind 7-8 kts	WEATHER CONDITIONS		Sunny, light cloud wind 7-8 kts

OBSERVED RANGE IN CALIBRATE: 51.764 KM
 COMPUTED SLANT RANGE: 46.832 KM
 MOBILE ZERO SETTING IS: 4.932 KM
 OBSERVED RANGE IN OPERATE: 46.832 KM TIME: 1930

SIGNED: *De Heaverlo*

NOTES REGARDING CALIBRATION PROCEDURES:

1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
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3. Each report will be complete in itself. Do not refer to other reports for information.
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VII. BASIC CONTROL

The following Maxiran base stations were occupied to control this survey. Coordinates, as listed below, were obtained from the ONI basic control files, and do not necessarily represent those coordinates used for pre-plotting and final mapping of the survey.

Universal Transverse Mercator Projection
Australian National Spheroid
Zone 55
Central Meridian 147° East
AUSTRALIAN GEODETIC DATUM

STATION BLACKWARRI:

Latitude	38°24'15"07 S	N = 5,749,264 meters
Longitude	146°38'49"24 E	E = 469,179 meters
Elevation	640 meters	

STATION CAPE PORTLAND (ST 770):

Latitude	40°45'18"10 S	N = 5,487,969 meters
Longitude	147°58'09"14 E	E = 581,814 meters
Elevation	52 meters	

STATION MOUNT CANN:

Latitude	37°38'54"13 S	N = 5,831,344 meters
Longitude	148°58'39"72 E	E = 674,472 meters
Elevation	530 meters	

STATION MOUNT TAYLOR (OFFSET):

Latitude	37°42'26"75 S	N = 5,826,484 meters
Longitude	147°33'33"08 E	E = 549,290 meters
Elevation	473 meters	

VIII. PERSONNEL

NAME	POSITION
Bridges, H.	Party Chief
Hoggart, A.	Mobile Operator
Taylor, D.	Mobile Operator
Dellinger, J.	Base Operator
Johnstone, J.	Base Operator
Molloy, R.	Base Operator
Rathbone, P.	Base Operator

IX. DISTRIBUTION

Geophysical Service International
25 Barracks Street
Perth, W.A.
AUSTRALIA

Attention: Mr. John Stanton

Nine copies

Offshore Navigation, Inc.
Post Office Box 23504
Harahan, Louisiana 70183

Two copies

Offshore Navigation, Inc.
Post Office Box 291
Cloverdale, W.A. 6105
AUSTRALIA

One copy

STATION: BLACKWARRI

LOCATED: Station Blackwarri is located 27.9 kilometers from the town of Yarram, Victoria, Australia. The station is located in a cleared paddock on the property of Mr. T. Novak, whose farm house is located approximately 1/4 kilometer from the station marker. The surrounding country is heavy timber country.

ACCESS: Set the vehicle's odometer to 00.0 kilometer at Yarram. Proceed south from Yarram on the Gippsland Highway for 3.1 kilometers to the Won Won/Tarligoon turnoff. Turn left at this point and drive through the township of Won Won at 8.5 kilometers to 16.4 kilometers and a junction signposted "Blackwarri." Turn left at this junction and follow the gravel road, passing a farm house at 19.7 kilometers to a "T" junction and "Give Way" sign at 27.6 kilometers. Turn right at this point. The marker will be 0.3 kilometer from this turn, on top of a hill on the righthand side of the road. A track will be seen on the right that will lead to the marker. This is a drive on station with any type of vehicle.

MARKER: The station marker consists of a standard trig marker triangle with a black ball on top. The trig marker can be seen from the road and farm house.

GENERAL: No local labor is available. All food and fuel supplies can be obtained in Yarram. Water can be obtained from the farm house.

The station is located on property owned by Mr. T. Novak. Permission must be obtained from Mr. Novak to occupy this site. No rent was paid for its use.

STATION: BLACKWARRI (continued)

This station is very cold during the winter months, April through August. It is suggested that a caravan be obtained for this station if it is occupied during this period. During the period of February through May 1980, a camper van was rented from the station property owner, Mr. Novak.

A 50-foot Maxiran tower was erected at this site, the minimum height required to clear surrounding brush and obstructions. Clear vista is from 070° to 210°. Star stakes were used to secure the tower.

ELEVATION: 640 meters

SKETCH: See next page.

