SAILFISH NO. 1 - SITE PREPARATION

for

N.S.W. OIL AND GAS COMPANY N.L.

by

LASER ELECTRONICS PTY. LTD

and

PLANET MANAGEMENT AND RESEARCH PTY. LTD

AUGUST, 1971

ABSTRACT

A programme of sea-bottom sampling and profiling was undertaken by Laser Electronics Pty. Ltd. between the 14th and 19th July, 1971 to ascertain the anchoring conditions at the proposed Sailfish No. 1 drilling site in Tasmanian Permit T/1P. The bottom samples consisted of coarse sand with shelly fragments from a uniform layer some 30 feet thick, dipping gently northeast.

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INTRODUCTION

Laser Electronics Pty. Ltd. conducted the sea-bottom sampling survey within petroleum exploration permit T/1P approximately 50 miles north-east of Flinders Island (see Plate 1). The survey consisted of nearly four miles of shallow sub-bottom sparker profiling near the Sailfish No. 1 proposed site, and bottom sampling from eleven locations within the anchoring area. A five mile fathometer profile was undertaken northeast of the Sailfish site over a previously recorded sub-sea channel.

The data were obtained a board the M.V. Sprightly during the period 14th - 19th July 1971. N.S.W. Oil and Gas Company N.L. had one geophysical and one geological technician on board throughout the survey. Amalgamated Decca Surveys Pty. Ltd. provided the navigational control for the survey.

OBJECTIVE OF SURVEY

The objective of the survey was to ascertain sub-sea anchoring conditions in the area of the Sailfish location.

DISCUSSION OF RESULTS

The results of the survey indicate good anchoring conditions at the Sailfish No. 1 drilling site. The sea bottom appears smooth and free from topographic irregularities near the site. The slope of the continental shelf in the area of Sailfish No. 1 is approximately 30 feet per mile (less than $\frac{1}{2}$ degree) to the northeast. The sparker profiles indicate the immediate bottom layer to be about 30 feet thick and overlying a minor unconfirmity. Dredge samples from the sea floor retrieved coarse sand and shelly fragments. The nature of the sediments beneath the first 30 feet of sediments is unknown.

Enclosure 1 is a location map of the work done. The Hi-fix survey system that was used had a positioning error of about 1,400 yards with respect to the Shoran system used previously for the Sailfish Marine Seismic Survey. This error is based on the results of fathometer profile comparisons shown in Enclosure 2.

CONCLUSIONS AND RECOMMENDATIONS

The main objective of the survey has been fulfilled. Suitable anchoring conditons have been ascertained in the area of interest about the Sailfish No. 1 proposed site. The sea-bottom is smooth, dips gently to the northeast and consists of at least 30 feet of coarse sand.

The Hi-fix positioning system incurred an error due to a miscount of lanes as the traverse was not closed, however, as the margin of error still puts the areas close enough to the Sailfish location it served its purpose.

Planet Management and Research is of the opinion that it is imperative that the same survey system and base stations be used for positioning the drilling rig as were used to locate the geophysical anomalies.

PLANET MANAGEMENT AND RESEARCH PTY LTD

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352005

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APPENDIX I

Laser Electronics Pty. Ltd.

27th July, 1971.

REPORT ON WELL SITE INVESTIGATION BASS STRAIT.

The vessel used for the investigation was the M.V. SPRIGHTLY, a 150 foot ocean going tug which is based in Geelong. The charter of the vessel commenced on Wednesday the 14th July, 1971 at 1800 hours.

The Decca party of two comprising Mr. Dave Garforth and Mr. Nobby Clarke had access to the vessel on Tuesday 13th July and spent both Tuesday 13th July and Wednesday 14th July, 1971 rigging their aerials and installing their equipment on the bridge of the vessel.

The Laser Electronics party of three comprising - Managing Director, Mr. Noel Walden, Operations Manager, Mr. Earl Blight and field technician Mr. Geof Todd arrived at the vessel on Wednesday morning, 14th July, and spent the day installing the profiling equipment and sampling equipment in the small winch house towards the rear of the vessel.

Planet representatives Mr. John Hainer and Mr. Marty Brulhart arrived at the vessel on the Wednesday 14th July, also, and transferred their equipment on board.

A diesel powered winch with 10,000 feet of cable arrived at the vessel at 1000 hours Wednesday morning 14th July, and a crane was hired to lift it onto the deck of the vessel. It was placed on the port side of the after-deck and was held in

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position by means of steel braces welded to the gunwhale of the vessel. The winch was hired from R.D. Agnew Pty. Ltd., and was accompanied by an operator Mr. S. Doneman. Two sheaves were fastened to the ships super structure to lead the cable over the side clear of the gunwhale.

At 1830 hours on Wednesday 14th July, the M.V. SPRIGHTLY, left Cunningham Pier at Geelong bound for Flinders Island.

The vessel travelled at full speed all night Wednesday 14th July and arrived off the No. 1 Decca Shore Station on the northern end of Flinders Island at 1530 hours on Thursday 15th July. Here the vessel slowed down and the Decca equipment was calibrated. At the same time the Laser Electronics sub-bottom profiling equipment was tested. After calibration the vessel set off at full speed again for the calibration area of the No. 2 Decca shore station on Flinders Island, arriving at 1930 hours. The Decca equipment was calibrated and the vessel set off again, this time for Well Site No.1.

During the night the Decca equipment lost signal from its No.1 shore station due to atmospheric interference. This made it necessary to return to No.1 Station during the night to re-calibrate.

On Friday 16th July, 1971, at 1100 hours the vessel arrived at the Well Site No.1 and a marker buoy with a large flag on it was dropped at the Well Site. The rope holding the buoy to the anchor parted. Checked the water depth at the Well Site (260ft) and recovered the buoy.

At 1145 hours a grab was dropped at the Well Site No. 1. It was recovered with only a small sample. At 1155 hours it was dropped again and recovered with no sample at all. At 1205 hours the first of several attempts at sampling were made with the drop corer but all were unsuccessful. At 1255 hours at

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Well Site No 1, a small dredger was lowered and at 1305 hours a sample of 2-3 lbs was recovered from the bottom. This was at Decca Position 835.40 and 1112.40.

At 1312 hours moved to location A2000(1) Decca position 827.09 and 1107.26 and dropped the dredger. It was recovered at 1320 hours (at Decca position 829.00 and 1108.00) with only a small sample. At 1325 hours the dredger was dropped again A2000(2) and recovered at 1340 hours with a $1\frac{1}{2}$ to 2 lbs sample. This was sample A2000(2).

At 1355 hours arrived at position A'2000(1) (Decca position 842.45 and 1117.29) and dropped the dredger. At 1405 hours a small sample was recovered. At 1410 hours the dredger was dropped again in almost the same position and at 1420 hours a 3-4lbs sample was recovered. This was sample A'2000(2).

At 1435 hours arrived at position B'2000(1) (Decca position 840.77 and 1119.15) and dropped the dredger. At 1445 hours the dredger was recovered but the bag containing the sample fell off and the sample was lost. At 1455 hours in almost the same location (Decca position 840.40 and 1119.54) the dredger was dropped again and recovered at 1505 hours with a 3.4lbs sample. This was sample B'2000(2).

At 1510 hours arrived at position B2000(1) (Decca position 829.20 and 1104.41) and dropped the dredger. It was recovered at 1520 hours with a 3-4lbs sample.

At 1530 hours arrived at position C2000(1) (Decca psoition 834.50 and 1106.34) and dropped the dredger. It was recovered at 1540 hours with a 3-4lbs sample.

At 1545 hours arrived at position C'2000(1) (Decca postion 835.42 and 1118.65) and dropped the dredger. It was recovered at 1555 hours with a sample of 3-4lbs.

At 1610 hours arrived at position D'2000(1) (Decca position 830.14 and 1112.72) and dropped the dredger. It was recovered at 1620 hours with a 2-3 lbs sample.

At 1630 hours arrived at position D2000(1) (Decca position 839.87 and 1110.70) and dropped the dredger. It was recovered at 1640 hours with no sample. At 1650 hours it was dropped at almost the same location (Deeca position 839.96 and 1110.80) and recovered at 1705 hours with a 3-4 lbs sample. This was sample D2000(2).

The sampling equipment was then stowed away and the seismic equipment rigged astern and then test run.

At 1806 hours the profiling commenced on line D D'(1) bearing 295° at Decca position 839.84 and 1111.41. At 1814 hours passed over Well Site No.1 - Decca position 835.01 and 1112.03 and at 1824 hours line 'D' was concluded at Decca position 830.03 and 1113.04. This line was run on the 80 fathom scale of the recorder and after discussion with Planet representatives it was decided to use the 200 fathom scale on the recorder and re run the line later on.

At 1905 hours commenced profiling on Line AA' bearing 70° at Decca position 827.10 and 1108.07 at 1916 hours passed over Well Site No.1 - Decca position 834.87 and 1112.37. At 1927 hours line 'A' was concluded at Decca position 842.80 and 1116.91. This line was recorded on the recorder 200 fathom scale.

