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CRA EXPLORATION PTY.LIMITED.

PRELIMINARY REPORT ON AN AIRBORNE

GEOPHYSICAL SURVEY, RAPID RIVER E.L. 1/79

NORTH-WEST TASMANIA

Author : M.F.Flis

Date : August, 1982.

Submitted to : T.W.Dickson

Accepted by : *T.W. Dickson*

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1. SUMMARY

An airborne magnetic and radiometric survey was flown over Rapid River E.L. 1/79. The data was used to create an interpreted geology map for the area. Magnetic anomalies were delineated for future follow-up work. Recommendations are put forward for priority grading of anomalies by inversion modelling, and correspondence to radiometrics and Input E.M. anomalies.

2. INTRODUCTION

Rapid River E.L. 1/79, a CRAE-Geopeko Joint Venture, lies to the south and west of the Arthur River, North-West Tasmania (location map Plan TASH 842). The major geological feature of the area is the north-east trending belt of Precambrian metamorphic rocks known as the Arthur Lineament.

Due to the paucity of geological knowledge, and the lack of access within the E.L., it was decided to conduct an airborne geophysical survey to delineate prospects for ground follow-up. Austirex International Ltd. were contracted to fly the magnetic and radiometric survey. Surveying commenced on the 6th of February, 1982 and concluded on the 14th of February, 1982. A total of 2,380 line kilometres was flown.

This report is a preliminary appraisal of the airborne survey.

3. CONCLUSIONS

The airborne geophysical survey provided information about the distribution of major rock units. In particular, the Arthur Lineament metamorphics and amphibolites, dolerite dyke systems, some sedimentary units and Tertiary basalts were outlined. Data from a previous Input E.M. survey further delineated carbonaceous shale horizons.

A number of anomalous magnetic responses will require ground follow-up work after evaluation by modelling.

4. RECOMMENDATIONS

It is recommended that -

1. Magnetic anomalies outlined on the interpretation map to be modelled by inversion.
2. Anomalies to be priority weighted by reference to inverted parameters, radiometrics, and coincident Input E.M. anomalies.
3. Priority targets to be followed up on the ground with reconnaissance magnetometer traverses, lithology identification, geochemistry, and, where appropriate, E.M.
4. Black shale horizons defined by the Input E.M. survey to be followed up with geochem.

5. GEOLOGY

The geology of the Rapid River E.L. area is little known. Reconnaissance type traverses by the Tasmanian Geological Survey were carried out along the Arthur, Rapid and Keith Rivers. From these surveys, photo-interpretation and interpretation from surrounding areas the following general geology is "known" :

The E.L. may be divided into four distinct areas. The first of these consists of a north-easterly trending belt of Precambrian pelitic schists known as the Whyte schist. The presence of siltstones, dolomitic siltstones and quartzites has led to the more general term of Keith Beds. This belt, regionally called the Arthur Lineament, attains a middle green schist facies metamorphic grade to the north of the area (Gee, 1971).

The schists are predominantly fine grained mica and quartz mica schists (usually muscovite). (McNeil, 1960).

Amphibolites, of possible Cambrian age and probable igneous origin (Urquhart, 1966), occur within the lineament. These contain the Savage River magnetite deposits to the south of the E.L.

The Arthur Lineament is bounded to the west by the 'younger' less metamorphosed Precambrian Neasey Quartzites and Corinna Slates, the contact being poorly determined as metamorphically gradational or ? unconformable. The quartzites are clean, well sorted and often interbedded with black argillites.

Mudstones and sandstones, also of 'younger' Precambrian age, bound the lineament to the east. Very little is known about these units and their relationship to the Neasey Quartzites and Corinna Slates.

The eastern edge of the surveyed area consists of Permian sandstones, siltstones, mudstones and tillites. Although this succession is bounded to the west by the Arthur River, a small infaulted block is reported within the lineament between the Arthur and Lyons Rivers.

Dolerite dyke swarms of probable Precambrian age occur within the Neasey Quartzite.

Tertiary vesicular basalts pervade the area.

5.1 Mineralisation

The E.L. is generally devoid of mining and prospecting activity- possibly due to its inaccessibility.

Copper mineralisation consisting of chalcopyrite and malachite, attaining a reported grade of 22.4% copper with 232 grammes silver and 16 grammes gold (McNeil, 1960), occurs at the Victory Mine on the Arthur River.