AUSTRALIAN GEODETIC DATUM

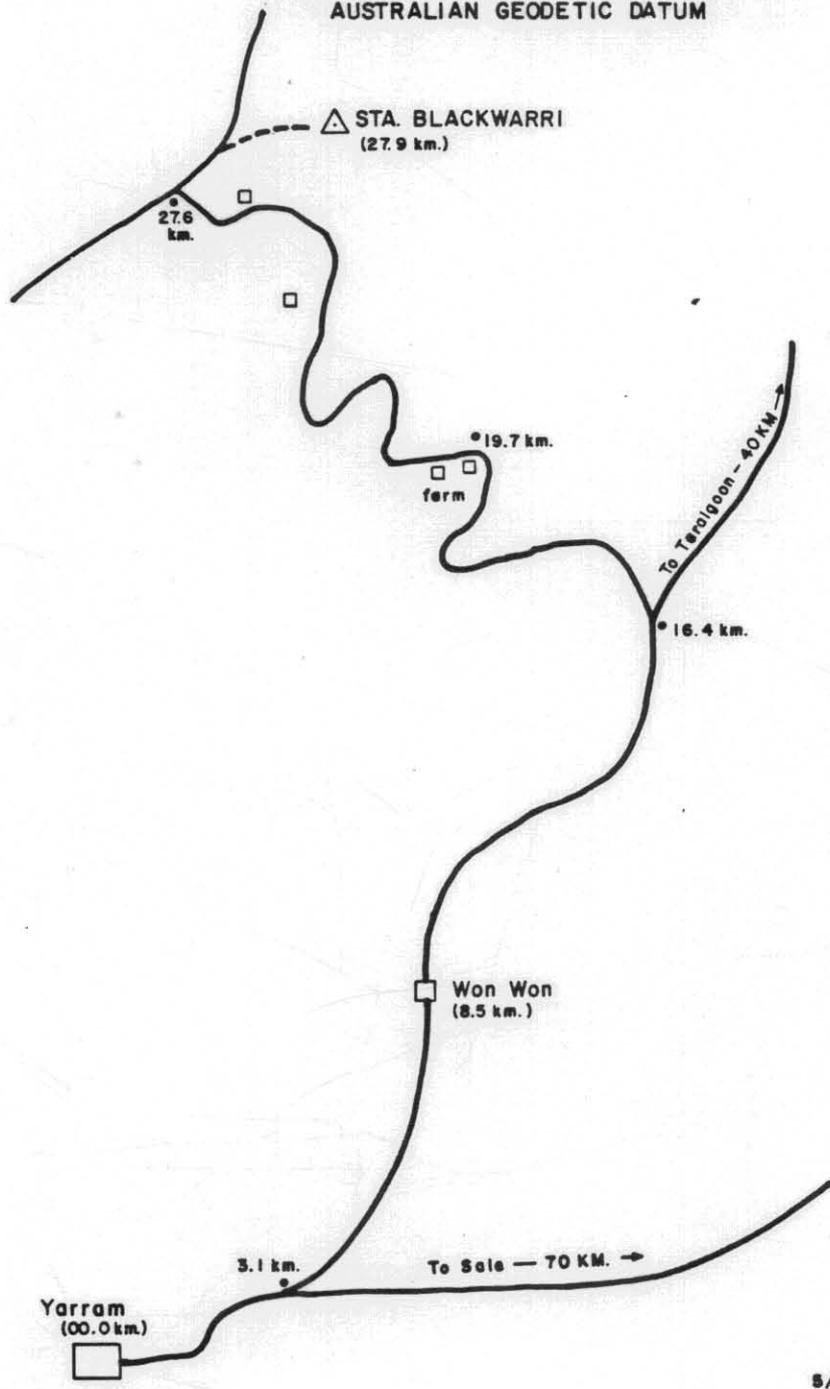
GEOGRAPHICAL COORDINATES		UTM PROJ., AUST. NAT. SPHEROID ZONE 55, C. M. 147° EAST	
Latitude	Longitude	North	East
38°24'15"07 S	146°38'49"24 E	5,749,264 meters	469,179 meters

STA. BLACKWARRI — AUSTRALIA

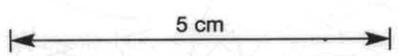
LAT. 38°24'15".07 S
LONG. 146°38'49".24 E
ELEV. 640 meters

N 5,749,264 meters
E 469,179 meters

UTM PROJECTION, AUST. NATIONAL SPHEROID
ZONE 55 C.M. 147° E
AUSTRALIAN GEODETIC DATUM



5/80/1201



STATION: CAPE PORTLAND (ST 770)

LOCATED: Station Cape Portland (ST 770) is located near Cape Portland, Tasmania, Australia, and 26.4 kilometers from the town of Gladstone.

NOTE: This station is named "STATION CHARMOUTH HILL S.T. 770" on the Lands Department, Tasmania survey sheet.

The station is located on a large clear hill in a 1,000-acre paddock.

ACCESS: From Launceston, Tasmania, proceed on the Bass Highway to Scottsdale. Continue on the Bass Highway through Scottsdale and drive a total of 107 kilometers from Launceston to the signposted junction to Gladstone. At Gladstone, turn right at Mr. Watt's Garage, and set the odometer to 00.00 kilometers. From the garage, drive 2.4 kilometers, and take the lefthand fork (Cape Portland Road). Drive down Cape Portland Road past Rushy Lagoon (12.9 kilometers), and follow the gravel road to the gate at Mr. H. Mills' farm, a total of 25.3 kilometers from Mr. Watt's Garage. Cross this gate and follow the track to the station marker, a total of 26.4 kilometers from the garage. This is a drive-on site, and can be reached by four-wheel drive or two-wheel drive vehicles.

