CAMBRIDGE GULF EXPLORATION NL

Combined Mineral Exploration Report

NT-1 and NT-2 Mineral Exploration Licences

for the period 18 January 1995 to 17 January 1996

Confidential Report Lodged in compliance with

Licence Condition 17

of Mineral Exploration Licences NT-1-MEL and NT-2-MEL

Administered under the Offshore Minerals Act, 1994

Tenements	1:250 000 Map Ref
NT-1-MEL	SD52-11
NT-2-MEL	SD-52-10/11

Tenement Holder

Cambridge Gulf Exploration NL
ACN 059 458 374
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Report Date: 16 April 1996

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1. SUMMARY

In January 1995 a detailed infill geophysical survey was completed in the Victoria Offshore Prospect (NT-1-MEL and NT-2-MEL). In the combined licence areas 103.5 line kilometres of seismic and 103.5 line kilometres of sidescan sonar data were acquired. In February post processing of 424 line kilometres of seismic data, acquired in March 1994, was undertaken at Elics in France. Subsequently the 1994 data was reinterpreted, and between April and June 199 was digitised and modelled with the January 1995 data.

A bulk sampling technique was designed and world-wide research was undertaken to find a suitable tool for large diameter drilling. After negotiations with a Joint Venture partner and the construction of a processing plant, a large diameter reverse circulation airlift drilling programme commenced in the Berkeley Prospect (Western Australia), in May 1995. The aim of this Phase of exploration was to define an alluvial diamond resource within the Berkeley Prospect and to proceed with the drilling of targets in other tenements including NT-1-MEL and NT-2-MEL.

Unfortunately, problems with equipment, inclement weather and local sub-marine sediment conditions were encountered, preventing the successful continuation of the programme. Thus, the drilling programme was called to a premature halt in September 1995 before any holes could be drilled in NT-1-MEL and NT-2-MEL.

In October 1995 a further infill seismic and sidescan sonar survey was undertaken, comprising 512 line kilometres of boomer data and 401 line kilometres of chirp data (both seismic reflection techniques), and 512 kilometres of sidescan sonar data. This was followed by a regional environmental study in November which included sediment and water sampling, and water clarity measurements at twelve sites and drop cores at four sites.

1.1 Expenditure Statement for NT-1-MEL

In the twelve months from 18 January 1995 to 17 January 1996 the following expenditure was incurred in NT-1-MEL:

1.	Acquisistion of the October 1995 geophysical data including seismic and sidescan sonar	$24 818
2.	Computer expenses	$85
3.	Consultants	$34 016
4.	Equipment and plant hire	$10 407
5.	Experimental large diameter drilling works	$493 647
6.	Interpretation of the March 1994 seismic data	$6 920
7.	Interpretation of the January 1995 seismic data	$4 919
8.	Interpretation of the October 1995 seismic data	$668
9.	Legal fees for contract negotiations	$4 587
10.	Mobilisation of the processing plant for the large diameter drill barge Java Constructor	$163 820
5.	Preliminary environmental research	$1 286
6.	Regional environmental survey - November 1995	$7 546
7.	Reproduction, maps and publications	$780
8.	Transport, freight and travel	$1 637
9.	Technical staff salaries	$58 362
	Sub-total	**$813 498**
10.	Office overheads (20%)	$162 699
	Total expenditure (18-1-95 to 17-1-96)	**$976 197**

1.2 Expenditure Statement for NT-2-MEL

In the twelve months from 18 January 1995 to 17 January 1996 the following expenditure was incurred in NT-2-MEL:

1.	Acquisistion of the October 1995 geophysical data including seismic and sidescan sonar	$55 682
2.	Computer expenses	$85
3.	Consultants	$34 016
4.	Equipment and plant hire	$10 407
5.	Experimental large diameter drilling works	$493 550
6.	Interpretation of the March 1994 seismic data	$6 155
7.	Interpretation of the January 1995 seismic data	$5 404
8.	Interpretation of the October 1995 seismic data	$193
9.	Legal fees for contract negotiations	$4 587
10.	Mobilisation of the processing plant for the large diameter drill barge Java Constructor	$163 675
5.	Preliminary environmental research	$2 268
6.	Regional environmental survey - November 1995	$2 975
7.	Reproduction, maps and publications	$581
8.	Transport, freight and travel	$1 636
9.	Technical staff salaries	$58 174
	Sub-total	**$839 388**
10.	Office overheads (20%)	$167 877
	Total expenditure (18-1-95 to 17-1-96)	**$1 007 265**

1.3 Allocation of Mobilisation and Experimentation Costs

Cambridge Gulf Exploration NL (CGE) has allocated a proportion of the costs involved in the research and development of a suitable bulk sampling method, for use on all its tenements, to both NT-1-MEL and NT-2-MEL. The costs for the evaluation of a jackup drilling platform, contract negotiations, and mobilisation of the drilling vessels for the 1995 bulk sampling programme have been included and a dollar value apportioned to NT-1-MEL and NT-2-MEL on the basis of the area of the licences as a percentage of the total area of exploration licences held by CGE.

The costs of research and mobilisation have been included in the total expenditure as they reflect a fair and just representation of the level of commitment and investment in ensuring a valid and successful exploration programme.

Further information on the rationale behind the proportional allocation of these costs can be found in a short paper attached to the covering letter accompanying this report.

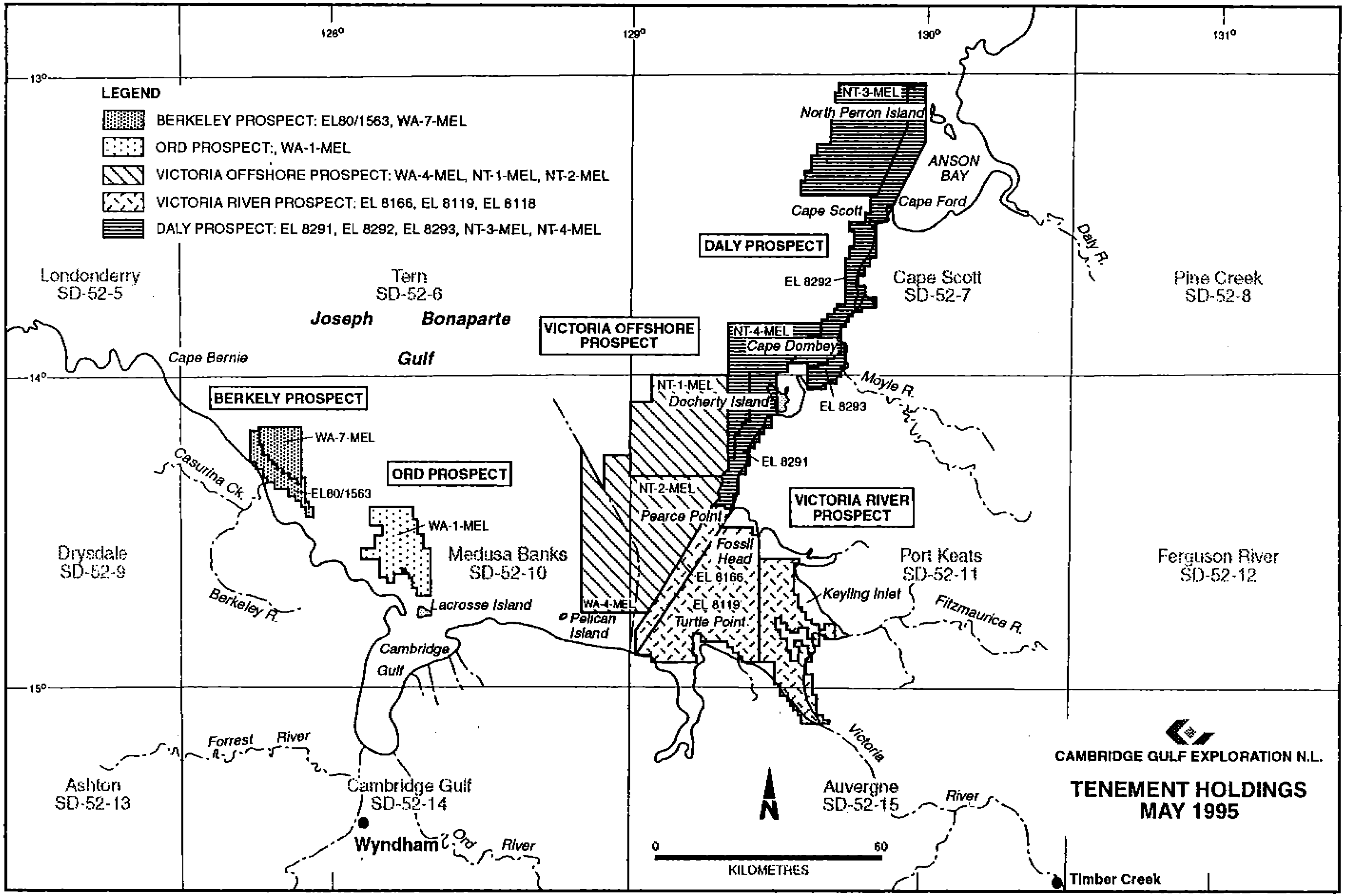


Figure 2-2 Cambridge Gulf Exploration NL - Tenement Holdings (May 1995).

3. TENEMENT SITUATION

Mineral Exploration Licences NT-1-MEL and NT-2-MEL were granted on the 17th of January 1992. The licences comprises 373 blocks (graticules) and 375 blocks respectively and form part of the Victoria Offshore Prospect (Figure 2-1).

NT-1-MEL and NT-2-MEL are 100% owned by:

Cambridge Gulf Exploration NL
ACN 059 458 374
Level 4, Southshore Piazza
81-83 The Esplanade
P.O. Box 740
South Perth WA 6151

4. HIGH RESOLUTION SEISMIC SURVEY (JANUARY 1995)

4.1 Introduction

A high resolution seismic survey was undertaken by Racal Survey Australia Ltd on the 20th and 21st of January 1995, using the survey vessel "Miclyn Cove" chartered from Total Marine Services Pty Ltd. Two separate areas in the Victoria Offshore Prospect were each surveyed by four primary lines with orientations of 42°/222°. The cross lines were surveyed, one at 132° in the southern area, and one at 160° in the northern area. Figure 4-1 is a map showing the survey run lines; the trackplot charts are provided in Appendix 9. A total of 55 line kilometres were run in NT-1-MEL and 49 line kilometres in NT-2-MEL.

A description of the equipment used and the procedures followed is given in the following sections and the general layout of instrumentation on the survey vessel is provided in Appendix 1

A summary of field survey parameters is provided in Appendix 2 and a summary of the digital seismic data record is provided in Appendix 3.

4.2 Equipment Description

4.2.1 Positioning and Navigation

DGPS Navigation System

The LandStar Differential GPS System was used for the January 1995 seismic survey. The system embodies the successful combination of data capacity, range and coverage with a flexible networked approach that lends itself to comprehensive performance and quality monitoring.

The link capacity of 1200 bits per second allows data from a number of networked reference stations to be sent simultaneously without introducing unacceptable delays between reference station and user. With ten reference stations each generating correction data for ranges from eight satellites, an update rate of better than two seconds is achieved by the LandStar system.

Satellite communications systems, particularly at the Optus L-band frequencies of 1.5586GHz are reliable and free of the interference associated with the crowded M.F./H.F. bands. This high data integrity gives users confidence that the corrections will be continuously received without interference.

The LandStar system includes a 24 hour monitoring facility to ensure the validity of data received at the control centre from the DGPS reference stations and that the same data is received over the LandStar satellite data link.

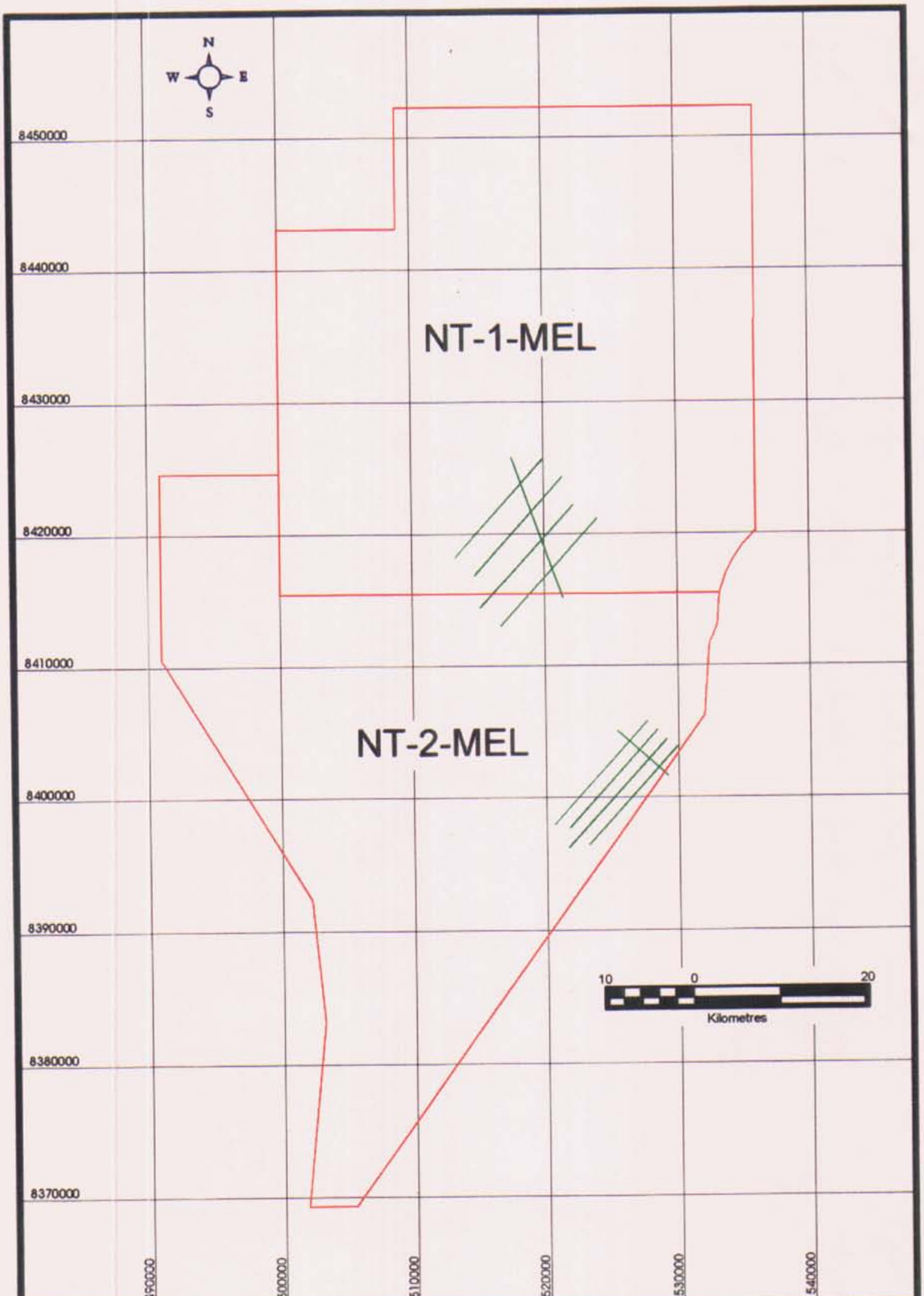


Figure 4-1 Victoria Offshore Prospect Seismic Survey January 1995 - survey lines for NT-1-MEL and NT-2-MEL .

Monitoring and control functions include extensive analysis and archiving of the reference corrections and the comparison of range rate corrections - arriving from different stations within the network. The system also receives the broadcast message from the satellite data link and applies this data to a monitor receiver at the control centre to verify positioning performance. Time series plots of this performance, in latitude, longitude, and height, together with PDOP and HDOP figures are generated.

The LandStar scheme is a homogeneous network within the WGS 84 geodetic reference frame. The original network, prior to the Australian extension included ten primary triangulation stations for which the WGS 84 values were supplied. The vectors established during this build up create a network between the Far East, Australia and Europe.

For the Australian extension to the network, two primary geodetic points were used at each site, together with the transportable laser ranging site, Gnangara 73 in Perth. Additional data was also obtained from AUSLIG for Darwin, Karratha and Tidbinbilla fiducial sites and included in the reference station adjustment. Trimble 4000 SST geodetic receivers were used to simultaneously obtain phase data which was then post processed to derive the vectors between sites. The vector results were entered into "Geolab" 3D adjustment software, to obtain adjusted values for the reference stations.

Trimble 4000DL GPS Receiver

The Trimble 4000DL GPS receiver is designed for moderate precision static and dynamic positioning applications. The GPS receiver provides time and three-dimensional station co-ordinates at a once-per-second update rate.

The receiver receives the civilian coded signal (C/A) from the GPS NAVSTAR satellites. The receiver automatically acquires and simultaneously tracks GPS satellites and precisely measures carrier and code phase and computes position and velocity. Latitude, longitude and height values are output on the World Geodetic System (WGS 84) Earth-centred, Earth-fixed co-ordinate system. The receiver is designed to measure the following observables:

- Coarse/Acquisition (C/A) code Pseudo-ranges,
- Rate of change of Pseudo-range,
- Integrated Carrier.

C/A code correlation techniques measure the propagation time of the signal from the satellite to the antenna. Latitude, longitude, height and time can be determined from measurements made from at least four satellites, by a process similar to triangulation.

To determine speed and heading, the receiver calculates the rate of change of Range (the range-rate) by measuring the Doppler shift of the carrier.

It is capable of receiving and processing differential corrections from other reference sources using the standard format of the Radio Technical Commission for Màritime Services, Special Committee 104 (RTCM SC-104), Version 1.0 or 2.0 protocols.

The 4000DL has several options available, including internal data logging memory, event marker logging etc. and therefore may be used alone or as part of a more extensive navigation system.

Navigation Computer System

The navigation computer system used for this project was based on the Hewlett Packard 9000/330 series computer, operating Racal's General Navigation System (GNS) Survey software Version S2.40L with communication between the computer and navigation receivers and peripherals via Racal's Interface 80. The navigation computer has a computation cycle time of one to two seconds.

The GNS system is capable of performing three separate position computations based on data obtained from three positioning systems, each of which can support two receivers. From each receiver, depending on receiver type, a maximum of 16 patterns may be acquired so that a total pool of 96 patterns can be obtained. For each computation a maximum of ten Lines of Position (LOP) may be drawn from the pool as required. Mixed system computations employing operator defined weighting is thereby possible as is the ability to use an LOP in more than one computation.

In addition to navigation receivers, GNS can be interfaced to a Gyro compass, echo sounder and many other types of peripherals, depending on the software version in use. In this case, Survey Version S2.40L was used in conjunction with TSS Annotator (Fix mark) and Klein Interface (speed output).

DGPS positions may be employed in place of LOP computations in which case, the DGPS position can be subjected to an operator defined seven parameter or block shift datum transformation to the working datum.

The vessel's computed position/track is output to a VDU on the bridge to assist the helmsman maintain the selected track guidance line. The VDU displays graphically the selected survey line, the vessel's position in relation to that line and numerical data to assist the helmsman such as the along-line and off-line distances, vessel speed and course made good, gyro heading, distance and bearing to end of line and water depth.

Data logging and event marks were controlled by the navigation computer which was set at 100 metre intervals to log position and depth data to disk, and provide an event closure to a TSS alpha-numeric annotator. This, in turn annotated the acquisition recorders, e.g. echo sounder, side scan sonar recorder, EPC recorder and Delph Elics system.

All positional information recorded by the navigation computer was referenced to the echo sounder transducer which was the datum point on the survey vessel to which all laybacks/offsets were related.

The positioning and navigation system comprised:

2 x Trimble 4000DL GPS Receivers
2 x LandStar Receivers
2 x LandStar Antennas
2 x Interface 80
2 x Barco Monitors
1 x TSS Annotator
1 x SG Brown Gyro
1 x HP Plotter
2 x SkyFix Antenna Control Unit
2 x Demodulators/Decoder
1 x SkyFix Radome
2 x Compaq 486 Computer
2 x HP 9000/330 Computers c/w Disc Drives, VDU, Keyboard
2 x Barco Monitors
2 x HP Thinkjet Printers
plus all associated software, cables, manuals, etc.

4.2.2 Hydrography

The echosounder system comprised:

2 x Atlas Deso 20 Dual Frequency over the side mounted Transducer
2 x Atlas Deso 20 Echo Sounder Recorder
1 x Bar Check
1 x HeCo-10 Heave Compensator
1 x Applied Microsystems STD-12 Velocity Probe S/No. 559

The Atlas-Deso 20 Echo Sounder, which was used on this project is a dual frequency system operating at 33 kHz and 210 kHz. Digital technology is employed so that the equipment comprises one unit incorporating an analogue/digital recorder, transceiver electronics and digitiser. During the survey both hull and over-the-side mountings were used.

Heave Compensator

Echo sounder data is distorted by vessel motion in rough weather or rolling seas. To remove the vertical movement of the survey vessel a Heco-10 Motion Compensation System was interfaced to the Atlas-Deso 20 echo sounder.

The Heco-10 Motion Compensator system comprises a control unit (main instrument) and a separate sensor containing a gimbal-mounted accelerometer. It is compatible with any echo sounder or digitiser. In 'Echo Sounder Mode' the sensor is mounted adjacent to the sounder's transducer. Digital accelerometer data is relayed to the main instrument where instantaneous vertical displacement is continually displayed. Depth values supplied from an echo sounder are also displayed, along with the displacement-corrected depth. These are both made available for data-logging.

The echo sounder itself remains completely unaffected, with the exception of an optional line which may be printed on the echo chart. This line indicates the corrected depth, but is offset from the original seabed to avoid confusion.

The Heco-10 has a range of ± 3 metres and an accuracy of ± 5 centimetres over a 2 - 20 second period, or 5% of the measured range.

4.2.3 Sidescan Sonar

The Klein sidescan sonar system was used to provide sea floor mapping. The system consisted of a single frequency 100 kHz towfish, a Klein 595 digital graphic recorder, deck and tow cables.

The towfish contains transducers which transmit short pulses of high frequency acoustic energy in fan shaped beams at right angles to the fish's track. These beams are narrow in the horizontal and wide in the vertical planes. Housed in the nose of the towfish are the transmitting and receiving circuitry, and on receipt of a trigger pulse from the shipborne recorder these transducers are energised. The receiving circuitry amplifies the returned echoes and sends them up the tow cable to the recorder for display.

The Klein 595 recorder has five channels to record continuous sidescan sonar as well as sub-bottom topography. The returned signals are electronically processed and printed line by line to produce the sonar image. The Klein 595 is controlled by a microprocessor and includes a wide variety of capabilities including image correction, record expansion, annotation and menu-driven operation. The Klein 595 features a fixed head, high resolution, high speed dry thermal printer in which each dot is individually digitally addressed to produce 16 distinct grey shades.

4.2.4 Sub-bottom Profiling System

The sub-bottom profiling system comprised the following components:

1 x EG&G Surface - Tow Uniboom Boomer Model 230
2 x 24 Channel Streamer
2 x Deck Lead
2 x Tow Leader
1 x Elics Delph-24 Acquisition Computer and Exabyte drive
2 x Interface Box
1 x KFC 17" Monitor
2 x Gulton Plotter
1 x Seamap 24 Channel Processing Computer
1 x Exabyte Drive
1 x Mitsubishi 17" Monitor
2 x TSS TVG Filter
2 x Krohn Hite Analogue Filter
1 x TSS Swell Filter
2 x EPC 9701 Graphic Recorder
2 x EG & G 231 Triggered Capacitor Bank
2 x EG & G 232A Power Supply

EG & G Model 230 Seismic Source

The EG & G Model 230 Uniboom is an underwater sound source for use in sub-bottom profiling systems. The output acoustic energy of the source may be adjusted by the operator so as to provide the best survey results throughout a wide range of geological environments and operational conditions.

The Source Module is an electrically driven transducer, which, when connected to an appropriate triggered capacitor bank and power supply, produces a well defined, highly repeatable acoustic pulse in the water. The characteristics of the pulse depend upon the amount of capacity and the energy level to which it is charged.

Power Supply/Trigger Bank

Electrical energy to drive the EG & G Model 230 Uniboom was provided by the EG & G Model 232-A Power Supply and 231 Trigger Capacitor Bank (Control Bank).

The Model 232-A Power Supply provides a source of high-voltage direct current for charging the capacitor banks used in sub-bottom profiling systems. The 232-A will charge 1000 Joules to 3.8kV in

0.5 seconds. This allows the operator to select sound-pulse repetition rates as fast as two pulses per second at an energy level of 1000 Joules.

System specifications are as follows:

Input Voltage:	110 - 120 or 220 - 240V AC,
	50 - 60 Hz, single phased
Output Voltage:	3.8 kV DC maximum
Charging Rate:	0.5 seconds per 1000 Joules

The Model 231 takes the high voltage DC from a 232-A Power Supply, stores it in an internal 160μF capacitor bank and supplies this stored energy to a seismic source transducer. The 231 contains 160μF of capacitive energy storage and associated control and high energy switching circuitry. It can control and switch up to 8400 Joules at an average power of 2000 Watts, depending on the application. The 231 is safety interlocked for operator protection and switching of the electrical energy to the transducer is accomplished by a Rail Gap.

System specifications are as follows:

Capacitive Energy Storage:	1000 J (160 microFarads at 3.53 kV)
Energy Switching :	8400 J maximum
Input Power	
AC:	240V at 2 A
DC:	3.8 kV maximum at 0.5A
	average (from 232-A)
Trigger Input: pulse from recorder.	Contact closure or 12V DC

24-Channel Hydrophones

The Delph-24 employs a dedicated multi-channel hydrophone streamer which is interfaced with a standard seismic source. The streamer is equipped with a 24-channel hydrophone array immersed in low density oil. The streamer is also equipped with a high pass filter.

4.3 Geodetic Parameters

The co-ordinates given in the survey report, and reproduced here, refer to the following:

- The location co-ordinates are defined on Australian Geodetic Datum 1984 (AGD 84).
- The Global Positioning System (GPS) is referenced to the World Geodetic System 1984 (WGS 84).

4.3.1 Datums

Datum	**Australian Geodetic Datum 1984**
Spheroid:	Australian National
Semi-major Axis (a):	6 378 160.000m
Semi-minor Axis (b):	6 356 774.719m
Eccentricity Squared (e^2):	0.006 694 542
Flattening (1/f):	298.25

Datum	**World Geodetic System 1984**
Spheroid:	WGS 84
Semi-major Axis (a):	6 378 137.000m
Semi-minor Axis (b):	6 356 752.3142m
Eccentricity Squared (e^2):	0.006 694 380
Flattening (1/f):	298.257 223 563

4.3.2 Projection

Projection:	**Universal Transverse Mercator**
AMG Zone:	52
Central Meridian (C.M.):	129° East
Scale factor on the C.M.:	0.9996
False Easting:	500 000m
False Northing:	10 000 000m
Latitude of Origin:	0° (Equator)
Unit of Measure:	International Metre

4.3.3 Datum Transformation

The following seven-parameter datum transformation was used to convert WGS 84 co-ordinates to AGD 84 co-ordinates:

Dx =	+116.00m
Dy =	+50.47m
Dz =	-141.69m
Rx =	+0.230"
Ry =	+0.390"
Rz =	+0.344"
Scale (K) =	-0.0983

These values are from the paper by M. Higgins, Department of Mapping and Surveying, Queensland. These values were also adopted by the Inter-Governmental Advisory Committee on Surveying and Mapping Standards and Specifications for Control Surveys in July, 1990.

