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MICROFILMED

PIEMAN RIVER

EXPLORATION LICENCE 2/73 - TASMANIA

PROGRESS REPORT FOR THE PERIOD

JANUARY 31 - JULY 31, 1973

BY ESSO AUSTRALIA LTD.

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July 30, 1973

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INTRODUCTION

Esso Australia Ltd. (Esso) undertook a study of the mineral potential of Australia and associated territories during 1971. The positive results of this mineral potential study were reflected in the decision to commence active base metal exploration operations in 1972. One of the key base metal provinces selected for exploration occurs in the northwest of Tasmania. Accordingly, Esso applied for an area and was granted Exploration Licence 2/73 on January 31, 1973.

The licence area covers 800 square miles of the Pieman and Arthur River drainages north of Zeehan as shown on Figure 1. Rainfall in the area exceeds 100 inches for most of the year. The area is thickly forested and has poor access creating difficult exploration conditions.

As proposed in the exploration program submitted with the application for Exploration Licence 2/73, Esso contracted an airborne geophysical survey over the licence area, this being the first phase of evaluating the regional economic potential. Limited ground checks of some of the airborne geophysical anomalies have been completed and future evaluation of the remaining anomalies is planned.

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GEOLOGY

The region northwest of Zeehan consists of low grade metamorphic Precambrian sediments overlain by Cambrian and younger sediments which have been successively intruded by Precambrian dolerite dikes, Paleozoic granites and Jurassic dolerite cone sheets (Sills ?). The combination of poor outcrops, dense vegetation, structural complexity and difficult access have inhibited a thorough understanding of the geology of the region. Moreover, there has been virtually no previous detailed geological studies of the licence area.

PRECAMBRIAN ROCKS

Virtually the entirety of Exploration Licence 2/73 is composed of Precambrian units, being the Oonah Quartzite and Slate Formation and the Whyte Schist Formation. The latter formation is recorded as being part of the Older Precambrian rocks and its distribution within the licence is restricted to the eastern parts. The Whyte Schist Formation consists of undifferentiated low grade metamorphic pelites which have been intruded by dolerite dikes. These dikes may be the source of some isolated magnetic anomalies recorded during Esso's airborne geophysical survey and appear to have a vegetation expression of thick forest cover.

The Oonah Quartzite and Slate Formation forms part of the Younger Precambrian rocks and is the dominant outcropping feature within the licence area. This formation consists mainly of quartzose quartzite with minor black slate and dolomite members. These Younger Precambrian rocks are readily recognizable from the air by the dominant quartzite ridges covered by the ubquitous "button" grass. The airborne geophysical survey demonstrated that the Oonah Quartzite and Slate Formation exhibits two meridional trending zones containing bedrock conductors separated by a geophysical unresponsive area. Brief field studies show that the bedrock conductors examined so far are black graphitic slates. The geophysically unresponsive region may correlate to the dolomites mapped by Spry (1964) but have yet to be examined.

PALEOZOIC ROCKS

Paleozoic rocks of small areal extent outcrop in the southern part of the licence area. These rocks consist of Silurian and Devonian shales, slates and quartzite with some Permian tillites. A small number of Devonian granite stocks have intruded the Precambrian sequence along the western parts of the licence area during the Kanimblan Orogeny. These stocks appear to be post folding and are intruded along large scale anticlinal structures (Carey 1953). Solomon (1965) suggests the granite stocks are characterized by late stage mineralization near the margins. Commonly, these stocks exhibit splendid zoning effects outward into the pre ore wall rocks. Isolated stocks of gabbro have been recorded by Government geologists in the south of the licence area.

CAINOZOIC ROCKS

The Cainozoic rocks within the licence area are primarily gravels, moraine and alluvium overlying some of the above described rocks. Igneous activity is recorded by Jurassic dolerite cone sheets (sill ?) and Tertiary basalt flows.

