

TABLE OF CONTENTS

ABSTRACT		Page No.
1.0	INTRODUCTION	1
2.0	EQUIPMENT AND PERSONNEL	3
2.1	Positioning and Navigation	3
2.2	Echo Sounder	5
2.3	Heave Compensator	6
2.4	SVP-16 Velocity Meter	6
2.5	Side Scan Sonar	6
2.6	Seabed Sampling	7
2.7	Survey Vessel	7
2.8	Personnel	8
3.0	CALIBRATION OF EQUIPMENT	9
3.1	Differential G.P.S. Calibration	9
3.2	Echo Sounder Calibration	9
3.3	Side Scan Sonar Calibration	10
4.0	SURVEY OPERATIONS	11
4.1	Mobilisation	11
4.2	Positioning and Navigation	11
4.3	Echo Sounder	12
4.4	Side Scan Sonar	13
4.5	Seabed Sampling	13
4.6	Demobilisation	14
5.0	DATA REDUCTION	15
5.1	Navigation	15
5.2	Echo Sounding	15
5.3	Side Scan Sonar	16
6.0	RESULTS	17
6.1	Navigation	17
6.2	Echo Sounding	17
6.3	Side Scan Sonar	17
6.4	Sea Bed Sampling	18
7.0	CONCLUSIONS AND RECOMMENDATIONS	19

FIGURES

(ALL MISSING)	FIGURE 1	GENERAL LOCATION DIAGRAM
	FIGURE 2	VESSEL OFFSET DIAGRAM
	FIGURE 3	DGPS EQUIPMENT CONFIGURATION
	FIGURE 4	SIDE SCAN SONAR DATA EXAMPLE

APPENDICES

APPENDIX "A"	DAILY OPERATIONS REPORTS
APPENDIX "B"	GPS PREDICTIONS
APPENDIX "C"	DGPS BASE STATION DESCRIPTION
APPENDIX "D"	SURVEY RUN LOGS
APPENDIX "E"	TIDAL INFORMATION
APPENDIX "F"	REPORT ON CALIBRATION OF ACOUSTIC ARRAY

DRAWINGS

PLAN NO. 8978-B-1

Bathymetry

ABSTRACT

Between 7th and 9th June and 16th and 17th June, 1992, Associated Surveys International conducted an echo sounder and side scan sonar survey over a 3km by 3km site centred on the proposed King 1 location with given co-ordinates of:

Latitude: 39 deg 35 min 24.44 sec South
Longitude: 145 deg 31 min 8.8 sec East
Eastings: 372836.072
Northings: 5616670.92

100m spaced primary lines were surveyed on a bearing of 160/340 deg, and cross lines were surveyed at 250 m spacing.

Echo sounding results show the seabed across the site to be almost flat, mostly varying between 72.0 and 73.0 metres.

At location a depth of 72.2 is recorded.

Preliminary side scan sonar interpretations show no protuberances or debris on the seabed over the site and no evidence of gas seepage is noted.

The side scan sonar records show the seabed to have low to moderate uniform reflectivity, interpreted as indicating uniform mostly fine grained sediments.

There are very weak striations trending west northwest to east southeast across the site interpreted as slight grain size sorting of the sediments by the current into extremely low sand wave type structures.

Anchor drag marks are in evidence in the northeast corner of the site, and there are some small, poorly defined, more reflective patches 1200 m west northwest of the location, which may be either weed or coarser sediments exposed by current scouring.

Drop coring near the location confirms the presence of uncohesive silty fine to medium sands over denser fine shell gravels and gravelly clays possibly down to 1.9m.

The survey results indicate no hazards to the placement of a rig at this location, and the sediments as sampled near the location should have adequate anchor holding capacity if they are continuous over the rest of the surveyed site.

However in the absence of any other information from the sub-bottom, there is no way of determining whether the minimum sediment thickness as determined from coring is available at all the anchor locations.

Although the surficial fine sediments are continuous across the site, it is possible that there are consolidated sediments unsuitable for anchoring at shallow depths below the seabed. As well in the absence of sub-bottom information, there is no way of determining the presence or absence of possible sub-bottom drilling hazards such as gas pockets.

1.0 INTRODUCTION

Associated Surveys International Pty. Ltd. (ASI) was contracted by SAGASCO Resources Limited to undertake a bathymetric and geohazard rig site survey at the proposed King 1 site in Permit T/18P in southern Bass Strait.

Survey operations were carried out between 7th and 9th June, 1992 and between 16th and 17th June, 1992, following a period of weather downtime and work for SAGASCO on another site.

The vessel "Derwent Enterprise" was chartered by ASI for this work and mobilised with all necessary survey equipment in the port of Melbourne.

The vessel was navigated using a differential Global Positioning System (DGPS) interfaced to the ASI PCNav computer navigation system and bathymetric and geophysical data were obtained with echo sounder and side scan sonar.

Differential GPS corrections were derived from a coordinated base station at Blackwarry in Gippsland, Victoria.

A drop corer was used to obtain samples of the seabed sediments near the location.

A Sonardyne acoustic array was deployed and calibrated during the survey in preparation for the forthcoming rig move to this location (to be reported elsewhere).

The survey of the King site was conducted over a 3 km by 3 km square centred on the following location:

Latitude:	39 deg 35 min 24.44 sec south
Longitude:	145 deg 31 min 8.8 sec east
Easting:	372836.072
Northing:	5616670.92
Spheroid:	ANS
Datum:	AGD 84
Projection:	UTM Central Meridian 147 Deg East

31 primary lines spaced at 100 m were surveyed on a bearing of 160/340 deg, and 13 cross lines spaced at 250 m were surveyed on a bearing of 70/250 deg.

This report details the equipment used and the procedures adopted to perform the survey operations. The results obtained are discussed and various conclusions and recommendations are put forward concerning installation of a rig at this site.

Figure 1 is a general locality diagram of the survey area.

2.0 EQUIPMENT AND PERSONNEL

2.1 Positioning and Navigation

2.1.1 DGPS Navigation System

The onboard DGPS system comprised:

- 2 x Ashtech GPS Receivers and antennas (one spare)
- 1 x Furuno FS-1550 AU SSB Transceiver for reception of differential corrections from the base station.
- 2 x Advanced Electronic Applications, PAKRATT Model 232 MBX Modems (one spare) for downloading differential corrections from the SSB transceiver and passing corrections to the GPS Windows computer.
- 1 x NEC Powermate SX/20 Personal Computer with ASI GPS Windows software for performing differential corrections and passing these on to the navigation computer system.
- 1 x NEC Multisync 2A video monitor
- 1 x Codan 8528S, SSB Transceiver for voice communication with the base station or as back up for reception of differential corrections.

Cabling and power supplies as required.

The base station equipment comprised:

- 1 x 80 foot Texas Tower with a substantial insulated base and radial ground mat
- 2 x Ashtech DGPS receivers and antennas (one spare)
- 2 x HF Codan Radios (one as spare or for voice communication)
- 2 x Pakratt Modems (one spare)
- 2 x NEC Powermate SX/20 personal computers with ASI DGPS Windows Software (one spare)
- 2 x NEC Multisync 2A video monitors (one spare)

Cabling and power supplies as required.

The Ashtech receivers are capable of both static and dynamic operations and can track up to 12 satellites simultaneously. Code phase, carrier phase and integrated doppler measurement capabilities allow the computation of doppler smoothed position fixes.

RS 232 interface ports allow output of carrier phase data, integrated doppler measurements, position fixes, frequency and phase offsets of local oscillator, system data and navigation data.

Figure 3 provides details of the equipment configuration for the DGPS system.

2.1.2 GPS Windows System

The 'GPS Windows' system has been developed by Associated Surveys to provide real time differential GPS navigation. Identical hardware and software is employed at both the base and remote sites. The Ashtech XII receivers output code phase, carrier phase and integrated Doppler measurement of the L1 frequency to the system. Range and range rate corrections are determined at the base station and are transmitted to the mobile site via the HF radio link and Pakratt modem. These corrections are then applied to the measurements made at the mobile site, providing a more accurate estimate of the user's position.

Each position solution is accompanied by an estimate of its accuracy (2 x DRMS), therefore providing the operator with an indication of any degradation in fix quality due to such factors as poor satellite geometry or temporary loss of lock on a satellite. 2 x DRMS is a relationship of the variances of X and Y such that the position is accurate with a 98.2% probability of the stated figure i.e. 2 x DRMS value of 5 metres means that there is 98.2% probability that that position is within 5 metres based on knowledge of the PDOP value and individual pseudo range variances.

The software also provides automatic quality control by ensuring that such sources of error as mismatching satellites and satellite ephemeris updates between base and mobile sites are eliminated. In addition, the user may monitor system performance through a variety of quality control indicators. A skyplot displays the relative positions of satellites used in the position solution and the received corrections, ephemeris updates used and raw data can be displayed.

2.1.3. PCNav Navigation Computer System

The navigation computer system comprised:

- 1 x NEC Powermate 486/25 personal computer
- 1 x NEC Powermate SX/20 personal computer (as spare)
- 2 x NEC Multisync 2A Video Monitors, one for the helmsman's display
- 2 x NEC Pinwriter 3200 printers (one spare)

- 1 x 4 port Digiboard serial interface for interfacing of the PCNav computer with the GPS Windows computer, the echo sounder system and the fix boxes.
- 2 x ASI Fix Boxes for transmitting fix marks generated by the PCNav computer to the echo sounder and side scan sonar recorder.

Cabling and power supplies as required.

The PCNav Navigation computer accepts corrected DGPS derived co-ordinates for vessel position from the GPS Windows computer and on the video display, repeated at the helmsman's monitor, shows position relative to a required run line or way point for accurate navigation of the vessel.

The video display also includes information on positioning quality, course and speed made good, fix number updates, line/waypoint parameters, depth digitised from the echo sounder and corrected co-ordinates of any required offset positions.

At each "fix", time and date of each fix, corrected position co-ordinates, position relative to the line/waypoint, position quality and digitised depth are output to the printer.

The PCNav computer also logs navigation and echo sounder data to hard disc at an operator selectable rate, and has facilities for generating and maintaining runline and way point libraries.

2.2 Echo Sounder

The primary echo sounder system comprised:

- 1 x Atlas Deso 20 Survey Echo Sounder
 - 1 x 210 kHz transducer
 - 1 x 33 kHz transducer
- Spares, cabling and power supplies as required.

This system has the 210 and 33 kHz transducers fitted in a streamlined aluminium housing fixed to an over-the-side demountable bracket which can be raised for steaming to site and during bad weather and lowered into position for survey operations.

For this survey the transducer bracket was mounted on the starboard side.

Soundings are digitised by the Deso 20 and output to the PCNav computer via a TSS 320 Heave Compensator.

A back-up system comprised:

- 1 x Atlas Deso 10 Survey Echo Sounder
- 1 x 210 kHz transducer
- 1 x 30 khz transducer

2.3 Heave Compensator

A TSS 320 Heave Compensator was used for this survey, the accelerometer being installed on the starboard side of the vessel as near as possible to the echo sounder transducer.

This system incorporates an RS 232 serial interface to pass heave corrected depths to the PCNav navigation computer.

2.4 SVP-16 Velocity Meter

The speed of sound in water was determined using an Applied Microsystems SVP16 velocity probe. Temperature and speed of sound data is recorded against depth as the probe is lowered to the bottom on a rope. The data is downloaded to a PC when the unit is returned to the surface using PROCOMM, a standard communications software package. This data is analysed graphically using the ASI program VEL to determine mean velocity through the water column.

2.5 Side Scan Sonar

An EG&G 260 Image Correcting Side Scan Sonar System was used for this survey. This incorporates a 260 Recorder, two 100 kilohertz Model 272 T Towfish (one spare) and a 500m armoured cable on a remote controlled hydraulic winch with slip rings. A spares kit for the EG&G 260 and tow fish was included.

The 260 recorder corrects the record to remove the water column and corrects for slant range to produce a true scale record. The system can correct for vessel speed to produce a true scale record along line.