MARKER: The station marker is a standard Australian trig marker with a brass stud marked "ST 770."

There are four reference marks that were established at this station. Reference Marks 1, 2, and 4 consist of 0.46m long steel star bars at ground level in concrete. R.M. 1 and 2 are on line to distant trig. R.M. 3 consists of a 0.54m long galvanized iron pipe at ground level in concrete. Stone piles are over each reference mark.

STATION: CAPE PORTLAND (ST 770) (continued)

GENERAL: The station property is owned by Mr. Hugh Mills, Cape Portland, Gladstone, Tasmania. Mr. Mills' phone number is 003 572123. Permission to occupy the station must be obtained from Mr. Mill.

Labor, camping supplies, and the majority of food items must be obtained in Launceston. Camping equipment can be rented in Launceston from Allgoods. Water, oil, and gasoline can be obtained from Mr. Watt's Garage. There is a limited amount of food that can be obtained in Gladstone. Fresh fruit, vegetables, and meat can be obtained in Gladstone.

The station site is very windy and cold. It is suggested that a caravan be used. Mr. Watt can hire a caravan in Gladstone to be placed at the station.

A 50-foot tower was erected at this station, the minimum height required to clear surrounding brush and obstructions. Star stakes were used to secure the tower. No rent was paid to Mr. Mill for use of this station.

ELEVATION: 52 meters

SKETCH: See next page.

AUSTRALIAN GEODETIC DATUM

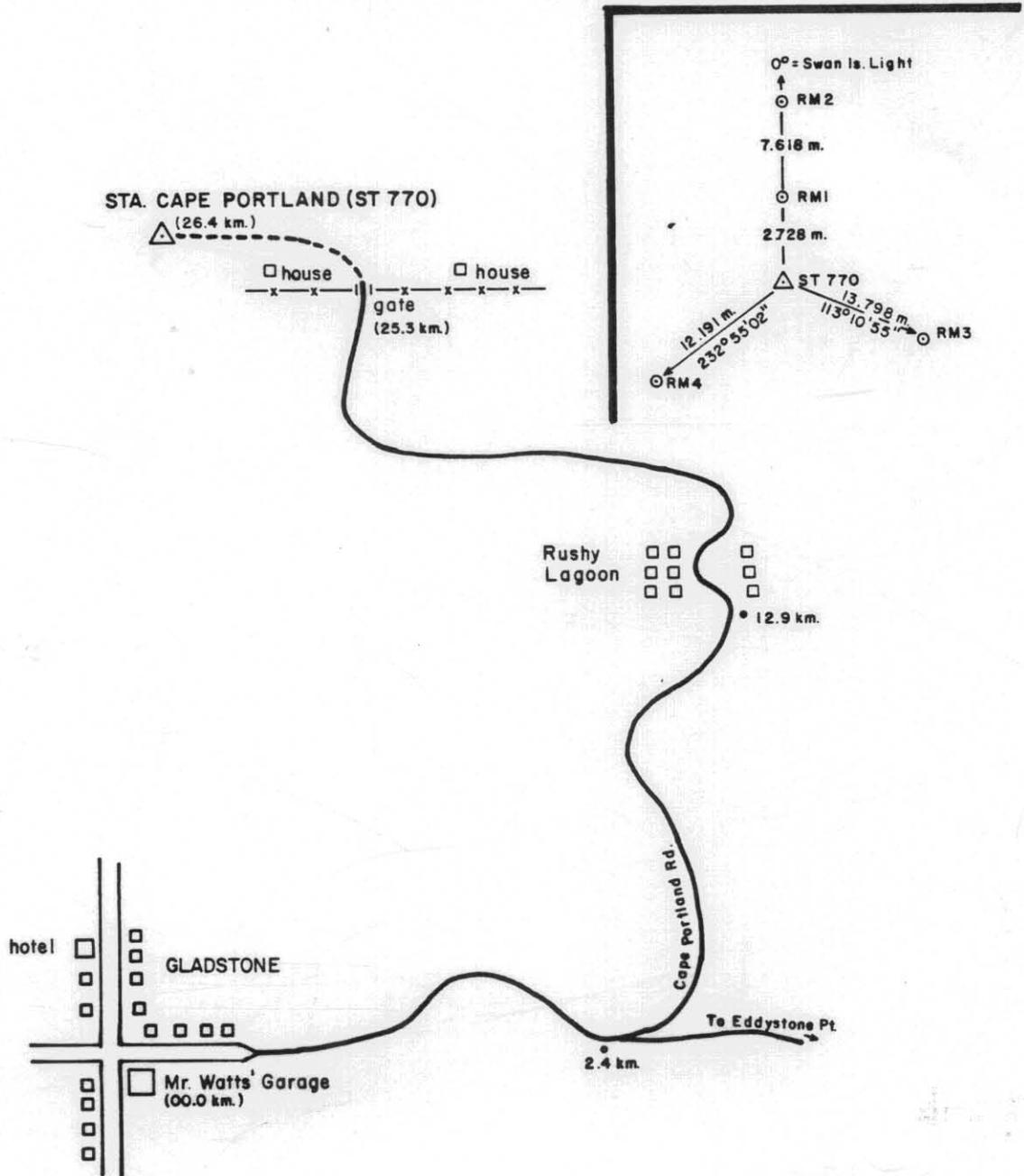
GEOGRAPHICAL COORDINATES		UTM PROJ., AUST. NAT. SPHEROID ZONE 55, C. M. 147° EAST	
Latitude	Longitude	North	East
40°45'18"10 S	147°58'09"14 E	5,487,969 meters	581,814 meters