FIELD GEOLOGY

Ground checking of 62 airborne conductive anomalies was attempted using helicopter support. However, dense vegetation restricted examination to 36 targets, and of those, only 13 exhibited outcrop. The results of these studies are summarized in Table 1 and their location shown on Plate 2.

TABLE 1

INPUT Anomaly	Examined	Geology
X 1	*	Biotite Granite
X 4	*	No outcrop
X 5	*	No outcrop
X 6W	not visited (hovered)	-
X 6E	*	-
X 7	*	Black slate
X 8	*	No outcrop
X 9	not visited (hovered)	-

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INPUT Anomaly	Examined	Geology
X 10	not visited (hovered)	-
X 11	not visited (hovered)	-
X 12	*	Black slate
X 13	*	No outcrop
X 14	*	No outcrop
X 15	*	No outcrop
X 16	*	No outcrop
X 17	*	Black slate
X 18	*	Black slate
X 19	*	No outcrop
X 21	*	Black slate
X 22	*	Black slate
X 23	*	Black slate
X 24	*	No outcrop
X 26	not visited (hovered)	-
X 27	*	No outcrop
X 28	*	No outcrop
X 29	*	Sand dune
X 30	*	No outcrop
X 31	*	No outcrop
X 32	*	No outcrop
X 33	*	No outcrop
X 34	*	Black slate
X 35W	*	No outcrop
X35E	*	Black slate
X 36	not visited (hovered)	-
X 37	*	No outcrop
X 38	*	No outcrop
X 39	*	No outcrop
X 43	*	Black slate
X 44	*	Black slate
X 46	*	No outcrop
X 47	*	Black slate
X 61	*	No outcrop

The remaining anomalies between X1 and X62 were not visited.

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STRUCTURE

The Precambrian rocks within Exploration Licence 2/73 form part of a structural high, the Rocky Cape Geanticline. This geanticline is separated from the Tyennan Geanticline to the east by a structural low of Paleozoic sediments. The Rocky Cape Geanticline is slightly arcuate and trends northeast from Granville Harbor. Spry (1964) suggests the various Precambrian rocks to be distributed in a series of belts which are often separated by faults, making for difficult structural interpretations. Minor structures and folds appear to be unrelated to the major folds which apparently are post minor structure developed.

The southern part of the Balfour Copper Trend is a mineralized structural zone which occurs in the northwest of the licence area. Not all the known copper prospects along this trend within the licence area have been examined. Four of the sulfide systems have been visited; however, three were barren containing pyrite and conformable to the bedding. The fourth system was a small copper vein 2 to 4 feet wide. The reported (1911) 20 feet thick lodes along the Balfour Copper Trend have yet to be located. A notable aspect of the copper prospect examined was the excellent development of rock cleavage that could be interpreted from the outcrop as being bedding. However, the rock exposures in the old mine workings clearly reveal the cleavage to be at right angles to the bedding which is N70°E.

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GEOPHYSICS

During March, 1973, Esso Australia Ltd. contracted Geoterrex Ltd. of Ottawa, Canada, to perform an airborne geophysical survey over the Pieman River, Exploration Licence 2/73. The Catalina aircraft employed for the survey carried a Barringer Mark V, 6 channel INPUT electromagnetic system, a Geometrics G803 nuclear precession magnetometer, and an Exploranium DGRS 1000 differential gamma ray spectrometer with a 980 cubic inch crystal detector. Data acquisition was in both analog and digital form. Navigation was controlled visually from air photomosaics. A total of 931 line miles was flown over the licence area.

Survey lines were oriented east-west and were spaced 1 mile apart initially. On inspection of the analog data, 194 line miles of in-fill flying was included in the program. The pilot attempted to maintain a mean terrain clearance of 400 feet. However, the rugged terrain encountered in some localities resulted in terrain clearance exceeding 700 feet locally.