4.4 Survey Vessel

The "Miclyn Cove" was supplied by Total Marine Services Pty Ltd. The vessel is a 900 BHP twin screw survey utility ship, with an overall length of 33.5 metres, a breadth of 7.78 metres and maximum draft of 3.89 metres. Appendix 1 provides an equipment offset diagram showing the position of the GPS antenna and the geophysical equipment.

4.5 Personnel

The following personnel were involved in the survey:

Mr. J. Tighe	- Party Chief/Surveyor
Mr K. O'Halloran	- Surveyor
Mr J Veitch	- Electronics Engineer
Mr. S. Kttat	- Underwater Engineer
Mr J. Cowans	- Geophysicist
Mr D Buchwalter	- Elics Engineer

Cambridge Gulf Exploration NL was represented by Mr John Graindorge.

4.6 Survey Operations

4.6.1 Positioning and Navigation

Positioning of the survey vessel, "Miclyn Cove", was achieved using Racal's LandStar Pseudorange Differential GPS, interfaced to the Racal General Navigation System.

The pseudorange differential GPS consisted of a Trimble 4000DL GPS receiver, Racal's LandStar differential correction link, and Compaq 486 computers operating Racal's "MultiFix" Multiple Reference Station Software.

The navigation and logging system carried on the survey vessel was based on the Hewlett Packard 9000/330 series computer with the navigation systems and peripherals interfaced to the computer via Racal's Interface 80 unit. The navigation computer supported a printer, plotter, VDU's and provided a fix closure to all geophysical equipment. The navigation computer provided a position up-date to the VDUs at approximately two second intervals and provided a fix closure every 100 metres. At each fix, the computer recorded all raw positioning data and computed positions to hard copy print outs and to 3.5 inch micro discs.

4.6.2 Echosounder

The echosounder system comprised:

an Atlas-Deso 20 dual frequency echo sounder, and

33 kHz and 210 kHz transducers

The transducers were housed in an over-the-side vessel mounting. The echo sounder data was corrected for vertical vessel motion by a HeCo-10 accelerometer-based Heave Compensator. The echo sounder provided continuous analogue and digital seabed profile data with the navigation computer system logging the high frequency digitised minimum water depth every six seconds. Bar checks to check transducer draught and seawater velocity were carried out prior to and after each survey. As the 30kHz frequency was giving occasional interference with the sidescan sonar record, this frequency was not used for the majority of the survey.

4.6.3 Sidescan Sonar System

The Klein sidescan sonar system was used to provide sea floor mapping. The system consisted of a dual frequency Klein 422 Towfish (operating at the 100kHz frequency), a Klein 595 digital graphic recorder and deck cable. The towfish was deployed from a winch located on the centre line of the Miclyn Cove via a block attached to the ship's "A" frame. The block also incorporated a cable counter which measured cable out from the stern.

The recording unit was operated at a slant range of 150 metres per channel. Although the quality of the data were good, problems were encountered in shallow water due to surface noise during adverse weather conditions.

4.6.4 Delph-24 Sub-bottom Profiler System

The Delph-24 is a multichannel, high resolution, digital seismic acquisition system manufactured by the French company Elics. Two self contained units were set up onboard the vessel allowing simultaneous acquisition and processing of the data.

The seismic source used was an EG&G 230 Uniboom, fired with a pulse of 300 Joules every one metre. The EG&G 232 Power Supply converts 240V AC input current to 3800V DC which charges capacitors in the EG&G 231 Triggered Capacitor Bank. A trigger pulse from the Delph acquisition system discharges the stored electrical energy to the boomer, causing the boomer plate to generate the seismic energy.

Acquisition

The acquisition unit consisted of a computer, fitted with acquisition boards and operating Delph2x software, recording the digitised raw seismic data from a 24 channel streamer directly onto Exabyte tape in SEGY format. A sampling frequency of 6000Hz was used to digitise the raw signal. A Gulton plotter printed out a hard copy of single channel data (channel 6 used), allowing noise conditions and data quality to be assessed in real time. The single channel data was band pass filtered (180 - 1080Hz) and had automatic gain control (either linear or exponential adaptation) applied. Additionally, in control mode prior to the commencement of each survey line, all 24 channels could be displayed graphically allowing for a check of all the hydrophones and the boomer source signal.

The 24 channel streamer comprised 24 groups of three hydrophones, with a group spacing of two metres. The boomer was fired every one metre giving a 100% CDP (common depth point) coverage for subsurface reflectors. Initially, the shot spacing was obtained by adjusting the shot interval to the correct value depending on the survey speed for a particular line (e.g. a survey speed of 3.0 knots required a shot interval of 648ms). However, this technique required the vessel's speed to be kept at the predetermined level throughout the line being surveyed, losing the flexibility of adjusting the speed as current and weather factors altered. After surveying for six days (in the Berkeley Prospect, Western Australia) using this method, software was written to interface Racal's GNS to the Delph via an additional computer, enabling the shots to be fired every one metre regardless of the vessel's speed. Over the whole survey, vessel speed varied between 2.0 and 4.5 knots, depending on sea conditions, wind and currents.

Processing

A separate processing unit consisted of a computer, fitted with a processing board, and Gulton plotter. The raw seismic data, recorded on Exabyte tape, was muted and stacked using a three point velocity model estimated from an examination of the single channel record. The choice of velocity model depended upon the depth of the seabed and the location of the bedrock beneath the seabed. An example of a mute and velocity model given below:

Mute: Time (ms)	Channel	Velocity: Time (ms)	Velocity (ms)
40	1	40	1500
44	8	90	1600
60	24	30	1850

AGC and band pass filtering were also applied to this processed data. The performance of a 24 channel stack took approximately the same length of time as the acquisition process.

4.7 Data Reduction

The digital bathymetric soundings were reduced to the Lowest Astronomical Tide (LAT) by the application of the Australian National Tide Table predicted tides for Pearce Point.

All the soundings on the working charts were colour coded, for every one metre change, to assist in the interpretation of the charts. All working bathymetric charts were checked for erroneous bathymetric "spikes". The tie-ins at line intersections were good, with errors of less than +/-0.5m on lines acquired during poor sea state.

4.8 Safety

Safety meetings attended by all crew of the Miclyn Cove and all Racal Survey personnel were held on 6 January 1995 and 21 January 1995. The location of the ship's safety equipment was explained as well as procedures in case of any emergency. Safe working practices which were to be employed at all times were discussed.

The safe work practices discussed at the first meeting had been adhered to throughout the survey and no incidents had been reported. The ship's master congratulated the crew on maintaining the vessel's six year record without a lost time accident.

5. PROCESSING OF THE SEISMIC DATA (1994 SURVEY)

5.1 Introduction

The shallow seismic data acquired in March 1994 in NT-1-MEL and NT-2-MEL was recorded as follows:

- On the survey vessel, one of the 24 channels was diverted to a printer providing a continuous hard copy profile;
- All 24 channels were recorded digitally to exabyte tapes.

At the completion of the survey, the digital data was processed to produce a 12 channel stacked profile hard copy.

Interpretation of the seismic profiles was made Mr J. Lean, geophysical consultant to Cambridge Gulf Exploration NL.

The lines and tie lines that were run over NT-1-MEL and NT-2-MEL are shown in Figure 5-1.

5.2 Data Acquisition

The seismic data was acquired in March 1994 by Fugro Survey Pty Ltd for CGE, using a low-powered (200-300 Joules/0.5 sec) boomer source and 24-channel hydrophone array, with digital recording on an Elics Delph24 system. In the Victoria Offshore Prospect (Figure 2-2 and Figure 5-1) main lines were run at five kilometre and ten kilometre intervals in northeast-southwest directions, with tie-lines at ten kilometre to 25 kilometre intervals. A single reconnaissance line was extended northeast into the Daly Prospect, past Cape Scott, turning offshore then across the mouth of Anson Bay. The details of the seismic survey and data acquisition were reported in *Combined Mineral Exploration Report NT-1-MEL and NT-2-MEL for the period 18 January 1994 to 17 January 1995.*

5.3 Processing of the Seismic Data

The 1994 seismic data was recorded digitally using the Delph 24 software marketed by Elics of Paris, France. The digital data format is an in-house format and therefore only readable by the Delph 24 software. Subsequent to the completion of the survey, numerous attempts were made to translate the data to a SEGY format readable by a third party. Attempts were also made to get the digital data processed by two local Oil and Gas seismic processing contractors. Sample data from the survey were processed after great difficulties by the contractors but failed to improve the existing data. It was also found that systematic processing of all the data by these contractors would be cost prohibitive.

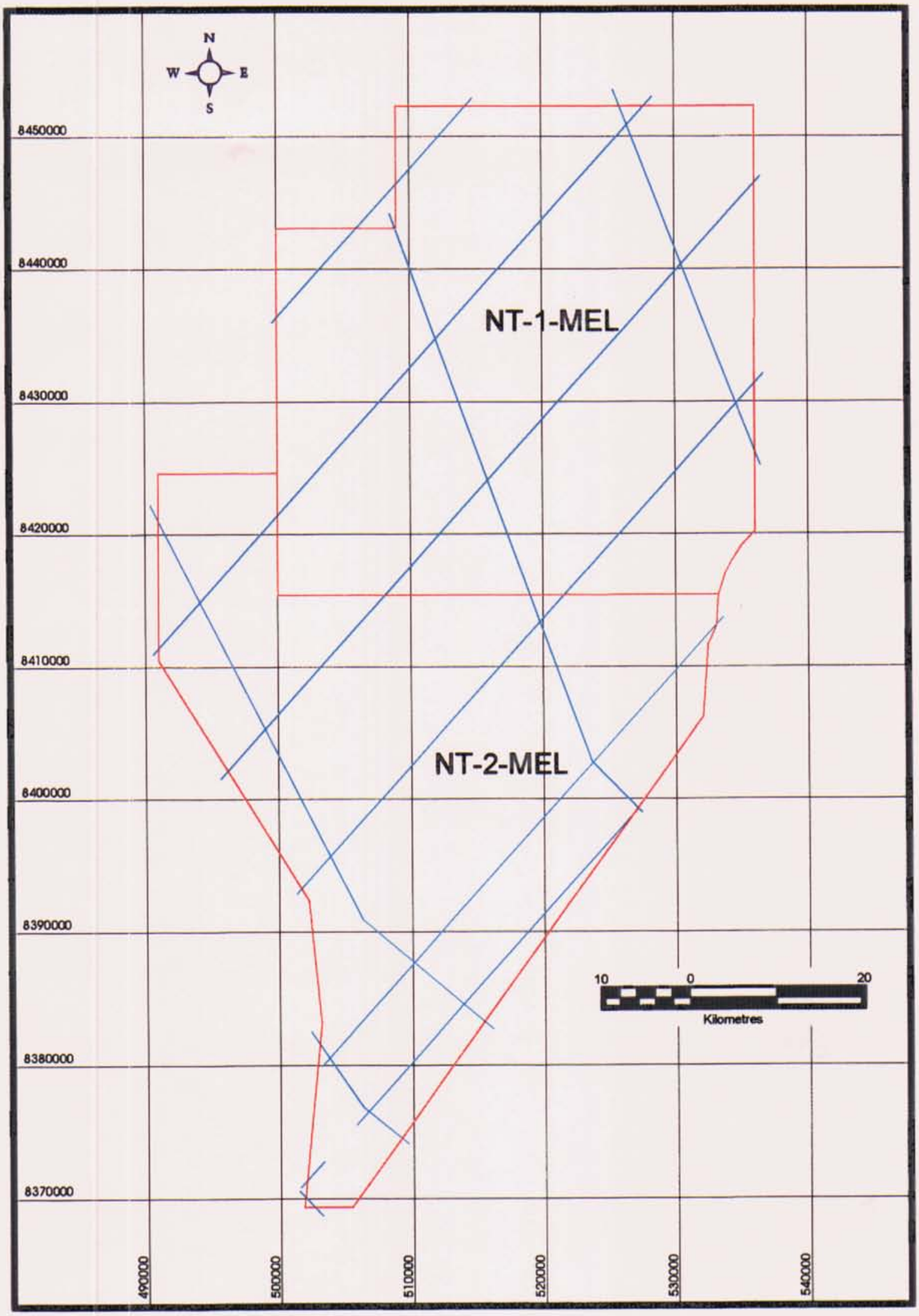


Figure 5-1 Victoria Offshore Prospect seismic survey in March 1994.

It took some eight months, from April to November 1994, before the Company was satisfied that the best and most cost effective processing available was using the Delph 24 software. Systematic processing was undertaken and completed in February 1995.

Initial processing was achieved by Common Depth Point (CDP) stacking of channels 1 to 12 using the parameters of streamer geometry and of the general layout of the acquisition equipment. At a later stage 24 channel CDP files were compiled from a selected number of lines.

5.3.1 Bandpass Filters

In the processing, these filters define the cut-off frequency of the high pass filter and the low-pass filter. The high-pass filter attenuates the spectral component of the signal below the cut-off frequency. The high-pass filter was set at 240 to 300 HZ during processing. Similarly, the low-pass filter attenuates the spectral components of the signal above the cut-off frequency and was set at 1500 to 1800 HZ.

5.3.2 Automatic Gain Control ("AGC")

The AGC processing offers improved visualisation of seismic signals by compensating for variations in the signal envelope by different means. By experimentation on various profiles, it was found that the best results were obtained by using exponential or linear adaptations. For the 24 channel CDP stack profiles an exponential adaptation was selected with equal sensitisation (rise time) and desensitisation (fall time) between 13 and 60 milliseconds; the window width was five milliseconds. For the 12 channel CDP stack profiles a linear adaptation was selected with rise and fall times of 20 milliseconds and a window width of 1.3 milliseconds.

5.3.3 Swell Filter

Several attempts were made to process the data with the swell filter, but this was not successful because the bang box signal was multiple and not sharp enough.

5.3.4 Time Varying Filter (TVF)

This option allows a bandpass filter (combination of high and low-pass filters) to be applied to the signal. It is applied between the seabed and the end of recording time.

This processing was also tried on the data but found to be less effective than the bandpass filters (see 5.3.1).

5.3.5 Predictive Deconvolution

This option allows seabed multiple to be attenuated and, as it requires knowledge of the seabed position, it must be used together with the swell filter. Predictive deconvolution was attempted on both the 12 and 24 channel CDP stacks with the following parameters:

- length of signature: 0.5 millisecond
- length of processing window: 0.5 millisecond
- filter co-efficient: 3
- position of multiple: variable from trace to trace

Predictive deconvolution was not successful because of the signal quality (see 5.3.3) and, generally, did not significantly attenuate the seabed multiples.

5.3.6 Horizontal Stacking

In the 24 channel CDP stack processing, a horizontal stacking of two channels was applied to attenuate the noise interference, particularly in the deeper part of the profile.

5.3.7 CDP Stacking

When the CDP stacked profiles were prepared, velocity and mute functions were defined using the real time single channel profiles produced during acquisition. The velocity function was generally defined at:

- 1500 metres per second at the top of recording, to
- 1600 metres per second some 40 milliseconds below seabed, to
- 1700 metres per second some 80 to 100 milliseconds below seabed, to
- 1900 metres per second some 120 to 140 milliseconds below seabed.

It should be noted that a number of velocity functions were defined for each traverse. The mute function was generally defined to enhance the top part of the profile with the nearest geophones (channels 1 to 5/7), and the deeper reflectors with the furthest geophones (channels 8 to 24). An example is given in Figure 5-2.

5.4 Processing Data Interpretation

It should be appreciated that both the seismic data processing and the interpretation were undertaken on the whole seismic survey regardless of tenement boundaries, and not on a tenement basis as required by the reporting regulations.

6. INTERPRETATION OF THE MARCH 1994 AND JANUARY 1995 SEISMIC DATA

6.1 Introduction

Earlier regional reconnaissance surveys and preliminary interpretation of the seismic data indicated that depositional environments and mechanisms may have existed and operated in the Joseph Bonaparte Gulf which could lead to concentrations of alluvial diamonds shed from primary sources in the Kimberley region which drains into the Gulf.

The aims of the interpretation were to assess the nature and distribution of the unconsolidated sediment sequences overlying bedrock in NT-1-MEL and NT-2-MEL, to identify environments of deposition with resource potential, and to define these sequences and environments to enable mapping, quantitative modelling, analysis and bulk sampling.

6.2 Interpretation Procedure and Map Compilation

The data used in the interpretation comprised:

- post-processed 12-channel Common Depth Point (CDP) stacked seismic records (main interpretation medium);
- real time single channel seismic monitor records (checks);
- a number of post-processed 24-channel CDP stacked seismic records (checks);
- analogue sidescan sonar records (used for limited checks).

Trackplots were used as the bases for the compilation of seismic interpretation summaries, showing the locations of inferred channels, boundaries, and target zones for follow-up investigation, etc.

During the interpretation of the bedrock surface, estimates of reliability were made based on the quality and clarity of the data, continuity of the reflector, and the presence of two principal elements used for the identification of the surface as bedrock (erosional form and truncation of underlying shallow-dipping strata). Reliability diagrams (working drawings) were compiled at 1:150 000 scale to allow overlay with interpretation summaries.

Detailed seismic interpretation comprised:

1. an initial examination of data;

2. formulation of a preliminary conceptual model (major divisions within the inferred sediment sequence and significant local environment types or target zones within divisions);
3. colour-coding of these divisions and zones; and tracing of these features on copies of the seismic records for subsequent digitisation, contour mapping and modelling.

The tracing of features was carried out primarily on 12-channel stacks, with reference to single channel monitor records or 24-channel stacks where necessary for clarification.

A colour code was used for tracing and identification of features and are consistent throughout the seismic profiles presented in the following sections:

- light blue - Unconformity (upper/lower sediment units);
- light green - Unconformity (lower sediment unit/bedrock);
- purple - Zone in upper sediment unit generally overlying light blue;
- dark blue - Zone in lower sediment unit generally underlying light blue;
- orange - Zone in lower sediment unit;
- dark green - Zone in lower sediment unit generally overlying light green.

All line intersection points were marked on the records, and internal consistency was maintained between all lines and reflectors.

6.3 Depths of Investigation, Resolution and Data Quality

Data was acquired over long distances and covered a wide variety of environments and geological conditions. Seismic penetration varied accordingly, and in addition, general data quality and vertical resolution varied according to weather conditions and the sea state encountered during acquisition.

6.3.1 Single Channel Monitor Records

Channel 6 of the 24-channel array was monitored in real time by output to a graphic recorder. This channel was chosen as a relatively quiet channel, away from vessel noise and wake.

This should not be considered equivalent to real time single channel data acquisition, since the channel comprised one group of three hydrophones at 30 centimetre spacings (0.6 metres active length), compared to

8-20 hydrophones at 30-15 centimetre spacing (2.1-2.85 metres active length) in common single channel arrays.

As a result, low gain and low signal/noise ratios (especially at high frequencies) were experienced, and often these records showed seabed and major shallow reflectors only, with effective penetration of only 10-20 metres. In some areas however, where sea conditions appeared very smooth, penetration of several tens of metres was observed. The single channel records were not intended for use in detailed subsurface interpretation, but were used for continuous detailed digitisation of seabed reflection times. While the continuity provided an advantage over stacked records (seabed was sometimes truncated by muting operators during post-processing), the large source-receiver offsets (>= 23 m) required correction of oblique raypath errors of up to eight milliseconds in minimum water depths (about five metres).

6.3.2 Common Depth Point Stacks

Common Depth Point (CDP) stacks were produced to provide an increase in the depth of investigation compared to previous single channel regional reconnaissance data. The specific aims were to increase amplitudes and signal/noise ratios, and to suppress multiple seabed reflections which limit the ability to interpret shallow water records even when penetration would otherwise be sufficient.

Again, variable geological conditions and sea states led to variations in subsurface penetration and clarity of data. 24-channel stacks provided higher reflection amplitudes and deeper penetration than 12-channel stacks, but with a significant loss of high frequencies, and hence seismic character. Therefore, 12-channel stacks were found to be more easily interpreted and are described below.

In areas of deep water, good subsurface penetration was achieved (e.g. 80 metres in sediments, in a water depth of 70 metres). Sub-bedrock penetration of over 50 metres was also observed in places. However, in areas of shallow water, penetration was still limited by strong multiples not effectively suppressed by stacking. Where gas concentrations were observed in shallow sediments, penetration was limited or prevented beyond the top of the gas due to high reflectivity or absorption, and scattering of energy.

Overall, a significant increase in penetration was achieved over single channel data in areas of deep water, with improved clarity of major reflectors including the bedrock surface and sub-bedrock strata. Some major reflectors were visible beyond the first seabed multiple, but effective penetration and interpretability of seismic character were still limited due to insufficient suppression of multiples. This may be due to an arbitrary velocity-depth distribution (e.g. 1500-1600-1700-1850 m/sec) assumed for calculation of time shifts in the stacking process, or to insufficient moveout over 12 channels.

Resolution is the minimum separation between parallel reflectors that still produces separate events on the seismic record. The processed seabed event (12-channel stacks) comprised three peaks within a wave packet approximately four milliseconds long, leading to a resolution of 3.2 metres at 1600 m/sec sediment velocity. Where subsurface reflectors were oblique to the seabed, they could be traced to within one metre of the seabed or better. Resolution was not high by single-channel standards, but good by multichannel standards.

General record quality, including level of detail and seismic character, dominant frequency, final gains and contrasts varied considerably within the whole data set, presumably due, in part, to variations in geological complexity over the wide geographical limits of the survey, and due to variable weather conditions and sea states. Some records were extremely clear and detailed, while others were very unclear, and required painstaking elimination of multiples and other events in order to be able to trace even major reflectors of interest.

The general data quality was included in the estimation of reliability of the bedrock interpretation. For the main investigation area, which included NT-1-MEL and NT-2-MEL in the Victoria Offshore Prospect, 23% of bedrock interpretations were estimated to have high reliability; 35% reasonable reliability; 32% low reliability; and 10% no reliability (where there was no data or the data was uninterpretable).

6.3.3 Line Density, Lateral Sampling and Interpolation

Shotpoint intervals of one metre were used in the data acquisition, that is, a high along-line lateral sampling density. Primary reflections were observed which are inferred to represent:

- seabed;
- erosional unconformities between unconsolidated sediment units;
- widespread depositional surfaces within sediment units;
- intra-unit bodies defined by seismic character; and
- the erosional unconformity forming the surface of gently folded sedimentary bedrock.

However, a number of seabed and intra-unit bodies were seen to be limited in along-line dimension to the order of one kilometre or less (much less than the seismic line separation). It is feasible that some of these features have been mis-correlated and incorrectly interpolated between lines and are actually separate bodies of more limited strike extent and different orientation. Figure 6-1 provides a typical seismic profile.

6.3.4 Corrections for Obliqueness and Stacking Errors

During interpretation, features of the seismic data that affected further processing of interpreted horizons and target zones were noted. Processing steps were recommended to minimise errors during quantitative modelling, and both problems and recommended solutions are summarised below for completeness.

Accurate bathymetric data was available as a basis for the calculation of reduced levels to seismic horizons. This entailed addition of bathymetry to interval reflection times between seabed and the seismic horizons of interest (horizon time - seabed time). However, stacked seismic data were sometimes truncated at the seabed during the muting process, preventing accurate digitisation of the seabed reflection time. Therefore single channel monitor records were used to determine seabed times, while 12-channel stacks were used to determine horizon times.

Two problems arose in this process:

- the single channel monitor records contained errors due to large source-receiver offsets and resulting oblique raypaths; and
- stacked data were found to contain errors (time delays) linked to the selected recording delay, offset from source to stacking location, and water velocity.

Firstly, an obliqueness correction was recommended as follows:

$$T0 = \sqrt{\left(T^2 - Td^2\right)}$$

Where:	T	is the digitised seabed reflection time (oblique path)
	$T0$	is the vertical seabed reflection time
	Td	is the direct source-receiver arrival time

$T0$ is the corrected single channel time required for subtraction from the moveout-corrected (vertical raypath) horizon time from the 12-channel stacked record. Errors of up to 8 milliseconds were expected in water depths of five metres encountered in this survey.

Secondly, a stack correction was recommended as follows, following advice from Elics (suppliers of the software that led to the error):

$$D = R - \sqrt{\left(R^2 + \left(\frac{X}{V}\right)^2\right)}$$

Where R is the recording delay on the 12-channel record

X is the offset from source to stacking location

V is the water velocity

D is the correction to be applied to the digitised horizon time prior to the calculation of interval time. Corrections up to -7.3 milliseconds were required for the recording delays and offset used in this survey. Subsequent versions of the software do not generate this error and no stack corrections are required.

6.3.5 Correlations and Velocity Determination

Little detailed information currently exists as to the seismic velocities of the sediments within NT-1-MEL and NT-2-MEL. Assumptions will be made during mapping and quantitative modelling regarding these velocities, but processes such as subaerial weathering, calcification and lateritisation may apply and this may dramatically alter the assumed velocities and hence computed depths.

It was recommended that in any follow-up drilling programme, detailed correlations be made between seismic interval times and drilled intervals, to enable a cross-plot to be built up showing true sediment velocities. These velocities can be used to adjust previous computations and to enable better first-time estimates in future programmes involving similar sediment types.

6.4 Geology as Interpreted from the Seismic Data

6.4.1 Bedrock

At Pearce Point and Fossil Head, siltstones and sandstones of the Permian lower Port Keats Group crop out. These are expected to form the upper part of the westward dipping Bonaparte Basin sediments beneath the Victoria Offshore Prospect including NT-1-MEL and NT-2-MEL. These sediments could be expected to form bedrock, or seismic basement, throughout the area surveyed.

Bedrock is inferred to crop out on the seabed, or occur at relatively shallow depths adjacent to the Pearce Point-Fossil Head exposures. An erosional reflector form is inferred. Although sub-bedrock character is obscured throughout much of the Victoria Offshore Prospect by multiples and as a result of attenuation in thicker sediments, an erosional form is interpreted with varying degrees of confidence. It is inferred that the bedrock in this area comprises the Port Keats Group sediments.

Palaeochannels

The erosional bedrock reflector includes many apparent channel features (Figure 6-2), of varying local relief, which were tentatively correlated from line to line on the bases of trend, shape and approximate depth.

