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FLINDERS #1
(PERMIT T/25P)

BATHYMETRIC AND GEOHAZARD SITE SURVEY

SURVEY REPORT
JUNE 1992

Prepared for: **SAGASCO RESOURCES LIMITED**
60 HINDMARSH SQUARE
ADELAIDE SOUTH AUSTRALIA

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ABSTRACT

Between 13th and 15th June, 1992, Associated Surveys International conducted an echo sounder and side scan sonar survey over a 3km by 3km site centred on the proposed Flinders 1 location with given co-ordinates of:

Latitude:	40 deg 22 min 51.83 sec South
Longitude:	145 deg 40 min 18.7 sec East

Eastings:	387261.113 m
Northings:	5529084.837 m

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

Results of echo sounding, show the seabed across the site to be flat with a very gentle slope from approximately 67m in the south to approximately 69m in the east.

At location a reduced depth of 68.4 m below LAT is recorded and the seabed is flat and smooth.

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 be moderately reflective and textured, interpreted as indicating moderately dense sediments with small scale irregular seabed relief due to the presence of shells and minor current scoured features.

Drop coring near the location confirms the presence of slightly to moderately dense and cohesive fine grained clayey sediments down to 2.6m.

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 survey area.

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 the anchor locations, and 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 Flinders 1 site in Permit T/25P in southern Bass Strait.

Survey operations were carried out between 13th June, 1992 and 15th June, 1992, following earlier work on another site and a period of weather downtime.

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.

The survey of the Flinders 1 site was conducted over a 3 km by 3 km square centred on the following location:

Latitude:	40 deg 22 min 51.83 sec South
Longitude:	145 deg 40 min 18.70 sec East
Easting:	387261.113
Northing:	5529084.837
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 vessel's 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 large to come sufficiently close to the beacons at night to perform other than gross positioning checks.

3.2 Echo Sounder Calibration

Echo sounder calibration had been performed earlier at another site by velocity of sound determination and by determination of transducer draft.

On the Flinders 1 site, a velocity of sound determination was performed before the start of work and a bar check was performed later as weather conditions improved.

The SVP-16 velocity meter was lowered to the seabed to determine a series of velocity readings, the average of which (1501.6 m/sec), 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 (to 2.99m) so that the echo trace and the digitiser output read 6.0 metres.

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 items of 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 tow fish at the correct height of 10 to 15m 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 Flinders 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 site based on the Standard Port of Stanley were generated by ASI and the relevant information abstracted and input to a tidal file. PCMap automatically reduced raw soundings to LAT datum using this tidal file. Reduced soundings have been contoured at intervals of 1 m and are presented on the bathymetric chart, Plan Number 8978-B-2.

Tidal information is reproduced in Appendix E to this report.

5.3 Side Scan Sonar

The side scan sonar data were cursorily examined in the field to ensure that there were no features that would need additional investigation, and in order to produce a preliminary report.

In the ASI office after completion of field work, the data were all rigourously re-examined and any features of significance were plotted on a vessel track plot map correctly offset to allow for towfish layback.

At this site there were no features of significance that required mapping and thus no map of seabed features is presented in 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.

Differential corrections were received from the base station at a maximum rate of every 5 seconds. Periods of interference were encountered on the 2 MHz frequency that greatly degraded the update rate of corrections. This was particularly prevalent in the early hours prior to daylight and was attributed to destructive interference between the groundwave and skywave signals from the base station.

To overcome time lost waiting for satisfactory differential corrections, survey operations were extended to include a GPS window between 1830 hrs and 2130 hrs.

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

Reduced soundings and smoothing contours at 1m intervals are plotted on Plan 8978-B-2.

The bathymetry indicates an essentially flat site, sloping gently across the prospect from 67m in the southern corner to just over 69m to the north and east. A reduced depth of 68.4m is recorded at the intended centre location and the seabed appears flat within the immediate vicinity.

Reduced sounding can be regarded as accurate to 0.3m based on the fit observed at surveyed cross lines.

6.3 Side Scan Sonar

The side scan sonar data example of Figure 4 is typical of the entire survey area.

Seabed reflectivity is consistently moderate, and this consistency indicates uniform geology across the site.

The texturing of the sonar data is attributed to irregular small scale seabed relief of less than 0.1 m, and varies slightly in intensity across the survey area.

This small scale relief is interpreted as the result of current scouring and sculpting of moderately dense fine grained sediments, and is also due to coarser shelly material which has been exposed on the seabed by current activity.

Apart from minor variation in the intensity of small scale relief across the site, the only other noted feature on the side scan sonar is the presence of some trawl marks in the extreme east southeast corner of the site.

6.4 Sea Bed Sampling

Two drop core samples were taken near the Flinders 1 location on 15th June, 1992. Results and a ship-board visual classification are as follows:

Core #F-1 387266m East. 5529102m North

Penetration - 1.4m confirmed, probably 2.6m

Recovery - 1.1m

Top - light olive, slightly to moderately cohesive, silty clay or clayey silt, with fine sand and minor shell gravel.

Bottom - light olive grey, slightly to moderately cohesive, silty clay or clayey silt with a trace of shell gravel.

Core #F-2 387240m East. 5529115m North

Penetration - 2.1m confirmed, probably 2.6

Recovery - 1.2m

Top - as for Core #F-1

Bottom - as for Core #F-1

7.0 CONCLUSIONS AND RECOMMENDATIONS

The seabed is essentially flat at the proposed Flinders 1 location and there are no bathymetric hazards to rig placement identified from the echo sounder or side scan sonar data.

The sidescan data also appears to be free of any other hazards such as gas seepages.

The 2.6 m or more of moderately dense fine grained clayey sediments sampled near the location should be adequate for anchor holding if they are continuous at anchoring positions.

The sidescan sonar results indicate uniform geology across the survey area so it can be assumed that these sediments are continuous across to the anchor positions.

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 the anchor locations, and there is no way of determining the presence or absence of possible sub-bottom drilling hazards such as gas pockets.

APPENDIX "A"

DAILY OPERATIONS REPORTS

286026

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 Appartments Melbourne

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
GPS WINDOWS PC	1	PAN SPARES	1	P. CASWELL	SURVEYOR
PCNAV PC	2 (1 SP)	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	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Caswell		2901

Document No. AS-HY-001(1)

286027

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	GEOPHYSICIST
				N. SMITH	ENGINEER
				M. CAMIGLI	GPS BASE OP.
CONSUMABLES					
VEHICLE	BUDGET STATION WAGON				
ACCOMMODATION	3× RIVERSIDE APPTS				

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
P A Caswell		2902

Document No. AS-HY-001(1)

286028

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	4/6/92
LOCATION	MELBOURNE	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
AM		Complete Modifications to Deso 20 and test with TSS 320 Compensator. Interface TSS 320 to PCNav computer.
		Pour concrete for 29 x weights alongside dock.
		Complete interfacing of fix box and test.
		HF radios tested and loaded with DGPS operating frequencies
		H. Campigli to vessel to collect computers for base station.
		Run sidescan cable through block and run cable to bridge for counter. Self test on 260 recorder passed OK.
	→ PM	No meals / accommodation onboard vessel