The geophysical data is presently being edited and processed by the contractor in Ottawa, Canada. Final plans are expected to be supplied in four to six weeks. The magnetometer and analog records reveal low to moderate activity throughout the area. Major magnetic trends delineated to date correspond well to features defined by previous aeromagnetic surveys in the area that were performed by Adastra Hunting Geophysics Pty. Ltd. for Electrolytic Zinc-Rio Tinto in 1957, and by Compagnie Generale de Geophysique for the Consolidated Syndicate in 1971. The magnetic data acquired by Geoterrex for Esso will be hand contoured and copies of these maps will be supplied to the Department of Mines as soon as they are received from Canada.

Inspection of the four channel differential spectrometer analog records indicates that no uranium bearing formations were detected. Attenuation of emitted gamma radiation by the ubiquitous moist soils and dense vegetation resulted in little variation on the radiometric records and no further processing is planned at present.

Interpretation of the electromagnetic analog records resulted in the selection of 62 anomalies which occur within Exploration Licence 2/73. Ground follow-up was initiated to locate these anomalies and identify possible conductors. Lack of road access necessitated helicopter mobilization although dense vegetation frequently precluded landing at these INPUT anomaly sites. The approximate locations of these anomalies are shown on Plate 2. Most of these anomalies are enclosed within two belts, one on the western side of the licence area, and the other along the eastern perimeter of the area, while very few anomalies were observed in a broad central region. It is possible that these elongate belts represent sedimentary sections containing black "graphitic" slates. The anomalies selected in the northern portion of the survey area are more widely distributed. In general, the rocks of the region are resistive and electromagnetic surveying appears to have been successful in locating bedrock conductors.

The INPUT anomalies selected for ground follow-up are summarized below:

TABLE 2

INPUT Anomaly	Electromagnetic Response	Magnetic Correlation
X 1	4 channels	-
X 2	4 "	-
X 3	5 "	-
X 4	3 "	-
X 5	3 "	-
X 6	6 "	1000 gammas
X 7	6 "	-
X 8	6 "	-
X 9	6 "	-
X 10	6 "	-
X 11	6 "	-
X 12	5 "	-
X 13	6 "	-
X 14	6 "	-
X 15	6 "	-
X 16	4 "	50 gammas
X 17	6 "	-
X 18	6 "	15 gammas
X 19	6 "	55 gammas (displaced)
X 20	6 "	-
X 21	4 "	-
X 22	6 "	-

INPUT Anomaly	Electromagnetic Response	Magnetic Correlation
X 23	6 channels	45 gammas (displaced)
X 24	3 "	40 gammas (displaced)
X 25	3 "	15 gammas (displaced)
X 26	4 "	-
X 27	6 "	-
X 28	3 "	150 gammas
X 29	6 "	-
X 30	5 "	30 gammas (very broad)
X 31	5 "	-
X 32	6 "	-
X 33	6 "	-
X 34	6 "	-
X 35	6 "	-
X 36	5 "	-
X 37	5 "	-
X 38	4 "	-
X 39	3 "	-
X 40	6 "	-
X 42	6 "	-
X 43	4 "	-
X 44	5 "	-
X 45	2 "	130 gammas
X 46	6 "	-
X 47	6 "	-
X 48	6 "	-
X 49	3 "	50 gammas
X 50	2 "	90 gammas (displaced)
X 51	4 "	130 gammas (displaced)
X 52	4 "	90 gammas
X 53	3 "	120 gammas (displaced)
X 54	3 "	150 gammas
X 55	6 "	230 gammas (displaced)
X 56	6 "	-
X 57	6 "	-
X 58	5 "	-
X 59	6 "	-
X 60	4 "	750 gammas
X 61	6 "	100 gammas
X 62	4 "	700 gammas (displaced)

The INPUT survey results showing the distribution and the character of the anomalies defined will be given when they are available from the contractor.

GEOCHEMISTRY

Twelve rock samples were collected from some of the ground sites of the airborne anomalies and analyzed for copper, lead, zinc and cobalt. The results are now summarized.