The cable was deployed over a pulley block suspended from a 3m high gantry at the vessels stern. This block was equipped with a cable counter with a read-out on the vessel's bridge, and the cable was also measured and marked with coloured tape, so that layback of the tow fish behind the navigation antenna could be accurately monitored.

2.6 Seabed Sampling

A drop corer with a 2.0 metre by 75 mm core barrel and up to 500 kg weight was used for coring.

This unit incorporated "orange peel" type core catchers and a one way valve to assist in sample retention, also 75 mm PVC core liners so that samples could be retained undisturbed. The core barrel has an external stretch ring which will slide up the barrel as it enters the seabed to record the depth of penetration.

The vessel was fitted with an hydraulic winch with 150 metres of 3/8 steel wire to assist in deployment and retrieval of the corer via a snatch block under the 3 metre high gantry at the vessel's stern.

2.7 Survey Vessel

The "Derwent Enterprise" was chartered from Korevaar Marine of Melbourne. This is a 58 metre utility vessel, powered by 4 Daihatsu engines totalling 4,400 BHP driving 2 propellor nozzles. It has a beam of 13 m and a draught of 4.4 m.

The survey computers and recorders were operated on the bridge, spare equipment was stored in a large 'tween decks area and part of a large cabin was used for the limited data reduction carried out on board.

Figure 2 is an equipment offset diagram for the vessel indicating positions of the DGPS antenna and geophysical sensors.

2.8 Personnel

The following personnel were involved with the surveys:

Mr Paul Caswell - Party Chief/Hydrographic Surveyor

Mr Allan Terrill - Geophysicist

Mr Nigel Smith - Electronics Engineer

Mr David Lovering - Hydrographic Surveyor

Capt. Rob Rae - Master, Derwent Enterprise

Mr Harry Campigli - Base Station Operator

SAGASCO was represented by Mr John Rutherford.

3.0 CALIBRATION OF EQUIPMENT

3.1 Differential G.P.S. Calibration

To provide a check on the positioning integrity of the Differential GPS the installed system was checked against co-ordinated channel beacons as the vessel departed Melbourne on 6th June, 1992.

The vessel was under the control of a pilot, and was considered too big to come sufficiently close to the beacons at night to perform other than gross positioning checks.

3.2 Echo Sounder Calibration

Echo sounder calibration was performed by velocity of sound determination and by determination of transducer draft.

The SVP-16 velocity meter was lowered to the seabed to determine a series of velocity readings, the average of which was adopted as being appropriate for the depths to be sounded and set into the echo sounder.

The transducer depth was determined by the bar check method whereby a steel disk was lowered to precisely 6.0 metres below sea level under the transducer, and the draft setting on the sounder was adjusted so that the echo trace and the digitiser output read 6.0 metres.

On 7th June, prior to start of work the velocity of sound was determined at 1503 m/sec and transducer depth determined at 2.97m.

On 14th June in good weather conditions at another site the transducer depth was reset to 2.99 m, and the velocity of sound was re-determined on 16th June, prior to recommencement of work at King 1, at 1500 m/sec.

A further bar check on 16th June, whilst the vessel was at anchor during acoustic observations confirmed the transducer depth of 2.99 m.

3.3 Side Scan Sonar Calibration

After mobilisation and prior to departure for site, a series of internal test routines were performed on the EG&G 260 recorder to check printing and data processing functions, and to check that scale correction of the paper record accurately corresponded to the input vessel survey speed.

4.0 SURVEY OPERATIONS

4.1 Mobilisation

Equipment was road and air freighted to Melbourne for installation on the survey vessel.

Three personnel arrived in Melbourne on 2nd June, 1992, and the fourth arrived on 6th June.

Equipment was installed and tested between 2nd and 6th June, and this period included a significant delay due to problems with airfreighting of some survey equipment.

The DGPS base station was mobilised by the base station operator between 2nd and 4th June, 1992.

4.2 Positioning and Navigation

4.2.1 Differential G.P.S.

Prior to commencement of survey the latest Almanac was downloaded from the GPS receiver and satellite predictions generated with an elevation mask of 10 degrees. The chosen working window had a PDOP value generally below 5. Refer to Appendix "B" for an example of the predicted GPS Window.

Corrections were transmitted from the base station at Blackwarry, Victoria at five second intervals on a HF radio transmitting at 2.515 MHz frequency. These were received on the vessel and passed to the GPS Windows computer via the Pakratt modem.

This HF frequency was also used to make voice contact with the base station operator at regular schedules.

Coordinates in the WGS 84 datum had been established for the DGPS base station at Blackwarry by the observation of GPS static baselines to a nearby trig point and to a co-ordinated point in Melbourne as a check.

Co-ordinates were converted to the Australian National Spheroid (ANS) and entered to the base station GPS Windows computer. Full details of base station co-ordination are included in Appendix C to this report.

4.2.2 Vessel Navigation

For running survey lines a run line library was generated and stored on the PCNav computer. This allowed quick call up of the next runline to be surveyed.

A graphical display of the runline was displayed on the Helmsman's monitor to allow for easy navigation to the line and along its length. Once on line the PCNav was placed in the data collection and logging mode.

A fix was generated at the start of the line and then at 30 second intervals along the line until an end of line fix when the side scan sonar tow fish had passed the end of the defined line. All fixes were marked on the echo sounder and side scan sonar recorder via the fix box unit, and the first, last and every fifth fix were hand annotated on the analogue records.

Survey run logs were maintained throughout the survey and are reproduced in Appendix D.

Offsets from the navigation antenna to the various sensor positions were measured and entered to the computer allowing offset positions to be tracked. There was no interfaced gyrocompass available so computed course made good (CMG) was used for vessel heading for determination of offset positions.

A hard copy record was printed on a NEC Pinwriter printer, listing position and depth information at each fix event. Position and depth data were also recorded to the PC hard disk in binary format and later copied to 3 1/2 inch floppy disc for carrying to the Perth office for processing.

4.3 Echo Sounder

The Atlas Deso 20 echo sounder was operated at a recorder range of 50 to 100 metres to provide an analogue record of the sea bottom. Soundings were heave corrected, digitised and passed to the computer system and confirmation of digitisation was provided by a trace on the analogue echo sounder record.

Data from the 210 kHz transducer were used for the digitisation of the soundings, and a dual 210 and 33 kHz trace was recorded on the analogue record for enhanced delineation of possible seabed features.

10 soundings per second were logged by the PCNav system.

Line details and fix numbers were annotated on the analogue record manually and each completed echo roll clearly marked to indicate date, client and contract details and lines run.

4.4 Side Scan Sonar

The side scan sonar fish was deployed from the stern of the vessel, and the cable length was varied between 275 and 325 metres in order to maintain the towfish at the required height of 10 to 15 metres for 100m range operation. Cable length was rigorously noted on the paper record so that corrected laybacks behind the DGPS antenna position could be derived during interpretation.

The 260 side scan sonar recorder was set to provide true scale records of the seafloor to a range of 100 metres either side of the 100 metre spaced survey lines and 200 metres for 250 m spaced cross lines.

The fix box provided fixes from the PCNav computer along the records and these were annotated manually. Start and end of line details were also annotated and entered in a log book. Completed record rolls were labelled with project and line number details.

4.5 Seabed Sampling

The vessels winch was not of freefall type, so the drop corer was lowered to within 10 or 15 metres of the seabed by the winch. The cable was then secured by a quick release cable gripper until slack wire was payed out and the corer was then allowed to free-fall as soon as the navigation system determined that the stern of the vessel was over the required coring location and the vessel was stationary.

The corer was then retrieved to the surface and recovered onto the deck with the assistance of a second winch and checked for penetration.

The cutting shoe and core catcher were removed and any catcher sample was placed into plastic sample bags. The core liner was removed to check for undisturbed samples, then cut to length and capped.

The tube and bag samples were annotated with the site details and sample numbers, after brief shipboard visual classifications were recorded.

These sample descriptions are presented in Section 6.4 of this report.

4.6 Demobilisation

Following completion of survey work on the King 1 site the vessel undertook work at another site in Bass Strait. The vessel was finally demobilised alongside Victoria Dock, Port of Melbourne on 22nd June 1992. All equipment from the vessel and DGPS base station was returned to Perth by rail freight.

Personnel departed Melbourne on the afternoon of 22nd June.

5.0 DATA REDUCTION

5.1 Navigation

Position fixing data was returned to ASI Perth office on 3 1/2 floppy discs to enable post processing. The package used was the ASI PCMap software which enables trackplots to be drawn for the required offset position. All charts drawn have been produced at a scale of 1:5000.

The Geodetic parameters used were:

Spheroid	Australian National Spheroid
Semi Major Axis	6378160
Inverse Flattening	298.25
Datum:	AGD 84
Projection:	Australian Map Grid
Central Meridian:	147 deg East
False Easting:	500 000
False Northing:	10 000 000
Scale Factor on CM:	0.9996
Latitude of Origin:	0 deg

5.2 Echo Sounding

The logged soundings were processed using PCMap which allowed editing of any spurious data and the application of the tidal correction. Predicted tidal levels for the King 1 site were obtained by producing a cotidal chart based on the predicted tides for the Standard Ports of Port Phillip heads, Stanley, Burnie and the Secondary Port of Waratah Bay. PCMap automatically reduced raw soundings to LAT datum using an ASCII file created from the predictions. Reduced soundings have been contoured at intervals of 1 m and are presented on the bathymetric charts, Plan Number 8978-B-1.

Tidal information is reproduced in Appendix E to this report.

5.3 Side Scan Sonar

The side scan sonar records were all cursorily examined while on site to determine if there were any anomalous features requiring additional investigation, and in order to produce a preliminary report.

On return to ASI's offices in West Perth, all the data were rigorously re-examined and any features were plotted on a trackplot of vessels position with corrected offsets to allow for layback of the towfish.

On completion of this interpretation and plotting, it was determined that there were no features of significance that would require mapping, and thus no seabed features map is presented with this report.

6.0 RESULTS

6.1 Navigation

It was decided to undertake survey operations during the 12 hour period from 0200 hrs to 1400 hrs when the GPS provided almost continuous positioning with a minimum of 4 SVS and low PDOP value. Following a break for poor weather an additional GPS window was worked between 1830 hrs and 2130 hrs when the vessel returned to the King 1 site from shelter.

Differential corrections were received from the base station at a maximum rate of every 5 seconds. Equipment problems at the base station on 16th June caused corrections to be lost for a short period.

The 2 DRMS value was monitored throughout the survey and seen to be below 5m during the majority of survey operations. At the discretion of the client's representative, survey lines were run during short periods of higher 2 DRMS or only 3 SVS. In this case lines were only accepted if no position jumps were observed when 4 satellites or good satellite geometry was restored.

6.2 Echo Sounding

The bathymetry map, Plan No. 8978-B-1, shows the seabed to be almost flat across this site, varying from slightly less than 72.0 m in the east and slightly more than 73.0 m in the southwest and extreme northeast. At the proposed location a depth of 72.2 m is recorded.

6.3 Side Scan Sonar

The example of Figure 4 is typical of the data across the entire site.

The seabed exhibits uniform low to moderate sonar reflectivity with very fine grained sonar texture.

This sonar character is interpreted as representing a smooth seabed with uniform fine grained sandy sediments.

There are very weak discontinuous striations or lineations in sonar texture, trending oblique to the survey lines in a west northwest to east southeast direction.

These are interpreted as corresponding to slight grain size sorting of the sediments by the current into extremely low (less than 0.1m) sand wave type structures.

1200 metres west northwest of the location is an area up to 300m across which contains 5 small (30m across) diffuse, poorly defined patches with slightly higher sonar reflectivity.

These are either weed patches or patches of coarser sediments exposed by current activity, and have no significance unless the presence of coarser sediments is an indication that coarse, dense, possibly consolidated, substrate may be closer to the seabed surface here than elsewhere in the site.

Between 2.0 and 2.1 km north from the location is an area of disturbed seabed with possible pieces of debris and a radial pattern of anchor drag marks. This is attributed to an earlier drilling location, and can be readily checked by reference to SAGASCO's records.

