EGG ISLAND

BASS STRAIT

TASMANIA

MARINE SEISMIC SURVEY

1982

FINAL REPORT

EGG ISLAND

MARINE SEISMIC SURVEY

1982

TASMANIA

PERMIT T-16/P

for

WEAVER OIL AND GAS CORPORATION
14141 SOUTHWEST FREEWAY
P.O. BOX 4562
HOUSTON, TEXAS 77210

and

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

by

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

Submitted by
Weaver Oil and Gas Corporation
Houston, Texas

ABSTRACT

The Egg Island Seismic Survey comprises 347.475 kilometers (215.957 miles) of new seismic lines on the continental shelf of Tasmania: The survey took place on Weaver Oil and Gas Corporation, Australia Permit T-16/P between March 1 and March 4, 1982.

Most of the new lines surveyed were designed to further evaluate structural anomalies disclosed by earlier surveys, with the remainder devoted to gaining stratigraphic and regional control.

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GENERAL INFORMATION

SECTION I

GENERAL INFORMATION

Introduction

The 1982 Egg Island Seismic Survey was conducted on Exploration Permit T-16/P which was awarded on July 21, 1980 to Weaver Oil and Gas Corporation, 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 347.475 kilometers (215.957 miles) of new seismic, gravity and magnetic data were recorded between March 1 to March 4, 1982.

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 onboard general purpose digital computer. The ship's position was continously 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.

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 Weaver Oil and Gas Corporation, Australia offices in Houston, Texas.

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

Daily Operations

Field supervision was provided by Mr. Jack Downing, Vice President - Geophysics, Weaver Oil and Gas Corporation, Australia, and Mr. David C. Lowry, Consulting Petroleum Geologist and Manager of Weaver Oil and Gas Corporation, Australia in Perth.

GEOLOGICAL SUMMARY

The Egg Island Seismic Survey took place in the southern area of the Bass Basin.

The Bass Basin is located offshore between the southern coast of Victoria and the northern coast of Tasmania. It is bounded to the west by King Island and to the east by Flinders Island and the Bassian Rise. Water depth throughout the basin rarely exceeds 270 feet (82 meters). The area has been actively explored for hydrocarbons since 1963.

The oldest sedimentary rocks encountered while drilling are Early Cretaceous. However, the greatest volume of sediments accumulated during the Tertiary. Lithologies vary from continental sandstone, siltstone, shale and coal in the nonmarine Cretaceous to Middle Eocene section, while the Upper Eocene to recent section consists of shale, sandstone, marl, mudstone and limestone. Drilling and seismic data indicate that there was a considerable amount of volcanic activity in the basin throughout its history.

The southeastern area of the basin exhibits the earliest structural growth whereas the structural growth in the central and northwestern areas occurred later. Structural style also varies from tilted fault blocks with thousands of feet of vertical displacement in the southeastern area, to low relief small anticlinal folds and minor faults in the northwestern area. Most of the prominent structural trends are oriented in a northwestern-southeastern direction which is parallel or subparallel to the present basin axis.

Stratigraphic control for the project area is provided by ten wells, namely:

Pelican #1

Pelican #2

Pelican #3

Pelican #4

Poonboon #1

Nangkero #1

Durroon #1

Narimba #1

Tarook #1A

Bass #3

In addition, eight wells drilled in the vicinity are considered relevant and are included in this report. These are:

Aroo #1

Bass #1

Cormorant #1

Toolka #1

Konkon #1

Bass #2

Yurongi

Dondu #1

The Pelican #1 well was drilled in 1970 to a measured depth of 10,428 feet (3,178.45 meters) penetrating a section ranging in age from Recent to Upper Paleocene. The deep anticlinal closure was encountered as predicted. The top of the Eocene Shale or Demons Bluff was intersected at 5,365 feet and the top of the sand section at 5,760 feet. The first gas-condensate pay zone was encountered at 8,110 feet. A total of 12 sands are interpreted to contain hydrocarbons. The sands below 9,822 feet were found to have abnormally high pressures. Reservoir qualities of the sands within the Eocene Eastern View Coal Measures section were found to be satisfactory in regards to porosities and permeabilities. These sands were found to be separated and interbedded with impermeable siltstones and shales capable of sealing the trap.

The Pelican #2 well was drilled in 1970 to a measured depth of 10,066 feet (3,068.12 meters) penetrating a section ranging in age from Recent to Eocene. The well was located 2.5 miles northwest of the Pelican #1 discovery well. The first overpressured sand was encountered at 9,779 feet. Pelican #2 intersected numerous sands which are interpreted to contain gas-condensate. Sand bodies interpreted to contain hydrocarbons above 8,700 feet in the Pelican #1 well were either not present or water bearing in Pelican #2. The first hydrocarbon bearing sand was recognized at 9,096 feet and the well eventually bottomed in a high pressure zone without drilling through the hydrocarbon column into water bearing formations.

The Pelican #3 well was drilled in 1972 to a measured depth of 9,537 feet (2,906.88 meters) penetrating a section ranging in age from Recent to Paleocene. The prognozed pay section found in the Pelican #1 and #2 wells was not encountered. However, minor gas shows were reported whilst drilling the Paleocene section. Abnormal pressure was encountered at approximately 8,432 feet and the sands below this depth were tight.

The Pelican #4 well was drilled in 1979 to a measured depth of 10,009 feet (3,050.74 meters). Significant indications of hydrocarbons were recorded from 8,950 feet to total depth.

The Poonboon #1 well was drilled in 1972 to a measured depth of 10,715 feet (3,266 meters) penetrating a section ranging in age from Recent to Late Cretaceous. Abnormal pressure was encountered at approximately 9,300 feet. The only show recorded in the well was when the well kicked at 10,463 feet with a mud weight of 10.2 ppg. Log analysis indicated that the basal 6 feet of a sand interval from 10,416 to 10,450 feet may be hydrocarbon bearing; the well was abandoned as a dry hole due to excessive pressure imbalance.

The Nangkero #1 well was drilled in 1974 to a measured depth of 9,440 feet (2,877.3 meters) penetrating a section ranging in age from Recent to Upper Paleocene. No hydrocarbon shows were encountered in the well.

The Durroon #1 was drilled in 1972 to a measured depth of 9,922 feet (3,024.22 meters) penetrating a section ranging in age from Recent to Lower Cretaceous. There were no indications of hydrocarbons nor abnormal formation pressures recorded in the well.

The Narimba #1 well drilled in 1973 to a measured depth of 11,003 feet (3,353.7 meters) penetrating a section ranging in age from Recent to Eocene. There were no hydrocarbon shows reported nor was there abnormally pressured sections penetrated.

The Tarook #1A well was drilled in 1972 to a measured depth of 9,100 feet (2,773.68 meters) penetrating a section ranging in age from Recent to Eocene. The well was entirely devoid of hydrocarbon indications.

The Bass #3 well was drilled in 1967 to a measured depth of 7,978 feet (2,431.7 meters) penetrating a section ranging in age from Recent to basement. Hydrocarbon indications were recorded while drilling and a formation interval test recovered gas-condensate and water.

The Aroo #1 well was drilled in 1974 to a measured depth of 12,112 feet (3,691.74 meters) penetrating a section ranging in age from Recent to Paleocene or pre-Paleocene volcanics. Indications of hydrocarbons were observed at several levels including the top of a sand within the volcanic sequence. Formation tests recovered small amounts of gas.

The Bass #1 well was drilled in 1965 to a measured depth of 7,717 feet (2,352.14 meters) penetrating a section ranging in age from Recent to Upper Cretaceous. No commercial hydrocarbons were logged.

The Cormorant #1 well was drilled in 1970 to a measured depth of 9,846 feet (3,001 meters) penetrating a section ranging in age from Recent to Eocene. Significant indications of oil have been recorded in the Eocene.

The Toolka #1 well was drilled in 1974 to a measured depth of 8,907 feet (2,714.85 meters) penetrating a section ranging in age from Recent to Eocene. Minor oil and gas shows were encountered in the Middle Eocene while drilling; however, formation interval test results were negative.

The Konkon #1 well was drilled in 1973 to a measured depth of 5,043 feet (1,537.1 meters) penetrating a section ranging in age from Recent to Lower Cretaceous. The well encountered the predicted sequence with no show of oil or gas and was abandoned in highly altered volcanics.

The Bass #2 well was drilled in 1966 to a measured depth of 5,910 feet (1,801.36 meters) penetrating a section ranging in age from Recent to basement. Two hundred and fifty six feet of volcanic rocks of undeterminate age were encountered between the base of the Tertiary and the top of basement. Aside from normal background gas, no hydrocarbons were recorded in the well.

The Yurongi well was drilled in 1973 to a measured depth of 8,000 feet (2,438.4 meters) penetrating a section ranging in age from Recent to

Paleocene. No significant indications of hydrocarbons were recorded.

The Dondu #1 well was drilled in 1973 to a measured depth of 9,603 feet (2927 meters) penetrating a section ranging in age from Recent to Upper Paleocene. The well results were essentially as predicted. The relatively thick Eocene coal sequence is indicative of the amount of total organic matter present, and preliminary geochemical studies indicate that the sediments are mature enough to generate hydrocarbons below a depth of about 7,000 feet. Even though there were some hydrocarbon indications reported while drilling, subsequent electric log interpretation suggest that these shows were very minor and were dispersed rather than concentrated in any of the sandstones.

GEOPHYSICAL SUMMARY

Design and location of the Egg Island Marine 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 Service Limited 1961

Flinders Island-Kingston Seismic Survey for Hematite Exploration by Western Geophysical 1962-1963

Bass Basin Seismic Survey for Esso Australia by Western Geophysical 1965

King Island East Seismic Survey for Esso Australia by Geophysical Seismic International 1965

Tasmania Aeromagnetic Survey for the Bureau of Mineral Resources by Aero 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 Service 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 Service International 1970-1971

Bass B71A Seismic and Magnetic Survey for Esso Australia by Geophysical Service 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 Service International 1972

Bass HB75A Seismic Survey for Hematite Petroleum by Geophysical Service International 1975

Stoney Head Seismic Survey for Weaver Oil and Gas Corporation, Australia by Western Geophysical Company 1981

Description of Survey Area

The prospect was designated as Permit area T-16/P by the Tasmanian Department of Mines. The approximate Geodetic Center of the prospect for T-16/P was 40° 45' South latitude by 146° 30' East longitude.

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 adversed effect on the operation. There were no oil rigs in the area and water depth exceeded twenty meters for the duration of the survey.

DATA ACQUISITION

SECTION II

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<u>Data Acquisition</u>

GENERAL INFORMATION

Contractors

The survey was conducted on behalf of Weaver Oil and Gas Corporation 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 Weaver Oil is located at 5599 San Felipe, Suite 1100, Houston, Texas 77056. 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 at 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 Weaver Oil 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, however, during March 1, winds force 6 to 8 were experienced which resulted in some production time being lost.

Key Field Personnel

David Lowry:	Exploration Manager for Weaver Oil and Gas, Australia based at Perth office, responsible for liaison between Western Geophysical and Weaver's principal office; also acted as 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

Instrument Test

Semi-monthly and monthly instrument test were conducted on the DFS V recording system as per the instrument manual's instructions. The results of these tests 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.

EQUIPMENT & INSTRUMENTATION

EQUIPMENT AND INSTRUMENTATION

A. 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

B. 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
Ancilliary 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

C. Instrument Description

The WESTERN ODYSSEY is equipped with a DFS V seismic acquisition system consisting of two analog modules, a controller module and four tape transports. The system accepts analog inputs signals from the streamer cable and converts these to digital form for recording on magnetic tape.

Each analog module contains 60 pairs of wires available for data acquisition. These wires come directly from the streamer cable (through a deck cable leading from the cable reel to the instrument room). Each individual channel is passed through a line filter to mitigate the effects of ambient static picked up from the seismic lines. From this filter the signal is applied to a differential pre-amplifier, then an optional lowcut filter, an alias filter and finally through an optional 50 or 60 Hz notch filter.

After the filtration process the signals are time division multiplexed to a floating point amplifier to allow for scanning of all data channels within the specified sample interval. The particular channel which is to be connected to the amplifier in any time slot is determined by an address from the controller module. The floating point amplifier adjust its gain in steps of 4:1 to bring the amplified signal to the optimum level for application to the Analog-to-Digital Converter.

The Controller Module provides a stream of commands to the Analog Module that perform the following functions:

1. Address the channels to be sampled.
2. Command the sending of status and zero offset data.
3. Control whether the gain ranging amplifier automatically selects its gain (AGC) or operates at a gain specified by the operator.
4. Control the source of input to the A/D converter.

In the normal data acquisition mode the floating point amplifier is commanded to be in it's automatic gain ranging mode, however the amplifier may be commanded to be in any of eight possible settings (particularly for test and calibration purposes). When in the normal data acquisition mode the A/D converter is commanded to derive it's input from the floating point amplifier but for various test and calibration procedures the A/D converter can derive its input from the internal test oscillator in the Analog Module, an external voltage source or ground.

The sequence of address sent out by the Controller to the Analog Module causes each individual analog channel to be sampled in sequence. Before commencement of a new sequence of addresses two time intervals occur that are reserved for specific purposes. During the first time interval, called First Start of Scan (SOS1), a special address is sent which causes the Analog Module to send back status information about the filter settings and gain constants of the Analog Module and to reset stabilize the floating point amplifier. During ensuing second interval, labled Second Start of Scan (SOS2), the input to the amplifier in the Analog Module is commanded to be short to ground. Thus the information returned to the Controller Module as a result of this command contains zero offset information. The sequence of addresses is generated continuously whenever the power is on. However when a time break (start of energy source discharge) is received the sequence is interrupted and command for a Data Start and SOS1 are transmitted to commence a new sequence.

The digital data from the Analog Module comes to the Controller Module in bit serial format. After conversion to parallel format, a number which represents the dc offset of the amplifier and A/D converter in the Analog Module is subtracted from each data word (each word represents the instantaneous voltage at the moment of sampling of a channel).

The number to be subtracted is derived from the information obtained during SOS2. Since the dc offset of the amplifier may be somewhat dependent on amplifier gain, the gain is set to a different value during the successive SOS2. A separate value of dc offset is stored in a memory for each of the gain settings of the amplifier. In normal operation, the amplifier sets its own gain and the gain value that it determines is received by the controller in three bits of the data word. These bits are an address in memory from which to obtain the proper number to subtract. It is not appropriate to completely update the memory every time a new sample of the zero offset is obtained because the new value received is exaggerated by the effect of noise and thus would cause values placed in memory to be erratic. Therefore, when a new offset sample is obtained, only a fraction of the difference between the new value and the old value is added to the memory. Thus, the quantity stored in memory is a long-term average of zero offset.