Sample No.	Rock Type	Location	Cu	Pb	Zn	Co
1600 1	Biotite granite	X 1	25	20	45	5
1600 2	Black slate	X 12	40	20	30	5
1600 3	Black slate	X 35E	50	<20	20	5
1600 4	Black slate	X 47	15	<20	40	5
1600 5	Black slate	X 23	10	20	15	5
1600 9	Black slate	X 43	45	<20	15	5
160 12	Black slate	X 18	20	40	15	5
160 13	Black slate	X 17	15	20	10	5
160 14	Black slate	X 44	5	<20	10	5
160 15	Black slate	X 34	190	<20	20	5
160 16	Black slate	X 7	10	35	10	5
160 17	Black slate	X 21	10	20	15	5

FINANCIAL EXPENDITURES

Esso has expended A$42,604.00 on the exploration program covering Exploration Licence 2/73 in Tasmania during the period January 31 to July 31, 1973. This amount can be broken down into the following items:

Item	Australian Dollars
Geology	8,973.00
Geophysics	25,788.00
Geochemistry	37.00
Land	24.00
Helicopter	5,385.00
Office overhead	2,397.00
TOTAL	$ 42,604.00

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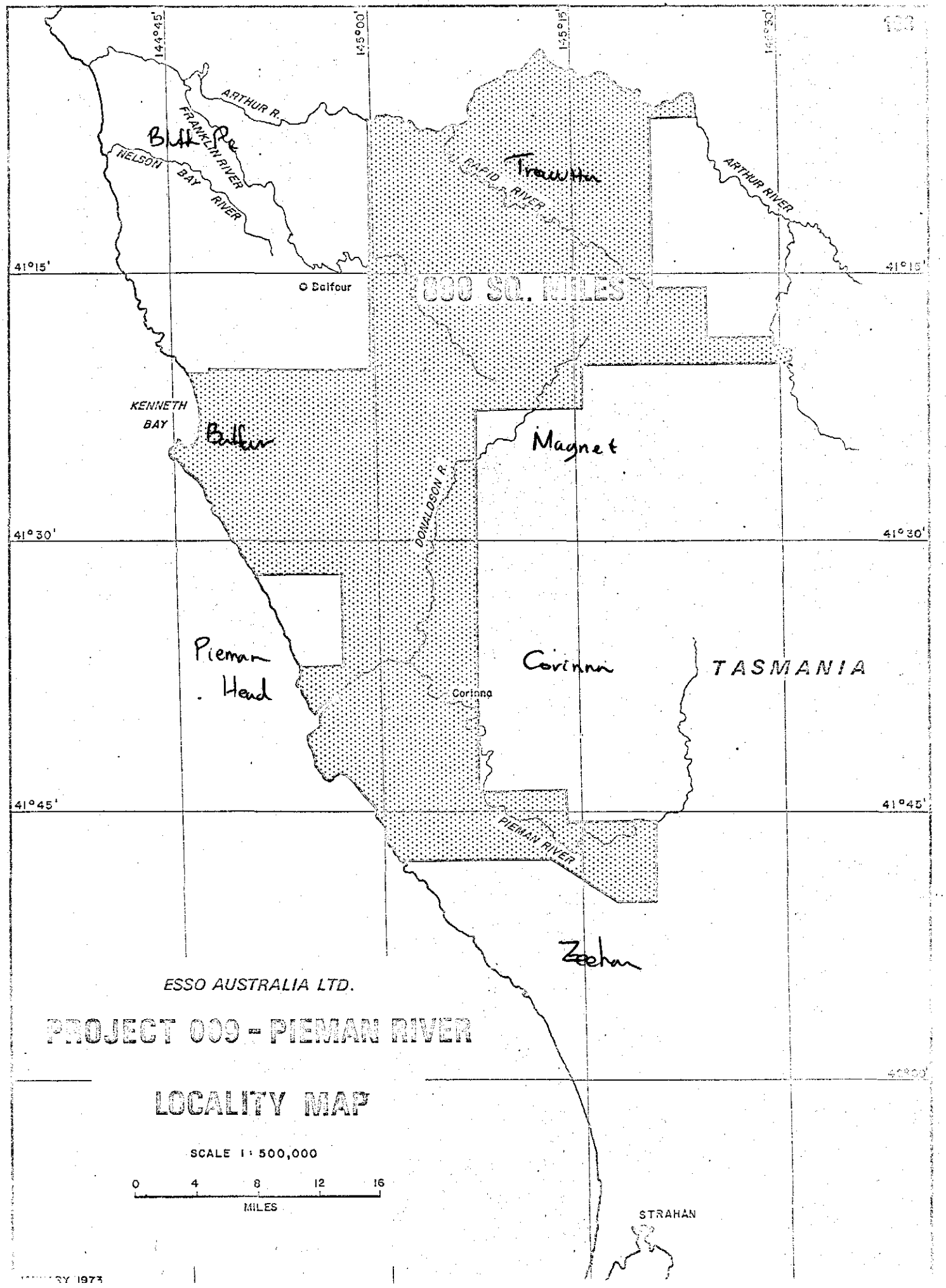
Carey, S. W., 1953, Geological Structure of Tasmania in relation to Mineralization. Geology of Australian Ore Deposits, 1st ed. (Ed. A. B. Edwards), pp 1108-1128.

