

00 12

**MICROFILMED**

20 NOV 1985	ERIC
DEPT. OF MINES	
REF. No. 12,711/85	

E.L. #1/83

WESTERN 56 SQ. KM.

RELINQUISHMENT REPORT

**OPEN FILE**

*P.A. Roberts*  
By: P.A. Roberts

Date: November, 1985.

Circulation: R.G.C.(1)  
Mines Department (1)

G.F.E.L. Report No.: T/85/12

001

**CONTENTS**

1.	INTRODUCTION	1.
2.	WORK COMPLETED 1983-85	2.
2.1	1983-84	2.
2.2	1984-85	3.

**APPENDICES**

1. Report by R.A. Poltock: "Cambrian Windows in the Black Bluff Range, December 1984 - January 1985".
2. Memorandum by J.R. Bishop: "Lake Lea Petrophysical Measurements".

LIST OF FIGURESFigure

1. Locality Plan, 1:250,000 (in text)
2. Land Tenure Map, 1:25,000
3. Lea Sheet, Interpretative Geology, 1:25,000
4. Lea Sheet, Stream Sediment Geochemistry - Au, 1:25,000
5. Lea Sheet, Stream Sediment Geochemistry - Sn, 1:25,000
6. Lea Sheet, Stream Sediment Geochemistry - Cu, 1:25,000
- ✓ 7. Lea Sheet, Stream Sediment Geochemistry - Pb, 1:25,000
- ✓ 8. Lea Sheet, Stream Sediment Geochemistry - Zn, 1:25,000
9. Lea Sheet, Stream Sediment Geochemistry - W, 1:25,000
10. Lea Sheet, DIGHEM EM Anomalies, 1:25,000
11. Lea Sheet, Ground Magnetics, 1:25,000
12. Lea Sheet, Induced Polarization (Chargeability), 1:25,000
13. Lea Sheet, Resistivity, 1:25,000
14. Lea Sheet, EM, SP, Gravity and Radiometrics, 1:25,000
15. Black Bluff Range, Cross Sections, 1:25,000

1.

## 1. INTRODUCTION

E.L. 41/83 is located west of Moina, northern Tasmania. The area covered by the E.L. is moderately rugged and quite elevated being located in the northern foothills of the Central Plateau.

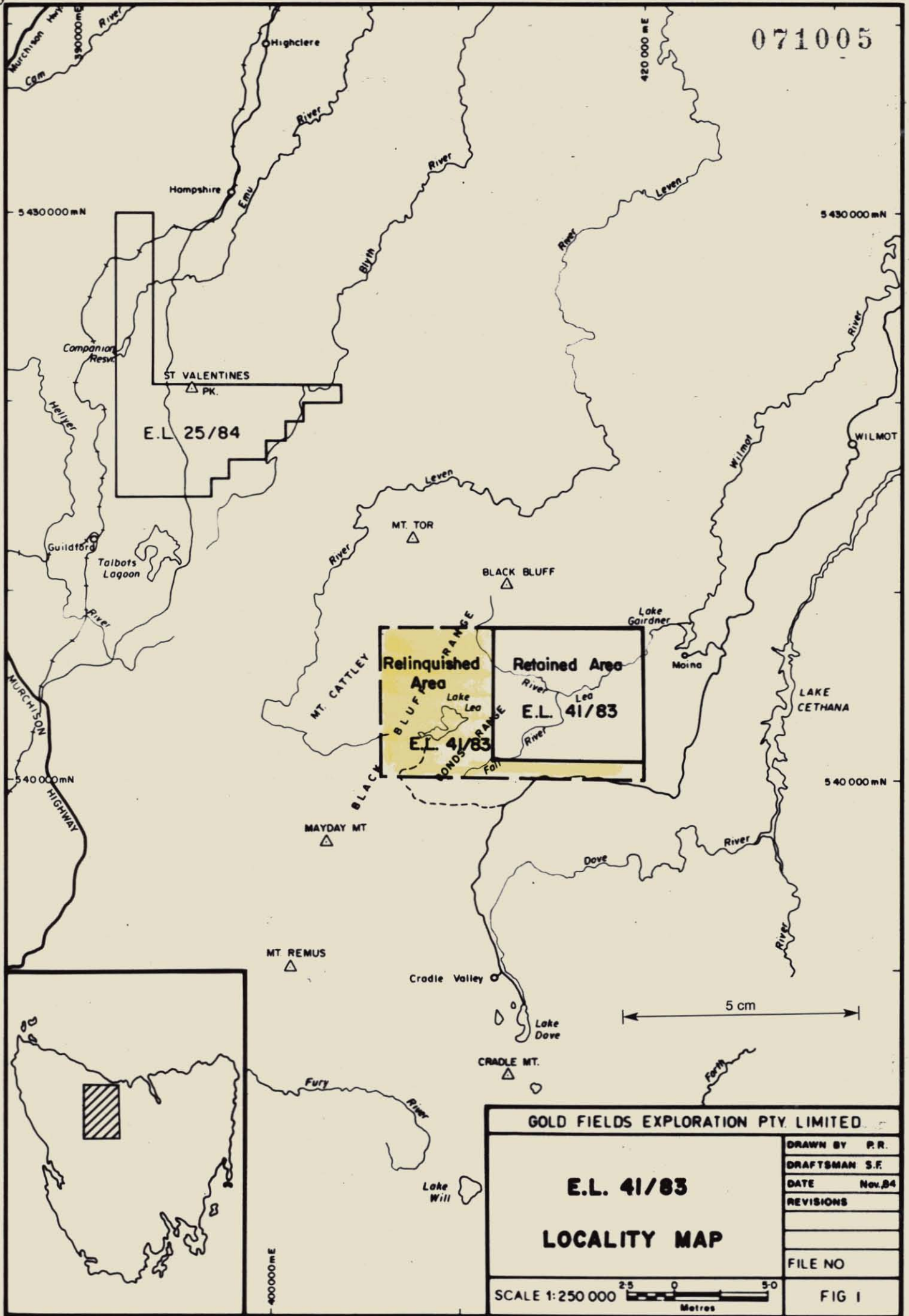
Geologically, the area consists of Cambrian Mt. Read Volcanics and Ordovician conglomerates, sandstones and limestones, some of which are concealed beneath a veneer of Tertiary basalt.

Until recently, the E.L. covered an area of 112 sq. km.; it has now been reduced to 56 sq. km. by relinquishing the western and southern parts of the E.L. (see Figure 2).

This report describes the work completed on the relinquished area since the licence was granted in December, 1983.

004

071005



<b>GOLD FIELDS EXPLORATION PTY. LIMITED</b>	
<b>E.L. 41/83</b>	DRAWN BY P.R.
<b>LOCALITY MAP</b>	DRAFTSMAN S.F.
	DATE Nov. 84
	REVISIONS
	FILE NO
SCALE 1:250 000	FIG 1

**2. WORK COMPLETED 1983-85****2.1 1983-84**

In the first year of the licence's tenure, a major effort was put into compiling all of the data obtained by the previous mineral explorers in this area i.e. Pickands Mather, Tasminex, Union Oil, Geopeko and Comalco. The main result of this work was the production of a series of geological, geophysical and geochemical plans, all of which were drafted onto the Lake Lea 1:25,000 topographic map (Figures 3-14).

A review of the compiled data resulted in the following conclusions:

- (1) There is little remaining potential for volcanogenic massive sulfide mineralization in the southern part of the area where the majority of the Cambrian Volcanics outcrop. The latter were effectively explored by Geopeko who explained the stream geochemical anomalies in this area as being derived from minor base metal mineralized veins in a weakly altered quartz feldspar biotite porphyry.
- (2) Several "windows" of Cambrian volcanics surrounded by (overlying) Ordovician conglomerates and sandstones had been recognized by previous workers in the Black Bluff Range in the northern part of the area. These volcanics lie approximately along strike from the Hellyer deposit and may therefore be prospective for volcanogenic massive sulfides. The presence of these "windows" suggested that the volcanics may be shallowly concealed beneath Ordovician sediments through much of the Black Bluff Range.