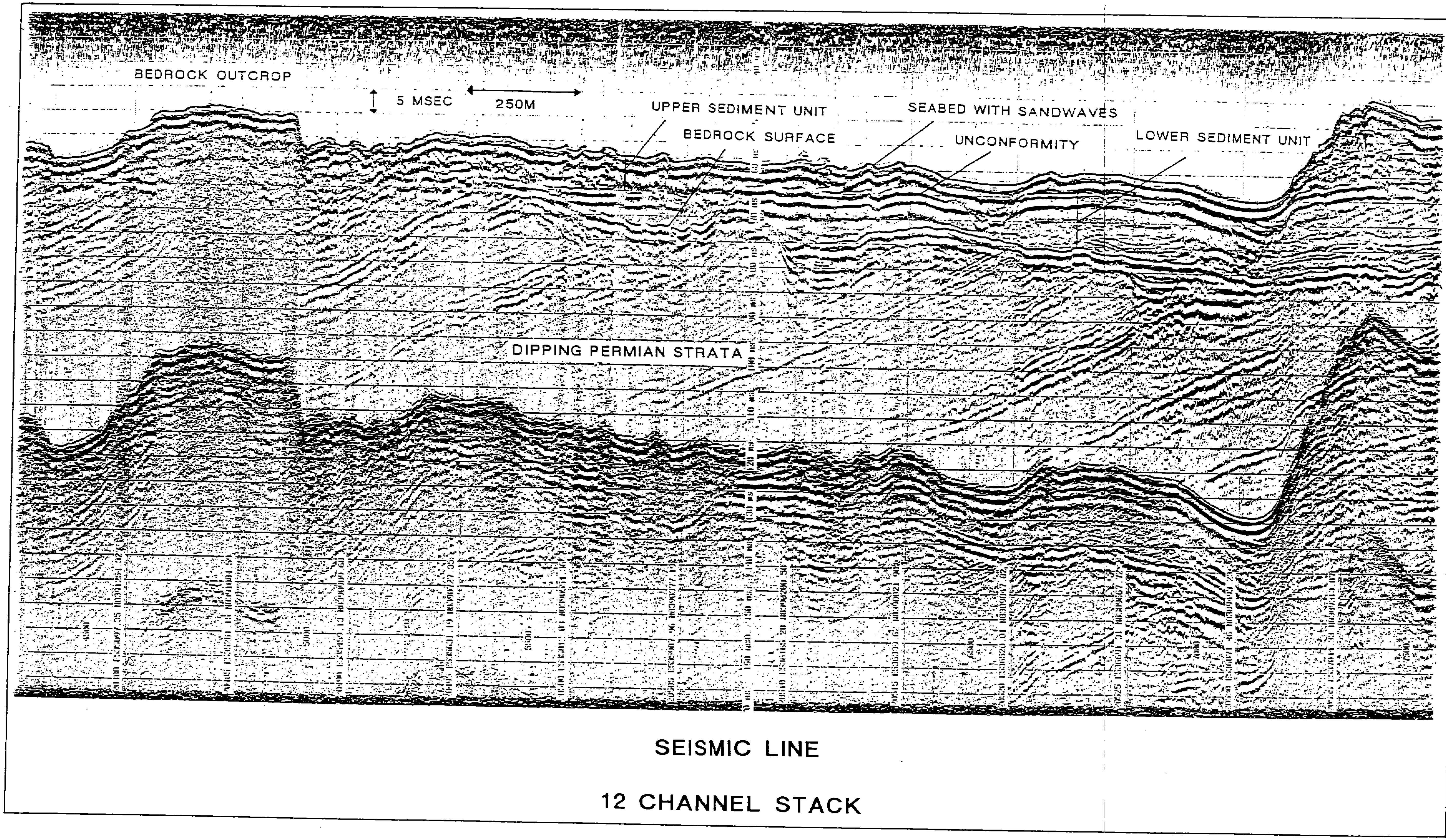


Figure 6-1 A typical seismic profile showing interpreted unconformities and bedrock definition.

A bedrock system underlies, and in places forms the present seabed system, coalescing ten kilometres southwest of Pearce Point and trending northwest for a further forty kilometres at reflection times up to 147 milliseconds. Trends are then unclear, but a northerly division is possible, where this main channel may be joined by another system originating near the shoreline between Pearce Point and Cape Hay. A west-northwesterly plunging bedrock ridge extends from just south of Cape Hay, forming the northern boundary of the braid channel. Maximum reflection times of around 150 milliseconds observed in these bedrock channels in the Victoria Offshore Prospect are consistent with marine regression and downcutting to about 120 metres during the last major glaciation and low sea level stand.

6.4.2 Unconsolidated Sediments

Unconformities and Sediment Units

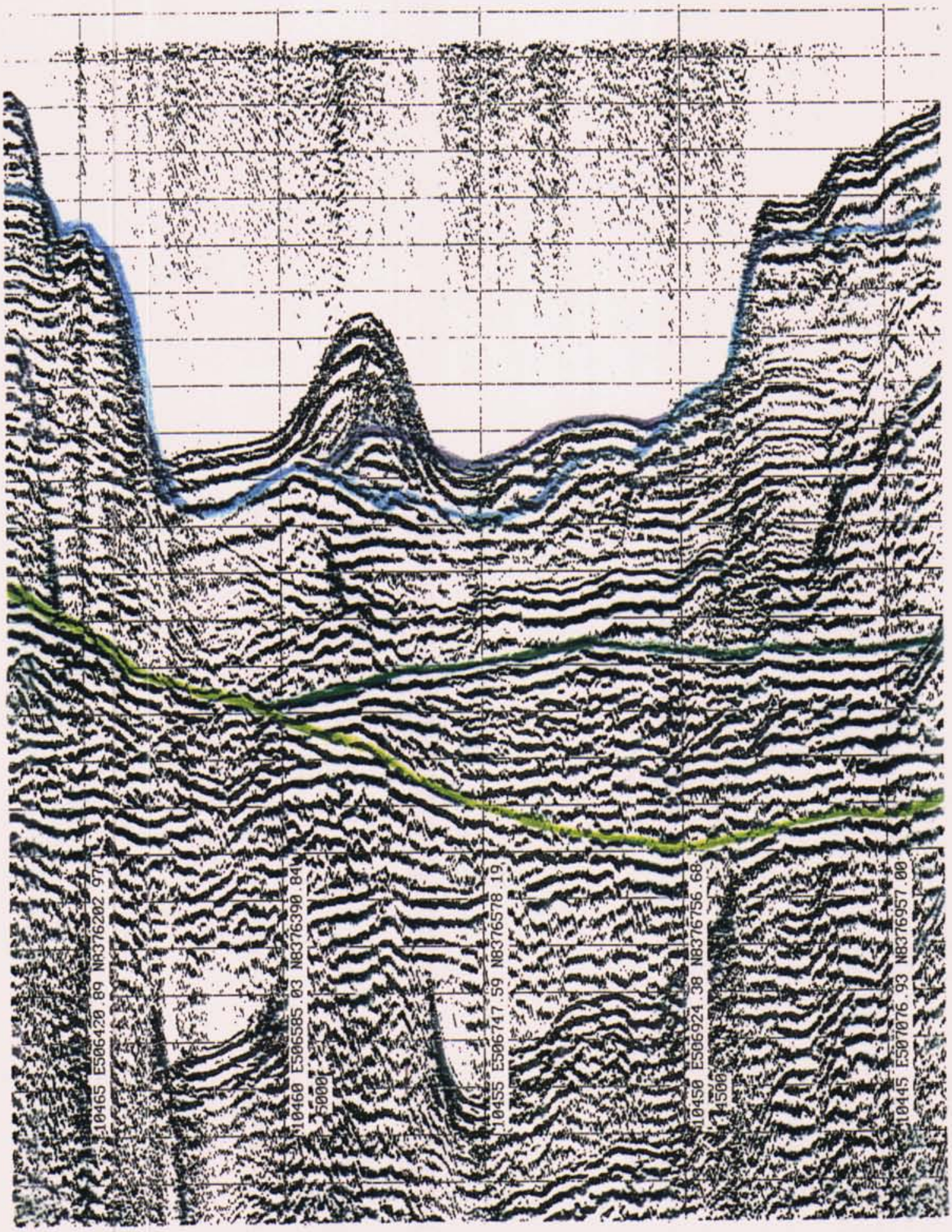
Between the seabed and the inferred bedrock reflector a complex sequence of unconsolidated sediments was inferred, exhibiting a variety of intrasediment reflector forms (e.g. planar horizontal, sigmoidal, highly erosional), and a variety of seismic characters (e.g. transparent, cross-bedded, diffractive), in the intervals between reflectors. The uppermost of these intrasediment reflectors is widespread, slightly to strongly erosional in form, and is inferred to represent a regional unconformity separating the sediments into upper and lower units.

Upper Sediment Unit

The unconformity at the base of the upper sediment unit indicates a number of small palaeochannels, which are difficult to correlate between lines at the present spacing. Draped or cross-bedded channel fill sediments are often indicated, and broader areas of the upper unit exhibit a seismically transparent (uniform fine grained) character (Figure 6-3), or low angle cross bedding, consistent with a muddy composition and present-day accumulation in a shallow marine environment. Where present, sand ridges form the youngest element of the upper unit, possibly by reworking of adjacent sediments, and often show a basal reflector laterally continuous with the surrounding seabed.

Lower Sediment Unit

Most of the unconsolidated sediments in the surveyed area fall within a sequence collectively called the lower unit. This can be a highly complex sequence with a number of local erosional surfaces, local or widespread zones of internal cross-bedding (Figure 6-4), and lenses of material with chaotic/diffractive/ coarse/non-bedded character (Figure 6-5). A deltaic or fluvio-deltaic environment of deposition is inferred for these sediments. By contrast, the complex sequence can occur adjacent to, below or within



LEGEND

unconformity (upper/lower sediment units)

zone in upper sediment unit, generally overlying light blue

unconformity (lower sediment unit/bedrock)

zone in lower sediment unit, generally overlying light green

Figure 6-2 A typical example of the channel feature in the erosional bedrock reflector.

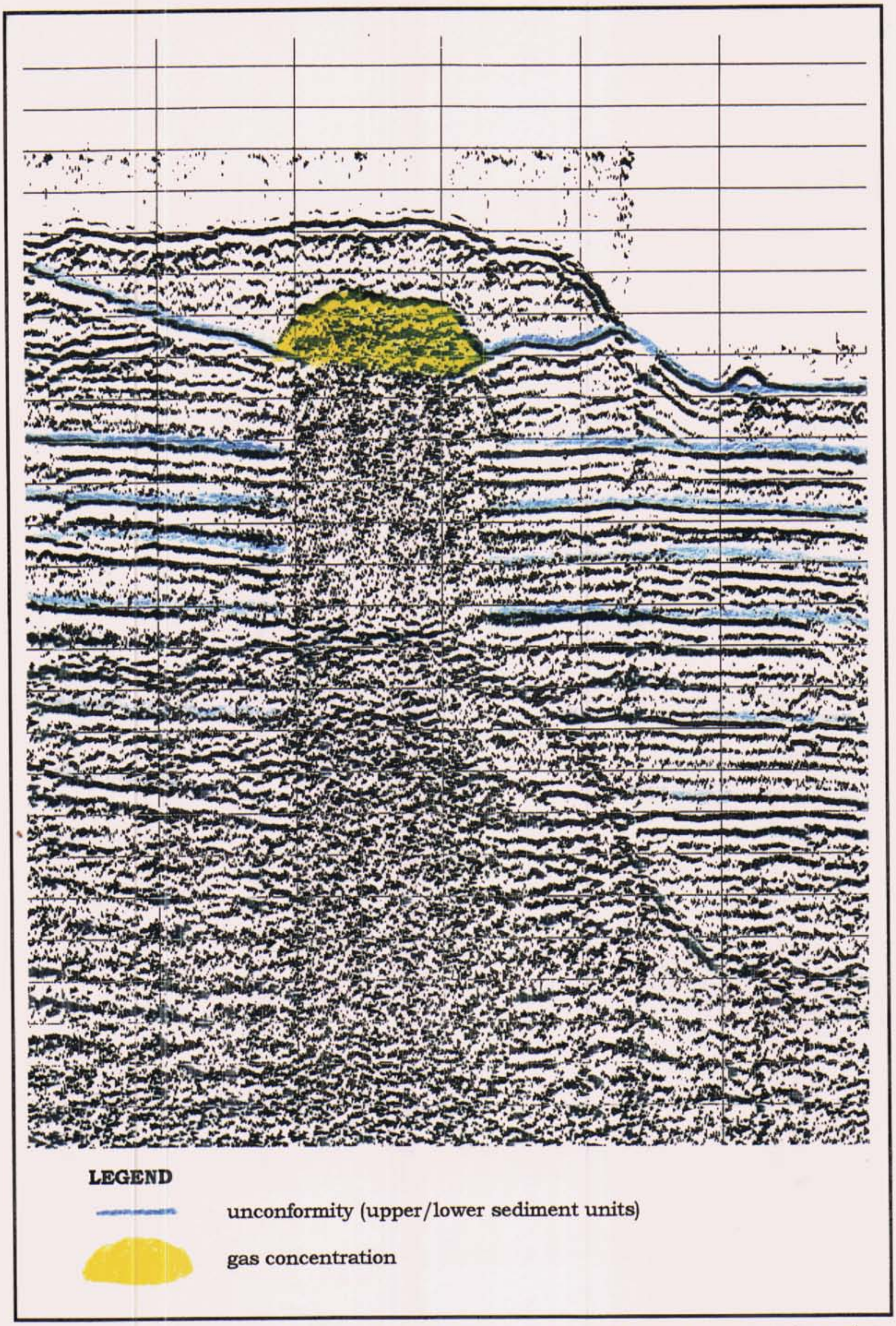
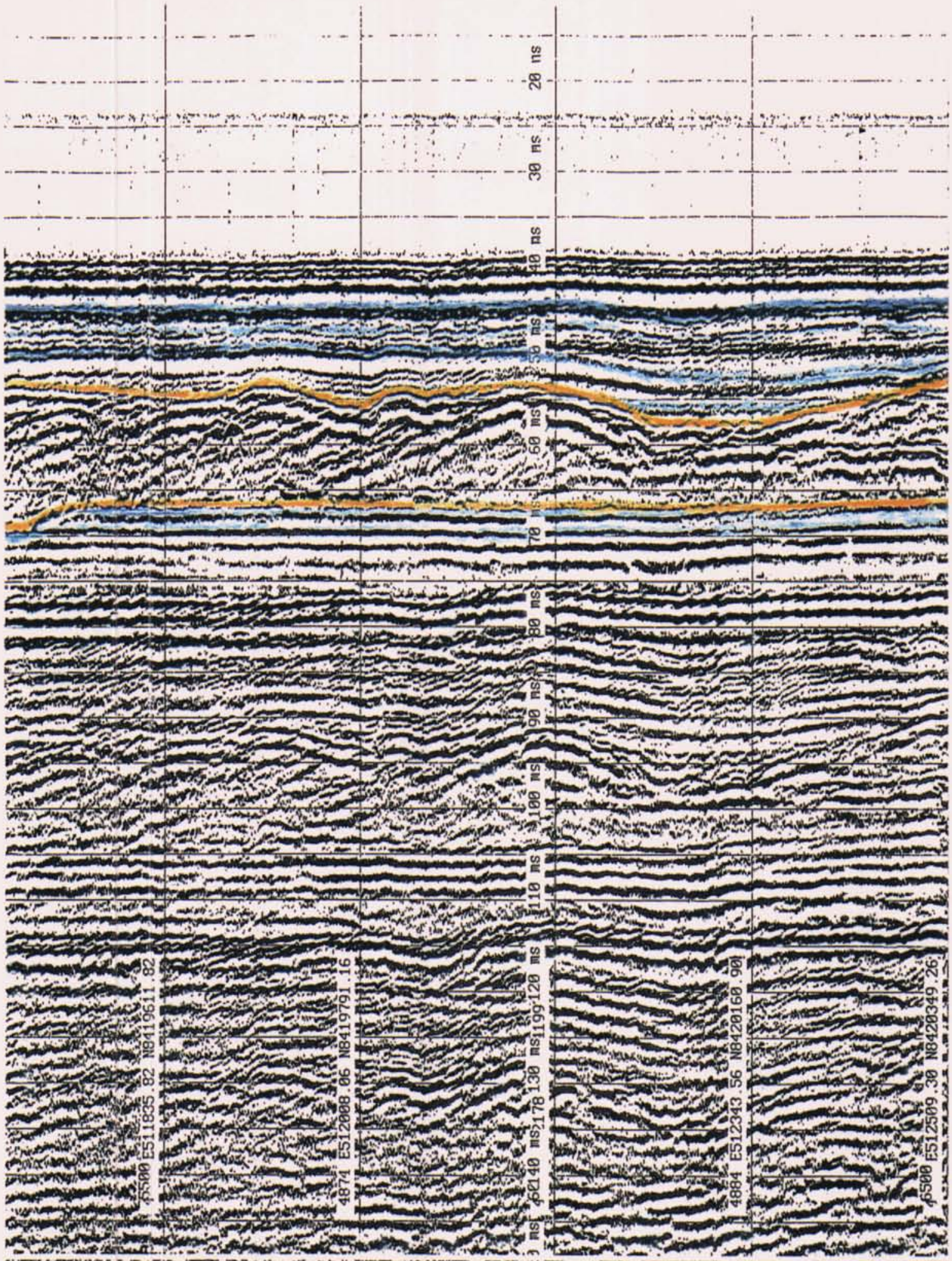


Figure 6-3 A transparent, fine-grained lens of recent sediment overlying a channel in the lower sediment unit. There is an inferred gas concentration in the upper unit causing acoustic opacity.



LEGEND

unconformity (upper/lower sediment units)

cross-bedded, coarser-grained lens

Figure 6-4 A subdivision of the lower sediment unit (below the light blue unit) into conformable flat-bedded and draped, fine-grained sediments, both above and below a cross-bedded, coarser-grained lens (orange zone).

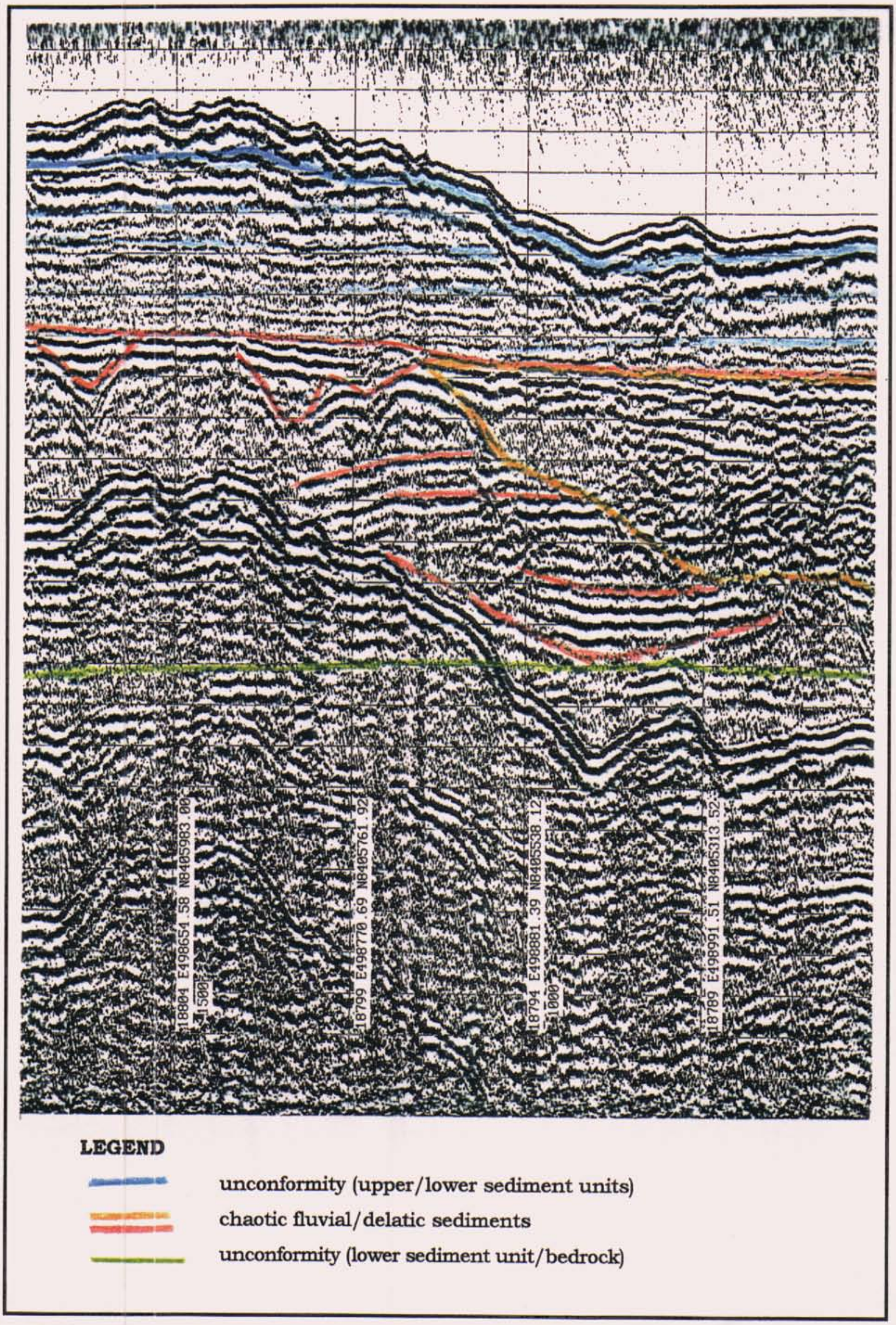


Figure 6-5 A subdivision of the lower sediment unit (light blue - light green) into conformable flat-bedded (marine/estuarine) sediments over more chaotic (fluvial/ deltaic) sediments.

a sequence of sub-horizontal monotonously interbedded sediments showing only occasional local scouring (Figure 6-6). A shallow marine environment of deposition is inferred for these sediments, with the whole of the lower unit possibly representing a transgressive sequence.

6.5 Resource potential

The presence of palaeochannels incised in the bedrock surface provides for the possibility of the transport of diamonds eroded from the primary source. Possible environments in which a concentration of diamonds could occur include shoreface or strandline deposits reworked by longshore currents and wave action, trapped coarse channel-fill deposits, coarse fluvial or fluvio-deltaic deposits reworked during transgression, gravel terraces and lag deposits associated with channel deepening or migration, and possibly surficial gravel deposits reworked by strong tidal processes.

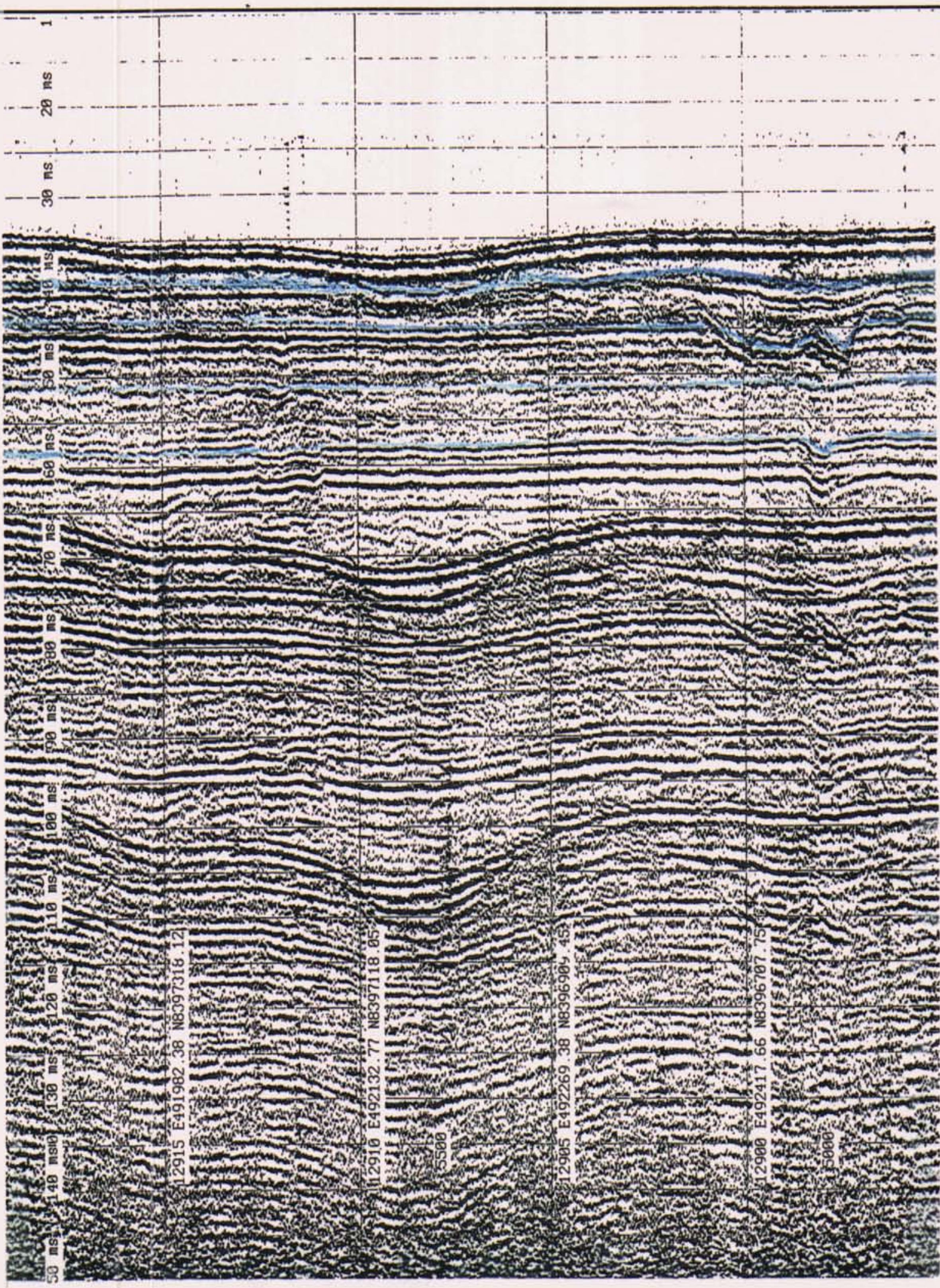
No evidence was found in the seismic data that would indicate the preservation of shoreface deposits. However, a number of targets were defined in the fluvial or fluvio-deltaic phases of the lower sediment unit throughout Victoria Offshore Prospect, and these have some potential for economic diamond resources. One minor group of targets occurs within the upper sediment unit, at, or close to, the seabed. Targets from both units represent a very small percentage of the total area and total volume of sediment investigated, and some are neither thick nor laterally extensive.