At 1958 hours commenced profiling on line B'B bearing 205° at Decca position 840.89 and 1119.83. At 2007 hours crossed Well Site No.1 at Decca position 834.89 and 1111.14 and concluded line 'B' at 2018 hours at Decca position 829.01 and 1104.29. This line was recorded

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on 200 fathom scale.

At 2100 hours commenced profiling on line CC' bearing 341° at Decca position 834.46 and 1106.02. At 2109 hrs crossed Well Site No.1 at Decca position 835.39 and 1112.97 and concluded line 'C' at 2117 hours at Decca position 836.09 and 1118.25. This line was recorded on 200 fathom scale.

At 2205 hours commenced profiling Line D'D (2) bearing 115° at Decca position 830.05 and 1113.35. At 2217 hours crossed Well Site No.1 At decca position 834.96 and 1112.93 and at 2231 hours concluded line 'D' at Decca position 839.97 and 1112.25. This re-run of line 4 was recorded on the 200 fathom scale.

At 2315 hours commenced profiling on fathometer line bearing 344° at Decca position 891.11 and 1203.08. The position marked on the recording near the middle of the line is at Decca position 906.75 and 1251.80. Line 4 was concluded at 0022 hours Saturday 17th July, 1971 at Decca position 918.22 and 1284.40. This line was recorded on the 200 fathom scale.

At 0440 hours on Saturday 17th July 1971, commenced profiling on line 5 bearing 314°. Profiling results on this line were affected considerably by the rough seas and it was impossible to produce a worthwhile record below 600 fathoms.

At 0830 hours finished profiling on line 5 and dropped the dredger at Decca position 1116.94 and 1209.87. Approximately 5,500 ft of cable was let out and the dredger was recovered at 1000 hours with no sample.

At 1015 hours the drop corer was dropped and approximately 7,000 ft of cable was let out. At 1100 hours whilst recovering the drop corer, the cable broke with 800 ft to go.

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The drop corer was lost and no sample was recovered. It was decided to abandon the attempt to sample on the continental shelf as the rough water and the currents made it almost impossible to get equipment onto the bottom. The Current and the drift of the vessel both being away from and down the shelf.

The vessel then moved off to Well Site No.2 arriving at Decca position 820.13 and 1015.63 at 1245 hours. The dredger was dropped and recovered at 1300 hours with no sample. At 1305 hours the dredger was dropped again and recovered at 1320 hours with no sample. Once again because of the rough seas it was extremely difficult to keep the dredger on the bottom.

At this time there was strong wind warning current for force 9 winds. The vessel then steamed off to re-calibrate at No.2 Decca Shore Station then No.1 Decca Shore Station on Flinders Island.

During the day the Planet representative Mr.John Hayner obtained from the Skipper of the vessel:-

1 only Coil 3½" rope
2 only 56lb lead blocks
2 only 4" eye bolts
2 only Lengths chain
3 only Screw Shackles
3 only Towing monkey faces.

These items were used to anchor a buoy at Sailfish No.1 Well Site. The ship proceeded from No.1 Station on Flinders Island after calibrating to Well Site No.1 (Decca position 834.70 and 1111.79). A buoy anchored with the above items was dropped at 0040 hours on Sunday 18th July, 1971.

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At 0135 hours on Sunday 18th July, 1971, the vessel reached Well Site No. 3 (Decca position 838.13 and 1234.55) but it was too rough to sample. It was decided to return to Geelong. The vessel reached the entrance to Port Phillip Bay during Sunday night but was unable to get a Pilot until 0700 hours on Monday 19th July, 1971. The ship finally berthed at Cunningham Pier at 1000 hours on Monday. The remainder of Monday was spent in unloading the equipment and restoring the vessel.

Hire expired at 1830 hours Monday 19th July, 1971.

LASER ELECTRONICS PTY. LTD.

APPENDIX II

NAVIGATIONAL CONTROL

The Hi-fix system, installation of chain stations and marine receivers are described on the data sheets, Pp 11-3 to 11-6. Base (slave) station control was surveyed by Decca from national mapping 1st order control on Flinders Island. Positions of slaves 1 and 2 are shown on Plates 2 and 3. The Hi-fix system was used in the two-range mode in conjunction with the Trisponder system, a line of sight system used to calibrate the Hi-fix system whenever necessary. The Trisponder system is described on Pp 11-7 and 11-8. The Hi-fix frequency used was 1906.05 KHz.

The Hi-fix system measures or counts em wavelengths traversed between base station and boat, by means of phase comparisons. In order to reproduce the locations of the sparker survey lines, grab samples etc., it is necessary to have a continuous record of the Hi-fix lane or $\frac{1}{2}$ wavelength count between the time of system calibration and the time of recording the sparker data. The saw-tooth (lane count) recorder failed mechanically early in the survey, and no continuous record exists. There is no back-up to this system; when it fails it becomes necessary for the operator to visually monitor the lane count integrator continuously for a period, in this case of up to 14 hours. Under these circumstances the failure of the saw-tooth recorder was amiss, for there is no way to prove that an error in lane count did not occur.

Previous seismic survey control in the area used the Shoran system, and is described in the B.M.R. subsidised report "Sailfish Marine Seismic Survey" April 1971. This system measure time elapsed of em waves from boat to base stations. Subsequent checks on the use of the Shoran system in this area indicate that it is essentially accurate. It is possible to reproduce the locations of the seismic lines from basic data, and therefore to assess the degree of accuracy of the final line locations with respect to base stations, permit boundaries, map origins etc. These checks revealed that the assumed longitude of base station Mt. Cann was about 500 feet displaced eastward relative to the other base stations, Walkers Lookout and Deal Island, which resulted in a slightly distorted plot on portions of Sailfish Lines 35, 36 and 37 only. However, the checks also revealed that the remaining lines are recorded accurately (within the limits of the equipment) with respect to the island base stations, the permit boundary, and with respect to previous (Shoran) work in the area. Three previous tri-sections from the boat to three shore stations have all shown errors less than 20 yeards associated with Deal Island and Walkers Lookout base stations. Repeatability of locations within the system has been demonstrated by comparison of water bottom profiles over sea-bottom

features, and by comparison of subsurface features on the seismic sections. There is no reason to doubt the essential accuracy of the Shoran system as used during the Sailfish Marine Seismic Survey and previous surveys in the area. Pages II-9 to II-14 contain relevant back-up material to the above remarks concerning the Shoran system. Pages 9, 10 & 11 give the national mapping geographics of the base stations. Page 12 gives the geographics used for the Shoran base map, and page 13 gives the obsolete geographics of the base stations. Page 14 shows the results of three trisections associated with Deal Island, Walkers Lookout and one other base station.

D. D. TAYLOR
Acting Chief Geophysicist
Planet Management & Research Pty. Ltd.

THE HI-FIX SYSTEM - INSTALLATION OF CHAIN STATIONS

352014

While Survey Sales Sheets Nos. 1a and 1b say what Hi-Fix is and does, and how it does it, the object here is to indicate the accuracy and operational coverage which can be expected of the system. Both these requirements influence the choice of position for the chain stations.

SELECTION OF STATION SITES

The Hi-Fix System is not critical as regards the selection of suitable sites for the chain stations, although certain precautions should be observed if the best results are to be obtained. In general, similar considerations apply to Hi-Fix as to the operation of communications equipment working on ground wave propagation at frequencies in the region of 2MHz, but owing to its design features Hi-Fix operates successfully in areas of noise which preclude the use of communications transmissions in this frequency band.

Ideally the stations should be sited on level ground, preferably on moist soil rather than on rock or sand, and should be as close to the water's edge as possible. Clear avoidance of tall natural features such as large rock faces and trees is advisable, while constructions like pylons, buildings, cranes, overhead traction wires, high tension cables and telephone lines should be given a wide berth.

POSITION-FIXING ACCURACY—REPEATABILITY

Sites for stations (in both hyperbolic and two-range chains) are chosen to give a good angle of cut of the position lines (as near as possible to 90 degrees) in the operations area. It is useful to note that in hyperbolic chains accuracy can be improved by lengthening the base-lines, since this narrows the lane width in front of the chain.

For theoretical purposes it is convenient to consider Hi-Fix errors in two categories : first, those inherent in the nature of the system, known as 'random' errors ; and secondly terrain or 'fixed' errors. Random errors arise from fluctuations in the propagation medium, small variations in the equipment, the human reading of lane counters and so on. They apply to each pattern position line, and can conveniently be lumped into a figure known as the 'Standard Deviation' of that position line. In Hi-Fix chains with stations situated on the shore and operating from short baselines the standard deviation is normally taken as 0.01 of a lane, but when the baselines are longer and operational areas greater, it may be advisable to use a larger figure. When the angle of cut of position lines, the lane width, the standard deviation and a probability factor are mathematically expressed together, a family of accuracy 'contours' for the chain is obtained. The figure noted on each accuracy contour may be regarded as a figure of merit of the system, in other words a vessel returning to a desired position on a contour would expect a repeat of the former reading within the limiting figure given on the contour ; this is known as the 'repeatability' at that point.

