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REF. No.	7393/85			

BASS BASIN

Tasmania, Australia
Permit T-19-P
Quarterly Report

First Quarter Report
March 27, 1984 to June 27, 1984

Submitted by
Perthshire Petroleum, Ltd.
Houston, Texas USA

TPR
CR-0209

Summary

No well was drilled and no geophysical data was acquired during this quarter. The geophysical data base for this permit was assembled and reviewed in preparation for additional prospect definition seismic acquisition.

The acquisition parameters, procedures and instrumentation used in the Crocodile Rock and Octopus surveys of 1981 and 1982 are summarized.

The Magnetic and gravity expression of the various leads so far identified have been studied. Results are summarized.

Results of the regional Aeromagnetic survey of the Bass Basin have been studied. Trend and alignments are indicated. Calculated depths to magnetic basement are compared to results obtained in the nearby wells.

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List of Enclosures

Location of Prospects and Leads, Total Magnetic Intensity Contours, Calculated
Depths to Magnetic Basement

Location of Prospects and Leads, Gravity Contours

Introduction

Exploration Permit T-19-P is located in the northwest corner of the Bass Basin. An area essentially unexplored except for one well, Konkon #1 drilled to probable basement which consists of highly altered volcanics at this location. Figure 1.

Following the regional mapping of Permit T-19-P the Crocodile Rock and Octopus surveys data was assembled in order to study the acquisition and processing parameters in preparation for a prospect definition acquisition program. These survey reports are enclosed.

The local magnetic and gravity maps generated from data acquired in the course of these seismic surveys have been studied in order to check fault trends and relative structural evolution of the various trends. The calculated depths to magnetic basement have been compared with the indications of acoustic basement seen on seismic lines.

In order to gain a better regional understanding of the regional tectonic and evolution of this portion of the Bass Basin, the results of the regional and magnetic survey were compared with those of the marine surveys. The regional trends are easily identified. Calculated depths to magnetic basement appear to be a little shallow and in many cases, strongly influenced by volcanics.

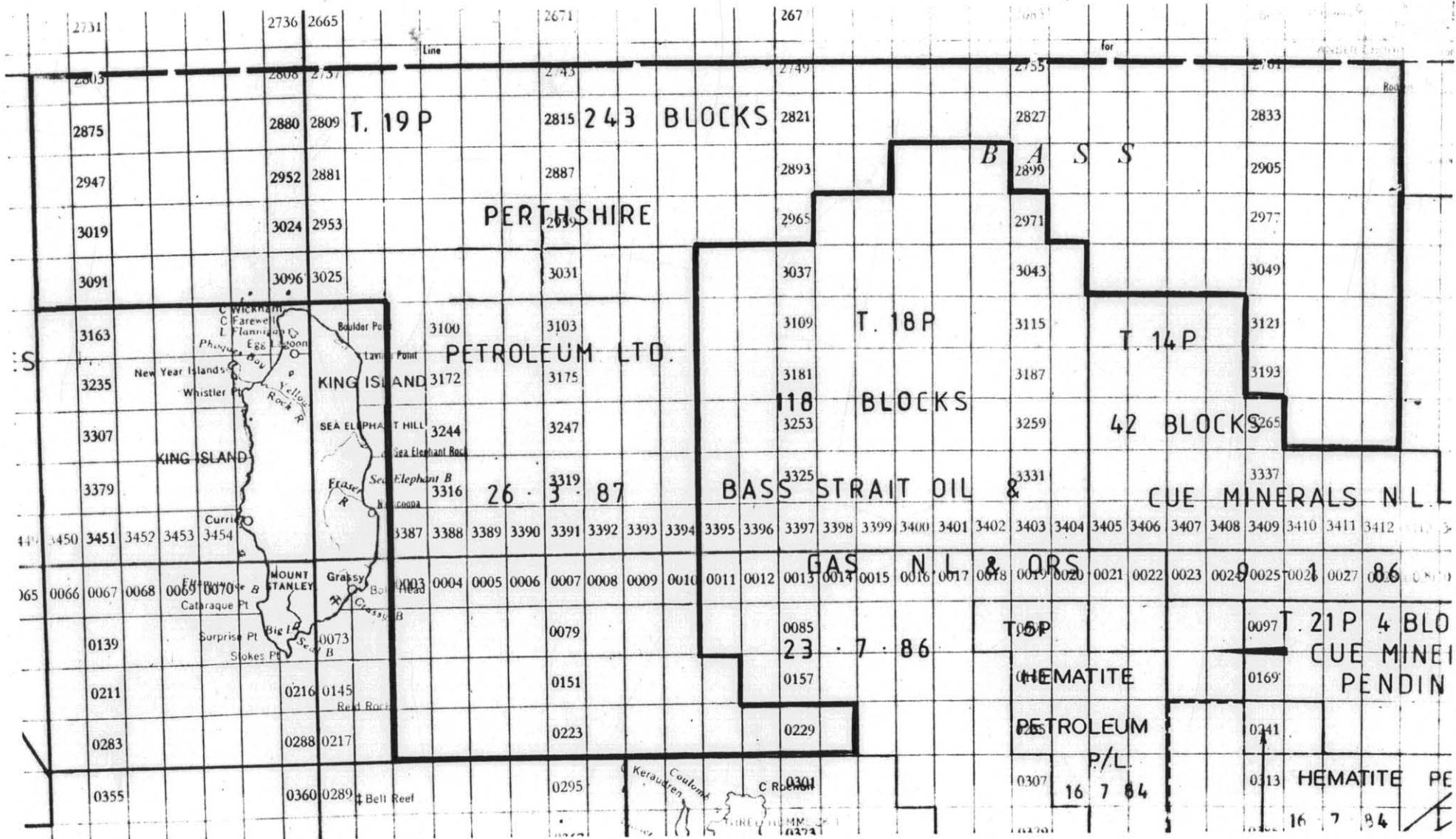


Figure 1

224011

CROCODILE ROCK
MARINE SEISMIC SURVEY

1981

TASMANIA

PERMIT T-19/P

for

PERTSHIRE PETROLEUM, LTD.
16TH FLOOR, 109 ST. GEORGE'S TERRACE
PERTH, (W.A.) AUSTRALIA 6000

by

WESTERN GEOPHYSICAL COMPANY OF AMERICA
10001 RICHMOND AVENUE
HOUSTON, TEXAS
PARTY 86 M/V WESTERN ODYSSEY

GENERAL INFORMATION

Introduction

The 1981 Crocodile Rock Seismic Survey was conducted on Exploration Permit T-19/P which was awarded on March 27th, 1981 to Perthshire Petroleum, Ltd., Perth, Western Australia.

The M/V Western ODYSSEY, a fully equipped seismic vessel operated by Western Geophysical Company of America, was used to conduct the survey. Some 270.725 kilometers (168.23 miles) of new seismic, gravity and magnetic data were recorded.

The navigation system consisted of Western Geophysical's Western Integrated Navigation System which comprises four main subsystems; a doppler-sonar system to determine the ship's velocity continuously; a satellite system to provide the ship's position at intervals averaging two to four hours, a digital computer and a recording system to record computer data. Calculations, for all subsystems and data integration were handled by the on-board general purpose digital computer. The ship's position was continuously calculated by integrating the sonar velocity and updating with satellite fixes. The navigation data was shipped to Western Geophysical's Navigation Department in Singapore for processing.

Seismic recordings were made with a DFS "V" seismic acquisition system - manufactured by Texas Instruments - consisting of two analog modules, a controller module and four tape transports.

The energy source consisted of twenty high pressure Western airguns. In normal operating circumstances, ten of the airguns were combined to form a 560 cubic inches tuned array. The airguns are operated at a pressure of 5,000 pounds per square inch.

The streamer cable used by the Western ODYSSEY was composed of 48 detachable and interchangeable LRS Marine Active Cable sections. Each section is 50 meters in length and contains two 25 meter groups of twenty WM2-036 geophones.

Gravity data was acquired with a La Coste Romberg meter while magnetic data was acquired with a Geometrics G801/3 meter.

Interpretations of this data were made at Perthshire Petroleum, Ltd. offices in Houston, Texas.

Field tapes and processing tapes are presently at Western Geophysical's processing center in Houston, Texas and will later be stored at Geodata Services, Inc. in Houston, Texas.

DAILY OPERATIONS

Field supervision was provided by Mr. Jack Downing, Vice President - Geophysics, Weaver Oil and Gas Corporation, Australia, and Mr. W. Sleator, Geophysical Consultant, based in Australia. The activities were coordinated through Mr. David C. Lowry, Consulting Petroleum Geologist and Manager of Weaver Oil and Gas Corporation, Australia in Perth. Perthshire Petroleum, Ltd. is a wholly owned subsidiary of Weaver Oil and Gas Corporation.

DESCRIPTION OF SURVEY AREA

The prospect was designed as T-19-P. The survey consisted of 6 lines comprising a total assigned program of 271 kilometers. The survey area is in the Perthshire's Crocodile Rock survey area in the Bass Strait off the coast of Victoria, Australia. Figure 2, 3.

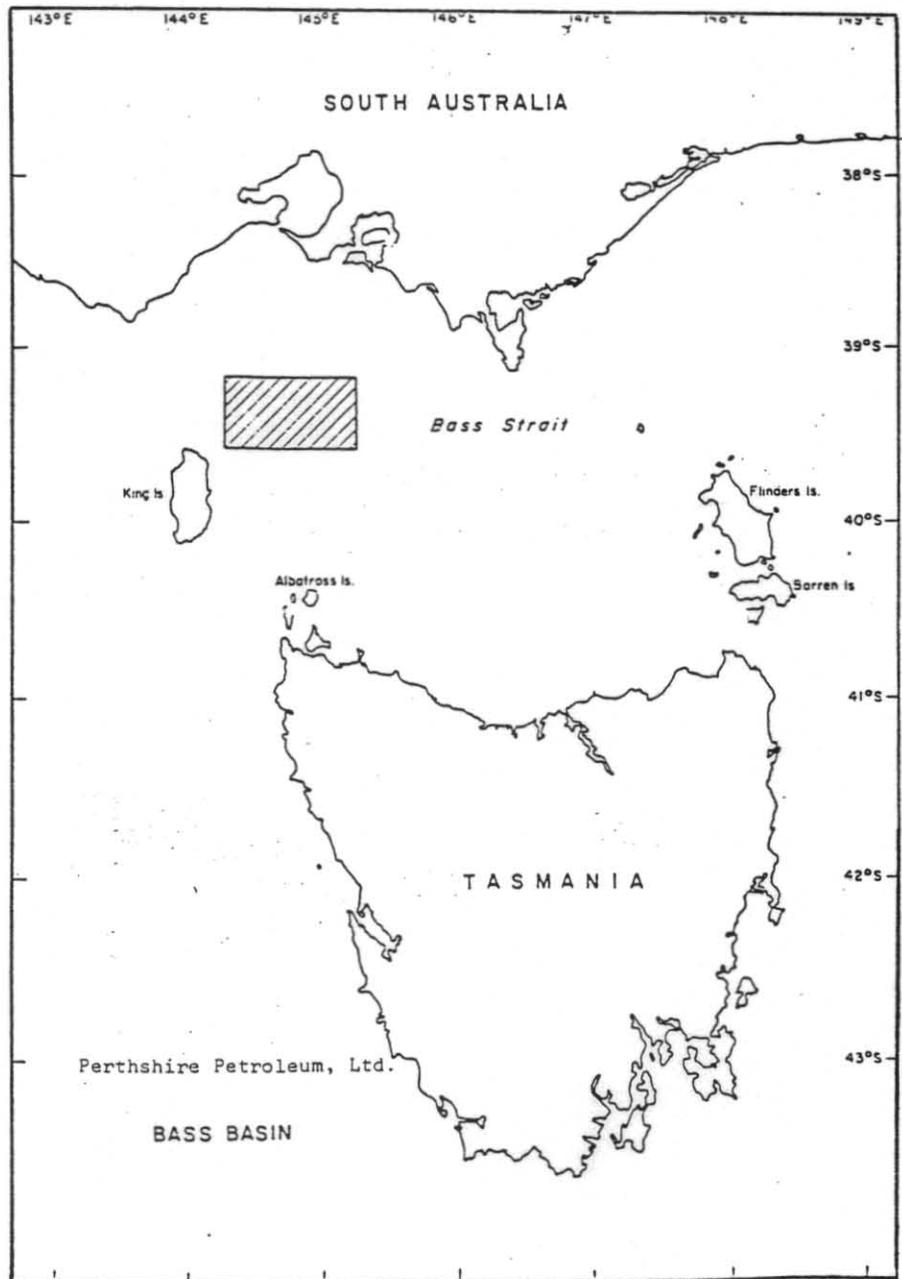
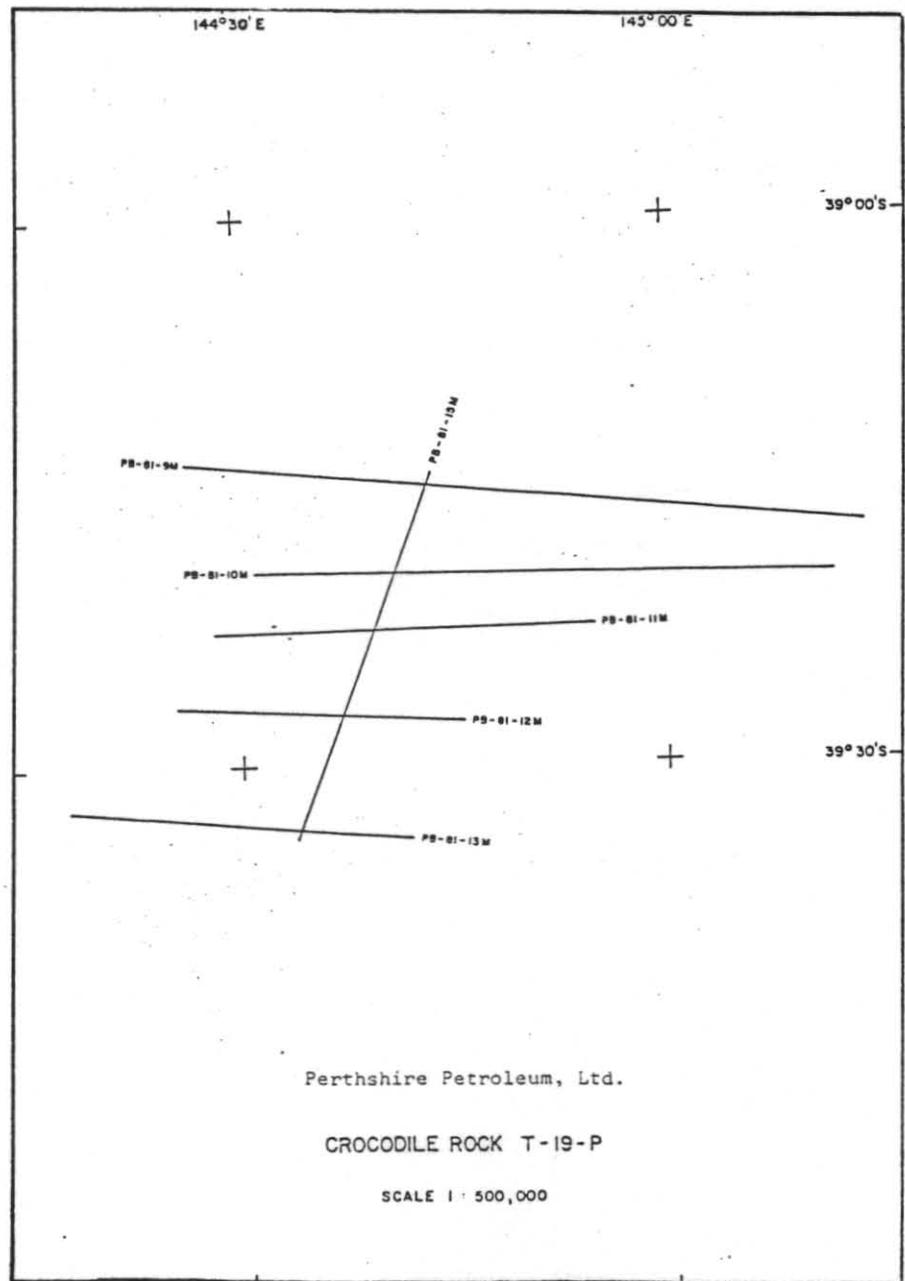


Figure 2

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5 cm

Figure 3

Contractors

The survey was conducted on behalf of Perthshire Petroleum, Ltd. of Houston, Texas and Perth, West Australia.