6.6 Targets for Further Investigation

A number of target areas were identified in NT-1-MEL and NT-2-MEL in the interpretation by Mr J. Lean. A summary of these targets is provided in Table 6-1.

The Purple units represent poorly bedded diffractive sediments (possibly gravels) in convex-up mounds of limited lateral extent, which may be subject to present day tidal reworking in scour channels of the Victoria system. The limited dimensions (600-700 metres along line by 15-25 msecs thick) and limited number of such bodies identified place a low priority on these targets for further investigation, although they provide the only direct access.

The Dark Blue units are generally thin (7-14 msec) zones up to five kilometres in strike length directly underlying the light blue unconformity north of the Keep River. They are characterised by disturbed or poorly defined bedding, which may be coarse in grainsize or alternatively, may be due to local reworking of non-prospective fines.



LEGEND

unconformity (upper/lower sediment units)

Figure 6-6 A monotonous, thinly-bedded, flat-bedded lower sediment unit (below light blue). Minor channelling and some marker beds can be traced for many kilometres. It is inferred that these sediments are fine-grained and deposited from suspension in a marine or estuarine environment.

Table 6-1 Summary of targets identified in the interpretation of the March 1994 and January 1995 sesimic data.

TARGET	LICENCE AREA	LINE NUMBER	MEDIAN FIX
PURPLE			
PU2	NT-2-MEL	V90	8321
PU2	NT-2-MEL	V85	10455
PU2	NT-2-MEL	VTL2	12396
DARK BLUE			
DB4	NT-2-MEL	VTL3	18650
DB4	NT-2-MEL	V100	7128
DB5	NT-1-MEL	V110	4844
ORANGE			
OR1	NT-2-MEL	V110	4489
OR1	NT-2-MEL	VTL3	18784
OR2	NT-1-MEL	V110	4854
OR2	NT-1-MEL	V108	400
OR2	NT-1-MEL	V110	4874
OR3	NT-1-MEL	V108	899
OR3	NT-1-MEL	VTL4	19743
OR3	NT-1-MEL	V120	3252
OR4	NT-2-MEL	V120	3317
OR5	NT-1-MEL	VTL4	19488
DARK GREEN			
DG4	NT-2-MEL	V85	10445
DG4	NT-2-MEL	V90	8376
DG4	NT-2-MEL	VTL2	12401
DG5	NT-2-MEL	V85	9991
DG6	NT-2-MEL	V88	300
DG6	NT-2-MEL	V89	406
DG6	NT-2-MEL	V89	410
DG6	NT-2-MEL	VTL4	20171
DG6	NT-2-MEL	VTL4	20204
DG8	NT-1-MEL	V108	878
DG8	NT-1-MEL	V110	4944

Orange units are targets of more limited lateral extent (two to three kilometres diameter) but up to 28 milliseconds in vertical extent beneath 10 to 23 milliseconds of sediment towards the offshore end of the Keep and Victoria River channel systems. Various cross sections were identified from channel fill to convex-up lenses, but with common internal character (coarse, slightly diffractive and cross-bedded) indicating sand or fine gravel, possibly deposited in a delta front.

The Dark Green form elongate zones up to fifteen kilometres long and one kilometre wide trending sub-parallel to existing shoals and channels. They are 8 to 26 milliseconds thick and directly overlie bedrock as channel fill or convex-up lenses, generally showing poorly defined or low angle bedding. These targets are mainly confined to the braided area of the Victoria River channels, and may contain coarse sands or gravels which have been subject to previous tidal concentration processes.

6.7 Summary

The examination of 527 line kilometres of seismic reflection data in NT-1-MEL and NT-2-MEL (in conjunction with the examination of a further 1000 line kilometres in the Company's Northern Territory tenements) has enabled the interpretation of lateral and vertical variations in the unconsolidated sediments, to a degree commensurate with line spacings of five to ten kilometres. The digital interpretation is provided on disk in Appendix 4. A legend for the digital interpretation is also provided.

A division was made into upper and lower sediment units separated by an erosional unconformity. The upper unit represents recent and current deposition of fine grained shallow marine sediments, plus tidal scouring and tidal movement of sediment in large ridges and smaller sandwaves. The lower unit comprises a number of depositional and erosional phases showing complex lateral and vertical facies changes from fine-grained, horizontally-bedded, shallow marine sediments to cross-bedded, fluvio-deltaic sands and poorly-bedded, channel-fill sands, and possible gravel lenses.

Some features indicate that, in a relatively small percentage of the area, environments exist which may favour the deposition and concentration of alluvial diamonds along with coarse-grained sediments. These environments, primarily the higher energy environments of the lower sediment unit, were identified as targets for further investigation by digitisation, contour mapping and quantitative modelling.

6.8 Further seismic investigations

In the current seismic survey and interpretation, 12-channel and 24-channel stacked data were employed to improve effective penetration and to clarify data within the zone below the first seabed multiple. Improvements were made in effective penetration compared to single channel data, including improved ability to trace major reflectors below the first multiple, but multiples were not significantly suppressed to the point where seismic character could be inferred at these levels. In addition, high resolution was not achieved.

It was recommended that for any infill work in NT-1-MEL and NT-2-MEL, single channel acquisition be considered, which may not enable equivalent penetration, but it is believed it will significantly improve both vertical and horizontal resolution within an acceptable depth of investigation, and will provide an improved representation of seismic character of the sediments. An essential component of this single channel acquisition should be carefully monitored swell filtering, which can allow acquisition in a wider range of sea conditions, and can clarify records significantly when used in conjunction with other facilities such as time varying or automatic gain.

7. REVERSE CIRCULATION AIRLIFT DRILLING PROGRAMME (1995)

7.1 Introduction

Using the geotechnical and geological information gained from the two bulk sampling surveys completed by the Lady 'S' in the Ord and Berkeley Prospects, it was estimated that the economic diamond cut-off grade could be very low, in the range of 0.02 carat per cubic metre. It was also established that the most effective method of sampling would be by drilling in a cased hole, which would enable reasonably accurate grade determination within 95% confidence limits and, because the economic cut-off grade was so low, the drilling tool would have to recover large samples.

Further world-wide research followed, during which various large diameter drilling tools were investigated. At its Annual General Meeting of 21 December 1994, CGE announced that it had entered into a Head of Agreement with a Consortium that had the tools and expertise to undertake quantitative offshore large diameter drilling.

The Company's intentions are to drill in its most promising area, the Berkeley Prospect, and thereafter to drill all its prospects in Western Australia and the Northern Territory.

7.2 Calculation of Minimum Sample Size

Alluvial diamonds are generally of gem quality due to their depositional history; during transport from the source poor quality stones are degraded into very small particles. Alluvial diamond deposits are, therefore, characterised by high unit value. If an alluvial deposit is mined in bulk, it is also characterised by low mining costs. The combination of high unit value and low mining costs means that an offshore alluvial diamond deposit can be economical at very low diamond concentration (or grade).

Using the geophysical data and the data collected from the two bulk sampling surveys a conceptual geological model and a conceptual mining scenario was used to calculate the sample size required to evaluate the Company's offshore tenements.

7.2.1 Mining Cost Estimation

The conceptual geological model assumes a deposit of diamondiferous material ten metres thick beneath five metres of sterile overburden. It is also assumed that all materials are bulk mined and that 15% of the mined material is fed to the heavy media separation plant. The following assumptions are based on the data collected to date:

- capital investment is $200 Million with a 10 year amortisation;
- mining capacity 1500 cubic metres per hour at 70% efficiency;
- mining cost @ $2 per cubic metre;
- treatment cost @ $2 per cubic metre;
- other costs $1.63 per cubic metre.

The total mining and treatment cost is then calculated at $5.63 per cubic metre.

7.2.2 Cut-off Grade Estimation

Assuming that the diamond value is $250 per carat (based on the valuation of diamonds recovered during the bulk sampling survey with the Lady 'S') and that the average stone size is 0.25 carats, the provisional cut-off grade is calculated to be 0.0225 carats per cubic metre. The provisional cut-off grade indicates, therefore, that one can expect nine stones of 0.25 carats per 100 cubic metres.

7.2.3 Sample Size Considerations

The sample size considerations are given in Table 7-1. Assuming that in an alluvial diamond deposit, the diamond distribution is a straight Poisson distribution (not a Sichel's compounding Poisson distribution), the chances of finding one stone and two stones in a drill hole are shown in Table 7-2.

Table 7-1 Sample size considerations

Diameter Drill Hole in metres	Bank m^3 per 15m penetration	Expected Number of Stones
0.75	6.6	0.59
1.00	11.77	1.06
1.50	26.4	2.37
2.00	47.1	4.24

Table 7-2 The chance of finding one stone and two stones for a given drill hole diameter

Drill Hole Diameter (m)	% Chance of finding at least one stone	% Chance of finding at least two stones
0.75	45	12
1.00	63	26
1.50	90	69
2.00	98.5	92

As a cross check of the Poisson distribution interpretation, the theoretical relative error based on Gy's formula (Gy, PM, 1982: *Sampling of Particulate Material, Theory and Practice*, Elsevier, Amsterdam; pp 431) for sampling can be calculated:

$$S^2 = \left(\frac{1}{M_S} - \frac{1}{M_L}\right) \times C \times d^3$$

where:
- $S^2 =$ Variance of grade
- $M_S =$ Sample weight in grams
- $M_L =$ Weight in grams of the deposit (universe) from which the sample is taken
- $C =$ Sampling constant
- $d =$ particle diameter in cm = 0.25 (for diamonds of approximately 0.25 to 0.3 carats)

the sampling constant:

$$C = c \times l \times f \times g$$

where:
- $c =$ the mineralogical factor
- $l =$ the liberation factor
- $f =$ Shape factor or coefficient of cubicity = 0.5
- $g =$ Size range factor = 0.25

The mineralogical factor (c) can be calculated from:

$$c = \frac{1-a}{a}\left\{(1-a)\lambda_a + a\lambda_g\right\}$$

where:
- $\lambda_a =$ density of diamond 3.5 gr/cm^3
- $\lambda_g =$ density of gangue in gr/cm^3
- $a =$ estimate of the critical compound in grams per gram of total materials

At the calculated minimum grade of interest we wish to detect (conceptual cut-off grade) of 1.125 carats per 100 tonnes we can calculate that:

$a =$ 2.25×10^{-9} grams diamond per gram of solids

Because (a) is very small, parts of the formula become negligible:

$$c = \frac{1}{a}\lambda_a$$

Furthermore, M_L is the weight of the deposit (universe) in grams and thus $\frac{1}{M_L}$ is negligible.

Gy's formula now reads:

$$S^2 = \frac{1}{M_s} \times \frac{1}{a} \times \lambda_a \times f \times g \times l \times d^3$$

In the geological model, which assumes a thickness of 15 metres of material, a drill hole with a diameter of two metres will contain 47 cubic metres or approximately 100 tonnes (10^8 grams).

From Gy's formula

$$S^2 = 0.03$$
$$S = 0.17$$

The relative standard deviation of the average grades in 100 tonne samples 17%.

Within the 95% confidence limits the relative error is ± 2 x S = 34% of the conceptual minimum grade of 1.13 carats per 100 tonnes and, therefore, the lower conceptual limit is 0.75 carats per 100 tonnes (or three stones) and the upper conceptual limit is 1.51 carats per 100 tonnes (or six stones).

7.2.4 Conclusion

Using assumptions based on the geological model and the limited data collected in the previous two bulk sampling programmes, it can be calculated that:

- mining costs are estimated at $5.63 per cubic metre;
- the provisional cut-off grade is 0.0225 carats per cubic metres (1.12 carats per 100 tonnes);
- the relative error of finding the provisional cut-off grade in a 100 tonne sample is 34% within the 95% confidence limit;
- the drill hole diameter required to sample the geological model must be at least two metres.

7.3 Identification of Sampling Techniques

Having established that the most effective sampling tool is a large diameter drill in a cased hole, which would enable reasonably accurate grade determination within 95% confidence limits, CGE initiated a world wide search for such a tool. Various drilling techniques were investigated including jetting, rotary and monocore drilling, clamshell excavation and dredging. Because the work was to take place offshore, the Company also investigated a number of drill ships, semi-submersible and jackup platforms, and drill barges.

On 4 April 1995, a delegation of CGE staff visited the Northern Territory Department of Mines and Energy and explained in detail the drilling survey proposed. Later that month, the Company submitted a formal drilling program entitled *Phase III Drilling Programme - Project Proposal and Environmental Summary, Joseph Bonaparte Gulf.*

7.4 Large Diameter Reverse Circulation Air Lift Drilling

7.4.1 The Drilling Rig

A hydraulically operated pile top drill rig (Figure 7-1) was used for the drilling operations. During normal operation the drill casing was stabbed through a template which was supported in the water at the stern of the barge by a diesel driven winch. The template and casing were then lowered to the seabed. A mudmat, at the base of the template, supported the structure on the seabed. The casing reached its designated target penetration depth using a vibrator installed on top of the casing. The bottom hole assembly including the 2.3 metre roller drill bit was lowered into the casing and drilling commenced. All auxiliary equipment supporting the entire drilling project was situated onboard the crane barge. Prior to the commencement of reverse circulation airlift drilling, the drilling unit was connected to the processing plant where all the drill cuttings were processed and sampled. A specially designed wire line tool could be used to take U samples at selected sites. The sample cores, with a diameter of 115 mm, were taken through the centre of the drill at selected depths during the drilling of a hole

7.4.2 The Processing Plant

The processing plant was contained entirely on the ship and target material passed directly from the drill pipe to the plant. A flow chart illustrating the path taken by the plant feed is given in Figure 7-2.

The drill cuttings entered a boil box where excess air was removed and the velocity was reduced before the target material entered the processing plant. The target material was then washed through a screen removing particles smaller than 1.5 mm. This material was returned to the sea-bed as unwanted sediment.

From the screen the target material moved into a scrubber together with volumes of sea water. Here the aggregated particles were broken down and the target material "washed". A trommel removed all

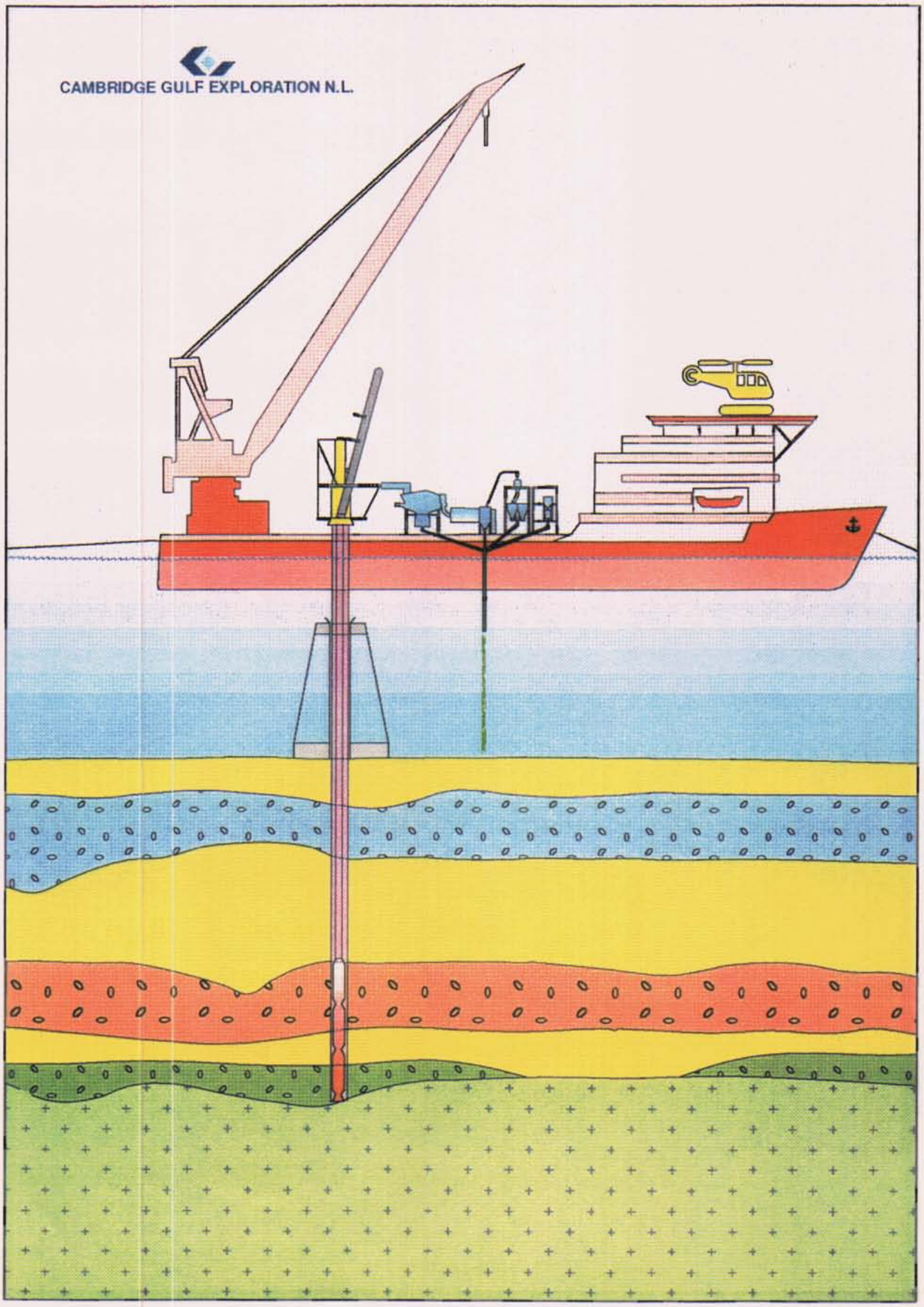


Figure 7-1 Schematic plan of the drilling operation showing the conceptual model, vessel, drilling rig and processing plant.

particles greater than 14 mm to the discharge pipe. The remaining target material was pumped to a cyclone where excess sea water was removed. This water flowed into the discharge pipe with the unwanted fine particles (smaller than 1.5 mm).

The target material was stored in one of three bins as plant feed, before being fed to the heavy media separation (HMS) plant. All particles with a specific gravity of greater than 2.7 were removed to the Sortex machine while the unwanted sediment was sent to the discharge pipe.

All unwanted sediment and water was returned to the sea via a single discharge pipe, the outlet of which was approximately ten metres below the water line. Geological and geotechnical samples were taken at various stages in the processing. These were contained and sent ashore for subsequent analysis.

7.4.3 Operational Support

The drilling barge (Java Constructor) is not self-propelled and was towed by a tug, the Australia Tide. The tug towed the Java Constructor to each location and laid the anchors that kept the barge in position. The tug also acted as a resupply tender for the barge.

The drilling and processing was entirely contained on the drilling vessel. Staff change-overs were via helicopter from Kununurra. CGE"s Perth based staff and any visitors to the drilling ship were also helicoptered in from Kununurra. The helicopter company has night operation facilities and could be used in an emergency. Resupply of food, water and fuel, and provision of a mail and spare parts/equipment service was by way of the supply tender from Wyndham.

Cambridge Gulf Exploration operated a comprehensive security system on board the drilling vessel.

7.5 Outcome of the Large Diameter Drilling Programme

Between late May and early September 1995, Cambridge Gulf Exploration NL (CGE) undertook an experimental, large diameter, drilling programme. During this time the suitability of both the large diameter drilling equipment and CGE's own processing plant were tested in one of the Company's tenements (EL 80/1563). After three months of experimentation with both cased and uncased holes, the project was called to a halt as the original aims of the programme were not being met with the drilling equipment configuration being used. Nevertheless, valuable data was obtained in a variety of research areas.

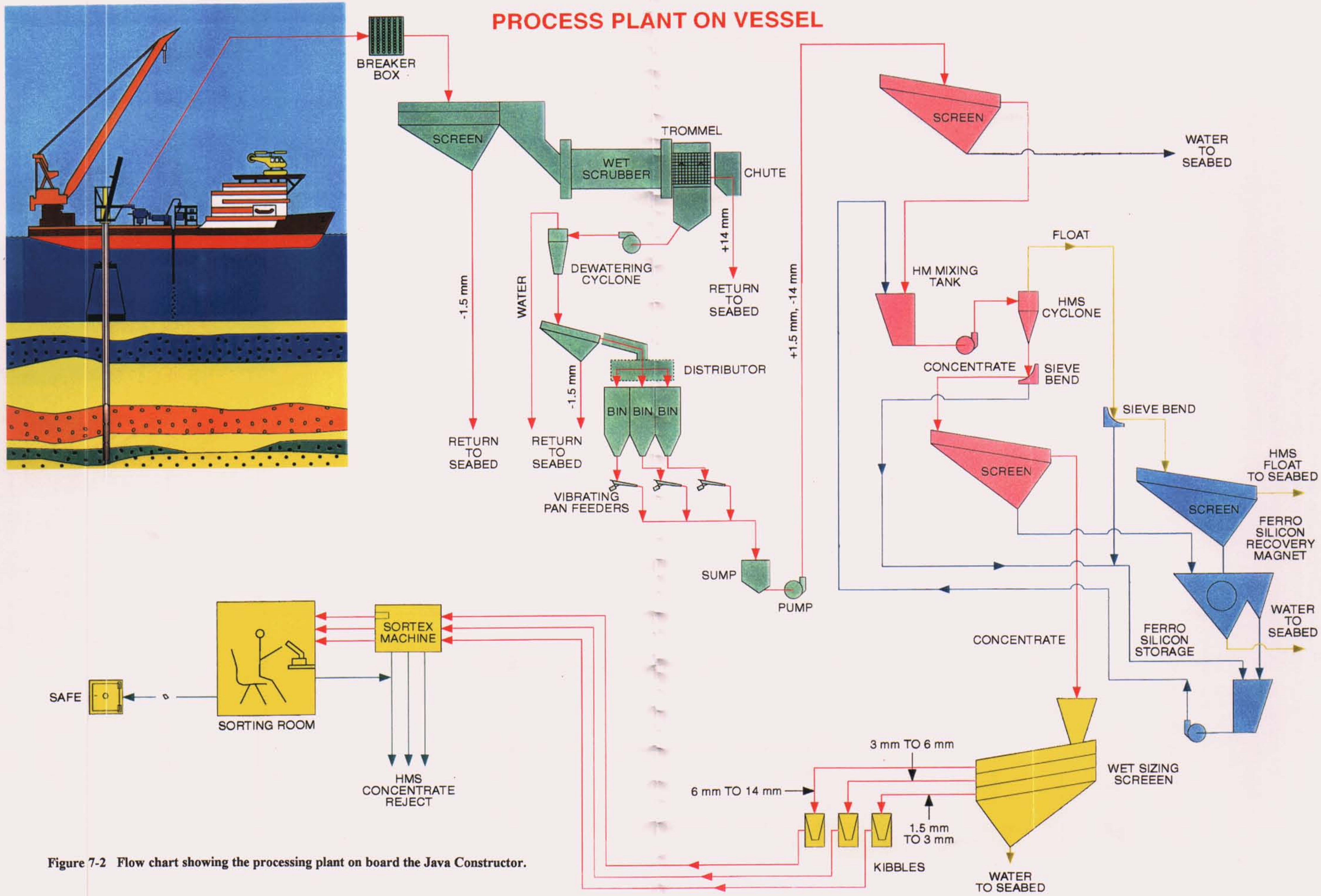


Figure 7-2 Flow chart showing the processing plant on board the Java Constructor.

A total of 40 holes were drilled to depths of between 3 and 26 metres below the seabed. After several failed attempts to use the original cased drilling method, open holes were experimented with. All drilling was carried out with the drill rig attached to the stern of the Java Constructor, and a series of experimental drill bits were constructed on the barge to drill open holes and partly cased holes of different diameters (0.6 to 1.5 metres). In total, thirty six open holes were drilled with a variety of experimental drill bits. A range of modifications were made to the drill bits in an attempt to reduce hole collapse and loss of circulation. However, the constant movement of the drill barge, and consequently the movement of the drill bit, resulted in the drill bit being jammed into the bottom of the hole causing loss of circulation. While some modifications partially alleviated the problems, hole collapse and loss of circulation still prevented adequate penetration of the seabed.

During the fourteen weeks that the drilling was undertaken a range of delays and difficulties were experienced including:

- inclement weather;
- damage to the crane and drilling equipment;
- minor problems with the commissioning of the processing plant;
- difficulties with local soil (sub-marine sediment) conditions;
- contractual difficulties.

The experimentation with large diameter drilling, while not as successful as originally hoped, has yielded a variety of information; information which will ultimately form the platform from which to launch a better and more successful bulk sampling programme. Although the experience gained was within only one tenement, the lateral continuity of the geology and physical environment within the Joseph Bonaparte Gulf, and the consistency of both CGE's alluvial diamond theory and exploration philosophy, means that the experience will benefit the exploration in all the tenements CGE hold in the Gulf.

8. HIGH RESOLUTION INFILL SEISMIC SURVEY (OCTOBER 1995)

8.1 Introduction

Between 14 October and 1 November 1995 a survey comprising hydrographic, shallow marine single channel seismic profiling and sidescan sonar was completed over CGE tenements in the Joseph Bonaparte Gulf. The survey was carried out by Racal Survey Australia Limited on board the MV Miclyn Achiever. Mr John Lean, CGE's consultant geophysicist, was on board to ensure that the quality of data was of the highest order possible, within the framework of the CGE/Racal contract, and for the intended purpose of the data. The survey covered all tenements and the lines run over NT-1-MEL and NT-2-MEL were contiguous with the running of lines over the adjacent Western Australian and Northern Territory licence areas (Figure 8-1). An offset diagram for the MV Miclyn Achiever and general instrument layout is provided in Appendix 5

8.1.1 The Survey

Forty seven lines were surveyed over both the Victoria Offshore Prospect and the adjacent Victoria River Prospect between 16 and 24 October. A total of 512 line kilometres were surveyed in NT-1-MEL and NT-2-MEL during this time, and resurveying of selected lines using the X-Star system occurred on 25 October. The majority of lines were run in a northeast to southwest direction (roughly parallel to the coastline) with a few long dip lines oriented northwest - southeast.

Initial surveying with the echo sounder, sidescan sonar and boomer systems was augmented by the X-Star system on 19 October. Rough sea conditions on 22 and 23 October led to a degradation of data quality but as a whole the dataset is exceptional. A summary of the field survey parameters is provided in Appendix 6 and a summary of the digital seismic data record is provided in Appendix 7.

8.2 Aims of the Geophysical Survey

The leases had previously been investigated, and indications were that depositional environments and mechanisms may have existed and operated in these areas which could have led to concentrations of alluvial diamonds. The overall objective of the survey was, therefore, to obtain data enabling detailed quantitative assessment of the shallow geology in the leases, i.e. the nature and distribution of the unconsolidated sediments overlying bedrock.