POSITION-FIXING ACCURACY—ABSOLUTE

Radio transmissions travel in free space with the velocity of light. For chains with signal paths predominantly over the sea the propagation speed is slightly less than in free space, but the salinity of the surface water and the amount of land intruding into the signal paths influence the groundwave speed. The Decca Navigator Company has great experience in the selection of the correct propagation velocity and this experience is put to good use in the calibration of Hi-Fix chains.

When the shore stations have been surveyed into the geodetic net, the propagation speed has been established and the chain has been calibrated, the Hi-Fix readings can be converted into geographical or grid co-ordinates as required. However, certain residual, or 'fixed', errors will remain. Should the project so demand, a table of these errors can be compiled, so that the absolute positioning accuracy of which the chain is capable can be achieved.

OPERATIONAL COVERAGE

A single Hi-Fix chain with long baselines will accurately fix positions in sea areas encompassing thousands of square miles. In regions of low atmospheric disturbance, for example temperate zones, the operating range is considerably increased giving even wider coverage.

Survey Division, The Decca Navigator Company Limited, 9 Albert Embankment, London S.E.1

Publication Reference : J44

THE HI-FIX SYSTEM FOR POSITION FIXING

352015

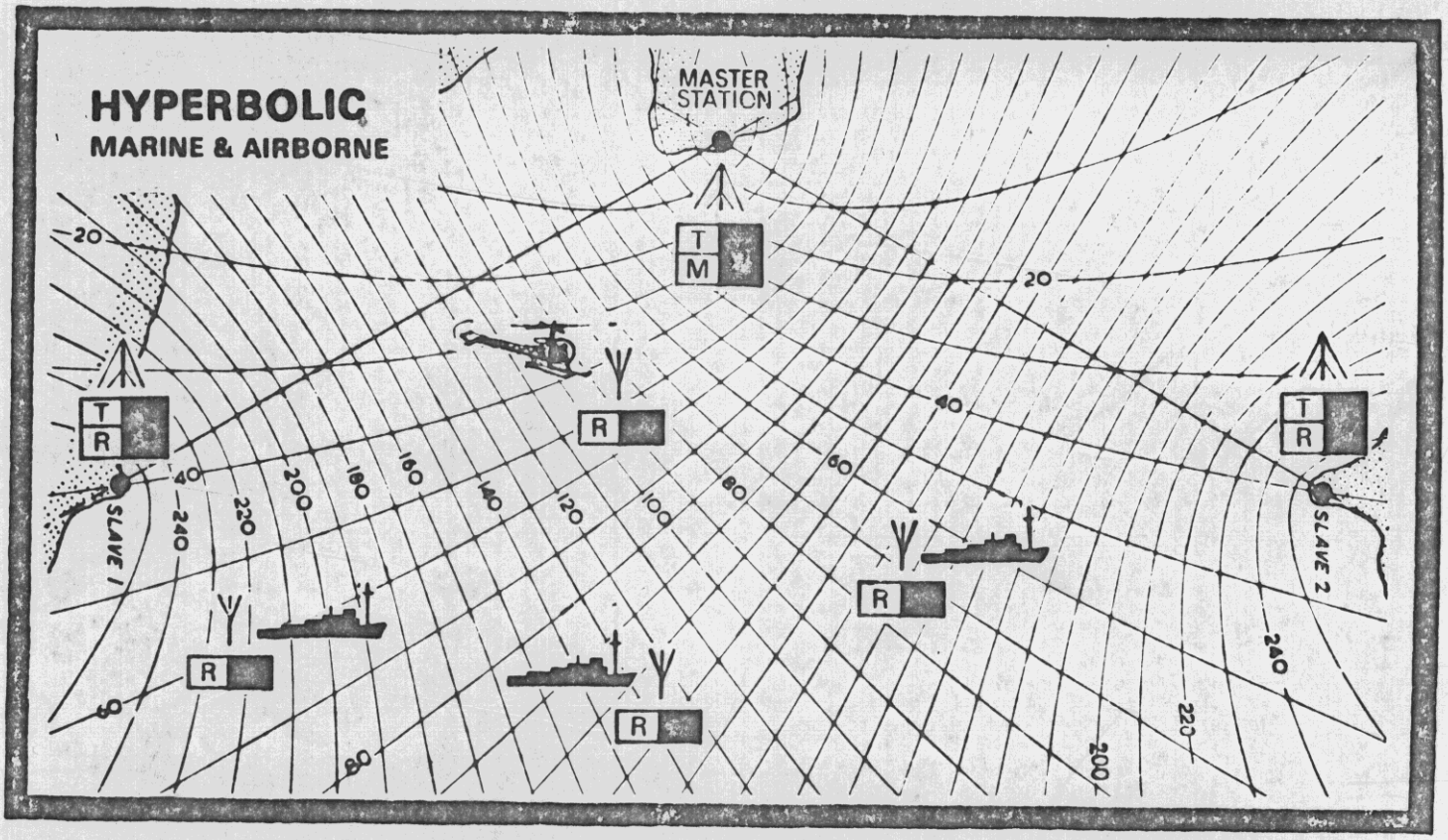
HI-FIX is an accurate, portable electronic position-fixing system designed for hydrographic, geophysical, constructional and other surveys which require flexibility and simplicity of operation.
The three transmitting stations shown overleaf may be installed as either a hyperbolic or a two-range chain (T, R, M for Transmitter, Receiver and Master Oscillator respectively). The former is more flexible but the latter gives more precision at a distance owing to the nature of the lattice.
The transmitters emit CW signals in sequence, all sharing one radio frequency. The signals from the Master and each Slave in turn are phase-compared in the Receiver, giving two pattern co-ordinates which are read off two counters and provide the 'fix'. For a continuous run of 'fixes' a page copy or perforated tape is made available; when other data such as rectilinear co-ordinates, depth soundings, and time are needed, suitable data logging equipment is added.