STA. CAPE PORTLAND (ST 770)—AUSTRALIA

LAT. 40°45' 18".10 S
 LONG. 147°58' 09".14 E
 ELEV. 52 meters

N 5,487,969 meters
 E 581,814 meters

UTM PROJECTION, AUST. NATIONAL SPHEROID
 ZONE 55 C.M. 147° E
 AUSTRALIAN GEODETIC DATUM



5/80/1201

STATION: MOUNT CANN

LOCATED: This station site is located on Mount Cann, approximately 30 statute miles east-northeast of Orbost, Australia. The station marker is located on a cleared mountain top. The cleared area of land is approximately 300 meters in diameter. Past this clearing, the terrain becomes mountainous, and covered with tall timber. A wooden fire watch tower and forestry hut is located in the cleared area.

This description is subject to revision, as a new tower is proposed for this site.

ACCESS: From the Nagara Motel in Lakes Entrance, set the vehicle's odometer to 00.0 kilometer, then travel east from the motel on the Princes Highway. Drive through Nowa Nowa (23 kilometers) and Orbost (59 kilometers) to Kilometer Post 424 at the Bemm River Bridge (109.4 kilometers.) Take the first road to the right after crossing the bridge (109.9 kilometers.) Follow this road, Poddy Creek Road, to the first "Y" junction (113.5 kilometers). Take the righthand fork and drive on this road to the next "Y" junction (118.1 kilometers.) Take the lefthand road at this fork and drive to the next junction (118.6 kilometers.) Take the Bemm Tower road at this point and drive to the top of Mount Cann and the station marker.

Access to this station can be made by a conventional drive vehicle, except during wet conditions. The road is steep and becomes very slippery during rainy periods.

MARKER: The station marker is located alongside the forestry lookout tower. The station marker is a standard trig marker, consisting of a 100cm diameter bronze disc marked "GEODETIC SURVEY VICTORIA." The disc is set in concrete, measuring 370cm in diameter. A pyramid, consisting of black pipe, is set over

STATION: MOUNT CANN (continued)

the trig marker. This pyramid is approximately 2 meters square at the base and is approximately 4 meters in height.

The trig marker is located approximately 15 meters at a bearing of 290° from the Mt. Bemm Forestry Fire Tower.

GENERAL: All food, water, fuel, oil, and camping equipment must be purchased before reaching the site.

In the winter months, this site is prone to low clouds, rain, strong winds, and is quite cold.

At present (1980), there is a small forestry hut some 20 meters from the trig marker. The Forestry Department does not mind that this hut be used as living quarters for navigation personnel, provided that it is not being occupied by forestry personnel.

A 60-foot tower was erected at this station, the minimum height required to clear surrounding brush and obstructions. Clear vista is from 130° to 240°. Star stakes were used to secure the tower.

Permission to occupy this site must be obtained from the Forestry Department at Cann River. No rent was paid for its use.

ELEVATION: 530 meters

SKETCH: See next page.