Solomon, M., 1965, Geology and Mineralization of Tasmania, Geology of Australian Ore Deposits, 2nd ed. (Ed. J. McAndrew), pp 464-477.

Spry, A., 1964, Precambrian Rocks of Tasmania, Part VI, the Zeehan-Corinna Area, Department of Geology, University of Tasmania Publication 143.

Ward, K., 1911, The Mount Balfour Mining Field, Mines Department of Tasmania, Bulletin No. 10.


144°45'
145°00'
145°15'
145°30'
ARTHUR R.
FRANKLIN RIVER
NELSON BAY RIVER
RAPID RIVER
ARTHUR RIVER
41°15'
Dalfour
800 SQ. MILES
KENNETH BAY
DONALDSON R.
41°30'
Corinna
TASMANIA
PIEMAN RIVER
41°45'
ESSO AUSTRALIA LTD.
PROJECT 009 - PIEMAN RIVER
LOCALITY MAP
SCALE 1 : 500,000
0 4 8 12 16
MILES
STRAHAN

144° 45' 145° 00' 145° 15' 145° 30'

41° 00' 41° 15' 41° 30' 41° 45'

TROWUTTA

WARATAH

RENISON BELL

ROSEBERY

Sandy Cape

SOUTHERN OCEAN

E.L. 2/73

RIVER ARTHUR

FRANKLAND RIVER

RAPID RIVER

DONALDSON RIVER

SAVAGE RIVER

HEAZLEWOOD RIVER

WHYTE RIVER

STANLEY RIVER

WILSON RIVER

HUSKISSON RIVER

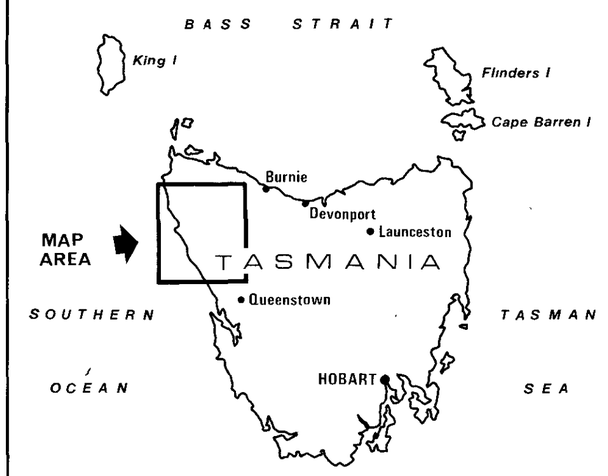
PIEMAN RIVER

X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60 X61 X62

X1 cyanite

X21 X29 X34 X4 X5 X23 X22 X24 slate

LOCALITY MAP



LEGEND

Approximate position of Airborne EM Flight Line

X21 Approximate position of 'INPUT' Anomaly

73-964

MINERALS DEPARTMENT, ESSO AUSTRALIA LTD

PIEMAN RIVER - 009
TASMANIA

670014

COMBINED AIRBORNE EM & MAGNETOMETER SURVEY OF E.L. 2/73

5 cm

SCALE 1 : 250,000

5 0 5 10 Miles

Author :