6.4 Sea Bed Sampling

Two drop core samples were taken near the King 1 location on 16th June, 1992. Results and on board visual classifications are as follows:

Core # K-1	372821.4 m East	5616659.1 m North
	Penetration - 1.9m	
	Recovery - 0.8 m	
	Top - Light olive, uncohesive silty fine to medium shell sand	
	Bottom - Light grey uncohesive silty fine shell gravel, occasionally very weakly cemented and occasionally with zones of cohesive gravelly clay.	
Core # K-2	372840.9 m East	5616685.4 m North
	Penetration - possibly 1.9 m	
	Recovery - 0.65 m	
	Top - as for core K-1	
	Bottom - light olive grey, dense, moderately cohesive, silty gravelly (shelly) clay.	

7.0 CONCLUSIONS AND RECOMMENDATIONS

The seabed at the King 1 location and across the surrounding site is essentially flat and smooth, and no seabed hazards or protuberances are identified from echo sounder and side scan sonar data.

There is also no visible evidence on the side scan sonar data for other hazards such as gas seeps.

The fine sands overlaying coarser, occasionally clayey, and occasionally consolidated sediments down to 1.9m near the location, should provide adequate anchor holding.

In the absence of any other sub-seabed information it cannot be determined if sediments with adequate anchor holding capacity are similarly thick at all the anchor locations, and it is possible that sediments below the uniform fine sandy layer identified from side scan sonar data may be more consolidated and thus less suitable for reliable anchoring, as may possibly be the case in an area 1200m west northwest of location.

As well, in the absence of sub-bottom data, there is no way of determining the presence or absence of potential sub-bottom drilling hazards such as gas pockets.

APPENDIX "A"

DAILY OPERATIONS REPORTS

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. 8978 DATE 2/6/92

LOCATION MELBOURNE VESSEL DERWENT ENTERPRISE

FROM	TO (E.S.T)	SUMMARY OF OPERATIONS
(W.A.T) 0700	1230	P. Caswell / N. Smith / A. Terrill travel Perth → Melbourne
PM		Onboard vessel Derwent Enterprise at 14 Victoria Dock. Locate equipment and commence mobilisation.
		H. Campigli mobilise base station for Diff. GPS at Blackwarry, Victoria
		Overnight Riverside Apartments Melbourne

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
GPS WINDOWS PC	1	PAN SPARES	1	P. CASWELL	SURVEYOR
PC/NAV PC	2 (1SP)	COMPATT	4	A. TERRILL	GEOPHYSICIST
MONITOR	3	DUNKING TRANS.	2	N. SMITH	ENGINEER
CODAN RADIO/ANT	1	SIDE SCAN 260	1	H. CAMPIGLI	GPS BASE OP.
FURUNO RADIO/ANT.	1	PRINTER	2 (1SP)		
PAKRATT MODEM	2 (1SP)	TSS 320	1		BASE STATION
ASHTEC GPS	2 (1SP)	SVP 16	1		CODAN RADIO 2 (1SP)
DESO 20	1	SIDE SCAN WINCH	1		PAKRATT 2 (1SP)
PAN	1	DROP CORER	2 (1SP)		80' ANTENNA 1
CONSUMABLES					GPS WINDOWS PC 2 (1SP)
VEHICLE		BUDGET STATION WAGON			(NOT INSTALLED)
ACCOMMODATION		3 X RIVERSIDE APPTS			

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

P. Caswell

CLIENT REPRESENTATIVES SIGNATURE

[Signature]

DOR

2901

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. 8978 DATE 3/6/92

LOCATION MELBOURNE VESSEL DERWENT ENTERPRISE

FROM	TO	SUMMARY OF OPERATIONS
AM		Personnel continue with mobilisation of vessel. Install survey equipment on bridge and test all computer equipment. Install radios and GPS on bridge roof/main mast - test interfacing to computers/modem. Fabrication of echosounder bracket commences. Install cables for sidescan winch and connect to hydraulics.
	PM	No meals / accommodation onboard.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[AS DOR 2902]				P. CASWELL	SURVEYOR
				A. TERRILL	GEO PHYSICIST
				N. SMITH	ENGINEER
				H. CAMPGLI	GPS BASE OP.

CONSUMABLES	
VEHICLE	BUDGET STATION WAGON
ACCOMMODATION	3 x RIVERSIDE APPTS

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE <i>PALmer</i>	CLIENT REPRESENTATIVES SIGNATURE <i>[Signature]</i>	DOR 2902
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CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

293028

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. HY 8978 DATE 4/6/92

LOCATION MELBOURNE VESSEL DERWENT ENTERPRISE

Table with columns FROM, TO, and SUMMARY OF OPERATIONS. Contains handwritten notes about modifications to Deso 20, TSS 320 compensator, PCNAV computer, concrete pouring, interfacing of Tix box, HF radios, and M. Campigli's visit.

Table with columns EQUIPMENT, NUMBER, EQUIPMENT, NUMBER, PERSONNEL, and TITLE. Lists personnel: P. CASWELL (SURVEYOR), A. TERRILL (GEOPHYSICIST), N. SMITH (ENGINEER), and H. CAMPIGLI (GPS BASE OP.).

Table with columns CONSUMABLES, VEHICLE, and ACCOMMODATION. Entries include BUDGET STATION WAGON and 3 X RIVERSIDE APARTMENTS.

AUTHORISED CONTRACT CHANGES/COMMENTS ADVISED BY ASI THAT DELAY TO ARRIVAL OF SSS FISH. VESSEL CANNOT SAIL UNTIL FRIDAY PM / SATURDAY

PARTY CHIEF'S SIGNATURE

PA Caswell

CLIENT REPRESENTATIVES SIGNATURE

[Handwritten signature]

DOR

2903

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

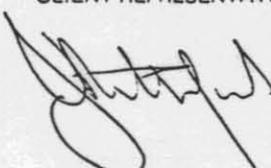
CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	5/6/92
LOCATION	MELBOURNE	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
AM		Personnel check out of hotel* and continue with mobilisation of vessel.
		Assemble drop cover and check components
		Test download and data collection of SVP
		Connect straps to Compatt releases and install in float collars.
		Assemble Echosounder transducers to bracket and test
		Modify drop coring winch to increase diameter
1500		Safety meeting
		Concrete blocks and spare SVP loaded onboard
		Obtain channel beacon coords from MPA.
		Commence securing of mobilised equipment on bridge and transit cases in hold.
		Personnel (x3) accommodated onboard. Lunch only taken.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
AS DOR 290	WITH	ADDITION		P. CASWELL	SURVEYOR
of :-				A. TERRILL	GEOPHYSICIST
DESD 10	1 (SP)			N. SMITH	ENGINEER
COMPATT WEIGHTS	29]			H. CAMPIGLI	GPS BASE OP

CONSUMABLES					
VEHICLE	BUDGET STATION WAGON				
ACCOMMODATION	(ONBOARD VESSEL)		* HOTEL BILL PAID NIGEL SMITH ASI DINERS CARD.		

AUTHORISED CONTRACT CHANGES/COMMENTS LOAD 60 TONS FUEL TO DERWENT ENTERPRISE

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Lowell		2904

CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

293030

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. HY 8978 DATE 6/6/92

LOCATION MELBOURNE VESSEL DERWENT ENTERPRISE

FROM	TO	SUMMARY OF OPERATIONS
AM		Wind drop core wire and rope for SV16 onto respective winches.
		Complete extension of E/S cables and secure all equipment for passage. Wet test E/S transducers
		Complete testing of side scan winch hand controls
		Measure offsets and enter survey parameters to PC/No
1230	1340	Collect side scan fish/current meter from airport and return to vessel - test side scan fish on deck and in water.
1600		DGPS corrections received ; initial power supply problems at base.
1800		Pilot onboard, depart Melbourne for King 1 location
		Gross error checks on DGPS along navigation channel
	→ 2359	Continue passage to site

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
AS DOR 2904 WTH		ADDITION OF :-		P. CASWELL	SURVEYOR
				A. TERRILL	GEO PHYSICIST
272 Tow FISH	2 (1 SP)			N. SMITH	ENGINEER
CURRENT METER	1			H. CAMPIGLI	GPS BASE OP.
		* FOR SHELL PART OF WORK ONLY		D. LOVERING	SURVEYOR
				(ON BOARD 1100 HRS)	

CONSUMABLES	
VEHICLE	BUDGET STATION WAGON RETURNED 1650 HRS
ACCOMMODATION	4X ONBOARD VESSEL RENTAL # 255392

AUTHORISED CONTRACT CHANGES/COMMENTS
 1600 HRS D.P FUEL TANKS 7C 850mm 7S MT
 7P 790mm DAILY SERVICE 2700 Gallons

PARTY CHIEF'S SIGNATURE <i>PA Linell</i>	CLIENT REPRESENTATIVES SIGNATURE <i>[Signature]</i>	DOR 2905
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DAILY OPERATIONS REPORT (HYDRO)

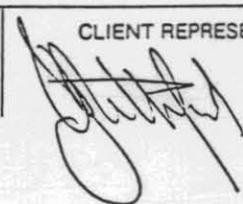
CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	7/6/92
LOCATION	KING 1 - BASS STRAIT	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
0000	→	Passage to King 1 location
0530		Vessel cross into sagasco Block T/18P - mobilisation officially completed.
0730	0820	Stream side scan cable and mark up intervals
0800	1015	GPS unusable in either differential or stand alone mode - attributed to US operators
1100		DGPS good, on location for SV16 dip (SV16.1)
1130	1230	Deploy and secure E/S Transducer bracket stbd side
1255		Bar check - Draft 2.97m Mean velocity 1502.76 m/s
1315		Deploy side scan fish
1330		Adjust GPS antenna and run into first line
1400	1530	Survey equipment operational, running practise lines for track control
1625	2359	Vessel at Anchor for night

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[AS DOR 2905]			O/B VESSEL	P. CASWELL	SURVEYOR
				D. LOVERING	- " -
				A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPIGLI	GPS BASE OP
CONSUMABLES					
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

07:30 ARRIVE King #1 LOCATION

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Caswell		2906

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

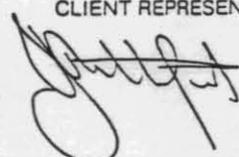
DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	8/6/92
LOCATION	KING 1 - BASS STRAIT	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
0000	0100	At Anchor
0100		Heave up anchor and run up positioning system
	0240	- check with base station. Proceed towards location
0250		Deploy fish and wait on good satellite positioning
0330		Running primary survey lines 160°/340° with
	1430	Echosounder and side scan to end of GPS window
1435		Remark side scan cable and recover fish -
	1545	make adjustments to pulley block
1510		Drop anchor approx 7km @ 345° to King 1
1510	1540	Back up survey data to disc

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[AS DOR 2905]				P. CASWELL	SURVEYOR
			O/B	D. LOVERING	- " -
			VESSEL	A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPIGLI	GPS BASE OP.
CONSUMABLES	1 E/S 1 S/S 3 DISC				
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Lowell		2907

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

CLIENT		SAGASCO		JOB NO.		HY 8978		DATE		9/6/92	
LOCATION		KING 1 - BASS STRAIT		VESSEL		DERWENT ENTERPRISE					
FROM	TO	SUMMARY OF OPERATIONS (WIND NW 15-20 KTS INCREASING 25-30 KTS)									
0000	0230	At Anchor									
0230	0300	Heave up anchor, survey system operational									
0310		Deploy side scan fish									
0300	0410	Corrections from base sporadic on 2 MHz, try alternative frequencies but but all noisy.									
0415		Improvements to corrections, run in to first line									
0430		Running survey lines with Echo sounder and side scan on bearing 160/340°.									
0810	0843	Break in survey due to lost corrections from base									
1315		Decision to stop lines due to deterioration in weather and resulting degradation in sounding data and ability to keep vessel on track.									
1330	1400	Recover fish and Echo sounder bracket									
1410	1500	Back up survey data to disc and routine preparation									
EQUIPMENT		NUMBER		EQUIPMENT		NUMBER		PERSONNEL		TITLE	
1400	1730	Vessel steaming with/into weather remaining close to loc ^A									
1730	2359	Underway towards N-Tasmania coast for shelter									
[AS DOR 2905]						o/B		P. CASWELL		SURVEYOR	
						VESSEL		D. LOVERING		- " -	
								A. TERRILL		GEOPHYSICIST	
								N. SMITH		ENGINEER	
								H. CAMPGLI		GPS BASE OP	
CONSUMABLES		1 E/S 1 S/S 3 DISC									
VEHICLE											
ACCOMMODATION											