The deposit is associated with the "Keith River Gossan" (Porter, 1971) found within a sequence of dolomites, siltstones, shales, and quartzites of the Keith Beds. Mineralization includes up to 60 percent pyrite with minor magnetite and specular haematite.

Small amounts of alluvial gold have been worked along the Arthur River and at Folly Hill where a deposit of Late Tertiary, poorly cemented alluvial sands have been sluiced.

The amphibolites and Whyte Schists are prospective for magnetite, gold, and magnesite (Urquhart, 1966).

Pyrite bands in black argillites of the Neasey Quartzite are common.

6. PREVIOUS GEOPHYSICS

The area of the E.L. has been included in two previous airborne geophysical surveys. The first of these was an aeromagnetic survey flown for Rio Tinto Australian Exploration Pty.Ltd. in 1958. The survey was flown by Adastr-Hunting using east-west flight lines spaced at 800 metres. Sensor altitude was 150 metres (McCarthy, 1958).

The second survey was an Input electromagnetic (E.M.) survey flown for Esso Aust. Ltd. by Geoterrex Ltd. in 1973 (Neale, 1974). Flight lines were east-west with 1600 metre spacing (some 800 metre infills) at an altitude of 150 metres. Aeromagnetic data was also recorded. Relatively rudimentary follow-up work after this survey suggests many of the anomalies mapped are still of interest. Data from this survey has been replotted for use in this investigation.

The Tasmanian Department of Mines has recently completed an aeromagnetic survey of the west coast. Although the surveyed area does not include any of the Rapid River E.L. it does adjoin its southern margin.

As a result, the southern extension of the Arthur Lineament has been further clarified in a magnetic sense. The survey was flown by Geoex Ltd. using east-west flight lines with a 500 metre spacing at a height of 135 metres.

Regional B.M.R. gravity data is available for the entire area.

7. SURVEY SPECIFICATIONS

Austirex International Ltd. flew the current aeromagnetic survey. Flight lines were east-west with a spacing of 250 metres at a (sensor) height of 100 metres. A radiometric system with 16,780 cubic centimetres of crystal volume was included.

Navigation was visual off 1974, 1:20,000, black and white aerial photography. Due to a complete lack of distinguishable features in some areas, however, navigation was attempted with success off 1:100 000 topographic maps!

A copy of the contract with full specifications is included as Appendix I.

7.1 Data Presentation

Maps of total magnetic intensity, stacked profiles and flight path plots were provided by the contractor at 1:25 000. These were later reduced to 1:50 000. Both gridded magnetic data and gridded radiometric data was processed by CRAE (Canberra) for colour imagery display on a COMTAL screen. Slides were taken of the following images.

1. Aeromagnetics
2. Total count radiometrics (raw and filtered)
3. Uranium channel (raw and filtered)
4. Thorium channel (raw and filtered)

5. Potassium channel (raw and filtered)
6. Uranium, Thorium and Potassium composite.
7. Uranium/Thorium ratio.
8. Uranium/Potassium ratio.
9. Thorium/Potassium ratio.
10. Principle Component 1 (U + Th + K)
11. Principle Component 2 (K - U)
12. Principle Component 3 (U + K - Th)
13. Principle Components composite.
14. Normalized (to U + Th + K) Uranium.
15. Normalized Thorium.
16. Normalized Potassium.
17. Normalized composite.

For brevity only selected slides have been reproduced in this report (namely images 1,2,3,4,5,13, and 17). See Plans TASH 845 to TASH 851.

8. DISCUSSION

Qualitative interpretations were carried out on the magnetic and radiometric data. An interpretation map (Plan TASH 844) is attached.

8.1 Magnetics

The dominant feature of the total magnetic intensity map (Plan TASH 843) is the north-easterly trending belt of intense magnetic highs associated with the Arthur Lineament. A major magnetic marker horizon within the southern portion of the belt is indicative of the Cambrian amphibolites in which the Savage River magnetite deposits occur 20 kilometres to the south. A repeat of this occurs to the west on the southern edge of the map. Department of Mines aeromagnetics indicates that this horizon is the western limb of a bifurcation which occurs 5 kilometres to the north of the Savage River Mine.

The amphibolite zone appears to terminate about one kilometre south of a major north-west trending fault - the Rapid River Fault - along which the Rapid River flows.