The first filter removes those components of dc offset which are common to all channels but does not help the offset caused by the multiplexes of the individual channels. In order to remove the dc offset of the individual channels, it is necessary to have a memory location for each channel where a number can be stored which is to be subtracted from the data on that channel. The offset information for each channel can only be obtained from the data received from that particular channel. Thus, the number stored in memory for a particular channel is built up by adding (to the number in memory) a fraction of the difference between each new sample and the number stored in memory. Hence, the number to be subtracted is constantly changing. The net effect is the digital equivalent to a capacitor/resistor lowcut filter where the number stored in memory (which is subtracted) is analogous to the voltage across the capacitor in the analog realm. To perform this function in the analog realm would require a capacitor for each channel and switches for selecting the proper capacitors for each channel. Therefore, the digital method is much simpler. The filter time constant is 128 milliseconds.

The standard recording formats of the system are SEG-B and SEG-C. In both formats, each seismic event is recorded in a file consisting of a header block containing record constants and a data block containing seismic data values. The principal difference between the formats is the method of recording data values. Despite this difference, both header block tape formats are similar. The first 24 bytes of the header consist of record constants and processing information. The seismic channel fixed and early gain is recorded next for each channel. After this strip, the auxiliary channel identifier code is recorded for each auxiliary channel, then any external data may be recorded at the operator's discretion.

In the SEG-B format, data is organized in 2 byte words with each byte consisting of 8 bits of information. The first of the data block comprise the sync group. Bits 0 through 5 of the sync group are recorded as "ones" for a normal time break and as "zeros" if the system is operated from an internal time break. Bit 6 indicates the number of seismic channels as designated in the following chart :

CHANNELS	1	2	3	4
24	0	0	0	0
36	0	1	0	0
48	0	0	0	1
others	1	1	1	1

The next five words after the sync group are the auxiliary channels. The first auxiliary channel is timing word. During the remainder of the scan, seismic channels are recorded. The gain for 4 seismic channels is combined in one data word by 4 data words containing the mantissa of each of the seismic channels. The magnitude representing the channel output is expressed as a binary number with negative values in one's or two's complement code.

In the SEG-C format, data is organised in four 32 bit words, each word containining the data value for one channel. The recorded data value is the actual channel input in millivolts expressed in IBM-compatible floating point notation. In this notation, a data value is represented by a sign bit, a 7 bit characteristic of exponent and a 24 bit fraction. The characteristic signifies a power of 16 in binary excess 64 code. The fraction is normalized to put the significant digit of the data within the uppermost 4 digits of the fraction.

The data coming from the offset filter (data in the form of a 16 bit two's complement number and a three bit gain for each sample) must be rearranged to be placed on the half inch 9 track (8 bits plus parity) tape. The logic which performs this function is called Format Logic. Only 15 of the 16 bits are actually used. The most significant bit is used to indicate overflow. The output of the Format Logic is a progression of 8 bit words arranged in accordance with either the SEG-B or SEG-C standard formats as chosen by the plug-in Format Logic board in the Controller Module. But after the words are generated, it is further necesssary to encode the bits according to either the NRZI or the Phase Encoded modes of writing on the tape. The logic that performs this is called the Write Logic. The Write Logic is on the NZ board for NRZI and on the PE board for Phase Encoded. There must be a timing buffer between the Format Logic and the Write Logic. That is, the data may not be available from the Format Logic at exactly the time when it is desired to feed information to the Write Logic. The average data rate will have to be equal. The required flexibility is provided by a first in/first out memory (FIFO). This device can load a number of words into its input and later read them out of the output in the same order as they were entered. This reading out can occur at different times. The controller Write Logic translates the "ones" and "zeros" of each word into appropriate flux direction signals to be sent to the Tape Transport for writing on tape. In the case of phase encoded signals, this requires two flux direction bits sent for each signal bit. The data is rearranged into 8-bit-plus parity bit parallel words, and these are encoded into 8-bit-plus parity flux direction words. After this 4 command bits are added to each data word and the resulting data command words are converted to bit serial form and sent to Tape Transport. Clock and sync signals are also sent to the Tape Transport. The communication from the Tape Transport to the Controller Module is divided into 2 parts :

1. The data read from the tape is communicated to the controller by 10 wire pairs which carry all 9 tracks from the tape and a read clock for NRZI to the controller in parallel.
2. The status information (tape rewind, end of tape, etc.) is carried over a serial interface.

The Tape Transport motion control commands are sent over the serial interface with the write data. The commands are issued by the Controller Module, but the means of executing the commands are in the Tape Transport Module. Before a record is written on tape, a header is written which contains file identification and a number of constants which are introduced from the controller. Also, there are pieces of information such as gain constants and filter settings which are received from the Analog Module. All this information is arranged into a procession of 8-bit-plus parity (the same as the data) and is arranged in a specified sequence by the header logic according to SEG-B or SEG-C format. The header information or the data information is selected at the appropriate time for feeding the FIFO. The Tape Transport Module is the means by which the digital data from the Controller Module is recorded on magnetic tape. Four transports are used in the system to facilitate dual recording where and when requested by clientele. Each of the 10 inch transports record the data on 1/2 inch tape using IBM-compatible 9-track dual gap heads. The recording can be either 800 bits per inch NRZI or 1600 BPI PE. The transports consists of the capstan drive, mechanical drives, power supply and take up reel servo systems, record/reproduce head data electronics and tape position sensors.

Single Trace Plotter

The plotter used was an EPC Labs Inc. Model 4600 Graphic Recorder. Cable trace 95 was recorded to a time of five seconds from time zero, the recorder being triggered by a signal from the Energy Source Synchronizer.

Magnetometer

A Geometrics Model G801/3 direct reading proton magnetometer with an associated geometrics cable and sensor was used to acquire data in analog form on a HP 7130A strip chart recorder, and in digital form on a magnetic tape through a Litton Resources System Geoscience Data Unit.

Gravity Meter

A standard La Coste and Romberg air-sea gravity meter, system number S88 was used to acquire gravity data. Data was recorded both in analog and digital forms. Analog form was recorded on a Texas Instruments Stripchart Recorder. The digital form was recorded on magnetic tape through the G.D.U.

Data Acquisition System

To digitize the magnetic and gravity data, a Litton Resources Systems Geoscience Data Unit was used. This system scanned the date, time, gravity value, magnetic value, navigation data and water depth on a continuous basis and recorded the value on magnetic tape every 20 seconds.

Depth Recorder

A Krupp-Atlas Model 640 with a 0 - 2000 fathom range was used as the primary depth recorder for the survey. A Simrad Model EX38D with a 0 - 600 fathom range was used as a back-up depth recorder. Both of these fathometers were calibrated against a known depth prior to the start of the survey.

D. Energy Source

The M/V WESTERN ODYSSEY's high pressure energy source system consists of twenty high pressure WESTERN airguns with reservoir capacities ranging from 20 to 200 cubic inches. In normal operating circumstances, 10 of the airguns are combined to form a 760 cubic inches tuned array. The airguns are operated at a pressure of 4,500 psi supplied from 4 of 6 available Price Air Gun Master Compressors.

For various reasons, most airguns have some inherent firing delay and do not fire immediately upon receipt of a "fire" command pulse. The amount of this delay tends to drift with time and naturally varies from unit to unit. To overcome this problem and to assure all airguns fire within specs required for an optimum energy pulse, the system is controlled by the LRS-100 Energy Source Synchronizer. The LRS-100 is a modular microprocessor based system designed specifically to control the firing of a seismic energy source array so that all guns fire concurrently or in a pre-designated staggered time sequence. The system accomplished this by electronically sensing the individual gun delays and automatically establishing a firing sequence to compensate for the variations in delay. The basic sequence of operation is as follows :

1. The Controller Module receives a fire command which signals the start of the firing cycle. The fire command signal may be issued by the seismic system, navigation system or the LRS-100 Cycle Controller.

2. At some pre-calculated point after receiving the fire command, the controller will issue a fire pulse to the solenoid power supply for each gun. The solenoid in turn triggers the release of the control pressure air. As this occurs, an imbalance is created between the control pressure reservoir and the high pressure reservoir that allows the high pressure air to force the seat and shuttle upward and expose the exhaust ports, thus releasing the pressure air.

3. Upon firing, a sensor on the guns produces a return signal which is detected by the controller. Ideally, this fire detect signal should occur at a pre-selected time referred to as the Aiming Point.

4. If the fire detect for any guns does not occur at the Aiming Point, the controller will correct the error by adjusting the time at which the next fire pulse is issued to the gun. These adjustments are computed from a filter applied to the previous error values.

5. Time break for the recording system is generated by the synchronizer when 62.5% of the total enabled gun array volume has returned fire detect signals. The time break is thus a true representation of the release of air. There are no delays to be compensated for in processing of the data.

Through this method of constant electronic adjustment, the energy source system delivers its optimal seismic signals.

E. Streamer Cable

Modern seismic marine streamer cables originated from WW II anti-torpedo technology. The modern cables are 2.5 to 3 inches in diameter and, when filled with a special kerosene based fluid, are neutrally buoyant in the water column. As water density changes, the overall buoyancy of the streamer is adjusted by the addition or removal of thin lead weights taped onto the streamer at various intervals.

The streamer cable used by the WESTERN ODYSSEY is 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 hydrophones. This gives the streamer an overall active length of 2400 meters excluding the lead-in and elastic sections.

The 500 foot nylon reinforced neoprene lead-in is heavily weighted in order to depress the front end of the streamer cable to the desired operating depth. It is also outfitted with neoprene flarings for noise reduction. In normal operation, two 75 meter elastic sections are attached at the tail of the lead-in for additional noise reduction.

To maintain the streamer cable at the specified depth in the water column, a series of Syntron Depth Controller are employed at equal intervals along the cable. An electronic pulse controls the angle of the wings and thus controls their influence on the cable's depth. The cable depth is monitored from the readouts of pressure sensitive transducers located at regular intervals along the streamer.

A tail buoy is connected at the far end of the cable and is tracked by the vessel's radar, making it possible to observe how closely the cable is trailing the vessel along its line of motion.

RECORDING PARAMETERS

RECORDING PARAMETERS

A. Instrument 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		Gain Constant	Voltage(mV RMS)
Difference Mode	:	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

B. 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

C. Energy Source Configuration

Array Volume	:	760 cubic inches
Number of Guns	:	10
Array Pressure	:	4500 psi
Shot Depth	:	6 meters
Shot Interval	:	25 meters

OPERATIONS CHRONOLOGY

Date	Time	Events and Remarks
March 1	0955	Winds still at force 7 while on T-15P prospect. Heading to T-16P prospect, line WB82-29 to shoot side seas.
	1650	Start of line WB82-29.
	1911	End of line.
	2240	Start of line WB82-32.
	2400	Last shotpoint of day recorded.
		Production for the day: 39.450 kms.
March 2	0001	First shotpoint of day recorded.
	0219	End of line WB82-32.
	0351	Continue with T-15P prospect.
	1502	Return to T-16P prospect, start of line WB82-30.
	1711	End of line.
	1844	Start of line WB82-44.
	2055	End of line.
	2158	Start of line WB82-45.
	2400	Last shotpoint of day recorded.
		Production for the day: 91.450 kms.
March 3	0001	First shotpoint of day recorded.
	0021	End of line WB82-45.
	0214	Start of line WB82-46.
	0414	End of line.
	0620	Start of line WB82-51.
	0836	End of line.
	1008	Start of line WB82-50.
	1215	End of line.
	1320	Start of line WB82-49.
	1526	End of line.

Date	Time	Events and Remarks
	1632	Start of line WB82-48.
	1830	End of line.
	1921	Start of line WB82-47.
	2108	End of line. Line scratched as three Sat. fixes rejected during line recording. Client agree with 1.75 hours chargeable.
	2400	On line change.
		Production for the day: 136.325 kms.
March 4	0001	Heading to line WB82-13 EXT.
	0027	Start of line WB82-13 EXT.
	0119	End of line.
	0226	Start of line WB82-53.
	0513	End of line.
	0606	Start of line WB82-52.
	0955	End of line.
	1217	Start of line WB82-47A.
	1400	End of line.
	1435	Commence picking up cable.
	1600	Cable onboard, enroute to Portland for offloading data.
	2400	Enroute to Portland.
		Production for the day: 80.250 kms.
March 5	0001	Enroute to Portland.
	1500	Anchored in Portland harbour, boat alongside, offload WEAVER's data and representative.
		End of WEAVER T-16P prospect.

STATISTICAL SUMMARY

STATISTICAL SUMMARY

DATE	LINE	SP - SP	PROFILES	KMS
March 1	WB82-29	001 - 1018	1018	25.450
	WB82-32	001 - 560	560	14.000
March 2	WB82-32	561 - 1476	916	22.900
	WB82-30	001 - 944	944	23.600
	WB82-44	001 - 927	927	23.175
	WB82-45	001 - 871	871	21.775
March 3	WB82-45	872 - 1008	137	3.425
	WB82-46	001 - 875	875	21.875
	WB82-51	001 - 982	982	24.550
	WB82-50	001 - 920	920	23.000
	WB82-49	001 - 929	929	23.225
	WB82-48	001 - 859	859	21.475
March 4	WB82-13 EXT	001 - 363	363	9.075
	WB82-53	001 - 1181	1181	29.525
	WB82-52	001 - 1666	1666	41.650
	WB82-47A	001 - 751	751	18.775
			TOTAL KILOMETERS:	347.475

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<u>LINE SUMMARY</u>

LINE SUMMARY

Date	Line No.	Description
March 1	WB82-29	Direction 005°. Start of line SP 001. Reel number 060552 to 060568. Guns 9, 10, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Tailbuoy not detectable from start to end of line due to rough seas conditions. Depth indicator between sections 21 and 22 ground. Completed line at SP 1018.
March 2	WB82-32	Direction 101°. Start of line SP 001. Reel number 060569 to 060592. Guns 1, 3, 4, 5, 6, 7, 8, 10, 14 and 15 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Tailbuoy not detectable from start of line to SP 420 due to rough seas. Parity errors on SPs 868, 873 and 874. Depth indicator between sections 21 and 22 leakage. Completed line at SP 1476.
March 2	WB82-30	Direction 265°. Start of line SP 001. Reel number 060635 to 060650. Guns 9, 10, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Parity errors on SPs 560 and 744. Depth indicator between sections 21 and 22 leakage at start of line. Completed line at SP 944.
March 2	WB82-44	Direction 179°. Start of line SP 001. Reel number 060651 to 060665. Guns 1, 2, 4, 5, 6, 7, 8, 9 and 10 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Depth indicator between sections 21 and 22 leakage at start of line. Completed line at SP 927.

Date	Line No.	Description
March 2	WB82-45	Direction 327°. Start of line SP 001. Reel number begin from 060666. Guns 9, 10, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Parity errors on SP 622. Depth indicator between sections 21 and 22 leakage at start of line. Completed line at SP 1008.
March 3	WB82-46	Direction 179°. Start of line SP 001. Reel number 060683 to 060697. Guns 1, 2, 4, 5, 6, 7, 8, 9 and 10 on, capacity 760 cubic inches. 5 second records. Leakage in depth indicator between sections 21 and 22. Completed line at SP 875.
March 3	WB82-51	Direction 246°. Start of line SP 001. Reel number 060698 to 060713. Guns 11, 12, 13, 14, 15, 16, 17, 19 and 20 on, capacity 760 cubic inches. 5 second records. Leakage in group 19, group 19 dead at start of line. Parity errors on SPs 461, 559 and 686. Depth indicator between sections 21 and 22 leakage. Completed line at SP 982.
March 3	WB82-50	Direction 025°. Start of line SP 001. Reel number 060714 to 060728. Guns 1, 2, 4, 5, 6, 7, 8, 10 and 15 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Noise on cable caused by ship passing between SP 480 to SP 620. Parity errors on SPs 260 and 521. Depth indicator between sections 21 and 22; leakage at start of line. Completed line at SP 920.