AUSTRALIAN GEODETIC DATUM

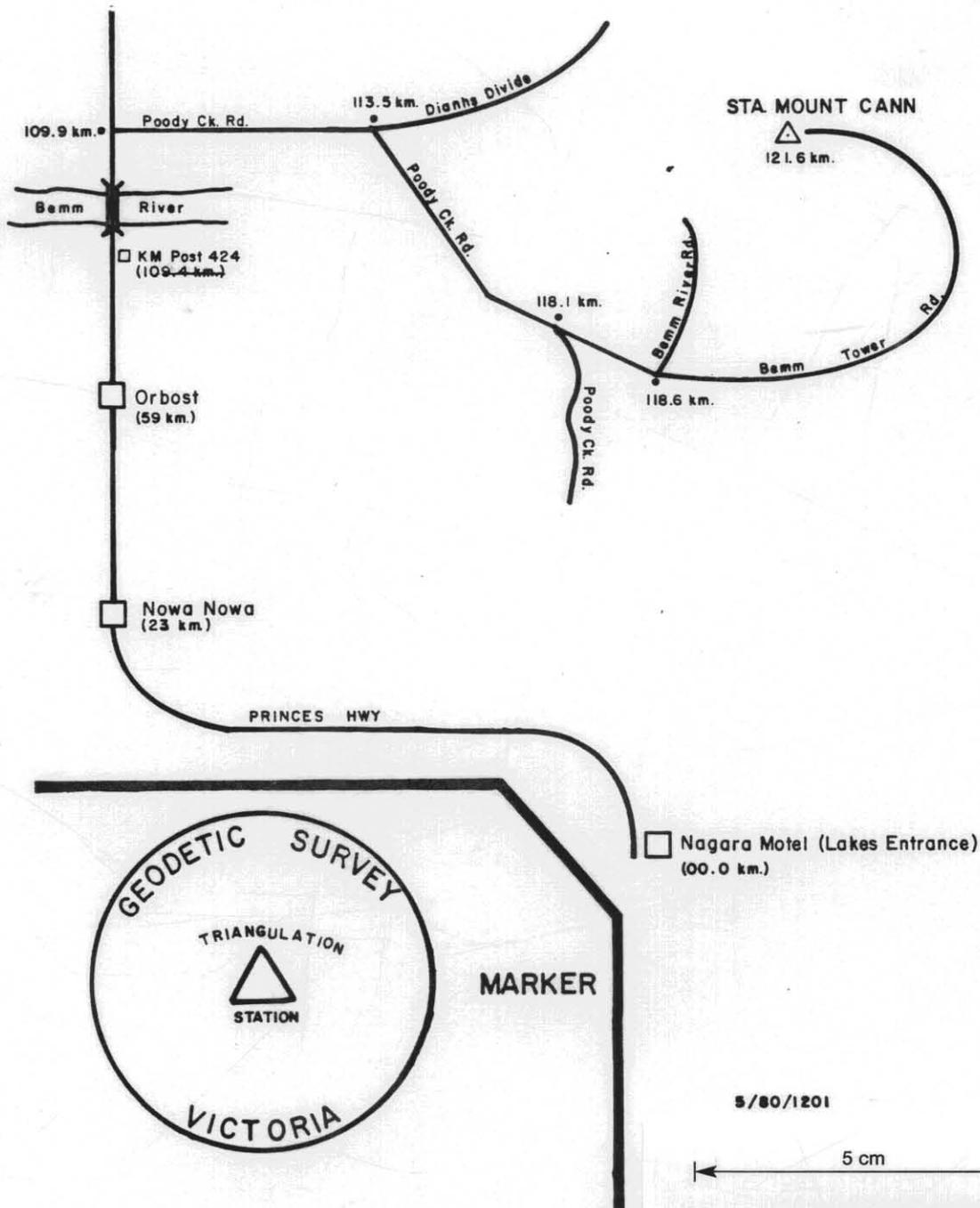
GEOGRAPHICAL COORDINATES		UTM PROJ., AUST. NAT. SPHEROID ZONE 55, C. M. 147°EAST	
Latitude	Longitude	North	East
37°38'54"13 S	148°58'39"72 E	5,831,344 meters	674,472 meters

STA. MOUNT CANN — AUSTRALIA

LAT. 37°38'54".13 S
 LONG. 148°58'39".72 E
 ELEV. 530 meters

N 5,831,344 meters
 E 674,472 meters

UTM PROJECTION, AUST. NATIONAL SPHEROID
 ZONE 55 C.M. 147° E
 AUSTRALIAN GEODETIC DATUM



STATION: MT. TAYLOR (OFFSET)

LOCATED: This station is located near the Mt. Taylor Forestry Lookout Tower, between the towns of Bullumwaal and Bairnsdale, Victoria, Australia. The station site is surrounded by heavy timber and farming land.

ACCESS: Set the vehicle's odometer to 00.0 kilometers at the Bairnsdale Post Office on Bailey Street. Proceed on Bailey Street to Riverine Road. Turn left on Riverine Road, and follow this road to Mitchell River Bridge (1.8 kilometers.) Cross the bridge and follow this road through Wy Yung to Mt. Taylor Forestry Department (16.3 kilometers) located on the lefthand side of the road. From the forestry Department, follow the gravel road up Mount Taylor for 2 kilometers to a cross road. Take the right-hand road (signposted "Bairnsdale 13 M."), (Tower Right), and follow the track to a cattle grid. Cross over the cattle grid and follow this track to the station site. This station is a drive-on site. During periods of wet weather, a four-wheel vehicle would be required to reach the station.

MAKRRER: The trig marker consists of a 12-foot high tripod. The tower is OFFSET 80 feet at a bearing of 270° True from this trig marker. This is due to power-lines in the area of the trig marker. The OFFSET location is marked with a square block of concrete, set flush with the ground. There is a bronze plaque embedded in this marker that is inscribed "ESSO - ONI, OFFSET, ELEVATION."

GENERAL: There is no water available on site. Water, food, fuel, oil, and local labor can be obtained in Bairnsdale.

A 220 VAC power source can be obtained at this station by contacting S.E.C. in Bairnsdale.

This station is very cold during the winter months. Caravans can be hired in Bairnsdale.

STATION: MT. TAYLOR (OFFSET) (continued)

A 60-foot tower was erected at this station, the minimum height required to clear surrounding brush and obstructions. Clear vista is from 090° to 230°. Star stakes were used to secure the tower.

Permission to occupy this station must be obtained from the Forestry Department, located at the base of Mount Taylor. No rent was paid for its use.

ELEVATION: 473 meters

SKETCH: See next page.