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[AS DOR 2901]				P. CASWELL	SURVEYOR
				A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPIGLI	GPS BASE OP.
CONSUMABLES					
VEHICLE	BUDGET STATION WAGON				
ACCOMMODATION	3 x RIVERSIDE APPARTMENTS				

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	CLIENT REPRESENTATIVES SIGNATURE	DOR
P A Caswell		2903

Document No. AS-HY-001(1)

286029

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 checkout of hotel* and continue with mobilisation of vessel.
		Assemble drop corer 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 sounder loaded onboard
		Obtain channel beacon coords from MPA.
		Commence securing of mobilised equipment on bridge and transit cases in hold.
		Personnel (X 3) accommodated onboard. Lunch only taken.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
AS DOR 2901	WITH	ADDITION		P. CASWELL	SURVEYOR
of :-				A. TERRILL	GEOPHYSICIST
DESO 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
P A Caswell		2904

286030

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

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 SVP16 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 PCNa
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 trial location
		Gross error checks on DGPS along navigation channe
→	2359	Continue passage to site

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
AS DOR 2904 WITH		ADDITION OF :-		P. CASWELL	SURVEYOR
				A. TERRILL	GEOPHYSICIST
272 TOW FISH	2 (1 SP)			N. SMITH	ENGINEER
CURRENT METER	1			H. CAMPIGLI	GPS BASE OP.
	*	FOR SHELL PART		D. LOVERING	SURVEYOR
		OF WORK ONLY		(ONBOARD 1100 HRS)	
CONSUMABLES					
VEHICLE	BUDGET STATION WAGON		RETURNED 1650 HRS RENTAL # 255392		
ACCOMMODATION	4x ONBOARD VESSEL				

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

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
P A Linnell		2905

Document No AS-HY-001(1)

286031

CONTRACTOR

DAILY OPERATIONS REPORT (HYDRO)

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

FROM	TO	SUMMARY OF OPERATIONS
0000	→	Passage to king 1 location
0530		Vessel cross into sagasco Block T/18P - mobilisat. 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 SVP16 dip (SVP16.1)
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
				P. CASWELL	SURVEYOR
[AS DOR 2905]			Q/B VESSEL	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
P A Caswell		2906

Document No. AS-HY-001(1)

286032

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 7 km @ 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
P A Caswell		2907

Document No. AS-HY-001(1)

286033

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 all noisy.
0415		Improvements to corrections, run in to first line
0430		Running survey lines with Echo sounder and side
	1310	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 tracker
1410	1500	Back up survey data to disc and archive preparation

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
1400 1730	Vessel steaming with/into weather remaining close to lee				
1730 2359	Underway towards N. Tasmania coast for shelter				
[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

FIRST LINE FOR DAY COMMENCED 04:49

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Caswell		2908

Document No AS-HY-001(1)

CONTRACTOR

286034

DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	10/6/92
LOCATION	BASS STRAIT	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
0000	0250	Vessel heading for shelter
0250		At Anchor Sawyer Bay, North Tasmania
		Routine Maintenance on equipment, general
→	2359	administration.
		Strong SW winds persist - obtain regular
		weather reports.

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

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
P A Caswell		2909

Document No. AS-HY-001(1)

286035

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	11/6/92
LOCATION	BASS STRAIT	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
0000		Vessel at Anchor off Stanley, North Tasmania
		waiting on improvement to weather SW
	2230	winds 25-30 kts persist
2230		Heave up anchor, vessel u/way to
	2359	Flinders 1 location

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	HEAT GUN / ELECTRICAL TAPE PURCHASED ASHORE IN STANLEY.
VEHICLE	
ACCOMMODATION	

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Caswell		2910

Document No AS-HY-001(1)

286036

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 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
	0345	conditions for running lines.
0345		Vessel u/way to shelter, conditions remain
		unfavourable for safe deployment of survey
		equipment and collection of satisfactory data
0730		At Anchor off Stanley.
		General maintenance and administration
		Dummy runs with drop corer device, assemble
	2359	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. CAMPIGLI	GPS BASE OP.
CONSUMABLES	PURCHASED 150m x 10mm WIRE FOR DROP CORER				
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
P A Caswell		2911

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286037

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

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
0000		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 1501.5 m/s. Transducer draft 2.97 m - 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 Desa 20. Spool new wire to drop 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]					P. CASWELL	SURVEYOR
				O/B	D. LOVERING	— " —
				VESSEL	A. TERRILL	GEOPHYSICIST
					N. SMITH	ENGINEER
					H. CAMPIGLI	GPS BASE OP
CONSUMABLES		1½ E/S 155 4 DISCS				
VEHICLE						
ACCOMMODATION						

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
P A Caswell		2912

Document No. AS-HY-001(1)

286038

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	14/6/92
LOCATION	FLINDERS 1 - BASS STRAIT	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS
0000	0500	Vessel at Anchor on Flinders 1 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 ; liase 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
2155	2215	Back up survey data to disc and sort analogue records.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
[Equipment as DOR 2905]				P. CASWELL	SURVEYOR
			O/B	D. LOVERING	— " —
			VESSEL	A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPIGLI	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	CLIENT REPRESENTATIVES SIGNATURE	DOR
PACaswell		2913

Document No. AS-HY-001(1)

286039

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

CLIENT	SAGASCO	JOB NO.	HY 8978	DATE	15/6/92
LOCATION	FLINDERS 1 - BASS STRAIT	VESSEL	DERWENT ENTERPRISE		

FROM	TO	SUMMARY OF OPERATIONS SEAS < 1M
0000		Vessel at anchor Flinders 1 location
0220		Monitoring DGPS corrections - too sporadic for survey.
0500		Heave up Anchor
0520		Deploy fish and run in to Line F21
0535	1119	Running survey lines Echosounder + Sidescan Sonar
1125		Recover fish and prepare for drop coring
1223		Lower drop corer to 20m from seabed
1231		Core F-1 (Fix 2823) 387266 E 5529102 N PEN 1.4 CONFIRMED BEK 2.6 PROBABLE 1.1
1319		Core F-2 (Fix 2824) 387240 E 5529115 N PEN 2.1 CONFIRMED 2.6 PROBABLE
1325	1350	Secure coring equipment and proceed to anchor LEE 1.2
1650		Heave up on anchor . No corrections from base station
1938		Corrections restored , running in to line F16A
1947	2123	Running survey lines to complete survey
2130	2150	Recover side scan fish and overside transducer.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
2359	Vessel	v/way to	King 1	location	
[Equipment	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 SS 3 DISC				
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Caswell		2914

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CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL 286040

DAILY OPERATIONS REPORT (HYDRO)