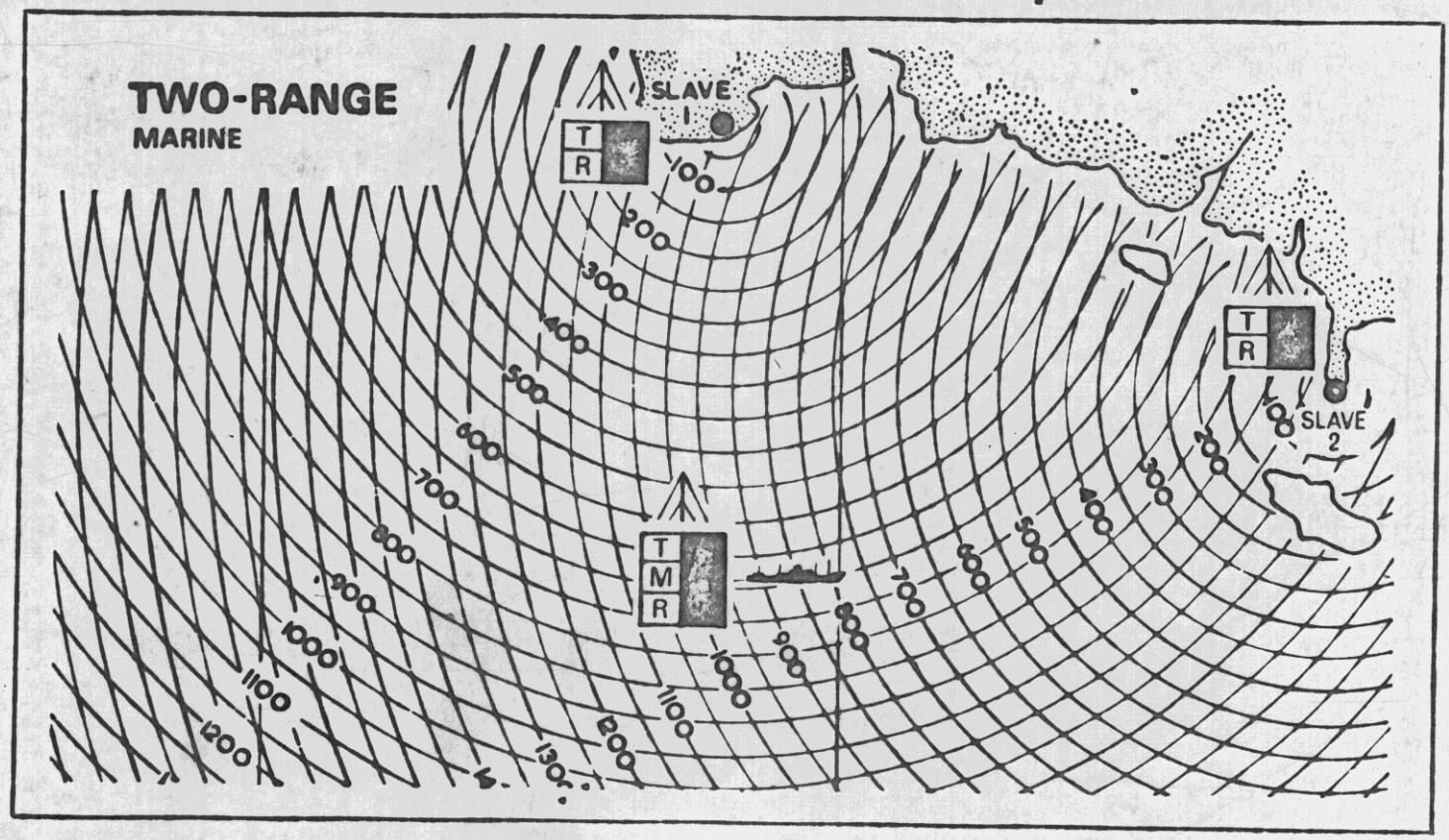
SYSTEM CHARACTERISTICS

(a) *Operating (pattern) frequency:*	Nominally in the band 1700-2000kHz
(b) *Trigger frequency:*	60Hz below operating frequency
(c) *Type of Transmission:*	Interrupted Continuous Wave Master : F.9 Slaves : A.1
(d) *Switching rate:*	60±1 per minute
(e) *Radiated power:*	10W or 40W from 31ft (9·5m) aerial of 300pf capacity
(f) *Maximum Operating ranges over sea:*	50-100 miles (90-180km) for 10W radiated 100-200 miles (180-360km) for 40W radiated Possible reduction of 50% in the Tropics
(g) *Receiver Bandwidth:*	100Hz between 6dB points
(h) *Maximum Receiver Speed:*	20 knots (37km/hr), 60 knots 111km/hr) or 120 knots (222km/hr) according to the type of receiver in use
(i) *Power Supply:*	All units are fed with a nominal 24V d.c. supply, positive earth (type of earth does not affect the airborne receiver). The marine receiver type 9217/III requires a nominal 12V d.c. centre tap
(j) *Positioning Accuracy of the System:*	Better than 2 metres under optimum conditions

Decca Survey Limited, Kings Avenue House, Kings Avenue, New Malden, Surrey
Telephone : 01-942 9661 Cables : DECSURVEY NEW MALDEN Telex : 262321

Publication Reference : J44





THE HI-FIX SYSTEM

For Position Fixing

5 cm

HI-FIX MARINE RECEIVER TYPE 9217/III

352017

FUNCTIONS

(a) As a user's Shipborne receiver which accepts pattern information from the chain stations and displays it on lane counters, so fixing the ship's position in the lattice.

(b) As a slave control receiver, which locks the phase and frequency of the slave transmission to that of the master signal.

BLOWER & SYNCHRO SUPPLY UNIT TYPE 9369

This unit is designed to be used with the receiver.

(a) To provide the receiver with forced air cooling in hot ambients.

(b) To furnish a 400Hz supply to the receiver's synchro resolvers and where necessary to detect the output of these resolvers, for the purpose of using further displays.

(c) To enable up to three additional displays to be connected, in both the lane integration and lane identification modes.

PHYSICAL CHARACTERISTICS

The receiver is housed in a light alloy transit case, which includes shock mounts. Together with its associated blower unit the receiver may be stacked and bolted to the other units having the same type of transit case, to form an equipment bay.

TECHNICAL DATA

(a) *Operating (pattern) frequency:*
Nominally in the band 1700-2000kHz

(b) *Trigger frequency:*
Operating frequency less 60Hz

(c) *The unit is able to receive any one of the four spot frequencies in any 25kHz band within the above frequency limits.*

(d) *Station sampling rate:*
±60 per minute

(e) *I.F. Bandwidth:*
100Hz (approx.) between 6dB points

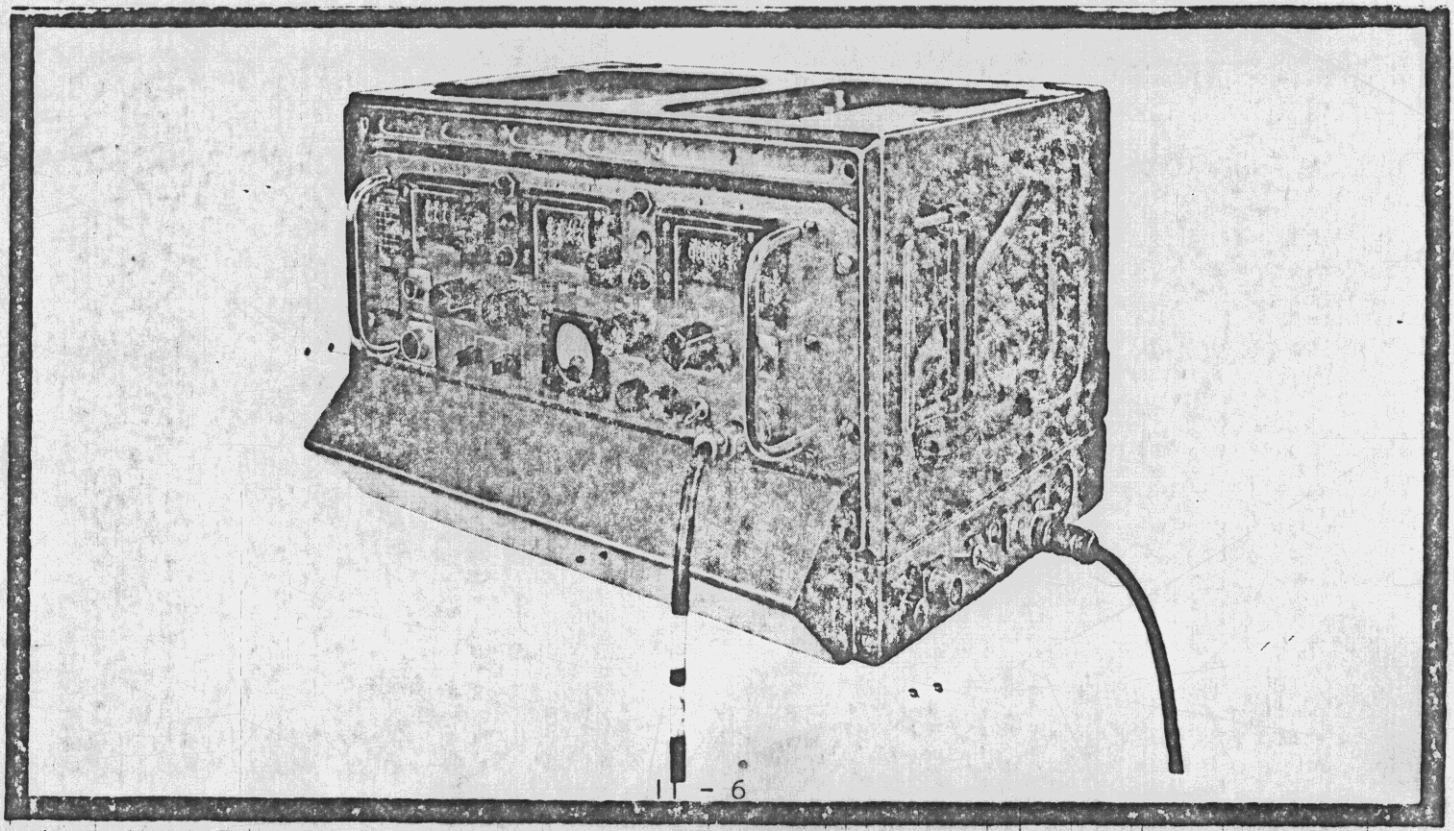
(f) *R.F. Sensitivity measured at A.E. IN plug from source of 100 ohms:*
2μV is required to lock-in the receiver

(g) *R.F. Drive voltage measured at the R.F. OUT socket:*
Between 0.5 and 2.0V into a 100 ohms load

(h) *Maximum speed at lane width 75m:*
20 knots (37km/hr)
(60 knots (111km/hr) with special order)

(i) *Power consumption:*
Receiver ... 3A (max.)
Blowers ... 50mA
Synchro Supply ... 2A (max.)
} at 24V d.c.