As a result of the second conclusion, a decision was made to try and ascertain the thickness of Ordovician cover in the Black Bluff Range by carrying out some geological mapping there to:

- (1) Determine if any more Cambrian volcanic "windows" remain unmapped in the Range, and
- (2) Examine the structure of the Ordovician sediments in order to draw some sections through the Range.

2.2 1984-85

Late in 1984, geological contractor R.A. Poltock was engaged to undertake the mapping exercise described above. A copy of his report and plans are attached (Appendix 1, Figures 2, 15). His major conclusions were that:

- (1) The Ordovician cover is up to 400m thick.
- (2) There are more "windows" of Cambrian volcanics in the Black Bluff Range than previous work had indicated.
- (3) The volcanics exposed in the "windows" comprise essentially unaltered volcanoclastic conglomerate and quartz feldspar phyric rhyolites. These rocks may be equivalent to the Tyndall Group in the Queenstown area and may therefore conformably underlie the Ordovician sediments. If Central Volcanic Sequence volcanics do exist in this area, they are not exposed in the "windows" and are therefore quite deeply buried throughout the Range.

As the Central Volcanic Sequence is the part of the Mt. Read Volcanics most prospective for volcanogenic massive sulfides, the third conclusion was quite discouraging. Despite this, it was felt that it would be worth considering geophysical depth sounding techniques in order to get some more information on the Ordovician-Cambrian contact. Consequently eight core samples of both major rock types were obtained from the Black Bluff Range and measured petrophysically in order to determine which geophysical technique would be likely to be most effective. The results of this work are given in the attached memorandum by Dr. J.R. Bishop (Appendix 2). These results suggest that:

- (1) Neither gravity nor electrical methods would be effective in identifying the Cambrian-Ordovician contact.
- (2) Seismic methods might distinguish the contact however the difference in seismic velocities between the sediments and the volcanics is not sufficiently large to be sure of this.

Given the expense of seismic work and the complete lack of encouragement from the geological mapping, it was concluded that there was no justification for pursuing the idea of using geophysics any further.

As a consequence of the above work, it was concluded that no further work could be recommended on the western section of the licence area and that it should therefore be relinquished.

008

APPENDIX 1

003

071010

EL 41/83

CAMBRIAN WINDOWS IN THE BLACK BLUFF RANGE

DECEMBER 1984 - JANUARY 1985

Roger Poltock Geological for  
GOLD FIELDS EXPLORATION

INTRODUCTION

The North Western section of EL 41/83 and the adjoining 18 km vacant block to the North have been previously mapped as Roland Conglomerate (here to include Moina Sandstone).

It was considered that the Roland Conglomerate may be thin enough to permit an effective geophysical survey of underlying possibly prospective Mt. Read Volcanics. The volcanics are exposed to the NW, NE (Leven River/Smith's Plains area) and further South on the Black Bluff Range.

Several days field traversing was carried out after photo-interpretation of the area in conjunction with structural trends in the Roland Conglomerate from Seymour 1980. Two NE trending windows of volcanics were located (approximately 2 km x .3 km) see Figure 1, exposed in anticlinal structures in the conglomerate. Mt. Read lithologies exposed include a Jukes equivalent volcanoclastic conglomerate and a quartz feldspar phyric rhyolite. These lithologies are not considered to be prospective, alteration is limited to weak hematization and chloritization. A third fault controlled window is interpreted in the West, but no outcrop was located.

Mt. Read-Roland contacts are extremely variable lithologically, it is not possible to map basal units and estimate with any confidence thickness of conglomerate cover. From measuring sections in the field and section lines (see Figure 2), the conglomerate may be up to 400 m thick.

### 1. Thickness of Roland Conglomerate

This can be directly measured in the field (see Photo 1 a +250 m flat lying sequence exposed in cliffs and waterfalls 413500E 5408500N).

Topographic and geological section lines A B C (Figure 2) have been compiled from fact and interpreted data. These sections are stylized and haven't taken into consideration local structural and depositional complexities of the basal conglomerate (Seymour cut and fill structures in the Black Bluff Range West of Lake Lea).

In addition to the conglomerate sequence an unprospective layer of:

- a) Jukes conglomerate is present in some areas
- b) quartz feldspar phyric rhyolites may be roughly conformable with the Roland Conglomerate.

### 2. Basal-Roland Conglomerate

Lithological variability is characteristic of this basal sequence. It was initially hoped that a distinctive stratigraphic unit may indicate proximity to the Roland/Mt. Read contact or alternatively the Roland/Gordon Limestone, the latter is completely eroded from the Black Bluff Range.

Basal Roland/Mt. Read lithologies include:

- a) Jukes equivalent? Conglomerate composed of volcanic and Precambrian derived detritus, e.g. 11590, 11593.
- b) Quartz and quartzite cobble conglomerate.

012

3.

- c) Hematitic quartz jasper pebble conglomerate and hematitic siltstone. 11591, 11592.
- d) Quartzite white - hematitic, well bedded - bioturbated. 11587.

3. Mt. Read Volcanics

The windows are controlled by NE trending folds and faults. The only volcanics located are massive quartz feldspar pyritic rhyolites - possibly lavas. These are slightly hematitic, occasionally feldspars are chloritized.

Exposures of the volcanics are limited due to extensive Roland derived boulder fields.

The Western interpreted window 406000E 5409500N may be extensive, a faulted repetition of the volcanics to Roland conglomerate sequence.

4. Geophysical Considerations

a) Area is well suited to airborne or ground survey, topography - undulating, alpine vegetation generally <2 m high (see Photos 1 and 2).

b) Roland Conglomerate thickness in some areas +250 m to a maximum of 400 m, in addition an unprospective wedge of Jukes Conglomerate.

c) Pyritic and hematitic Roland Conglomerate occurs in the area, Peko mention extensive pyritic sandstones in the Kauri and Cave Creek traversed.

d) Comalco Geophysical traverses are located approximately 3 km NE of section Line A in Winterbrook Smith's Plains area. These should be useful as indicators of the geophysical characteristics of this area.



Photo 1: Shallow dipping pebble conglomerate-sandstone.  
Roland Conglomerate at this locality (413500E  
5408500N) +250 m thick.



Photo 2: Mt. Read - Roland Conglomerate contact.  
To left poor exposure of rhyolite 11587,  
overlain by easterly dipping well bedded  
quartz sandstone.

REFERENCE

Seymour, D.B. (1980),

"The Tabberabberan Orogeny in Northwest Tasmania".

FIGURE

1. Cambrian Window Black Bluff Range 1:25,000.
2. A-B-C Black Bluff Range interpretive section lines 1:25,000.

APPENDICES

Sample record 11585 - 11593



017

APPENDIX 2



Memorandum to: P.A. Roberts, Gold Fields Exploration.

from: J.R. Bishop, Mitre Geophysics.

date: 12th November, 1985.

Subject: LAKE LEA PETROPHYSICAL MEASUREMENTS.

A number of samples of Ordovician sediments and Cambrian Mt Read Volcanics have been collected from the Black Bluff Range west of Lake Lea, for petrophysical measurements. A portable corer was used to take short sections (less than 10cm) of core from relatively fresh outcrop.

The measurements were made to see if there were any physical property contrasts between the two rock types (which would then perhaps allow the thickness of the overlying sediments to be determined). The small number of samples cannot be regarded as statistically significant, but the results suggest that electrical methods and gravity would not work.

The velocities of the sediments are mostly lower than the volcanics and seismic methods may work, although the contrasts are not large.