Specific aims were the acquisition of:

1. more detailed bathymetric data;
2. sidescan sonar data showing the nature and morphology of seabed sediments;

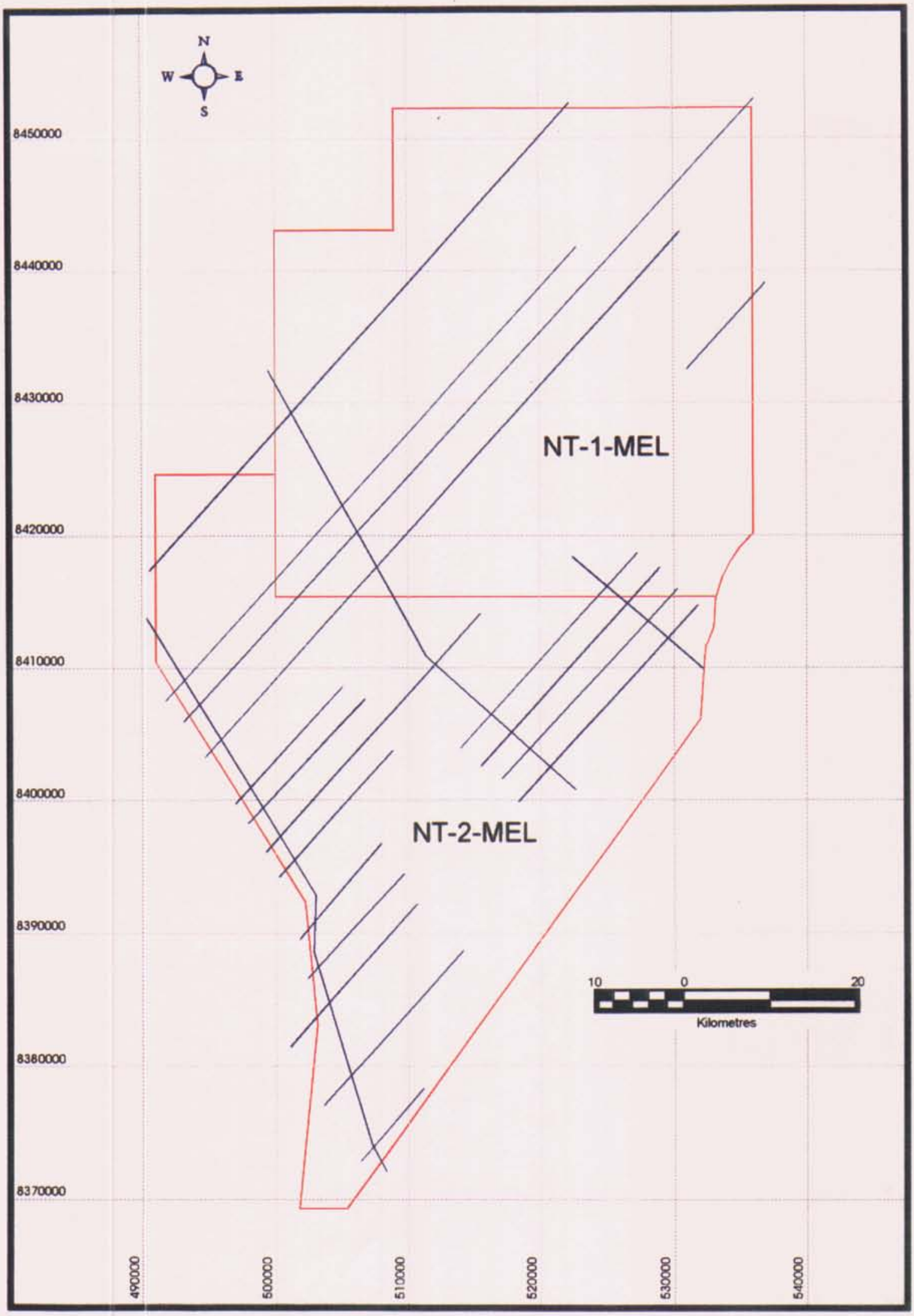


Figure 8-1 The survey lines that were run in NT-1-MEL and NT-2-MEL in the October 1995 Seismic Survey.

3. infill seismic reflection data showing the nature and vertical distribution of the unconsolidated sediments and bedrock where visible, leading to the understanding of the overall geology of the sedimentary sequence and the delineation of prospective sediment units.

8.3 Equipment, Personnel and Safety

8.3.1 Positioning and Navigation

DGPS Navigation System

The LandStar Differential GPS System was used for the October 1995 seismic survey. The system embodies the successful combination of data capacity, range and coverage with a flexible networked approach that lends itself to comprehensive performance and quality monitoring.

The link capacity of 1200 bits per second allows data from a number of networked reference stations to be sent simultaneously without introducing unacceptable delays between reference station and user. With ten reference stations each generating correction data for ranges from eight satellites, an update rate of better than two seconds is achieved by the LandStar system.

Satellite communications systems, particularly at the Inmarsat L-band frequencies of 1.5586GHz are reliable and free of the interference associated with the crowded M.F./H.F. bands. This high data integrity gives users confidence that the corrections will be continuously received without interference.

The LandStar system includes a 24 hour monitoring facility to ensure the validity of data received at the control centre from the DGPS reference stations and that the same data is received over the LandStar satellite data link.

Monitoring and control functions include extensive analysis and archiving of the reference corrections and the comparison of range rate corrections - arriving from different stations within the network. The system also receives the broadcast message from the satellite data link and applies this data to a monitor receiver at the control centre to verify positioning performance. Time series plots of this performance, in latitude, longitude, and height, together with PDOP and HDOP figures are generated.

The LandStar scheme is a homogeneous network within the WGS 84 geodetic reference frame. The original network, prior to the Australian extension included ten primary triangulation stations for which the WGS 84 values were supplied. The vectors established during this build up create a network between the Far East, Australia and Europe.

For the Australian extension to the network, two primary geodetic points were used at each site, together with the transportable laser ranging site, Gnangara 73 in Perth. Additional data was also obtained from AUSLIG for Darwin, Karratha and Tidbinbilla fiducial sites and included in the reference station adjustment. Trimble 4000 SST geodetic receivers were used to simultaneously obtain phase data which was then post processed to derive the vectors between sites. The vector results were entered into "Geolab" 3D adjustment software, to obtain adjusted values for the reference stations.

Trimble 4000DL GPS Receiver

The Trimble 4000DL GPS receiver is designed for moderate precision static and dynamic positioning applications. The GPS receiver provides time and three-dimensional station co-ordinates at a once-per-second update rate.

The receiver receives the civilian coded signal (C/A) from the GPS NAVSTAR satellites. The receiver automatically acquires and simultaneously tracks GPS satellites and precisely measures carrier and code phase and computes position and velocity. Latitude, longitude and height values are output on the World Geodetic System (WGS 84) Earth-centred, Earth-fixed co-ordinate system. The receiver is designed to measure the following observables:

- Coarse/Acquisition (C/A) code Pseudo-ranges,
- Rate of change of Pseudo-range,
- Integrated Carrier.

C/A code correlation techniques measure the propagation time of the signal from the satellite to the antenna. Latitude, longitude, height and time can be determined from measurements made from at least four satellites, by a process similar to triangulation.

To determine speed and heading, the receiver calculates the rate of change of Range (the range-rate) by measuring the Doppler shift of the carrier.

It is capable of receiving and processing differential corrections from other reference sources using the standard format of the Radio Technical Commission for Maritime Services, Special Committee 104 (RTCM SC-104), Version 1.0 or 2.0 protocols.

The 4000DL has several options available, including internal data logging memory, event marker logging, etc., and therefore may be used alone or as part of a more extensive navigation system.

Navigation Computer System

The navigation computer system used for this project consisted of a Compaq 486 portable computer operating Racal's General Navigation System (GNS) version GNS 400. Associated peripheral equipment included a printer, plotter, a Compaq 486 notebook operating Racal's GRREP graphics repeater software and, an SGB 1000 Gyrocompass.

Interfacing the navigation equipment and peripheral equipment (ENSIN, sidescan sonar system, X-Star system and the echosounder) was achieved by linking directly to the navigation computer by means of an intelligent 8-channel digiboard.

8.3.2 Echosounder

The Atlas-Deso 20 Echo Sounder, which was used on this project is a dual frequency system operating at 33 kHz and 210 kHz. Digital technology is employed so that the equipment comprises one unit incorporating an analogue/digital recorder, transceiver electronics and digitiser. During the survey an over-the-side mounting was used.

The echosounder contains two digitisers, one for each transmitted frequency. Returns from several transmissions are stored, weighted and summed so that the faint returns from the seabed will be recognised as background noise. Digital information is indicated in the display window of the analogue recorder and is available for external use. The digitised data between on-line fixes are recorded by the GNS as intermediate depths. The digitiser can be set to track either of the two frequencies. During this survey the GNS logged the higher (210 kHz) frequency data; the lower frequency data were not recorded because of the cross-talk with the sidescan sonar equipment (and subsequent noise on the sidescan analogue records).

TSS 335 Motion Sensor

The 335 heave data was interfaced to the Deso 20 which produced a corrected analogue trace at the Transmission zero or the blanking line when required. A TSS 335B Motion Sensor was used on this survey to correct bathymetric data from the Deso 20 echosounder.

The TSS 335B is a compact stand alone sensor. The sensor provides accurate measurements of roll, pitch and heave in real time. The sensor pod is a fully sealed cylindrical unit of hard anodised aluminium and is depth rated to 100 metres.

The sensor was mounted near to the echosounder pole using the triangular mounting bracket supplied. The 30 metre cable is connected to an active junction box, normally positioned close to the receiving equipment. The active junction box is used to supply power to the sensor pod, and to convert between the digital and analogue current mode signals used by the sensor, and the rs232C digital ±10V analogue signals required by the external equipment. The analogue roll, pitch and heave outputs are updated 2730 times per second.

The TSS 335 Motion Sensor has a range of ±10 metres and an accuracy of ± 5 centimetres or 5% whichever is the greater.

8.3.3 Sidescan Sonar

The Klein sidescan sonar system was used to provide sea floor mapping. The system consisted of a single frequency 100 kHz towfish, a Klein 595 digital graphic recorder, deck and tow cables.

The towfish contains transducers which transmit short pulses of high frequency acoustic energy in fan shaped beams at right angles to the fish's track. These beams are narrow in the horizontal and wide in the vertical planes. Housed in the nose of the towfish are the transmitting and receiving circuitry, and on receipt of a trigger pulse from the shipborne recorder these transducers are energised. The receiving circuitry amplifies the returned echoes and sends them up the tow cable to the recorder for display.

The Klein 595 recorder has five channels to record continuous sidescan sonar as well as sub-bottom topography. The returned signals are electronically processed and printed line by line to produce the sonar image. The Klein 595 is controlled by a microprocessor and includes a wide variety of capabilities including image correction, record expansion, annotation and menu-driven operation. The Klein 595 features a fixed head, high resolution, high speed dry thermal printer in which each dot is individually digitally addressed to produce 16 distinct grey shades.

8.3.4 EG&G Boomer and ENSIN Digital Acquisition System

The sub-bottom profiling system comprised the following components:

1 x EG&G Surface - Tow Uniboom Boomer Model 230
1 x EG&G single-channel seismic streamer
1 x ENSIN digital acquisition motherboard

2 x PC processing units (terminal, keyboard, mouse, hard disk with graphics board)
1 x DAT 4mm Tape Drive
1 x Gulton Plotter
1 x EPC 9701 Graphic Recorder
2 x EG & G 231 Triggered Capacitor Bank
2 x EG & G 232A Power Supply

EG & G Model 230 Seismic Source

The EG & G Model 230 Uniboom (boomer) is a surface towed acoustic source for use in sub-bottom profiling systems. A boomer functions by sending an electrical current across a plate mounted within a small twin-hulled tow vehicle behind the ship. The plate moves against a membrane in response to the electrical charge. The voltage of the electrical current determines the amount of acoustic energy put into the water column and the characteristics of the pulse may be adjusted by the operator so as to provide the best survey results throughout a wide range of geological environments and operational conditions. In general, the larger the energy requirements the slower the repetition rate of source firing as the capacitor banks require more time to recharge.

Power Supply/Trigger Bank

Electrical energy to drive the EG & G Model 230 Uniboom was provided by the EG & G Model 232-A Power Supply and 231 Trigger Capacitor Bank (Control Bank).

The Model 232-A Power Supply provides a source of high-voltage direct current for charging the capacitor banks used in sub-bottom profiling systems. The 232-A will charge 1000 Joules to 3.8kV in 0.5 seconds. This allows the operator to select sound-pulse repetition rates as fast as two pulses per second at an energy level of 1000 Joules.

System specifications are as follows:

Input Voltage:	110 - 120 or 220 - 240V AC,
	50 - 60 Hz, single phased
Output Voltage:	3.8 kV DC maximum
Charging Rate:	0.5 seconds per 1000 Joules

The Model 231 takes the high voltage DC from a 232-A Power Supply, stores it in an internal 160μF capacitor bank and supplies this stored energy to a seismic source transducer. The 231 contains 160μF of capacitive energy storage and associated control and high energy switching circuitry. It can control and switch up to 8400 Joules at an average power of 2000 Watts, depending on the application. The

231 is safety interlocked for operator protection and switching of the electrical energy to the transducer is accomplished by a Rail Gap.

System specifications are as follows:

Capacitive Energy Storage:	1000 J (160 microFarads at 3.53 kV)
Energy Switching :	8400 J maximum
Input Power	
AC:	240V at 2 A
DC:	3.8 kV maximum at 0.5A average (from 232-A)
Trigger Input:	Contact closure or 12V DC
pulse from recorder.	

ENSIN Digital Acquisition, Processing and Interpretation System

ENSIN (Engineering Seismic Interpretation) is a single-channel, high resolution, digital seismic acquisition, processing and interpretation package manufactured by the Perth-based exploration and mining software company Micromine Pty Ltd. ENSIN is designed and developed for IBM PC and compatible computers, and operates on a variety of processors and screens, and interfaces to most printers, plotters and digitisers.

The ENSIN acquisition and processing card is responsible for converting the analogue signal received from the single-channel streamer to a digital format based on the user-specified sampling frequency. The digitised data can be stored on hard disk or directly on DAT tape in a specialised ENSIN binary format, which in turn can be converted to the industry standard SEGY format.

8.3.5 X-Star Sub-bottom Profiler System

The X-Star Full System Sonar is an FM sub-bottom profiler that generates cross sectional images of the seabed and collects digital normal incidence reflection data over many frequency ranges. The reflectors measured by the system are displayed as shades of grey or colour on a computer monitor.

The frequency range of operation is determined by the acoustic characteristics of the transmitter and receiver mounted in the tow vehicle. For this survey an SB-216S tow fish was used, operating at a pulse width of 20ms and a frequency range of 2-10 kHz. Nominal vertical resolution was 15 centimetres with penetration depths of the order of five metres for sand and 20 metres for silt.

The X-Star sub-bottom profiler consists of the following components:

- the deck unit,
- a high resolution colour monitor,
- an underwater signal cable,
- a towed vehicle.

A Sparc workstation, containing a DSP (Digital Signal Processor) board, is mounted within the deck unit. The DSP board stores the transmitted waveform and the correlation filter, and performs the correlation processing and spherical range corrections. At periodic intervals the transmitted waveform is sent to the D/A converter which generates an analogue pilot signal (using 20 bits) that is amplified by a 1kW power amplifier to drive the transmitter transducer.

Acoustic returns from the sea floor are measured with the receiving array. The output of the receiving array is amplified by a preamp mounted in the vehicle. The output of the preamp is connected via the underwater signal cable to a digitally controlled amplifier in the deck unit before being sampled by a 16 bit A/D converter. The sampled acoustic return is processed by the DSP board and sent via the DSP link to the Sparc for display and recording.

8.3.6 Personnel

The personnel provided by Racal to carry out the required data acquisition on a 24 hour per day basis were :

Party Chief/Surveyor	G. Davies
Surveyor	J. Tighe
Geophysicist	D. Bergersen
Electronics Engineers	L. Etheridge, P. W. Chan

John Lean was the Cambridge Gulf Exploration representative.

8.3.7 Safety

The crew of the Miclyn Achiever and Racal staff attended a safety meeting on 14 October. Gareth Davies gave a general description of the survey and the safety issues involved. Specific hazards were discussed and the steps to be taken to avoid problems were noted. The emergency muster station signals were demonstrated and the location of the ship's safety equipment was explained and pointed out on a tour of the ship. The procedures to be followed in case of any emergency were also explained.

8.4 Operational Summary

8.4.1 On-line Procedures

The Racal Survey General Navigation System (GNS) Survey software package was used to provide the on-line navigation of the survey vessel. A nine channel Trimble 4000DL MKII GPS receiver was used in conjunction with Racal's LandStar/Skyfix Differential GPS and other ancillary equipment, which were interfaced to a PC operating the navigation software.

A fix at 30 second intervals was supplied to the sidescan sonar, echo sounder, and boomer and X-Star profilers. This allows information, including date, time and fix number, to be output onto the hard copy analogue echo sounder and sidescan sonar records. The boomer data hard copy record was annotated with fix marks, and fix number and positioning data were logged on the seismic data tape. Fix marks, fix numbers and positioning data were also logged on both the hard copy and the Exabyte tape of the X-Star system.

Offsets were applied in the system software from the GPS antenna to the datum point (echo sounder transducer). See Appendix 5 for the vessel offsets.

8.4.2 Echo Sounder

Bathymetric profiling was carried out using an Atlas-Deso 20 dual frequency echo sounder operating with both 33 kHz and 210 kHz transducers in an over-the-side vessel mounting. The echo sounder data were corrected for vertical vessel motion by a TSS 335 motion sensor. The echo sounder provided continuous analogue and digital seabed profile data with the navigation computer system logging the high frequency, digitised, minimum water depth data. Bar checks to check transducer draught and sea water velocity were carried out either prior to or after the survey in each prospect. The 33 kHz frequency was not logged in the Victoria Offshore Prospect because of interference with the sidescan sonar record.

8.4.3 Sidescan Sonar System

The Klein sidescan sonar system was used to provide backscatter characteristics of the sea floor. The system consists of a dual frequency Klein 422 Towfish (operating at the 100 kHz frequency), a Klein 595 digital graphic recorder, and deck cable. The towfish was deployed from a winch located on the centre line of the Miclyn Achiever via a block attached to the ship's A-frame. The block also incorporated a cable counter which measured cable out from the stern (the cable itself was marked with tape at five metre intervals).

Sidescan sonar data were recorded in analogue format only. The recording unit was operated at a slant range of 100 metres per channel and at a speed of 3.5 knots. The data quality was good throughout the survey.

8.4.4 Boomer Shallow Seismic Reflection System

High-resolution single-channel seismic data were collected in both analogue and digital format. The seismic source used was an EG&G 230 surface towed boomer fired every 450 ms with energy output of 300J. The boomer source was deployed off the starboard side of the vessel 15 metres aft of the stern. The EG&G 232 power supply was used in conjunction with an EG&G 231 triggered capacitor bank to generate the output energy, with an additional capacitor bank serving as a backup.

Acoustic energy reflected from the sea floor and substratal interfaces was measured by a linear array of hydrophones towed off the port side of the ship 12 metres aft of the stern. Eight hydrophones, spaced 40 centimetres apart, acted as a single channel receiver for acoustic energy. The piezoelectrical crystals within the hydrophones converted pressure changes associated with the returned acoustic signals to electrical impulses which were sent to the shipboard computers and recorders.

The analogue signals sent from the seismic streamer were converted to digital format with the ENSIN seismic acquisition, processing, and interpretation package. For this survey a Gulton thermal printer was used to generate a real-time analogue record.

Acquisition and Processing Parameters

As mentioned in the preceding section, the energy output for the boomer in this survey was 300 J fired every 450 ms. The ENSIN system is capable of recording shot rates as short as 125 ms; the shot rate used in this survey was determined by the recharge capabilities of the capacitor banks (and general wear and tear on the equipment).

A sampling frequency of 9.2 kHz was used to digitise the data. The trigger length for each shot was 345 ms, and the record length was 258 ms. The real-time analogue scale was set at 0-200 ms; the data were replotted with a vertical scale of 100 ms onshore.

A 495 Hz to 4.5 kHz bandpass filter was initially applied to the data, and tests on the low and high frequency cut-offs during the course of the survey showed little improvement in data quality (higher S/N ratio). Analysis of the frequency spectra for individual shots during the testing phase of deconvolution showed that the bulk of the signal lay between 1 kHz and 3 kHz, and hence the original bandpass parameters appear reasonable. Attempts to construct an effective spiking deconvolution operator were unsuccessful, the overall result being an addition of high frequency noise to the data. Subsequently, no deconvolution was applied to the real-time data. Other real time processing routines applied to the analogue record swell filtering (filter length of 25 shots).

8.4.5 X-Star Sub-bottom Profiling System

The frequency range of operation is determined by the acoustic characteristics of the transmitter and receiver mounted in the tow vehicle. During this survey an SB-216S two fish operating at a pulse width of 20 ms and a frequency rate of 2-10 kHz was used. The X-Star fish was towed from the port side of the ship, three to five metres beneath the sea surface. Nominal vertical resolution was 15 centimetres with penetration depths of the order of five metres for sand and 20 metres for silt. Analogue plots produced on an Alden thermal printer were scaled in the vertical direction in metres, based on a preset water/sediment velocity of 1500 m/s. Digital data were recorded on Exabyte tape with approximately 52 files per tape.

8.5 Data Reduction

The digital bathymetric soundings were reduced to the Lowest Astronomical Tide (LAT) by the application of the Australian National Tide Table predicted tides for Pearce Point.

All the soundings on the working charts were colour coded, for every one metre change, to assist in the interpretation of the charts. All working bathymetric charts were checked for erroneous bathymetric "spikes". The tie-ins at line intersections were good but variable for each of the Prospects in the survey, a function of the accuracy of the tide data available.

For the Victoria Offshore Prospect and adjacent lease areas, a co-tidal chart had to be designed, due to the large area of the surveys. This was accomplished by obtaining contour plots for the four major tidal constituents from the National Tidal Facility at Flinders University. The constituents were interpolated and the tide values computed for selected points offshore. Together with data from ANTT for sites around the Joseph Bonaparte Gulf, a co-tidal chart of contours of time differences and range factors, relative to Pearce Point, was drawn. The time difference and range factors were then abstracted into ten kilometre by ten kilometre grid boxes. The values were applied to the tides of Pearce Point and then applied to the raw bathymetry.

8.6 Geodetic Parameters

The co-ordinates given in the survey report, and reproduced here, refer to the following:

- The location co-ordinates are defined on Australian Geodetic Datum 1984 (AGD 84).
- The Global Positioning System (GPS) is referenced to the World Geodetic System 1984 (WGS 84).

8.6.1 Datums

Datum	**Australian Geodetic Datum 1984**
Spheroid:	Australian National
Semi-major Axis (a):	6 378 160.000m
Semi-minor Axis (b):	6 356 774.719m
Eccentricity Squared (e^2):	0.006 694 542
Flattening (1/f):	298.25

Datum	**World Geodetic System 1984**
Spheroid:	WGS 84
Semi-major Axis (a):	6 378 137.000m
Semi-minor Axis (b):	6 356 752.3142m
Eccentricity Squared (e^2):	0.006 694 380
Flattening (1/f):	298.257 223 563

8.6.2 Projection

Projection:	**Universal Transverse Mercator**
AMG Zone:	52
Central Meridian (C.M.):	129° East
Scale factor on the C.M.:	0.9996
False Easting:	500 000m
False Northing:	10 000 000m
Latitude of Origin:	0° (Equator)
Unit of Measure:	International Metre

8.6.3 Datum Transformation

The following seven-parameter datum transformation was used to convert WGS 84 co-ordinates to AGD 84 co-ordinates:

Dx =	+116.00m
Dy =	+50.47m
Dz =	-141.69m
Rx =	+0.230"
Ry =	+0.390"
Rz =	+0.344"
Scale (K) =	-0.0983

These values are from the paper by M. Higgins, Department of Mapping and Surveying, Queensland. These values were also adopted by the Inter-Governmental Advisory Committee on Surveying and Mapping Standards and Specifications for Control Surveys in July, 1990.

8.7 Recommendations

CGE's consultant geophysicist made the following recommendations following the acquisition of the seismic and sidescan sonar data.

8.7.1 Seismic Post-Processing

Throughout the survey (NT-1-MEL and NT-2-MEL and other Northern Territory and Western Australian tenements), a total of seven lines were plotted in the wrong orientation compared to parallel lines. In addition, some 30 lines contain sections of data (some very short) where swell filtering problems or gain problems have occurred and subsurface data is degraded. While partial replots and cut-and-paste of many of these lines would produce full line high quality plots, the opportunity exists to improve resolution and interpretability of all lines.

Three options are theoretically available :

- Expanded scale re-plots;
- Pre-Stack Spiking Deconvolution for pulse compression and improved resolution; and
- Predictive Deconvolution for multiple suppression.

The first of these options was recommended for all lines, to improve vertical and horizontal resolution and make full use of the dynamic range of recorded amplitudes, i.e. show more subtle changes in amplitudes for better interpretability. Since maximum primary reflection times were not observed in excess of 120 msecs, a display window of 119 msecs (one of the available steps) is recommended, together with a printer speed of 66 lines/inch. Display delays may need to be employed where water depths increase and subsurface information would otherwise be lost. Other than display window, display delay and printer speed, other re-processing parameters should remain as per data acquisition.

Pending the results of deconvolution tests being carried out on sample data by Mr. Andy Lane for Micromine, further recommendations may be made for reprocessing at least parts of lines. Preliminary results indicate that spiking deconvolution is restricted to a filter length which is too short to satisfactorily compress the ringing associated with the sandier seabed reflections. Predictive deconvolution allows a longer filter which could be used for compression, but is designed for multiple suppression and would normally use a much longer filter which would vary according to water depth range. Initial tests indicate prohibitively long reprocessing times, and this option may only be recommended selectively to solve particular problems of interpretation.

8.8 Interpretation

Post processing and interpretation of the seismic data acquired in October 1995 will be undertaken in the next twelve months. The interpretation will be carried out in association with the interpretation that was completed in May 1995 on data acquired in 1994 and January 1995 (Section 6). The interpretation of the sidescan sonar records will be undertaken in the interpretation and analysis of the environmental data acquired in November 1995 (refer Section 9) and will be reported on in the next Annual Mineral Exploration Report.

9. REGIONAL BASELINE ENVIRONMENTAL STUDY

9.1 Introduction

Cambridge Gulf Exploration has designed a baseline environmental study that will be carried out in conjunction with bulk sampling in all of CGE's tenements in the Joseph Bonaparte Gulf. The Company has retained the services of D.C. Blandford & Associates Pty Ltd, Consultants in Environmental Science, to oversee the surveys that will comprise the baseline study, while CGE staff will design and implement individual surveys.