(j) *Power supply:*
From secondary battery at 22 to 28V, with centre tap at 11-14V, and positive earth



DECCA TRISPONDER

Model 202A

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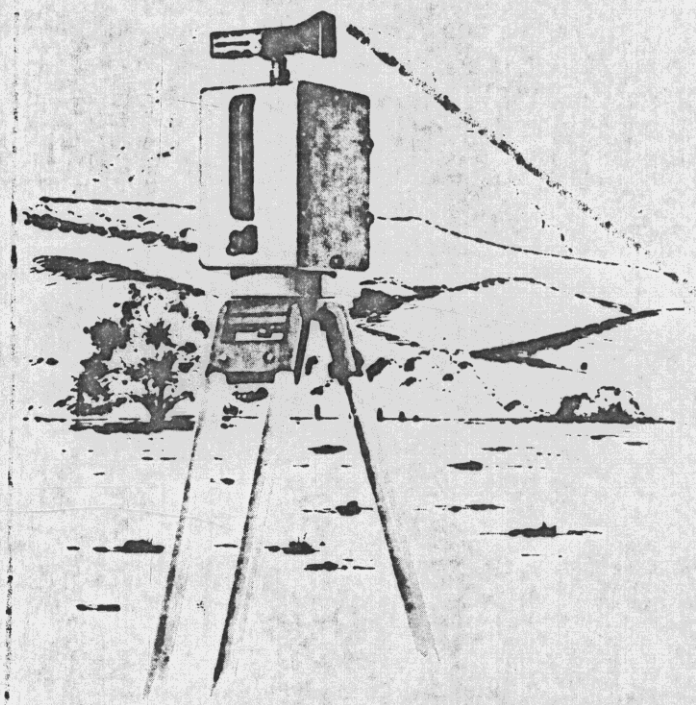
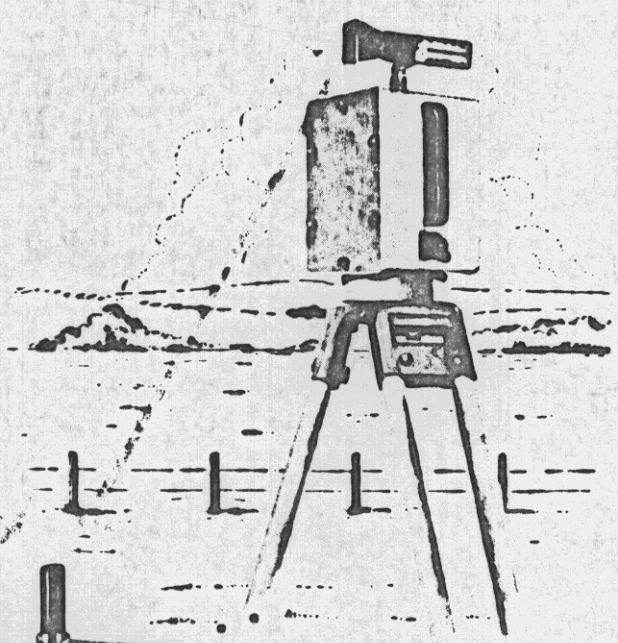
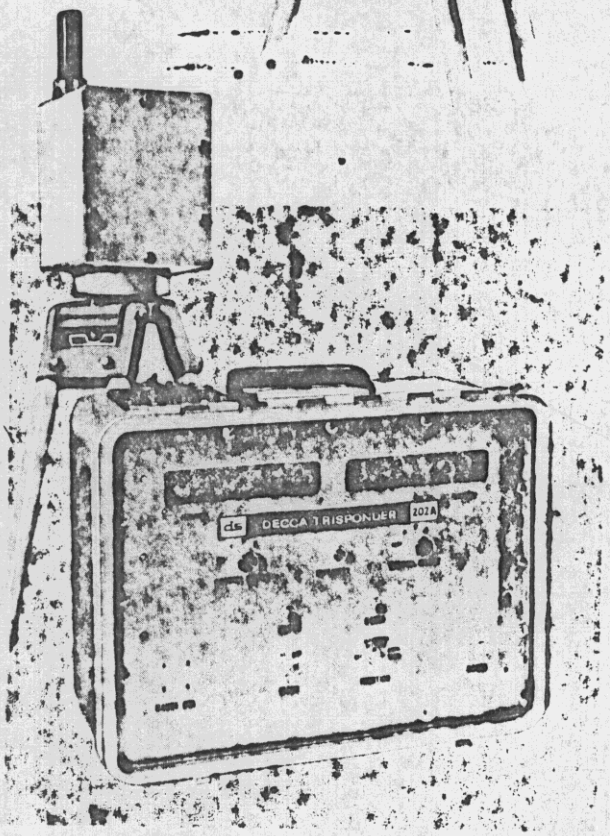
For accurate position-fixing of aircraft and sea-going vessels engaged in hydrography, environmental and geophysical surveys, and allied projects.







The Decca Trisponder Survey System 202A is a portable, short range, microwave position fixing aid.
Using pulsed transmissions and digital measuring techniques, the system provides a continuous, non-ambiguous indication of the boat's range from two fixed points on which the small remote station transponders have been installed. Low power consumption and high reliability enables servicing to be restricted to infrequent visits to the shore stations.
In operation, the pulse of energy is radiated from the microwave transmitter aboard the vessel which is coded to trigger any two of the four possible remote stations which, after a fixed delay, re-transmit an answering pulse. The time between each transmitted and received pulse is then converted into a true distance measurement between the two stations.

Equipment

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The mobile master station comprises:
(1) The DMU (Distance Measuring Unit) which contains all the controls and displays for the operation, all the electronics for interrogation and distance measurements,
(2) The transponder with omni-directional antenna, and
(3) The 24V battery supply.

The fixed slave stations each comprise:
(1) The Transponder with directional antenna.
(2) The 24V battery supply.

Technical Data

DISTANCE MEASURING UNIT

Range	Line of sight to 15 miles
Accuracy	±3 metres
Resolution	10 metres in × 10 Mode (Coarse) 1 metre in × 1 Mode (Fine)
Display	Two 5-digit ranges displayed simultaneously in kilometres
Calibration	By simple adjustment of preset controls
Outputs	BCD output 1–2–4–8 code + 5V logic level
Power	22 to 32V dc, 50 watts operating
Size	16 × 12 × 8½ inches
Weight	25 lb (less batteries)
Housing	Rugged, weatherproof aluminium transit case

TRANSPONDERS

RF Power	Peak transmitter power 400 watts minimum
Frequency	X-band 9200 to 9500MHz
Environmental	Operating temperature range —35°F to 165°F
Power	22 to 32V dc, 30 watts operating
Size	4½ × 6 × 7 inches
Weight	8 lb (less batteries)
Housing	Rugged, weatherproof drawn aluminium case

Features

- ☐ Very lightweight and portable, with minimal power consumption; capable of rapid deployment.
- ☐ Solid state throughout with transponders built to military specifications to meet all environmental conditions.
- ☐ Up to 7 days unattended operation with two 12V batteries.
- ☐ Built-in capability to select any two of four slave transponders.
- ☐ In × 1 mode provides readout to 1 metre. In × 10 mode provides readout to 10 metres.
- ☐ In × 1 mode the DMU determines the average of 10 independent range measurements and updates the display each second.
- ☐ Simple calibration adjustment.
- ☐ X-band frequencies eliminates propagation problems.
- ☐ Highly effective for helicopter operations.
- ☐ Standard BCD logic output.

A DECCA SURVEY PRODUCT

...ON SUMMARY

352020 Serial No

Station Number and Name: NM/H/1 WALKERS LOOKOUT Order: FIRST

Map Name: FLINDERS ISLAND Map Number: SK 55-2 Scale 1:250,000

DATUM: Australian Geodetic Datum. 1966

RECTANGULAR COORDINATES: Australian Map Grid: In Metres

GRID BEARING = ADJ AZIMUTH + CONVERGENCE. HEIGHTS: In Metres above Mean Sea Level.

WALKERS LOOKOUT NM H 1 SECTION 97 130 SERIAL 24

SOUTH LATITUDE	EAST LONGITUDE	ZONE	EASTING	NORTHING	CONVERGENCE	HEIGHT
40 3 27.5309	148 4 46.4005	55	592074.295	5565270.745	+0 41 41.30	413.6

TO	SERIAL	ADJ AZIMUTH	ADJ LENGTH
BROUGHAM SUGARLOAF	23	287 9 45.61	7610.691
KILLIECRANKIE	20	325 18 50.34	33025.533
SOUTH PATRIARCH	32	60 28 52.42	12097.317
DEAL ISLAND	14	313 34 3.51	90266.518

...l Connections & Reference Marks.

...COUNCIL OF AUSTRALIA

352021

...N SUMMARY

Station Number and Name: DEAL ISLAND Order: Second

Map Name: DEAL ISLAND Map Number: SJ 55-15 Scale 1: 250,000

DATUM: Australian Geodetic Datum. 1966

RECTANGULAR COORDINATES: Australian Map Grid: In Metres

GRID BEARING = ADJ AZIMUTH + CONVERGENCE. HEIGHTS: In Metres above Mean Sea Level.