To conduct the survey, Perthshire Petroleum, Ltd. contracted WESTERN GEOPHYSICAL COMPANY OF AMERICA, a Delaware Corporation and a Division of LITTON INDUSTRIES.

Weather

Moderate winds and seas dominated the weather conditions during the survey operation. Although the Bass Strait is noted for its severe weather, this was fortunately not the case during the vessel's time on the prospect. At no time during the survey was it delayed or interrupted as a result of poor weather.

224018

Disposition of Data

The digital recorded magnetic tapes were shipped to WESTERN GEOPHYSICAL COMPANY in Houston, Texas, for disposition to the nominated processing center. Included with the data shipments were copies of the observer's line summary sheets, streamer cable and airgun configuration prints, co-ordinator's logs, LRS-100 computer printouts, E.P.C. rolls, camera monitor rolls, fathometer rolls and parameter reports.

The navigation and GDU data was shipped to WESTERN GEOPHYSICAL's Navigation Department in Singapore for processing.

Instrument Test

Semi-monthly and monthly instrument test were conducted on the DFS V system as per the instrument manual's instructions. The results of these test were sent to WESTERN GEOPHYSICAL's processing center in Singapore for processing and initial interpretation, then forwarded to WESTERN GEOPHYSICAL's Houston office for final analysis.

In addition to this, daily test were also conducted to ensure that the instrument's performance was consistent with specifications.

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Key Field Personnel

Perthshire Petroleum, Ltd.

David Lowery : Exploration Manager based at Perth office, responsible for liaison between WESTERN GEOPHYSICAL and Perthshire's principal office.

WESTERN GEOPHYSICAL COMPANY

Paul J. Hughes : Operations Manager, based at field office, responsible for client liaison and vessel logistics.

Tim N. Leighton : Marine Operations Co-ordinator, responsible for vessel's operation at sea including quality control.

Kevin Roberts : Instrument Technician

Brent Wise : Observer

Dicky Chow : Observer

Ian Bramley : Navigator

Jim Green : Navigator

Phil Knight : Airgun Mechanic

Mal Wetherspoon : Airgun Mechanic

224020

Survey Vessel

Name : M/V Western Odyssey
Length : 185 feet
Beam : 40 feet
Draft : 10 feet
Tonnage; gross/net : 830/250
Engines : 2 x Caterpillar D-399 TA
1090 HP each
Propulsion : 2 x Kamewa 50 x F/4 Control
Pitch Propellers
Generators : 2 x 550 kw - for air
compressors
2 x 175 kw - for ship's power
2 x 30 kw - for instruments
Radar : 2 x Decca Model 926, 48 mile
range
Gyro Compass : Sperry model 227 with auto
pilot
Bow Thruster : Kamewa SP 1300 with 350 HP
Electric Motor
Stabilization : Flume Type with Anti-Roll
Blige Keel
Accommodation : 36 persons
Endurance : 35 days minimum
Official Number : 8775
Call Letters : HO - 3498
Port of Registry : Panama
Helideck : 40 feet x 50 feet

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Seismic Equipment and Instrumentation

Instruments : DFS V 120 Channel

Main Cable : 2400 Streamer, 96 groups
25 m Group spacing - 96
ch.mode
50 m Group spacing - 48
ch.mode

Mini Streamer* : 6 or 12 groups, 12.5 m group
spacing incorporated into
* Not in use during main cable offset sections
this survey.

Compressors : 6 x Price 5000 psi electric
drive compressors

Navigation

Primary : SAT-NAV 16 / WINS PHASE IV

Secondary : LRS Phase IV Integrated
Satellite Navigation system

Communications : Comsat 'MARISAT' Satellite
Terminal with telex and
telephone facilities

Sailor 800 Watt Programmable
SSB Ship/Shore Radio

Sailor VHF Radio

UTS 10S Auxillary

SSB Radio, 150 watts

Gravity Meter : La Coste Romberg

Magnetometer : Geometrics G801/3

Ancillary Equipment : LRS Geoscience Data
Acquisition System (Data
Logger)

EPC Single Trace Plotter

SIE ERC 100 Monitor Camera

LRS-100 Energy Source
Synchronizer

224022

LRS Airgun Solenoid Controller

Kalamos M2A Cable Fault Locator

Krupp-Altas Model 6020
Fathometer - 2000 fathom range

Raytheon model DE 750
Fathometer - 600 fathom range

Simrad model EX38D
Fathometer - 1000 fathom range

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Instrument Settings and Specifications

Model : DFS V

System Number : 408

Tape Format : SEG-B, 9 track

BPI Density : 1600

Number of Channels Available : 124

Number Seismic Channels : 96

Auxiliary Channels : Timebreak - Channel 1
Waterbreak - Channel 2

Pre-Amp Gain : 36 dB

Total Gain : 120 dB

Lo Cut Filter : Out

Hi Cut Filter : 64 Hz, Slope 70 dB/OCT

Sample Rate : 4 milliseconds

Record Length : 6 seconds

Analog Module Specs

 Frequency Response : 3 to 256 Hz

 Maximum Gain : 132 dB

 Minimum Gain : 24 dB

Input Impedence

 Difference Mode : 20,000 ohm resistive
in parallel with
0.035 microfarads

 Common Mode : 500 ohms parallel
with the series
combination of 0.02
microfarads and
induction of 6 Henries

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Max. Input Signal	<u>Gain Constant</u>	<u>Voltage(mV RMS)</u>
Difference Mode:	24	327.68
	26	81.92
	8	20.48

Common Mode:	<u>F. Range (Hz)</u>	<u>Voltage(Peak)</u>
	0 - 60	7
	60 - 700	3.5
	700 - 1K	7
	1K - 3K	10
	3K - 10K	50

Distortion : 0.05% 3 to 256 Hz

Crossfeed Isolation : 80 dB between any 2 channels, feeding 1 channel only

Control Module Specs

Timing Accuracy : -0.005%

Data Word Rate : 64 kHz Max

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Cable Parameters

Percent Coverage : 4800%

Pops per km : 40

Number of Groups : 96

Center Energy Source to
Center Near Group : 200.7 meters

Center Near Group to
Center Far Group : 2,375 meters

Group Center to Group Center: 25 meters

Number of Phones per Group : 20

Depth Detectors at Head of
Groups : 2, 16, 32, 48, 64, 80,
96, Head of Mini

Depth Controllers on Groups : SS 2, 12, 26, 40, 54,
68, 82, 96, SS

Center Near Group to
SAT NAV Antenna : 278.6 meters

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C. Airgun Configuration

Array Volume : 555 cu. inches

Number of Guns : 10

Array Pressure : 4500 psi

Shot Depth : 6 meters

Shot Interval : 25 meters

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STATISTICAL SUMMARY

<u>DATE</u>	<u>LINE</u>	<u>SP - SP</u>	<u>PROFILES</u>	<u>KMS</u>
April 5	PB81-15M	100 - 1199	1100	27.500
April 6	PB81-15M	1200 - 1695	496	12.400
April 7	PB81-9M	100 - 2849	2750	68.750
	PB81-10M	100 - 2469	2370	59.250
	PB81-11M	100 - 779	680	17.000
April 8	PB81-11	780 - 1645	866	21.650
	PB81-12	100 - 1271	1172	29.300
	PB81-13	100 - 1494	1395	34.875

Total Kilometers: 270.725

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LINE SUMMARY

PB81 - 9M Start of line, first reel - 091563,
7th April first shotpoint 100. End of line,
reel 091614, last shotpoint 2849.

PB81 - 10M Start of line, first reel - 091615,
7th April first shotpoint 100. End of line,
reel 091659, last shotpoint 2469.

PB81 - 11M Start of line, first reel - 091660,
7th April first shotpoint 100. End of day,
8th April reel 091673, last shotpoint 779.
First SP of day, 8th April - 780, on
reel 091673. End of line, reel
091689, last shotpoint 1645.

PB81 - 12M Start of line, first reel - 091690,
8th April first shotpoint 100. End of line,
reel 091712, last shotpoint 1271.

PB81 - 13M Start of line, first reel - 091713,
8th April first shotpoint 100. End of line,
reel 091739, last shotpoint 1500.

PB81 - 15M Start of line, first reel - 091532,
5th April first shotpoint 100. Last shotpoint
6th April of day, 5th April - 1199, reel
091552. End of line, reel 091562,
last shotpoint 1695.

General

Water depths were recorded in fathoms every 40th shotpoint using an Echograph 600 S, model Atlas by Krupp.

A magnetic survey was taken with a Geometrics SSAA magnetometer. The magnetic reel to sensor was 193 meters. A data logger was used to record the survey.

A S/N S88 gravity meter was used for the gravity survey. A data logger was also used for this survey.

The following are descriptions of the programs and procedures in the order in which they were applied.

INTRODUCTION

Between April 5 and April 8, 1981, Western Geophysical Company shot marine seismic lines Offshore Australia, Bass Basin for Perthshire Petroleum, Ltd. This survey was recorded by Party 86 aboard the "Western Odyssey" and covered 168.23 miles. The digital processing for this survey was performed at the Houston Digital Center from April 16 to June 25, 1981.

The navigation system was by navigation satellite. Antenna positions were located by 16/WINS Phase IV equipment. Mapping was performed by Western Geophysical Company in Singapore at a scale of 1 to 100,000.

The seismic recording was done on a DFS V system. The DFS V recorded 124 channels in SEG-B format at a 4 ms. sampling interval for 6 seconds. The field filter settings were a low cut out and a high cut of 64 hz with a slope of 70 db/octave.

The cable used was a 96 group streamer which was pulled at an average depth of 14 meters. Each group consisted of 20 phones with a 25 meter spacing between group centers. (Hydrophone configuration diagram included.)

The energy source consisted of an array of 10 air guns. The array had a volume of 555 cubic inches with 4500 psi. A shot was made every 25 meters at a depth of 6 meters. (Air gun array diagram included.)

Test pops were taken at the start of each line, and noise file strips were made at the beginning and end of each line. Monitor records were produced every 29th shotpoint.

NAVIGATION SYSTEM - WINS^(R) PHASE IV

Western Geophysical's WINS^(R) (Western Integrated Navigation System) is comprised of four main subsystems; a doppler-sonar system to determine ship's velocity continuously, a satellite system to provide ship's position at intervals averaging two to four hours, a digital computer and a recording system to record computed data. Calculations, for all subsystems and data integration, are handled by the on-board general purpose digital computer. The ship's position is continuously calculated by integrating the sonar velocity and updating with acceptable satellite fixes.

DOPPLER SONAR SUBSYSTEMDoppler Sonar

The main unit is a Marquardt 2020A doppler sonar system. This system uses a 4-element transducer, in a single assembly, to transmit and receive pulses of 300 KHz sonic energy reflected from the sea floor.

The four elements transmit and receive energy at an angle of 30° to the vertical in the fore, aft, port and starboard directions. The associated electronics control both the pulse transmission pattern and provide independent phase-locked-loop tracking of each of the four received signals. The output from the tracker circuits are demodulated to determine the frequency shift present in the received signals. The frequency shift of each channel is pulse shaped to provide a digital pulse rate proportional to ship's velocity in that channel. Vertical velocity, heave, is derived in the computer. Pulse rates proportional to velocities in the 2 horizontal ship axes are provided to the computer.

The sonar will normally maintain lock on the sea bottom to depths greater than 600 feet. When "bottom lock" is

lost the sonar will automatically track the sonar return from the water mass. The velocities in this mode are relative to the water mass and therefore in error in the presence of ocean currents. The change in sonar mode may be controlled manually as well as automatically. The sonar mode is indicated to the computer and data logger and also visually displayed.

Velocity Resolution and Compensation

The horizontal ship-referenced velocities are resolved into North and East velocities by the computer. The necessary heading reference is provided by a gyro-compass (Sperry MK227) with electronic readout provided by a resolver. A resolver-digital converter provides a digital heading to the computer. The gyro-compass is corrected internally for latitude error. Dynamic gyro-compass errors are corrected in the computer.

Other corrections to the sonar velocities are for sound velocity in water and ship attitude.

Sound velocity in water is measured by a velocimeter (N.U.S. 1020) which provides an output frequency proportional to sonic velocity. This signal is used by the computer for sonar scale factor correction.

Ship attitude data are provided by pendulous resolver inclinometers (G.A.P. S2000) in the pitch and roll axes. The outputs of these devices are converted to digital form and passed to the computer. The computer applies corrections for pitch and roll and pitch-heave and roll-heave interaction.

SATELLITE SUBSYSTEM

The satellite receiver, Magnavox 702A-3, automatically acquires and tracks the signal from each satellite as they become available. Each satellite transmits a message on two frequencies, 400 MHz and 150 MHz, which are independently tracked by two phase-lock-loop receivers.

The doppler shift on each frequency is measured. Digital data representing the high channel doppler-shift cycle count, low channel doppler-shift cycle count and satellite message are passed to the computer.

The satellite fix program is a "short doppler" program which employs the accumulated doppler data in 23-second intervals instead of the 2 minute interval used in the earlier programs. Use of the 23-second interval allows accurate fix computation under reception and pass length conditions which would prevent a 2 minute interval program from computing a fix.

Fix accuracy is very much a function of the accuracy of the measurement of the ship's velocity during the pass. In particular one knot error in measurement of the north velocity can induce a position error of up to 1500 ft. in the satellite fix. Accurate knowledge of velocity from the sonar subsystem reduces this error to negligible proportions.

COMPUTER AND PERIPHERAL EQUIPMENT

The computer (HP 2100A) is a general purpose digital computer. The computer accepts data from all the sensor units and a manual entry keyboard. A CRT display unit is fed by the computer to provide a display of present latitude, longitude, heading, cross-course velocity and distance, and along-course velocity and distance. Several other parameters are also displayed. Initialization parameters, such as G.M.T., satellite antenna height, shotpoint interval, etc. are entered by the operator via a keyboard.

A digital line printer is used to provide a visual history by printing time and position at 10-minute intervals. The printer is also used to provide a printout of the satellite fix parameters.

The computer program is loaded from magnetic tape. Program may also be loaded with paper-mylar punched tape.

All computed navigation data, are sampled in digital form every twenty seconds. The resulting data scan is accumulated in a core memory and written onto IBM-compatible, 9-track magnetic tape at 10-minute intervals. Satellite data is accumulated for the entire satellite pass and written onto tape at the end of each pass.

The seismic system is interfaced to the computer in order to record the seismic file and reel number on the navigation tape, to allow the positive positioning of each seismic record. This interface also allows the navigation system to control the seismic recording interval on the basis of elapsed distance, instead of the more normal elapsed time method. The required distance is part of the computer initialization data.

To ensure recorded data validity, data recorded on magnetic tape is read back to the computer and compared with the data written to the tape. This data may also be printed for visual verification.

SURVEY OPERATION

The system is initialized with the Latitude/Longitude end points of the line and shotpoint control parameters; pop and shotpoint interval, initial shotpoint number and direction of count.