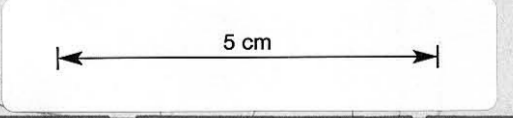
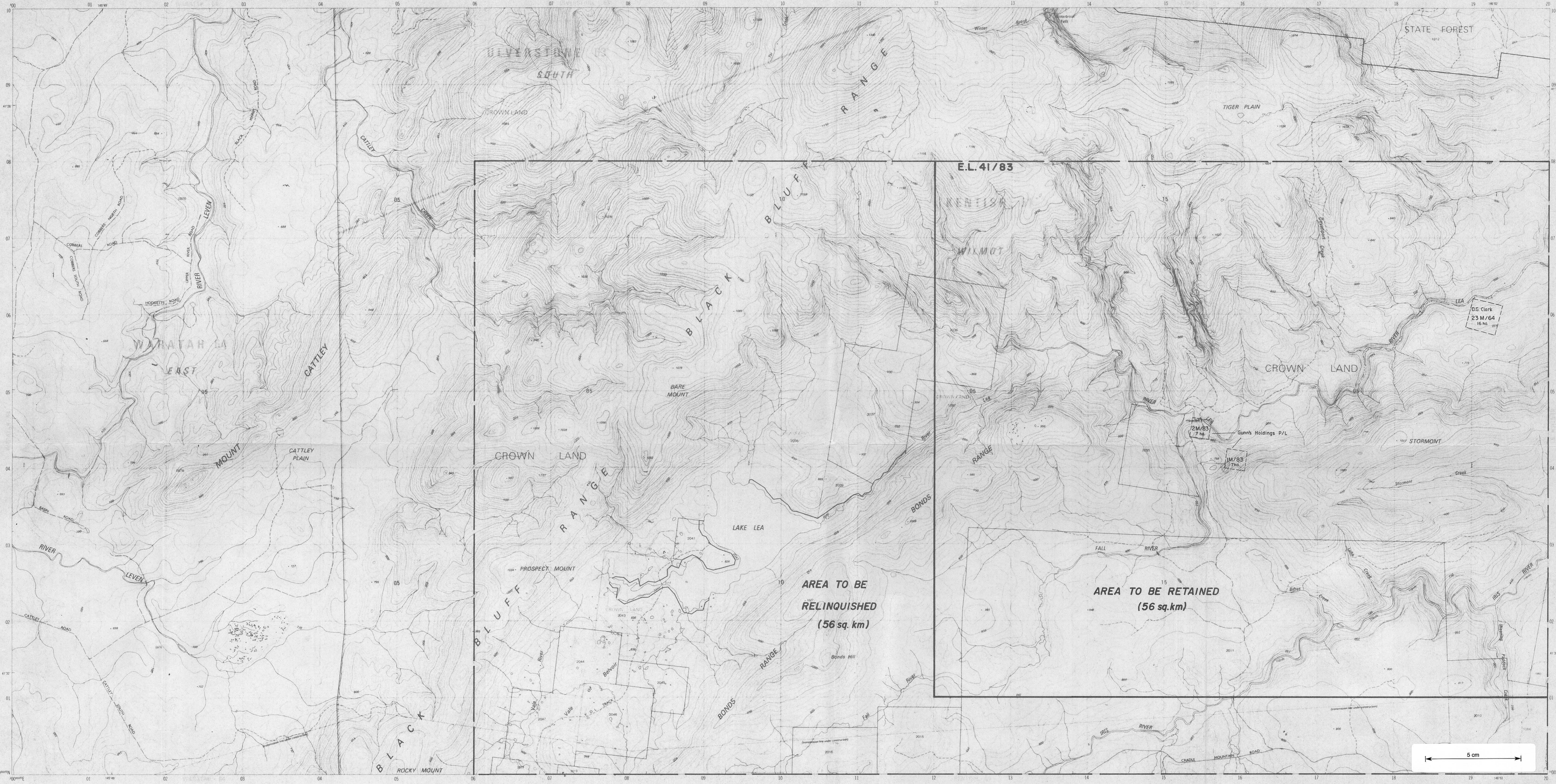
019



071020

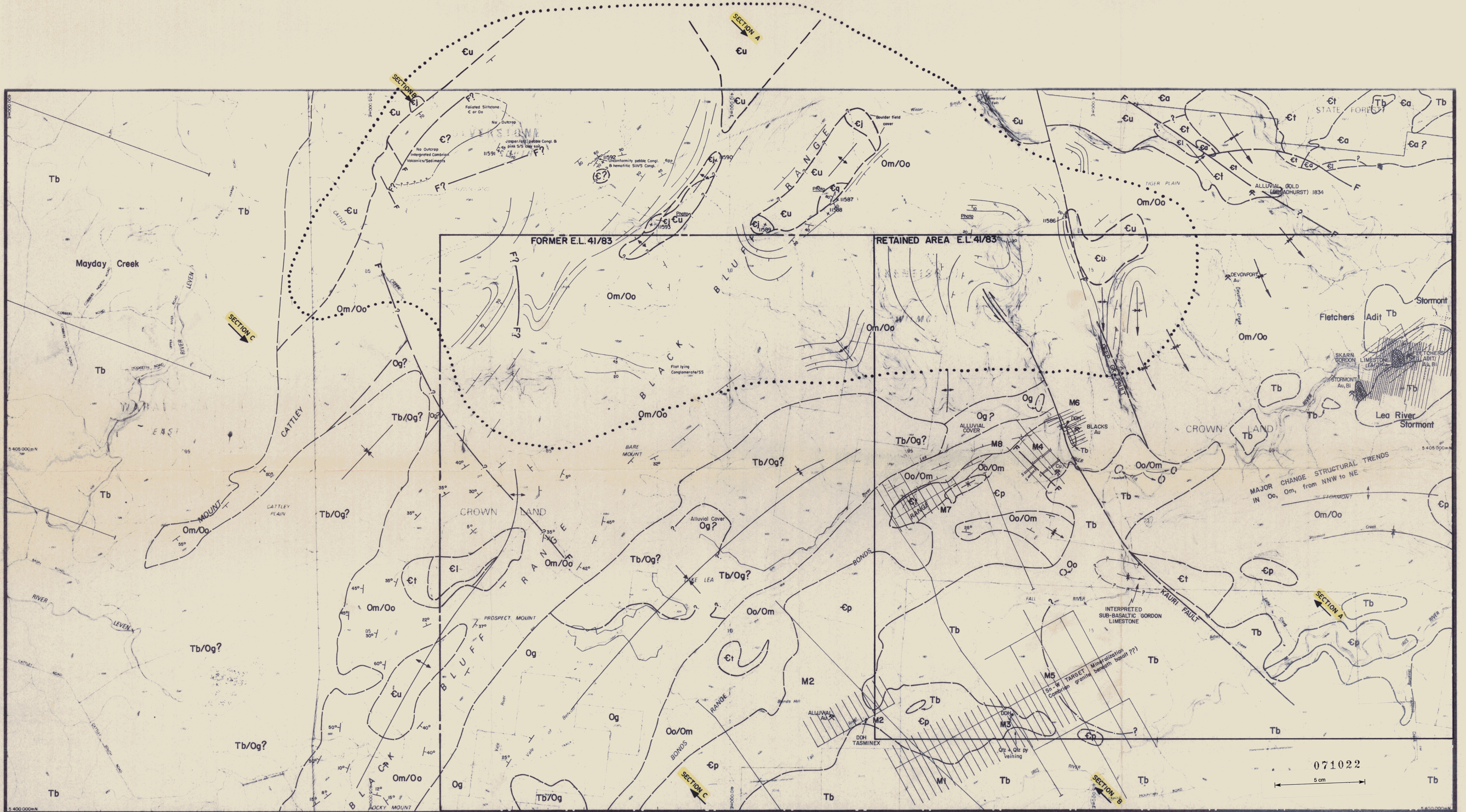
## LAKE LEA PETROPHYSICAL MEASUREMENTS.