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

FROM	TO	SUMMARY OF OPERATIONS
0000	0300	Vessel contrive passage to King 1
0130		Survey system running, Diff corrections good
0305	0320	Deploy sounder transducer and side scan fish
0328		Corrections off the air, contact Base Operator -
		problem with GPS receiver, change with spare and
	0455	restore corrections to vessel. (0430 SVP Dip Vel. 1500.17m/s)
0533		Commence first line, abort due to problems with
	0710	vessel's Autopilot - Ship's Engineer investigating cause
0725	1003	Recommence survey lines and complete primary lines.
1010		Recover side scan fish and prepare drop corer.
1050		Core K-1 (Fix 3013) 372621 E 5616659 N
1130		Core K-2 (Fix 3016) 372641 E 5616685 N
1155		Redeploy side scan fish - problem with satellite antenna
		at base no corrections being received.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
1230	Recover fish and prepare acoustic transponders for				
	deployment using GPS Stand Alone				
1352	Drop	Transponder #	112	372236 E 5617393 N	
1413	Drop	Transponder #	313	373418 E 5617199 N	
1415	Corrections restored from base station				
1432	Drop	Transponder #	109	373416 E 5615993 N	
1453	Drop	Transponder #	410	372188 E 5616131 N	
		[CONTINUED ON DOR 2916]			
CONSUMABLES					
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
P Abwell		2915

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL 286041

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 Dip (SVP16.4) Water Column 1499.43 m/s
1900		Heave up Anchor and proceed to start of cross lines
1915		Deploy side scan fish
1939	2126	Running survey lines with Echosander and sidescan
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 DOR 2905]			O/B	D. LOVERING	— " —
			VESSEL	A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPIGLI	GPS BASE OP.
CONSUMABLES	1x E/S 1x S/S 2x Discs				
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS OPERATING ACOUSTICS TRANSPONDERS ON SEABED.

PARTY CHIEF'S SIGNATURE PA Caswell

CLIENT REPRESENTATIVES SIGNATURE

DOR 2916

286042

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

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 commence 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 (PLRAW 3.169)
1036	1051	— " — " — # 410 (PLRAW 4.169)
1108	1123	— " — " — # 109 (PLRAW 5.169)
1131	1145	— " — " — # 313 (PLRAW 6.169)
1210		Vessel at anchor in centre of array. Processing calibration data
1320		Recover transducer and deploy dunker alone to
	1345	below vessel hull. Comparative DGPS/Acastic fixes
1420	1430	Velocity Dip (SVP 16.5)

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
→ 1600	Complete calibration calculations and wait for good DGPS for fix comparisons				
1800 1815	Take comparative DGPS/Acastic fixes (Logged to file PLRAW 7.169). 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
P A Cowell		2917

286043

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

DAILY OPERATIONS REPORT (HYDRO)

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

FROM	TO	SUMMARY OF OPERATIONS
1820	1830	Recover duntring transducer and heave up Anchor
1835		Vessel depart king 1 location for Wild Dog site
		All survey equipment secured for passage
2000		Vessel depart Sagasco Permit T/18P
→	2359	Passage to Wild Dog

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
				P. CASWELL	SURVEYOR
[AS DOR	2905]		O/B	D LEVERING	— " —
			VESSEL	A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				H. CAMPIGLI	GPS BASE OP
CONSUMABLES	½ x ES ½ x SS 2x Discs				
VEHICLE					
ACCOMMODATION					

AUTHORISED CONTRACT CHANGES/COMMENTS OPERATING ACOUSTICS

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
PA Caswell		2918

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CONTRACTOR

286044

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 (1½-2m long swell)
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 (SVP16.6) Water column 1498.07m/
0400	0410	Bar check . Draft at 2-99 m.
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]					P. CASWELL	SURVEYOR
				O/B	D. LOVERING	— " —
				VESSEL	A. TERRILL	GEOPHYSICIST
					N. SMITH	ENGINEER
CONSUMABLES		1 x E/S 1 x SS 3 x DISCS				
VEHICLE					H. CAMPAGLI	BASE OP.
ACCOMMODATION						

AUTHORISED CONTRACT CHANGES/COMMENTS

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

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CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL 286045

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 corer
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
P A Cowell		2922

Document No. AS-HY-001(1)

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL 286046

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	2905]		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	CLIENT REPRESENTATIVES SIGNATURE	DOR
P A Caswell		2923

286047

CONTRACTOR ASSOCIATED SURVEYS INTERNATIONAL

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 Harm
		Arrensmith to nominated laboratory.

EQUIPMENT	NUMBER	EQUIPMENT	NUMBER	PERSONNEL	TITLE
				P CASWELL	SURVEYOR
				D LOVERING	— " —
[AS DOR 2905]				A. TERRILL	GEOPHYSICIST
				N. SMITH	ENGINEER
				M. CAMPBELL	GPS BASE OP
CONSUMABLES					
VEHICLE					
ACCOMMODATION	B/FAST ONLY C/B VESSEL				