Date	Line No.	Description
March 3	WB82-49	Direction 207°. Start of line SP 001. Reel number 060729 to 060743. Guns 9, 10, 11, 12, 14, 16, 17, 18, 19 and 20 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Depth indicator between sections 21 and 22 leakage at start of line. Completed line at SP 929.
March 3	WB82-48	Direction 030°. Start of line SP 001. Reel number 060744 to 060757. Guns 1, 3, 4, 5, 6, 7, 8, 10, 14 and 15 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. At SP 540 gun 10 off, capacity 740 cubic inches. At SP 546 gun 20 on, capacity 760 cubic inches. At SP 557 gun 3 off, gun 18 on, capacity 760 cubic inches. Parity errors on SP 250. Depth indicator between sections 21 and 22 leakage at start of line. Completed line at SP 859.
March 3	WB82-47	Direction 220°. Start of line SP 001. Reel number 060758 to 060770. Guns 8, 9, 11, 12, 14, 16, 17, 19 and 20 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Noise on cable caused by ship between SP 80 to SP 220. Depth indicator between sections 21 and 22 leakage at start of line. Completed line at SP 751. This line data was scratched as three Sat. fixes were rejected during recording.
March 4	WB82-13 EXT	Direction 000°. Start of line SP 001. Reel number 060771 to 060777. Guns 4, 10, 11, 12, 13, 14, 15, 16, 17 and 20 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Parity errors on SPs 87, 88, 91 and 358. Depth indicator between sections 21 and 22 leakage at start of line. Completed line at SP 363.

Date	Line No.	Description
March 4	WB82-53	Direction 153°. Start of line SP 001. Reel number 060778 to 060796. Guns 1, 2, 4, 5, 6, 7, 8, 9 and 10 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Missed SPs 1003 and 1004 on tape deck chnages. Parity errors on SP 936. Leakage in depth indicator between sections 21 and 22. Completed line at SP 1181.
March 4	WB82-52	Direction 302°. Start of line SP 001. Reel number 060797 to 060824. Guns 10, 11, 12, 13, 14, 16, 17, 18 and 20 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Lost SPs 211 to 217 due to Sat-Nav problems. At SP 892 guns 14 and 20 off, SP 894 gun 4 on, capacity 750 cubic inches. At SP 898 gun 4 off, gun 3 on, capacity at 760 cubic inches. Noise on cable caused by passing ship between SP 680 to SP 720. Parity errors on SPs 443, 596, 860, 861, 862, 865, 1243, 1274 and 1558. Leakage in depth indicator between sections 21 and 22. Completed line at SP 1666.
March 4	WB82-47A	Direction 040°. Start of line SP 001. Reel number 060825 to 060836. Guns 1, 2, 4, 6, 7, 8, 9, 10 and 20 on, capacity 760 cubic inches. 5 second records. Leakage in group 19 at start of line. Parity errors on SP 92. Depth indicator between sections 21 and 22 ground at start of line. Completed line at SP 751.

NAVIGATION

SECTION III

1. NAVIGATION SYSTEM DESCRIPTION

The WINS Phase IV

Western Geophysical's WINS(R) (Western Integrated Navigation System) is comprised of four main sub-systems; 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 sub-systems 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 SUBSYSTEM

Doppler 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 past. 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.

DATA PROCESSING

SECTION IV

Data Processing

206062

Introduction

In February 1982, Western Geophysical Company shot 14 lines, approximately 347 km of marine data offshore Australia, Permit T - 16 (Egg Island) for Weaver Oil And Gas Corporation. The digital processing for this survey was performed by GeoCenter, Inc. of Houston, Texas from February 1982 to April 1982.

The primary navigation system used was WINS PHASE. The secondary navigation system was SAT - NAV.

The seismic recording was done on a DFS V system. The DFS V recorded 96 channels in SEG-B format at a 2 ms sampling interval for 5 seconds. The field filter settings were a low cut out and a high cut out of 128HZ with a slope of 70 db/octave.

The cable used was a 96 group streamer which was pulled at an average depth of 12 meters. Each group consisted of 20 phones evenly spaced with a 25 meter spacing between group centers.

The energy source consisted of an array of 10 air guns with a capacity of 760 cubic inches and 4500 PSI. A shot was made every 25 meters at a depth of 6 meters.

Demultiplex

The data was demultiplexed into trace sequential SEG-Y 32-bit floating point format using our PREP program. During the demultiplex run the near trace was edited to a secondary tape and displayed to check the results of the demultiplex program and to determine velocity analysis locations. Also at this time the data was resampled from 2 ms to 4 ms. An anti-alias filter before resampling was not deemed necessary since the field filter had eliminated the problem.

Testing - Deconvolution

Testing was done on various lines. The geometry tests conducted were adjacent-trace and two-pop sum and also a combination of both. These tests revealed after client review that summing should be performed. The summing improved the signal to noise ratio. Various deconvolution before stack tests were performed. After reviewing the tests with the client, it was decided that a 32 ms predictive distance and a 160 ms operator length was the optimum prestack decon for this data. Post stack deconvolution tests were also performed and after client review it was decided that no post stack decon was necessary.

Our IGEM program then generated common depth point ordered tapes in SEG-Y format incorporating in the trace headers all the basic information regarding field parameter such as spread distances and line geometry. A 2:1 adjacent trace sum was performed at this time prior to CDP sort.

Prior to deconvolution a geometric spreading correction was applied to compensate for spherical divergence. Deconvolution was then performed using the Wiener - Levinson least squares minimum phase algorithm. The design gates for the deconvolution operators varied as a function of the distance of the trace from the source. A new operator was calculated for each trace. Auto correlations were computed before and after deconvolution, providing a check on the effectiveness of the decon.

Velocity Analysis

Velocity analyses were performed using the constant velocity stack method. Six adjacent deconvolved CDP gathers were used. These analyses were performed at the rate of 1 per 2 km. The results were displayed in a variable area, wiggle trace mode using a versatec electrostatic plotter. The stacking velocity functions were determined from these analyses.

Normal Moveout Application And CDP Stacking

Normal moveout corrections were applied to each trace on a fractional millisecond basis. The program used a 16 point Lagrangian operator for interpolation. The velocity functions were input at specified CDP locations along the line. Velocities were then interpolated between input points on a CDP basis. Within each velocity function, RMS velocities were linearly interpolated between control points. Traces were muted individually after normal moveout application. 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 the relative recorded time-varying amplitude of the trace.

Quality control of the applied velocity functions was performed by generating an ISO-VELOCITY plot. Where deemed necessary revised velocity functions were used to compute the normal moveout corrections.

Time - Variant Filtering

Time variant zero phase digital filter tests were run to determine the optimum filter pass-bands and times of application. Filter pass-bands were chosen after client review and the filters and times of application are noted in the section headers for each line. These filters were both space and time-variant in order to follow structural trends. Filter slopes are also noted in the side label.

Conclusion

All final sections were checked for quality and approved prior to release. All questionable data was investigated and revised where necessary. The sections were displayed at a vertical scale of 2.5 in/sec and a horizontal scale of 24 tr/in. All velocity information i.e. "knee points", line ties, and water depth were noted at the top of the section.

J. S. Hayhre
Data Processing Manager

GRAVITY/MAGNETICS

206070

PROCESSING GRAVITY/MAGNETIC DATA

IN

BASS BASIN

EGG ISLAND AREA

OFFSHORE AUSTRALIA

1982 SURVEY

for

WEAVER OIL AND GAS

by

AERO SERVICE DIVISION
WESTERN GEOPHYSICAL COMPANY
OF AMERICA

AUGUST, 1982

SECTION V

THE GRAVITY AND MAGNETIC SURVEY

The Gravity and Magnetic field survey was performed on Weaver Oil and Gas Permit T-16/P between February 22, 1982 and March 4, 1982 by Western Geophysical Company of America, Party 86 on board the M/V Western ODYSSEY. The gravity meter used was La Coste 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 the survey was made at Port Victoria, Australia and a base value of 980,038.85 milligals 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 coordinates were provided by Western Geophysical Company of America using the ARGO navigation system. There were approximately 1,140 kilometers of gravity and 1,354 kilometers of magnetics recorded with 55 line segments. All gravity and magnetic data was directly tied to the previous bass basin survey shot in April, 1981.

The portion of the survey that can be attributed to T-16/P is 345 km of gravity recorded and 363.6 km of magnetics recorded with 15 line segments.

PROCESSING FLOW

Plate 10 shows the data processing flow for the gravity and magnetics processing. The following paragraphs discuss each of the steps involved in the data processing flow.

A. Edit - This program processes the field tape data at 20 second intervals and outputs a gravity and magnetic sample at every minute by averaging the current sample with the samples occurring 20 seconds earlier and 20 seconds later. Before averaging, each sample is checked to see if the value falls within a reasonable accepted range for such data. If a value falls outside the acceptable range, it is not used in the average. A delta value check is made also. The values used were:

	DELTA	MINIMUM	MAXIMUM	
Gravity	333	55,000	70,000	Counter Units
Magnetics	666	25,000	60,000	Gammas

These numbers were based on empirical information gathered during previous data processing.

B. Gravity/Magnetics Update - This program is used to make changes to line numbers, water depths, or to manually update sensor information when obvious errors such as one point spikes not trapped by the edit program appear on the quality control profiles.

C. Navigation Reformat - This program changes the format of the navigation tapes to Aero's standard gravity/magnetics tape format to facilitate further processing.

D. Navigation Resequence - This program records all navigation data to coincide with the gravity and magnetics data.

E. Navigation Merge - After the reformatting and resequencing operations have been performed, this program merges the navigation data with the gravity and magnetics data, scales gravity counter units to milligals using the gravity meter constant, scales gravity counter units to milligals using the gravity meter constant, and computes latitude corrections. Latitude corrections are computed using the algorithm for the Geodetic Reference System, 1967 (GFGRS, 1967). If any discontinuities (large distance jumps) or missing data exist, the affected samples are flagged. All subsequent processes are performed using the merged gravity magnetics formatted (GMI) tape. It was noticed at this point that there was 1 line segment of gravity data where the gravity meter had malfunctioned. This line was deleted from further processing and is listed as follows:

WB82-47A

F. Eotvos Effect Removal - This program reads the GMI tape and computes a raw Eotvos correction for each sample using the following formula:

E = 7.5 * S * COS (LAT) * SIN (HEAD)

where

E = Eotvos correction

S = Ship's speed in knots

LAT = Ship's latitude

HEAD = Ship's heading

Speed and heading are computed from the time, latitude, and longitude of the tape record. These raw Eotvos numbers are smoothed in a three (3) point running average synthetic operation and then filtered using a parabolic recursive filter passing frequencies below 0.0007 Hz. This filter setting has proven to be effective in reducing high frequency noise jitter associated with ship motion and navigation resolution. The final filtered Eotvos correction is applied to each free air gravity sample and all values are written onto the output tape.

G. MAGNETIC REGIONAL REMOVAL AND HORIZONTAL GRADIENT CALCULATION - This program reads the GMI tape and computes the earth's normal magnetic field using the International Geomagnetic Reference, 1975 updated to 1981. Each sample's latitude, longitude, and time is used to develop a unique value for that sample. This program also calculates the magnetic horizontal gradient from the gradiometer system's master and slave sensors by subtraction and division by the distance between sensors where applicable.

H. FILTERING - Low pass filtering operations are performed on both the gravity and magnetics data. The magnetics filtering is used to smooth high frequency instrument noise and the gravity filter is used to smooth the effects of the sea state and wave action. Each preliminary profile is examined and a particular filter length is chosen manually to compensate for the observed "noise". A filter length of 0.0003 Hz. was used for the gravity data and 0.0008 Hz. was used for the magnetic data. After the filtering process, each line is checked by plotting profiles displaying water depth, Eotvos, free air gravity without Eotvos correction, unfiltered free air gravity with Eotvos correction, filtered free air gravity with Eotvos, and unfiltered magnetics. Any error conditions (such as direct or inverse correlation of Eotvos correction and Bouguer gravity, improper filtering, or errors in water depths) are spotted and corrected before further processing.

I. INTERSECTION PICKER - Latitude and longitude coordinates from the GMI tape are input to this program and an intersection algorithm calculates sample times at which lines cross one another. Subsequent processing programs use this intersection information to compute statistics for applying systematic corrections.

J. INTERSECTION MISTIE - By using the intersections determined in the Intersection Picker Program and the sensor data tape output by the Filter Program, this program calculates the filtered free air gravity and filtered magnetics misties at intersections. The average free air mistie is 7.67 milligals, and the average magnetics mistie is 14.18 gammas.

K. FREE AIR SYSFIX - The sensor data output from the Filter Program and the mistie data are used to compute a systematic adjustment bias for each line by the method of least squares. The data is then corrected by adding the applicable bias to each line. The average filtered adjusted free air gravity mistie for the survey after this process is 2.36 milligals.

L. MAGNETICS SYSFIX - Next the same procedure as above is used to systematically adjust the magnetics data. The average magnetics mistie for the survey for the adjusted filtered magnetics is 8.36 gammas.

M. BOUGUER AND TERRAIN CORRECTION - The water depths values at each sample are used to compute Bouguer and terrain corrections for application to the adjusted free air gravity. The terrain corrections are two (2) dimensional and are computed by the Talwani et al method referenced in the Journal of Geophysical Research, Vol. 64, No. 1 January, 1959, page 49. The first and last depth for each line is extended to infinity for purposes of this calculation.

N. INTERSECTION MISTIE - This program is run next to compute mistie in the unadjusted Bouguer gravity after the above correction have been applied. The average mistie for the unadjusted Bouguer gravity is 12.11 milligals.

O. BOUGUER GRAVITY SYSFIX - Using the sensor data output by the Bouguer and terrain correction program and the mistie information listed above, a systematic error correction is computed and applied using least squares to minimize the average errors across the entire survey. After applying this correction for the survey, the average mistie is 2.32 milligals.