AUTHORISED CONTRACT CHANGES/COMMENTS

FIRST LINE FOR DAY COMMENCED 04:49

PARTY CHIEF'S SIGNATURE

P.A. Caswell

CLIENT REPRESENTATIVES SIGNATURE

DOR

2908

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. MY 8978 DATE 12/6/92

LOCATION BASS STRAIT VESSEL DERWENT ENTERPRISE

FROM	TO	SUMMARY OF OPERATIONS
0000	0130	Vessel passage to Flinders 1 site
0130		Arrive on location, running cross lines in direction 070°/250° to assess sea conditions for running lines.
0345	0345	Vessel u/way to shelter, conditions remain unfavourable for the safe deployment of survey equipment and collection of satisfactory data.
0730		At Anchor off Stanley.
		General maintenance and administration.
	2359	Dummy runs with drop cover device, assemble weights and secure.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[AS DOR]	2905			P. CASWELL	SURVEYOR
			O/B	D. LOVERING	" "
			VESSEL	A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPICLI	GPS BASE OP.
CONSUMABLES	PURCHASED 150M x 10MM WIRE FOR DROP COVER				
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE <i>PA Caswell</i>	CLIENT REPRESENTATIVES SIGNATURE <i>[Signature]</i>	DOR 2911
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DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. HY 8978 DATE 13/6/92

LOCATION FLINDERS 1 - BASS STRAIT VESSEL DERWENT ENTERPRISE

FROM TO SUMMARY OF OPERATIONS

0800		Heave up on Anchor and u/way to Flinders
0230		Survey system operational 11 km from location
0320	0350	Arrive on location rig up and deploy transducer
0400		SVP16 velocity dip ^(SVP162) . Mean water column velocity 150155 m/s. Transducer draft 2.97m - too rough for bar check.
0430		Deploy fish and run in to line, abort due to noise
	0445	interference on DGPS corrections
0535		Corrections improved commence run in to cross line F44
0554	1415	Running Echo Sounder + Side Scan Survey lines
1420	1435	GPS window ended. Recover fish and anchor on location
1430	1700	Reposition radio equipment to try and reduce interference from Deck 20. Spool new wire to deep core winch + mark
1805	1920	Weigh anchor deploy fish and wait for good GPS.
1932	2130	Running survey lines until end of GPS window

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
2200	2359	Vessel at anchor on location.		Back up	Survey data

[Equipment as DOR 2905]

o/b
VESSEL

P. CASWELL	SURVEYOR
D. LOVERING	- " -
A. TERRILL	GEOPHYSICIST
N. SMITH	ENGINEER

H. CAMPGLI GPS BASE OP

CONSUMABLES 1 1/2 E/S 155 & DISCS

VEHICLE

ACCOMMODATION

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

P A Caswell

CLIENT REPRESENTATIVES SIGNATURE

[Signature]

DOR

2912

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAQASCO JOB NO. HY 8978 DATE 14/6/92

LOCATION FLINDERS I - BASS STRAIT VESSEL DERWENT ENTERPRISE

FROM	TO	SUMMARY OF OPERATIONS
0800	0500	Vessel at Anchor on flinders I site location
0500		Heave up Anchor
0540		Deploy side scan fish and run into line
0552	0805	Running survey lines with Echo sounder + Side Scan Sonar
0805	1005	GPS not usable due to operations by US operators
0830	0845	Bar check vessel draft Deso 20 set to 2.99 m.
1007		Commence run in to line F2.
1030	1343	Running survey lines to end of GPS window.
1405		Recover fish and anchor on location
1915		Heave up anchor; liaise with base station - reset required on GPS receiver before corrections restored
1950		Deploy side scan fish and run in to line, complete 3 further lines before GPS window finished
2145	2155	Recover fish and anchor on location

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
2155	2215	Back up survey data to disc and sort analogue records.			

[Equipment as DOR 2905]				o/b VESSEL	P. CASWELL	SURVEYOR
					D. LOVERING	- " -
					A. TERRILL	GEO PHYSICIST
					N. SMITH	ENGINEER
					H. CAMPGLI	GPS BASE OP

CONSUMABLES	1 x E/S 1 x S/S 2 x DISCS	
VEHICLE		
ACCOMMODATION		

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE PACowell	CLIENT REPRESENTATIVES SIGNATURE 	DOR 2913 Document No. AS-HY-001(1)
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CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

293039

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. HY 8978 DATE 15/6/92

LOCATION FLINDERS 1 - BASS STRAIT VESSEL DERWENT ENTERPRISE

Table with columns: FROM, TO, SUMMARY OF OPERATIONS, SEAS < 1M. Entries include vessel at anchor, monitoring DGPS corrections, heave up anchor, deploying fish, running survey lines, recovering fish, and completing survey.

Table with columns: EQUIPMENT, NUMBER, EQUIPMENT, NUMBER, PERSONNEL, TITLE. Includes equipment list (vessel, AS DOR 2905) and personnel list (P. CASWELL, D. LOVERING, A. TERRILL, N. SMITH, H. CAMPIGLI).

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE

PA Couch

CLIENT REPRESENTATIVES SIGNATURE

[Handwritten signature]

DOR

2914

CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

293040

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SAGASCO JOB NO. HY 8978 DATE 16/6/92

LOCATION KING 1 - BASS STRAIT VESSEL DERWENT ENTERPRISE

Table with columns FROM, TO, and SUMMARY OF OPERATIONS. Entries include vessel passage to King 1, survey system running, deployment of transducer and side scan fish, GPS receiver issues, and core K-1 and K-2 data.

Table with columns EQUIPMENT, NUMBER, EQUIPMENT, NUMBER, PERSONNEL, and TITLE. Entries list acoustic transponder deployment and recovery of fish.

[CONTINUED ON DOR 2916]

CONSUMABLES, VEHICLE, ACCOMMODATION

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE P Alwell

CLIENT REPRESENTATIVES SIGNATURE [Signature]

DOR 2915

CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

293041

DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	16/6/92 (CONT)
LOCATION	KING 1 BASS STRAIT		VESSEL	DERWENT ENTERPRISE	

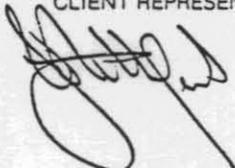
FROM	TO	SUMMARY OF OPERATIONS
1510		Vessel at Anchor at centre of array.
1520		Undertake relative calibration by measuring transponder
	1605	baselines in both directions. Bar check draft 2.99m.
1615	1645	velocity Dp (SVP16.4) water column 1499.43m/s
1900		Heave up Anchor and proceed to start of cross lines
1915		Deploy side scan fish
1939	2126	Running survey lines with Echosounder and side scan
2135		Recover side scan fish
2150	2359	Vessel at Anchor. Back up survey data and complete relative calibration calculations.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
				P. CASWELL	SURVEYOR
[AS POR 2905]			O/B	D. LOVERING	- " -
			VESEL	A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPAGLI	GPS BASE OP.

CONSUMABLES	1 x E/S	1 x S/S	2 x DISCS		
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

OPERATING ACOUSTICS
TRANSPONDERS ON SEABED

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Lowell		2916

DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	17/6/92
LOCATION	KING 1 - BASS STRAIT		VESSEL	DERWENT ENTERPRISE	

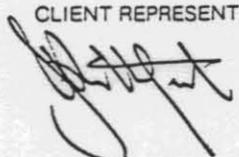
FROM	TO	SUMMARY OF OPERATIONS
0000	0310	Vessel at Anchor
0310		Heave up Anchor - DGPS corrections good
0320	0830	Deploy fish and commerce survey lines at 0330
0835	0845	Recover side scan fish and transducer mount
0915		Redeploy transducer mount with sonardyne dunker attached
0938	1000	Box in Compatt # 313 (PCRAW3.169)
1036	1051	- " - " - # 410 (PCRAW4.169)
1108	1123	- " - " - # 109 (PCRAW5.169)
1131	1145	- " - " - # 313 (PCRAW6.169)
1210		Vessel at anchor in centre of array. Processing calibration data
1320		Recover transducer and deploy dunker alone, to below vessel hull. Comparative DGPS/Acoustic fixes
1420	1430	Velocity Dip (SVP16.5)

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
→	1600	Complete calibration calculations and wait for good DGPS for fix comparisons			
1800	1815	Take comparative DGPS/Acoustic fixes (logged to file PCRAW7.169). Systems agree to ± 5m, calibration acceptable.			

(CONTINUED ON DOR 2918)

CONSUMABLES	
VEHICLE	
ACCOMMODATION	

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Cowell		2917

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SHELL JOB NO. HY 8978 DATE 18/6/92

LOCATION WILD DOG 1 VESSEL DERWENT ENTERPRISE

FROM	TO	SUMMARY OF OPERATIONS
0000	0100	Passage from Sagasco Block T/78 P
0100		Enter shell Permit VIC P/28
0315		On location at Wild Dog 1
0145		Survey system running - 12 Nm X 305° to location DGPS corrections received ok.
0325		Deploy Echosounder transducer
0340	0400	Undertake velocity dip (SVP 16.6) water column 1498.07m
0400	0410	Bar check. Draft at 2.99m.
0415		Deploy side scan fish
0439	1438	Running survey lines with Echosounder + side scan sonar
0545		Break in lines due to unusable corrections from Base
0715		station - interference to signal on 2 MHz
1450		Recover sidescan fish, stream drop core wire
	1510	and prepare current meter for observations

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
1520	2359	AT Anchor			
1545	1615	Current meter observations			
1820	1850	—	"	—	
2030	2100	—	"	—	

[Equipment as DOR 2905]

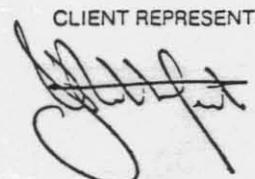
	o/b	P. CASWELL	SURVEYOR
		D. LOVERING	— " —
	VESSEL	A. TERRILL	GEOPHYSICIST
		N. SMITH	ENGINEER

CONSUMABLES 1 x E/S 1 x SS 3 x DISCS

VEHICLE H. CAMAGLI BASE OP.