AUTHORISED CONTRACT CHANGES/COMMENTS 1100 DIP FUEL TANKS. 7C 78 cm 7P MT 7S MT

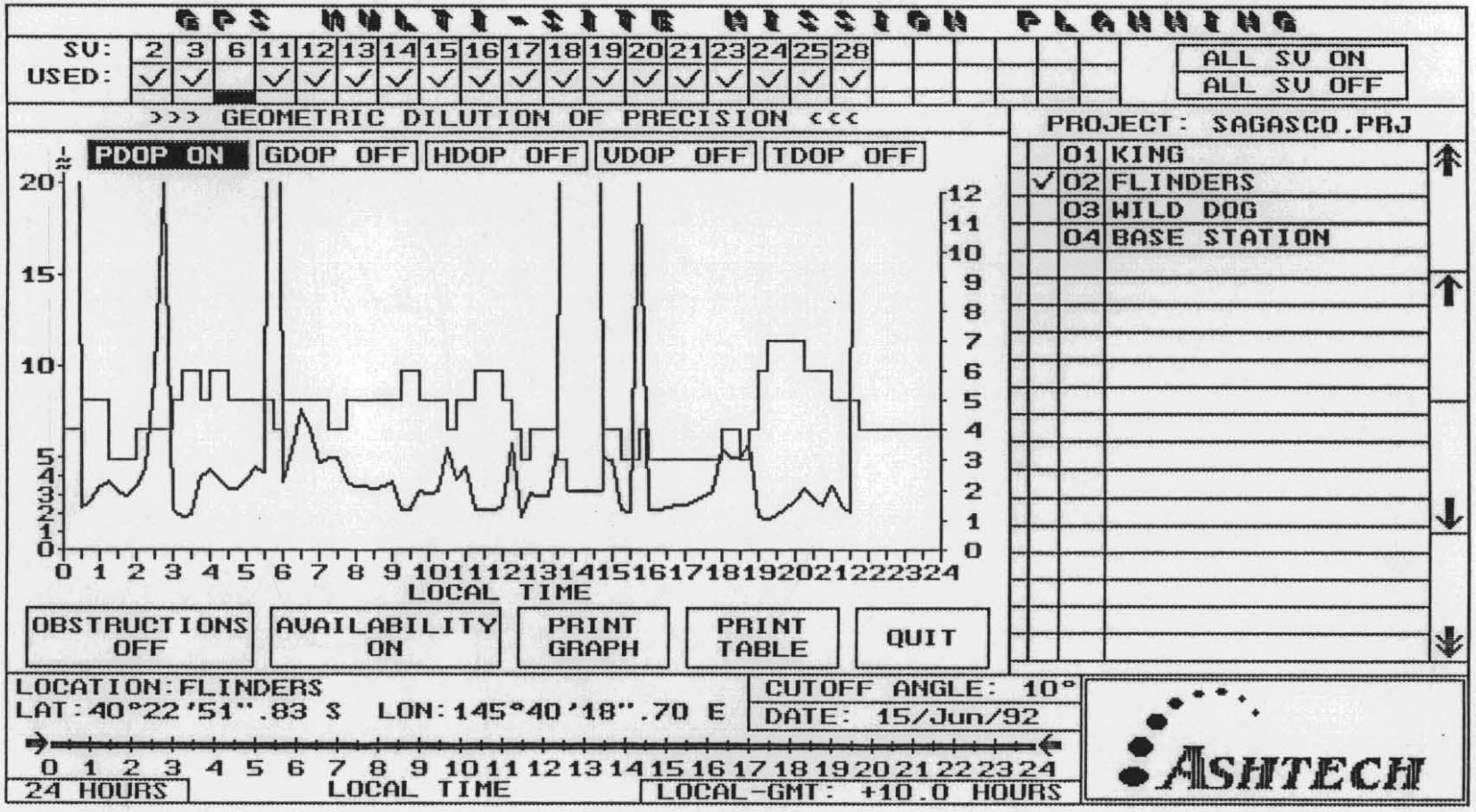
DAILY SERVICE TANK 1950 gall

GENR 1 260 G — 2 240 G

PARTY CHIEF'S SIGNATURE	CLIENT REPRESENTATIVES SIGNATURE	DOR
P A Caswell		2924

APPENDIX "B"

GPS PREDICTIONS


GPS MULTI-SITE MISSION PLANNING
SV:
USED:
2 3 6 11 12 13 14 15 16 17 18 19 20 21 23 24 25 28
ALL SV ON
ALL SV OFF
>>> GEOMETRIC DILUTION OF PRECISION <<<
PROJECT: SAGASCO.PRJ
PDOP ON
GDOP OFF
HDOP OFF
VDOP OFF
TDOP OFF
01 KING
02 FLINDERS
03 WILD DOG
04 BASE STATION
LOCAL TIME
OBSTRUCTIONS OFF
AVAILABILITY ON
PRINT GRAPH
PRINT TABLE
QUIT
LOCATION: FLINDERS
LAT: 40°22'51".83 S LON: 145°40'18".70 E
CUTOFF ANGLE: 10°
DATE: 15/Jun/92
24 HOURS
LOCAL TIME
LOCAL-GMT: +10.0 HOURS
ASHTECH

5 cm

APPENDIX "C"

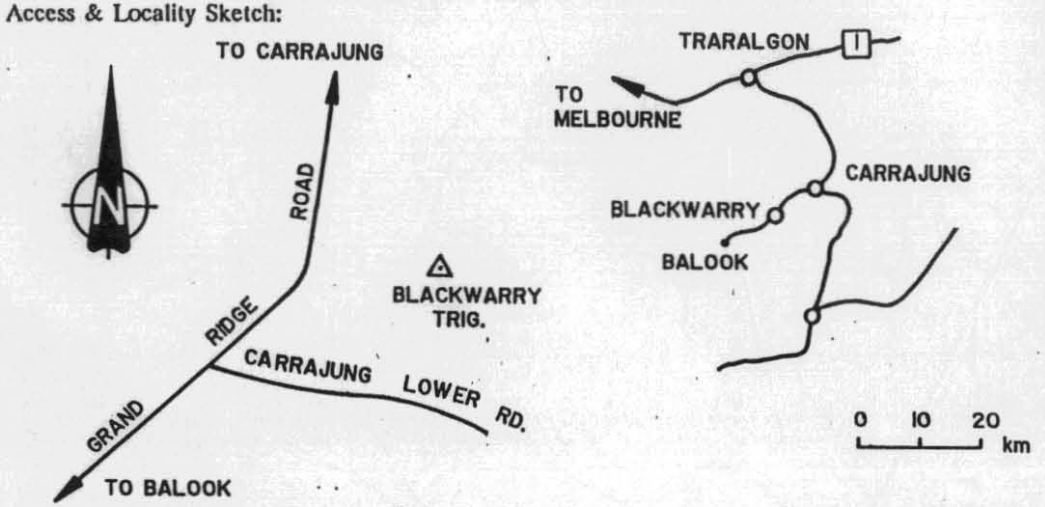
DGPS BASE STATION DESCRIPTION

ASSOCIATED SURVEYS INTERNATIONAL PTY LTD A.C.N. 009 172 990

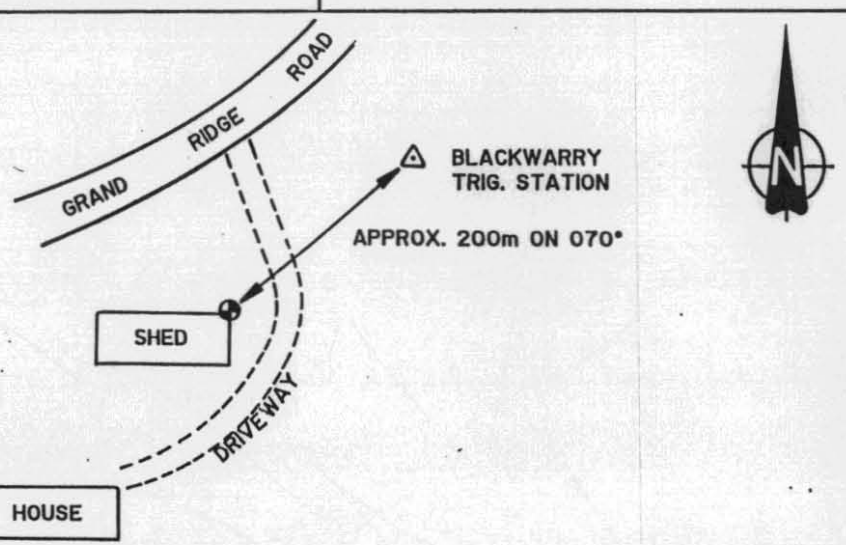
SURVEY STATION SUMMARY

Established by: ASSOCIATED SURVEYS INTERNATIONAL	Date: 28-5-1992	Station Name: HY8978-McDonald
Station Description: Station is steel pole on corner of shed at property of S & M McDonald, Grand Ridge Road, Blackwarry, Victoria	Coordinate Details: ANS Spheroid: Projection: AMG Zone: 55 C.M.: 147°E Vertical Datum: AHD	Latitude: 38°24'18".0276 S Longitude: 146°38'45".3874 E Easting: 469086.141 Northing: 5749172.871 Height: 644.466
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.	Comments on Accuracy: Horiz: ±0.05m Station surveyed in by GPS Static Baseline from Blackwarry Trig Station Vert:	WGS84LAT: 38°24'12".5623 S WGS84LONG: 146°38'50".1145 E WGS84HT: 650.984

Access & Locality Sketch:



Station Diagram



Surveyor:

Field Book:

Checked:

28605

DOC NO : AS-HY-029(1)