Amphibolites may continue, at depth, to the north along the well defined linear magnetic feature seen there. However, this would require a transcurrent fault movement of at least 3 kilometres, which is not seen in other features transected by the fault. In addition, the character of the anomaly has changed: to the north it appears to be caused by two distinct parallel horizons which would necessitate either the reappearance of the western limb seen in the south, or further structural complications.

The magnetic character of the lineament is further complicated by the presence of widespread Tertiary basalts. These basalts appear to contain a reversed remanent magnetization giving rise to predominantly negative magnetic anomalies. This would suggest that these basalts are of the same age as that seen at Mt. Bischoff (Flis, 1982).

To the west of the lineament a swarm of dolerite dykes trending north-south are the major feature in a relatively quiet magnetic area. The significance of the dyke-like anomaly in the north-west corner of the area is unknown at this stage. Its intensity and size are markedly different from other dykes seen in the area, and thus requires further follow-up.

Similarly the magnetic activity in the north-north-west corner of the area cannot be attributed to anything until field investigations are carried out. It may be associated with the lineament, but the relationship is not clear.

Magnetic activity to the east of the lineament is confined to areas with Tertiary basalt cover. One exception to this is in the south-east corner of the area where a steep magnetic gradient indicates the presence of a major change in lithology in the Permian.

8.2 Radiometrics

Although it was not expected that radiometrics would show marked relief over the area, it was included in the survey to maximize information and aid in magnetic target evaluation. Indeed, the range in gamma counts in the four channels was not large: 12 to 262 c.p.s. in total count, 0 to 72 c.p.s. in potassium, 0 to 36 c.p.s. in uranium, and 0 to 47 c.p.s. in thorium. The total count and potassium channels proved most useful in the interpretation process, possibly due to their higher relief.

A major problem in radiometrics, pertinent to this locale, is the attenuation of gamma rays by soil, water, and vegetation cover. As the survey was carried out in February, attenuation by water soaked soils is minimal, but not by any means insignificant as the area is never really dry. Vegetation varies from grass plains to myrtle and eucalypt forests with up to 100% crown cover. The relationship between vegetation cover (from Forestry Commission photo-interpretation) and count rate is not clear. Some areas of grass plains show a high count rate while others do not. The relationship in forested areas is even less predictable.

Given the obvious limitations of radiometric data from an area such as this, the following observations could still be made from the set of data presentations outlined in Section 7.1 :

- a) all major rivers, creeks and watersheds show as high counts in all channels. This may be due to the increase in exposed outcrop along the deeply incised river valleys or the presence of accumulations of weathered out minerals (such as monazite and micas),
- b) in general, all channels are sympathetic as can be seen from the raw data correlation matrix:

	U	Th	K
U	1.0		
Th	0.65	1.0	
K	0.67	0.75	1.0

- c) Tertiary basalts show as low counts on all channels, but particularly the potassium channel. Generally $U > Th > K$,
- d) the Arthur Lineament is typically potassium deficient along its entire length and thorium deficient towards the south. This is surprising as one would expect a high potassium count from the mica schists present in the lineament. The presence of basalts may be swamping the signal, however. In general $U > Th > K$ south of the Rapid River Fault whilst $Th > U > K$ north of it,
- e) rocks to the west of the lineament tend to be very potassic and may reflect the marine character of these sediments. Generally $K > Th > U$,
- f) sedimentary sequences to the east of the lineament are bimodal: a wedge of rock on the eastern boundary of the lineament is potassium rich with $K > U > Th$, whilst the rest have $Th > U > K$,
- g) the Permian sequences tend to have $Th > K > U$,
- h) a number of well defined radiometric highs and lows occur in the west. These may be attributable to sequences of sandstones and shales.

In addition the various radiometric computer images show complexities which, at this stage, are little understood. Further work is required.

8.3 General

A number of the more obvious anomalous magnetic responses have been outlined on the interpretation map. The possibility of some of them being basalt-caused is a major concern. Careful evaluation will have to be carried out before field checking begins.

Magnetic anomaly 1211/11250 in the north is attributable to the Keith River Copper Occurrence, (Porter, 1971). The significance of the locality of this mineralisation (i.e. adjacent to the Arthur Lineament) has never been investigated. Any significance may have an important bearing on anomalies 1371/5780 and 1721/7196, both of which occur on the eastern edge of the lineament.