DEAL ISLAND SECTION 97 130 SERIAL 14

SOUTH LATITUDE	EAST LONGITUDE	ZONE	EASTING	NORTHING	CONVERGENCE	HEIGHT
39 29 41,3623	147 19 9,2260	55	527449,196	5628246,215	+0 12 10,92	209,6

TO	SERIAL	ADJ AZIMUTH	ADJ LENGTH
KILLIECRANKIE	20	127 26 3,23	58321,345
BROUGHAM SUGARLOAF	23	136 22 36,15	83518,430
HUMMOCK	22	151 53 22,84	75667,009
LA TROBE	9	303 40 50,72	98065,005
HUNTER	7	314 25 2,29	105873,349
FATIGUE	4	319 6 45,44	134844,082
WALKERS LOOKOUT NM HI	24	134 3 14,77	90266,519

SECTION FLINDERS SERIAL 1

FOURTH ORDER

PYRAMID	16	190 14 5,67	36789,583
CURTIS	13	271 36 27,55	58314,926
DEVILS TOWER	12	284 26 45,82	51312,391
RODONDO	11	289 34 26,54	85526,455
CLIFFY ISLAND	8	318 24 26,50	80281,970
NORTH SISTER	19	108 21 18,54	59503,669
SOUTH SISTER	18	113 44 35,45	56848,356
WRIGHT ROCK	15	120 29 6,06	21742,352
DEAL IS LIG THOUSE	3	125 5 33,05	207,459

...al Connections & Reference Marks.

352022

Station Number and Name: 00050 CANN Order: 1ST.

Map Name: MURRUNGOWAR Map Number: 8622 Scale 1: 100000

DATUM: Australian National Datum 1966: a = 6,378,160 metres; 1/f = 298.25; Johnston Origin.

RECTANGULAR CO-ORDINATES: Universal Transverse Mercator System; Australian National Spheroid; In Metres.

GRID BEARING=ADJ. AZIMUTH + CONVERGENCE. HEIGHTS: In Metres above Mean Sea Level.

CANN SECTION 23 27 B SERIAL 21

SOUTH LATITUDE	EAST LONGITUDE	ZONE	EASTING	NORTHING	CONVERGENCE	HEIGHT
37 38 54.1332	148 58 39.7215	55	674472.129	5831343.701	+1 12 29.92	530.4

TO	SERIAL	ADJ AZIMUTH	ADJ LENGTH
RAYMOND	19	257 43 37.27	34191.240
MURRUNGOWAR	20	292 1 57.28	25055.245
NOORINBEE	22	33 40 53.28	20624.896
MARAMINGO	27	62 37 10.17	56668.231
RAYMOND	19	257 43 37.27	34191.240
EVERARD	26	105 50 14.20	28294.708

CANN SECTION VIC ST20 SERIAL 11

SOUTH LATITUDE	EAST LONGITUDE	ZONE	EASTING	NORTHING	CONVERGENCE	HEIGHT
37 38 54.1332	148 58 39.7215	55	674472.129	5831343.700	+1 12 29.92	530.4

TO	SERIAL	ADJ AZIMUTH	ADJ LENGTH
NOORINBEE	9	33 40 53.28	20624.897
MARAMINGO	15	62 37 10.16	56668.231
GENOA PEAK	14	77 25 22.12	58691.041
EVERARD	10	105 50 14.18	28294.707
MURRUNGOWAR	12	292 1 57.28	25055.246
ELLERY	2	327 39 9.39	33146.612
KAYE	7	40 22 58.18	36599.702

CANN SECTION VIC MR2 SERIAL 2

SOUTH LATITUDE	EAST LONGITUDE	ZONE	EASTING	NORTHING	CONVERGENCE	HEIGHT
37 38 54.1332	148 58 39.7215	55	674472.129	5831343.700	+1 12 29.92	530.4

TO	SERIAL	ADJ AZIMUTH	ADJ LENGTH
CAPE CONRAN	3	230 55 10.71	28132.069

352023

ENGINEERING COMPUTER SERVICES PTY. LTD.

48 Chandos Street

JOB REF. 713/NMM
PROG. RRN000

ENGINEERING COMPUTER SERVICES F

STATION IDENTIFICATION

COMPLETE STATION FILE LISTIN(
COORDINATES

2 WALKERS LKOUT	40 3 27.5308	148 4 46.400E	594059.3E	26:
3 DEAL ISLAND	39 29 41.3655	147 19 9.230E	524111.7E	33:
5 MOUNT CANN	37 38 55.3455	148 58 45.800E	687591.9E	55:

352024

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

DIVISION OF NATIONAL MAPPING

DERWENT HOUSE, 22-34 UNIVERSITY AVENUE, CANBERRA CITY, A.C.T.

Postal Address: Box 667 P.O. Canberra City 2601

Telephone: 486644 *Telegrams:* Natmap

In reply please quote: NM 71/286

12 August 1971.

Area Supervisor,
Offshore Navigation, Inc.,
P.O. Box 21,
RAMSGATE, N.S.W. 2217

Dear Sir,

In reply to your letter of 9 August 1971, I enclose Station Summaries showing geographical coordinates on the Australian Geodetic Datum, Australian Map Grid coordinates and unadjusted heights for the following stations:

NM/H/1 Walkers Lookout	Waterhouse
Deal Island	Cann
Deal Island Lighthouse	William
Nowa Nowa	

Geographical coordinates on the Clarke 1858 spheroid, Sydney datum are as follows:

	Latitude	Longitude
NM/H/1 Walkers Lookout	40° 03' 28".838	148° 04' 52".436
Deal Island	39° 29' 42".622	147° 19' 15".462
Deal Island Lighthouse	39° 29' 46".490	147° 19' 22".565
Nowa Nowa	37° 41' 36".913	148° 05' 30".010
Waterhouse	40° 52' 04".930	147° 37' 48.325

Geographical coordinates on the Clark 1858 spheroid, Sydney datum for Mt Cann and Mt William are not available in this Division and they may be obtained from the Surveyors General, Melbourne and Hobart respectively.

Differences in geographical coordinates are due to different origins, spheroids and adjustments of the surveys.

Yours faithfully,

(B. P. LAMBERT)
Director of National Mapping.

THREE - WAY FIXES USING SHORAN

	TEST 1	TEST 2	TEST 3
Walkers Lookout	130.110 miles	40.672	70.495
Deal Is.	114.286	51.897	93.040
Nowa	49.644		
Waterhouse		45.247	
William			50.803
Error in Metres	16	7	0
Date of Test	30 Dec. 68	14 Oct. 69	16 Jan. 69

APPENDIX III

HI-FIX AND SHORAN COMPATIBILITY TEST

The test consisted of a comparison of two fathometer profiles. Line 4 of the (Hi-fix) Sailfish No. 1 Site Preparation Survey was programmed to coincide with Line 38 of the (Shoran) Sailfish Marine Seismic Survey recorded previously. These lines traverse a major sea-bottom channel with irregular relief from 300 feet to 1,000 feet depth. The two profiles recorded were dissimilar.

A comparison of sparker Line 4 and previous fathometer lines from the Sailfish Marine Seismic Survey is shown on Enclosure 3. This indicates a displacement of 1315 yards to the northwest at the south end of Line 4, and 1550 yards northwest at the north end. This displacement can be accounted for by a mis-count of 3 lanes on pattern one and a mis-count of 9 lanes on pattern two of the Hi-fix survey.

Previous work in the area using Shoran positioning indicates reliable repeatability of positions. This can be shown by 14 lines traversed twice with a five day interval between first and second traverses. In all cases fathometer records are compatible. A further check of Shoran positioning was done by trisection between shot point 130 on Sailfish Line 17 and all base stations. The mean error was 36 metres, due mainly to a small error in the co-ordinates of Mt. Cann, which affected portions of Lines 35, 36 and 37 only. All work done during the Sailfish Marine Seismic Survey ties to previous surveys in the area. The mapped position of the No. 1 test location and Decca slave positions agree with the given co-ordinates.

It is assumed that an incorrect lane count was kept during the course of the survey. An attempt was made to reconstruct from the field data the exact movements of the ship during the survey. This proved impossible for the following reasons:

1) No continuous saw-tooth records or lattice charts from the time of calibration until the time of recalibration were kept.

2) Any error in lane count during the survey due to interruption of signals could only be noted by visual means during the times when saw-tooth record and lattice charts were not in operation. The total time when no records were kept amounts to 14 hours out of a total time of 41 hours between calibrations. A continuous watch would require two operators on duty 24 hours per day.

3) Recalibration at the end of the survey was not detailed in the observers logs. Hi-fix readings are not noted in the logs. No verification of a 5 lane error adjustment for both patterns exists, although it was made in the logs.

A total adjustment of 13 lanes is recorded in the observers logs.
A further 12 lanes could have been missed during the survey.

It is likely that profiles and samples at No. 1 wellsite are displaced by the same amount as line 4. Tidal effects are of the order of 6 feet.

Attached is an abbreviated daily log showing calibration times and periods during which a visual check would be needed to ensure correct lane count.

July 15th

15:45 Calibration of pattern one completed.