P. FINAL GRAVITY/MAGNETICS PROFILE - This program creates a Calcomp drum plot tape from the sensor data contained on a GMI tape. This tape is fed to a Calcomp 1052 drum plotter and the final gravity and magnetics profiles are plotted on 10" gridded paper. The horizontal scale of the profiles for the survey is 1 inch = 2,450 meters. Vertical scales of the plotted curves are listed below:

GRAVITY:

a) Final Bouguer Gravity @ 5 milligals/inch
b) Adjusted Free Air Gravity @ 5 milligals/inch
c) Adjusted Bouguer Gravity @ 5 milligals/inch
d) Eotvos Correction @ 5 milligals/inch
e) Water Depths @ 20 meters/inch

MAGNETICS:

f) Adjusted Raw Magnetics @ 20 gammas/inch
g) Total Magnetic Intensity @ 20 gammas/inch

In addition to the above presentation, a set of gravity and magnetic profiles were produced on 10" gridded mylar with the horizontal scale of 1" = 575 meters matching the seismic sections scale. Vertical scales of the two plotted curves are as follows:

h) Final Bouguer Gravity @ 5 milligals/inch

i) Total Magnetic Intensity @ 20 gammas/inch

Q. GRAVITY/MAGNETICS MAPMAKER - This program creates a Flatbed plot tape from the sensor data contained on a GMI tape, this data is fed to a 748 Flatbed plotter and the final mylar maps on which the contours are drafted are made. The maps are at a scale of 1:100,000. The projection used was Universal Transverse Mercator with the spheroid being Australian National. The central meridian is 147°E. The maps are bounded on the south by latitude 41°00'S, on the north by latitude 148°00'E. and extend eartward from longitude 144°00'E to longitude 146°00'E. The maps are covering the entire survey area are as follows:

a) Six (6) Total Magnetic Anomaly Map @ contour interval = 10 gammas (MAPS 1-5) and 20 gammas (MAP 6)

b) Six (6) Bouguer Gravity Map @ contour interval = 1 milligal.

206078

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 (HHMMSS)
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

60-Word Records, 100 Records (24404 Bytes) per Block, Fortran unformatted.

INTERPRETATION

SECTION V

General

The Egg Island Marine seismic survey program detailed structural leads developed by preceding surveys, and furnished a fill-in of some wide reconnaissance traverses, thus permitting a more reliable definition of the principal structural and fault trends.

A seismic tie between the survey area and the Pelican #1 well was established during the Stoney Head seismic survey in 1981. The correlation is somewhat tenuous due to the great distance involved and the significant variations in signal character, nevertheless it does provide valuable stratigraphic control.

Map Horizons

Semicontinuous reflective horizons have been mapped. The top of the Eastern View Coal Measures ia a very good, easily correlatible event that was carried over the permit area. The M-diversus reflector is semicontinuous and more difficult to correlate. The high amplitude events of the Eastern View Coal Measures generates a series of multiples that tend to mash and over-ride the M. diversus reflectors which have a lower reflection co-efficient.

Structural Features of Interest:

Tasmanian Devil Prospect - A prominent structural feature located along the S.S.W. margin of the Basin was identified from earlier surveys and mapped at different horizon levels. It is a deep seated tilted fault block well illustrated by both the old and the new seismic data. The Eastern View Coal Measures is carried across this anomaly and has approximately 600-800' of prospective section at the highest structural point. It is undetermined at this point if the M. diversus reflector can be carried across this feature, due to the seismic interference created by the EVCM. It is quite obvious that the Lower Eocene and Paleocene reflectors thin dramatically on the NE flank of T-Devil, and how much section is present on the crest of the structure is not determined at this time. Gravity and magnetics modeling is presently being undertaken to try to resolve this question.

The area north and east of T-Devil which includes a portion of Permit T-15/P has been mapped, but has failed to indicate additional prospective features.

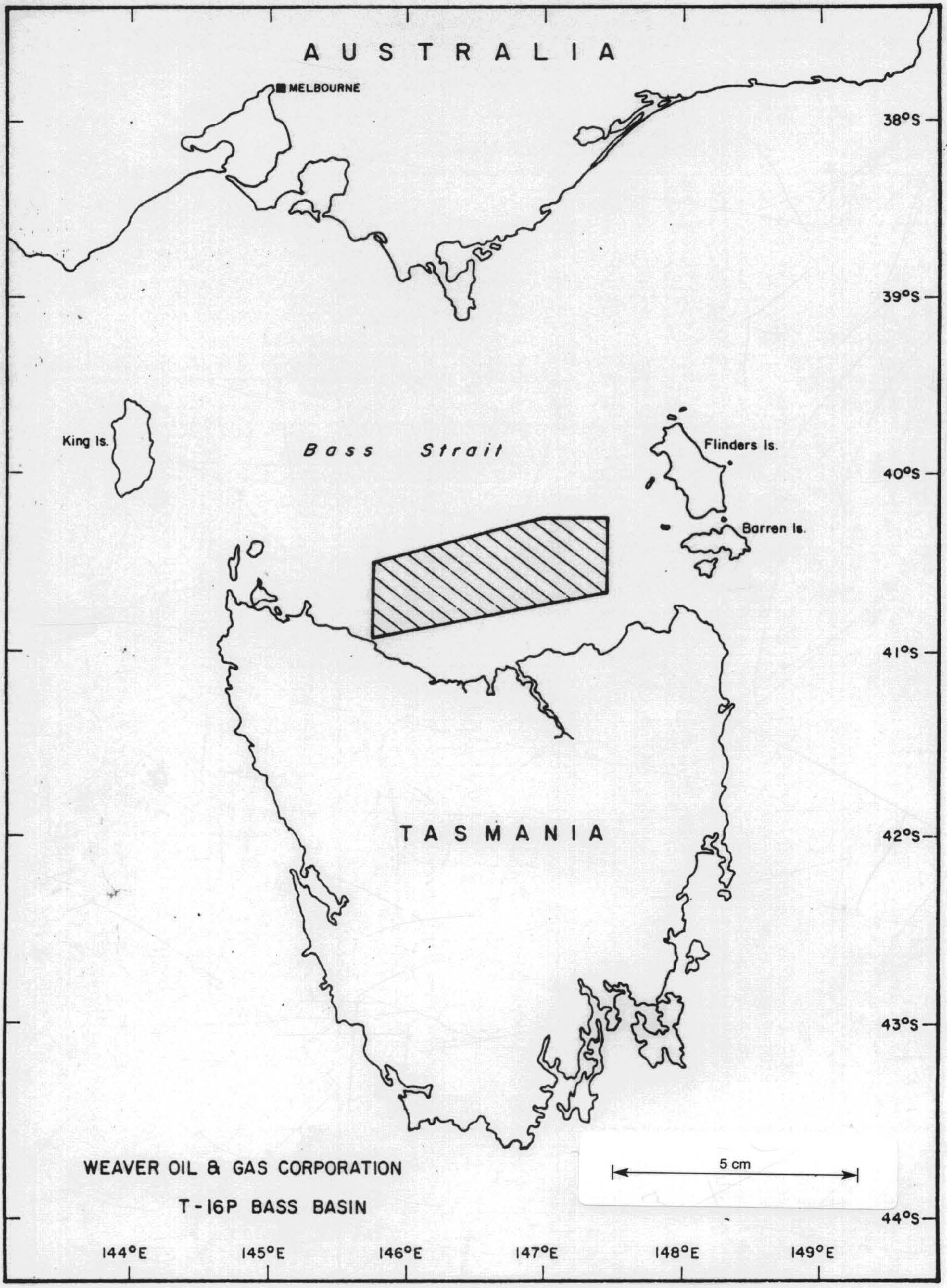
LIST OF PLATES

SECTION VI

List of Plates

PLATES

206085



WEAVER OIL & GAS CORPORATION

T-16P BASS BASIN

PLATE 1

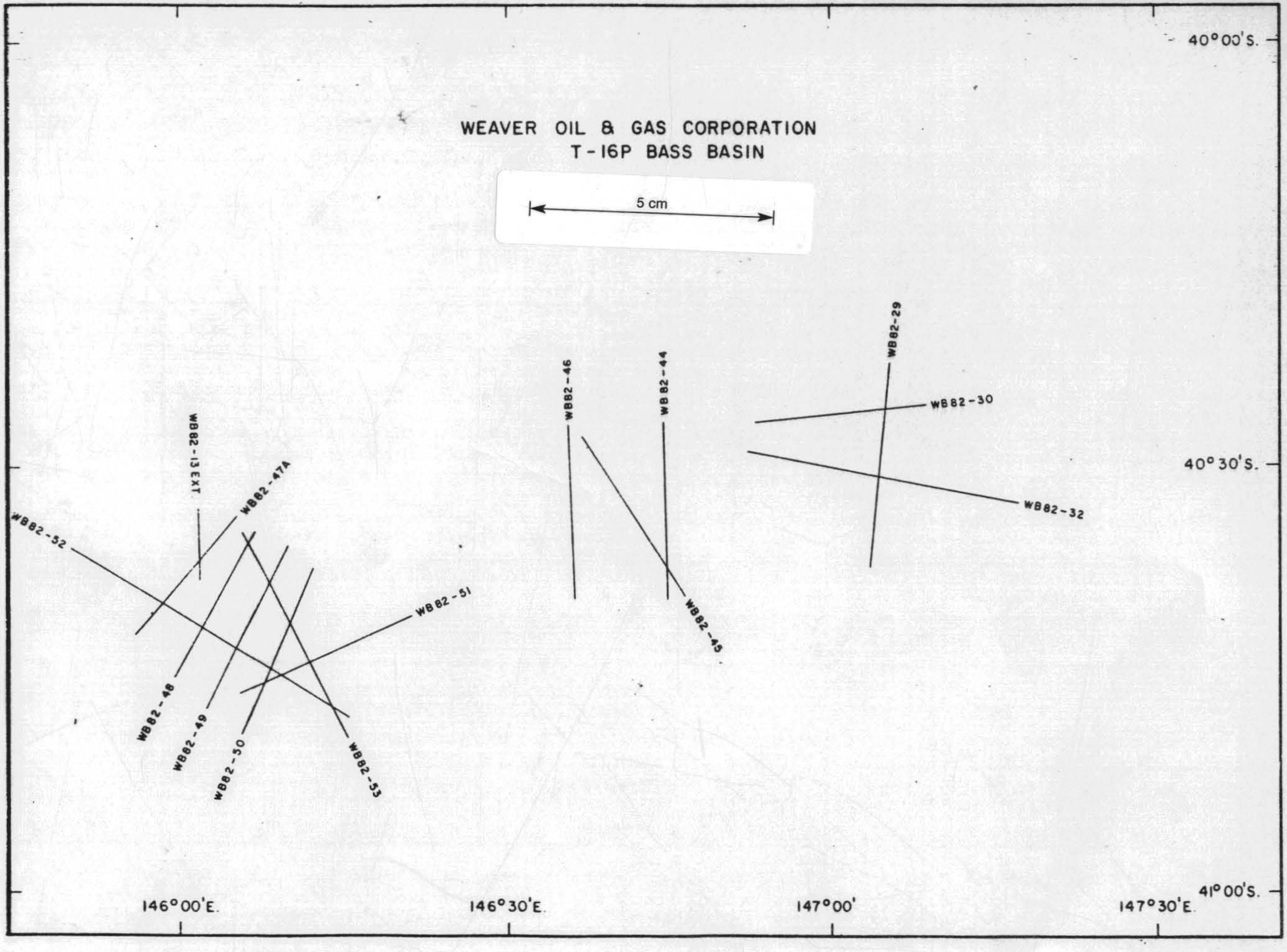
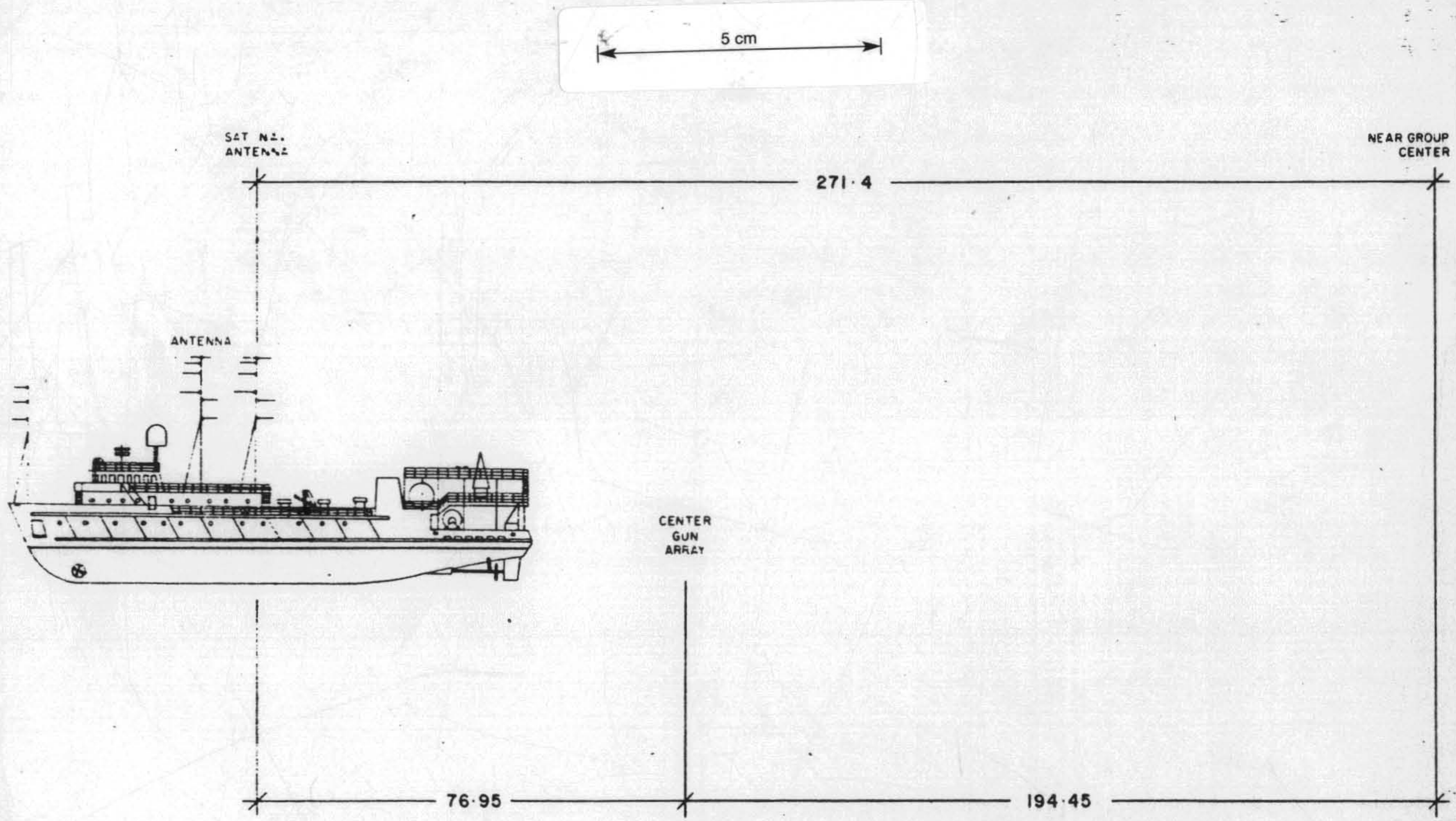


PLATE 2

20686



WESTERN ODYSSEY PARTY 86

(DISTANCES IN METERS)