As the first step in determining CGE's obligations and future approach to environmental management, Mr Blandford has had discussions with a number of State and Federal departments and agencies, and has consulted various private sector marine and non-marine consultants regarding offshore mining in the Joseph Bonaparte Gulf at some point in the future.

9.2 Regional Survey - November 1995

In conjunction with the seismic survey that was undertaken in October 1995 a regional environmental sampling survey was completed in November 1995. This involved sampling at sixty locations throughout CGE's tenements; five of these sites were in NT-1-MEL and seven in NT-2-MEL (Figure 9-1). At each site the following samples, recordings and observations were taken:

- surficial sediment sample using a grab sampler;
- benthic organism sample using a grab sampler;
- water quality samples at various depths using a bottle sampler;
- water clarity reading using a secchi disk;
- tide and current recordings.

In addition, at four of the twelve sites drop cores were taken (VP008, VP011, VP012 and VP014, refer to Figure 9-1). Sample logs recorded at the time of sampling are provided in Appendix 8.

9.3 Survey Logistics, Sampling Equipment and Methodology

Sampling sites were pre-selected on the basis of the proposed seismic and sidescan sonar survey lines. This was done so that use of the data acquired in both parts of the survey could be maximised, and a greater knowledge of the seabed environment could be gained for use in future analysis and in

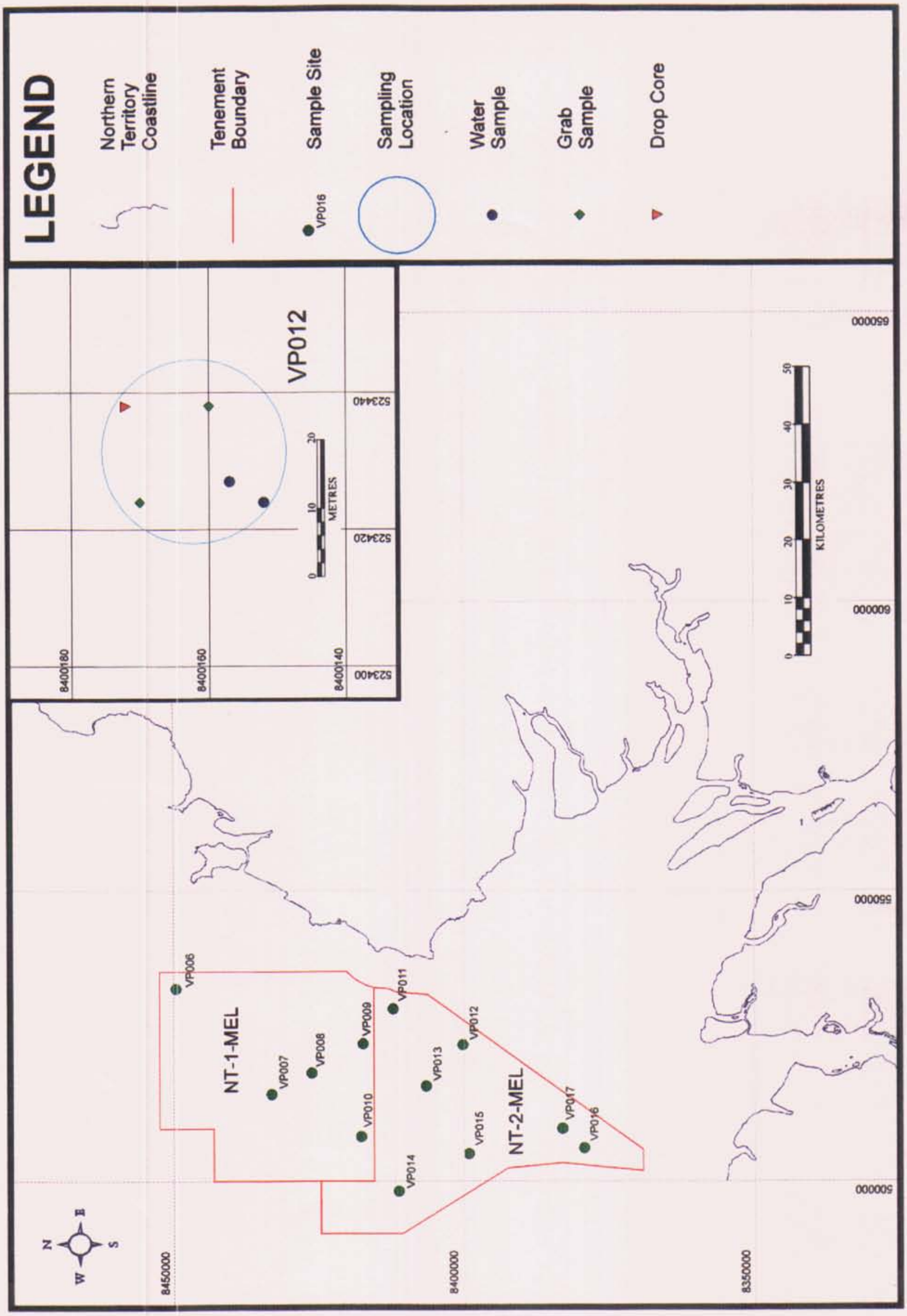


Figure 9-1 Environmental sample sites in NT-1-MEL and NT-2-MEL. The inset illustrates a typical sample location showing the sampling area boundary within which all samples were taken.

understanding the oceanographic processes occurring in the Gulf. Locations were also selected so that as representative a range of environments were sampled as possible. Thus a range of depths, distances from the coast and seabed character were sampled during the survey and within each tenement. The survey was undertaken on the Miclyn Achiever with the assistance of the ship's crew and staff from RACAL Survey Australia Ltd.

9.3.1 Navigation and Sample Locations

Positioning on the pre-selected sites was achieved using equipment provided and operated by RACAL. This comprised Skyfix and LandStar as primary and secondary Differential Global Positioning Systems (DGPS). Further details are given in Section 8.3.

Strong currents associated with tidal movements presented difficulties for the helmsman and affected his ability to keep the boat stationary on each location. The sampling methodology was such that it was dangerous to take the samples with the ship's propeller rotating as the strong tides threatened to push the equipment cables into the propeller. To avoid such a situation the boat was allowed to drift with repositioning for subsequent samples at the same location. As a result each location has a sampling "area" within which all samples and recordings were taken (Figure 9-1).

9.3.2 Sampling Methodology

The various samples were taken in a specific order at each site. This ensured that all objectives were met, samples were obtained and processed in a consistent manner and the safety of all personnel and equipment was assured.

Surficial Sediment Samples

Surficial sediment samples were taken using a Van Veen grab with a capacity of 0.1 cubic metres (ten litres). With the jaws held open the grab was lowered to the seabed on a steel cable using the ship's winch and the A-frame at the stern. When the cable slackened the grab was known to have reached the seabed and the winch was reversed. A change in tension on the cable released the bridle holding the jaws open, and, as the cable raised the arms of the sampler, the jaws enclosed an amount of sediment. The maximum penetration achieved was approximately 20 centimetres and the average sample size approximately four to six litres. However, some sites had a hard or cobbled seabed and penetration was less. Thus, smaller samples were obtained.

Where the sediment contained gravel or shell material large particles occasionally held open the jaws allowing finer sediment to escape while the grab was brought to the surface (Figure 9-2). As a result of

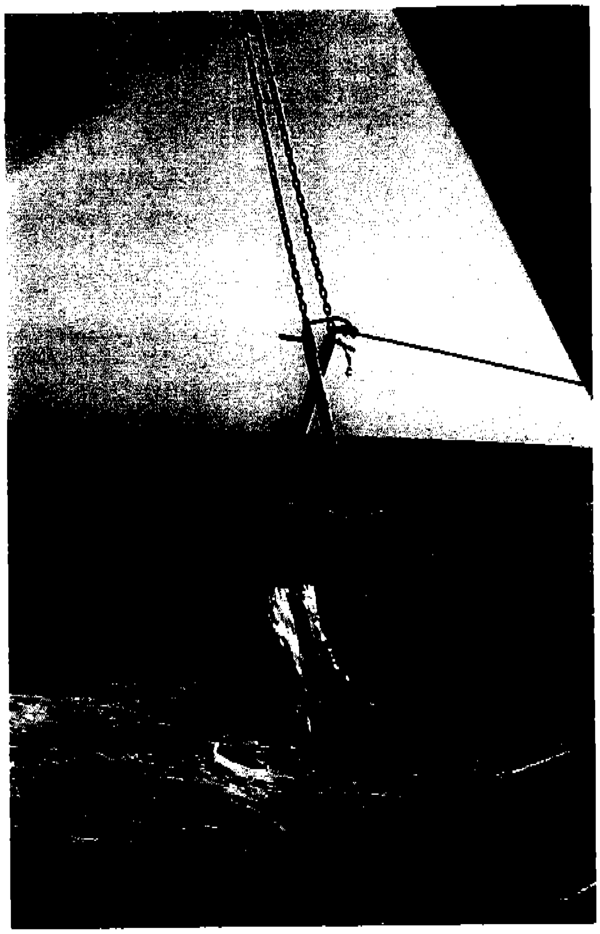


Figure 9-2 Large particles of gravel or shell have wedged in the jaws of the grab and this allows finer particles to be washed out by site water trapped by the grab upon closing.

this problem, or shallow penetration, on some sites several attempts were necessary in order to get a large enough sample.

Once the grab was back on the deck the jaws were opened and the sediment spilled onto a clean board (Figure 9-3). The sediment was split and three representative samples taken. Two of these samples were bagged for subsequent particle size and chemical analysis. The third sample was processed for benthic organisms. The sample was placed on a one millimetre wire mesh sieve and washed through with seawater removing all particles smaller than one millimetre. The remaining sediment was described, placed in a labelled calico bag and into a drum of formalin for preservation of all soft tissues. The samples will be sorted and the organisms identified at a later stage.

Water Quality Samples

Water samples were taken at two depths at each location: one metre below the water surface and at approximately 1.5 metres above the seabed. The samples were obtained using a Niskin water bottle suspended on a steel cable (Figure 9-4). The hollow tube that forms the sampler allows water to enter and flow through the tube as it descends to the required depth, thus ensuring that the water obtained is from the level to be sampled. A bronze messenger is sent down the cable and triggers two bungs which seal the tube. The sampler is then raised to the surface and the water released into a screw top container. The capacity of the sampler is 1.7 litres.

The water samples will undergo chemical analysis and the volume of sediment (suspended solids) per litre will be measured at a later date.

Figure 9-3 Emptying the grab sampler onto the deck of the ship for splitting.

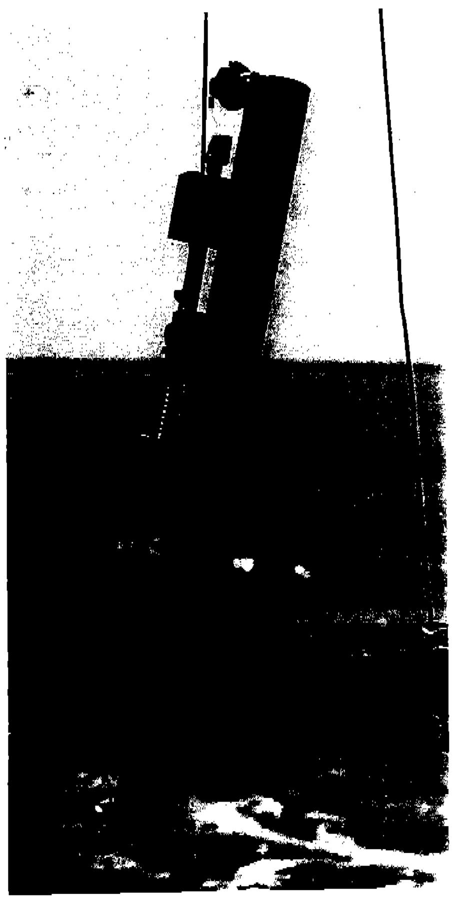


Figure 9-4 The Niskin bottle sampler with bungs in the "open" position.

Water Clarity Recordings

A measure of the clarity of the water was obtained with a secchi disk. A flat metal disk, divided in four and painted white and black on alternate quarters, was lowered into the water on a marked and graduated rope. A weight suspended from the lower side of the secchi disk ensured that the disk sat horizontally in the water. The depth immediately above that depth at which the disk disappeared from view was recorded. Several measurements were made at each site on both sides of the ship and the average was logged for the site.

The results of these measurements will be reported with the results of further analysis on the sediment and water samples in the next annual technical report.

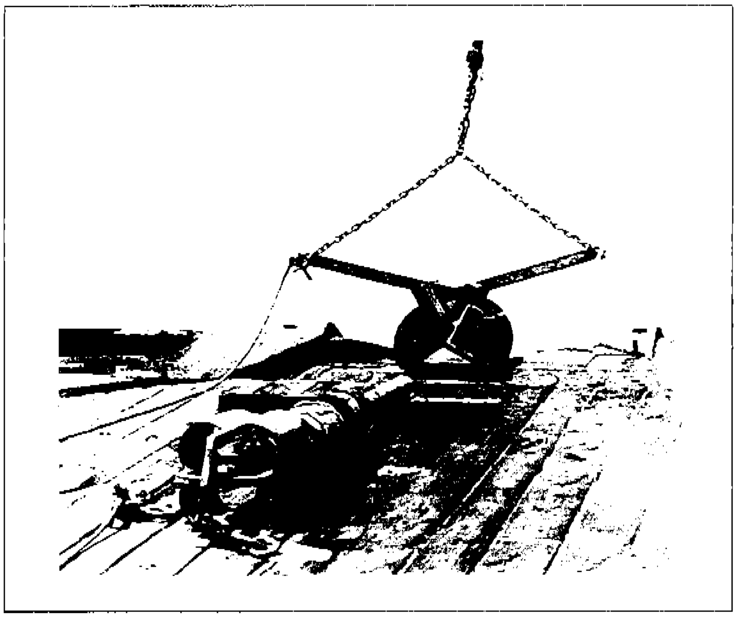


Figure 9-5 The drop corer and grab sampler ready for deployment.

Drop Cores

The drop cores were taken using a 85 centimetre barrel with numerous weights attached to the top of the barrel (Figure 9-5). The barrel was lowered using a steel cable, winch and the A-frame until it was within ten metres of the seabed. The corer was then dropped by allowing the winch to spin freely and the cable to run slack. When the cable ceased running out the corer was known to have penetrated the seabed and finished travelling. The winch was reversed and the corer returned to the deck.

The cores will be logged and analysed in the next twelve months and the results will be reported in the next annual mineral exploration report.

10. PROPOSED ACTIVITIES AND ESTIMATE OF EXPENDITURE FOR THE TWELVE MONTHS TO 17 JANUARY 1997

10.1 Proposed Activities on NT-1-MEL

During the next twelve months the exploration activities will be:

1. Processing and interpretation of the October 1995 seismic data. This interpretation will include a reconcilialtion with the already interpreted March 1994 and January 1995 seismic data.
2. Updating of the existing computer database with the new data.
3. Processing and assaying of samples collected in the November 1995 regional environmental survey.
4. Mapping and interpretation of the sidescan sonar data acquired in the March 1994, January and October 1995 geophysical surveys
5. Study of existing aerial magnetic.
6. Selection of sites for drilling and bulk sampling investigations.

10.2 Proposed Expenditure on NT-1-MEL

The proposed expenditure on NT-1-MEL for the next twelve months is:

1.	Processing of the October 1995 seismic data	$3 000
2.	Interpretation of the October 1995 seismic data	$5 500
3.	Digitising and computer modelling of the October 1995 seismic data	$4 500
4.	Processing and assaying of environmental samples	$3 000
5.	Mapping of sidescan sonar data	$5 700
6.	Aerial magnetic study	$500
7.	Tenement administration and report compilation	$10 000
8.	Technical personnel salaries	$58 000
	Sub-total	**$90 200**
9.	Office Overheads (20%)	$18 040
	Total	**$108 240**

10.3 Proposed Activities on NT-2-MEL

During the next twelve months the exploration activities will be:

1. Processing and interpretation of the October 1995 seismic data. This interpretation will include areconciliaItion with the already interpreted March 1994 and January 1995 seismic data.
2. Updating of the existing computer database with the new data.
3. Processing and assaying of samples collected in the November 1995 regional environmental survey.
4. Mapping and interpretation of the sidescan sonar data acquired in the March 1994, January and October 1995 geophysical surveys
5. Study of existing aerial magnetic data.
6. Selection of sites for drilling and bulk sampling investigations.

10.4 Proposed Expenditure on NT-2-MEL

The proposed expenditure on NT-2-MEL for the next twelve months is:

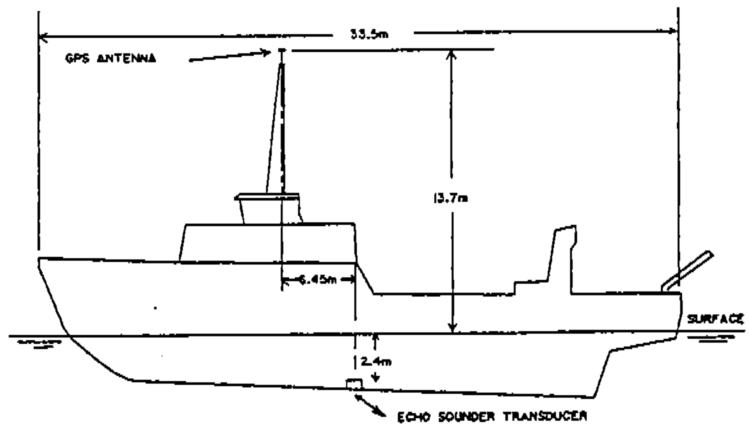
1.	Processing of the October 1995 seismic data	$3 000
2.	Interpretation of the October 1995 seismic data	$5 500
3.	Digitising and computer modelling of the October 1995 seismic data	$8 000
4.	Processing and assaying of environmental samples	$5 000
5.	Mapping of sidescan sonar data	$5 700
6.	Aerial magnetic study	$500
7.	Tenement administration and report compilation	$10 000
8.	Technical personnel salaries	$58 000
	Sub-total	**$95 700**
9.	Office Overheads (20%)	$19 140
	Total	**$114 840**

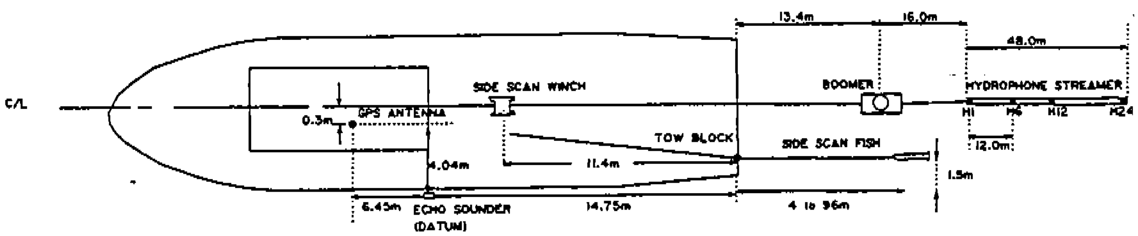
Appendix 1

Offset Diagram for the Miclyn Cove

(January 1995 Seismic Survey)

VESSEL DIAGRAM





M.V. MICLYN COVE

(NOT TO SCALE)

Appendix 2

Summary of field survey parameters,

January 1995 Seismic Survey

SEISMIC SURVEY -- JANUARY 1995
SUMMARY OF FIELD SURVEY PARAMETERS

Date	Line No.	Time SOL Hr:Min	Time EOL Hr:Min	Time Hr:Min	Daily Total Hr:Min	Fix SOL No.	Fix EOL No.	Fix Total No.	Azim. Deg. Grid	East SOL m	North SOL m	East EOL m	North EOL m	Seismic Length km	Seismic Daily km	Speed km/hr	Speed Knot	Side Scan Length km	Side Scan Daily km	Seismic Tape No.	Seismic File No.
VICTORIA OFFSHORE PROJECT																					
20-Jan-95	V86	9:30	11:21	1:51		1	105	105	42	522988	8396113	529979	8403837	10.42		5.63	3.04	10.42		15	1
	V87	14:27	16:34	2:07		132	247	116	42	521573	8396011	529248	8404529	11.47		5.42	2.92	11.47		16	2
	V88	17:35	19:06	1:31		248	353	106	222	528565	8405240	521540	8397464	10.48		6.91	3.73	10.48		16	3
	V89	19:40	21:24	1:44		354	462	109	42	520585	8397887	527789	8405910	10.78		6.22	3.36	10.78		17	1
	VTL6	22:29	0:20	1:51	9:04	463	518	56	132	525330	8405112	529420	8401431	5.50	48.65	2.97	1.60	5.50	48.65	17	2
21-Jan-95	V102	3:06	4:42	1:36		519	631	113	222	524079	8421222	516583	8412893	11.21		7.00	3.78	11.21		18	1
	V104	5:24	7:13	1:49		632	743	112	42	515065	8414196	522496	8422449	11.11		6.11	3.30	11.11		19	1
	V106	7:45	9:13	1:28		744	849	106	222	521503	8424317	514476	8416530	10.49		7.15	3.86	10.49		19	2
	V108	9:38	10:59	1:21		850	954	105	42	513339	8418240	520292	8425984	10.41		7.71	4.16	10.41		20	1
	VTL7A	11:40	13:46	2:06	8:20	955	1072	118	160	517629	8425794	521577	8414834	11.65	54.86	5.55	2.99	11.65	54.86	20	2
	TOTALS							**1046**						**103.50**	**103.50**	**6.21**	**3.35**	**103.50**	**103.50**		

Appendix 3

Summary of the digital seismic data record, January 1995 Seismic Survey

DATE	LINE	SOL	EOL	AZIMUTH	TAPE	FILE
20-1-95	V86	1	105	042	15	1
20-1-95	V87	106	131	222	16	2
20-1-95	V87	132	247	042	16	2
20-1-95	V88	248	353	222	16	3
20-1-95	V89	354	462	042	17	1
20-1-95	V102	519	361	222	17	2
20-1-95	VTL6	463	518	132	18	1
21-1-95	V104	632	743	042	19	1
21-1-95	V106	744	849	222	19	2
21-1-95	V108	850	954	042	20	1
21-1-95	VTL7a	955	1072	160	20	2

Appendix 4

Interpretation of the 1994 and January 1995 Seismic Surveys

The enclosed disk is an *xtree gold* executable archived file which will decompress automatically to 22 files; that is, one file for each line interpreted.

LEGEND

S/B	Sea bed
TP	top of purple unit
BP	Bottom of purple unit
LB	Light blue unconformity
TDB	Top of dark blue unit
BDB	Bottom of dark blue unit
TO	Top of orange unit
BO	Bottom of orange unit
TDG	Top of dark green unit
BDG	Bottom of dark green unit
LG	Light green unconformity

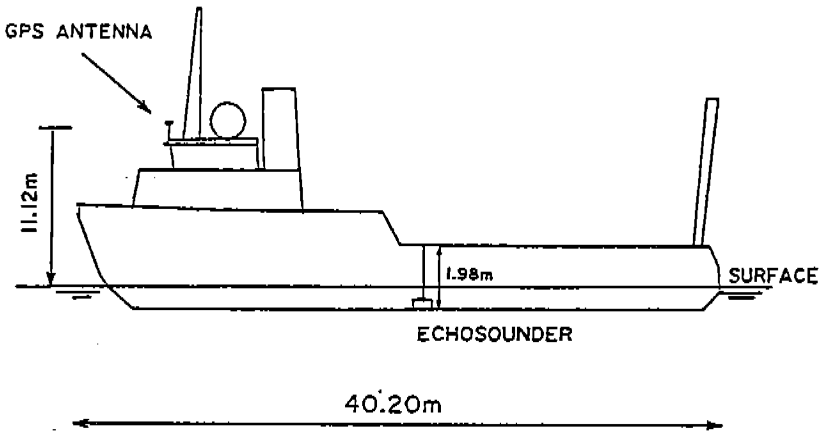
Appendix 5

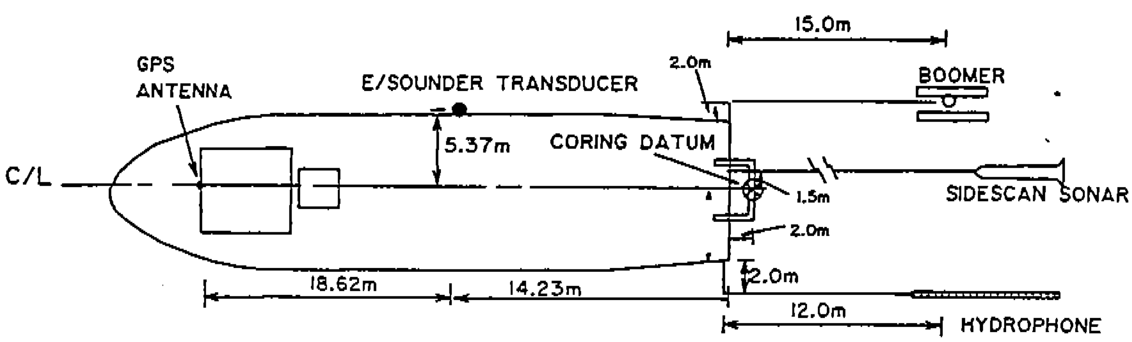
Offset Diagram for the Miclyn Achiever

(October 1995 Survey)

M.V. MICLYN ACHIEVER

(NOT TO SCALE)