Date :

Drafted by : P. L. Spinner

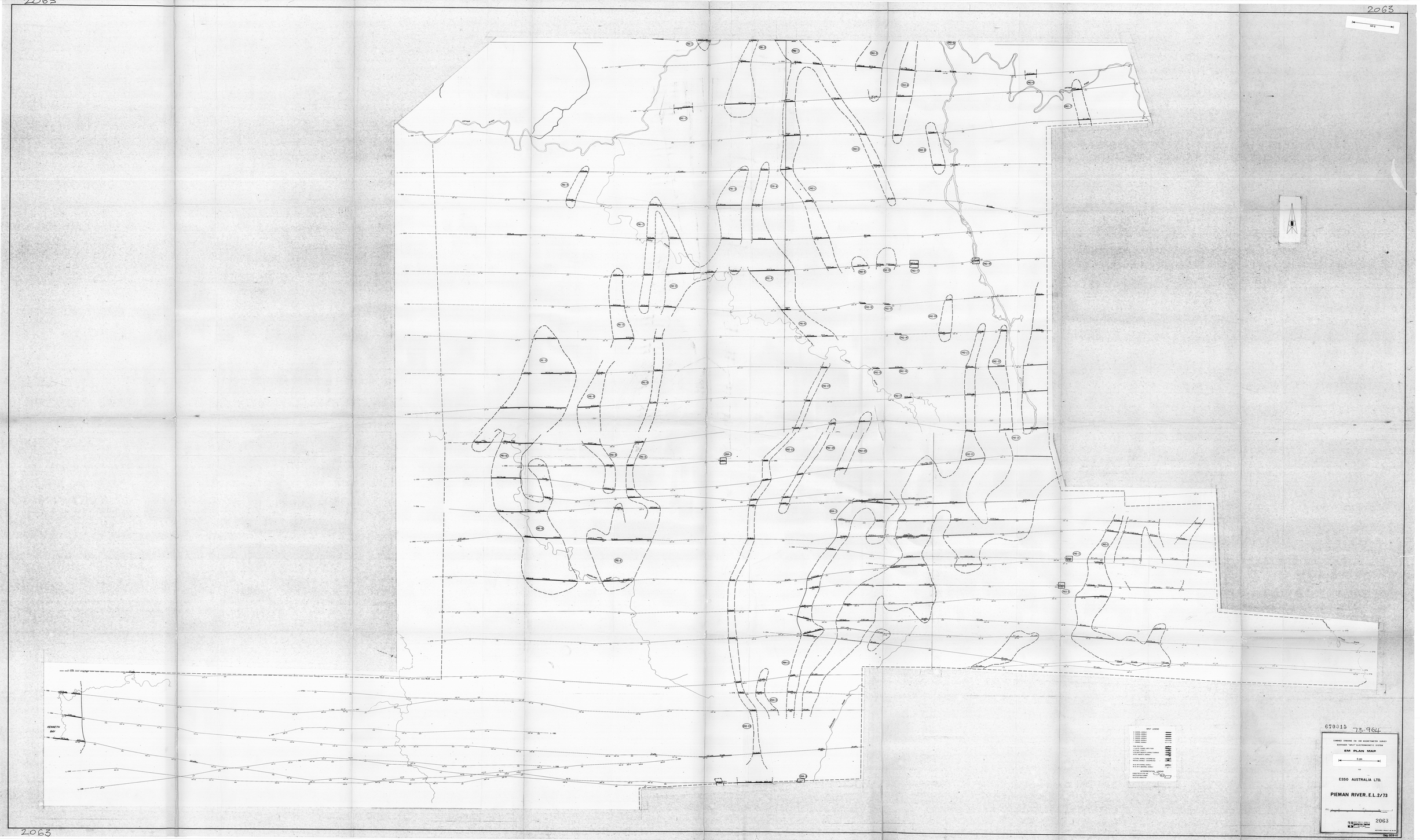
Revised :