ACCOMMODATION

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE P A Caswell	CLIENT REPRESENTATIVES SIGNATURE 	DOR 2919
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CONTRACTOR

ASSOCIATED SURVEYS INTERNATIONAL

293045

DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SHELL	JOB NO.	HY 8978	DATE	21/6/92
LOCATION	WILD DOG BASS STRAIT	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
0000	0650	Vessel at Anchor
0600		Monitoring DGPS corrections - being received regularly
0650	0715	Heave up Anchor and prepare drop cover
0732		Core C3 250397 E 5702761 N
0803		Core C7 250427 E 5702724 N
0805		GPS system off the air due to U.S. operators -
	1000	vessel to Anchor to standby (Bar check sounder and recover transducer.)
1000		Raise Anchor 1005 Good GPS positioning restored
1043		Core C14 250021 E 5702313 N
1122		Core C16 249877 E 5703125 N
1229		Core C10 250710 E 5703293 N
1245		Core C12 250872 E 5702459 N
1300		Core C15 249824 E 5702566 N
1318		Core C17 250135 E 5703356 N

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
1330	Core	C11	250919 E 5703062 N		
1400	Core	C13	250636 E 5702259 N		
1419	Core	C6	250430 E 5702885 N		
1446	Core	C16A	249863 E 5703136 N		
1522	Core	C18	249853 E 5702757 N		

[Continued on DOR 2922]

CONSUMABLES	
VEHICLE	
ACCOMMODATION	

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
<i>P. Alwell</i>	<i>[Signature]</i>	2922

DAILY OPERATIONS REPORT (HYDRO)

CLIENT SHELL	JOB NO. HY 8978	DATE 21/6/92 (CONT)
LOCATION WILD DOG 1	VESSEL DERWENT ENTERPRISE	

FROM	TO	SUMMARY OF OPERATIONS
1530		secure all equipment on deck, vessel underway towards Melbourne
1600		Contact Base station and advise that all survey work complete
1550	1700	Running checks on all backed up survey data on disc
1600	1800	H. Campigli commence demobilisation of DGPS Base station
1920		Vessel at anchor outside entrance to Port Philip Bay at 38° 20' S 144° 33.5' E
	2359	Continue with vessel demobilisation

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
				P. CASWELL	SURVEYOR
			O/B	D. LOVERING	- " -
[AS DOR 29105]		VESSEL		A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPIGLI	GPS BASE OP.
CONSUMABLES	2x DISCS	MISC. DROP CORE MATERIALS			
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE <i>P.A. Caswell</i>	CLIENT REPRESENTATIVES SIGNATURE <i>[Signature]</i>	DOR 2923
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DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SHELL	JOB NO.	HY 8978	DATE	22/6/92
LOCATION	MELBOURNE	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
0000	0030	Vessel at Anchor
0030		Pilot onboard, vessel underway to port
	0500	of Melbourne to berth at Victoria Dock
0530		Complete demobilisation of vessel, all
	1200	equipment packaged and loaded to truck.
1100		Obtain final fuel figures.
		D. Lovering return Adelaide
		P. Caswell / A. Terrill / N Smith return Perth
		* Base station equipment to be transported 23/6/92
		to Sadliers Transport in Melbourne to join
		with vessel equipment for freight by rail to Perth.
		* Samples from Wild Dog coring delivered by Harry
		Arrowsmith to nominated laboratory.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
				P. CASWELL	SURVEYOR
				D. LOVERING	- " -
[AS DOR 2905]				A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPELL	GPS BASE OP

CONSUMABLES	
VEHICLE	
ACCOMMODATION	B/FAST ONLY O/B VESSEL

AUTHORISED CONTRACT CHANGES/COMMENTS 1100 O/P FUEL TANKS. 7C 78 cm GENR 1 260 G
 DAILY SERVICE TANK 1950 Gall 7P MT -- 2 240 G
 7S MT

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Caswell		2924

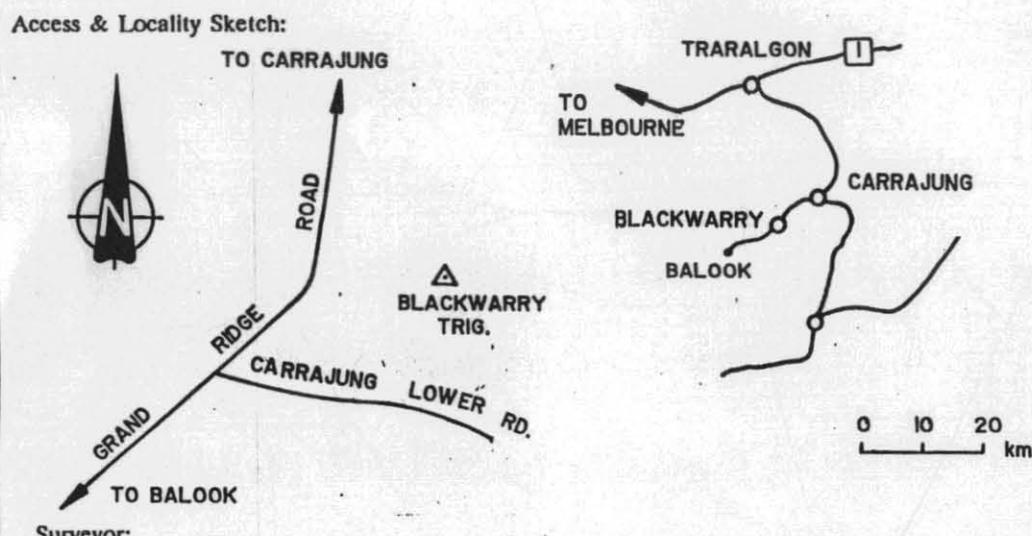
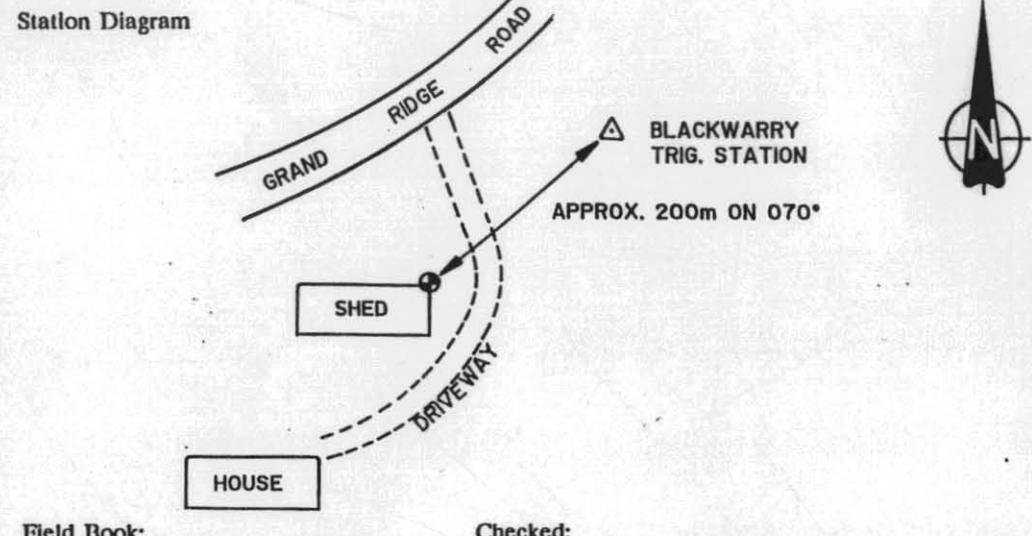
APPENDIX "B"

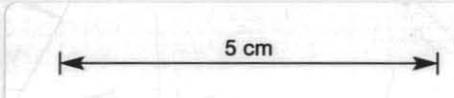
GPS PREDICTIONS

APPENDIX "C"

DGPS BASE STATION DESCRIPTIONS



<p>Established by: ASSOCIATED SURVEYS INTERNATIONAL</p>	<p>Date: 28-5-1992</p>	<p>Station Name: HY8978-McDonald</p>
<p>Station Description: Station is steel pole on corner of shed at property of S & M McDonald, Grand Ridge Road, Blackwarry, Victoria</p>	<p>Coordinate Details: ANS Spheroid: Projection: AMG Zone: 55 C.M.: 147°E Vertical Datum: AHD</p>	<p>Latitude: 38°24'18".0276 S Longitude: 146°38'45".3874 E Easting: 469086.141 Northing: 5749172.871 Height: 644.466</p>
<p>Access Description: Access to the above property is via Carrajung South of Traralgon. Turn off Grand Ridge Road 0.25km North of junction with Carrajung lower Road.</p>	<p>Comments on Accuracy: Horiz: ±0.05m Station surveyed in by GPS Static Baseline from Blackwarry Trig Station Vert:</p>	<p>WGS84LAT: 38°24'12".5623 S WGS84LONG: 146°38'50".1145 E WGS84HT: 650.984</p>
<p>Access & Locality Sketch:</p>  <p>Surveyor:</p>	<p>Station Diagram</p>  <p>Field Book: _____ Checked: _____</p>	



293052

THE FLOAT DOUBLE DIFFERENCE SOLUTION (L1)

Measure of geometry: 0.000003 Wavelength = 0.190294 (m/cycle)
 num meas = 1319 num used = 1288 rms_resid = 0.005785(m)
 Fit-Fit Chisq = 1639.004 NDF = 11.926

Reference SV: 11

SV	Ambiguity	FIT	Meas	SV	Ambiguity	FIT	Meas
12	10580.052f	0.033	134	15	4207797.963f	0.032	249
21	1403399.028f	0.024	321	23	3750423.023f	0.034	164
25	6552765.023f	0.027	206	28	2945822.011f	0.035	214

- Sigmax (m): 0.015811
- Sigmay (m): 0.012357
- Sigmaz (m): 0.008080
- SigmaN (cy): 0.102244
- SigmaN (cy): 0.060493
- SigmaN (cy): 0.075394
- SigmaN (cy): 0.101105
- SigmaN (cy): 0.065371
- SigmaN (cy): 0.032516

x 1.00
 y 0.10y 1.00
 z 0.18z-0.02z 1.00
 N 0.06N-0.97N-0.08N 1.00
 N 0.84N-0.38N-0.17N 0.39N 1.00
 N-0.31N-0.86N-0.24N 0.89N 0.1N 1.00
 N-0.18N-0.94N-0.04N 0.93N 0.16N 0.94N 1.00
 N-0.60N-0.59N 0.24N 0.58N-0.38N 0.74N 0.74N 1.00
 N-0.20N 0.08N 0.70N-0.09N-0.36N-0.07N 0.02N 0.41N 1.00

del_station: -0.000000 0.000000 0.000000

Station1: FIXED STATION

Station2: UNKNOWN STATION

	(00000)	(BLKW)	(00000)	(MCDD)
Latitude:	-38.40267608	-38 24 9.63390	-38.40348950	-38 24 12.56219
E-Long :	146.64829989	146 38 53.87960	146.64725411	146 38 50.11480
W-Long :	213.35170011	213 21 6.12040	213.35274589	213 21 9.88520
E-Height:	655.1230		650.9871	

Baseline vector: 99.7903 43.6898 -68.1964

Mark1_xyz :	-4180985.9513	2751798.1579	-3940975.7749
Az1 E1 D1 :	225.33276	-1.8447	128.5210
E1 N1 U1 :	-91.3580	-90.3015	-4.1359
Mark2_xyz :	-4180886.1610	2751841.8477	-3941043.9713
Az2 E2 D2 :	45.33341	1.8436	128.5210
E2 N2 U2 :	91.3570	90.3014	4.1359

INTEGER FIXED DOUBLE DIFFERENCE (L1) SOLUTION

CONTRAST	930.364677	5	
CHISQ	1655.313815	Change	16.310179
CONTRAST	294.626647	1	
CHISQ	1692.159279	Change	36.845464
CONTRAST	294.867614	4	
CHISQ	1693.078914	Change	0.919635
CONTRAST	881.175977	2	
CHISQ	1787.466030	Change	94.387116
CONTRAST	1120.063964	3	
CHISQ	1787.849813	Change	0.383783
CONTRAST	1199.223876	0	
CHISQ	2183.819503	Change	395.969690

rms_resid = 0.006678(m)

Sigmaz (m): 0.004676

x y z

x 1.00

y-0.68y 1.00

z 0.73z-0.66z 1.00

del_station: 0.007178 0.003421 -0.000891

Station1: FIXED STATION

Station2: UNKNOWN STATION

(00000) (BLKW)
 Latitude: -38.40267608 -38 24 9.63390
 E-Long : 146.64829989 146 38 53.87960
 W-Long : 213.35170011 213 21 6.12040
 E-Height: 655.1230

(00000) (MCDD)
 -38.40348953 -38 24 12.56229
 146.64725403 146 38 50.11452
 213.35274597 213 21 9.88548
 650.9844

Baseline vector: 99.7975 43.6932 -68.1973

Mark1_xyz : -4180985.9513 2751798.1579 -3940975.7749
 Az1 E1 D1 : 225.33386 -1.8458 128.5282
 E1 N1 U1 : -91.3649 -90.3047 -4.1386
 Mark2_xyz : -4180886.1539 2751841.8511 -3941043.9722
 Az2 E2 D2 : 45.33451 1.8447 128.5282
 E2 N2 U2 : 91.3638 90.3047 4.1386