Appendix 6

Summary of field survey parameters, October 1995 Seismic Survey

CAMBRIDGE GULF EXPLORATION - SEISMIC SURVEY OCTOBER 1995 - SUMMARY OF OPERATIONS

Date	Line	Time (hr:mn)			Fix No.			Azim.	SOL	(m)	EOL	(m)	Length	Speed			Boomer				XSta				Sidescan		Remarks
		SOL	EOL	Online	SOL	EOL	Total	DegG	East	North	East	North	(km)	km/hr	knots	m/fix	line km	Roll	ENSDAT	SEGDAT	line km	Roll	EXB	File	Line km	Roll	
17-Oct-95	V1250*	05:47	13:55	08:08	3506	4480	974	42	481219	8406942	521683	8452000	60.56	7.45	4.02	62.18	60.11	4	8	24	0.00				60.56	13-15	ENSIN missed 4480-4487(450m). Chnl 85ms fix4453
	V1250A	13:58	14:38	00:40	4487	4569	82	42	521993	8452346	525611	8456361	5.40	8.11	4.37	65.91	5.40	4	8	24	0.00				5.40	15	
	V920	23:34	23:59	00:25	5424	5477	53	222	531816	8414663	529622	8412254	3.26	7.82	4.22	61.48	3.26	5	6		0.00				3.26	18-...	
DAILY TOTAL				09:13			1109						69.22				68.77				0.00				62.22		
18-Oct-95	V920	00:00	02:24	02:24	5477	5765	288	223	529622	8412254	518250	8399850	16.83	7.01	3.78	58.43	16.83	5	6	22	0.00				16.83	...-19	
	V940	02:52	05:28	02:36	5766	6079	313	42	516870	8401374	530440	8416196	20.10	7.73	4.17	64.20	20.10	5	6	22	0.00				20.10	19	
	V960	05:59	08:43	02:44	6080	6408	328	222	529000	8417701	515392	8402431	20.45	7.48	4.04	62.36	20.45	5	7	23	0.00				20.45	20	Revised ENSIN software operating (full fix marks)
	V980	09:05	11:46	02:41	6409	6732	323	42	513910	8403849	527287	8418666	19.96	7.44	4.01	61.80	19.96	5	7	23	0.00				19.96	21	
	VTL14	12:30	14:14	01:44	6733	6941	208	131	522303	8418478	532389	8409821	13.29	7.67	4.14	63.90	13.29	5	7	23	0.00				13.29	22	
DAILY TOTAL				12:09			1460						90.63				90.63				0.00				90.63		
20-Oct-95	V875	13:33	15:34	02:01	10850	11091	241	222	514172	8388849	503583	8377126	15.80	7.83	4.23	65.55	15.80	6	10		15.21	2	2	10-18	15.80	34	XStar missed11092-11101 (590m).
	V1150_1	18:11	23:59	05:48	11092	11791	699	42	489547	8401948	519033	8434267	43.75	7.52	4.06	62.59	43.75	7	10		43.75	2	2	19-52	43.75	35-36	Increased swell and wind chop-> blanking on ENSIN.
DAILY TOTAL				07:49			940						59.55				59.55				58.96				59.55		
21-Oct-95	V1150_1	00:00	01:47	01:47	11791	12004	213	42	519033	8434267	528120	8444236	13.49	7.56	4.08	63.33	13.24	7	10		13.49	2	2	19-52	13.49	36-38	ENSIN missed 12000-12004 (250m) on tape change.
	V1150_1A*	01:47	03:55	02:08	12004	12261	257	222	528120	8444236	539780	8456982	17.27	8.10	4.37	67.22	17.27	7	10		17.27	2	2	19-52	17.27	38	
	V1050_1A*	16:31	20:53	04:22	12983	13506	523	222	553081	8456934	530868	8432463	31.89	7.57	4.08	60.97	31.89	7	11		31.89	3	3	31-50	31.89	40-41	Lengths corrd for 1.16km o/lap. Fix12982=Fix13001
	V1125_1	22:03	23:59	01:56	13507	13741	234	222	530642	8443113	520453	8431843	15.19	7.86	4.24	64.93	14.93	7	11		15.19	4	4	0-7	15.19	41-42	ENSIN hangup. Missed 13737-13741 (260m).
DAILY TOTAL				10:13			1227						77.84				77.33				77.84				77.84		
22-Oct-95	V1125_1*	00:00	07:36	07:36	13741	14653	912	222	520453	8431843	481264	8388619	58.34	7.68	4.14	63.97	57.80	7	11		58.34	4	4	8-38	58.34	42-44	ENSIN hangup cont. Missed 13741-13749 (540m).
	V1080_1*	13:10	15:57	02:47	15033	15367	334	42	491958	8394192	505426	8408996	20.01	7.19	3.88	59.92	20.01	9	12		20.01	5	5	0-11	20.01	46	Increasing swell and wind chop (0.5-1m).
	V1060_1*	16:18	18:11	01:53	15368	15595	227	223	506692	8407704	497524	8397742	13.54	7.19	3.88	59.64	13.54	9	12		13.54	5	5	12-19	13.54	47	
	V1040_2*	18:32	21:50	03:18	15596	15992	396	42	498701	8395522	515698	8414366	25.38	7.69	4.15	64.08	25.38	9	12		25.38	5	5	20-34	25.38	48	
	V1020_1	23:13	23:59	00:46	15993	16086	93	222	509019	8404017	505199	8399782	5.70	7.44	4.01	61.33	5.70	9	12		5.70	5	5	35-	5.70	48	
DAILY TOTAL				16:20			1962						122.97				122.43				122.97				122.97		
23-Oct-95	V1020_1*	00:00	01:02	01:02	16086	16210	124	222	505199	8399782	499961	8393952	7.84	7.58	4.09	63.21	7.84	9	12		7.84	5	5	...-42	7.84	48-49	
	V975*	01:48	03:22	01:34	16211	16398	187	41	501125	8388812	508298	8397013	10.90	6.95	3.75	58.26	10.90	9	12		10.90	5	5	43-49	10.90	49	
	V950*	03:46	06:00	02:14	16399	16668	269	223	509786	8394663	499118	8383163	15.69	7.02	3.79	58.31	15.69	9	12		15.69	5	6	1-9	15.69	50	Blanking on ENSIN data due swell/chop this direction
	V925*	06:19	08:13	01:54	16669	16896	227	44	500614	8381663	510632	8392200	14.54	7.65	4.13	64.05	14.54	9	12		14.54	6	6	10-18	14.54	51	Blanking not as bad this direction but swell incr (1-2m)
	VTL11	09:49	11:53	02:04	16897	17145	248	312	523645	8400010	511152	8411334	16.86	8.16	4.40	67.99	16.86	9	13		16.86	6	6	19-...	16.86	52-...	New direction, 1-2m swell behind. SSS:corals?17115
	VTL11*	11:53	16:00	04:07	17145	17639	494	331	511152	8411334	497455	8436485	28.64	6.96	3.75	57.97	28.64	9	13		28.64	6	6	...-43	28.64	...-53	OK but some blanking.
DAILY TOTAL				13:12			15.49						94.46				94.46				94.46				94.46		
24-Oct-95	V825_1	07:22	07:24	00:02	18985	18988	3	289	511491	8378416	511265	8378494	0.24	7.17	3.87	79.69	0.24	9	14		0.24	7	7	48-...	0.24	57	
	V825_1	07:24	08:25	01:01	18988	19110	122	221	511265	8378494	506435	8372975	7.33	7.21	3.89	60.12	7.33	9	14		7.33	7	7	...-52	7.33	57	
DAILY TOTAL				01:03			125						7.57				7.57				7.57				7.57		
29-Oct-95	V1175*	17:41	23:59	06:18	30061	30818	757	222	522872	8441949	490255	8405778	48.71	7.73	4.17	64.34	48.71	14	14		48.71	14	16	0-...	48.71	86-87	
DAILY TOTAL				06:18			757						48.71				48.71				48.71				48.71		

* Parts of these lines lie in tenements adjacent to NT-1-MEL and NT-2-MEL, as most lines in the survey were run continuously from one tenement to the next.

Appendix 7

Summary of the digital seismic data record, October 1995 Seismic Survey

DATE	LINE	SOL	EOL	AZIMUTH	ROLL	TAPE
17-Oct-95	V1250	3750	4480	42	4	8
	V1250A	4487	4569	42	4	8
	V920	5424	5477	222	5	6
18-Oct-95	V920	5477	5765	223	5	6
	V940	5766	6079	42	5	6
	V960	6080	6408	222	5	7
	V980	6409	6732	42	5	7
	VTL14	6733	6905	131	5	7
20-Oct-95	V875	10850	11091	222	6	10
	V1150_1	11188	11791	42	7	10
21-Oct-95	V1150_1	11791	12004	42	7	10
	V1150_1A	12004	12170	222	7	10
	V1050_1A	13180	13506	222	7	11
	V1125_1	13507	13741	222	7	11
22-Oct-95	V1125_1	13741	14300	222	7	11
	V1080_1	15160	15367	42	9	12
	V1060_1	15368	15575	223	9	12
	V1040_2	15620	15992	42	9	12
	V1020_1	15993	16086	222	9	12
23-Oct-95	V1020_1	16086	16190	222	9	12
	V975	16240	16398	41	9	12
	V950	16399	16570	223	9	12
	V925	16725	16896	44	9	12
	VTL11	16897	17145	312	9	13
	VTL11	17145	17565	331	9	13
24-Oct-95	V825_1	18985	18988	289	9	14
	V825_1	18988	19110	221	9	14
29-Oct-95	V1175	30061	30584	222	14	14

Appendix 8

Logs for the samples taken during the regional environmental survey, November 1995.

SAMPLE SITE	CO-ORDINATES EASTING	NORTHING	SAMPLE TYPE	DEPTH (m)	RL (m)	DATE	TIDE EBB/FLOOD	H > LAT	CURRENT SPEED	DIR.	SAMPLE NUMBER	TIME	SEDIMENT DESCRIPTION	BIO SAMPLE DESCRIPTION	SECCHII DISK (CM)	REMARKS	DROP CORE DESCRIPTION	PENETRATION (cm)	RECOVERY cm	%
VP006	533082	8449636	GRAB	25	21.03	6/11/95	FLOOD	3.97	1.6 kn	170	E1-VP006-SED1	13.28	Grey, silty, sandy mud with fine terrigenous gravel, shells and shell fragments, some coral.	Shells and shell fragments, fine terrigenous gravel and coral fragments.	2.0 m	Clear				
											E1-VP006-SED2									
	533079	8449688	GRAB	25							E1-VP006-BIO	13.38								
	533100	8449595	WATER	1							E1-VP006-1	13.40								
	533182	8449384	WATER	22							E1-VP006-22	13.43								
VP007	514903	8433207	GRAB	40	36.16	6/11/95	EBB	3.84	1.7 kn	330	E1-VP007-SED1	07.36	Coarse sand to fine gravel. Gravel fraction is mostly shells and shell fragments, some coral. Sand fraction is terrigenous with a matrix of mud.	Coarse to fine shells and shell fragments. Coarse terrigenous sand.	0.75 m	Cloudy - greeny/blue				
											E1-VP007-SED2									
											E1-VP007-BIO									
	514829	8433451	WATER	1							E1-VP007-1	07.44								
	514829	8433616	WATER	35							E1-VP007-35	07.47								
VP008	518562	8426279	GRAB	32	26.88	6/11/95	EBB	5.12	1.0 kn	320	E1-VP008-SED1	06.22	Dead coral, some shells with a coating of mud in a matrix of fine coral and shell fragments, sand and mud.	Large pieces of dead coral in a matrix of shell fragments and small coral fragments. Some larger shells.	0.5 m	Cloudy/ muddy - greeny/grey in colour.	Coral and shelly gravel overlying stiff, grey mud & clay.	81	74.5	92
											E1-VP008-SED2									
	518505	8426282	GRAB	32							E1-VP008-BIO	06.31								
	518472	8426521	WATER	1							E1-VP008-1	06.48								
	518497	8426686	WATER	28							E1-VP008-28	06.52								
	518509	8426297	CORE	32							E1-VP008-DC	06.41								
VP009	523593	8417385	GRAB	33	27.29	6/11/95	EBB	5.71	0.5 kn	130	E1-VP009-SED1	05.24	Coarse cobbly material and terrigenous gravel, with a coating of mud and sand. Some fine shell fragments.	No bio sample: grab couldn't properly sample the cobbles over mud.	0.3 m	Cloudy/ muddy				
	523591	8417387	GRAB	33							E1-VP009-SED2	05.29								
	523608	8417392	WATER	1							E1-VP009-1	05.32								
	523650	8417391	WATER	25							E1-VP009-25	05.37								
VP010	507621	8417709	GRAB	27	22.41	4/11/95	FLOOD	4.59	2.5 kn	124	E1-VP010-SED1	13.56	Coarse shelly sand, with some mud and gravel.	Shells and shell fragments, with some terrigenous gravel. Some cobbles with marine growth attached.	1.1 m	Cloudy				
											E1-VP010-SED2									
	507567	8417740	GRAB	27							E1-VP010-BIO	14.07								
	507622	8417651	WATER	1							E1-VP010-1	13.58								
	507651	8417716	WATER	24							E1-VP010-24	14.11								
VP011	529562	8412224	GRAB	30	24.36	5/11/95	FLOOD	5.64	1.2 kn	170	E1-VP011-SED1	17.01	Shell and shell fragments with sandy mud matrix, some cobbles.	Not enough for Bio sample as cobbles held open grab jaws.	0.3 m	Cloudy/ muddy	Coarse, gravelly material overlying thick grey mud.	81	70	86.4
	529592	8412234	GRAB	30								17.07								
	529616	8412135	WATER	1							E1-VP011-1	17.18								
	529661	8412048	WATER	26							E1-VP011-26	17.23								
	529596	8412220	CORE	30							E1-VP011-DC	17.14								
VP012	523424	8400170	GRAB	59	53.86	4/11/95	FLOOD	5.14	2.8 kn	124	E1-VP012-BIO	16.03	Cobbles with a coating of mud. Not enough for sediment sample.	Small sample - one cobble with plant growth and mud coating.	0.25 m	Brown, muddy, turbid		unknown	18	-
	523438	8400160	GRAB	59								16.13								
	523424	8400152	WATER	1							E1-VP012-1	16.06								
	523427	8400157	WATER	56							E1-VP012-56	16.23								
	523438	8400172	CORE	59							E1-VP012-DC	16.26								
VP013	516318	8406554	GRAB	26.2	21.09	4/11/95	FLOOD	5.11	2.5 kn	124	E1-VP013-BIO	15.05	Large mud covered cobbles, little gravel. Not enough for sample as jaws wedged open by cobbles.	Large cobbles with some plant growth. Small amount of gravel and shell fragments.	0.3 m	Brown, muddy, turbid				
	516369	8406549	GRAB	26.2								15.15								
	516296	8406532	WATER	1							E1-VP013-1	15.06								
	516388	8406512	WATER	25							E1-VP013-25	15.20								
VP014	498206	8411296	GRAB	24.2	20.74	4/11/95	FLOOD	3.46	1.0 kn	125	E1-VP014-SED1	12.29	Gravelly sand with numerous shell fragments and some terrigenous gravel.	Coarse shelly material with gravel and old cobbles with growth attached.	1.6 m	Clear		115	61	53
	498180	8411345	GRAB	24.2							E1-VP014-BIO	12.40								
	498267	8411191	WATER	1							E1-VP014-1	12.31								
	498163	8411314	WATER	20							E1-VP014-20	12.42								
	498250	8411361	CORE	24.2							E1-VP014-DC	12.51								
VP015	504674	8399161	GRAB	33	30.52	4/11/95	FLOOD	2.48	1.7 kn	290	E1-VP015-BIO	11.03	Coarse cobbles (pavement?) with a thin covering of mud. Some gravel. Not enough for sediment sample.	Large cobbles with growth attached. Coarse shell fragments & some gravel.	0.2 m	Brown, muddy, turbid				
	504686	8399140	WATER	1							E1-VP015-1	11.05								
	504693	8399148	WATER	29							E1-VP015-29	11.12								
VP016	505638	8379404	GRAB	46	43.29	4/11/95	EBB	2.71	2.4 kn	307	E1-VP016-SED1	07.24	Very muddy sand overlain by a layer of thin grey/brown, slippery mud ooze.	Mostly shell fragments with some coarse sand. Very small sample as most washed through sieve.	0.2 m	Brown, muddy, turbid				
											E1-VP016-SED2									
	505678	8379423	GRAB	46							E1-VP016-BIO	07.32								
	505663	8379397	WATER	1							E1-VP016-1	07.27								
	505644	8379442	WATER	40							E1-VP016-40	07.37								
VP017	508979	8383103	GRAB	16.2	14.24	4/11/95	SLACK	1.96	2.0 kn	300	E1-VP017-SED1	09.46	Coarse shelly material, some sand, little mud.	Mainly shells and shell fragments, no live benthics visible.	0.15 m	Brown, muddy, turbid				
	508974	8383103	GRAB	16.2							E1-VP017-BIO	09.51								
	508971	8383082	WATER	1							E1-VP017-1	09.48								
	508954	8383077	WATER	13							E1-VP017-13	09.53								

Appendix 9

Trackplots for the January 1995 Seismic Survey

Appendix 9 is Missing

Appendix 10

Trackplots for the October 1995 Seismic Survey

CAMBRIDGE GULF EXPLORATION - SEISMIC SURVEY OCTOBER 1995 - SUMMARY OF OPERATIONS - VICTORIA AND DALY PROSPECTS

Date	Line	Time (hr:mn)				Fix No.		Azim.	SOL	(m)	EOL	(m)	Length		Speed		Boomer			Remarks
		SOL	EOL	Online	SOL	EOL	Total	DegG	East	North	East	North	(km)	km/hr	knots	m/fix	line km	Roll	SEGDAT	
	DTL12 ✓	15:56	16:53	0:57	21468	21582	114	61	556202	8452757	561932	8455890	6.53	6.87	3.71	57.29	6.53	10	31	
	DTL12 ✓	16:53	18:31	1:38	21582	21778	196	48	561932	8455890	572046	8465103	13.68	8.38	4.52	69.80	13.68	10	31	
	DTL9 ✓	18:52	20:16	1:24	21779	21946	167	315	569201	8466514	560858	8474719	11.70	8.36	4.51	70.07	11.70	10	31	
	V1050_2 ✓	21:30	23:09	1:39	21947	22144	197	223	570285	8474319	561541	8465037	12.75	7.73	4.17	64.73	12.75	10	31	
26-Oct-95	DTL11 ✓	0:01	1:46	1:45	22145	22355	210	46	569122	8466512	577601	8474612	11.73	6.70	3.62	55.84	11.73	10	31	Continuous runline DTL11-DTL6;
	DTL8 ✓	1:46	3:35	1:49	22356	22574	218	355	577636	8474671	576584	8487336	12.71	7.00	3.77	58.30	12.71	10	31	Start/Stop logging on corners. Some ENSIN gaps
	DTL7 ✓	3:36	4:21	0:45	22575	22665	90	75	576648	8487343	582077	8488798	5.62	7.49	4.04	62.45	5.62	10	31	
	DTL6 ✓	4:21	7:05	2:44	22666	22992	326	6	582151	8488858	584422	8510825	22.08	8.08	4.36	67.74	22.08	10	31	
	D1200 ✓	7:34	11:53	4:19	22993	23511	518	43	585237	8514151	608053	8538534	33.39	7.74	4.17	64.47	33.39	11	32	
	D1150 ✓	12:23	18:14	5:51	23512	24215	703	223	610862	8535567	579847	8502243	45.52	7.78	4.20	64.76	45.52	11	32	
	D1300 ✓	19:47	23:59	4:12	24216	24721	505	42	571762	8513692	593076	8536986	31.57	7.52	4.06	62.52	31.57	11	32	Missed XStar 24555-65 (650m EOT). Paper rec OK.
27-Oct-95	D1300 ✓	0:00	2:57	2:57	24721	25074	353	42	593076	8536986	606442	8551619	19.82	6.72	3.63	56.14	19.82	11	32	
	D1250 ✓	4:01	9:20	5:19	25075	25713	638	222	604433	8542449	577553	8512956	39.90	7.51	4.05	62.55	39.90	11	32	
	D1350 ✓	10:47	18:49	8:02	25714	26676	962	42	564934	8513337	605586	8558107	60.47	7.53	4.06	62.86	60.01	12	33	Bmr P/S failed , missed 25714-21 (460m).O'side lease
	D1450 ✓	20:04	23:59	3:55	26677	27148	471	223	593282	8559226	573386	8537523	29.44	7.52	4.06	62.51	29.05	12	33	ENSIN hangup. Missed 27142-8 (390m). To be re-run
28-Oct-95	D1450 ✓	0:00	1:17	1:17	27148	27301	153	223	573386	8537523	566741	8530290	9.82	7.65	4.13	64.20	9.17	12	33	ENSIN D1450A. Missed 27148-58 (650m)To be re-run.
	D1400_1 ✓	2:58	4:41	1:43	27302	27509	207	42	561518	8517047	570475	8527100	13.46	7.84	4.23	65.05	13.03	12	33	ENSIN missed 27302-7 (430m) at SOL. Outside lease.
	DTL2 ✓	6:25	10:44	4:19	27510	28027	517	133	569446	8538644	593531	8515994	33.06	7.66	4.13	63.95	33.06	13	34	
	DTL3 A	11:58	17:41	5:43	28028	28715	687	314	603411	8520091	573267	8548827	41.65	7.29	3.93	60.62	41.65	13	34	ENSIN data recorded as DTL3A.
	DTL4 ✓	18:51	23:59	5:08	28716	29334	618	133	577701	8557962	605796	8531324	38.72	7.54	4.07	62.65	38.72	13	34	
29-Oct-95	DTL4 ✓	0:00	0:22	0:22	29334	29378	44	134	605796	8531324	608006	8529218	3.05	8.33	4.49	69.38	3.05	13	34	
	DTL5 A ✓	2:46	5:08	2:22	29379	29663	284	315	604092	8546192	590842	8559420	18.72	7.91	4.27	65.93	18.72	13	34	ENSIN data recorded as DTL5A.
	D1500 ✓	5:34	8:40	3:06	29664	30035	371	223	587292	8560139	570371	8541885	24.89	8.03	4.33	67.09	24.89	13	34	XStar not printed first 1.4km. To be replayed from tape
	D1450B ✓	9:35	9:47	0:12	30036	30060	24	224	573960	8538124	572830	8536934	1.64	8.21	4.43	68.38	1.64	13	33	Re-run bmr. O'lap: Fixes 30041.9-55.7=27142-56
	V1175 ✓	17:41	23:59	6:18	30061	30818	757	222	522872	8441949	490255	8405778	48.71	7.73	4.17	64.34	48.71	14	30	
30-Oct-95	V1175 ✓	0:00	1:45	1:45	30818	31028	210	222	490255	8405778	481272	8395796	13.43	7.67	4.14	63.95	13.43	14	30	
	VTL8B ✓	4:35	8:25	3:50	31029	31488	459	149	485955	8420998	503060	8392898	32.90	8.58	4.63	71.67	32.90	14	30	Re-run of part VTL8 (weather affected)
	VTL8B ✓	8:25	8:47	0:22	31488	31533	45	182	503060	8392898	502938	8389936	2.96	8.09	4.36	65.88	2.96	14	30	See XStar c.31170: second event is not real.

D1450A
D1450B

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CAMBRIDGE GULF EXPLORATION - SEISMIC SURVEY OCTOBER 1995 - SUMMARY OF OPERATIONS - VICTORIA AND DALY PROSPECTS