Dwg. 009-7

PLATE 1

2062

Q27/1


2063
670015 73-964
COMBINED AIRBORNE EM AND MAGNETOMETER SURVEY
BARRINGER "INPUT" ELECTROMAGNETIC SYSTEM
EM PLAN MAP
5 cm
ESSO AUSTRALIA LTD.
PIEMAN RIVER. E.L.2/73
2063
Dwg 003-10
KENNETH BAY
INPUT LEGEND
INFORMATION LEGEND

2064

KENNETH BAY

PIEMAN RIVER

DONALDSON RIVER

PIEMAN RIVER

DONALDSON RIVER

LANGE RIVER

WHITE RIVER

INPUT LEGEND

E CHANNEL ANOMALY
D CHANNEL ANOMALY
C CHANNEL ANOMALY
B CHANNEL ANOMALY
A CHANNEL ANOMALY
C CHANNEL ANOMALY

PEAK POSITION
1 st and 4th CHANNEL AMPLITUDES
ALTITUDE (FEET)
COINCIDENT MAGNETIC ANOMALY (GAMMAS)
OFFSET MAGNETIC ANOMALY

CULTURAL ANOMALY (INTERPRETED)
RESIDUAL ANOMALY (INTERPRETED)

50 Hz WITH NORMAL ANOMALY
50 Hz WITH ABNORMAL ANOMALY

INTERPRETATION LEGEND

CONDUCTOR OUTLINE AND IDENTIFICATION NUMBER — 12-3

SELECTED CONDUCTOR

5 cm

73-964

COMBINED AIRBORNE EM AND MAGNETOMETER SURVEY

BARRINGER "INPUT" ELECTROMAGNETIC SYSTEM

EM PLAN MAP

PIEMAN RIVER AREA

TASMANIA, AUSTRALIA

FOR

ESSO AUSTRALIA LTD.

PIEMAN RIVER - E.L. 2/73

KM 0 1 2 3 4 5 KILOMETERS

2064

FLOWN IN MARCH, 1973 — GEOTERREX PROJECT No. 83-124

Dwg. 009-11

670016

5 cm

2065

KENNETH BAY

PIEMAN RIVER

DOMALOOSH RIVER

HUNTE RIVER

LEGEND

500 GAMMAS	
100 GAMMAS	
20 GAMMAS	
MAGNETIC LOW	
CONTOUR INTERVAL	20 GAMMAS

670017

5 cm

73-964

COMBINED AIRBORNE EM AND MAGNETOMETER SURVEY

BARRINGER "INPUT" ELECTROMAGNETIC SYSTEM

ISOMAGNETIC CONTOUR MAP

PIEMAN RIVER AREA

TASMANIA, AUSTRALIA

FOR

ESSO AUSTRALIA LTD.