FIXED DOUBLE DIFFERENCE SOLUTION (L1)

Measure of geometry: 0.000000 Wavelength = 0.190294 (m/cycle)

num_meas = 1319 num_used = 1299 rms_resid = 0.006922 (m)

Post-Fit Chisq = 2366.523 NDF = 12.028

Reference SV: 11

Integer Search Ratio = 294.627

SV	Ambiguity	FIT	Meas	SV	Ambiguity	FIT	Meas
12	10580.000X	0.047	143	15	4207798.000X	0.041	250
21	1403399.000X	0.027	321	23	3750423.000X	0.042	164
25	6552765.000X	0.027	206	28	2945822.000X	0.038	215

Sigmax (m): 0.005492

Sigmay (m): 0.003163

Sigmaz (m): 0.004831

x y z

x 1.00

y-0.68y 1.00

z 0.73z-0.66z 1.00

del_station: -0.000029 0.000029 -0.000006

Station1: FIXED STATION

Station2: UNKNOWN STATION

(00000) (BLKW)
 Latitude: -38.40267608 -38 24 9.63390
 E-Long : 146.64829989 146 38 53.87960
 W-Long : 213.35170011 213 21 6.12040
 E-Height: 655.1230

(00000) (MCDD)
 -38.40348953 -38 24 12.56230
 146.64725404 146 38 50.11453
 213.35274596 213 21 9.88547
 650.9840

Baseline vector: 99.7977 43.6929 -68.1972

Mark1_xyz : -4180985.9513 2751798.1579 -3940975.7749
 Az1 E1 D1 : 225.33378 -1.8460 128.5282
 E1 N1 U1 : -91.3647 -90.3048 -4.1390
 Mark2_xyz : -4180886.1536 2751841.8508 -3941043.9721
 Az2 E2 D2 : 45.33443 1.8448 128.5282
 E2 N2 U2 : 91.3636 90.3048 4.1390

Wed Jun 03 10:12:18 1992

APPENDIX "D"

SURVEY RUN LOGS



CLIENT: SAQASCO

JOB NO: HY 8978

LOCATION: KING 1

293056

DATE	RUN NO.	START TIME	END TIME	START FIX	END FIX	KTS RPM SPEED	LOG FILE DISC NO.	ECHO ROLL NO.	DIRECTION	HEAVE ON/OFF	SSS CABLE OUT	2 DRMS	COMMENTS	SURVEYOR
7/6/92	K38			TRIAL					LINE FOR TRACK CONTROL				- NO DATA LOGGED	PC
8/6/92	K16	0330	0349	1	39	5-6	P	1	340°	ON	300	3	RERUN - OFFLINE SSS ROLL #1 SS GAIN 4 No SONAR CONTACTS	PC
	K13	0400	0410	40	65	5-6	CRA	1	160°	ON	300	2-3	RERUN - OFFLINE TO 500m. OK to FIX 60 THEN GPS LOST. NO SSS CONTACTS	PC
	K10	0444	0500	66	98	5-6	W	1	340°	ON	325	3-4	SOL 550M ALONG SSS ROLL #2 NO SSS CONTACTS	PC
	K7	0527	0535	49	115	6	.	1	160°	ON	300	2-20	GPS CORR ^N POOR TO FIX 102 ABORTED DUE POOR CORRECTIONS	PC
	K4	0554	0612	116	153	5.5-6	16	1	340°	ON	325	2-4		PC
	K1	0620	0638	154	191	5.8-6.2	0	1	160°	ON	325	5-9	ONLINE 500M ALONG PCNAV FROZEN AT EOL NO SSS TARGETS	PC
	K3	0654	0656	197	200	6	P	1	340°	ON	-	4-5	ABORT OFFLINE	PC
	K3A	0714	0732	201	238	6	CRA	1	340°	ON	315	2-3		PC
	K6	0741	0759	239	277	5.9-6.2	AW	1	160°	ON	315	3-100	DROP TO 3 SVS MAX 28M OFFLINE NO SSS TARGETS	PC
	K9	0808	0810	278	281	6	2	1	340°	ON	315	98	3 SVS TO EOL SSS ROLL #3 SSS ROLL #3 ABORT GPS WINDOWS CRASH	PC
	K9A	0832	0852	282	319	5-6.2	16	1	340°	ON	310	2-3	SNAKING SOL. NO SSS TARGETS	PC
	K12	0920	0939	320	357	5.8-6.2	0	1	160°	ON	315	2-3		PC
	K15	1005	1022	358	394	6		1	340°	ON	315	5-6	OFFLINE 30M AT 1015 (3 SATS?) " END SSS ROLL #5	PC
	K18	1037	1054	395	431	6.0-6.2		1	160°	ON	315	2-3	NO SSS TARGETS END SSS ROLL #3	PC
													PCRAW 2.160 SSS ROLL #4 NO SSS CONTACTS	
													PCRAW 3.160 (CLOSED IN ERROR - VERY SMALL)	
													PCRAW 4.160	

* REPAIR IF POSSIBLE



CLIENT: SAQASCO

JOB NO: 8978

LOCATION: KING 1

293057

DATE	RUN NO.	START TIME	END TIME	START FIX	END FIX	KTS BPM SPEED	LOG FILE DISC. NO.	ECHO ROLL NO.	DIREC- TION	HEAVE ON/ OFF	SSS CABLE OUT	2DRMS	COMMENTS	E/S + SSS ONLY	SUR- VEYOR
8/6/92	K21	1108	1127	432	469	5.7-6.1	PCRAW 4.160	1	340	ON	315	2.5-3.0	SSS ROLL #4 (CONT)	CONT SSS ROLL #4 NO SSS CONTACTS	PC
(CONT)	K24	1141	1157	470	505	5.9-6.1	"	1	160	ON	315	2-3	26M OFFLINE FINAL 300M	(MINOR WEED? PATCHES) NO SSS CONTACTS	PC
✓	K27	1219	1237	506	543	6	"	1	340	ON	310	1.5-3	JUMPY GPS SOL	NO SSS CONTACTS	
✓(*)	K30	1251	1308	544	578	6.6	"	1	160	ON	325	8-100	BAD GPS GEOMETRY FROM FIX 556-576	NO POSITION NO SSS CONTACTS	PC
													SHIFT (LINE TO BE RERUN AS LOW PRIORITY)		
✓	K29	1324	1343	579	618	5.5-5.8	"	1	340	ON	310	2-3		NO SSS CONTACTS	PC
	K26	1355	1357	619	623	6.4	"	1	160	ON	310	-	About due satellites, dropped 5 → 4		PC
✓	K26A	1414	1430	624	658	6.5-6.8	"	1	160	ON	325	3-106	To 3 SVS FROM 1420 HRS	NO SSS CONTACTS	PC
9/6/92	K22	0449	0508	660	698	5.6-6.1	PCRAW 1.161	2	340	ON	305	2-5	SOME GAPS IN CORR ⁿ	NO SSS CONTACTS START SSS ROLL #5 FIX 693 SHIFT TO LINE SSS O/C NEAR SOL	PC
	K5	0520	0539	699	737	5.8-6.1	"	2	160	ON	300	2-3	MINOR DEBRIS OR WEED FIX 712	NO OTHER CONTACTS	PC
✓	K8	0551	0605	738	767	5.6-6.1	"	2	340	ON	300	2-20	FINISH LINE EARLY, NO CORRECTIONS - OK TO	NO SSS CONTACTS	PC
	K11	0625	0647	768	806	5.8-5.9	"	2	160	ON	315	5-13	CORR ⁿ ERRATIC AT SOL	18M PORT LINE FIX 780 NO SSS CONTACTS	PC
	K11												POSITION		
✓	K14	0703	0722	807	840	5.7-6.0	"	2	340	ON	300	3-5		NO SSS CONTACTS	
	K17	0734	0753	847	885	5.9	"	2	160	ON	315	3-99	3 SVS FROM FIX 869	NO SSS CONTACTS	PC
	K20	0808	0811	886	892	5.5	PCRAW 2.161	2	340	ON			OFFLINE 20M SOL	ABORTED DUE NAV	PC
	K20A						"	2	340	ON			(PROGRAM CRASH)		PC
✓	K20B	0922	0943	900	943	4.5-5	"	2	340	ON	260	2-3		NO SSS CONTACTS	PC

(*) RERUN IF POSSIBLE



CLIENT: SAQASCO

JOB NO: NY 8978

LOCATION: KING 1

293058

DATE	RUN NO.	START TIME	END TIME	START FIX	END FIX	KTS RPM/ SPEED	LOG FILE DISC. NO.	ECHO ROLL NO.	DIREC- TION	HEAVE ON/ OFF	SSS CABLE OUT	2DRMS	COMMENTS	SUR- VEYOR	
19/6/92	K23	1002	10 18 ²¹	944	982	5.8	PCRAW 2.161	2	160	ON	310	1.5-3.0	E/S + SSS ONLY NO SSS CONTACTS	PC	
/ (CONT)	K31	1034	1057	983	1029	4.5-5.0	-"-	2	340	ON	240	2-3	MAX OFFLINE + 16M FX 990 NO SSS CONTACTS START SSS ROLL #6	PC	
/	K28	11 15	1133	1030	1067	5.8-6.1	-"-	2	160	ON	300	2-10	GPS UNSTABLE 1049-50. CONSTELLATION SHIFTS FX 1054 + 1062 NO SSS CONTACTS	PC	
				(WEATHER DETERIORATING)											
√ *	K25	1147	12:10	1068	1116	3.5-4.5	-"-	2	340	ON		2-10	MINOR WEEED? TO STB NEAR EOL FX 1079 OFFLINE +20M DUE WX, FX 1083-20M 40M OFFLINE FX 1094. LINE FINISHED 200M	PC	
													CHECK NO ON RECORDS		
													SHORT DUE TO NAV. COMPUTER CRASH. PCRAW 2.161	CLOSE	
	K22	1230	1233	1117	1123	6	PCRAW 3.161	2	160	ON	/	25	ABORT BAD DGPS HIGH DRMS	PC	
√ *	K22A	1251	1309	1124	1158	5.9-7.5	-"-	2	160	ON	350	99→	SOL 3 SVS ^{→ EOL} INC SPEED FOR STEERAGE BAD GPS FX STOP LINES DUE TO DETERIORATION IN SOUNDING DATA.	FX	
													1140-42. " NO SSS CONTACTS		