Date	Line	Time (hr:mn)			Fix No.			Azim.	SOL	(m)	EOL	(m)	Length	Speed			Boomer			Remarks
		SOL	EOL	Online	SOL	EOL	Total	DegG	East	North	East	North	(km)	km/hr	knots	m/fix	line km	Roll	SEGDAT	
17-Oct-95	V1250 ✓	5:47	13:55	8:08	3506	4480	974	42	481219	8406942	521683	8452000	60.56	7.45	4.02	62.18	60.11	4	24	ENSIN missed 4480-4487(450m). Chnl 85ms fix4453
	V1250A ✓	13:58	14:38	0:40	4487	4569	82	42	521993	8452346	525611	8456361	5.40	8.11	4.37	65.91	5.40	4	24	
	VTL15 ✓	15:24	19:24	4:00	4570	5013	443	136	532919	8459966	551173	8440748	26.51	6.63	3.58	59.83	26.51	5	22	
	VTL17 ✓	19:26	22:51	3:25	5014	5423	409	216	551164	8440511	535899	8419747	25.77	7.54	4.07	63.01	25.55	5	22	ENSIN line change on DAT. Missed 5014-18(224m)
	V920 ✓	23:34	23:59	0:25	5424	5477	53	222	531816	8414663	529622	8412254	3.26	7.82	4.22	61.48	3.26	5	22	
18-Oct-95	V920 ✓	0:00	2:24	2:24	5477	5765	288	223	529622	8412254	518250	8399850	16.83	7.01	3.78	58.43	16.83	5	22	
	V940 ✓	2:52	5:28	2:36	5766	6079	313	42	516870	8401374	530440	8416196	20.10	7.73	4.17	64.20	20.10	5	22	
	V960 ✓	5:59	8:43	2:44	6080	6408	328	222	529000	8417701	515392	8402431	20.45	7.48	4.04	62.36	20.45	5	23	Revised ENSIN software operating (full fix marks)
	V980 ✓	9:05	11:46	2:41	6409	6732	323	42	513910	8403849	527287	8418666	19.96	7.44	4.01	61.80	19.96	5	23	
	VTL14 ✓	12:30	14:14	1:44	6733	6941	208	131	522303	8418478	532389	8409821	13.29	7.67	4.14	63.90	13.29	5	23	
	V825_2 ✓	15:01	17:10	2:09	6942	7199	257	223	534502	8403800	522773	8391211	17.21	8.00	4.32	66.95	17.21	5	23	
	V775_2 ✓	17:57	19:38	1:41	7200	7401	201	41	525827	8386967	533985	8396251	12.36	7.34	3.96	61.49	12.36	5	23	
	V725 ✓	20:12	21:02	0:50	7402	7502	100	222	537010	8392728	532693	8387864	6.50	7.80	4.21	65.03	6.50	5	23	Incomplete. Stop early tocatch tide/light on VTL10
	VTL10 ✓	22:23	23:59	1:36	7503	7697	194	138	522936	8392374	531633	8382622	13.07	8.17	4.41	67.35	13.07	5	23	
19-Oct-95	VTL10 ✓	0:00	6:35	6:35	7697	8487	790	140	531633	8382622	561823	8346059	47.42	7.20	3.89	60.02	47.12	5	23	ENSIN missed 8482-8487(300m). Channel dep. 7840
	VTL10A ✓	6:35	6:59	0:24	8487	8535	48	149	561823	8346059	563453	8343394	3.12	7.81	4.21	65.08	3.12	5	24	
	VTL13 ✓	11:16	14:44	3:28	8536	8952	416	137	549094	8382851	568596	8361780	28.71	8.28	4.47	69.02	28.71	6	25	
	VTL12A ✓	15:46	18:07	2:21	8953	9235	282	305	560882	8368247	545225	8379405	19.23	8.18	4.41	68.18	19.23	6	25	XStar on from fix 9107. ENSIN rec as VTL12A on DAT
	V575 ✓	19:22	22:10	2:48	9236	9572	336	42	537754	8371226	552303	8387212	21.62	7.72	4.17	64.33	21.62	6	25	
	V625 ✓	22:49	23:59	1:10	9573	9713	140	221	547782	8389952	541953	8383252	8.88	7.61	4.11	63.43	8.88	6	25	ENSIN hangup at fix 9712. Circle to resume on V625A.
20-Oct-95	V625A ✓	0:46	3:37	2:51	9738	10079	341	221	542098	8383387	527392	8366492	22.20	7.86	4.24	65.10	22.20	6	26	Lengths corrd for o/lap 200m. Fix9713=Fix 9741.5
	V675 ✓	4:16	8:16	4:00	10080	10560	480	41	523522	8369494	543875	8392953	31.06	7.76	4.19	64.70	31.06	6	26	Several gas zones e.g. fix10327
	V725A ✓	9:23	11:48	2:25	10561	10849	288	42	533589	8388848	521160	8374808	17.42	7.76	4.19	60.49	17.42	6	26	Lengths corrd for o/lap 1.33km. Fix7502=Fix10581.5
	V875 ✓	13:33	15:34	2:01	10850	11091	241	222	514172	8388849	503583	8377126	15.80	7.83	4.23	65.55	15.80	6	26	XStar missed11092-11101 (590m).
	V1150_1 ✓	18:11	23:59	5:48	11092	11791	699	42	489547	8401948	519033	8434267	43.75	7.52	4.06	62.59	43.75	7	26	Increased swell and wind chop-> blanking on ENSIN.
21-Oct-95	V1150_1 ✓	0:00	1:47	1:47	11791	12004	213	42	519033	8434267	528120	8444236	13.49	7.56	4.08	63.33	13.24	7	26	ENSIN missed 12000-12004 (250m) on tape change.
	V1150_1A ✓	1:47	3:55	2:08	12004	12261	257	222	528120	8444236	539780	8456982	17.27	8.10	4.37	67.22	17.27	7	26	
	V1150_1A ✓	3:55	4:23	0:28	12261	12316	55	96	539780	8456982	543580	8456589	3.82	8.19	4.42	69.46	3.82	7	26	
	V1150_1A ✓	4:23	4:52	0:29	12316	12374	58	16	543580	8456589	544648	8460321	3.88	8.03	4.33	66.93	3.88	7	26	
	V1150_1A ✓	4:52	7:06	2:14	12374	12643	269	44	544648	8460321	556985	8473283	17.89	8.01	4.32	66.52	17.89	7	26	
	DTL10 ✓	7:29	9:07	1:38	12644	12839	195	167	555619	8474655	558319	8462774	12.18	7.46	4.03	62.48	12.18	7	26	
	V1050_1 ✓	9:07	10:18	1:11	12840	12982	142	222	558308	8462705	552309	8456069	8.95	7.56	4.08	63.00	8.51	7	26	ENSIN missed 12840-12847 (440m) on cnr line change
	V1050_1A ✓	16:31	20:53	4:22	12983	13506	523	222	553081	8456934	530868	8432463	31.89	7.57	4.08	60.97	31.89	7	27	Lengths corrd for 1.16km o/lap. Fix12982=Fix13001
	V1125_1 ✓	22:03	23:59	1:56	13507	13741	234	222	530642	8443113	520453	8431843	15.19	7.86	4.24	64.93	14.93	7	27	ENSIN hangup. Missed 13737-13741 (260m).
22-Oct-95	V1125_1 ✓	0:00	7:36	7:36	13741	14653	912	222	520453	8431843	481264	8388619	58.34	7.68	4.14	63.97	57.80	7	27	ENSIN hangup cont. Missed 13741-13749 (540m).
	V1040_1 ✓	9:09	12:18	3:09	14654	15032	378	42	481221	8376211	497154	8394046	23.92	7.59	4.10	63.27	23.92	8	28	Line above recorded as ENSIN V1125_1A., DAT 13
	V1080_1 ✓	13:10	15:57	2:47	15033	15367	334	42	491958	8394192	505426	8408996	20.01	7.19	3.88	59.92	20.01	9	28	Increasing swell and wind chop (0.5-1m).
	V1060_1 ✓	16:18	18:11	1:53	15368	15595	227	223	506692	8407704	497524	8397742	13.54	7.19	3.88	59.64	13.54	9	28	
	V1040_2 ✓	18:32	21:50	3:18	15596	15992	396	42	498701	8395522	515698	8414366	25.38	7.69	4.15	64.08	25.38	9	28	
	V1020_1 ✓	23:13	23:59	0:46	15993	16086	93	222	509019	8404017	505199	8399782	5.70	7.44	4.01	61.33	5.70	9	28	
23-Oct-95	V1020_1 ✓	0:00	1:02	1:02	16086	16210	124	222	505199	8399782	499961	8393952	7.84	7.58	4.09	63.21	7.84	9	28	
	V975 ✓	1:48	3:22	1:34	16211	16398	187	41	501125	8388812	508298	8397013	10.90	6.95	3.75	58.26	10.90	9	28	
	V950 ✓	3:46	6:00	2:14	16399	16668	269	223	509786	8394663	499118	8383163	15.69	7.02	3.79	58.31	15.69	9	28	Blanking on ENSIN data due swell/chop this direction
	V925 ✓	6:19	8:13	1:54	16669	16896	227	44	500614	8381663	510632	8392200	14.54	7.65	4.13	64.05	14.54	9	28	Blanking not as bad this direction but swell incr (1-2m)
	VTL11 ✓	9:49	11:53	2:04	16897	17145	248	312	523645	8400010	511152	8411334	16.86	8.16	4.40	67.99	16.86	9	29	New direction, 1-2m swell behind. SSS:corals?17115
	VTL11 ✓	11:53	16:00	4:07	17145	17639	494	331	511152	8411334	497455	8436485	28.64	6.96	3.75	57.97	28.64	9	29	OK but some blanking.
	VTL8 ✓	18:13	23:42	5:29	17640	18297	657	149	485961	8420963	503029	8392904	32.84	5.99	3.23	49.99	32.84	9	30	Into 1-2m swell and chop. OK but some blanking.
	VTL8 ✓	23:42	23:59	0:17	18297	18333	36	182	503029	8392904	502951	8390654	2.25	7.95	4.29	62.54	2.25	9	30	Into 1-2m swell and chop. Some poor data. ?Re-run
24-Oct-95	VTL8 ✓	0:00	0:19	0:19	18333	18370	37	182	502951	8390654	502877	8388481	2.17	6.87	3.70	58.76	1.88	9	30	ENSIN EOTape. Missed 18339-18344 (290m).
	VTL8A ✓	0:19	2:14	1:55	18370	18600	230	163	502877	8388481	507182	8374520	14.61	7.62	4.11	63.52	14.61	9	30	ENSIN recorded as VTL8A
	VTL8A ✓	2:14	4:22	2:08	18600	18857	257	153	507182	8374520	516145	8356694	19.95	9.35	5.05	77.64	19.95	9	30	
	V775_1 ✓	5:53	5:58	0:05	18858	18868	10	17	508828	8368129	508986	8368634	0.53	6.35	3.43	52.91	0.53	9	30	
	V775_1 ✓	5:53	6:56	1:03	18858	18984	126	42	508986	8368634	514028	8374178	7.49	7.14	3.85	59.47	7.49	9	30	
	V825_1 ✓	7:22	7:24	0:02	18985	18988	3	289	511491	8378416	511265	8378494	0.24	7.17	3.87	79.69	0.24	9	30	
	V825_1 ✓	7:24	8:25	1:01	18988	19110	122	221	511265	8378494	506435	8372975	7.33	7.21	3.89	60.12	7.33	9	30	
	VTL16 ✓	12:24	15:55	3:31	21043	21466	423	135	533846	8475327	556109	8452794	31.68	9.01	4.86	74.88	31.68	10	31	Resume boomer/chirp/sss

V1125A

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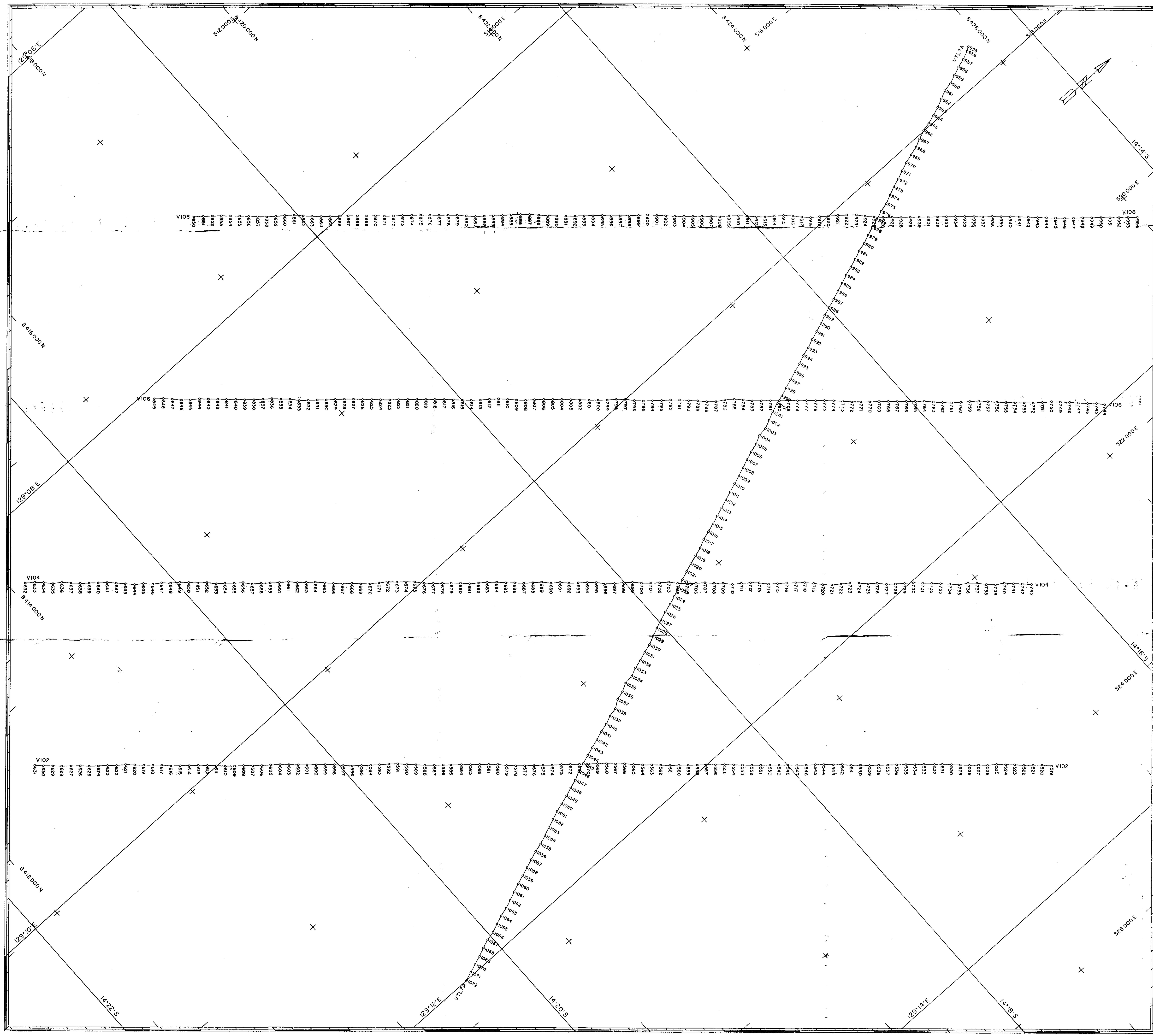
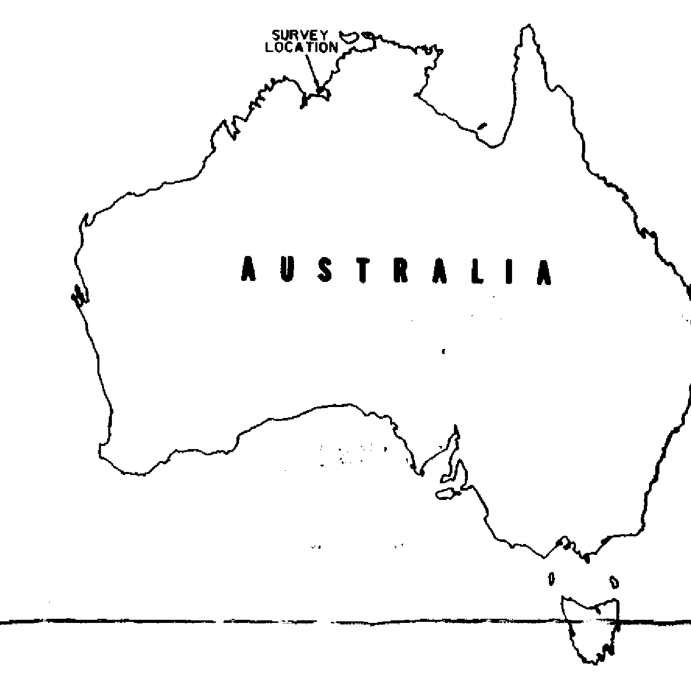


LOCATION DIAGRAM



LEGEND

BOOMER TRACK WITH FIX NUMBERS.

NOTES:

1. VESSEL POSITIONING SYSTEM: LANDSTAR DIFFERENTIAL GPS.

GEODETIC INFORMATION :

AUSTRALIAN GEODETIC DATUM 1984 PROJECTION: AUSTRALIAN MAP GRID 129°E

500 0 500 1000 Metres

SCALE 1:20000

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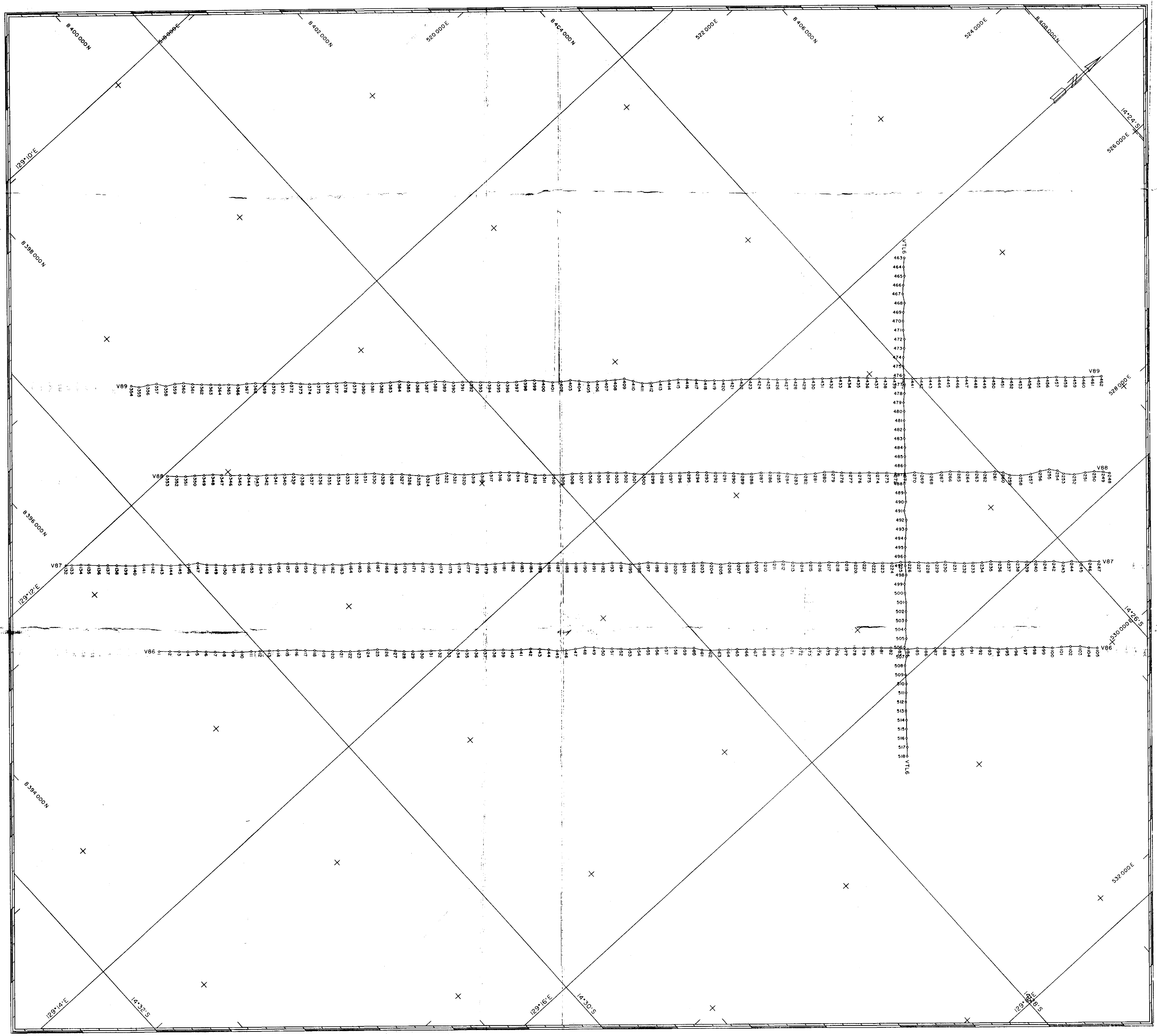
CAMBRIDGE GULF EXPLORATION N.L.

GEOPHYSICAL SURVEY
VICTORIA RIVER OFFSHORE
BOOMER TRACK CHART

Party Chief: J. Tighe	Drawn: J. Cowans	Drawing: A2331B-2-3 Sheet 7 of 8
Vessel: Miclyn Cove	Interpreted:	
Date: January 1995	Approved: G. Jones	

CR96/303



LOCATION DIAGRAM

LEGEND

BOOMER TRACK WITH FIX NUMBERS.

NOTES:

1. VESSEL POSITIONING SYSTEM: LANDSTAR DIFFERENTIAL GPS.

500 0 500 1000 Metres

SCALE 1:20000

GEODETIC INFORMATION :

AUSTRALIAN GEODETIC DATUM 1984 PROJECTION: AUSTRALIAN MAP GRID 129°E

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GEOPHYSICAL SURVEY
VICTORIA RIVER OFFSHORE
BOOMER TRACK CHART

Party Chief: J. Tighe	Drawn: J. Cowa	Drawing: A2331B-1-3 Sheet 3 of 8
Vessel: Miclyn Cove	Interpreted:	
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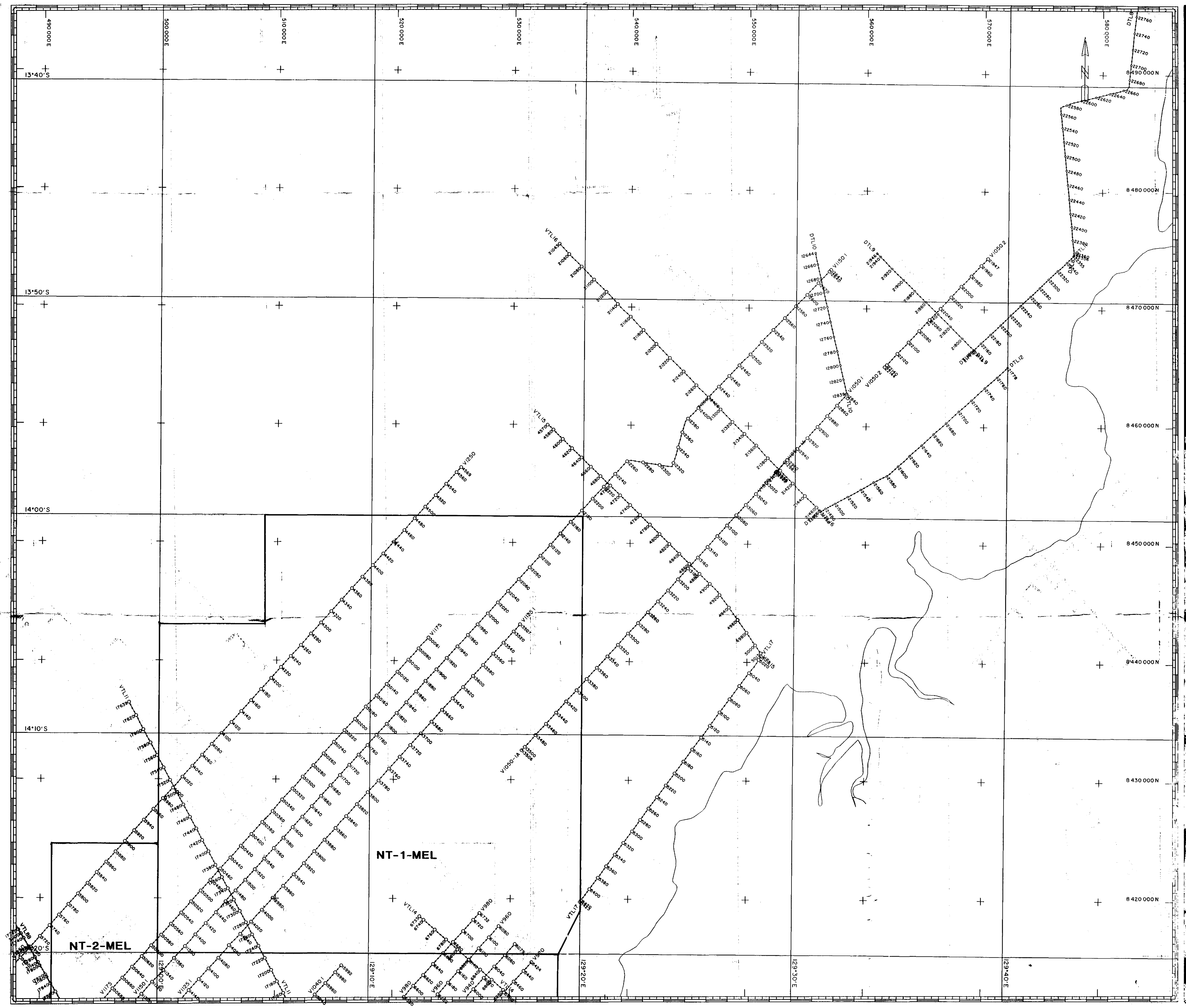
CR96/303



LOCATION DIAGRAM

LEGEND

BOOMER TRACK

NOTE: POSITIONING SYSTEM DIFFERENTIAL G.P.S.

0 2 4 6 8 10 12 Kilometres

SCALE 1:150,000

GEODETIC INFORMATION :

AUSTRALIAN GEODETIC DATUM 1984 PROJECTION: AUSTRALIAN MAP GRID 129°E

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CAMBRIDGE GULF EXPLORATION N.L.

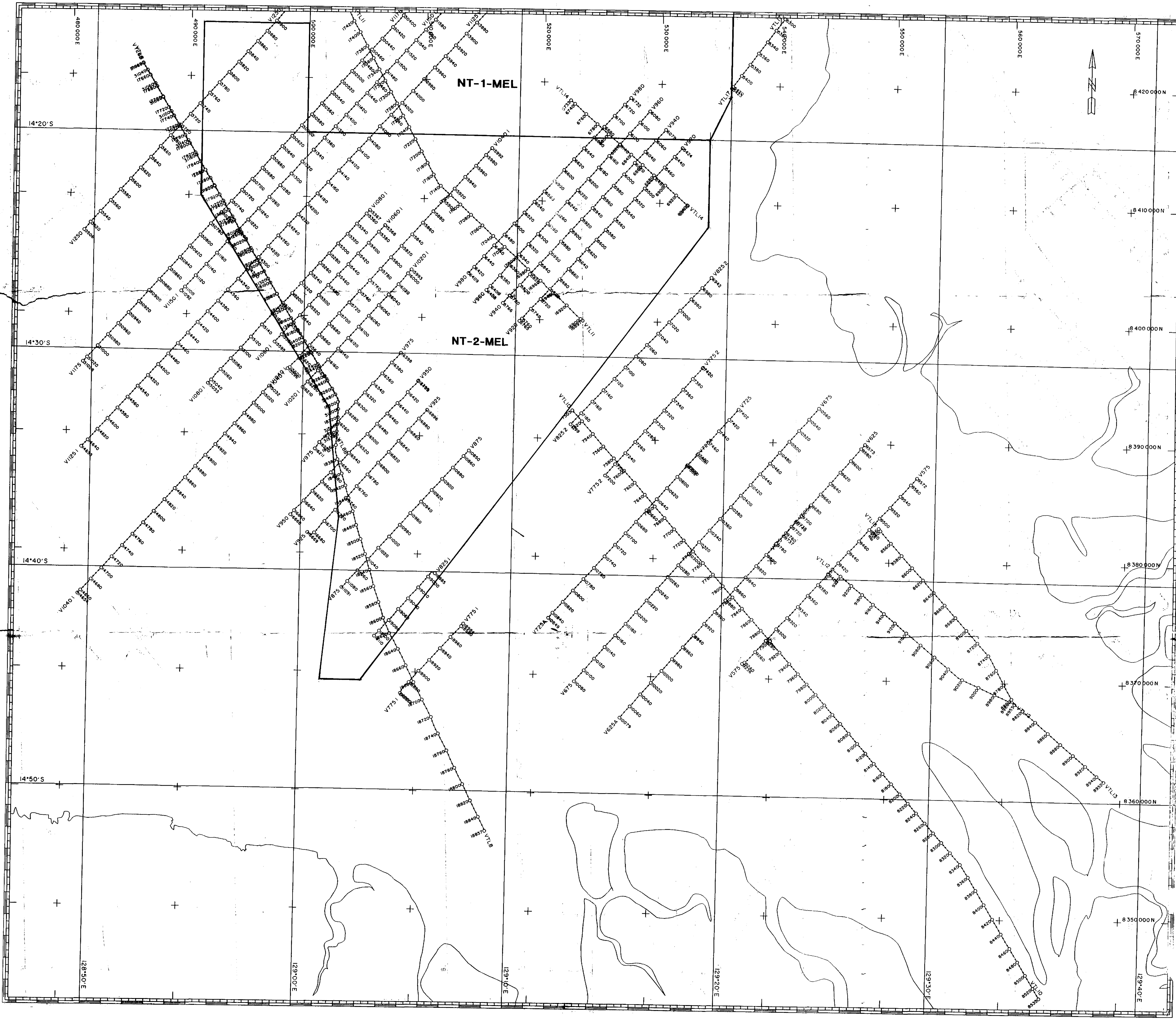
GEOPHYSICAL SURVEY OCTOBER 1995

VICTORIA OFFSHORE & DALY RIVER

BOOMER TRACK CHART

Party Chief: G. Davies	Drawn: K. Cormack	Drawing: R94C2V-2-3 Sheet 3 of 5
Vessel: Miclyn Achiever	Interpreted:	
Date: Oct/Nov 1995	Approved: G. Jones	

CR96/303



LEGEND

BOOMER TRACK

NOTE: POSITIONING SYSTEM DIFFERENTIAL G.P.S.

SCALE 1:150,000 (Kilometres)

GEODETIC INFORMATION:

AUSTRALIAN GEODETIC DATUM 1984 PROJECTION: AUSTRALIAN MAP GRID 129°E

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CAMBRIDGE GULF EXPLORATION N.L.

GEOPHYSICAL SURVEY OCT 95
VICTORIA
&
VICTORIA OFFSHORE PROSPECTS
BOOMER TRACK CHART

Party Chief: G. Davies	Drawn: K. Cormack.	Drawing: Sheet 3 of 5
Vessel: Miclyn Achiever	Interpreted:	
Date: Oct/Nov 1995	Approved: G. Jones	

CR96/303