WESTERN ODYSSEY

96 GROUP CABLE CONFIGURATION

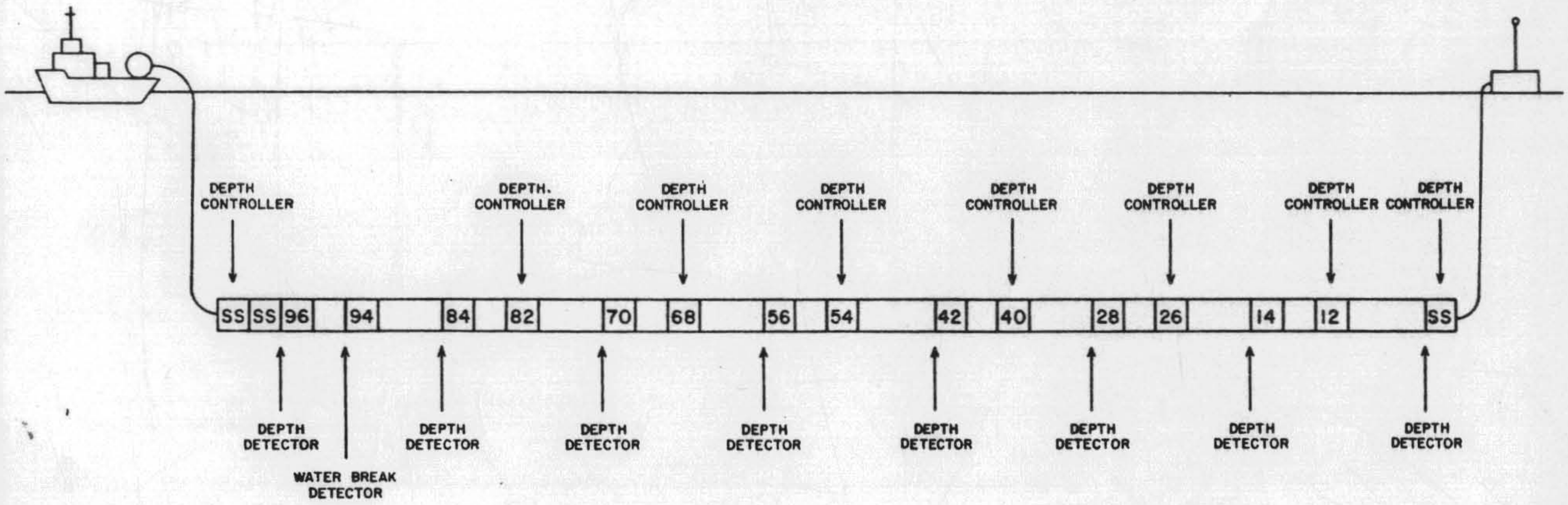


PLATE 4

20688

WESTERN ODYSSEY PARTY 86
GUN ARRAY CONFIGURATION

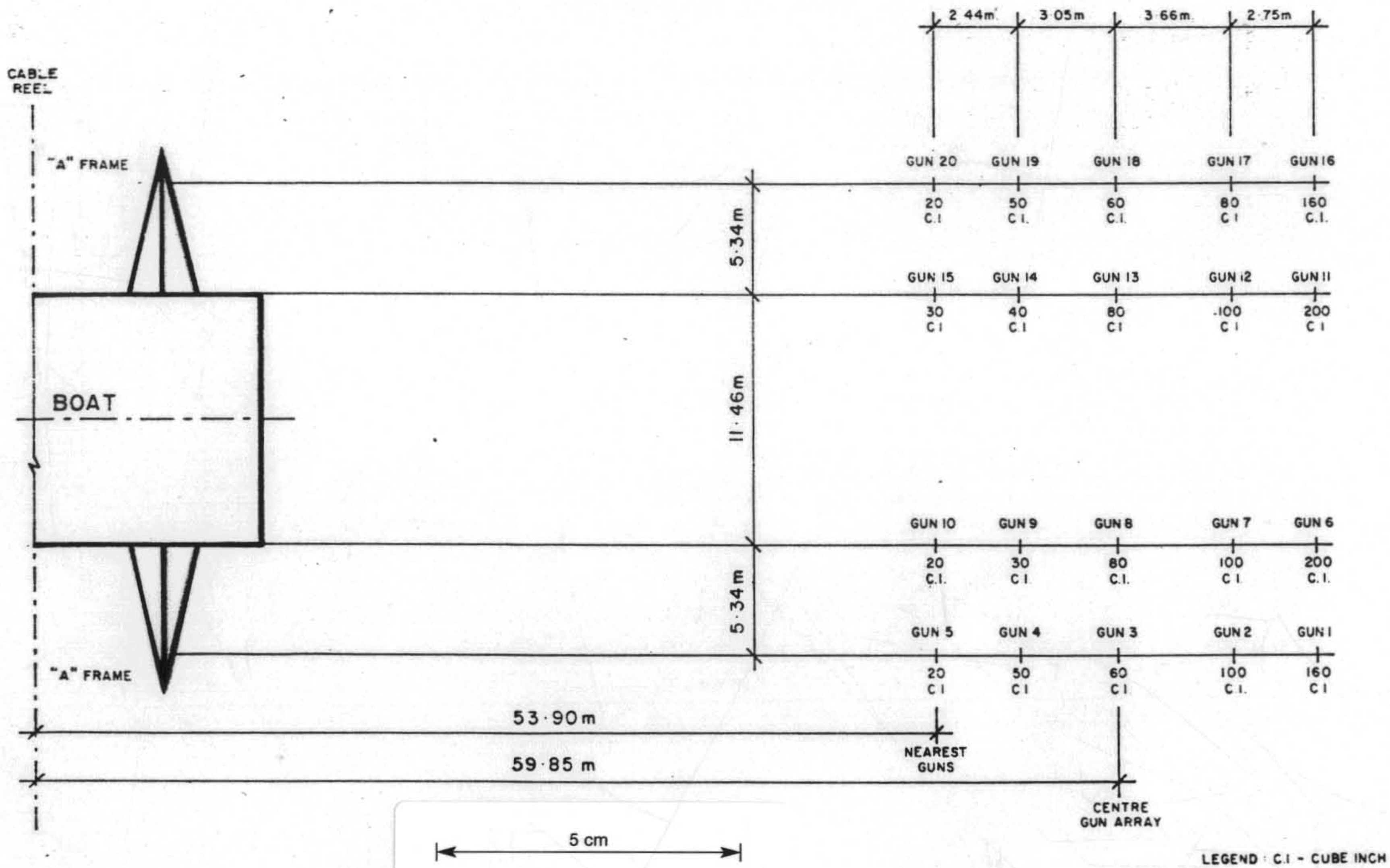


PLATE 5

206089

HYDROPHONE CONFIGURATION

WESTERN ODYSSEY 96 CHANNEL

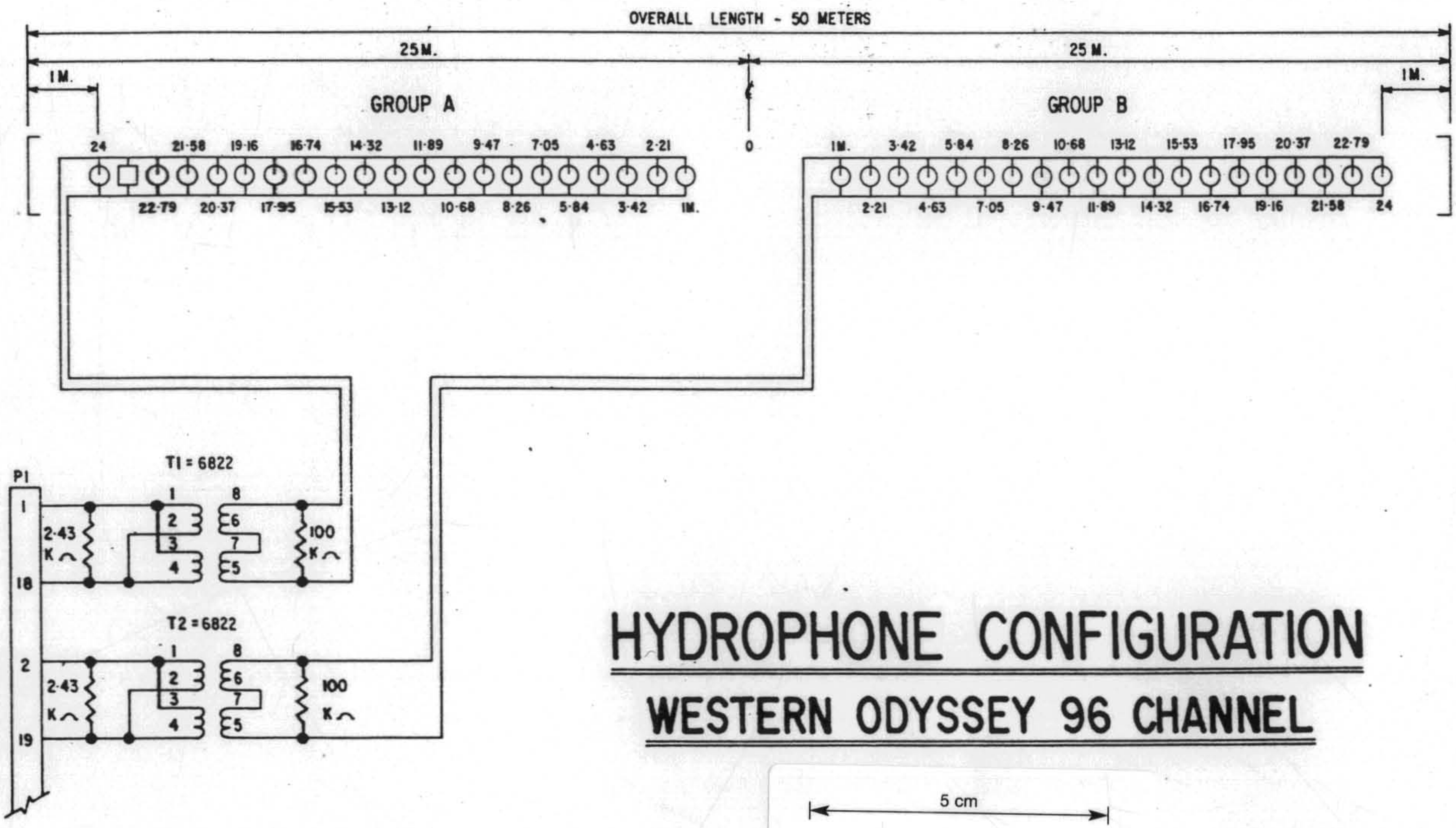
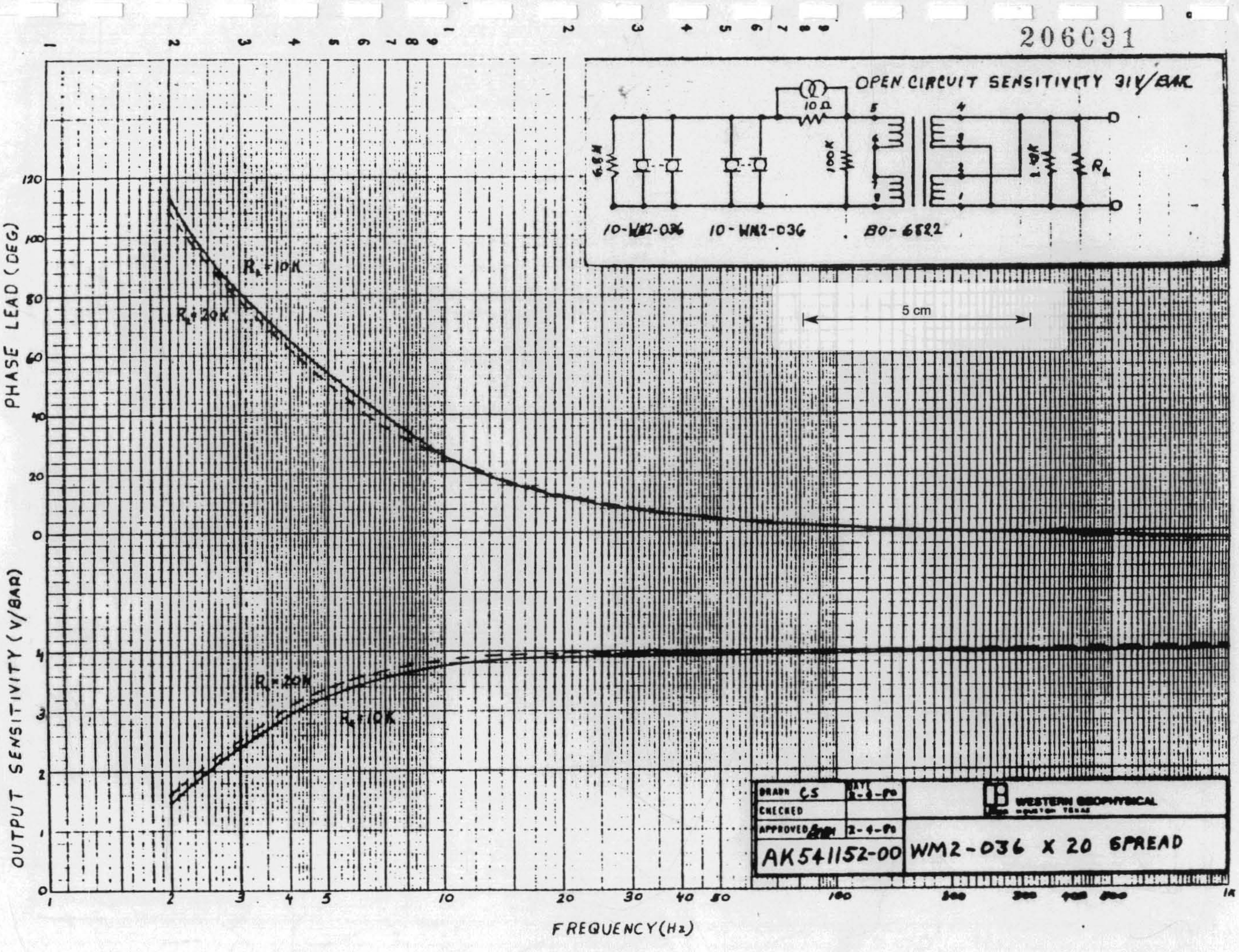


PLATE 6



206091
OPEN CIRCUIT SENSITIVITY 31V/BAR
10 Ω
6.8M
100K
R_L
10-WM2-036
10-WM2-036
BO-6822
5 cm
PHASE LEAD (DEG)
R_L=10K
R_L=20K
OUTPUT SENSITIVITY (V/BAR)
FREQUENCY (Hz)
DRAWN CS
DATE 2-4-80
CHECKED
APPROVED
2-4-80
AK541152-00
WESTERN GEOPHYSICAL
WM2-036 X 20 SPREAD