CLIENT: SAGASCO

JOB NO: HY 8978

LOCATION: KING 1

293059

DATE	RUN NO.	START TIME	END TIME	START FIX	END FIX	KTS RPM/ SPEED	LOG FILE DISC. NO.	ECHO ROLL NO.	DIRECTION	HEAVE ON/OFF	CABLE OUT	2DRMS	COMMENTS	SURVEYOR
K15A	K22A			2936			PCRAW 1.168	K3	340	ON			(IGNORE HEAVE COMP - SEAS CALM)	
16/6/92	K22	0533	0534	2936	2939	6.7	PCRAW 1.168	K3	340	ON			MISS FIRST 1 KM DJG AUTO PILOT - ABORTED	PC
✓	K22	0725	0743	2940	2976	6.2	PCRAW 1.168	K3	160	ON	325	2-4	3SV → FX 2951 No CORR 2951-52 [THIS IS A RGRUN]	PC
✓	K19	0754	0811	2977	3012	6.3	-"-	K3	340	ON	325	2-3		PC
✓	K16	0824	0841	3013	3049	6.2	-"-	K3	160	ON	325	2-3	CENTRELINE	PC
✓	K13	0853	0911	3050	3086	6.3	-"-	K4	340	ON	325	2-4	MAX 38M OFF FX 3054. BREAK IN CORR 3075-6 20M OFFLINE START ONLINE KP700 THEN JNARKING	PC
✓	K8A	0920	0927	3087	3102	6.3	-"-	K4	160	ON	325	2-4	RGRUN 1 KM ONLY SSS ROLL K8 TRACK SEAS NA SOL	PC
✓	K10A	0931	0938	3102	3116	6.5	-"-	K4	160	ON	325	3-5	RGRUN APPROX 800 M ONLY WEAK SMD LINES WNW. ESE	PC
✓	K7A	0946	1003	3117	3152	6.3	-"-	K4	340	ON	325	2-4	CLOSE LOGGING FILE TRACK SEAS NR EDL	PC
				(CROSS LINES)									(SEA CONDITIONS REMAIN GOOD)	
✓	K41	1939	1956	3160	3194	6.3	PCRAW 2.168	K4	070	ON	260	1-2	STERN POS ² LOGGED (PRIMARY OFFSET) IN ERROR START SSS ROLL K9 1500 M ALONG	PC
✓ [1500M]	K40	2007	2019	3195	3220	6.2	-"-	K4	250	ON	260	2-?	PRIMARY OFFSET IS SOUNDER LOST CORRECTIONS FROM FX 3212 LOGGING OFF FX 3220	
✓	K39	2050	2107	3221	3255	6.4	-"-	K4	070	ON	275	2-3	BAD POSITIONS BETWEEN FX 3234-35.	PC
✓ [1200M]	K38	2118	2126	3256	3272	6.5	-"-	K4	250	ON	260	2-115	CENTRELINE FX 3268 TO 35V's (APPROX 20M JUMP)	PC
													END LINE EARLY - OK TO 1200 M ALONG	
17/6/92	K37	0330	0348	3273	3309	6.2	PCRAW 1.169	K4	070	ON	280	2-5	GOOD POS'N 4-5 SV'S	DL
	K36	0400	0417	3310	3344	6.1	"	K4	250	ON	275	2-5	GOOD POS'N 5-6 SV'S	DL
	K35	0428	0445	3345	3381	6.5	"	"	070	ON	275	2-5	" " 6 SV'S 3360 BAD FIX	DL
	K34	0455	0511	3382	3416	6.3	"	"	250	ON	275	2-5	" " 6 SV'S 3396 FIX QUESTIONABLE	DL
	K33	0523	0539	3417	3444	6.5	"	"	070	ON	275	2-6	MISSSED 1ST SOUND MEAS	DL

NO DIGITISED DATA



CLIENT:

JOB NO:

LOCATION:

293060

DATE	RUN NO.	START TIME	END TIME	START FIX	END FIX	KTS RPM SPEED	LOG FILE DRG. NO.	ECHO ROLL NO.	DIRECTION	HEAVE ON/OFF	CABLE OUT	ZDRMS	COMMENTS	SURVEYOR	
17/6/92	K32	0550	0606	3450	3484	6.5	ACRAW 1.169	K4	250	ON	275 275	2-5	4 SV'S	[DIGITISED DEPTHS OK]	DL
	K38A	0622	0640	3485	3520	6.5	ACRAW 1.169	K4	70°	ON	275	2-5	RERUN WHOLE LINE	"	DL
	K40 A	0652	0710	3521	3556	6.4	PLRAW 2.169	K4	250°	ON	275	1.5-5	RERUN WHOLE LINE	"	PC
	K42	0720	0737	3557	3591	6.2	--	K4	070°	ON	275	2-5	SSS SCOUR? 3565		DL
	K43	0747	0804	3592	3626	6.3	"	K4	250°	ON	275	2-5			DL
	K44	0813	0830	3627	3661	6.4	"	K4	070	ON	275	2-4		TRAWL MARKS NE 602	PC
<div style="border: 1px solid black; padding: 10px; transform: rotate(-15deg); display: inline-block;"> <p>SURVEY LINES COMPLETE</p> </div>															

APPENDIX "E"

TIDAL INFORMATION

LOCATION - KING

293062

199206080242	2.12	199206081142	0.82
199206080252	2.21	199206081152	0.86
199206080302	2.27	199206081202	0.92
199206080312	2.35	199206081212	0.99
199206080322	2.42	199206081222	1.05
199206080332	2.48	199206081232	1.11
199206080342	2.54	199206081242	1.18
199206080352	2.60	199206081252	1.26
199206080402	2.67	199206081302	1.32
199206080412	2.71	199206081312	1.41
199206080422	2.75	199206081322	1.47
199206080432	2.79	199206081332	1.55
199206080442	2.84	199206081342	1.64
199206080452	2.86	199206081352	1.72
199206080502	2.86	199206081402	1.81
199206080512	2.88	199206081412	1.89
199206080522	2.88	199206081422	1.97
199206080532	2.86	199206081432	2.06
199206080542	2.84	199206081442	2.14
199206080552	2.81	199206081452	2.23
199206080602	2.77	199206081502	2.31
199206080612	2.71	199206081512	2.39
199206080622	2.67	199206081522	2.48
199206080632	2.58	199206081532	2.56
199206080642	2.52	199206081542	2.65
199206080652	2.44	199206081552	2.71
199206080702	2.33	199206081602	2.79
199206080712	2.25	199206081612	2.86
199206080722	2.14	199206081622	2.92
199206080732	2.04	199206081632	2.98
199206080742	1.93	199206081642	3.05
199206080752	1.81	199206081652	3.09
199206080802	1.70	199206081702	3.13
199206080812	1.60	199206081712	3.15
199206080822	1.49	199206081722	3.17
199206080832	1.39	199206081732	3.19
199206080842	1.28	199206081742	3.19
199206080852	1.20	199206081752	3.19
199206080902	1.09	199206081802	3.17
199206080912	1.01	199206081812	3.15
199206080922	0.95	199206081822	3.11
199206080932	0.88	199206081832	3.07
199206080942	0.82	199206081842	3.02
199206080952	0.78	199206081852	2.96
199206081002	0.74	199206081902	2.88
199206081012	0.69	199206081912	2.79
199206081022	0.67	199206081922	2.71
199206081032	0.67	199206081932	2.63
199206081042	0.67	199206081942	2.52
199206081052	0.67	199206081952	2.42
199206081102	0.69	199206082002	2.29
199206081112	0.71	199206082012	2.18
199206081122	0.74	199206082022	2.08
199206081132	0.78	199206082032	1.95
		199206082042	1.85
		199206082052	1.72

199206082102	1.62	199206090922	1.58
199206082112	1.51	199206090932	1.47
199206082122	1.41	199206090942	1.41
199206082132	1.32	199206090952	1.32
199206082142	1.22	199206091002	1.24
199206082152	1.13	199206091012	1.18
199206082202	1.07	199206091022	1.11
199206082212	1.01	199206091032	1.07
199206082222	0.95	199206091042	1.03
199206082232	0.90	199206091052	0.99
199206082242	0.86	199206091102	0.97
199206082252	0.82	199206091112	0.95
199206082302	0.80	199206091122	0.92
199206082312	0.78	199206091132	0.92
199206082322	0.78	199206091142	0.92
199206082332	0.78	199206091152	0.95
199206082342	0.78	199206091202	0.97
199206082352	0.80	199206091212	0.99
199206000002	0.82	199206091222	1.01
199206080012	0.84	199206091232	1.05
199206090322	1.97	199206091242	1.09
199206090332	2.04	199206091252	1.13
199206090342	2.12	199206091302	1.20
199206090352	2.18	199206091312	1.24
199206090402	2.25	199206091322	1.30
199206090412	2.33	199206091332	1.37
199206090422	2.39	199206091342	1.43
199206090432	2.46	199206091352	1.49
199206090442	2.52	199206091402	1.55
199206090452	2.56	199206091412	1.62
199206090502	2.63	199206091422	1.70
199206090512	2.67	199206091432	1.76
199206090522	2.71	199206091442	1.85
199206090532	2.75	199206091452	1.91
199206090542	2.77	199206091502	1.97
199206090552	2.79	199206091512	2.06
199206090602	2.81	199206091522	2.12
199206090612	2.81	199206091532	2.21
199206090622	2.81	199206091542	2.27
199206090632	2.79	199206091552	2.35
199206090642	2.77	199206091602	2.42
199206090652	2.73	199206091612	2.50
199206090702	2.71	199206091622	2.56
199206090712	2.65	199206091632	2.63
199206090722	2.60	199206091642	2.69
199206090732	2.54	199206091652	2.75
199206090742	2.46	199206091702	2.79
199206090752	2.39	199206091712	2.86
199206090802	2.31	199206091722	2.90
199206090812	2.23	199206091732	2.94
199206090822	2.12	199206091742	2.98
199206090832	2.04	199206091752	3.00
199206090842	1.93	199206091802	3.02
199206090852	1.85	199206091812	3.05
199206090902	1.74	199206091822	3.05
199206090912	1.66		

199206091832	3.05	199206160612	0.55
199206091842	3.02	199206160622	0.57
199206091852	3.00	199206160632	0.59
199206091902	2.98	199206160642	0.63
199206091912	2.94	199206160652	0.67
199206091922	2.90	199206160702	0.71
199206091932	2.86	199206160712	0.76
199206091942	2.79	199206160722	0.80
199206091952	2.71	199206160732	0.86
199206092002	2.65	199206160742	0.92
199206092012	2.54	199206160752	0.99
199206092022	2.46	199206160802	1.05
199206092032	2.37	199206160812	1.13
199206092042	2.27	199206160822	1.20
199206092052	2.16	199206160832	1.28
199206092102	2.06	199206160842	1.34
199206092112	1.95	199206160852	1.43
199206092122	1.85	199206160902	1.51
199206092132	1.74	199206160912	1.60
199206092142	1.64	199206160922	1.68
199206092152	1.53	199206160932	1.76
199206092202	1.43	199206160942	1.85
199206092212	1.34	199206160952	1.93
199206092222	1.24	199206161002	2.02
199206092232	1.16	199206161012	2.08
199206092242	1.09	199206161022	2.16
199206092252	1.01	199206161032	2.25
199206092302	0.95	199206161042	2.33
199206092312	0.90	199206161052	2.42
199206092322	0.84	199206161102	2.48
199206092332	0.80	199206161112	2.56
199206092342	0.78	199206161122	2.63
199206092352	0.76	199206161132	2.69
199206090002	0.74	199206161142	2.75
199206090012	0.71	199206161152	2.79
199206160242	1.53	199206161202	2.86
199206160252	1.45	199206161212	2.90
199206160302	1.37	199206161222	2.94
199206160312	1.28	199206161232	2.96
199206160322	1.20	199206161242	2.98
199206160332	1.11	199206161252	3.00
199206160342	1.03	199206161302	3.00
199206160352	0.97	199206161312	3.02
199206160402	0.88	199206161322	3.00
199206160412	0.82	199206161332	3.00
199206160422	0.78	199206161342	2.98
199206160432	0.71	199206161352	2.96
199206160442	0.67	199206161402	2.92
199206160452	0.63	199206161412	2.88
199206160502	0.59	199206161422	2.84
199206160512	0.57	199206161432	2.77
199206160522	0.55	199206161442	2.73
199206160532	0.53	199206161452	2.67
199206160542	0.53	199206161502	2.60
199206160552	0.53	199206161512	2.54
199206160602	0.53		