5 cm

REF : HY29GF/QA5

```
   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)                      (00000)    (MCDD)
  Latitude: -38.40267608 -38 24  9.63390        -38.40348953 -38 24 12.56229
  E-Long  : 146.64829989 146 38 53.87960        146.64725403 146 38 50.11452
  W-Long  : 213.35170011 213 21  6.12040        213.35274597 213 21  9.88548
  E-Height: 655.1230                             650.9844

  Baseline vector:         99.7975        43.6932       -68.1973

  Mark1_xyz  : -4180985.9513   2751798.1579  -3940975.7749
  Az1 El1 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 El2 D2 :       45.33451        1.8447       128.5282
  E2 N2 U2   :       91.3638       90.3047         4.1386


T  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

d_station: -0.000029 0.000029 -0.000006
     Station1: FIXED STATION                Station2: UNKNOWN STATION
                 (00000)    (BLKW)                      (00000)    (MCDD)
  Latitude: -38.40267608 -38 24  9.63390        -38.40348953 -38 24 12.56230
  E-Long  : 146.64829989 146 38 53.87960        146.64725404 146 38 50.11453
  W-Long  : 213.35170011 213 21  6.12040        213.35274596 213 21  9.88547
  E-Height: 655.1230                             650.9840

  Baseline vector:         99.7977        43.6929       -68.1972

  Mark1_xyz  : -4180985.9513   2751798.1579  -3940975.7749
  Az1 El1 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 El2 D2 :       45.33443        1.8448       128.5282
  E2 N2 U2   :       91.3636       90.3048         4.1390
Wed Jun 03 10:12:18 1992
```

286052

BLACKWARRY - MACDONALD

286053

```
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)
Post-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     y     z     N     N     N     N     N     N
x 1.00
y  .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 El1 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 El2 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)
```

APPENDIX "D"

SURVEY RUN LOGS

ASSOCIATED SURVEYS INTERNATIONAL Pty. Ltd.

SURVEY LOG RUN 2054 286055 (1)

CLIENT: SAGASCO JOB NO: HY 8978 LOCATION: FLINDERS 1 – T/25P

DATE	RUN NO.	START TIME	END TIME	START FIX	END FIX	KTS ~~BPM~~ SPEED	LOG FILE DISC ~~NO.~~	ECHO ROLL NO.	DIRECTION	HEAVE ON/ ~~OFF~~	CABLE OUT	2 DRMS	E/S + SSS ONLY COMMENTS	SURVEYOR
13/6/92	F44	0554	0614	1160	1200	5-6	PCRAW 1.165	F1	250°	ON	225 (X-LINES) 5→		SSS ROLL F1 NO CORRECTIONS 0559→0613 RERUN?	PC
	F43	0633	0651	1201	1236	6-6.5	–"–	F1	070°	ON	250	3-12	40m OFFLINE AT START GPS JUMPY DUE TO	
													POOR UPDATE of CORRECTIONS (SSS 200m Range)	PC
✓	F42	0707	0727	1237	1277	5-6	–"–	F1	250°	ON	235	3-5	FIX 1262-66 NAV. JUMPY	PC
✓	F41	0738	0756	1280	1315	5-6	–"–	F1	070°	ON	250	3 SATS (4) 98.9-3.0	50m OFFLINE AT START FIX 1301, 1302, 1303 CHECK SLOW UPDATE.	PC
✓	F40	0810	0829	1316	1356	5-6	–"–	F1	250°	ON	230	1-5	FIX 1316-17 BAD NAV. 40m OFFLINE FIX 1340	
													NO SSS CONTACTS FIX 1354 NO CORR^N (1355 OK) TEXTURE CHANGES	PC
✓	F39	0843	0901	1357	1393	6	PCRAW 2.165	F1	070°	ON	245	2-7	FIX 1384 OFFLINE DUE NO CORR^N "	PC
✓	F38 (C/L)	0914	0933	1394	1432	6	–"–	F1	250°	ON	225	2-5	SSS TEXTURE CHANGES NEAR EOL FIX 1395 (NO CORR^N) 35m OFFLINE FIX 1398 (FIX 1423, PC	
✓	F37	0948	1005	1433	1469	5.5-6	–"–	F1	070°	ON	245	1-6	NO SSS CONTACTS NAV JUMPY). FIX 1456 POOR UPDATE, ALSO BEFORE 1465	
	F36	1018	1024	1470	1485	6	–"–	F1	250°	ON	—	1→20	→EOL 1469 OK	PC
													→ABORTED DUE POOR CORRECTIONS	
✓	F36A	1051	1109	1486	1523	5.5-6	–"–	F1	250°	ON	235-250	2-4	NO SSS CONTACTS	PC
✓	F35	1122	1139	1524	1559	6	–"–	F1	070°	ON	250	2-3	"	PC
✓	F34	1150	1209	1560	1598	5.8-6.2	PCRAW 3.165	F1	250°	ON	230	1.5-5	"	PC
✓	F33	1222	1240	1599	1634	6.2	–"–	F1	070°	ON	250	–29	NAV POOR NO SSS CONTACTS FIX 1622→EOL TEXTURE CHANGES	~~DL~~
✓	F32	1253	1311	1635	1671	6	–"–	F1	250°	ON	225	2-10	" TRANS MARKS NEAR SOL	~~DL~~
✓?	F31	1322	1341	1672	1710 ~~1687~~	6-2	–"–	F1	340°	ON	~300	2-10	NO SSS CONTACTS / TEXTURE FIXS 1688→1706 No good POSSIBLE RERUN SSS ROLL F2	DL
✓	F28	1354	1412	1711	1748	6	–"–	F1	160°	ON	290	2-102 (3SATS)	LAST PART OF LINE ON 3 SATS SSS "	DL

286056

F(2)

ASSOCIATED SURVEYS INTERNATIONAL Pty. Ltd.