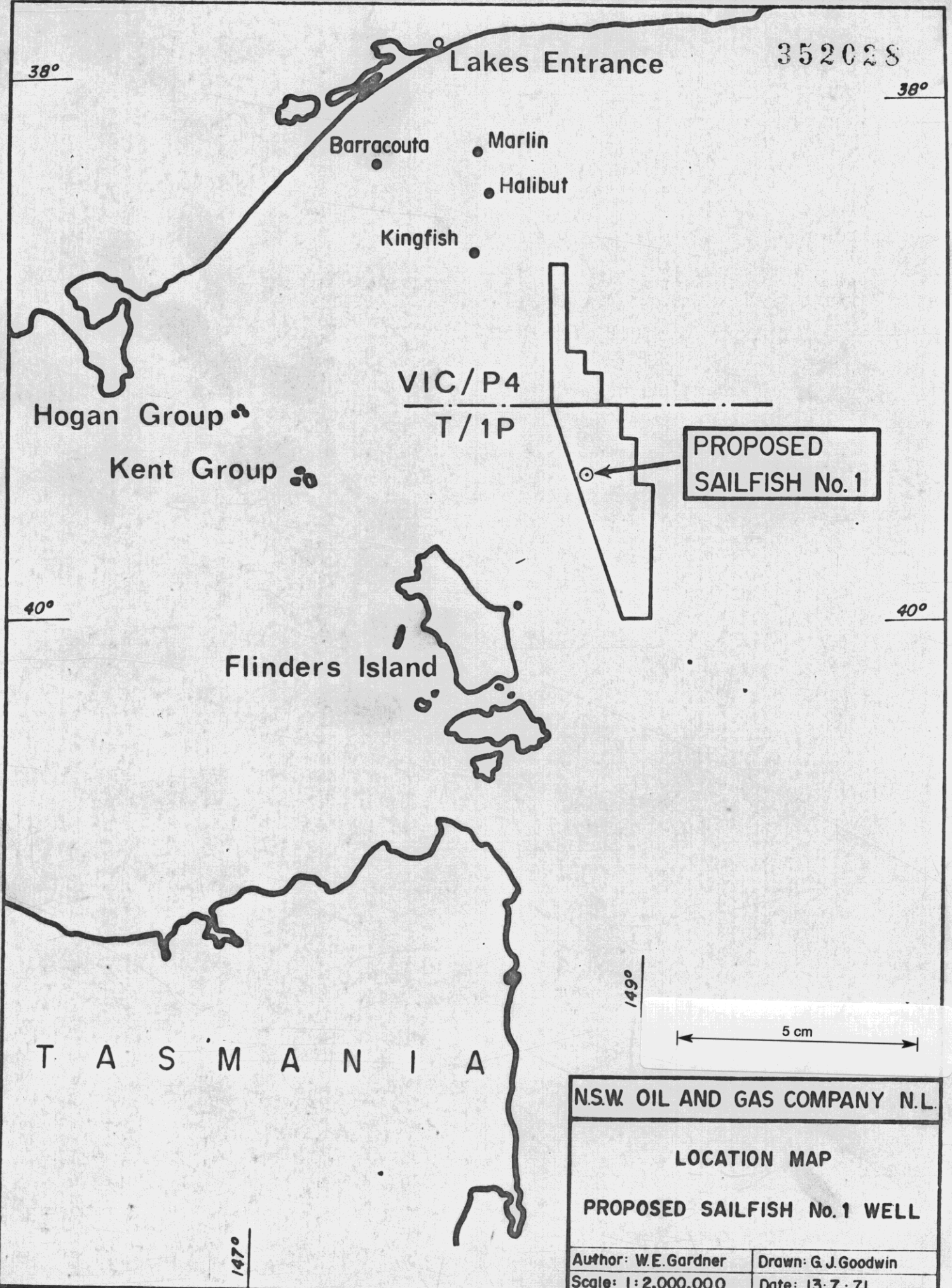
July 16th

04:45 Calibration of pattern two completed.
15:00 End of saw-tooth records.
16:50 - 18:00 No record of lane count.
18:24 - 19:05 " " " " "
19:27 - 19:55 " " " " "
20:17 - 21:00 " " " " "
21:15 - 22:00 " " " " "
22:30 - 23:00 " " " " "

July 17th

022 - 4:40 No record of lane count.
11:02 - 12:45 " " " " "
13:30 - 17:15 " " " " "
17:15 Recalibration of pattern two.
21:45 Recalibration of pattern one.

M. BRULHART
Operations Supervisor
N.S.W. Oil and Gas Company N.L.



N.S.W. OIL AND GAS COMPANY N.L.	
LOCATION MAP PROPOSED SAILFISH No. 1 WELL	
Author: W.E. Gardner	Drawn: G.J. Goodwin
Scale: 1:2,000,000	Date: 13·7·71

PLATE 1

Amalgamated Decca Surveys Pty. Ltd.

SURVEY DEPARTMENT

Appendix 3

352029

DESCRIPTION OF STATIONS

Date 2-7-71

Name of Station North Slave, Flinders Island No. State Trig 602'

Type of Station (Triangulation, traverse, bench mark, tide pole, astro, obs. spot, etc.) Closed Traverse

Position:

Lat. _____ Long. _____

height of mark in feet/metres above	
Land survey datum	M.H.W.S.

Depending on (Station) Walkers Lookout (A323). being at

Lat. 524 101:28 yds E Long. 1062 512:62 yds N

Rectangular co-ordinates in (U.T.M. etc.) Australian Transverse Mercator grid

Easting 583 241:9 feet/yards/metres. Northing 1102 580:6 feet/yards/metres.

Estimated accuracy ± 0:5 feet/yards/metres.

Origin: Lochmaben

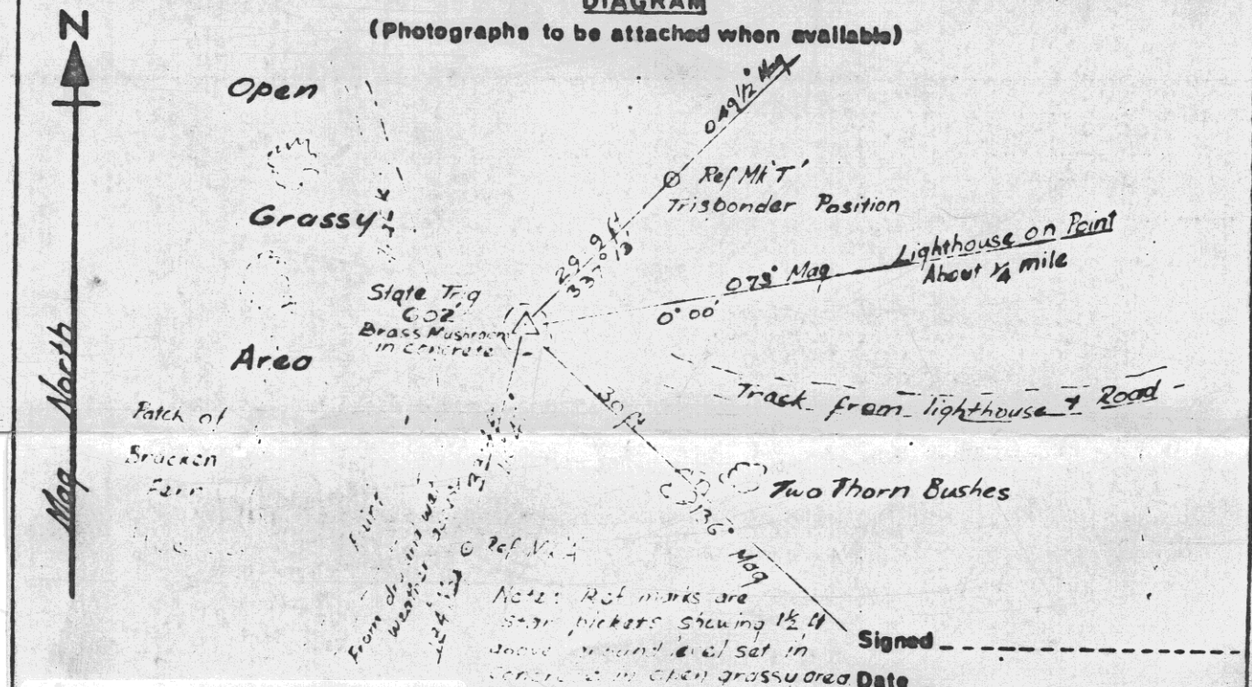
Lat. 34°S Long. 146° E

False Easting 400 000 feet/yards/metres. False Northing 4 800 000 feet/yards/metres.

Description 'State Trig 602' is marked by a brass mushroom set in a concrete block at ground level on a grassy slope on the N.E. side of a hill about ¼ mile west of the lighthouse at the northern entrance to the North East River, Flinders Island. Reference marks are as shown in the diagram. Access is by two wheel drive vehicle in dry weather, four wheel drive in wet weather.