199206161522	2.46	199206170302	1.79
199206161532	2.39	199206170312	1.70
199206161542	2.33	199206170322	1.62
199206161552	2.25	199206170332	1.53
199206161602	2.18	199206170342	1.43
199206161612	2.12	199206170352	1.34
199206161622	2.06	199206170402	1.26
199206161632	2.00	199206170412	1.18
199206161642	1.93	199206170422	1.09
199206161652	1.87	199206170432	1.01
199206161702	1.83	199206170442	0.92
199206161712	1.76	199206170452	0.86
199206161722	1.72	199206170502	0.80
199206161732	1.68	199206170512	0.74
199206161742	1.66	199206170522	0.67
199206161752	1.64	199206170532	0.63
199206161802	1.62	199206170542	0.59
199206161812	1.60	199206170552	0.57
199206161822	1.58	199206170602	0.53
199206161832	1.58	199206170612	0.53
199206161842	1.58	199206170622	0.50
199206161852	1.58	199206170632	0.50
199206161902	1.58	199206170642	0.50
199206161912	1.60	199206170652	0.53
199206161922	1.60	199206170702	0.55
199206161932	1.62	199206170712	0.57
199206161942	1.64	199206170722	0.59
199206161952	1.66	199206170732	0.63
199206162002	1.68	199206170742	0.67
199206162012	1.72	199206170752	0.71
199206162022	1.74	199206170802	0.78
199206162032	1.79	199206170812	0.82
199206162042	1.81	199206170822	0.88
199206162052	1.85	199206170832	0.95
199206162102	1.87	199206170842	1.03
199206162112	1.91	199206170852	1.09
199206162122	1.95	199206170902	1.16
199206162132	2.00	199206170912	1.24
199206162142	2.04	199206170922	1.32
199206162152	2.06	199206170932	1.41
199206162202	2.10	199206170942	1.49
199206162212	2.14	199206170952	1.58
199206162222	2.18	199206171002	1.66
199206162232	2.23	199206171012	1.74
199206162242	2.25	199206171022	1.83
199206162252	2.29	199206171032	1.91
199206162302	2.31	199206171042	2.00
199206162312	2.35	199206171052	2.08
199206162322	2.37	199206171102	2.16
199206162332	2.42	199206171112	2.25
199206162342	2.44	199206171122	2.33
199206162352	2.46	199206171132	2.42
199206160002	2.46	199206171142	2.50
199206160012	2.48	199206171152	2.58
199206170242	1.95	199206171202	2.65
199206170252	1.87		

199206171212 2.71
199206171222 2.77
199206171232 2.84
199206171242 2.90
199206171252 2.94
199206171302 2.98
199206171312 3.02
199206171322 3.05
199206171332 3.07
199206171342 3.09
199206171352 3.09
199206171402 3.09
199206171412 3.07
199206171422 3.05
199206171432 3.02
199206171442 2.98
199206171452 2.94
199206171502 2.90
199206171512 2.84
199206171522 2.79
199206171532 2.73
199206171542 2.65
199206171552 2.58
199206171602 2.50
199206171612 2.44
199206171622 2.35
199206171632 2.27
199206171642 2.18
199206171652 2.12
199206171702 2.04
199206171712 1.97

King 1

APPENDIX "F"

REPORT ON CALIBRATION OF ACOUSTIC ARRAY

ASSOCIATED SURVEYS INTERNATIONAL PTY LTD
LEAST SQUARES VARIATION OF COORDINATES ADJUSTMENT

File: FINAL.RPT

Time: 15:49:03

Date: 06-19-1992 (mm/dd/yyyy)

Title: KING 1 ACOUSTIC ARRAY

ADJUSTED COORDINATES

PT dE	NAME dN	EASTING	NORTHING
112	C112	372267.171	5617295.242
0.000	0.000		
410	C410	372194.762	5616134.997
0.000	0.000		
109	C109	373420.729	5615998.048
-0.000	0.000		

CORRECTIONS TO OBSERVATIONS

Obs Calculated	At	From C-O	To	Observed
1	313	100	410	228 1 41.00
41.00		-0.00		228 1
2	112		313	1164.403
0.666				1165.069
3	112		410	1162.045
0.675				1162.720
4	112		109	1737.191
-0.943				1736.248
5	313		109	1248.643
0.632				1249.274
6	313		410	1664.043
-0.906				1663.138
7	109		410	1233.195
0.633				1233.828

WVV	3.390
No of Observations	7
No of Redundancies	1
Variance Factor	3.390 (WVV / No Redundancies)

HY 8978SAGASCO KING 1JUNE 1992REPORT ON CALIBRATION OF ACOUSTIC ARRAY

A Sonardyne acoustic array was deployed and calibrated from the Derwent Enterprise on 16th and 17th June 1992 at the King 1 site in SAGASCO Permit T/18 P.

Four Sonardyne Compatts were deployed from the stern of the vessel, each attached to approximately 100 Kg of concrete weights. Compatt Nos. 112 and 313 were deployed using Stand Alone GPS for positioning. Corrections from the Base Station were subsequently restored and Compatt Nos. 410 and 109 were positioned using Differential GPS.

Calibration of the array was undertaken in two parts, firstly the relative calibration involving measurement of all inter-transponder seabed baselines and secondly, an absolute calibration to tie the array to a known coordinate framework. Baseline measurements were made between 1520 hrs and 1605 hrs on 16th June 1992 each baseline being measured in both directions and a mean value derived from a set of 10 observations.

Arbitrary coordinates were given to one transponder and relative coordinates computed for the other transponders based on a speed of sound in water of 1500.4 m/s at 72 m water depth. This value was obtained from a SVP16 velocity dip taken at 0430 hrs on 16th June. The adjustment revealed residuals of less than 1 metre on all baselines, thus demonstrating a strong internal consistency of the baseline observations.

The absolute calibration involved " box-in " observations around 3 Compatts, Nos. 313, 109 and 410. A repeat box-in was carried out on Compatt No. 313 to provide a check on the observations. Each box-in involved steaming a circle around the selected transponder measuring the acoustic range and simultaneous DGPS position. Observations were carried out between 0938 hrs and 1145 hrs on 17th June 1992. The offset from the GPS antenna to dunking transducer, mounted on the echo sounder bracket on the starboard side of the vessel, was accounted for using the known aft/stbd offset and calculated CMG for vessel heading. The CMG was seen to lag behind actual heading by up to 10 degrees, introducing a maximum error of approximately 3 m. By obtaining an even spread of data around the transponder this potential error was reduced.

The circles steamed were satisfactory and produced sufficient data for processing the box-ins using the ASI survey programs CALIB and ADJUST to compute a least squared adjusted position for each boxed-in transponder. The two separate box-ins of Compatt No.313 produced an agreement within 1 metre.

A least squares adjustment was then undertaken for the array, holding the boxed-in coordinate of Compatt No.313 and calculated bearing to Compatt No.410 as fixed and using all seabed baseline measurements. An SVP16 velocity dip was carried out at 1420 hrs on 16th June and a speed of sound of 1502 m/s determined for Compatt water depth. This value was used in the adjustment to convert baseline observations in milliseconds to distance in metres. The adjusted coordinates of the transponders were compared to the respective boxed-in coordinates of Compatt Nos.410 and 109 and an agreement of better than 5 metres was noted.

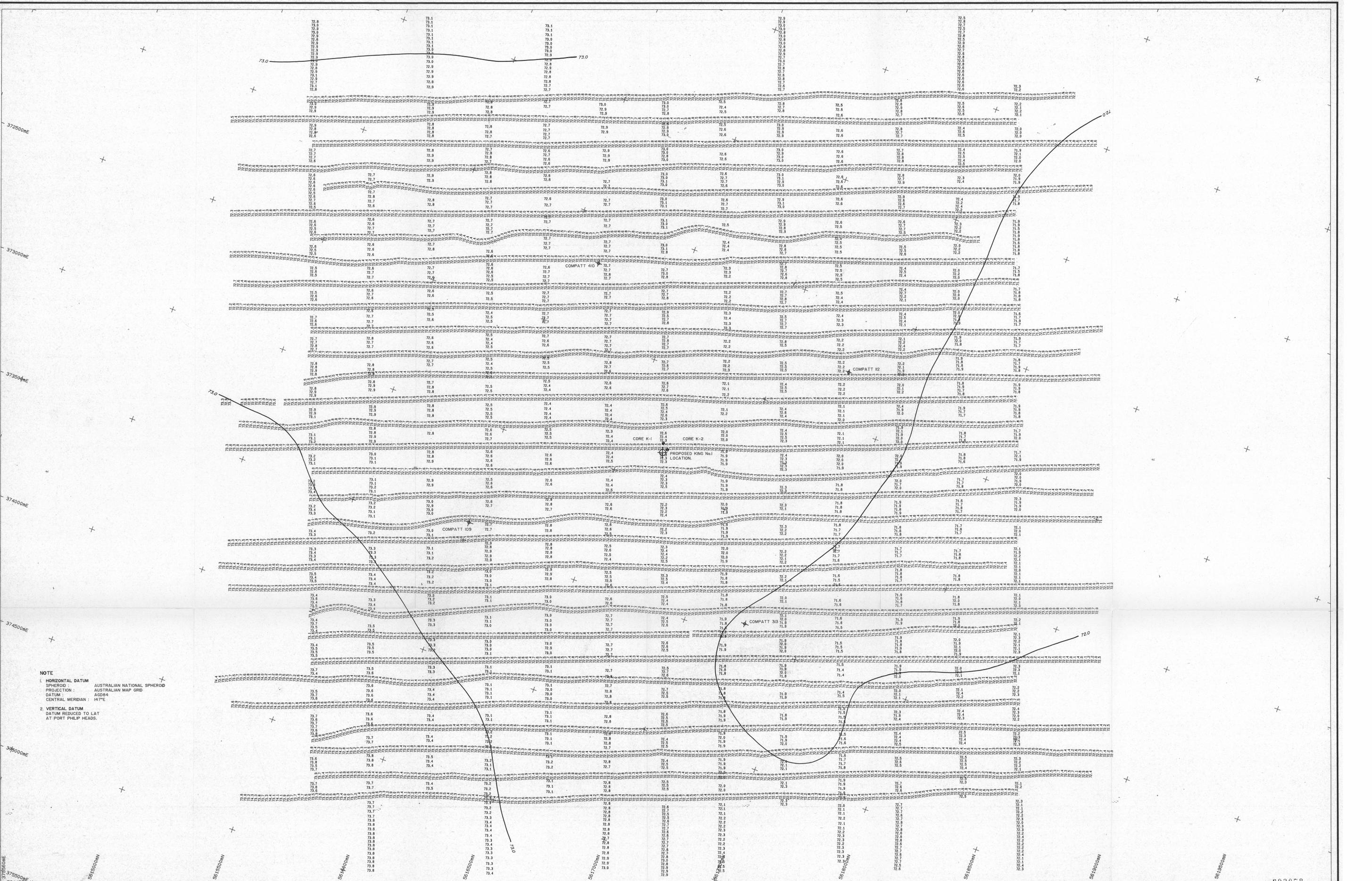
To verify the array calibration the vessel was positioned at the centre of the array and during a period of good DGPS comparisons were made between positions computed by the two systems. Vessel heading was manually input to the computer to try and ensure the offset computations between the two systems was correct for comparison fixes. Position differences as computed by acoustics and DGPS were of the order of 3-5 metres and the calibration accepted as satisfactory.

The final coordinates for the Compatts at King 1 are as follows :-

COMPATT 313	373431.020 E	5617247.040 N
COMPATT 112	372267.171 E	5617295.242 N
COMPATT 410	372194.762 E	5616134.997 N
COMPATT 109	373420.729 E	5615998.048 N

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DRAWINGS



NOTE
 1. HORIZONTAL DATUM
 SPHEROID: AUSTRALIAN NATIONAL SPHEROID
 PROJECTION: AUSTRALIAN MAP GRID
 DATUM: AG84
 CENTRAL MERIDIAN: 147°E
 2. VERTICAL DATUM
 DATUM REDUCED TO LAT
 AT PORT PHILIP HEADS.

27.7.92 COMPATT & CORE SAMPLE LOCATIONS PLOTTED.								KING No.1 (PERMIT T/18P) BATHYMETRIC AND GEOHAZARD SITE SURVEY BATHYMETRY				Client: SAGASCO RESOURCES LIMITED 60 HINDMARSH SQUARE ADELAIDE SOUTH AUSTRALIA				Surveyed P. CASWELL Field Bk Level Bk V.Date SEE NOTE 2 H.Date SEE NOTE 1 Checked 97				ASSOCIATED SURVEYS INTERNATIONAL Pty. Ltd. Survey House, 18 Promiss Street, West Perth P.O. Box 329, West Perth, W.A. 6005. Tel (09)322 4955 Fax (09)322 1775				Date JUNE 1992 Scale 1:5000 Drawn ERN Ref No. HY8978 Plan No. 8978-B-1 Rev. 1			
Date	Revision	Chkd	By					Date	Revision	Chkd	By	Orientation				This document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.											

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