SAMPLE NO.	G.F.E.L. NO.	MAGNETIC SUSCEPTIBILITY (cgs units x 10 <sup>-6</sup> )	DENSITY (t/c.m.)	RESISTIVITY ohm-m	SEISMIC VELOCITY (m/s)	ROCK TYPE
19/1	T00101	15.	2.73	8150.	5040.	Mt Read Volcanics. Qtz phytic lava; hematitic; weakly foliated.
19/2	T00102	13.	2.62	3880.	5110.	Owen Conglomerate. Lithic sst; hematitic. Sample taken perp. to bedding.
19/3	T00103	14.	2.70	3590.	5370.	"
19/4a /4b	T00104 "	8. 8.	2.72 2.69	6010.	6040.	Mt Read Volcanics. Qtz phytic lava; hematitic; weakly cleaved. Sample taken sub-parallel to cleavage.
19/5(i) /5(ii)	T00105 "	40. 0.	2.68 2.65	84100.	5760.	Mt Read Volcanics. Same location as 19/4, but perp. to cleavage (ie, horizontal).
19/6a(i) /6a(ii) /6b	T00106 " "	0. 0. 0.	2.62 2.65 2.66	10000.	4350.	Owen Conglomerate. Hematitic sandy-qtz cong. Sample taken perp. to bedding.
19/7a /7b	T00107 "	1. 5.	2.61 2.61	12500. 7780.	4000. 4270.	Owen Conglomerate. Hematitic siliceous pebble cong. Adjacent to 19/6.
19/8a /8b	T00108 "	2. 2.	2.64 2.64	7410. 6390.	3120. 3560.	Owen Conglomerate. Hematitic qtz sst. Adjacent to 19/6.

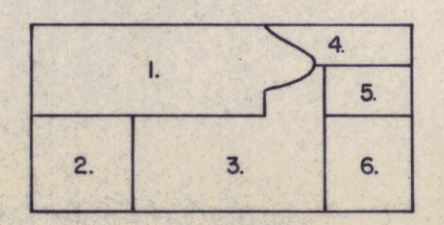


071021

<b>GOLD FIELDS EXPLORATION PTY. LIMITED</b>							
E.L. 41/83 LAKE LEA AREA							
<b>LAND TENURE MAP</b>							
85-2506	332						
SCALE 1:25000							
<table border="1"> <tr> <td>DRAWN BY : P.R.</td> </tr> <tr> <td>DRAFTSMAN : S.F.</td> </tr> <tr> <td>DATE : Nov, '84</td> </tr> <tr> <td>REVISIONS : Sep, '85</td> </tr> <tr> <td>FILE NO.</td> </tr> <tr> <td><b>FIG. 2</b></td> </tr> </table>		DRAWN BY : P.R.	DRAFTSMAN : S.F.	DATE : Nov, '84	REVISIONS : Sep, '85	FILE NO.	<b>FIG. 2</b>
DRAWN BY : P.R.							
DRAFTSMAN : S.F.							
DATE : Nov, '84							
REVISIONS : Sep, '85							
FILE NO.							
<b>FIG. 2</b>							



**GEOLOGICAL RESPONSIBILITY DIAGRAM**



1. Burnie 1:250,000 sheet; D.B. Seymour, R.P. unpublished mapping
2. Mackintosh 1 mile sheet
3. Geopako mapping (1978-1982)
4. Comalco mapping (Weste, 1978)
5. Sheffield 1 mile sheet, R.P. unpublished mapping
6. Middlesex 1 mile sheet, R.P. unpublished mapping

**LIMIT OF NEW DATA CONTRIBUTED BY R.P. POLTOCK & D.B. SEYMOUR**

**TERTIARY**

- Tb Basalt, locally underlain by greybill
- Tb/Og Basalt over interpreted Gordon Limestone

**ORDOVICIAN**

- Og Gordon Limestone
- Om/Oo Moira Sandstone/Owen Conglomerate undifferentiated. Predominantly bioturbated sandstone

**CAMBRIAN**

- Cj Volcanoclastic Conglomerate - Jukes Equivalent(?)
- Cq Quartz phric volcanics
- Ct Fine-medium grained volcanics, clastics
- Cl Rhyolite-dacite volcanics, probably lavas
- Ca Andesite lavas
- Cp Quartz-feldspar-biotite porphyry, partly intrusive, local sericitic alteration
- Cu Undifferentiated volcanics and sediments

**LEGEND**

**ALTERATION**

- Magnetite, garnet skarns
- Silicification with corundum sericite-speularite alteration

**CULTURE**

- Grid Lines
- M1: Mariner I (Geopako grid)
- Diamond drill hole
- Strike with dip of bedding
- Bedding trend line
- Anticline
- Syncline
- Blacks Au
- Old mines and prospects, name and contained metals
- Fault with movement shown
- Possible margin of concealed granite cupola

**GOLD FIELDS EXPLORATION PTY LIMITED**

E.L. 41/83  
**LAKE LEA AREA**  
**GEOLOGY 333**  
**CAMBRIAN WINDOWS-BLACK BLUFF RANGE**

SCALE 1:25000

DRAWN BY	R.P.
DRAFTSMAN	TGDS/S.F.
DATE	Nov '84
REVISIONS	
R.P./D.S.	Oct. 85
FILE NO.	
FIG	3

85-2506



NOTE:  
 Samples 700-900 east of dashed line  
 taken by Comalco. All other samples  
 taken by Geopeko.

— Active stream sediment samples  
 — Pan concentrate samples (Peko)  
 \* Repeat Assay  
 x Below detection limit

071023

5 cm

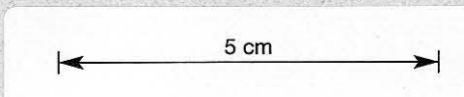
GOLD FIELDS EXPLORATION PTY LIMITED	
E.L. 41/83	
LAKE LEA AREA	
Stream Sediment Geochemistry (Au ppb)	
SCALE 1:25,000	FIG 4

85-2506



NOTE:  
 Samples 700-900 east of dashed line  
 taken by Comalco. All other samples  
 taken by Geopeko.

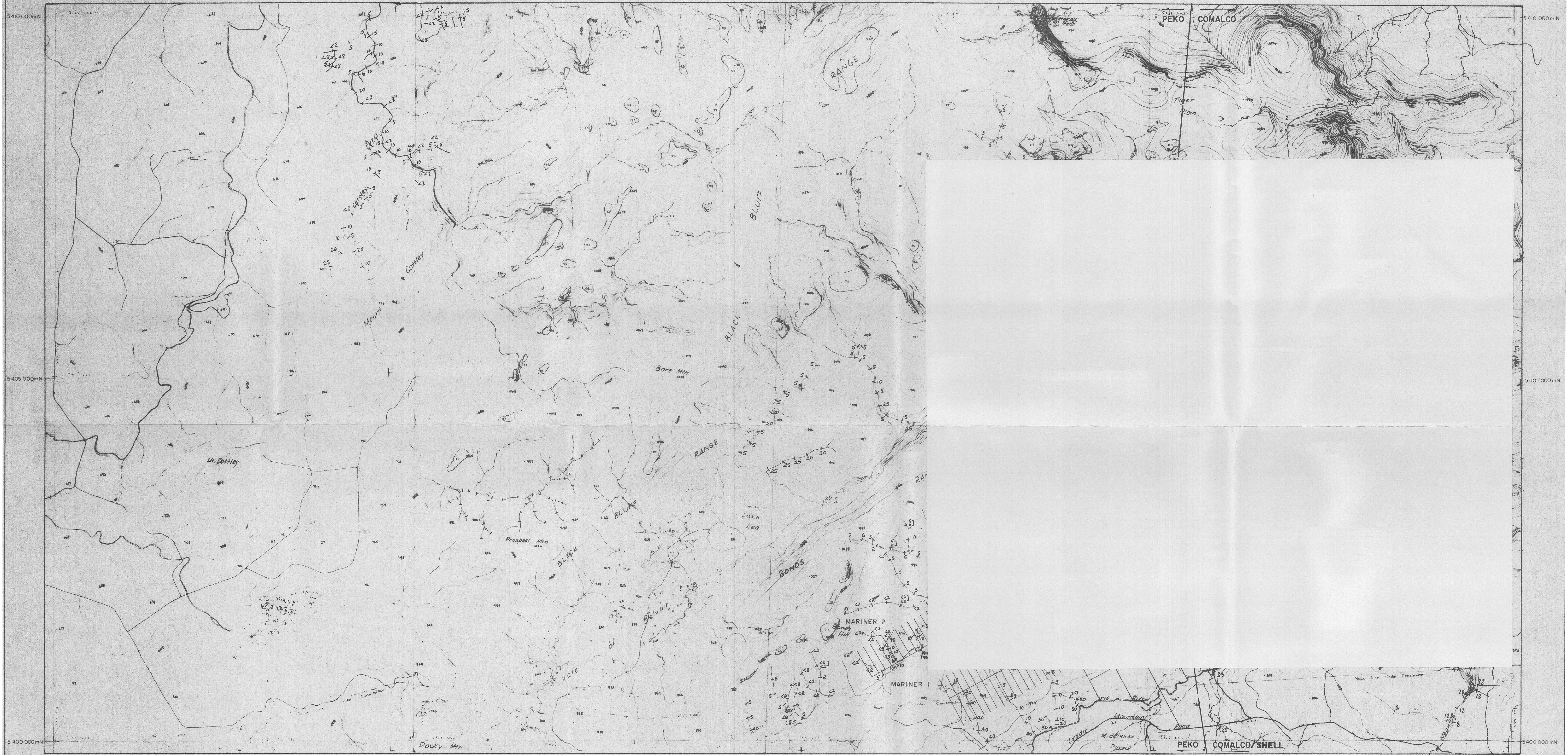
- Active stream sediment samples
- Pan concentrate samples (Peko)
- \* Repeat Assay
- x Below detection limit