PLATE 7

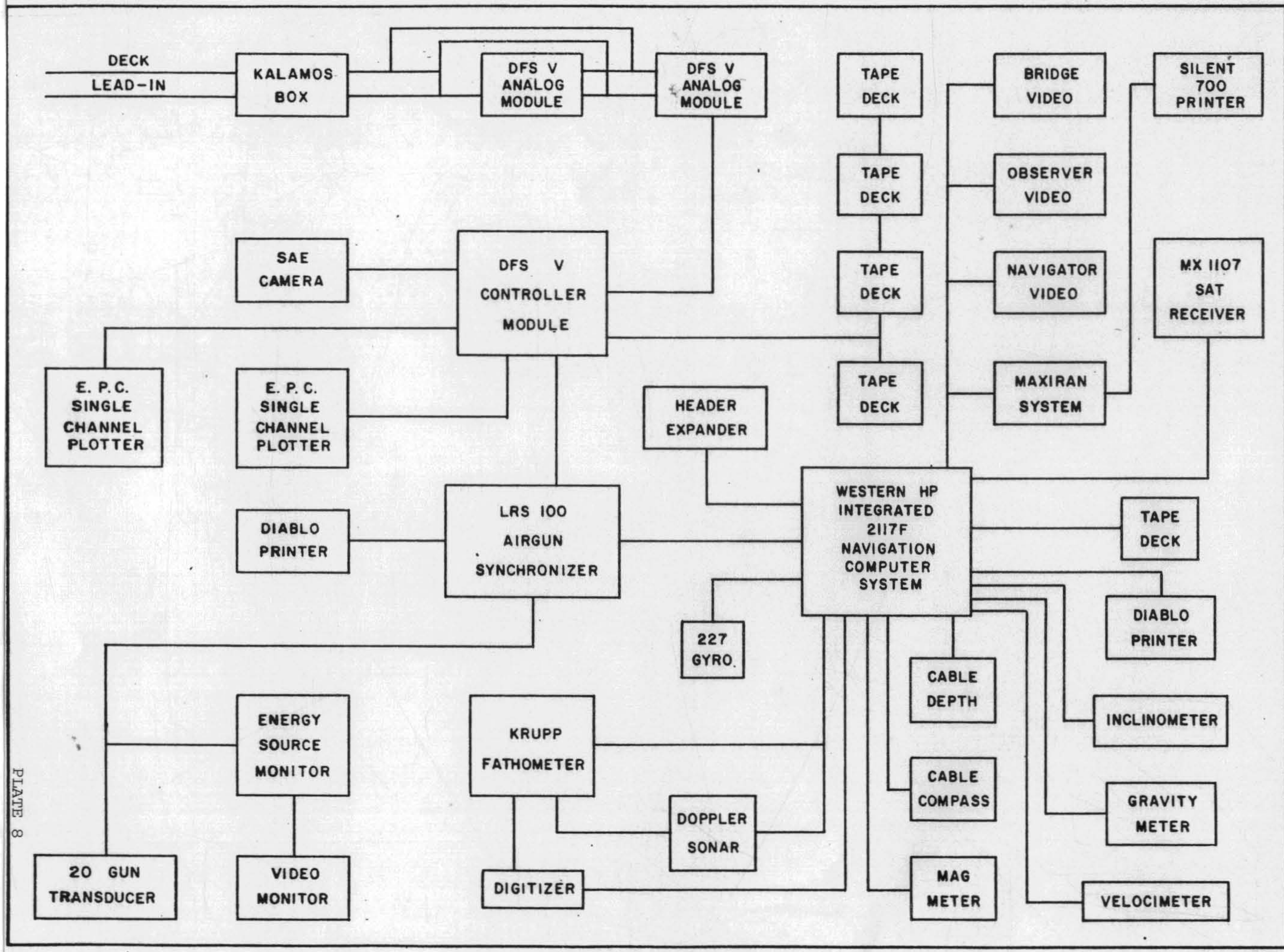
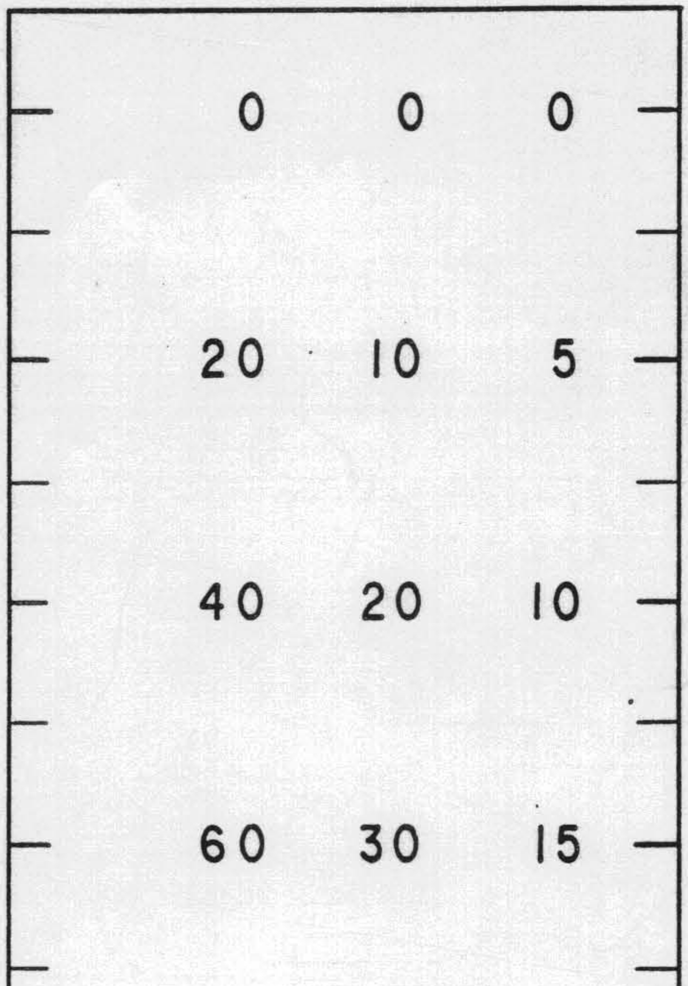


PLATE 8

BLOCK DIAGRAM

20692



FATHOMETER SCALE

PLATE 9

206094

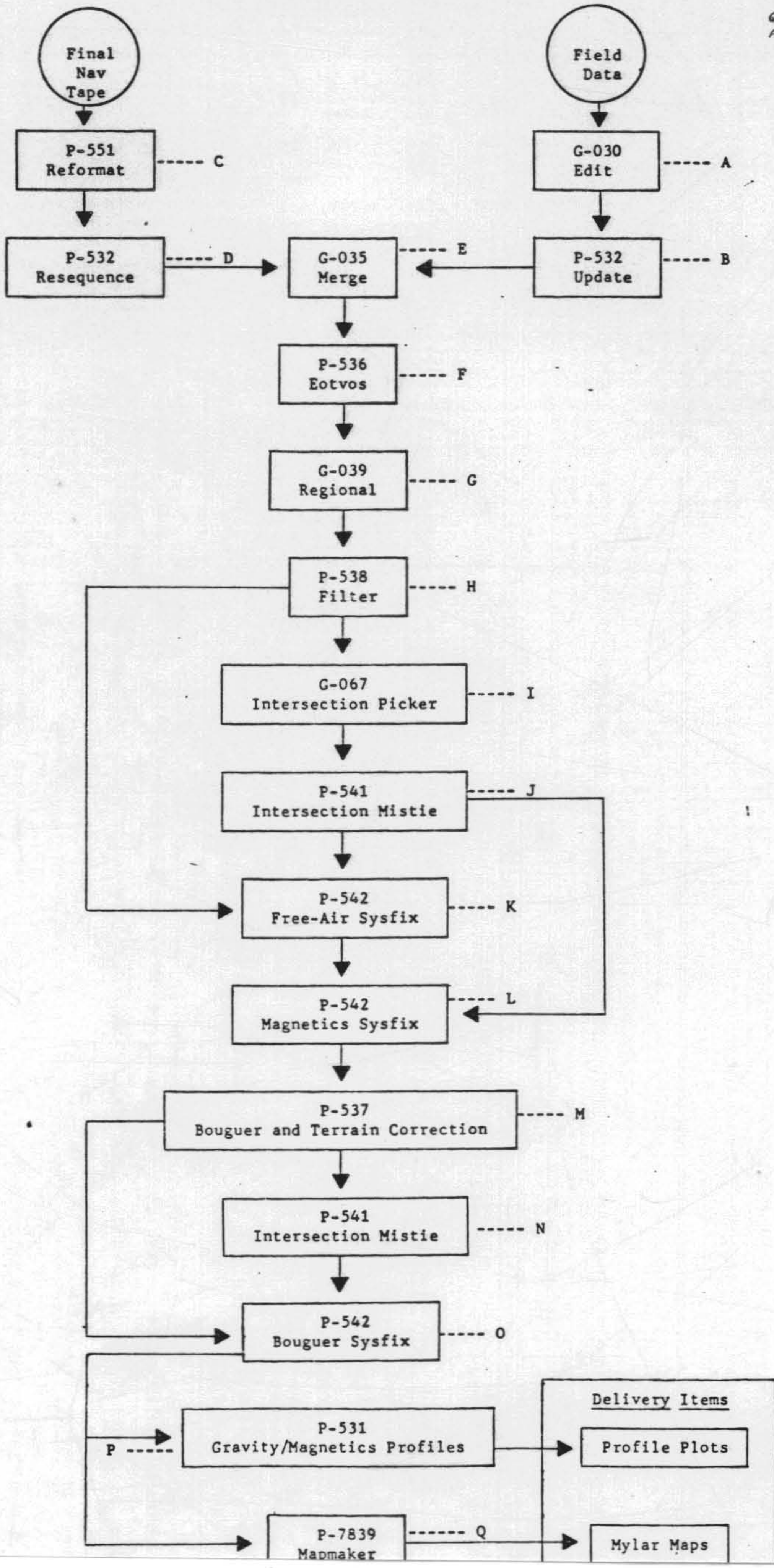


PLATE 10

BASIC DATA

SECTION VII

Basic Data Submitted

- Magnetics Profile showing:
  - Adusted Bouguer Gravity (MGLS)
  - Total Magnetics Intensity (GAMMAS)
  - Raw Magnetics (GAMMAS)
- Bouguer Gravity Profile showing:
  - Bouguer Gravity (MGALS)
  - Adj. Free Air Gravity (MGALS)
  - Filtered Eotvos Gravity (MGALS)
  - Water Depth (Meters)
- Bouguer Gravity Map - C.I. = 1 MGAL - Density = 2.2
- Total Magnetics Intensity Map - C.I. = 10 GAMMAS
- Total Magnetics Intensity Map - C.I. = 20 GAMMAS
- Final Bouguer Gravity/Total Magnetic Intensity Profiles showing:
  - Final Bouguer Gravity - 5 MGALS/in
  - Final Total Magnetic Intensity - 20 GAMMAS/in
- Navigation Data - Computer Printouts - Postplots
- Shot Point Location Map with Water Depth in Feet
- Shot Point Location Map

Seismic Lines

WB82-13 ext	SP 1-363
WB82-29	SP 1-1018
WB82-30	SP 1-944
WB82-32	SP 1-560
WB82-44	SP 1-927
WB82-45	SP 1-1008
WB82-46	SP 1-875
WB82-47A	SP 1-751
WB82-48	SP 1-859
WB82-49	SP 1-929
WB82-50	SP 1-920
WB82-51	SP 1-982
WB82-52	SP 1-1666
WB82-53	SP 1-1181

List of Interpretive Data Submitted

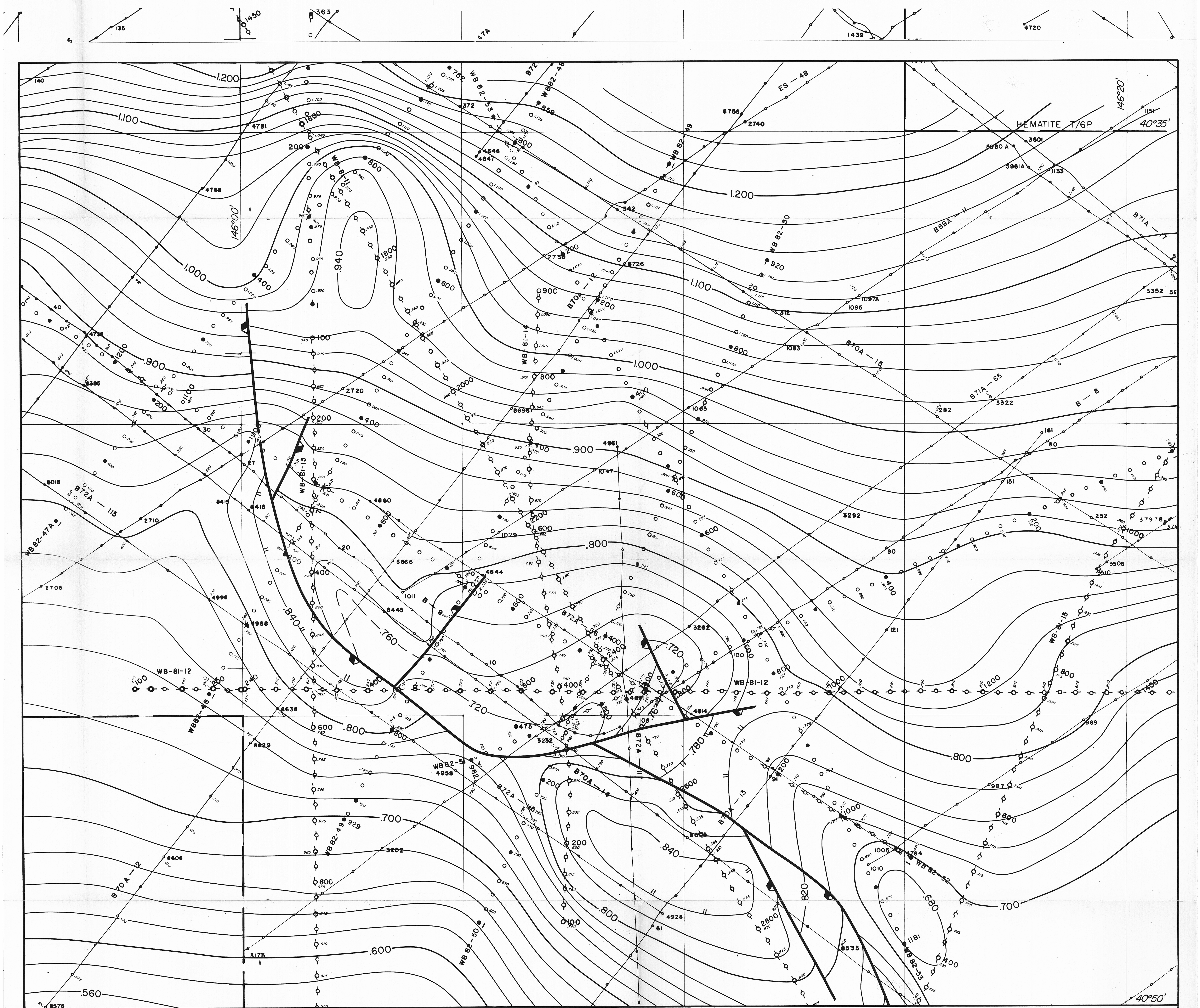
Seismic Time Structure Map - Tasmanian Devil Prospect
Eastern View Coal Measures