PIEMAN RIVER – E.L. 2/73

2065

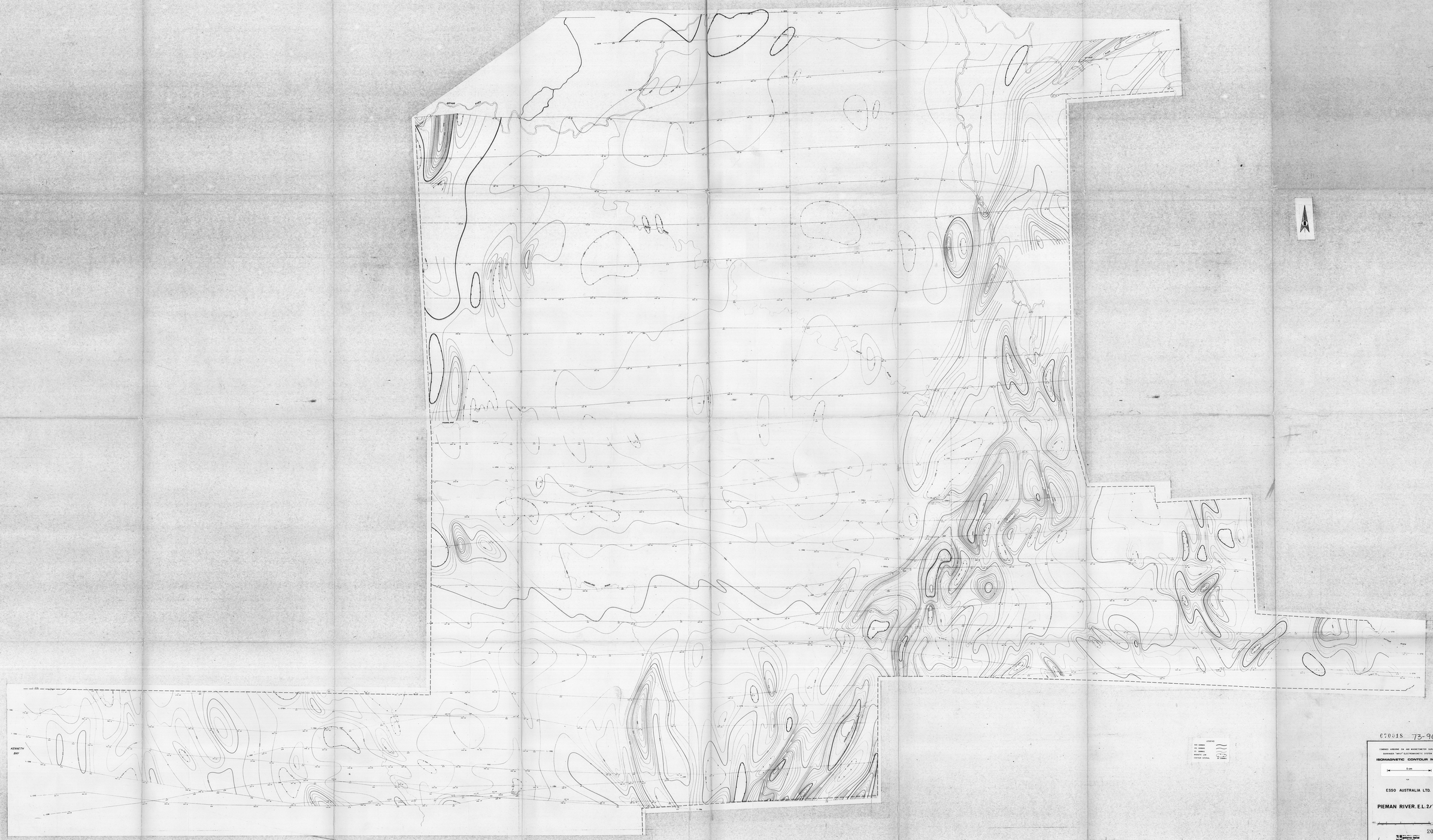
gouverres limited

FLOWN IN MARCH, 1973 GEOTERREX PROJECT No. 85-69

Dwg.009-13

5 cm

2066



670318 73-964

COMBINED AIRBORNE EM AND MAGNETOMETER SURVEY
BARRINGER "INPUT" ELECTROMAGNETIC SYSTEM

ISOMAGNETIC CONTOUR MAP

5 cm

FOR

ESSO AUSTRALIA LTD.

PIEMAN RIVER. E.L. 2/73

2066

27/1

Dwg. 2066-73