GOLD FIELDS EXPLORATION PTY LIMITED	
E.L. 41/83	
LAKE LEA AREA	
Stream Sediment Geochemistry	
(Sn p.p.m.)	
SCALE 1:25,000	FIG 5

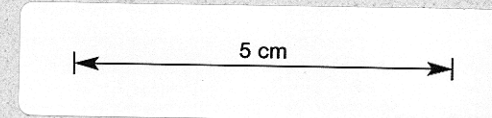
071024

85-2506



NOTE :  
 Samples 700-900 east of dashed line  
 taken by Comalco. All other samples  
 taken by Geopeko.

Active stream sediment samples



071025

GOLD FIELDS EXPLORATION PTY. LIMITED

E.L. 41/83  
 LAKE LEA AREA  
 Stream Sediment Geochemistry  
 (Cu ppm.)

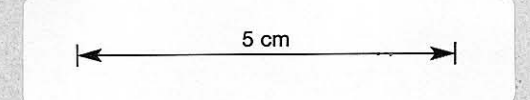
DRAWN BY	J.W.B.
DRAFTSMAN	S.F.
DATE	Mo: 84
REVISIONS	
FILE NO.	
SCALE 1:25 000	Metres

FIG 6



NOTE:  
 Samples 700-900 east of dashed line  
 taken by Comalco. All other samples  
 taken by Geopeko.

Active stream sediment samples



GOLD FIELDS EXPLORATION PTY LIMITED	
E.L. 41/83	
LAKE LEA AREA	
Stream Sediment Geochemistry	
(Pb p.p.m.)	
SCALE 1:25 000	FIG 7

071026

DRAWN BY JWB  
 DRAFTSMAN SF  
 DATE Mar 84  
 REVISIONS  
 FILE NO

85-2506



NOTE:  
 Samples 700-900 east of dashed line  
 taken by Comalco. All other samples  
 taken by Geopeko.

Active stream sediment samples

5 cm

071027

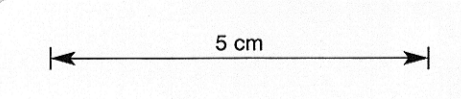
GOLD FIELDS EXPLORATION PTY LIMITED	
E.L. 41/83	
LAKE LEA AREA	
Stream Sediment Geochemistry	
(Zn p.p.m.)	
SCALE 1:25 000	FILE NO
	FIG 8

85-2506



NOTE:  
 Samples 700-900 east of dashed line  
 taken by Comalco. All other samples  
 taken by Geopeko.

- Active stream sediment samples
- Pan concentrate samples (Peko)
- Repeat Assay
- Below detection limit



**071028**

GOLD FIELDS EXPLORATION PTY LIMITED

E.L. 41/83

**LAKE LEA AREA**

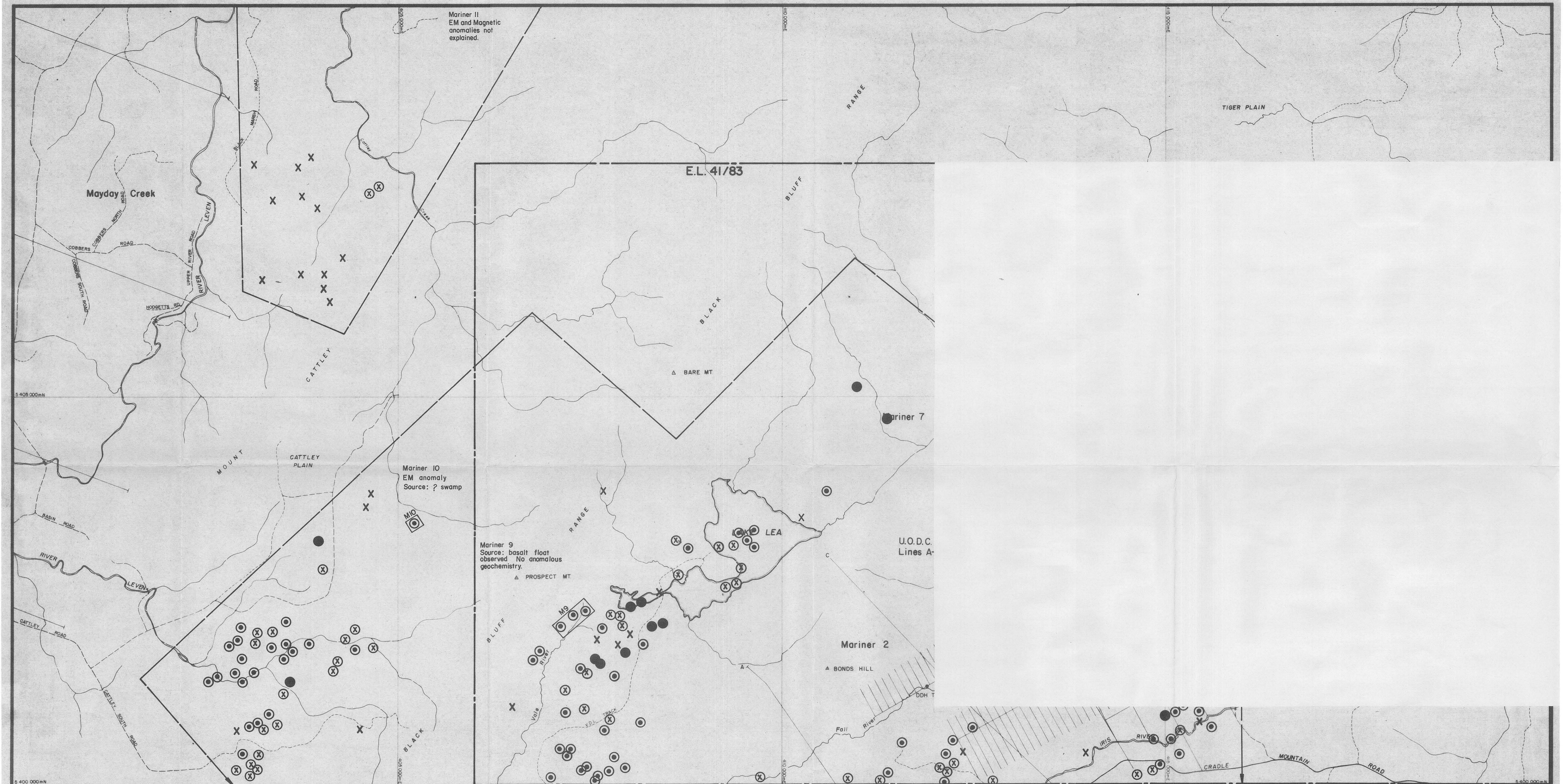
**Stream Sediment Geochemistry**  
(W p.p.m.)