The system displays along-course and cross-course distance and velocity relative to the great circle line passing through the specified line end points. These displays are also available in the wheel house. The problems of bringing the vessel on line and keeping it there are thus simplified and do not require voluminous preplot tabulations or track plotter charts.

The system described above provides a reliable means of navigation to the accuracy required for geophysical survey work on the continental shelf independent of any shore base support.

224035

DIGITAL PROCESSING REPORT
OF
OFFSHORE AUSTRALIA, BASS BASIN
CROCODILE ROCK
FOR
WEAVER OIL & GAS CORPORATION
BY
WESTERN GEOPHYSICAL COMPANY

EDIT

The edit program demultiplexed the 96 recorded channels into a trace sequential format retaining the full-word floating point format. No summing of field pops was done.

A near trace section for each line was displayed to check the results of the editing process and to determine velocity analysis locations.

VELOCITY ANALYSIS PROGRAM

Vertical velocities are automatically determined in the VELAN[®] (velocity analysis) program using cross-correlation techniques on deconvolved CDP gathers from the decon program. Two adjacent CDP families were used for each velocity analysis. Cross-correlations for each CDP family were obtained with the output of both families then summed to a single output, i.e., the VELAN velocity table was the average of two consecutive CDP family analyses.

The calcomp plot that was printed and is a plot of RMS velocity versus two-way time with a cross-correlation output trace at 40 millisecond intervals. Velocity increments of 250 feet per second were used. Velocity analysis locations were determined by examining near trace gathers.

224037

PREPROCESSOR/DECONVOLUTION

Line PB-81-12 was selected as a test line. Three types of predictive deconvolution tests were performed on the above line. After reviewing the tests with the client, it was decided that the 4 ms. predictive distance was the optimum decon to use for these data. Operator lengths were also based on autocorrelation information.

The preprocessor program generates common depth family (CDF) ordered tapes which conform to the SEG "exchange tape" specifications incorporating in reel and trace headers all basic information regarding field parameters such as spread distances and line geometry.

Prior to deconvolution a geometric spreading function was applied to compensate for spherical divergence. Deconvolution was then performed using the Weiner-Levinson least squares minimum phase algorithm. The prediction operator was constructed from an autocorrelation function in a time variant manner only in the sense that the autocorrelation start time and resultant operator for each trace was a function of the distance of the trace from the source. A new operator was calculated for each trace. Autocorrelations were computed before and after deconvolution providing a continuing check on the effectiveness of the decon. The data was subsampled to 4 ms. in the decon.

NORMAL MOVEOUT APPLICATION AND CDP STACKING PROGRAM

Normal moveout calculations were performed independently for each trace, with the velocity function being the same for each member of a CDP family. A straight-ray iso-velocity interpolative method was used between velocity analysis locations. Muting was applied after normal moveout and the application of mute was done for each trace, the members of each CDP family were summed together to produce a stacked output trace. Each sample of time of the stacked output trace was then divided by the number of "live" samples at that time which were summed to produce that stacked sample. Effectively, this retains relative recorded time-varying amplitude of the trace.

Quality control of the applied velocity functions was performed by outputting a stack monitor section. Where deemed necessary, revised velocity functions were used to compute residual normal moveout corrections for the final stack sections.

RAP® PROCESS

A Relative Amplitude Preservation (RAP) section was produced on selected lines picked by the client.

To produce the RAP section the no-gain stack tape was run through an amplitude decay analysis in order to obtain a set of multipliers to compensate for the loss of energy at depth.

An average set of multipliers was used for the area and applied to the stack in the residual amplitude compensation program.

The data was then filtered with a 6-60 band pass for the final RAP display.

224039

MIGRATION AFTER STACK

The finite-difference method of migration was used for this data. In this program approximations are first made to the Scalar wave equation intself rather than an integral solution, such as used in the diffraction-summation program. This method is accomplished by propagating waves recorded at the earth's surface backward in time down into the subsurface until scatterers or reflectors are encountered. This backward propagation is accomplished by using discrete (finite-difference) approximations to a differential equation that governs wave motion and results in a migration of the data into a position closely approximating their true position in space.

TIME VARIANT FILTERING PROGRAM

Time variant zero phase digital filter tests were run to determine the optimum filter pass-bands and times of application. Filter pass-bands at 70% response points and times of application are noted in the section headers for each line and these times are linearly variable in order to follow structural trends. The filters were designed with 18 db. slope and 36 db. slope, respectively, on the low and high frequency sides at 3 db. down on the amplitude plot.

SYNTHETIC SEISMOGRAMS

Introduction

Sonic logs acquired in the Comorant #1, and Konkon #1 wells were sent to Geoscience Technology Services Corporation for editing and digitization. Within the Eastern View Coal Measures care was taken to edit the sharp spikes created by the individual coal beds, otherwise a high amplitude event would have been produced thereby effectively masking the immediate underlying reflectors, as the synthetic process requires a short recovery period. A series of synthetic seismograms were then produced from the calculated reflection coefficients by convolving the latter with Ricker wavelets of 20 hz, 30 hz and 40 hz respectively. Formation tops and ages were then plotted on the display for ease in reflector identifications. They were then displayed on a vertical scale of 3.75 inches/second, comparable to the seismic sections on hand. In general, the 40 hz seismogram correlated more favorably with the seismic data which intersected the individual wells.

The units most easily correlated were the Oligocene/Eocene Shale contact and the Eocene Shale/Eastern View Coal Measures contact. Both wells correlated favorably, the Eocene Shale providing an excellent marker along with the Eastern View Coal Measures. Where igneous rocks were encountered, Konkon #1, a seismic event corresponding to the high increase in interval velocity was produced.

In general, Synthetic Seismograms were a great aid in correlating seismic events throughout the section. They were especially helpful in identifying reflectors beneath the Eastern View Coal Measures which produced a series of multiples effectively masking the underlying events. Figure 4, 5, 6, 7, 8 & 9.

224041

SYNTHETIC SEISMOGRAM

GTS CORP.

HOUSTON OFFICE 3724 DACOMA 77018

ESSO AUSTRALIA LTD. KONKON 1 WILDCAT AUSTRALIA TASHANIA

LOG DATUM = 32

SEISMIC DATUM = 0

COMMENTS

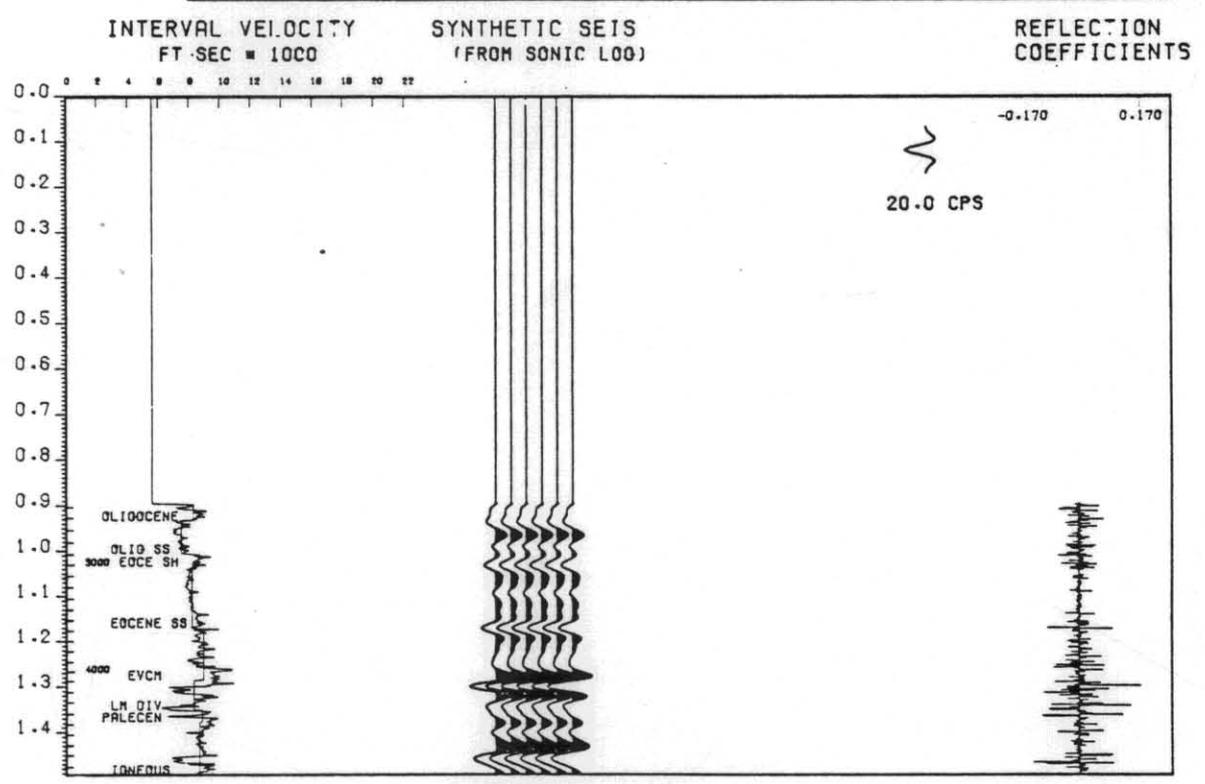


Figure 4

224042

SYNTHETIC SEISMOGRAM

GTS CORP.

HOUSTON OFFICE 3724 DACONA 77018
ESSO AUSTRALIA LTD. KONKON 1 WILLCAT AUSTRALIA TASMANIA
LOG DATUM = 32 SEISMIC DATUM = 0 COMMENTS _____

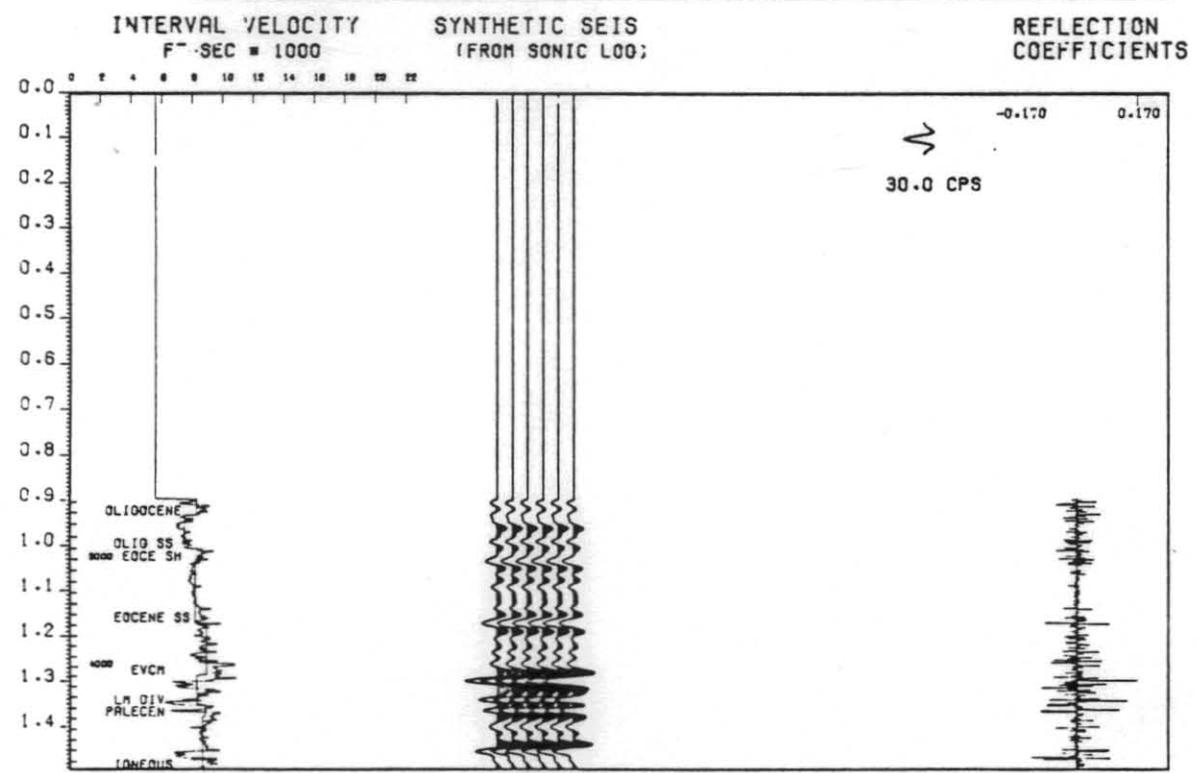


Figure 5

224043

SYNTHETIC SEISMOGRAM

GTS CORP.

HOUSTON OFFICE 3724 DACONA 77018

ESSO AUSTRALIA LTD. KONKON 1 WILDCAT AUSTRALIA TASMANIA

LOG DATUM = 32

SEISMIC DATUM = 0

COMMENTS _____

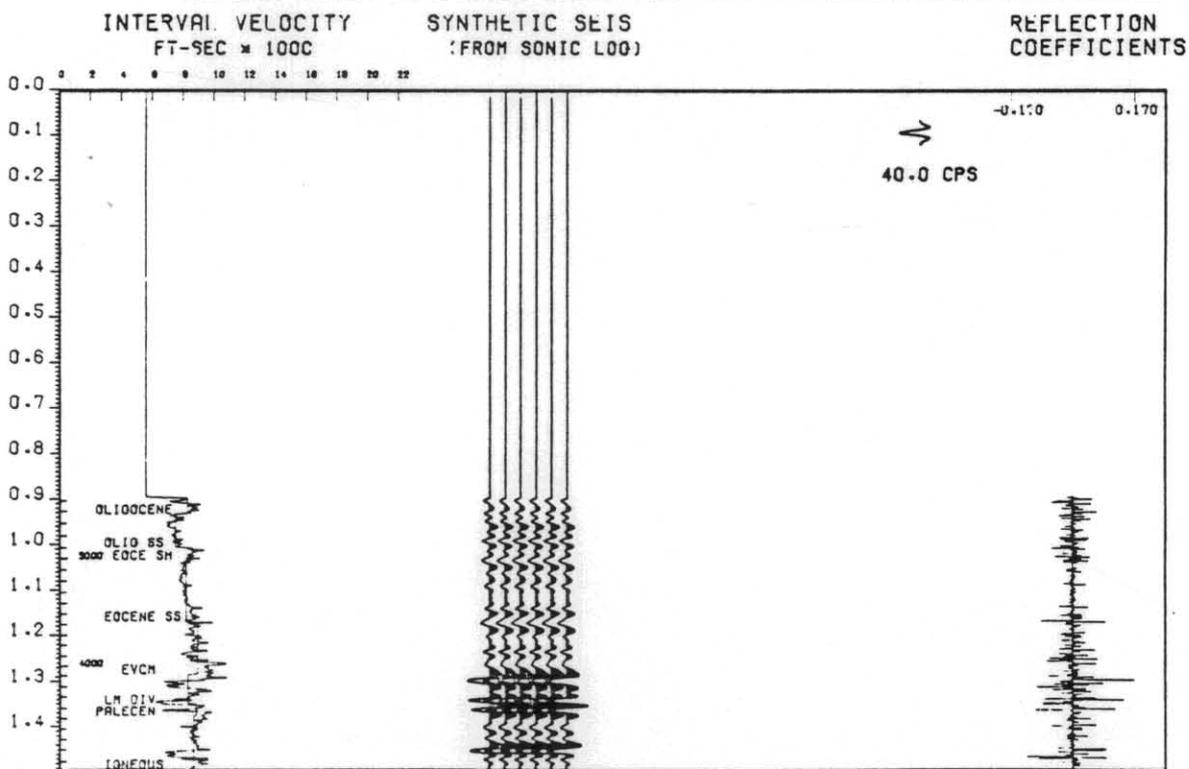


Figure 6

224044

GTS CORP. HOUSTON TEXAS 77002
ESSO EXP 4 PROD AUSTRALIA INC CORMORANT 1 AUSTRALIA TASMANIA
LOG DATUM = 100 SEISMIC DATUM = 0 COMMENTS _____