SURVEY LOG RUN 2055

CLIENT: SAGASCO JOB NO: HY 8978 LOCATION: FLINDERS 1 - T/25 P

DATE	RUN NO.	START TIME	END TIME	START FIX	END FIX	KNOTS ~~RPM~~/ SPEED	LOG FILE ~~DISC NO.~~	ECHO ROLL NO.	DIRECTION	HEAVE ON/ ~~OFF~~	CABLE OUT	2 DRMS	COMMENTS (ES + SSS ONLY)	SURVEYOR
13/6/92	F25	1932	1950	1749	1786	5.5-6.2	PCRAW 4.165	F1	340°	ON	300	1-16	NO SSS CONTACTS – VARIABLE ~~TEXTURE~~ NO CORRECTIONS AT START → FIX 1753 THEN 40M	
													OFFLINE TO FIX 1760 (KP 1000) [OK without Heave Comp..]	PC
✓	F22	2003	2014	1787	1797	5-6	-"-	F1	~~060~~°	ON	✓	1-3	LINE ABORTED PRINTER HANG UP. DATA → PRN FILE	PC
													LOGGED TO FIX 1797 935 M ALONG AT LEAST	
✓	F22A	2029	2043	1810	1837	5-6	-"-	F1	160°	ON	300	2-5	NO SSS CONTACTS. VARIABLE ~~TEXTURE~~ FIX 1829 POOR UPDATE SOL AT KP 937	PC
✓	F19	2055	2113	1838	1873	6	-"-	F2	340°	ON	300	2-4	~~SSS ROLL F3~~ SSS "	PC
	F16	2127	2140 ~~2135~~	1874	1901	6	-"-	F2	160°	ON	300	2-118	SSS " 2S OFFLINE AT FIX 1875. FIX 1892 DROP TO 3 SVS	
			↖	CHECK	PRN. FILE								JUMP 10M STBD CORRECTIONS STOPPED AT 2138	
													END LINE EARLY AT KP 2420 SSS "	PC
✓	14/6/92 F13	0552	0610	1902	1938	5.6-6.2	PCRAW 1.166	F2	340°	ON	300	5-18	SSS ROLL F3 SOME GAPS IN CORR^N. FIX 1928 [Sounding OK without Heave]	
													3 SVS BRIEFLY (MATCH EPHEM). NO SSS CONTACTS/ TEXTURED	PC
✓	F10	0625	0642	1939	1974	6	-"-	F2	160°	ON	300	3-6	MAX 35M OFFLINE. "	PC
✓	F7	0653	0711	1975	2011	5.8-6.2	-"-	F2	340	ON	315	2-5	IGNORE H/COMP "	PC
✓	F4	0721	0738	2012	2047	6.5	-"-	F2	160°	ON	320	2-99	SSS TEXTURED. SSS ROLL F4 3 SVS 0724 – EOL SCOURED? DEPRESSION NEAREOL	PC
✓	F1	0750	0805	2048	2079	6	-"-	F2	340°	ON	320	98-2	SSS ROLL F3 3 SVS SOL → FIX ~~2554~~ 2059 APPROX 5M TO STBD. LINE	ENDED
													SSS TEXTURED NO CONTACTS EARLY KP 2884 – GPS SYSTEM OFF.	PC
✓	F2	1030	1047	2080	2116	6	-"-	F2	160°	ON	325	3-6	SSS "	PC
✓	F5	1059	1116	2117	2151	6.5	PCRAW 2.166	F2	340°	ON	325	2-5	BAD POSITION 2129-30 + 2138-9. SSS "	PC
✓	F8	1129	1147	2152	2188	6.0-6.5	-"-	F2	160°	ON	325	2-3	SSS "	PC

ASSOCIATED SURVEYS INTERNATIONAL Pty. Ltd. **SURVEY LOG RUN** 2056 286057 F3

CLIENT: SAGASCO JOB NO: HY 8978 LOCATION: FLINDERS 1 - T/25P

DATE	RUN NO.	START TIME	END TIME	START FIX	END FIX	~~KNOTS~~ ~~RPM~~ SPEED	DISC. NO.	ECHO ROLL NO.	DIRECTION	HEAVE ON/OFF	CABLE OUT	2 DRMS	E/S + SSS ONLY COMMENTS	SURVEYOR
√ 14/6/92	F11	1159	1216	2189	2222	6.5	PCRAW 2.166	F2	340°	ON	325	1-2	IGNORE HEAVE SSS TEXTURED NO CONTACTS	PC
√	F14	1228	1242	2223	2257	6.2	PCRAW 2.166	F2	160°	ON	325	(EPHEM) 99	GPS WIN CRASH. 2 DRMS HIGH DUE M/M EPHEM FIXES 2236 - 2241 NO GOOD	DL
	F17	1257	1308	2258	2276	6.3	"	F2	340°	ON	325	(EPHEM) 99	GPS WIN CRASH START ROLL F6 FIXES 2268- NO GOOD ABORTED	
	F17A	1332	1343	2277	2297	6.3	"	F2	160°	ON	325	-20	IGNORE 2280 END AT FIX 2297 last item to be surveyed	DL
√	F9	1959	2018	2301	2338	6	-"-	F2	340°	ON	310	1.5-7	IGNORE HEAVE	PC
√	F12	2031	2049	2339	2376	5.5-6	PCRAW 3.166	F2	160°	ON	300	3-5	2S/M OFFLINE 2342	PC
√	F15	2103	2118	2377	2408	5-6	-"-	F2	340°	ON	300	2-4	JUMPY NAV FIX 2406. WINDOWS CRASH. EOL KP 2870 DUE GPS (CHECK END LOGGING)	PC
RERUN	F18	2131	2135	2412	2421	5-6	-"-	F2	160°	ON	/	2-119	FIX 2414-16 TO 3 SVS START ROLL F7 (POSITION OK) END LOGGING	
													CORRECTIONS STOPPED FROM BASE ALL LINES ↑ SSS TEXTURED NO CONTACTS	PC
		— SEA CONDITIONS GOOD IGNORE HEAVE COMP —												PC
√ 15/6/92	F21	0535	0553	2422	2458	6	PCRAW 1.167	F3	340°	ON	300	4-30	CORR^N POOR FIXING BAD → 2451 NO CORR^N 2432-3 HIGH 2DRMS DUE EPHEM M/M	NO JUMP
√	F24	0604	0621	2459	2495	6-6.5	-"-	F3	160°	ON	275	5-25	FIX 2483 CORR^N POOR, HIGH 2DRMS DUE POOR CORR^N.	PC
	F27	0636	0638	2496	2499	/	-"-	F3	340°	ON	/	/	SOL GPS JUMPY POOR CORR^N. ABORT LINE	PC
√	F27A	0654	0711	2500	2540	6	-"-	F3	340	ON	300	2-20	MANUAL HDG USED → FIX 2505 FIX 2520 GOOD FIX 2502 NO CORR^N ALSO 2503 + 2509 MAX 40M OFFLINE	TRG
													FIX 2528 NO CORR^N FIX 2532-3 BAD GPS FIX 2531 GOOD FIX 2534 OK	
													EOL EARLY GPS WINDOWS CRASH LAST FIX 2540 GOOD TO 2535	PC
√	F30	0731	0747	2541	2576	6	-"-	F3	160°	ON	300	(EPHEM) 99	3SV. TO 4 SVS ON TURN - NO POS^N JUMP	
X	F29	0803	0809	2577	2598	/	-"-	F3	340°	ON	/	/	ABORT GPS CRASH AGAIN	PC
√	F29	0813	0820	2592	2607	6	-"-	F3	340°	ON	310	5-6	FROM KP 2000 ONLY (APPROX 1S/M OFFLINE)	PC
√	F26	0835	0851	2608	2642		-"-	F3	160°	ON	300	4-6	START 555 ROLL F8	PC

ASSOCIATED SURVEYS INTERNATIONAL Pty. Ltd.