DRAWN BY J.W.B.	FILE NO
DRAFTSMAN TGDS.	FIG 9
DATE Nov 84	
REVISIONS	

SCALE 1:25000

95-2506

Mariner 11  
EM and Magnetic  
anomalies not  
explained.



Mariner 10  
EM anomaly  
Source: ? swamp

Mariner 9  
Source: basalt float  
observed No anomalous  
geochemistry.

U.O.D.C.  
Lines A-

Mariner 2

**LEGEND**

- Coverage
- Anomalies
- X Possible anomalies
- ⊗ Anomalies
- ⊗ Possible anomalies } Surface Response

**CULTURE**

- Grid Lines
- Diamond drill hole

071029

GOLD FIELDS EXPLORATION PTY LIMITED

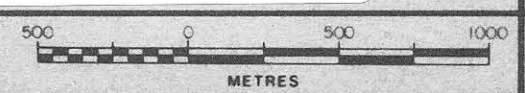
E.L. 41/83  
LAKE LEA AREA

**Dighem EM Responses**

5 cm

340

SCALE 1:25 000

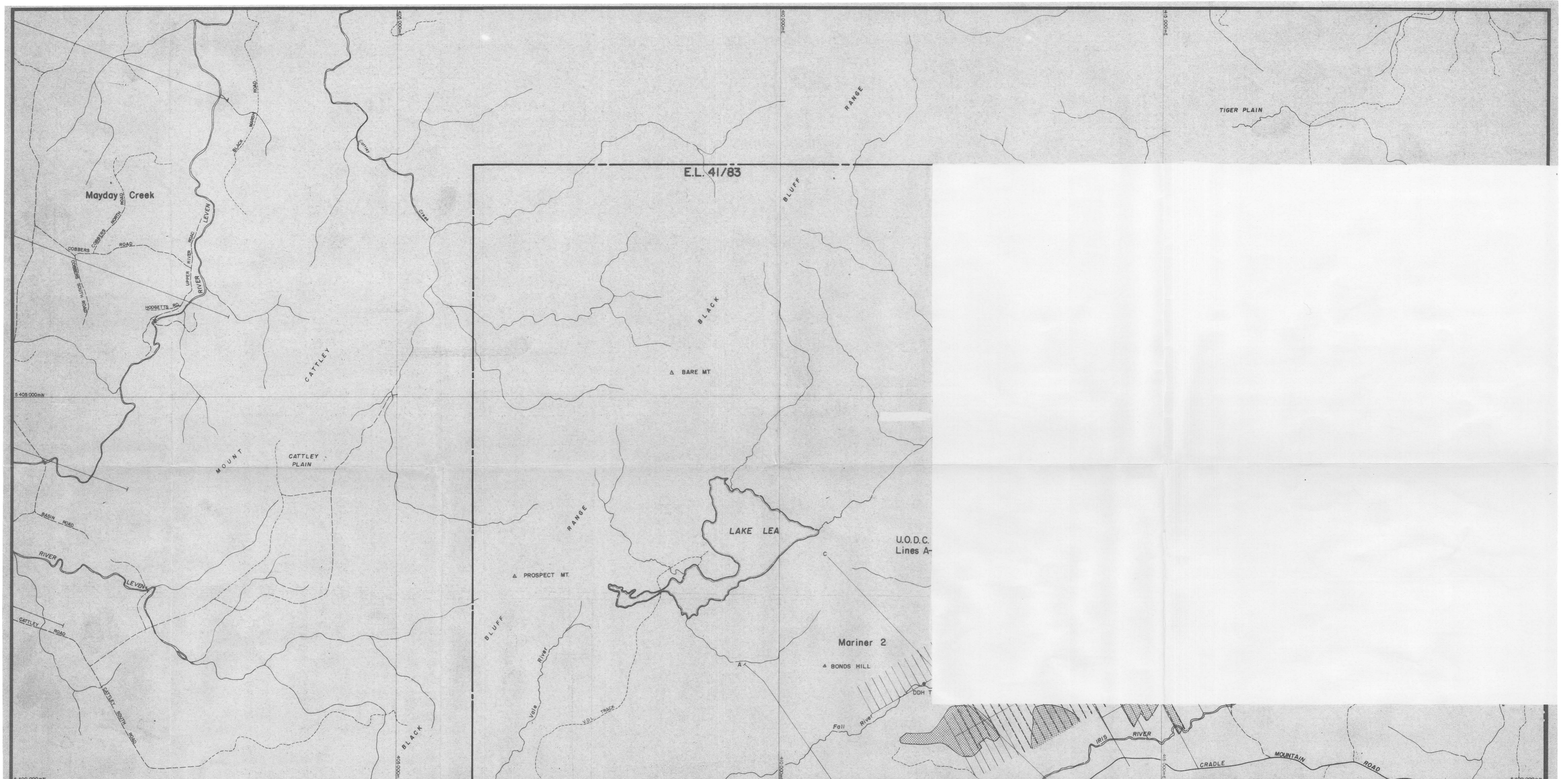


DRAWN BY  
DRAFTSMAN T.G.D.S.  
DATE Nov 84  
REVISIONS

FILE NO.