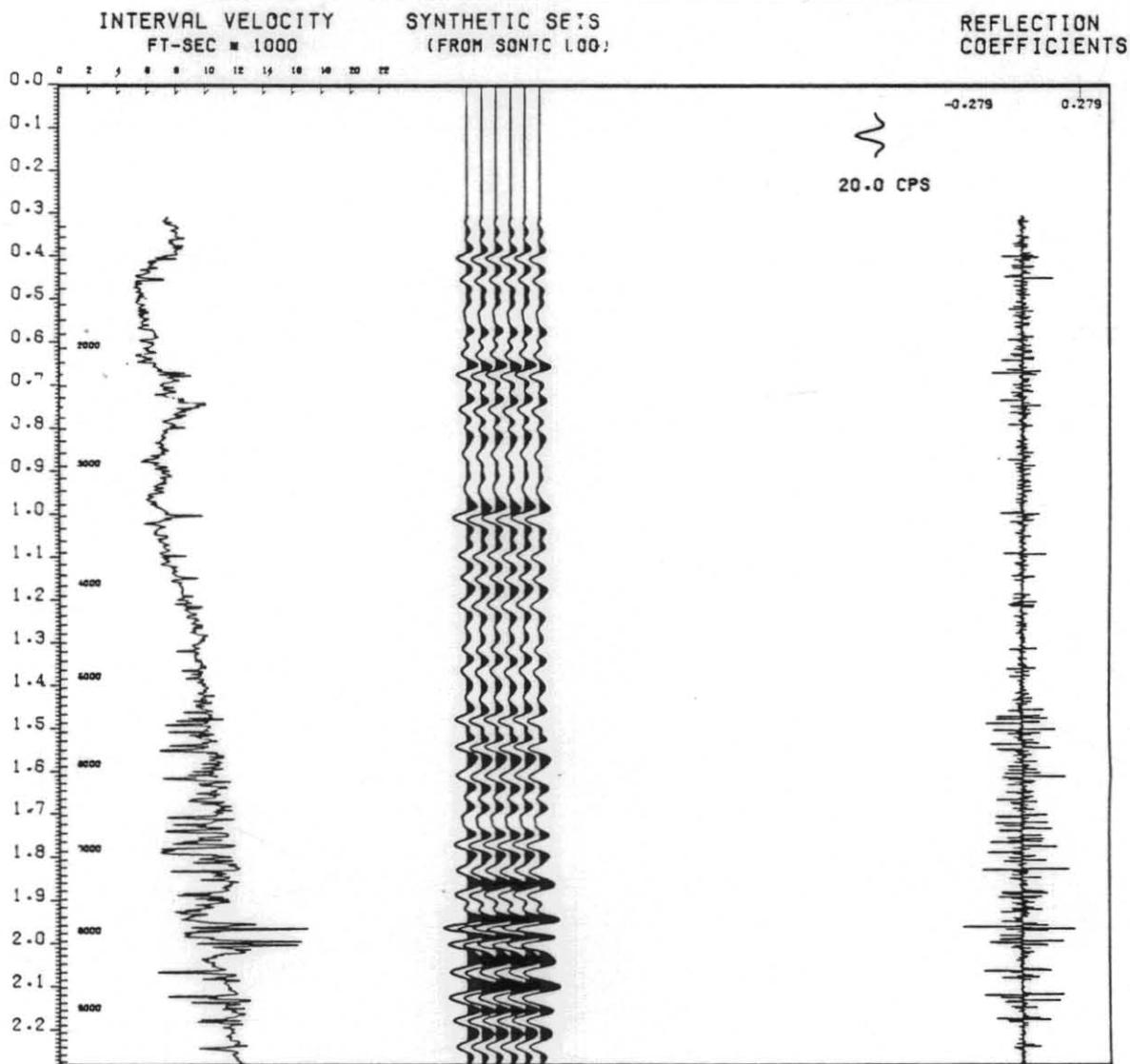


Figure 7

224045

GTS CORP. HOUSTON OFFICE 3724 DACONA 77018
ESSO EXP 4PROD AUSTRALIA INC CORMORANT 1 AUSTRALIA TASMANIA
LOG DATUM = 100 SEISMIC DATUM = 0 COMMENTS _____

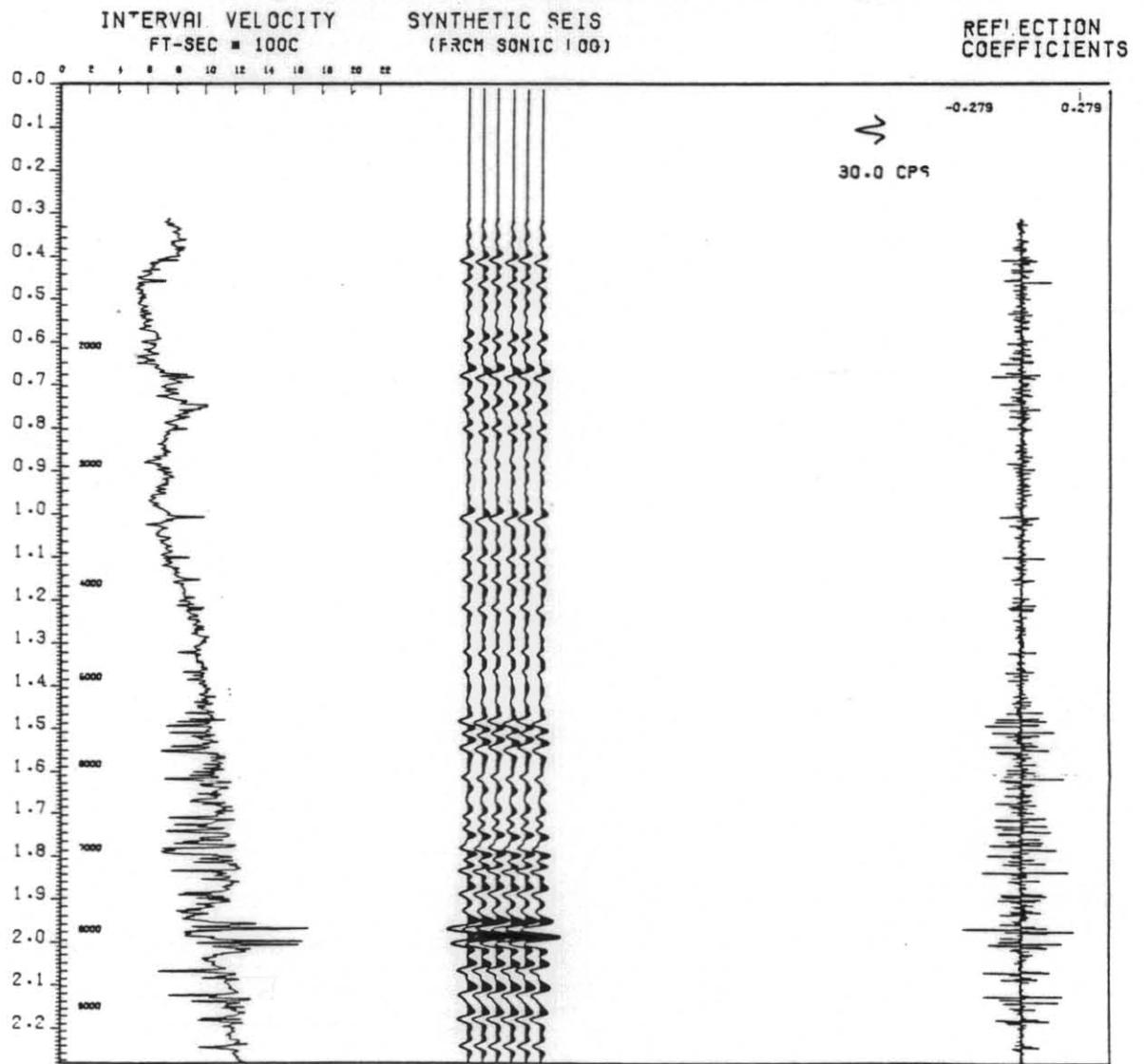


Figure 8

224046

GTS CORP • HOUSTON OFFICE 3.24 0600H 17018
ESSO EXP 4PROD AUSTRALIA INC CORPORANT 1 AUSTRALIA TASHANIA
LOG DATUM = 100 SEISMIC DATUM = 0 COMMENTS _____

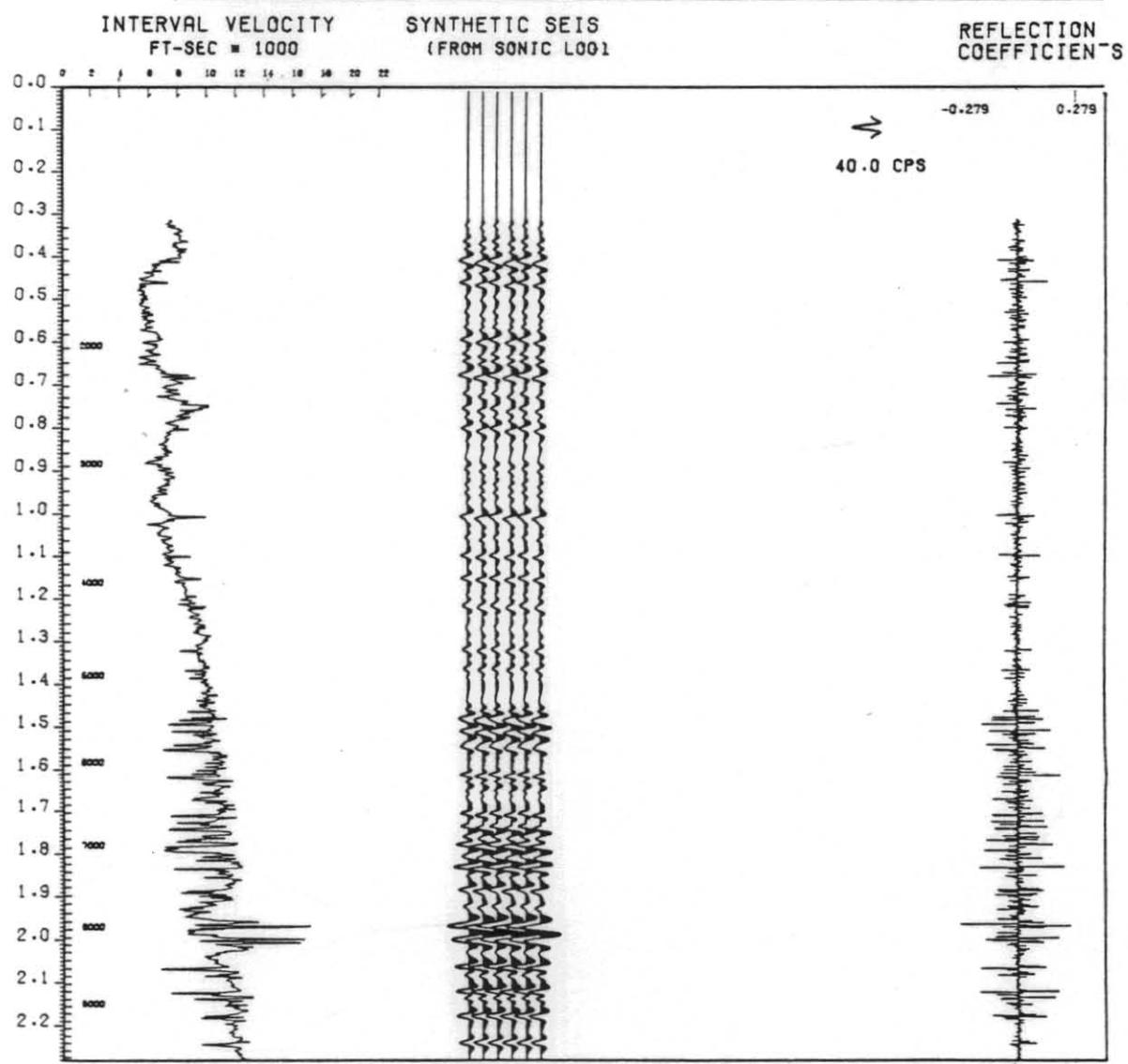


Figure 9

224047

GRAVITY/MAGNETIC DATA PROCESSING

IN

OFFSHORE TASMANIA
CROCODILE ROCK
AREA

FOR

PERTSHIRE PETROLEUM, LTD.

BY

AERO SERVICE DIVISION
WESTERN GEOPHYSICAL COMPANY
OF AMERICA

AUGUST, 1981

THE GRAVITY MAGNETIC SURVEY

The gravity/magnetic field survey was performed between April 5, 1981 and April 8, 1981, in conjunction with a seismic survey by party 86 on the M.V. Western Odyssey. The gravity meter used was LaCoste and Romberg S-88, which has a constant of 0.09961 milligals per counter division. All data was simultaneously recorded on analog strip charts and magnetic tape.

The in port reading for meter S-88 was made at Portland, Australia and a base value of 980025.53 was used.

The sea bottom density used on this survey was 2.2 grams per cubic centimeter.

Latitude correction was applied as computed by the gravity formula for the geodetic reference system, 1967 (GFGRS, 1967).

Navigation was by Western Navigation using (phase 4) navigation system.

PROCESSING OF GRAVITY/MAGNETIC DATA

Aero Service uses a versatile suite of computer programs in processing, profiling, and contouring of gravity and magnetic data. These programs use the same "GMI Intermediate Tape Format" for interactive utility, and are organized logically to form a truly interrelated gravity/magnetic data base system.

Reformat of Navigation Edit Tape

The navigation reformat program is run to change the tape format of the navigation edit tape to the gravity/magnetic intermediate (GMI) format.

Gravity/Magnetic Edit

The program is designed to edit gravity/magnetic field data recorded at irregular time intervals on GMI tape. Primary edit capabilities include assigning line numbers, changing GMI word position,

step back adjustment for time lags in recording, subsampling or averaging data to one minute time interval, converting of water depth units, and flagging of discontinuities in the data.

Evaluation of Field Data

At this point the digitally recorded data is checked with the strip chart data and any difference resolved.

Navigation Reformat

In this program the final navigation tapes are reformatted to the GMI format.

Navigation Merge

Final navigation data, shot points, and line names are merged with the gravity and magnetics. At the same time gravity counter units are reduced to milligals using the gravity meter constant. Latitude corrections are also made at this time and any discontinuities in navigation are flagged.

"Eotvos" Effect Removal

The GMI tape is read using latitude, longitude, and time in order to compute raw "Eotvos" correction. The "Eotvos" corrections are filtered by a running average of the sample under consideration and one sample on each side. Then a parabolic recursive filter with a frequency of 0.000700 hz is applied. At this point the Eotvos correction, $7.503 \text{ V} \cos(\text{Latitude}) \times \sin(\text{Course}) + .004154 \text{ V}^2$, is added to each free air gravity sample on the output tape.

Magnetics Reduction

This program computes and subtracts the Earth's main magnetic field (IGRF) from the observed data. Computation variables include the prospect's location and Julian date of the prospect's survey. Upon completion, the data is then output onto a GMI tape.

Gravity and Magnetics Filter

Data in the form of an evenly spaced time series is smoothed using a recursive parabolic algorithm, this algorithm is used in parallel and cascade in such a way to yield a zero phase, very flat response, low pass filter. The cut-off value used for the free air gravity data was 0.0007 Hz. and the cut-off value used for the magnetic data was .0007 Hz.