Seismic Time Structure Map - Tasmanian Devil Prospect
M. diversus Reflector

Seismic Time Structure Map - Regional
M. diversus Reflector

Seismic Time Structure Map - Regional
Paleocene Reflector

Seismic Isochron Map - Tasmanian Devil Prospect
Eastern View Coal Measures - Paleocene



AREA OF CLOSURE: 14,700 acres
VERTICAL CLOSURE: .060 sec. (254 feet)
DEPTH TO MAP HORIZON: .720 sec. (2310 feet)
WATER DEPTH: 228 feet

WEAVER OIL AND GAS CORPORATION, AUSTRALIA

T-16-P

TASMANIAN DEVIL PROSPECT
EASTERN VIEW COAL MEASURES

SEISMIC TIME STRUCTURE MAP

GEOPH: J.D. DOWNING/lal 206099 DRFT: lal

0 1 2 3mi
0 1 2 3 4 5km

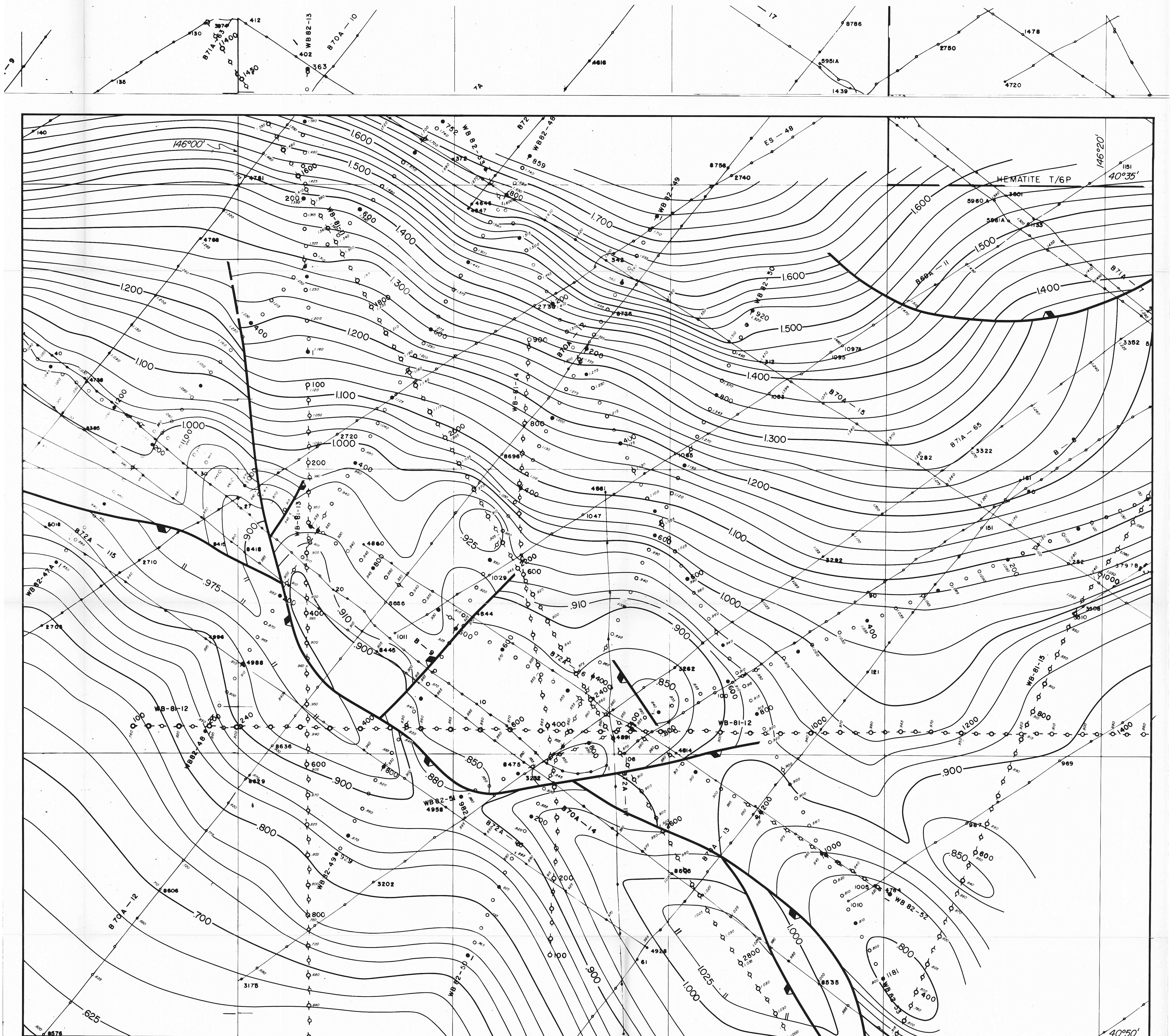
C.I.: .020 sec. SCALE 1:50,000 JULY 1982

5 cm

T/16P Part 3

OR-193 VOL II

①



AREA OF CLOSURE: 16,000 acres
VERTICAL CLOSURE: .060 sec. (275 feet)
DEPTH TO MAP HORIZON: .850 sec. (2872 feet)
WATER DEPTH: 228 feet

WEAVER OIL AND GAS CORPORATION, AUSTRALIA

T-16-P

TASMANIAN DEVIL PROSPECT

M. diversus

206100

SEISMIC TIME STRUCTURE MAP

GEOPH: J.D. DOWNING

DRFT: lal

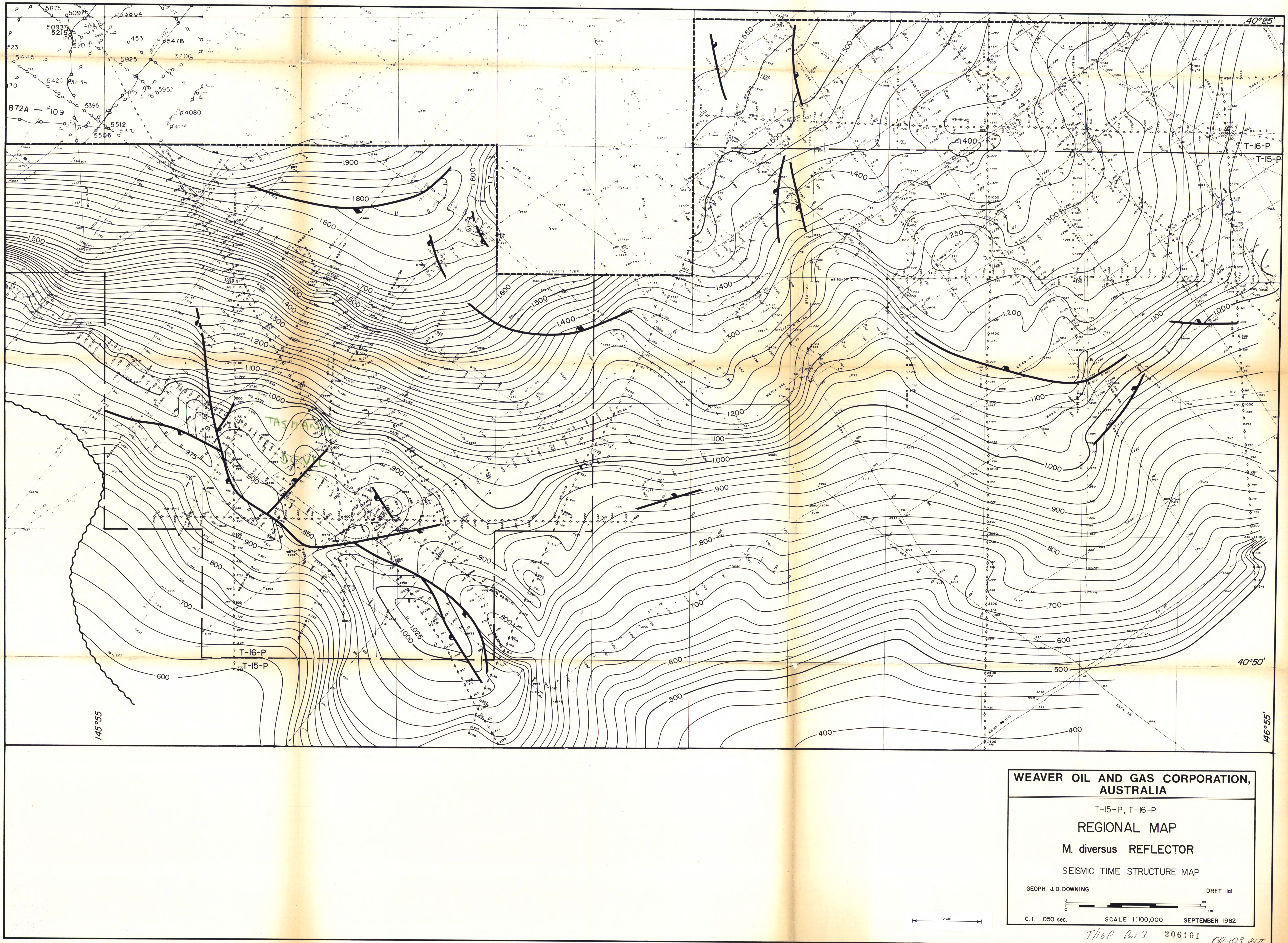
C.I.: .025 sec. SCALE 1:50,000 JULY 1982

5 cm

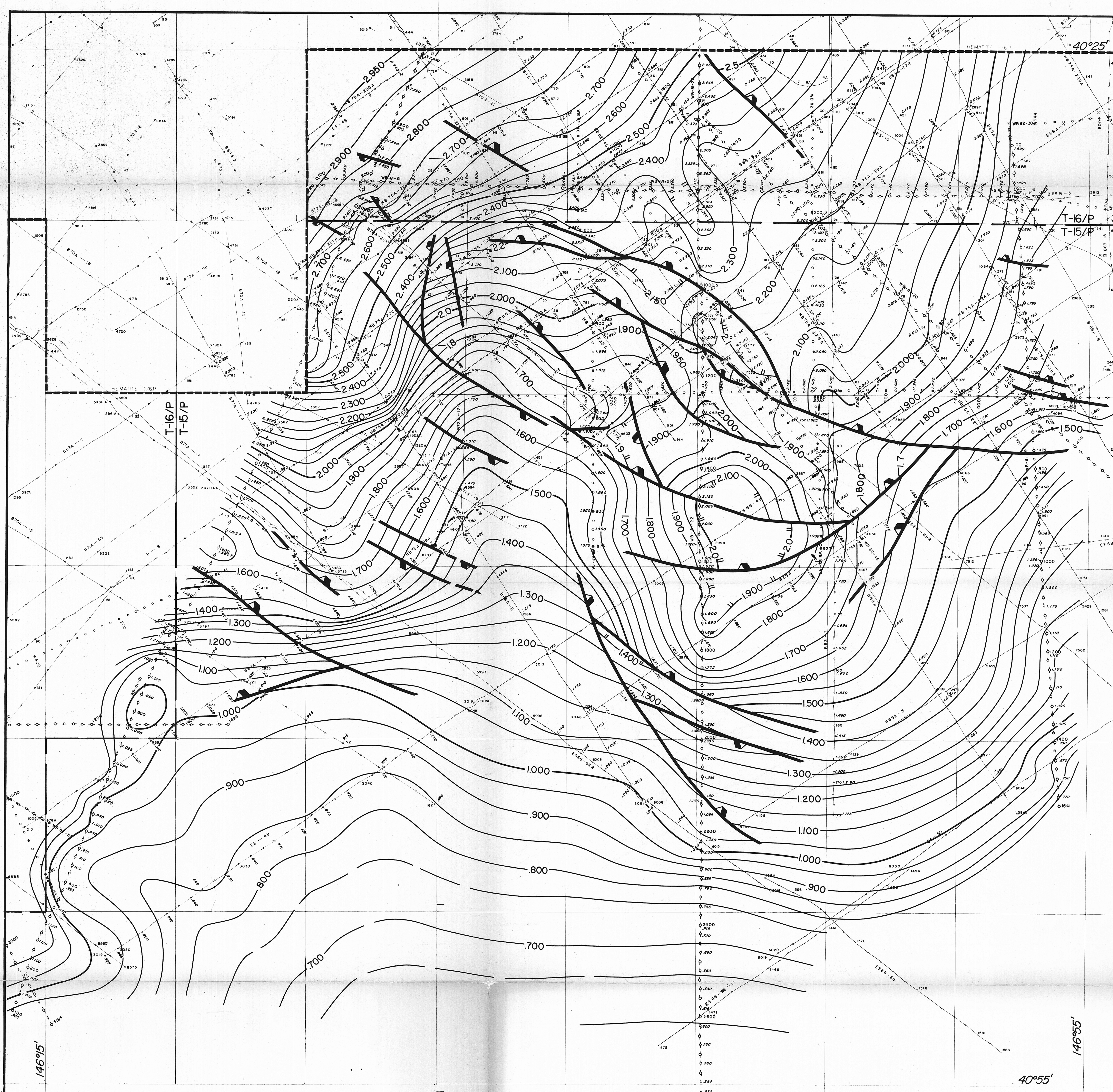
T/16P Part 3

OR-193 Vol II

(2)