FIG. 10

85-2506



**LEGEND**

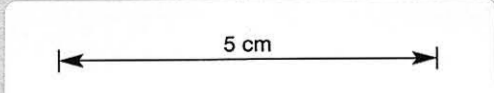
- Coverage
- ▨ Anomalies

**CULTURE**

- ▨ Grid Lines
- Diamond drill hole

GOLD FIELDS EXPLORATION PTY. LIMITED

E.L. 41/83  
LAKE LEA AREA  
**Magnetics**

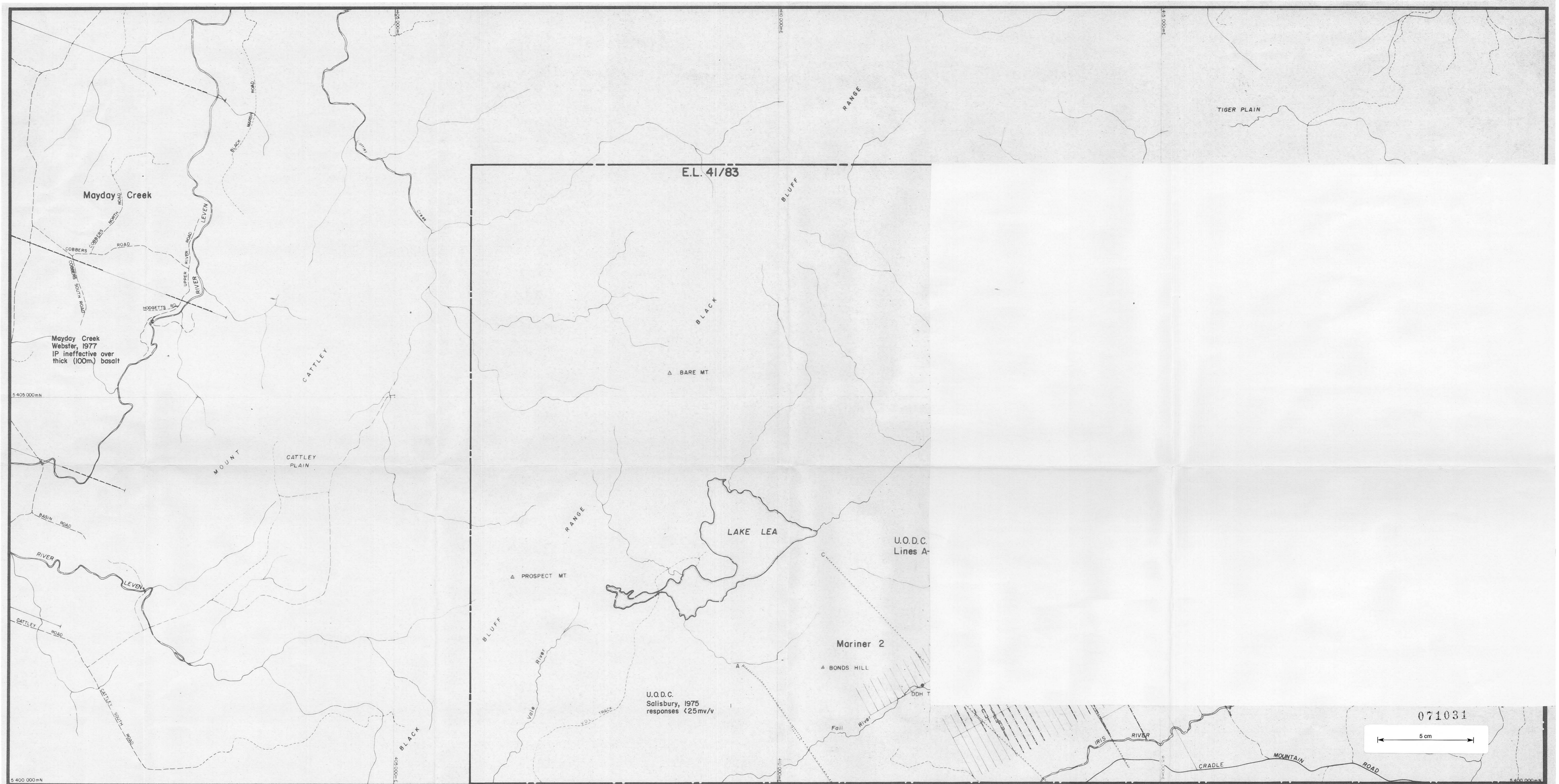


SCALE 1:25 000

DRAWN BY	
DRAFTSMAN	T.G.D.S.
DATE	Nov 84
REVISIONS	
FILE NO.	
FIG. II	

071030

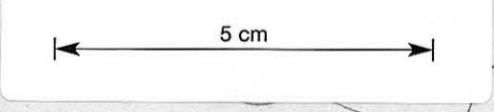
85-2506



E.L. 41/83

U.O.D.C. Salisbury, 1975 responses <25 mv/v

071031



**LEGEND**

- Gradient array : coverage ---  
anomalies [---] (--- anomalous zones)
- Dipole-dipole array : coverage ---  
anomalies [---]
- Pole-dipole array : coverage ---  
anomalies [---]

**CULTURE**

- [---] Grid Lines
- Diamond drill hole

GOLD FIELDS EXPLORATION PTY. LIMITED

E.L. 41/83  
LAKE LEA AREA  
Induced Polarisation  
Chargeability

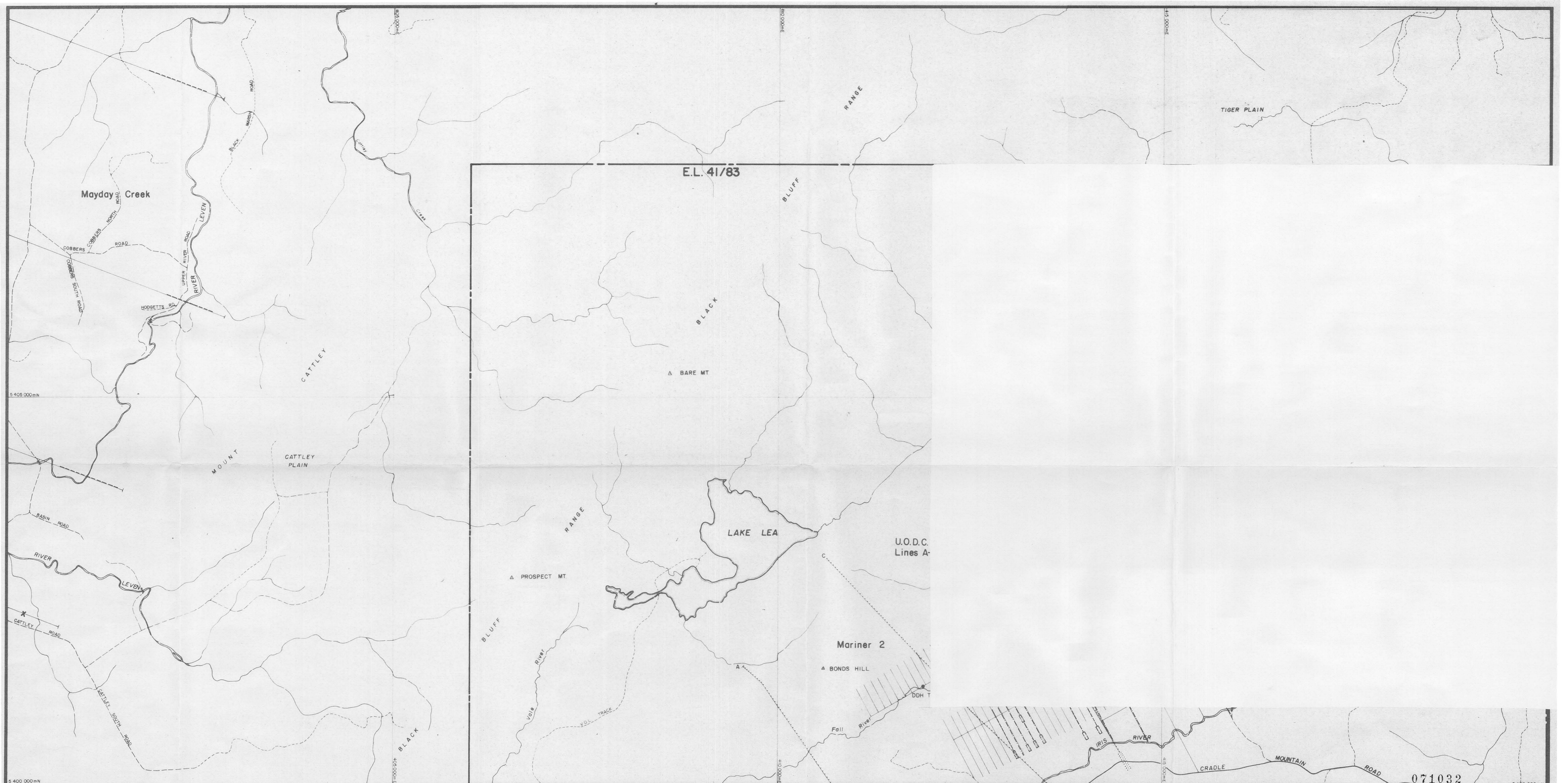
DRAWN BY	
DRAFTSMAN	T.G.D.S.
DATE	Nov 84
REVISIONS	
FILE NO.	