Bouguer and Terrain Correction

The water depths on tape were used to compute Bouguer and terrain correction, which were applied to the free air gravity. The terrain corrections were two-dimensional and were computed by the Talwani and Ewing method.

Intersection Calculator

Using the latitude and longitude of one minute samples on the GMI tape, the line segments are scanned to determine the location of line intersections.

Systematic Error Adjustment

Intersection mistie information is taken from the output tape of the intersection calculator program and a systematic error adjustment is computed for each line segment, such that the remaining misties are reduced substantially. These adjustments are then added to the selected GMI fields. The average mistie for the free air gravity before adjustment was 1.18 milligals. The average mistie after adjustment was 0.244. The average mistie before adjustment for the total magnetic field was 9.67 gammas; the average mistie after was 3.28 gammas.

Gravity/Magnetic Profile

The profile program is a general purpose program that produces a profile plot on a Cal-Comp drum plotter with up to eight fields displayed simultaneously with a variety of scale options. There were two sets of profiles made at this time. Gravity profiles displayed water depths, "Eotvos" correction, free air, and Bouguer gravity.

Map Maker

A GMI tape is input to the map maker program and produces a value posted shot point map on any scale, using almost any type of prescribed projection or spheroid.

Final Adjustment and Contouring of Maps

The remaining misties, called random error, are then resolved by a technician comparing parallel and perpendicular profiles and distributing the misties in such a way that no legitimate anomaly is destroyed nor created; then from the corrected profiles the maps are manually contoured.

FINAL PROFILES AND CONTOUR MAPSGravity and Magnetic Contour Maps

The maps are plotted on mylar at a scale of 1:100,000. The spheroid used was Australian National with the projection being Universal Transverse Mercator. The central meridian is 147 E. The maps are bounded on the South by latitude $39^{\circ} 35'S$ on the North by latitude $39^{\circ} 10'S$ and extends eastward from longitude $144^{\circ} 15'E$ to longitude $145^{\circ} 15'E$.

The contour interval for the Bouguer gravity maps is 1 milligal and for the total magnetic intensity map is 10 gammas.

Final Profiles

Final profiles are 10 inches wide plotted on graded paper at a horizontal scale of 2540 meters per inch corresponding to contour maps. In addition, another set of profiles were produced on 10 grided paper at a horizontal scale of 400 meters per inch matching the seismic sections. The fields and vertical scales of both sets of profiles are as follows:

A. Gravity

- (a) Free air gravity, adjusted @ 5 milligals per inch
- (b) Bouguer gravity @ 5 milligals per inch
- (c) Eotvos correction @ 5 milligals per inch
- (d) Water depths @ 100 meters per inch

B. Magnetics

- (a) Raw magnetics @ 20 gammas per inch
- (b) Total magnetic intensity @ 20 gammas per inch.

GRAVITY-MAGNETICS GMI INTERMEDIATE RECORD FORMAT

WORD	FORMAT	DESCRIPTION
1	I*4	Line Number
2	I*4	Julian Date
3	I*4	Greenwich Mean Time (HR:MM:SS)
4	I*4	Accumulated Time (seconds)
5	R*4	Shotpoint Number
6	A*4	Re-Shot Characters or 'INT '
7	R*4	Accumulated Distance (meters)
8	R*4	Water Depth (meters) or elevation
9	R*4	Latitude (degrees)
10	R*4	Longitude (degrees)
11	R*4	Northing - Y (meters)
12	R*4	Easting - X (meters)
13	A*4	Line Name (1st 4 characters)
14	A*4	Line Name (2nd 4 characters)
15	A*4	Area Name (4 characters)
16	R*4	Magnetics, Field Master
17	R*4	Magnetics, Field Slave
18	R*4	Magnetics, Gradient
19	R*4	Magnetics, Accumulated Gradient Field
20	R*4	
21	R*4	
22	R*4	
23	I*4	
24	R*4	Instrument-Corrected Gravity (Mgals)
25	I*4	Gravity Counter Units
26	R*4	Gravity Corrected for Monitors (Mgals)
27	R*4	"Eotvos" Correction (Mgals)
28	R*4	Slab Bouguer Gravity (Unfiltered) (Mgals)
29	R*4	Free Air Gravity before Eotvos (Mgals)
30	R*4	System Adj. Bouguer (Mgals)
31	R*4	Final Random Adj. Bouguer (Mgals)
32	R*4	Free Air Gravity (Mgals)
33	R*4	2-D Terrain Correction (Mgals)
34	R*4	Tide Correction (Mgals)
35	I*4	Magnetics, Field Master (gammas)
36	R*4	Magnetics, Diurnal & Regional Removed (gammas)
37	R*4	Magnetics, Regional Correction (gammas)
38	R*4	Magnetics, Diurnal Correction (gammas)
39	R*4	Magnetics, Filtered (gammas)
40	R*4	Magnetics, Systematic Adjusted (gammas)
41	R*4	Magnetics, Random Adjusted (gammas)
42	R*4	Tide (meters)
43	I*4	
44	I*4	
45	R*4	Slab Bouguer Correction (Mgals)
46	R*4	2-D Bouguer Gravity (Filtered)
47	R*4	
48	R*4	
49	R*4	Adjusted Water Depths (Meters)
50	R*4	Filtered Free Air Gravity (Mgals)
51	R*4	3-D Bouguer Correction (Mgals)
52	R*4	3-D Bouguer Gravity (Unfiltered)
53	R*4	Sysfixed Free Air Gravity (Mgals)
54	R*4	3-D Bouguer Gravity (Filtered)
55	R*4	Free Air Gravity, Random Adjusted (Mgals)
56	R*4	Magnetics, Hilbert Transform
57	R*4	Magnetics, Horizontal Derivative (Gammas)
58	R*4	Magnetics, Vertical Derivative (Gammas)
59	R*4	Magnetics, Reduced to Pole (Gammas)
60	I*4	Sequence Number

BASIC DATA ACQUIRED

224054

Velocity Analysis VELAN^R

Line PB-81-9M Sp 100-2849
Line PB-81-10M Sp 100-523
Line PB-81-10M Sp 460-1100
Line PB-81-10M Sp 1051-2469
Line PB-81-11M Sp 100-1645
Line PB-81-12M Sp 100-1271
Line PB-81-13M Sp 100-1494
Line PB-81-15M Sp 100-1695

Time Variant Filtering

Line PB-81-09M Sp 100-2849
Line PB-81-10M Sp 100-523, 460-1100- 1051-2469
Line PB-81-11M Sp 100-1645
Line PB-81-12M Sp 100-1271
Line PB-81-13M Sp 100-1494
Line PB-81-15M Sp 100-1695

MIG,TVF

Line PB-81-09M Sp 100-2849
Line PB-81-10M Sp 100-523, 460-1100, 1051-2469
Line PB-81-11M Sp 100-1645
Line PB-81-12M Sp 100-1271
Line PB-81-13M Sp 100-1494
Line PB-81-15M Sp 100-1695

224055

SEISMIC LINES WITH:

Magnetics Intensity (GAMMAS) &
Bouguer Gravity (MGALS) Profiles
Line PB-81-9M Sp 95-2848
Line PB-81-10M Sp 99-2465
Line PB-81-11M Sp 99-1639
Line PB-81-12M Sp 94-1265
Line PB-81-13M Sp 119-1508
Line PB-81-15M Sp 98-1689

BOUGUER GRAVITY PROFILES SHOWING:

Bouguer Gravity (MGALS)
Adj. Free Air Gravity (MGALS)
Filtered Eotvos Gravity (MGALS)
Water Depth (Meters)
Line PB-81-9M Sp 95-2848
Line PB-81-10M Sp 99-2465
Line PB-81-11M Sp 99-1639
Line PB-81-12M Sp 94-1265
Line PB-81-13M Sp 119-1508
Line PB-81-15M Sp 98-1689

MAGNETICS PROFILE SHOWING:

Total Magnetics Intensity (GAMMAS)
Raw Magnetics (GAMMAS)
Line PB-81-9M Sp 95-2848
Line PB-81-10M Sp 99-2465

224056

Line PB-81-11M Sp 99-1639

Line PB-81-12M Sp 94-1265

Line PB-81-13M Sp 119-1508

Line PB-81-15M Sp 98-1689

BOUGUER GRAVITY MAP - C.l. = 1MGAL - Density = 2.2

DEPTH TO MAGNETIC BASEMENT MAP

SHOT POINT LOCATION WITH WATER DEPTH IN FEET MAP

SHOT POINT LOCATION MAP

TOTAL MAGNETICS ANOMALY MAP - C.l. = 10 GAMMAS

224057

DEPTH TO MAGNETIC BASEMENT

IN THE

CROCODILE ROCK SURVEY AREA

TASMANIA, AUSTRALIA

FOR

PERTSHIRE PETROLEUM, LTD.

Aero Service Division
Western Geophysical
Company of America
Houston, Texas

October, 1981

Summary

The interpretation area Crocodile Rock is located within the Bass Strait of Southern Australia between the Otway Basin to the west and the Gippsland Basin to the east. The Crocodile Rock study occupies the area between $144^{\circ} 15'$ to $145^{\circ} 15'$ east longitude and $39^{\circ} 10'$ to $39^{\circ} 35'$ south latitude. While up to four and one half kilometers of sediment have been described in the neighborin basins, the Crocodile Rock area lie over an uplifted basement complex tying Tasmania to Australia, the margin of which may be roughly defined at the depositional boundary of the Eocene.

The magnetic interpretation of the Crocodile Rock area depicts what appears to be an eastward sloping basement surface ranging in depth below sea level from approximately 600 meters in the west to 2300 meters in the eastern part of the area. Four rather broad, possibly related igneous bodies are interpreted to cross the area along a northeasterly trend. Ranging in width from approximately 2 km to 9 km, the igneous rocks are interpreted to be intrusive in nature and are delineated by consistent calculated depth solutions along the major magnetic highs that cross the area. Two or more of the bodies may also be in fault contact with the surrounding lesser magnetic rock. Two small possible faults are noted with the sense of throw normal and eastwardly downthrown in both cases.

224059

OCTOPUS
MARINE SEISMIC SURVEY

1982

TASMANIA

PERMIT T-19/P

for

PERTSHIRE PETROLEUM, LTD.
16TH FLOOR, 109 ST. GEORGE'S TERRACE
PERTH, (W.A.) AUSTRALIA 6000

by

WESTERN GEOPHYSICAL COMPANY OF AMERICA
10001 RICHMOND AVENUE
HOUSTON, TEXAS

PARTY 86 M/V WESTERN ODYSSEY

Submitted by
Perthshire Petroleum, Ltd.
Wales Centre, 16th Floor
109 St. George's Terrace
Perth, (W.A.) Australia 6000

GENERAL INFORMATION

Introduction

The 1982 Octopus Seismic Survey was conducted on Exploration Permit T-19/P which was awarded on March 27, 1981 to Perthshire Petroleum, Ltd., Perth, Western Australia.

The M/V Western ODYSSEY, a fully equipped seismic vessel operated by Western Geophysical Company of America, was used to conduct the survey. Some 521.875 kilometers (324.347 miles) of new seismic, gravity and magnetic data were recorded.

The navigation system consisted of Western Geophysical's Integrated Navigation System which comprises four main subsystems; a doppler-sonar system to determine the ship's velocity continuously; a satellite system to provide the ship's position at intervals averaging two to four hours, a digital computer and a recording system to record computer data. Calculations, for all subsystems and data integration were handled by the on-board general purpose digital computer. The ship's position was continuously calculated by integrating the sonar velocity and updating with satellite fixes. The navigation data was shipped to Western Geophysical's Navigation Department in Singapore for processing.

Seismic recordings were made with a DFS "V" seismic acquisition system - manufactured by Texas Instruments - consisting of two analog modules, a controller module and four tape transports.

The digital recorded magnetic tapes were shipped to GeoCenter, Inc. in Houston, Texas for processing.

The energy source consisted of twenty high pressure Western airguns. In normal operating circumstances, ten of the airguns were combined to form a 760 cubic inches tuned array. The airguns are operated at a pressure of 4,500 pounds per square inch.

The streamer cable used by the Western ODYSSEY was composed of 48 detachable and interchangeable LRS Marine Active Cable sections. Each section is 50 meters in length and contains two 25 meter groups of twenty WM2-036 geophones.

224061

Gravity data was acquired with a La Coste Romberg meter while magnetic data was acquired with a Geometrics G801/3 meter.

Interpretations of the seismic data were made at Perthshire Petroleum, Ltd. offices in Houston, Texas.

Field tapes and processing tapes are presently at GeoCenter, Inc.'s processing center in Houston, Texas and will later be stored at Geodata Services, Inc. in Houston, Texas.

GEOPHYSICAL SUMMARY

Design and location of the Octopus Seismic Survey was based on the interpretation of seismic lines as well as magnetic and gravity data previously acquired by the State, the Commonwealth, as well as by the permit holders of the area. These surveys are:

Bass Strait and Encounter Bay aeromagnetic survey for Hematite Exploration by Aero Services Limited 1960-1961

Anderson's Inlet aeromagnetic survey for Oil Development by Aero Services Limited 1961

Flinders Island - Kingston seismic survey for Hematite Exploration by Western Geophysical 1962-1963

Bass Basin seismic for Esso Australia by Western Geophysical 1965

King Island East seismic survey for Esso Australia by Geophysical Services International 1965

Tasmania aeromagnetic survey for the Bureau of Mineral Resources by Aero Services Limited 1966

Eastern Bass Strait seismic survey for Esso Australia by Geophysical Services International 1966

Bass ED-67 seismic survey for Esso Australia by Geophysical Services International 1967

Bass EF-68 seismic survey for Esso Australia by Western Geophysical 1968

Bass B69A seismic and magnetic survey for Esso Australia by Western Geophysical 1968-1969

Bass B69B seismic and magnetic survey for Esso Australia by Western Geophysical 1969

Bass B70A seismic and magnetic survey for Esso Australia by Geophysical Services International 1970-1971

224063

Bass B71A seismic and magnetic survey for Esso Australia
by Geophysical Services International 1971-1972

Continental Margins Geophysical - seismic, magnetic and
gravity survey - for the Bureau of Mineral Resources
by GG 1971-1972

Bass B72A seismic survey for Esso Australia by Geophysical
Services International 1972

Bass HB75A seismic survey for Hematite Petroleum by Geo-
physical Services International 1975

Crocodile Rock Seismic Survey for Perthshire Petroleum,
Ltd. by Western Geophysical Company 1981

DESCRIPTION OF SURVEY AREA

The prospect was designated as permit area T-19/P by the Tasmanian Department of Mines. The approximate geodetic centre of the prospect for T-19/P was 39° 45' South latitude by 145° East longitude. Figure 10, 11.

There were no major shipping lanes passing through the prospect. Fishing activity in the area was sparse at the time of the survey as not to have an adverse effect on the operation. There were no oil rigs in the area and water depth exceeded twenty meters for the duration of the survey.

INTRODUCTION

Between February 22 and February 25, 1982, Western Geophysical Company shot marine seismic lines offshore Australia, Bass Basin for Perthshire Petroleum, Ltd. This survey was recorded by Party 86 aboard the "Western Odyssey" and covered 521.875 kms. The digital processing for this survey was performed at GeoCenter, Inc. in Houston, Texas from February 1982 to April 1982.

The navigation system was by navigation satellite. Antenna positions were located by 16/WINS PHASE IV equipment. Mapping was performed by Western Geophysical Company in Singapore at a scale of 1 to 100,000.

The seismic recording was done on a DFS V system. The DFS V recorded 124 channels in SEG-B format at a 4 ms. sampling interval for 6 seconds. The field filter settings were a low cut out and a high cut of 64 hz with a slope of 70 db/octave.