T/16P Pr 3 206101 OR-193 Vol II



WEAVER OIL AND GAS CORPORATION, AUSTRALIA

T-15-P, T-16-P

REGIONAL MAP

206102

PALEOCENE REFLECTOR

SEISMIC TIME STRUCTURE MAP

GEOPH: J. D. DOWNING

DRFT: lal

0 2 4 6 mi
0 2 4 6 8 10 km

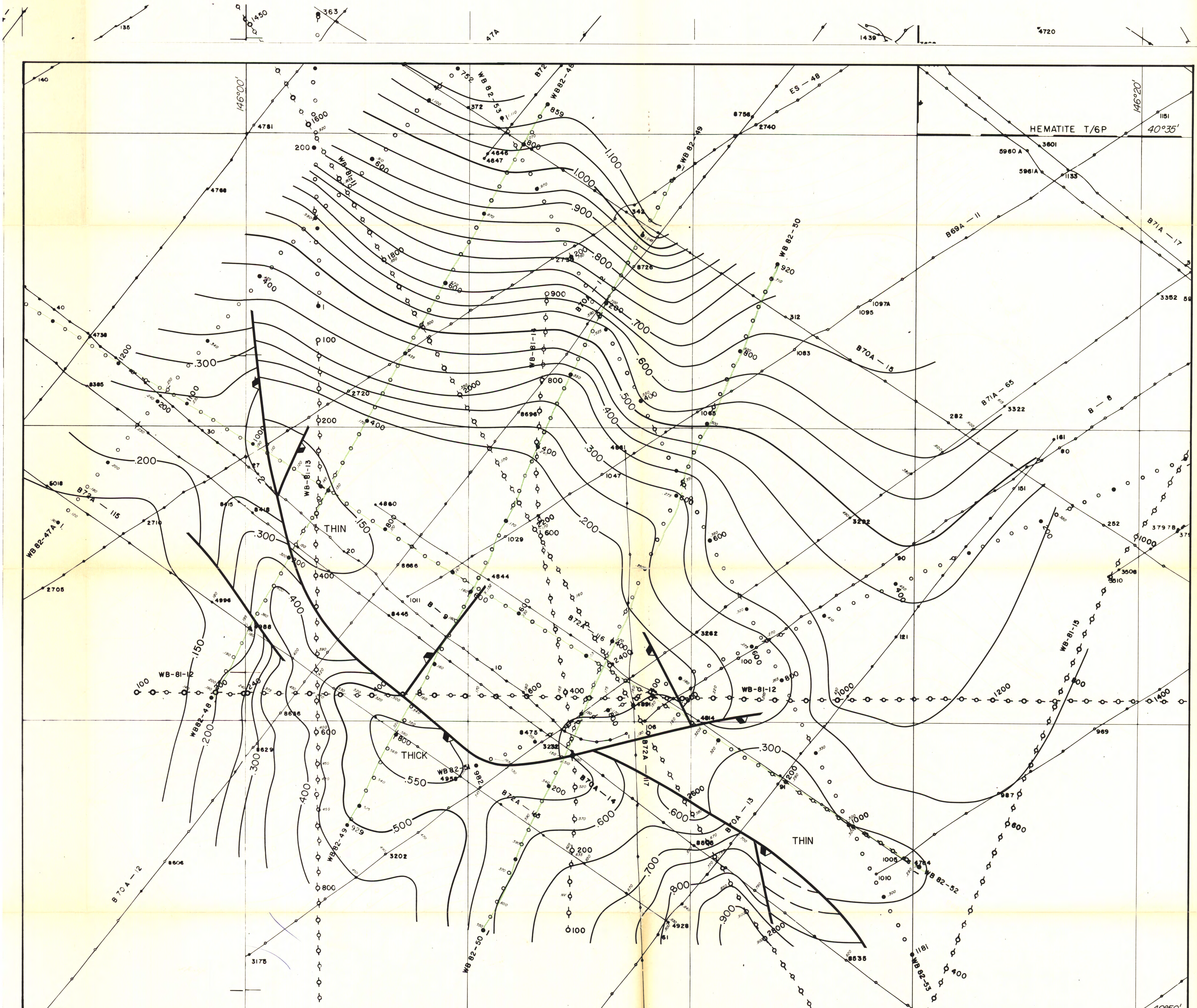
C.I.: .050 sec.

SCALE 1:100,000

SEPTEMBER 1982

T/16P Part 3

OR-193 VOL II



WEAVER OIL AND GAS CORPORATION, AUSTRALIA

T-16-P

TASMANIAN DEVIL PROSPECT

EASTERN VIEW COAL MEASURES — PALEOCENE? ISOCHRON

206103

GEOPH: J.D. DOWNING/lal DRFT: lal

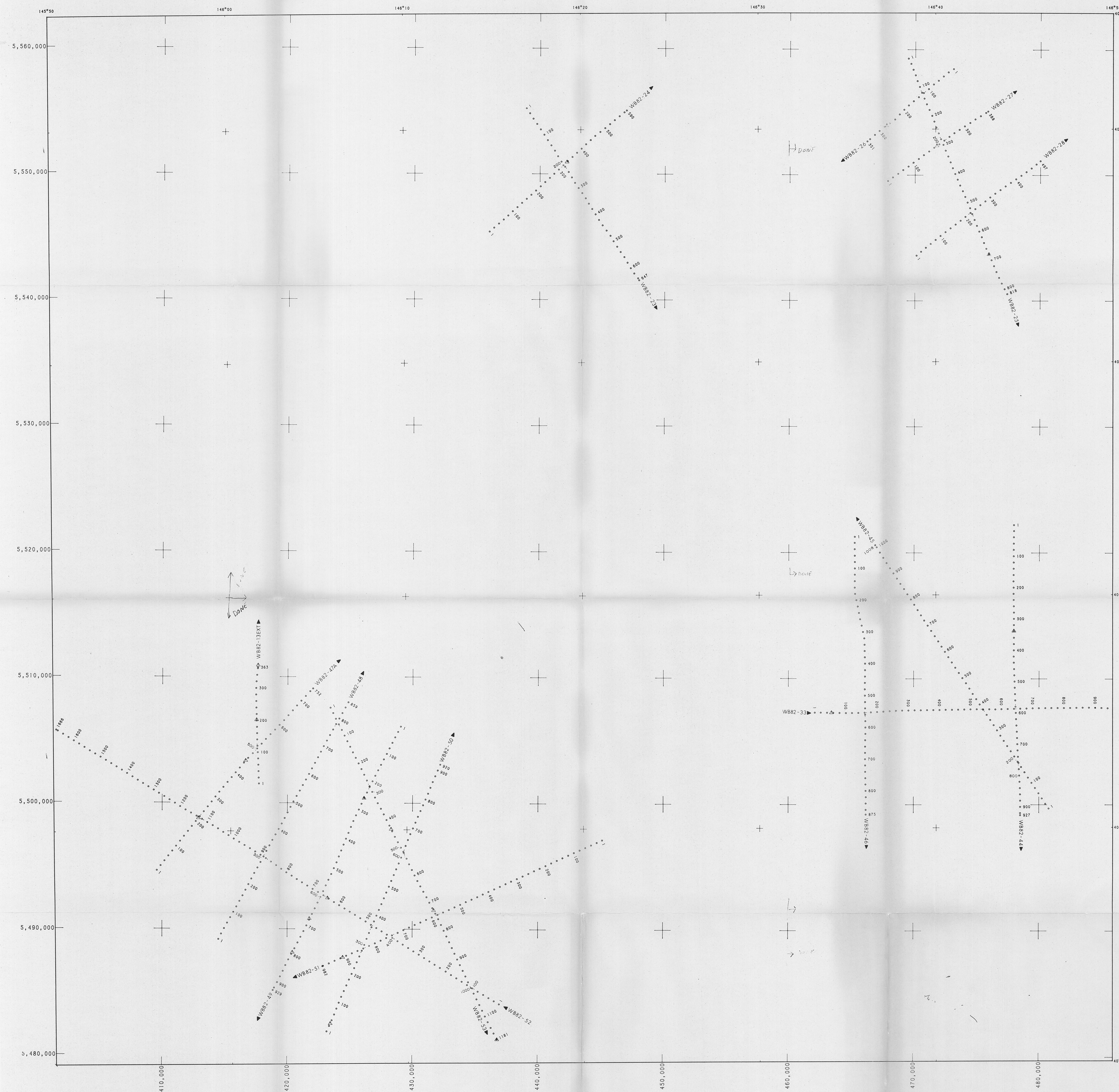
5 cm

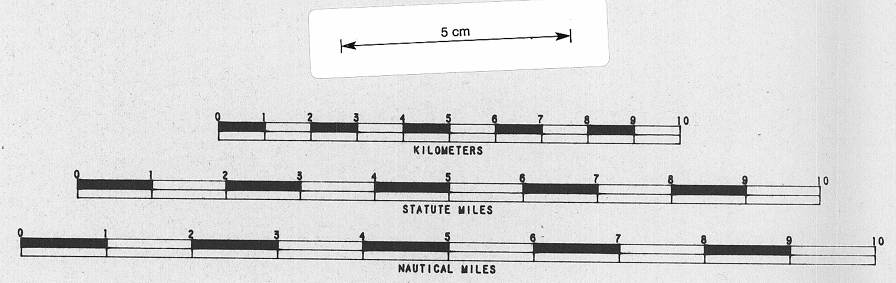
C.I.: .050 sec. SCALE 1:50,000 JULY 1982

T/16P Part 3

CR-193 VOL II

5





MAP NO. WEA-1-4

Unicorn Survey (T/15P)

Lines WB82-23
24
26
27
33

EGG ISLAND SURVEY (T/16P)

Lines WB82-25 49
28 50
44 51
45 52
46 53
47A 13 ext.
48

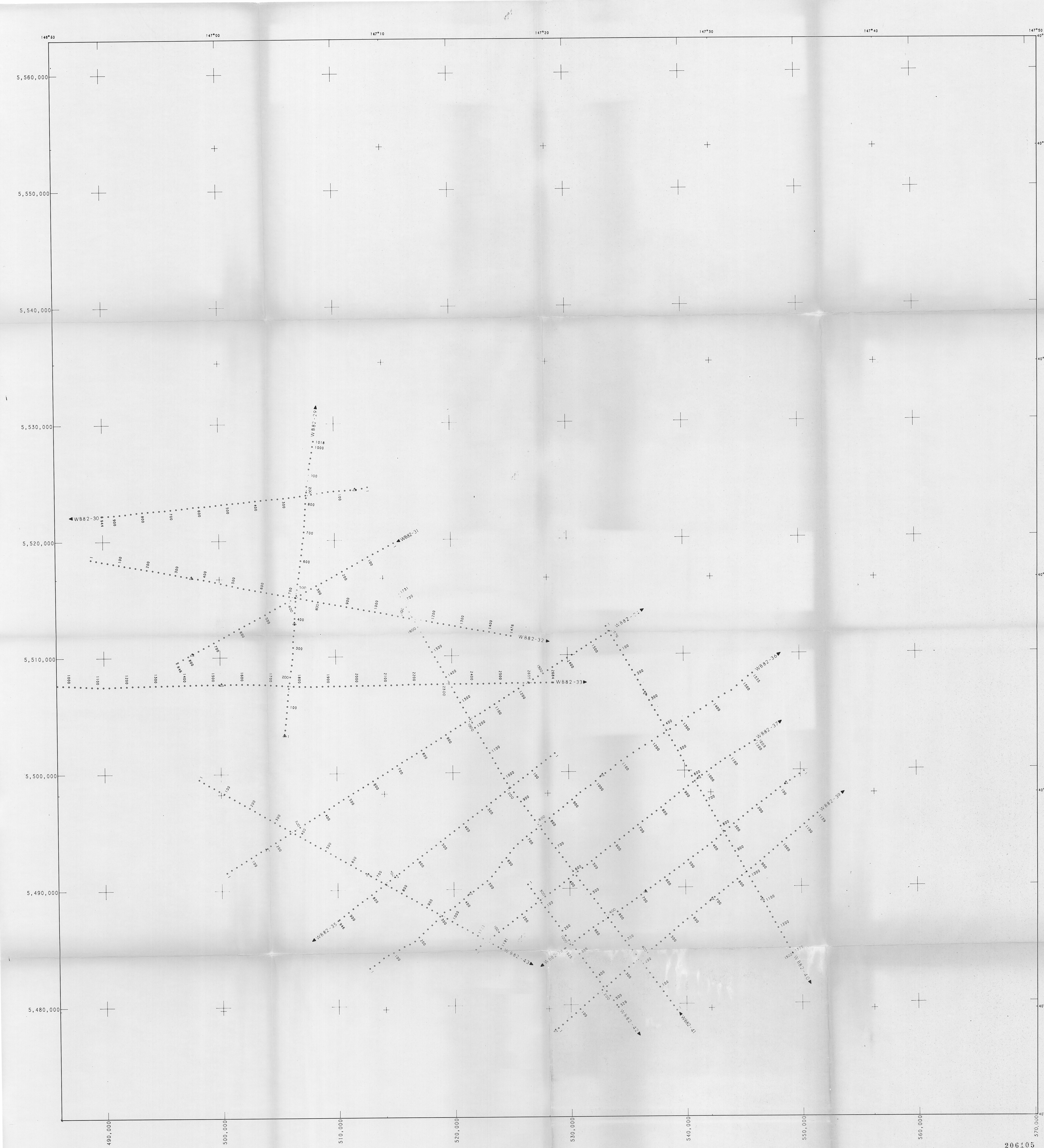
206104

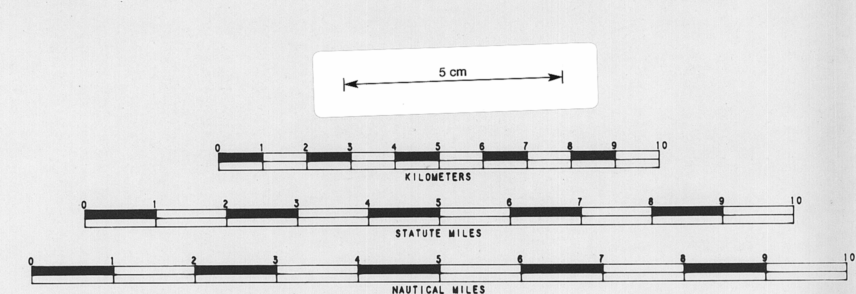
T/16P
WB82
Part 1/2

REVISIONS		WEAVER OIL AND GAS CORP	
DATE	BY	BASS BASIN	
		ANTENNA POSITIONS LOCATED BY WINS®	
		SCALE: 1 : 100,000	GRID SYSTEM: UTM ZONE NO. 55 GRID UNIT: METER FALSE NORTHING: 10,000,000 S., 0 N. FALSE EASTING: 500,000 FALSE ORIGIN AT C.M. AND LATITUDE: 0°00' 00.000" N SETBACK APPLIED: 0.0 METERS GEODETIC DATUM: AUST NTL
		PROJECTION: TRANSVERSE MERCATOR SPHEROID: AUSTRALIAN NAT. CENT. MERIDIAN: 147°00' 00.000" E SCALE FACTOR ON CENTRAL MERIDIAN: 0.9996000000	
WESTERN GEOPHYSICAL COMPANY OF AMERICA		DATE: APRIL 13, 1982	MAP NO.: WEA-1-4

OR-193 VOL II

6





MAP NO. WEA-1-5

Unicorn Survey (T/15P

Lines WB82-31 38
33 39
34 40
35 41
36 42
37

EGG ISLAND SURVEY (T/16P)

Lines WB82-29
30
32

206105

REVISIONS		WEAVER OIL AND GAS CORP	
DATE	BY	BASS BASIN	
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		SCALE: 1 : 100,000	GRID SYSTEM: UTM ZONE NO. 55 GRID UNIT: METER FALSE NORTHING: 10,000,000 S., 0 N. FALSE EASTING: 500,000 FALSE ORIGIN AT C.M. AND LATITUDE: 0°00' 00.000" N SETBACK APPLIED: 0.0 METERS GEODETIC DATUM: AUST NTL
		PROJECTION: TRANSVERSE MERCATOR SPHEROID: AUSTRALIAN NAT. CENT. MERIDIAN: 147°00' 00.000" E SCALE FACTOR ON CENTRAL MERIDIAN: 0.9996000000	
WESTERN GEOPHYSICAL COMPANY OF AMERICA		DATE: APRIL 13, 1982	MAP NO.: WEA-1-5

T/16P
WB82
Part 2/2

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(7)