AUSTRALIAN GEODETIC DATUM

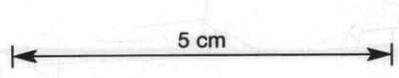
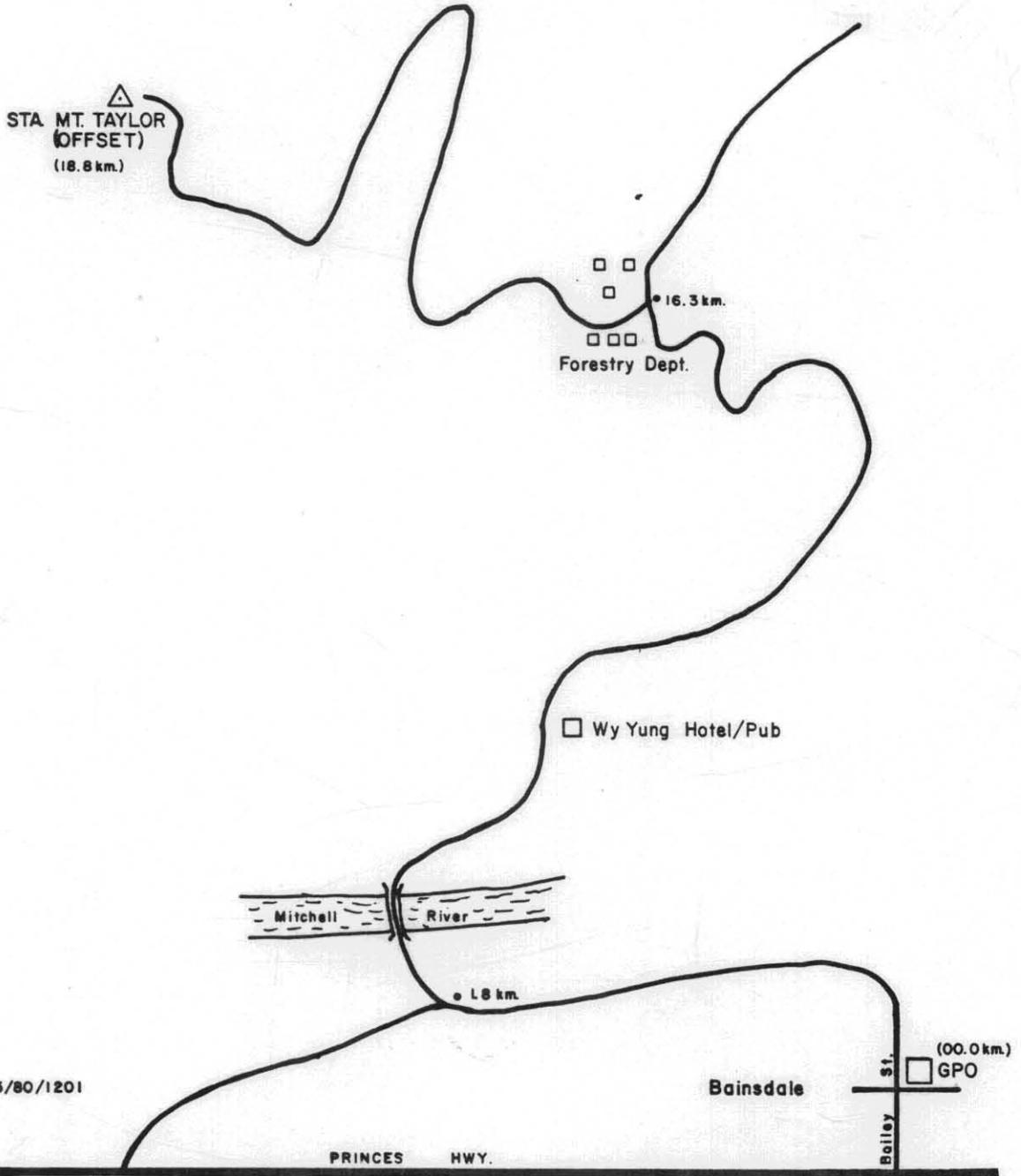
GEOGRAPHICAL COORDINATES		UTM PROJ., AUST. NAT. SPHEROID ZONE 55, G. M. 147° EAST	
Latitude	Longitude	North	East
37°42'26".75 S	147°33'33".08 E	5,826,484 meters	549,290 meters