SURVEY LOG RUN

2057 286058 D4

CLIENT: SAGASCO JOB NO: HY 8978 LOCATION: FLINDERS 1

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 (E/S + SSS ONLY)	SURVEYOR
15/6/92	F23	0903	0921	2643	2679	6	PCRAW 2.167	F3	340°	ON	315	4-6	32 m off line at start NO SSS CONTACTS/ TEXTURED	PC
/	F20	0933	0951	2680	2715	6	-"-	F3	160°	ON	320	4-6	"	PC
/	F18	1004	1021	2716	2751	6	-"-	F3	340°	ON	325	6-92 (3SV)	FIX 2769-72 GPS JUMPY "	PC
/	F6	1035	1052	2752	2787	6.2	-"-	F3	160°	ON	325	5-7	START SSS ROLL F9 NO SSS CONTACTS - TEXTURED	PC
/	F3	1101	1119	2788	2822	6	-"-	F3	340°	ON	325	2-7	FIX 2796-98 GPS JUMP 5→4 SVs — " continuing	PC
	RERUN	IF	POSSIBLE	FROM	KP 700 →		END						(APPEARS REAL) unstable. OFFLINE 2807→11 SSS "	
/	F16A	1947	1958	2826	2848	6-6.5	PCRAW 2.167	F3	340°	ON	310	1-2	RERUN 2 km ONLY SSS "	PC
/	F17B	2008	2020	2849	2873	6.5	PCRAW 3.167	F3	160	ON	310	2-3	— " — SSS "	PC
/	F29A	2033	2043	2874	2898	6.5	-"-	F3	340°	ON	310	2-4	— " — SSS "	PC
/	F25A	2053	2101	2899	2915	6.5	-"-	F3	160°	ON	310	2-5	RERUN APPROX 1.2 km SSS "	PC
✓	F33A	2113	2123 2118	2916	2935	6.5	-"-	F3	070°	ON	250	2-	CROSSLINE GPS JUMPY CORRECTIONS SPORADIC	PC
													FIX 2926 NO CORR^N SSS " RERUN 1.4 km ONLY	PC

SURVEY COMPLETE

APPENDIX "E"

TIDAL INFORMATION

LOCATION : FLINDERS

199206130400	0.70	199206131200	2.52
199206130410	0.71	199206131210	2.45
199206130420	0.73	199206131220	2.39
199206130430	0.76	199206131230	2.32
199206130440	0.80	199206131240	2.25
199206130450	0.84	199206131250	2.18
199206130460	0.89	199206131300	2.10
199206130510	0.95	199206131310	2.03
199206130520	1.02	199206131320	1.96
199206130530	1.09	199206131330	1.89
199206130540	1.17	199206131340	1.82
199206130550	1.25	199206131350	1.76
199206130560	1.34	199206131400	1.69
199206130610	1.43	199206131410	1.63
199206130620	1.53	199206131420	1.57
199206130630	1.63	199206131430	1.52
199206130640	1.73	199206131440	1.46
199206130650	1.83	199206131450	1.41
199206130660	1.93	199206131500	1.37
199206130710	2.03	199206131510	1.33
199206130720	2.12	199206131520	1.30
199206130730	2.22	199206131530	1.27
199206130740	2.31	199206131540	1.25
199206130750	2.40	199206131550	1.23
199206130760	2.48	199206131600	1.22
199206130810	2.56	199206131610	1.22
199206130820	2.63	199206131620	1.22
199206130830	2.70	199206131630	1.23
199206130840	2.76	199206131640	1.25
199206130850	2.81	199206131650	1.27
199206130860	2.86	199206131700	1.30
199206130910	2.90	199206131710	1.34
199206130920	2.93	199206131720	1.38
199206130930	2.95	199206131730	1.43
199206130940	2.97	199206131740	1.49
199206130950	2.98	199206131750	1.55
199206131000	2.98	199206131800	1.62
199206131010	2.97	199206131810	1.69
199206131020	2.96	199206131820	1.77
199206131030	2.94	199206131830	1.84
199206131040	2.91	199206131840	1.93
199206131050	2.88	199206131850	2.01
199206131100	2.84	199206131900	2.09
199206131110	2.80	199206131910	2.18
199206131120	2.75	199206131920	2.26
199206131130	2.70	199206131930	2.35
199206131140	2.64		
199206131150	2.58		

ı99206131940	2.43
199206131950	2.51
199206131960	2.59
199206132010	2.66
199206132020	2.73
199206132030	2.79
199206132040	2.85
199206132050	2.90
199206132060	2.95
199206132110	2.98
199206132120	3.01
199206132130	3.04
199206132140	3.05
199206132150	3.06
199206132160	3.06
199206132210	3.05
199206132220	3.03
199206132230	3.01
99206132240	2.98
ı99206132250	2.94
199206132260	2.90
199206132310	2.85
199206132320	2.80
199206132330	2.73
199206132340	2.67
199206132350	2.60
199206132360	2.52
199206140400	0.76
199206140410	0.73
199206140420	0.72
199206140430	0.70
199206140440	0.70
199206140450	0.70
199206140460	0.71
199206140510	0.73
199206140520	0.76
199206140530	0.79
)9206140540	0.84
199206140550	0.88
199206140560	0.94
199206140610	1.00
199206140620	1.07
199206140630	1.15
199206140640	1.23
199206140650	1.31
199206140660	1.40
199206140710	1.49
199206140720	1.59
199206140730	1.69
199206140740	1.78
199206140750	1.88
199206140760	1.98
199206140810	2.08
199206140820	2.17
199206140830	2.26
199206140840	2.35
199206140850	2.44
199206140860	2.52
199206140910	2.59
199206140920	2.66
199206140930	2.72
199206140940	2.78
199206140950	2.83
199206141000	2.87
199206141010	2.90
199206141020	2.93
199206141030	2.95
199206141040	2.96
199206141050	2.97
199206141100	2.96
199206141110	2.96
199206141120	2.94
199206141130	2.92
199206141140	2.89
199206141150	2.86
199206141200	2.82
199206141210	2.77
199206141220	2.72
199206141230	2.67
199206141240	2.62
199206141250	2.56
199206141300	2.49
199206141310	2.43
199206141320	2.36
199206141330	2.30
199206141340	2.23
199206141350	2.16
199206141400	2.09
199206141410	2.02
199206141420	1.95
199206141430	1.89
199206141440	1.82
199206141450	1.76
199206141500	1.69
199206141510	1.64
199206141520	1.58
199206141530	1.53
199206141540	1.48
199206141550	1.43
199206141600	1.39
199206141610	1.36

199206141620	1.33
199206141630	1.30
199206141640	1.29
199206141650	1.27
199206141700	1.27
199206141710	1.27
199206141720	1.28
199206141730	1.29
199206141740	1.31
199206141750	1.34
199206141800	1.37
199206141810	1.41
199206141820	1.46
199206141830	1.51
199206141840	1.56
199206141850	1.63
199206141900	1.69
199206141910	1.77
99206141920	1.84
199206141930	1.92
199206141940	2.00
199206141950	2.08
199206141960	2.16
199206142010	2.24
199206142020	2.32
199206142030	2.40
199206142040	2.48
199206142050	2.56
199206142060	2.63
199206142110	2.69
199206142120	2.76
199206142130	2.81
199206142140	2.86
199206142150	2.91
199206142160	2.94
199206142210	2.97
199206142220	3.00
99206142230	3.01
199206142240	3.02
199206142250	3.02
199206142260	3.01
199206142310	3.00
199206142320	2.98
199206142330	2.95
199206142340	2.91
199206142350	2.87
199206142360	2.82
199206150400	0.98
199206150410	0.93
199206150420	0.88
199206150430	0.83
199206150440	0.79
199206150450	0.76
199206150460	0.73
199206150510	0.71
199206150520	0.70
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199206150540	0.70
199206150550	0.71
199206150560	0.73
199206150610	0.76
199206150620	0.79
199206150630	0.83
199206150640	0.88
199206150650	0.93
199206150660	1.00
199206150710	1.06
199206150720	1.14
199206150730	1.22
199206150740	1.30
199206150750	1.39
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199206150950	2.51
199206151000	2.59
199206151010	2.66
199206151020	2.72
199206151030	2.78
199206151040	2.83
199206151050	2.87
199206151100	2.91
199206151110	2.94
199206151120	2.96
199206151130	2.97
199206151140	2.98
199206151150	2.98
199206151200	2.97
199206151210	2.96
199206151220	2.94
199206151230	2.91
199206151240	2.88
199206151250	2.84