The cable used was a 96 group streamer which was pulled at an average depth of 14 meters. Each group consisted of 20 phones with a 25 meter spacing between group centers.

The energy source consisted of an array of 10 air guns. The array had a volume of 760 cubic inches with 4500 psi. A shot was made every 25 meters at a depth of 6 meters. (Air gun array diagram included.)

Test pops were taken at the start of each line, and noise file strips were made at the beginning and end of each line. Monitor records were produced every 29th shotpoint.

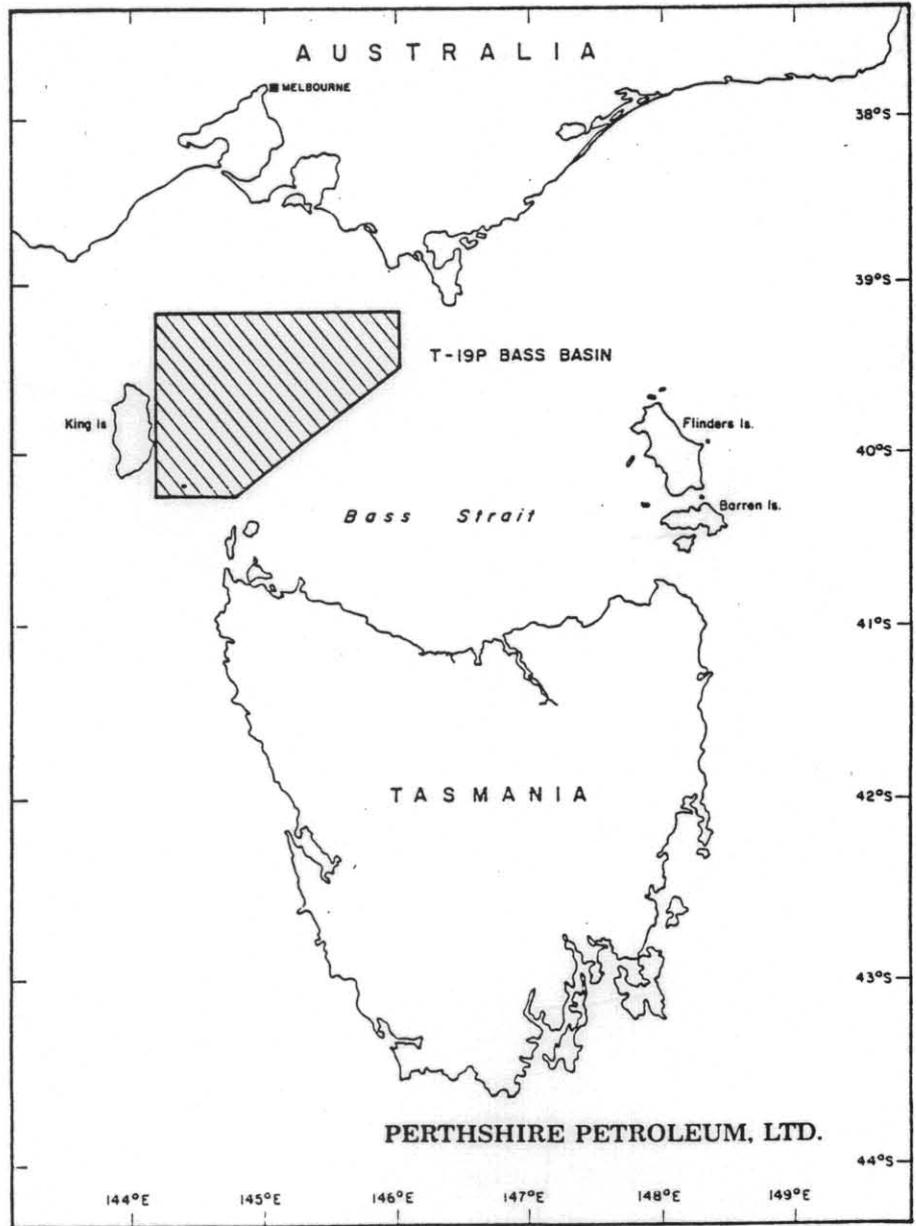
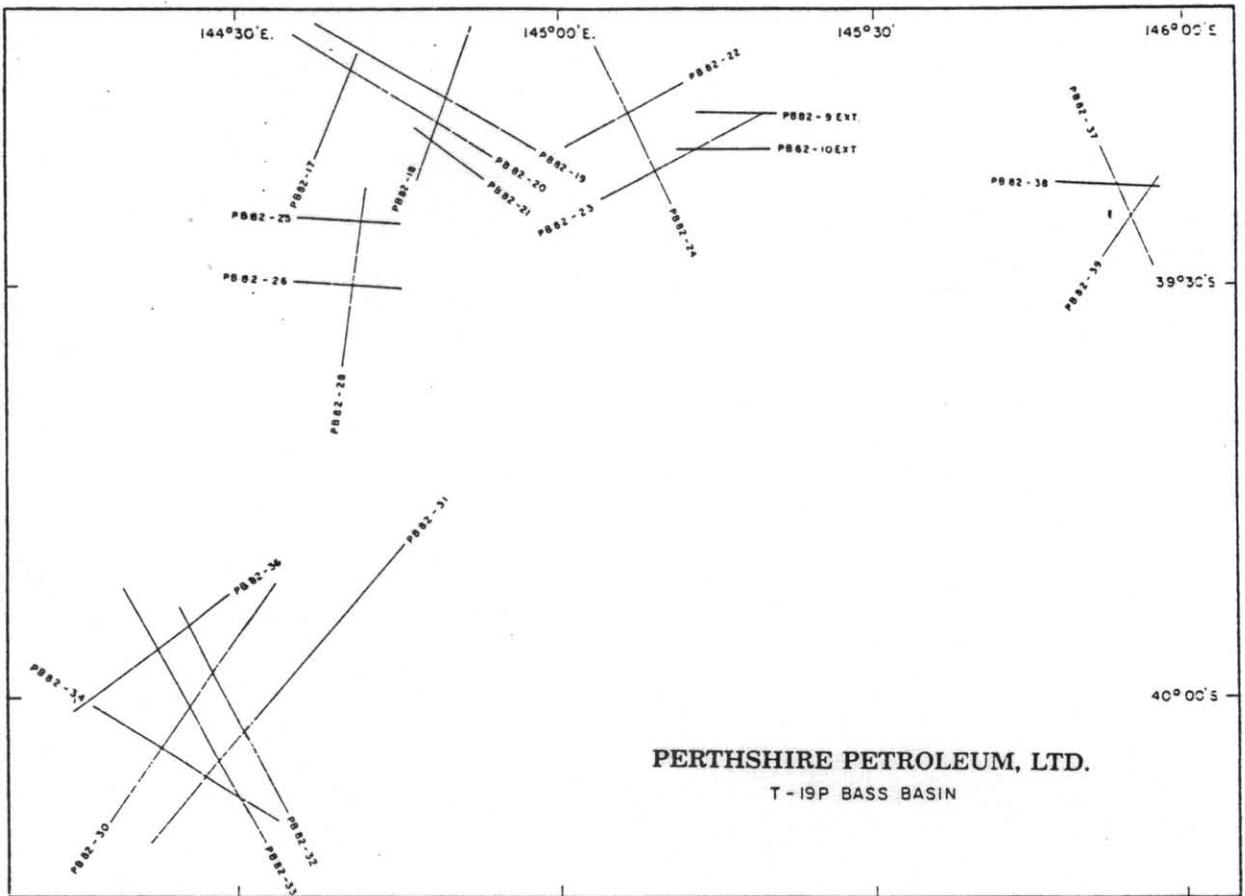


Figure 10

224066



PERTHSHIRE PETROLEUM, LTD.
T-19P BASS BASIN

5 cm

Figure 11

Contractors

The survey was conducted on behalf of Perthshire Petroleum, Ltd. who contracted Western Geophysical Company of America, a Delaware Corporation and a division of Litton Industries to conduct the above mentioned seismic survey.

Location of Headquarters

The main office of Perthshire Petroleum, Ltd. is located at 14141 Southwest Freeway, Sugarland, Texas 77478 - mailing address P.O. Box 4562, Houston, Texas 77210. The office in charge of Australian operations is located in Perth, Western Australia. It was to this office that all correspondence pertaining to the operation were directed.

The head office of Western Geophysical is located 10001 Richmond Avenue, Houston, Texas, U.S.A. The survey detailed in this text was conducted under the supervision of Western Geophysical's Singapore office located at Unit 301, Union Building, 37 Jalan Pemimpin, Singapore 2057, Republic of Singapore.

A temporary field office was established and maintained by Western Geophysical at Town Central Motel, 164-166 Nicholson Street, Bairnsdale, Victoria 3875, Australia in order to facilitate communications and logistics involved in the operation.

Communications

Daily production reports were issued to Perthshire Petroleum, Ltd. via telex from Western ODYSSEY and Western's field office in Bairnsdale. Production updates and vessel status were periodically issued to Western Geophysical's offices in both Singapore and Houston from the same field office.

Weather

The weather for the survey was fine with slight seas and force 2 winds.

Key Field Personnel

David Lowry:

Perthshire Petroleum, Ltd. Exploration Manager based at Perth office, responsible for liaison between Western Geophysical and Perthshire's principal office. Also onboard, client supervisor.

Western Geophysical Company:

Boyd Kolozs	Marine Operations Supervisor based in Singapore
Terry Leighton	Operations Manager
Peter Rock	Marine Operations Coordinator
Vinay Sharma	Instrument Technician
Mike Clark	Assistant Operations Coordinator
Dicky Chow	Observer
Mike Casey	Observer
Glen Batten	Airgun Mechanic
Mal Weatherspoon	Airgun Mechanic
Peter Durran	Mobile Navigator
Ken Furphy	Mobile Navigator

Disposition of Data

The recorded seismic data tapes, camera monitor records and fathometer charts were sent to GeoCenter Inc. in Houston, Texas.

The primary navigation data along with the gravity still readings results, magnetic data and gravity data were sent to Western Geophysical's Singapore office.

Data Processing

Data to be processed by:

Marine Seismic -	GeoCenter Inc. - Houston, Texas
Magnetic Data -	Aero Service - Houston, Texas
Gravity Data -	Aero Service - Houston, Texas
Primary Navigation Data -	Western Geophysical - Singapore

224069

EQUIPMENT AND INSTRUMENTATION

Survey Vessel

Name:	M/V Western Odyssey
Length:	185 feet
Beam:	40 feet
Draft:	10 feet
Tonnage; gross/net:	830/250
Engines:	2 x Caterpillar D-399 TA 1090 HP each
Propulsion:	2 x Kamewa 50 x F/4 Control Pitch Propellors
Generators:	2 x 550 kw - for air compressors 2 x 175 kw - for ship's power 2 x 30 kw - for instruments
Radar:	2 x Decca Model 926, 48 mile range
Gyro Compass:	Sperry Model 227 with auto pilot
Bow Thruster:	Kamewa SP 1300 with 350 HP Electric Motor
Stabilization:	Flume Type with Anti-Roll Blige Keel
Accommodation:	36 persons
Endurance:	35 days minimum
Official Number:	8775
Call Letters:	HO - 3498
Port of Registry:	Panama
Helideck	40 feet x 50 feet

Seismic Equipment and Instrumentation

Instruments	:	DFS V 120 Channel
Main Cable	:	2400 m Streamer, 96 groups 25 m group spacing - 96 ch. mode
Energy Source	:	Western Geophysical High Pressure 4500 psi Array Airgun
Compressors	:	6 x Price 5000 psi Compressors electrically driven
Primary Navigation	:	LRS WINS Phase IV Integrated Satellite Navigation System with Doppler Sonar
Communications	:	INMARSAT Satellite Terminal with telex and telephone facilities Sailor 800 Watt Programmable SSB Ship/Shore Radio Sailor VHF Radio
Gravity Meter	:	La Coste Romberg S 88
Magnetometer	:	Geometrics G801/3
Ancillary Equipment	:	Litton Resources System Geoscience Data Acquisition System (Data Logger) EPC Single Trace Plotter SIE ERC 10C Monitor Camera LRS-100 Energy Source Synchronizer LRS Airgun Solenoid Controller Kalamos M4 Cable Fault Locator Krupp-Altas Model 640 Fathometer - 2000 fathom range Simrad model EX38D Fathometer - 600 fathom range

RECORDING PARAMETERSInstrument Settings and Specifications

Model	:	DFS V
System No.	:	408
Pre-Amp Gain	:	36 dB
Total Gain	:	120 dB
Lo Cut Filter	:	OUT 3 Hz, Slope 18 dB/OCT
Hi Cut Filter	:	128 Hz, Slope 70 dB/OCT
Sample Rate	:	2 ms
Record Length	:	5 secs
Tape Format	:	SEG GAP B
BPI Density	:	1600
Number of Channels	:	124
Seismic Channels	:	96
Auxiliary Channels	:	Timebreak - Aux 1 Waterbreak - Aux 2 100 Hz - Aux 4
Analog Module Specs		
Frequency Response	:	3 to 256 Hz
Maximum Gain	:	132 dB
Minimum Gain	:	24 dB

Input Impedence

Difference Mode : 20,000 ohm resistive in parallel with 0.035 microfarads

Max. Input Signal

Difference Mode

	<u>Gain Constant</u>	<u>Voltage(mV RMS)</u>
:	24	327.68
	36	81.92
	48	20.48

Distortion

: 0.05% 3 to 256 Hz

Crossfeed Isolation

: 80 dB between any 2 channels, feeding 1 channel only

Control Module Specs

Timing Accuracy

: -0.005%

Data Word Rate

: 64 kHz maximum

Cable Parameters

1. Streamer:

Percent Coverage	:	4800%
Shot Point Interval	:	25 meters
Pops per km	:	40
Number of Groups	:	96
Center Enery Source to Center Near Group	:	194.45 meters
Center Near Group to Center Far Group	:	2,375 meters
Group Center to Group Center	:	25 meters
Number of Phones Per Group	:	20
Depth Detectors at Head of Groups	:	Tail stretch, 14, 28, 42, 56, 70, 84, 96
Depth Controllers on Groups	:	Tail stretch, 12, 26, 40, 54, 68, 82, head stretch
Water Break Detectors at Head of Groups	:	94
Center Near Group to Sat-Nav Antenna	:	271.4 meters

2. Magnetometer:

Sensitivity : 1 gamma
Chart Scale : 0 - 99 gammas

Recorder marked every 50 shotpoints with total magnetic value and time.

Magnetometer Reel to Sensor : 193 meters

3. Gravity Meter:

The only selectable control on the gravity meter which was used is the 2/3 minutes averaging control. During production recording, all readings were 3 minutes averaged while the still readings in port were 2 minutes averaged.