STA. MT. TAYLOR (OFFSET) — AUSTRALIA

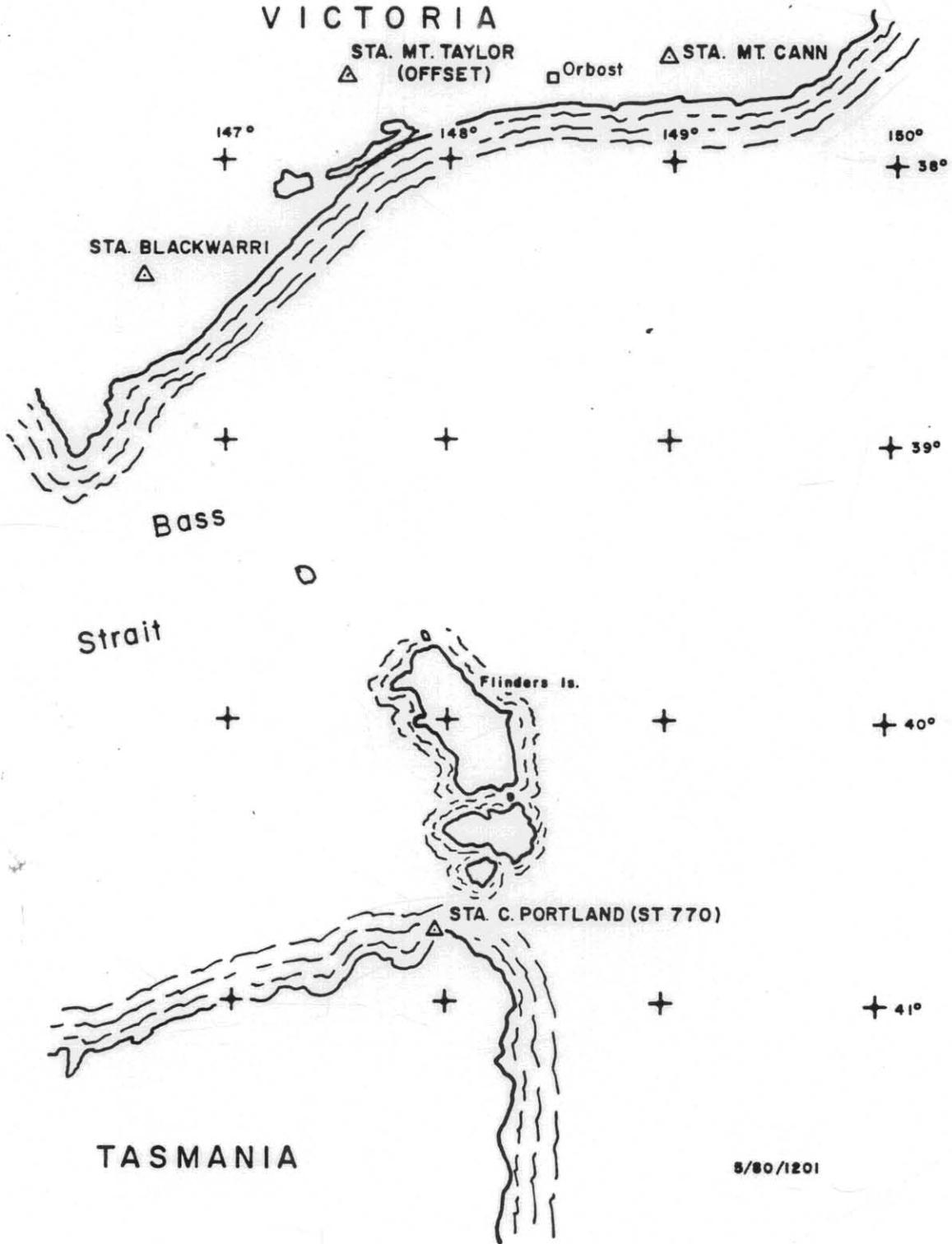
LAT. 37°42'26".75 S
LONG. 147°33'33".08 E
ELEV. 473 meters

N 5,826,484 meters
E 549,290 meters

UTM PROJECTION, AUST. NATIONAL SPHEROID
ZONE 55 C.M. 147° E
AUSTRALIAN GEODETIC DATUM



AREA OF OPERATIONS



8/80/1201

094112

APPENDIX A
DAILY OPERATIONS LOGS

094113

OFFSHORE NAVIGATION INC.
MAXIRAN DAILY OPERATIONS LOG

Project Number 1201 Date MAY 6TH 1980 Boat EUGENE McDERMOTT II Client Party Number 2931
 Geophysical Company G.S.I. Oil Company OTTER EXPLORATION Radio Frequency 7840 KHZ
 Country AUSTRALIA Area/Prospect BASS STRAIT Stepback Shot Point Interval 25m

Mobile Station	FREQUENCY	INTERROGATOR	MONITOR	AMPLIFIER	ANTENNA SYSTEM
	441 MHz	038	004	012	Tx Omni Rx L.P.s

BASE STATIONS

Position	Operator	Frequency	Beacon	Control Box	Amplifier	Code
BLACK WARRI	J. DELLINGER	429 MHz	023	013	011	3
MT. TAYLOR	P. RATHBONE	429 MHz	029	026	009	5
MT. CANN	J. JOHNSTONE	429 MHz	076	020		1
CAPE PORTLAND	R. MOLLOY	429 MHz	059	058		2

OPERATING TIME

Time On	Time Off	Requested By	System Used For
0001	2400	C. ORR	NAVIGATION
O/T Requested By			Total System - Hours Operation for Client 24 hrs

LOST TIME

From	To	Hours Lost	Reason(s)
		NIL	

Brief Operations Log & Remarks 0001 HEADING FOR LINE 80 F1

0255-0621 SPI-SP1380 LINE 80 F1 S.S.W.