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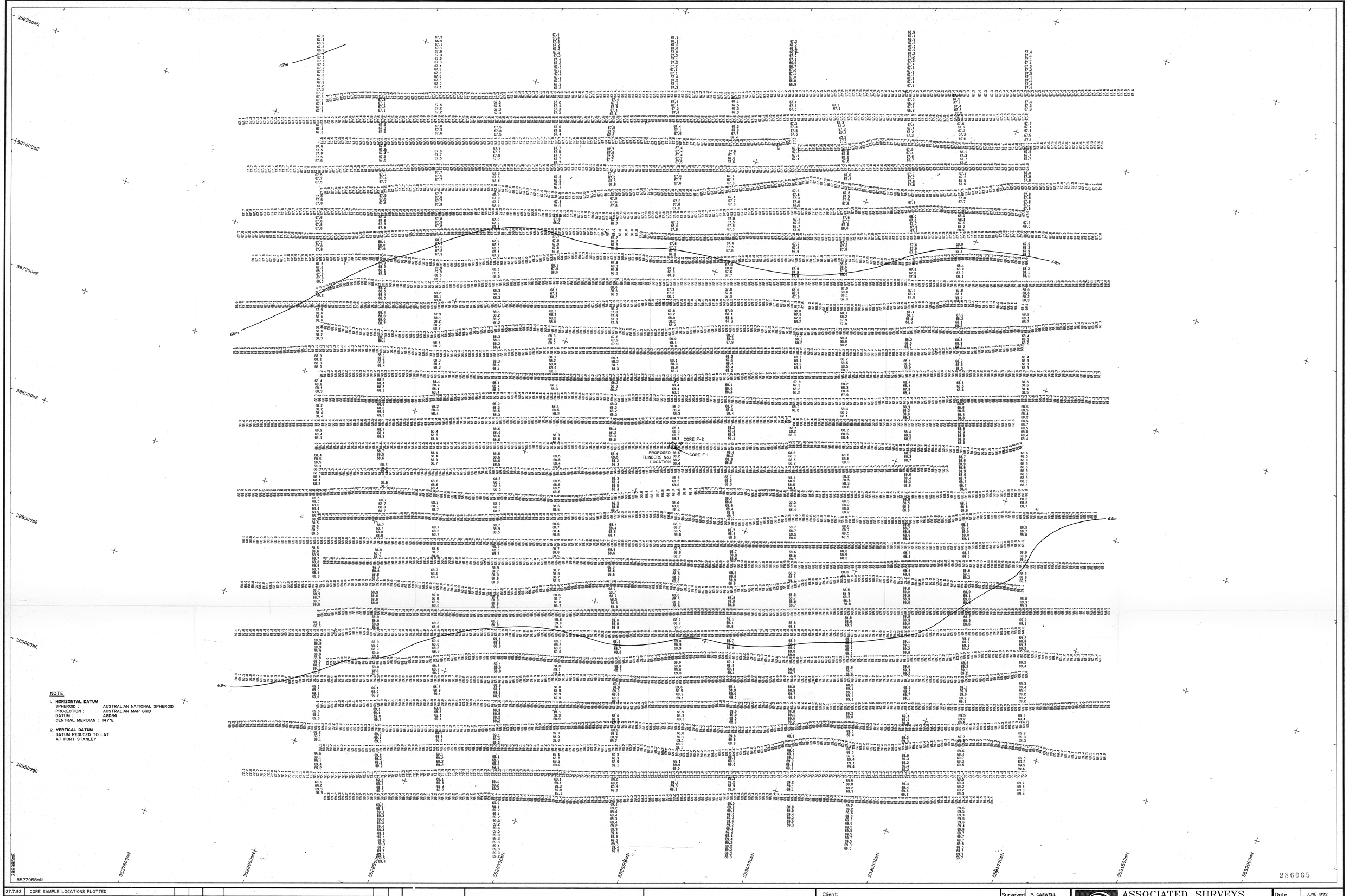
199206151350	2.53
199206151400	2.47
199206151410	2.40
199206151420	2.33
199206151430	2.27
199206151440	2.20
199206151450	2.13
199206151500	2.06
199206151510	1.99
199206151520	1.92
199206151530	1.86
199206151540	1.79
199206151550	1.73
199206151600	1.67
199206151610	1.61
199206151620	1.56
199206151630	1.51
199206151640	1.46
199206151650	1.42
199206151700	1.39
199206151710	1.35
199206151720	1.33
199206151730	1.31
199206151740	1.29
199206151750	1.28
199206151800	1.28
199206151810	1.29
199206151820	1.30
199206151830	1.32
199206151840	1.34
199206151850	1.37
199206151900	1.41
199206151910	1.45
199206151920	1.50
199206151930	1.56
199206151940	1.62
199206151950	1.68
199206151960	1.75
199206152010	1.82
199206152020	1.90
199206152030	1.98
199206152040	2.06
199206152050	2.14
199206152060	2.22
199206152110	2.30
199206152130	2.45
199206152140	2.53
199206152150	2.60
199206152160	2.66
199206152210	2.72
199206152220	2.78
199206152230	2.83
199206152240	2.88
199206152250	2.91
199206152260	2.94
199206152310	2.97
199206152320	2.98
199206152330	2.99
199206152340	2.99
199206152350	2.99
199206152360	2.97

DRAWINGS



NOTE

1. **HORIZONTAL DATUM**
   SPHEROID : AUSTRALIAN NATIONAL SPHEROID
   PROJECTION : AUSTRALIAN MAP GRID
   DATUM : AGD84
   CENTRAL MERIDIAN : 147°E

2. **VERTICAL DATUM**
   DATUM REDUCED TO LAT AT PORT STANLEY

286665

Date	Revision	Chkd	By	Date	Revision	Chkd	By
27.7.92	CORE SAMPLE LOCATIONS PLOTTED						

Orientation

FLINDERS No.1 (PERMIT T/25P)
BATHYMETRIC AND GEOHAZARD
SITE SURVEY

BATHYMETRY

Client:

SAGASCO RESOURCES LIMITED
60 HINDMARSH SQUARE
ADELAIDE SOUTH AUSTRALIA

5 cm

Surveyed	P. CASWELL
Field Bk	
Level Bk	
V.Datum	SEE NOTE 2
H.Datum	SEE NOTE 1
Checked	

ASSOCIATED SURVEYS INTERNATIONAL Pty. Ltd.
Survey House, 18 Prowse 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	ERIN
Ref No.	HY8978
Plan No.	8978-B-2
Rev.	1

OR-0994