The chart pen assignments by colour are:

Green	:	Gravity
Black	:	Total Correction
Red	:	Cross Coupling
Orange	:	Spring Tension

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Energy Source Configuration

Array Volume : 760 cubic inches

Number of Guns : 10

Array Pressure : 4500 psi

Shot Depth : 6 meters

Shot Interval : 25 meters

224056

STATISTICAL SUMMARY

<u>DATE</u>	<u>LINE</u>	<u>SP - SP</u>	<u>PROFILES</u>	<u>KMS</u>
February 22	PB82-30	061 - 1660	1600	40.000
	PB82-31	061 - 2133	2073	51.825
	PB82-36	061 - 1102	1042	26.050
	PB82-34	061 - 1237	1177	29.425
February 23	PB82-33	061 - 1615	1555	38.875
	PB82-32	061 - 1323	1263	31.575
	PB82-28	061 - 1016	956	23.900
	PB82-25	061 - 617	557	13.925
	PB82-26	061 - 645	585	14.625
February 24	PB82-18	061 - 878	818	20.450
	PB82-17	061 - 688	628	15.700
	PB82-21	001 - 485	485	12.125
	PB82-20	001 - 1254	1254	31.350
	PB82-19	001 - 1385	1385	34.625
	PB82-22	001 - 755	755	18.875
	PB82-24	001 - 520	520	13.000
February 25	PB82-24	521 - 988	468	11.700
	PB82-23	001 - 1037	1037	25.925
	PB82-10 EXT	001 - 504	504	12.600
	PB82-9 EXT	001 - 422	422	10.550
	PB82-38	001 - 546	546	13.650
	PB82-39	001 - 523	523	13.075
	PB82-37	001 - 722	722	18.050

TOTAL KILOMETERS: 521.875

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OPERATIONS CHRONOLOGY

<u>Date</u>	<u>Time</u>	<u>Events and Remarks</u>
February 20	1300	Heading for WEAVER prospect.
	2400	Enroute to WEAVER prospect.
February 21	0001	Enroute to WEAVER prospect.
	1500	Start laying cable.
	2400	Working on cable.
February 22	0001	Working on cable.
	0115	Cable out, running for line PB82-30.
	0332	Start of line PB82-30.
	0733	End of line.
	0900	Start of line PB82-31.
	1421	End of line.
	1655	Start of line PB82-36.
	1932	End of line.
	2021	Start of line PB82-34.
	2259	End of line.
	2400	On line change.
		Production for the day: 147.300 kms.
February 23	0001	On line change.
	0020	Start of line BP82-33.
	0356	End of line.
	0505	Start of line PB82-32.
	0807	End of line.
	1404	Start of line PB82-28.
	1620	End of line.
	1904	Start of line PB82-25.
	2029	End of line.
	2239	Start of line PB82-26.
	2400	Last shotpoint of day recorded, end of line.
	Production for the day: 122.900 kms.	

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<u>Date</u>	<u>Time</u>	<u>Events and Remarks</u>
February 24	0001	On line change.
	0126	Start of line PB82-18.
	0323	End of line.
	0520	Start of line PB82-17.
	0646	End of line.
	0839	Start of line PB82-21.
	0947	End of line.
	1100	Start of line PB82-20.
	1348	End of line.
	1509	Start of line PB82-19.
	1820	End of line.
	1856	Start of line PB82-22.
	2040	End of line.
	2249	Start of line PB82-24.
	2400	Last shotpoint of day recorded. Production for the day: 146.125 kms.
February 25	0001	First shotpoint of day recorded.
	0105	End of line PB82-24.
	0309	Start of line PB82-23.
	0534	End of line.
	0648	Start of line PB82-10 EXT.
	0759	End of line.
	0916	Start of line PB82-9 EXT.
	1012	End of line.
	1402	Start of line PB82-38.
	1517	End of line.
	1633	Start of line PB82-39.
	1746	End of line.
	2017	Start of line PB82-37.
	2154	End of line.
	2400	Heading for T-15P prospect. Production for the day: 105.550 kms.

LINE SUMMARY

<u>Date</u>	<u>Line No.</u>	<u>Description</u>
February 22	PB82-30	Direction 216 ⁰ . Start of line SP 061. Reel number 034932 to 034957. Guns 1, 3, 4, 5, 6, 7, 8, 10, 14 and 15 on, capacity 760 cubic inches. 5 second records. At SP 419 gun 13 off, gun 17 on, capacity 760 cubic inches. At SP 500 gun 17 off, gun 18 on, capacity 740 cubic inches. At SP 519 gun 20 on, capacity 760 cubic inches. Parity errors on SPs 300, 360, 577, 578 and 1493. Completed line at SP 1660.
February 22	PB82-31	Direction 041 ⁰ . Start of line SP 061. Reel number 034958 to 034990. Guns 1, 2, 4, 5, 6, 7, 8, 9 and 10 on, capacity 760 cubic inches. 5 second records. Completed line at SP 2133.
February 22	PB82-36	Direction 233 ⁰ . Start of line SP 061. Reel number 034991 to 060007. Guns 9, 10, 11, 12, 13, 14, 16, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Parity errors on SPs 489 and 610. Change in tape header series from 034999 to 060000. Completed line at SP 1102.
February 22	PB82-34	Direction 123 ⁰ . Start of line SP 061. Reel number 060008 to 060026. Guns 1, 3, 4, 5, 6, 7, 8, 9, 10 and 14 on, capacity 760 cubic inches. 5 second records. Missed SPs 435 and 436 on tape deck changes. At SP 229 gun 14 off, gun 19 on, capacity 770 cubic inches. Parity errors on SPs 563 and 711. Completed line at SP 1237.

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<u>Date</u>	<u>Line No.</u>	<u>Description</u>
February 23	PB82-33	Direction 332 ⁰ . Start of line SP 061. Reel number 060027 to 060051. Guns 9, 10, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Lost SP 988 due to navigation jump - Sat-Nav update. Parity errors on SP 552. Completed line at SP 1615.
February 23	PB82-32	Direction 152 ⁰ . Start of line SP 061. Reel number 060052 to 060073. Guns 1, 2, 4, 5, 6, 7, 8, 9 and 10 on, capacity 760 cubic inches. 5 second records. Missed SPs 1130 to 1142 on tape deck changes. Lost SPs 1130 to 1142 due to tape malfunction. Parity errors on SP 509. Completed line at SP 1323.
February 23	PB82-28	Direction 006 ⁰ . Start of line SP 061. Reel number 060074 to 060089. Guns 1, 3, 4, 5, 6, 7, 8, 10, 14 and 15 on, capacity 760 cubic inches. 5 second records. Parity errors on SP 560. Completed line at SP 1016.
February 23	PB82-25	Direction 274 ⁰ . Start of line SP 061. Reel number 060090 to 060098. Guns 9, 10, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Tailbuoy not detectable from start of line to end of line due to rough seas. Completed line at SP 617.
February 23	PB82-26	Direction 095 ⁰ . Start of line SP 061. Reel number 060099 to 060108. Guns 1, 3, 4, 5, 6, 7, 8, 10, 14 and 15 on, capacity 760 cubic inches. 5 second records. Completed line at SP 645.

224081

<u>Date</u>	<u>Line No.</u>	<u>Description</u>
February 24	PB82-18	Direction 022 ^o . Start of line SP 061. Reel number 060109 to 060122. Guns 5, 9, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Missed SP 547 on tape deck changes. Parity errors on SPs 295, 534, 538, 539, 540, 543 and 629. Completed line at SP 878.
February 24	PB82-17	Direction 202 ^o . Start of line SP 061. Reel number 060123 to 060134. Guns 1, 3, 4, 5, 6, 7, 8, 10, 14 and 15 on, capacity 760 cubic inches. 5 second records. Completed line at SP 688.
February 24	PB82-21	Direction 127 ^o . Start of line SP 061. Reel number 060135 to 060142. Guns 5, 9, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. At SP 45 gun 5 off, gun 10 on, capacity 760 cubic inches. At SP 92 gun 10 off, capacity 740 cubic inches. Completed line at SP 485.
February 24	PB82-20	Direction 301 ^o . Start of line SP 001. Reel number 060143 to 060163. Guns 1, 2, 3, 4, 11, 13, 15, 18 and 20 on, capacity 760 cubic inches. 5 second records. Completed line at SP 1254.
February 24	PB82-19	Direction 120 ^o . Start of line SP 001. Reel number 060164 to 060185. Guns 1, 2, 3, 4, 11, 13, 15, 18 and 20 on, capacity 760 cubic inches. 5 second records. Parity errors on SP 61. Completed line at SP 1385.

224082

<u>Date</u>	<u>Line No.</u>	<u>Description</u>
February 24	PB82-22	Direction 061 ⁰ . Start of line SP 001. Reel number 060186 to 060198. Guns 1, 3, 4, 5, 6, 7, 8, 10, 14 and 15 on, capacity 760 cubic inches. 5 second records. Noise on cable caused by passing ship between SP 600 to SP 660. Completed line at SP 755.
February 24	PB82-24	Direction 155 ⁰ . Start of line SP 001. Reel number begin from 060199. Guns 9, 10, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Parity errors on SP 115. Completed line at SP 988.
February 25	PB82-23	Direction 062 ⁰ . Start of line SP 001. Reel number 060215 to 060232. Guns 1, 3, 4, 6, 7, 8, 14, 15, 20 and 10 on, capacity 760 cubic inches. 5 second records. Lost SPs 676 to 679 and 688 to 691 due to tape deck malfunction. Parity errors on SP 320. Completed line at SP 1037.
February 25	PB82-10 EXT	Direction 270 ⁰ . Start of line SP 001. Guns 9, 10, 11, 12, 14, 16, 17, 18; 19 and 20 on, capacity 760 cubic inches. 5 second records. Completed line at SP 504.
February 25	PB82-9 EXT	Direction 270 ⁰ . Start of line SP 001. Reel number being from 060242. Guns 9, 10, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Completed line at SP 422.

224083

<u>Date</u>	<u>Line No.</u>	<u>Description</u>
February 25	PB82-38	Direction 092 ⁰ . Start of line SP 001. Reel number 060249 to 060257. Guns 1, 3, 4, 5, 6, 7, 8, 10, 14 and 15 on, capacity 760 cubic inches. 5 second records. Completed line at SP 546.
February 25	PB82-39	Direction 215 ⁰ . Start of line SP 001. Reel number 060258 to 060266. Guns 9, 10, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Parity errors on SPs 283, 284 and 285. Completed line at SP 523.
February 25	PB82-37	Direction 155 ⁰ . Start of line SP 001. Reel number 060267 to 060278. Guns 1, 3, 4, 5, 6, 7, 8, 10, 14 and 15 on, capacity 760 cubic inches. 5 second records. Lost SP 455 due to speed fluctuation. Completed line at SP 722.

Seismic vs. Gravity/Magnetic Interpretation

Seismic time structure map and isochron maps have been constructed over what appears to be the most prospective portion of Permit T-19-P. Several leads have been identified and grouped according to their geographic location, general trend orientation, relation to faulting, structural style and apparent evolution. These groups are the Manatee, Penguin and Seal areas.

The Manatee leads consist of north-northeast trending tilted fault blocks associated with a major basin forming growth fault. This fault or portion of it is later reactivated and becomes a high angle reverse fault. The objective section consists of Eocene, Paleocene and Cretaceous which, the most recent BMR studies, have shown to contain mature marine, deltaic, lacustrine source rocks. The primary objective section is located below a major unconformity which in itself also offers the possibility of entrapment.

The Penguin Horst blocks have a northwest-southeast orientation and plunge towards the northeast and southeast, or deeper portions of the basin.

The Seal leads consist of tilted fault blocks located on the northeast flank of the Bass Basin central Graben area. These leads are presently ill defined due to the low density of quality seismic data in this part of the basin.

Detail of each of these leads constitute the main body of the previously submitted 1984 Permit annual report.

The major fault trends and areas of closure have been plotted on a seismic shot point map at a scale of 1:100,000. The leads are identified. Map 1 shows the faults, closures and Total Magnetic Intensity contour lines. A distinct north-northeast trend of the Total Intensity Magnetic contours is recognized. This trend is parallel to the Manatee fault trend.

The area of intersect between the north-northeast trending Manatee leads and northwest trending Penguin leads is recognized on the Total Magnetic Intensity contours which are offset to the northwest. The area of the Seal leads is not very well recognized by the total Magnetic Intensity contours. This is due to the low density of seismic and magnetic data in this area.

Map 2 shows the faults, closures and gravity contour lines. A distinct north-northeast trend of the gravity contour is recognized. This trend is parallel and superimposed on the Manatee fault trends. The area of interest between the Manatee and Penguin trends is recognized on the gravity contours which are offset to the northwest. Again, the Seal leads area is not very well recognized due to the low density of data.

Depth to magnetic basement has been calculated using the magnetic data collected in the course of the Crocodile Rock and Octopus surveys. Results of these calculations are shown on Map 1. Several calculations have been performed over the known shallow basement areas or areas of condensed section recognized on seismic data. These calculations confirm the seismic interpretation. Only two values have been calculated in the trough areas

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or central Graben areas. The calculations indicates depths of 1500 and 2700 meters. The 2700 meters being qualified as indicating a depth below interpreted basement or new basement.

Aeromagnetic Survey

A regional aeromagnetic survey was carried out for Haematite Exploration Proprietary Limited by Aero Service Limited during 1961. A previous survey was carried out in 1960 and had indicated the presence of deep Tertiary Mesozoic sedimentary basin. The objective of the later survey was to delineate these basins.

Results of the operation are presented as a contour map of Total Magnetic Field Intensity and of calculated depths to magnetic basement. Figure 12.

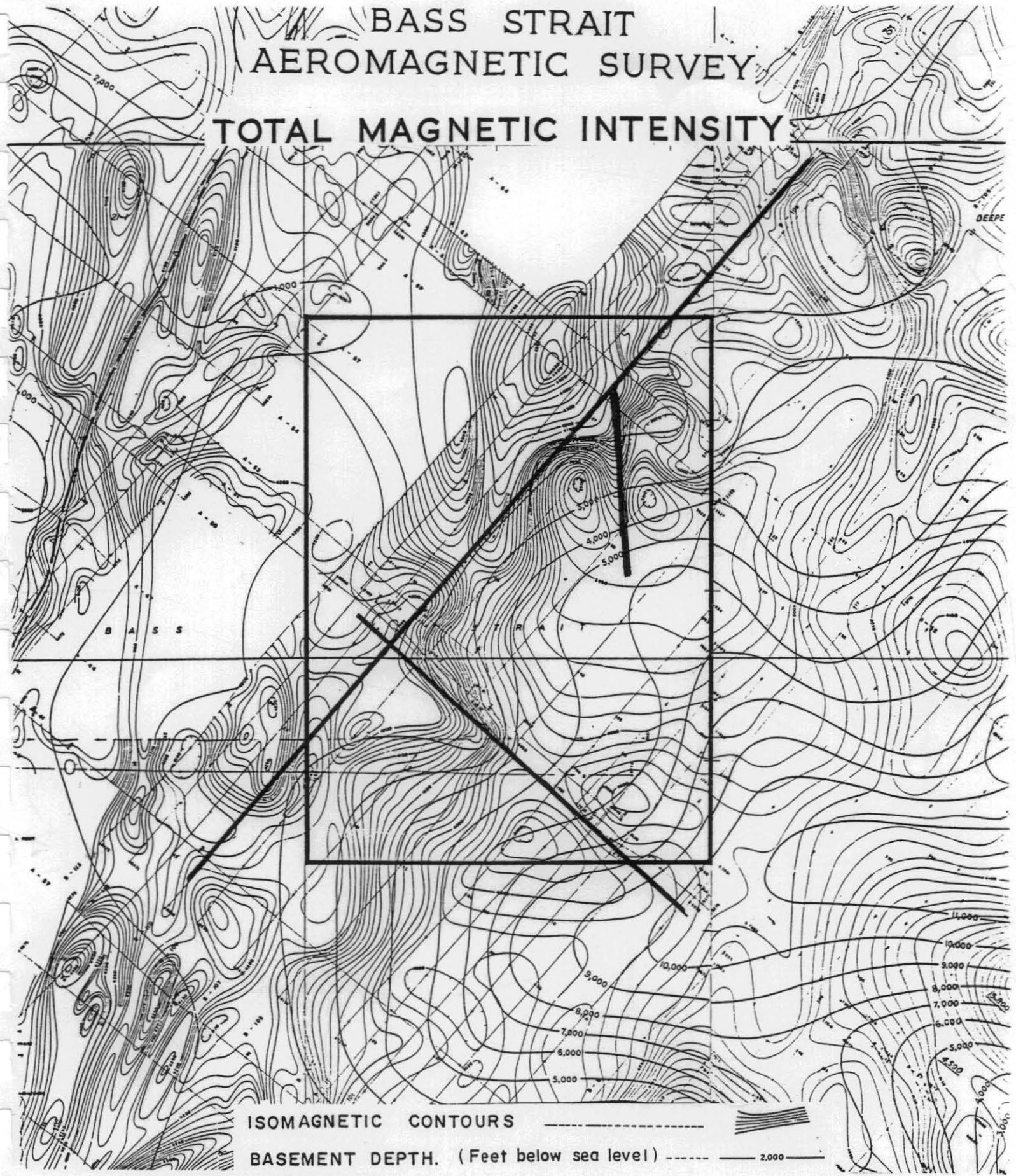
Three distinct orientations of the magnetic field are recognized and indicated. A northwest-southeast trend parallels the orientation of the Penquin tilted fault blocks. A northeast-southwest trend parallels the Manatee faults and leads. In addition, a north-south trend is indicated. Calculated depths to magnetic basement indicate a thickening of the section toward the southeast.