0813-1007 SPI-SP 795 LINE 80 F5 ESE

EXTENDED LINE CHANGE FOR GYRO REPAIRS

1321-1442 SPI-SP597 LINE 80 F6 S.W.

1642-1940 SPI-SP1302 LINE 80 F3 N.NE

2148-2331 SPI-SP 720 LINE 80 F2 E

2400 LINE CHANGE

Mobile Operators A. HOGGART 00-12

D. TAYLOR 12-24 Party Chief H. BRIDGES

Form N-1A

SEE INSTRUCTIONS ON REVERSE

094114

OFFSHORE NAVIGATION INC.
MAXIRAN DAILY OPERATIONS LOG

Project Number 1201 Date MAY 7th 1980 Boat EUGENE McDERMOTT II Client Party Number 2931
Geophysical Company G.S.I. Oil Company OTTER EXPLORATION Radio Frequency 7840 kHz
Country AUSTRALIA Area/Prospect BASS STRAIT Stepback Shot Point Interval 25m

Mobile Station	FREQUENCY	INTERROGATOR	MONITOR	AMPLIFIER	ANTENNA SYSTEM
	441 MHZ	038	004	012	Tx 0.5W Rx 1.5

BASE STATIONS						
Position	Operator	Frequency	Beacon	Control Box	Amplifier	Code
BLACKWARRI	J. DOLLINGER	429MHZ	023	013	011	3
MT. TAYLOR	P. RATHBONE	429MHZ	029	026	009	5
MT. GANNI	J. JOHNSTONE	429MHZ	076	020		1
CAPE PORTLAND	R. MOLLOY	429MHZ	059	058		2

OPERATING TIME			
Time On	Time Off	Requested By	System Used For
0001	2400	C. ORR	NAVIGATION
O/T Requested By			Total System - Hours Operation for Client 26 hrs

LOST TIME			
From	To	Hours Lost	Reason(s)
		NIL	

Brief Operations Log & Remarks 0001 LINE CHANGE
 0049-0315 SPI - SP1059 LINE 80 F4 S.S.W.
 0440-0639 SPI - SP 764 LINE 80 F7 E
 0746-1156 SPI - SP 1881 LINE 80 F8 S.W.
 1304-1637 SPI - SP 1565 LINE 80 F9 E
 1749-2102 SPI - SP 1385 LINE 80 F10 W.S.W.
 2216-2258 SPI - SP 307 LINE 80 F11 S.E. CIRCLE BLACKWARRI
 OUT NOIG. CAPE PORTLAND MT TAYLOR & MT GANNI STILL AVAILABLE
 2400 CIRCLING

Mobile Operators A. HOGGART 00-12
 D. TAYLOR 12-24 Party Chief H. BRIDGES

094115

OFFSHORE NAVIGATION INC.
MAXIRAN DAILY OPERATIONS LOG

Project Number 1201 Date MAY 8TH 1980 Boat EUGENE McDELMOTT II Client Party Number 2931
 Geophysical Company G.S.I. Oil Company OTTER EXPLORATION Radio Frequency 7840 KHZ
 Country AUSTRALIA Area/Prospect BASS STRAIT Stepback Shot Point Interval 25m

Mobile Station	FREQUENCY	INTERROGATOR	MONITOR	AMPLIFIER	ANTENNA SYSTEM
	441 MHz	038	004	012	Tx OMNI Rx L.P.S

BASE STATIONS						
Position	Operator	Frequency	Beacon	Control Box	Amplifier	Code
BLACKWARRI	J. DELLINGER	429 MHz	023	013	011	3
MT TAYLOR	P. RATHBONE	429 MHz	029	026	009	5
MT CANN	J. JOHNSTONE	429 MHz	076	020		2
CAPE PORTLAND	R. MOLLOY	429 MHz	059	058		1

OPERATING TIME			
Time On	Time Off	Requested By	System Used For
0001	2200	C. ORR	NAVIGATION
O/T Requested By	Total System - Hours Operation for Client		22 hrs

LOST TIME			
From	To	Hours Lost	Reason(s)
		NIL	

Brief Operations Log & Remarks 0001 ON CIRCLE
 0059 - 0339 SP101 - SP1318 LINE 80 F 11A SE. CIRCLE
 LINE OUT OF SPEC
 0606 - 0657 SP973 - SP1356 LINE 80 F 11B SE
 0818 - 1205 SP1 - SP1709 LINE 80 F 12 S.W.
 1518 - 1608 SP1 - SP377 LINE 80 F 13 SE C.M.S. PROSPECT
 CIRCLE
 1750 - 2020 SP321 - SP1501 LINE 80 F 13A SE
 2030 - 2200 PICK UP GUNS AND CABLE
 2200 PROSPECT COMPLETE, SYSTEM SECURED, HEADING
 FOR DEVONPORT
 2400 HEADING FOR DEVONPORT

Mobile Operators A. HOGGART 00-12 Party Chief H. BRIDGES
 D. TAYLOR 12-24