342

FIG. 12



85-2506



**LEGEND**

- Gradient array : coverage ——— anomalies [ ]
- Dipole-dipole array : coverage ——— anomalies [ ]
- Pole-dipole array : coverage ..... anomalies [ ]
- X Resistivity soundings

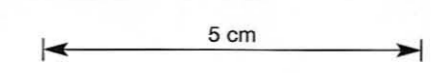
**CULTURE**

- [ ] Grid Lines
- Diamond drill hole

GOLD FIELDS EXPLORATION PTY. LIMITED

E.L. 41/83  
LAKE LEA AREA

**Resistivity**



343

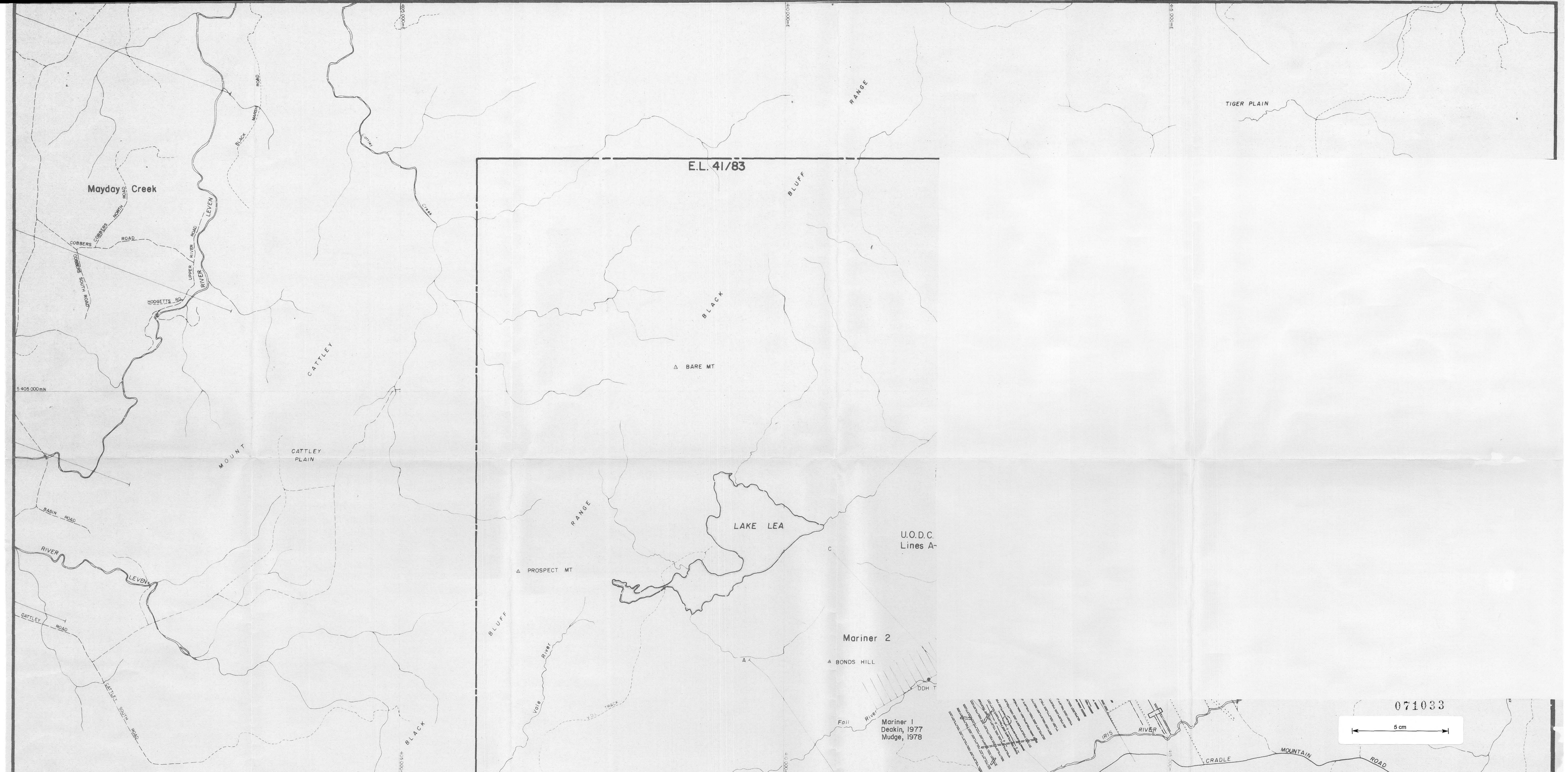
SCALE 1:25 000



DRAWN BY	
DRAFTSMAN	T.G.D.S.
DATE	Nov 84
REVISIONS	
FILE NO.	
FIG. 13	

85-2506

071032



**LEGEND**

- Gravity coverage
- Gravity contact
- Radiometrics coverage
- Radiometrics anomalies
- SP coverage
- SP anomalies
- VLF-EM coverage
- VLF-EM anomalies
- TEM coverage

**CULTURE**

- Grid Lines
- Diamond drill hole

GOLD FIELDS EXPLORATION PTY LIMITED

E.L. 41/83  
LAKE LEA AREA

EM, SP, Gravity  
and Radiometrics

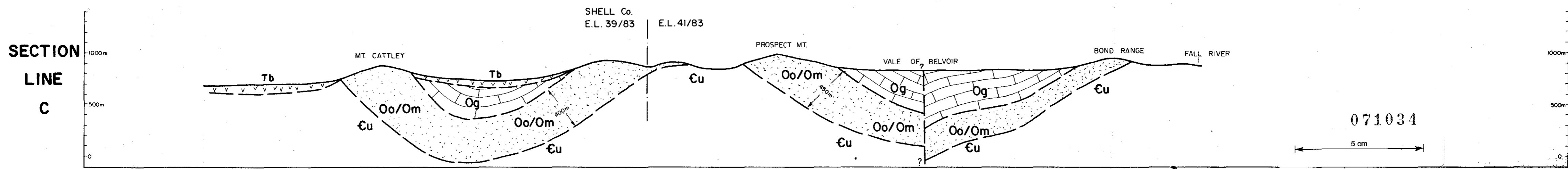
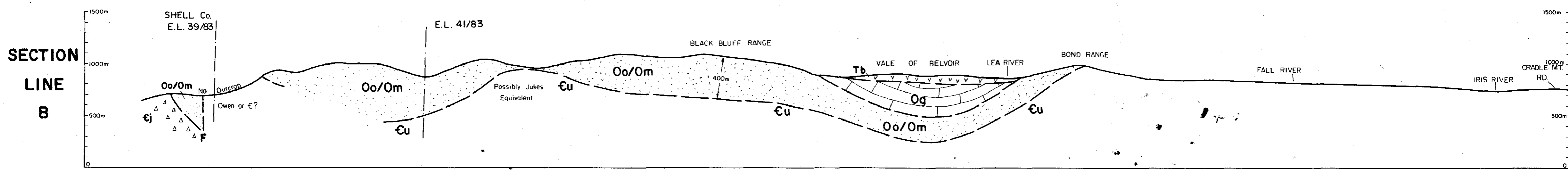
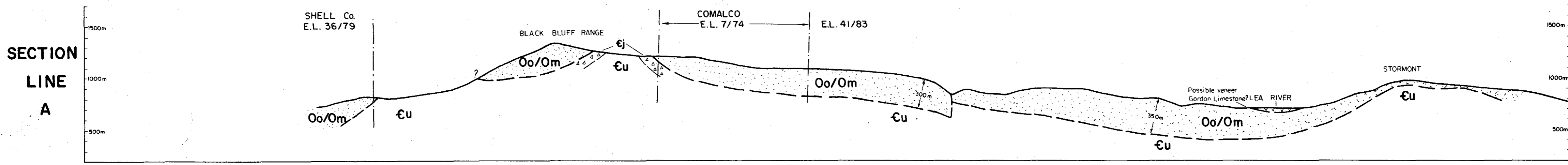
344

DRAWN BY	T.G.D.S.
DRAFTSMAN	T.G.D.S.
DATE	Nov. 84
REVISIONS	
FILE NO.	

SCALE 1:25 000 METRES

85-2506

FIG. 14



071034

5 cm

**LEGEND**

- Tertiary Basalt
- Ordovician Gordon Limestone
- Ordovician Moira Sandstone/Owen Conglomerate
- Undifferentiated volcanics and sediments
- Volcaniclastic Conglomerate - Jukes Equivalent(?)

\* See Figure 3 for location of sections.

GOLD FIELDS EXPLORATION PTY. LIMITED	
<b>E.L. 41/83</b>	
<b>BLACK BLUFF RANGE</b>	
<b>INTERPRETIVE SECTION LINES</b>	
<b>NW-SE 345</b>	
SCALE 1:25 000	
DRAWN BY : R.P.	DATE : Nov. 85
DRAFTSMAN: S.F.	REVISIONS :
FILE NO.	<b>FIG.15</b>

85-2506