DIAGRAM

(Photographs to be attached when available)



5 cm

PLATE 2

Amalgamated Decca Surveys Pty. Ltd.

SURVEY DEPARTMENT

Appendix 3 352030

DESCRIPTION OF STATIONS

Date 9-7-71

Name of Station South Slave Flinders Island No. 'State Trig 601'

Type of Station (Triangulation, traverse, bench mark. tide pole, astro. obs. spot, etc.) Closed Traverse

Position:

Lat. ---------- Long. ----------

Depending on (Station) Tea Dutchman (AB42) being at

Lat. 601838.0 yds E Long. 1054655.4 yds N

height of mark in feet/metres above	
Land survey datum	M.H.W.S.

Rectangular co-ordinates in (U.T.M. etc.) Australian Transverse Mercator grid

Easting 617321.4 feet/yards/metres. Northing 1043466.0 feet/yards/metres.

Estimated accuracy ± 0.5 feet/yards/metres.

Origin: Lochmaben

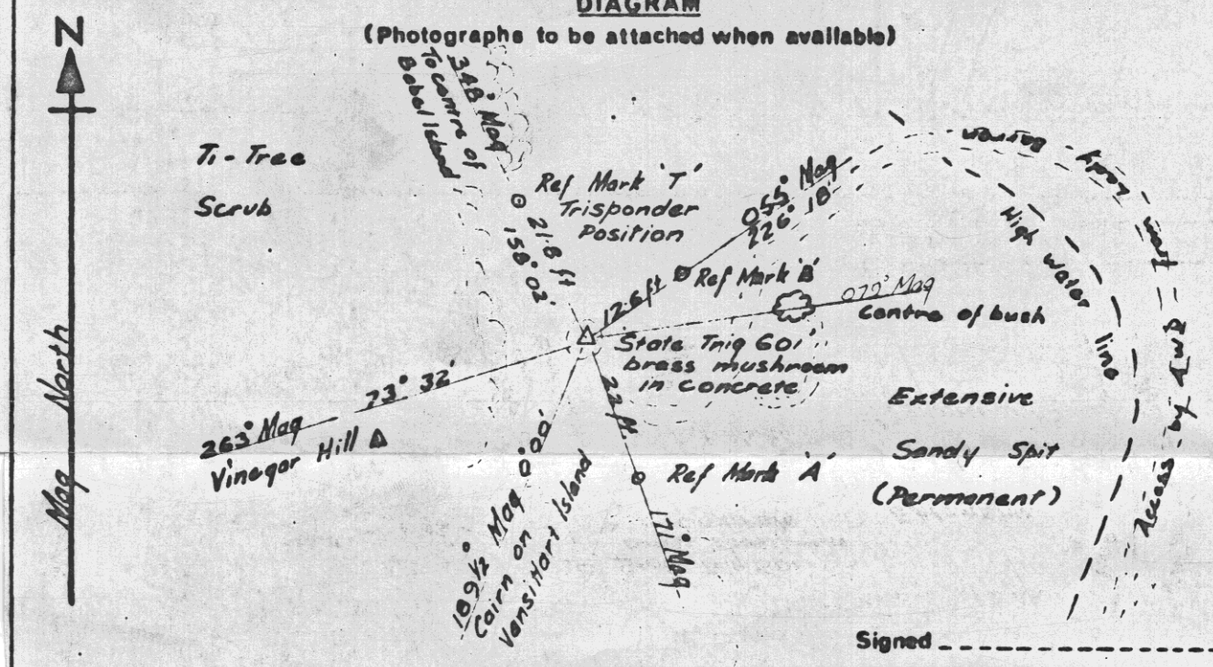
Lat. 34° S Long. 146° E

False Easting 400,000 feet/yards/metres. False Northing 6,800,000 feet/yards/metres.

Description 'State Trig 601' is marked by a brass mushroom set in cement at ground level on the top of a low sand hill on the edge of the ti-tree of the eastern end of the point South of Logan Lagoon Flinders Island. Reference marks are as shown in the diagram. Access to the station is by four wheel drive vehicle along the beach from Adelaide Bay at half tide.

DIAGRAM

(Photographs to be attached when available)



Signed ----------

Date ----------

PLATE 3

39 10S

39 13S

39 30S

39 43S

39 55S

148 25E

148 30E

148 45E

148 55E

ACTUAL POSITION OF LINE 4

PROGRAMMED POSITION OF LINE 4

PROBABLE POSITION OF WORK PATTERN

PROGRAMMED POSITION OF WORK PATTERN

SAILFISH NO. 1
Line 18. S.P. 70

PROBABLE POSITION OF GRAB SAMPLES

PROGRAMMED POSITION OF GRAB SAMPLES

SAILFISH NO. 2
Line 12. S.P. 50

SCALE OF MILES
0 1 2 3 4 MILES

TRANSVERSE MERCATOR PROJECTION REVISED JULY 1971

N.S.W. OIL AND GAS COMPANY N.L.

SAILFISH NO. 1 SITE PREPARATION

LOCATION MAP

5 cm

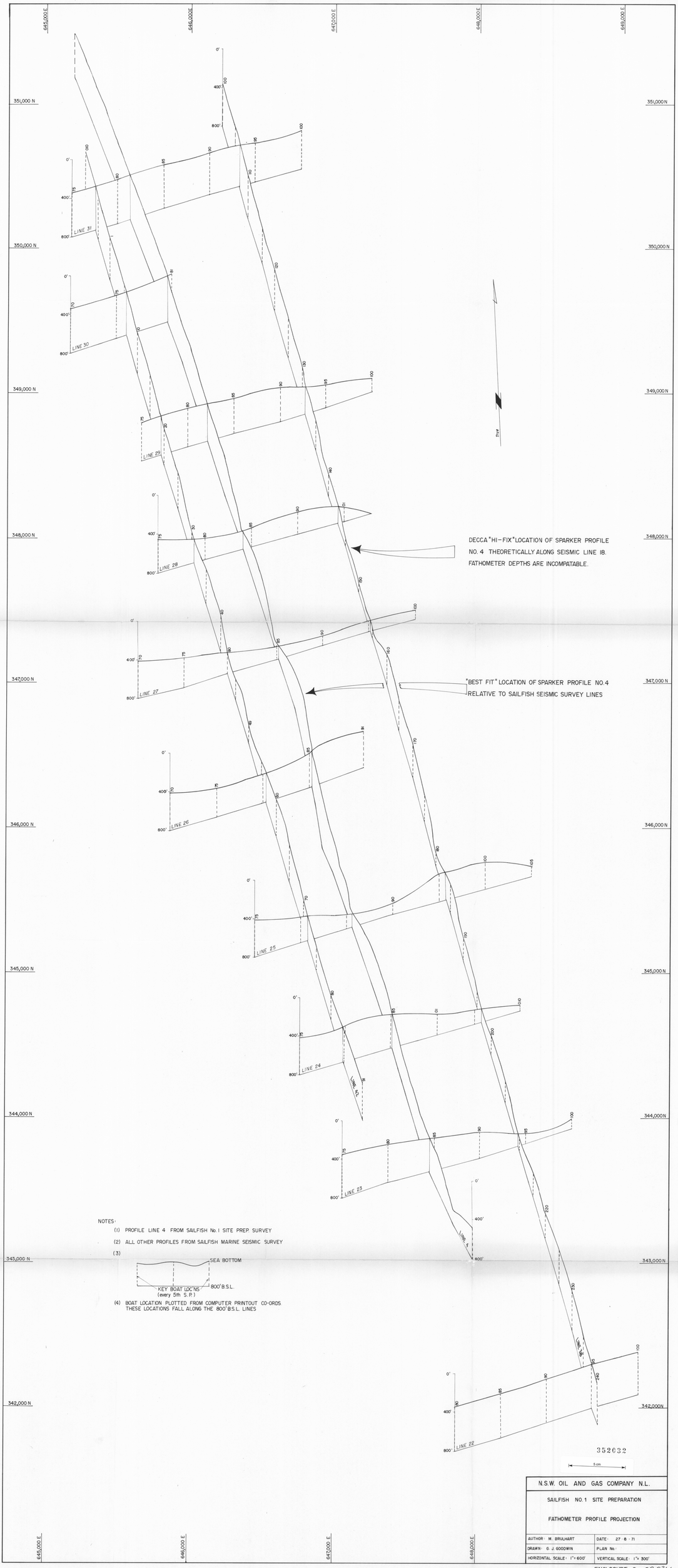
352031

PLANET MANAGEMENT AND RESEARCH PTY. LTD.

CONTOUR INTERVAL :	DATUM :
INTERPRETATION BY : M. BRULHART	DATE : AUG 1971
DRAWN BY : G. GOODWIN	DRAWING No :
SCALE : 1 to 50,000	

ENCLOSURE 1

OR-0344



ENCLOSURE 2 OP.0344