The outline of the detail area, enclosure Map 1 and 2 is shown. Calculated depths to basement indicate that magnetic basement is expected at approximately 2300 feet in the Konkon well. The Konkon well was abandoned at 5043 feet in presumed Lower Cretaceous highly altered volcanics. Figure 13.

At the Toolka well location, calculated depths to basement indicate that magnetic basement is expected at 7000 feet. The Toolka well was abandoned at 8907 feet in Eocene-Paleocene sediments after drilling through a volcanic section between approximate depths of 8,000 and 8,450 feet. At the Cormorant well location, calculated depth to basement indicate that magnetic basement is expected at 9,000 feet. The well was abandoned at 9845 feet in Paleocene sediments after drilling through a volcanic section between approximate depths of 8000 and 8270 feet. At the Aroo well location calculated depth to basement indicate that magnetic basement is expected at approximately 10,000 feet. The well was abandoned at 11,983 feet in Paleocene sediments after drilling an interbedded volcanic and sediments sections starting at approximately 10,300. At the Bass #3 well location, the calculated depth to basement indicate that magnetic basement is expected at approximately 5,500 feet. The well was abandoned at 7,978 feet in probable basement since approximately 7830 feet.

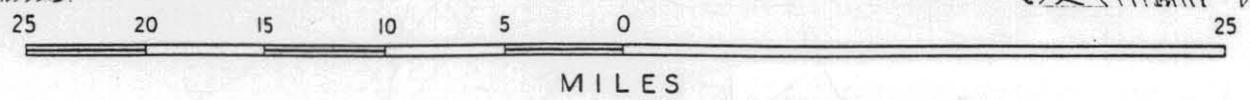
BASS STRAIT AEROMAGNETIC SURVEY

TOTAL MAGNETIC INTENSITY



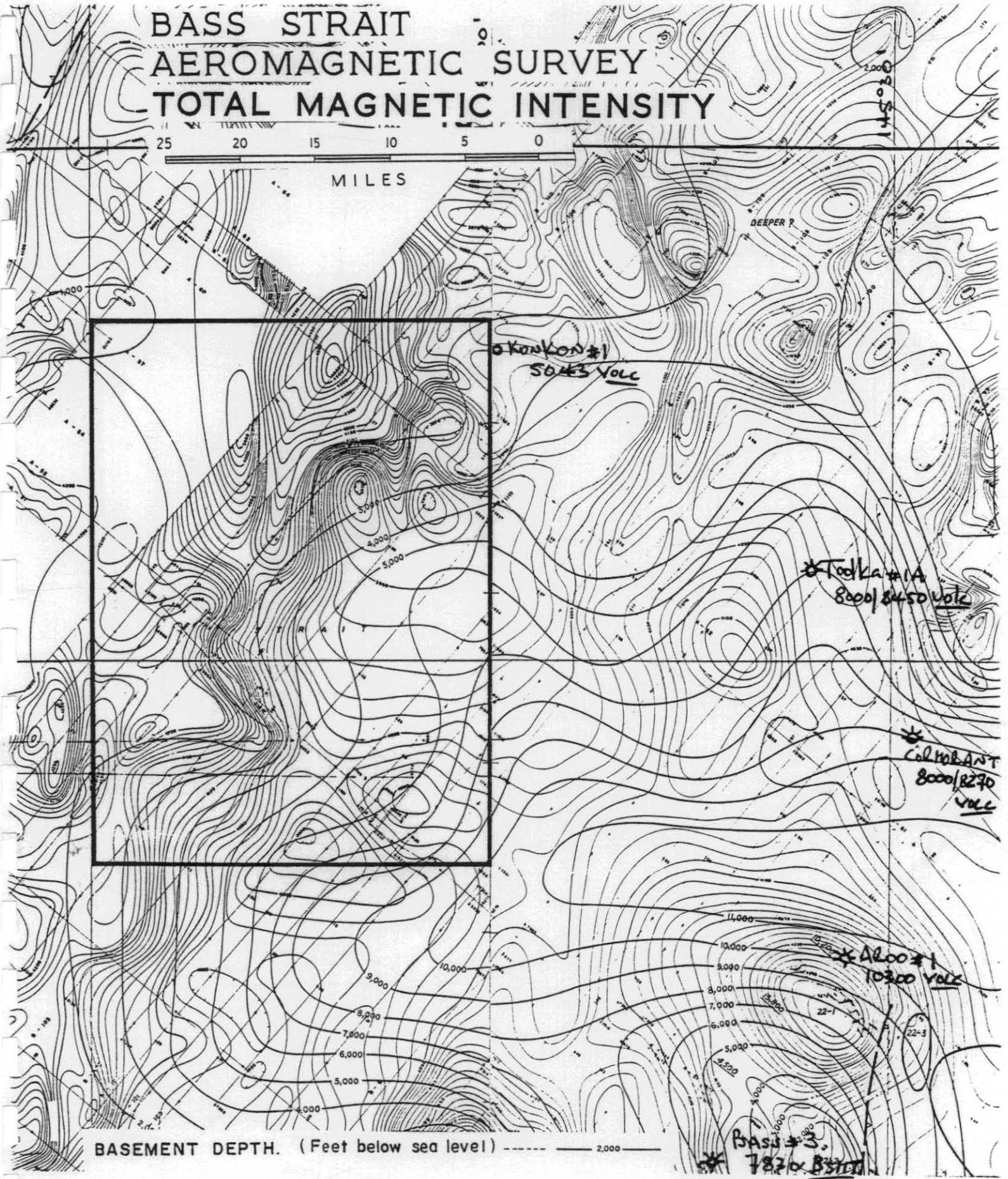
ISOMAGNETIC CONTOURS

BASEMENT DEPTH. (Feet below sea level)



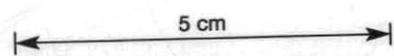
224089 Figure 12

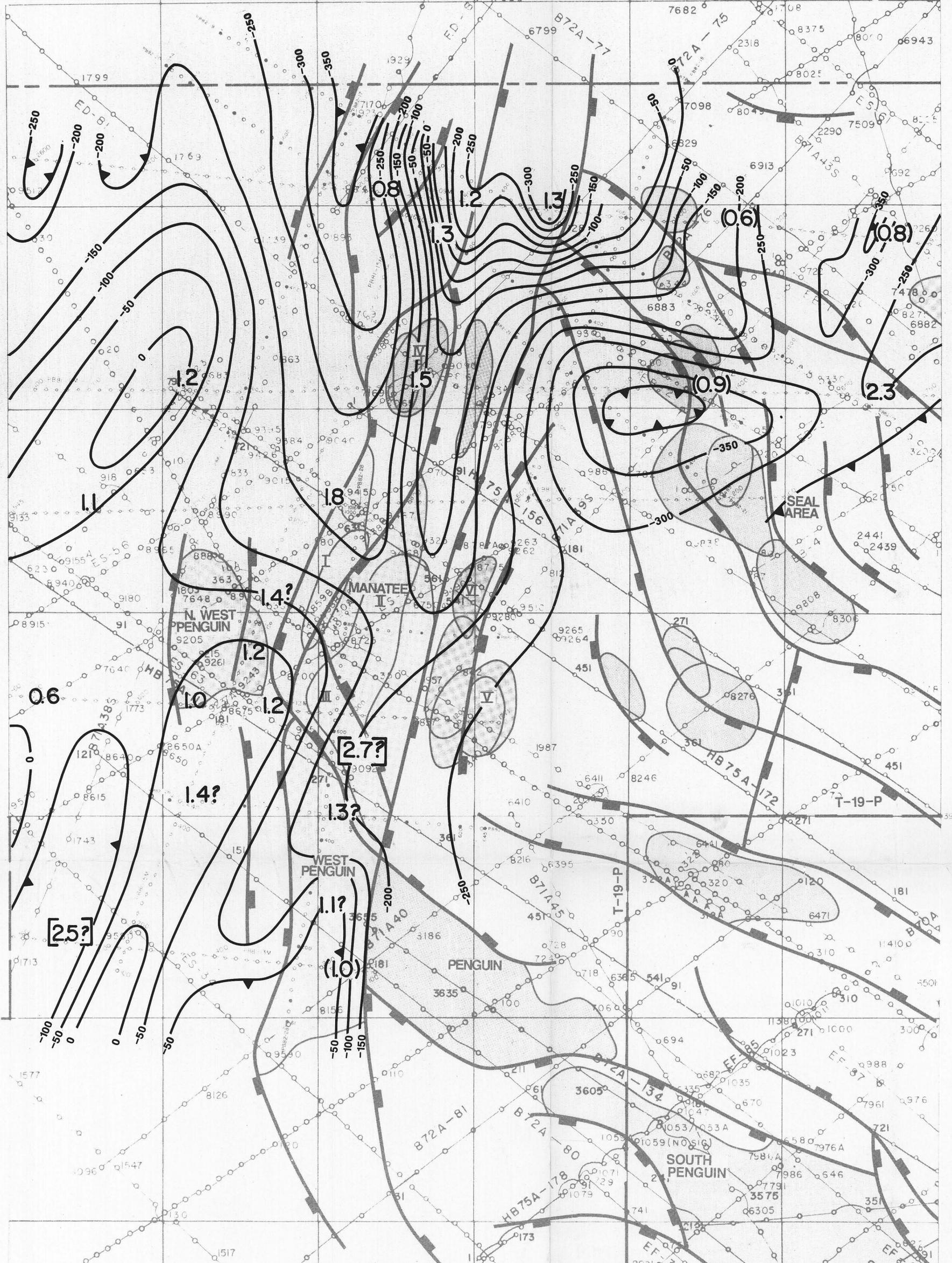
BASS STRAIT AEROMAGNETIC SURVEY TOTAL MAGNETIC INTENSITY



BASEMENT DEPTH. (Feet below sea level) ----- 2,000

224090 Figure 13

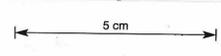




Depth to Magnetic Basement
 Graded Depths in Thousands of Meters
 to Interpreted Magnetic Basement

Depth Values in Parenthesis are from Sources
 Occurring Above Interpreted Basement. Values
 in Brackets Occur Below Interpreted
 Basement or Near Basement.

PERTSHIRE PETROLEUM LTD.



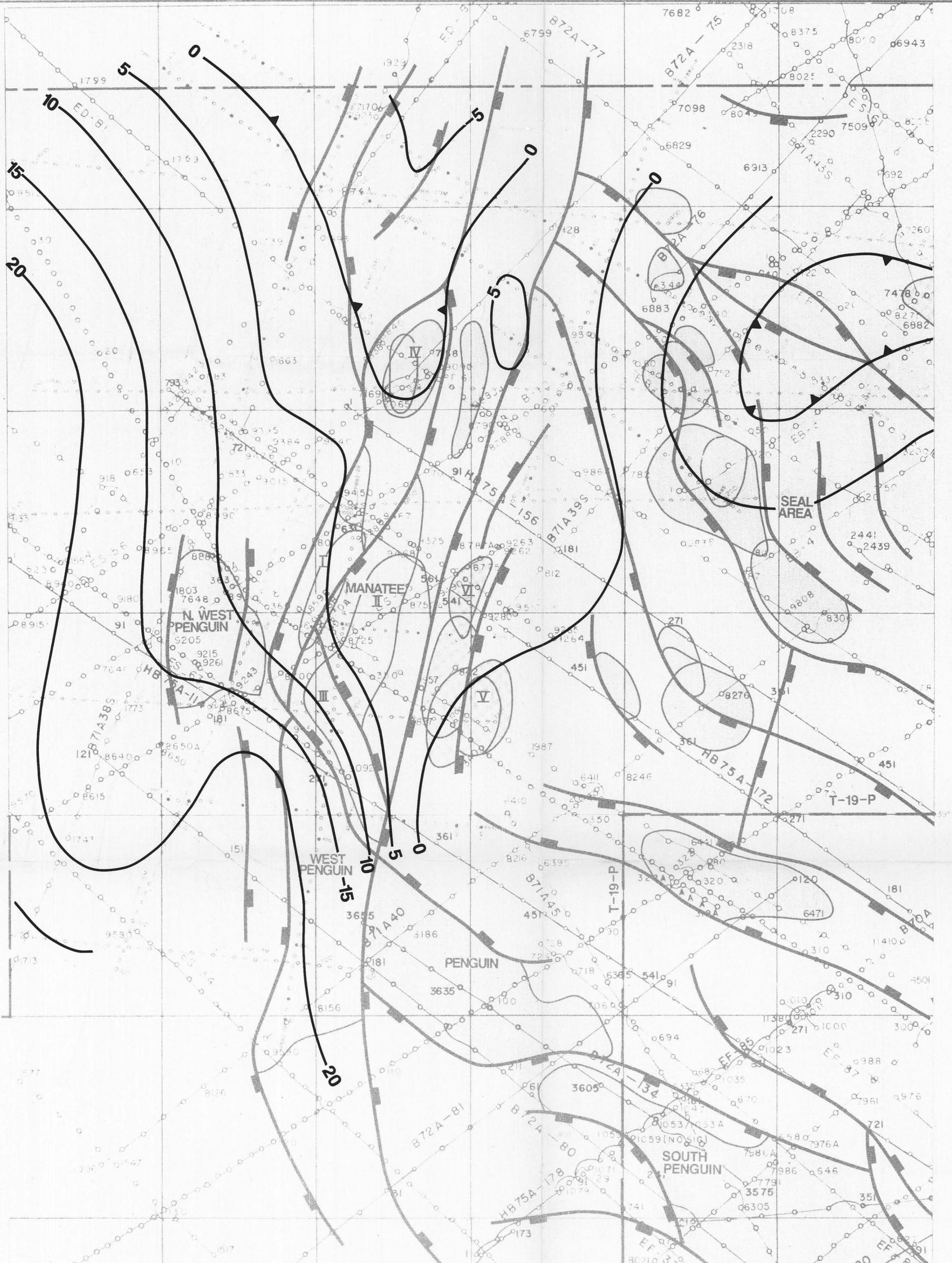
Permit T-19-P

Bass basin - TASMANIA
 Showing Location of Prospects
 and Leads. **TOTAL MAGNETIC**
INTENSITY CONTOURS Calculated
 Depth to Magnetic Basement.

Contour Interval: 50 gammas

DATE	1985	SCALE	1 : 100,000	SHEET No.	T/APP 11/8 TPR OR-209
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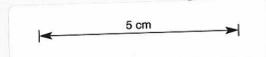
224091



PERTHSHIRE PETROLEUM LTD.

Permit T-19-P
Bass basin - TASMANIA
Showing Location of Prospects
and Leads. GRAVITY CONTOURS

224092



Contour Interval: 5 milligals

T/19P Part D

DATE	1985	SCALE	1 : 100,000	TPR OR. 209
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