A number of magnetic anomalies are also associated with electromagnetic responses: 1671/14300, 1671/14365, 1721/7350 and 1873/610 in the south; 1711/9010 in the west and 1320/1090 and 1321/1140 in the north-west. These must be considered high priority targets.

One of the more interesting regional features in the area is the effect of the Rapid River Fault on the lineament. The gross character of the lineament changes from uranium rich and magnetically intense in the south to thorium rich and magnetically subdued in the north. There is not immediate explanation for this observation, but it does show the fault is a fundamental structure of some importance.

Also, in the south radiometrics suggests that the margin of the lineament extends further west than the magnetics indicate. It should be pointed out, however, that the presence of surficial basalts may distort the picture.

9. REFERENCES

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- Gee, R.D. 1971 Geological Atlas 1 Mile Series Zone 7 Sheet 22 Table Cape. Explan. Rep. Geol. Surv. Tas.
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- McNeil, R.D. 1960 "Geological Reconnaissance of Part of the Arthur River Area". Tech. Rpt. No. 5, Tas. Dept. of Mines.
- Neale, R.C. 1974 "E.L. 2/73 Pieman River, Tasmania. Completion Report". Unpub. Esso Aust. Ltd.
- Porter, T.M. 1971 "Final Report on the Keith River Prospect, E.L. 43/70, North West Tasmania. Unpub. CRAE Rpt. 3793.
- Urquhart, G. 1966 "Magnetite Deposits of the Savage River - Rocky River Region". Geol. Surv. Bull. No. 48, Tas. Dept. of Mines.

10. KEYWORDS

Geophysics - mag; geophysics - rad; image processing, Precambrian, schist, amphibolite, basalt.

11. LOCATION

Burnie 1: 250 000 SK 55-3

12. LIST OF PLANS

<u>Plan No.</u>	<u>Title</u>	<u>Scale</u>
TASh 842	Locality Plan, Rapid River E.L. 1/79	1:2 000 000
TASh 843	Total Magnetic Intensity Map Rapid River E.L. 1/79	1:50 000
TASh 844	Qualitative Interpretation Map, Rapid River E.L. 1/79	1:50 000
TASh 845	Magnetic Intensity Image, Rapid River E.L. 1/79	As shown
TASh 846	Total Count Image, Rapid River E.L. 1/79	As shown
TASh 847	Uranium Channel Image, Rapid River E.L. 1/79	As shown
TASh 848	Thorium Channel Image, Rapid River E.L. 1/79	As shown
TASh 849	Potassium Channel Image, Rapid River E.L. 1/79	As shown
TASh 850	Principal Component Image, Rapid River E.L. 1/79	As shown
TASh 851	Normalized Radiometrics Image, Rapid River E.L. 1/79	As shown

NB Transparences in Vertiplan.

13. LIST OF APPENDICES

Appendix I Survey Specification and Contract Rapid River Airborne Survey.

14. LIST OF TRANSPARENCIES

Rapid River - Atlas

Sheet 1	Magnetic Contours	1:25 000
	Magnetic Stacked Profiles	1:25 000
	Flight Path	1:25 000
Sheet 2	Magnetic Contours	1:25 000
	Magnetic Stacked Profiles	1:25 000
	Flight Path	1:25 000
Sheet 3	Magnetic Contours	1:25 000
	Magnetic Stacked Profiles	1:25 000
	Flight Path	1:25 000
Sheet 4	Magnetic Contours	1:25 000
	Magnetic Stacked Profiles	1:25 000
	Flight Path	1:25 000
Sheet 5	Magnetic Contours	1:25 000
	Magnetic Stacked Profiles	1:25 000
	Flight Path	1:25 000
Sheet 6	Magnetic Contours	1:25 000
	Magnetic Stacked Profiles	1:25 000
	Flight Path	1:25 000
Sheet 7	Magnetic Contours	1:25 000
	Magnetic Stacked Profiles	1:25 000
	Flight Path	1:25 000
Sheet 8	Magnetic Contours	1:25 000
	Magnetic Stacked Profiles	1:25 000
	Flight Path	1:25 000

APPENDIX I

SURVEY SPECIFICATION AND CONTRACT RAPID RIVER

AIRBORNE SURVEY

**AUSTIREX INTERNATIONAL LTD**

41 KISHORN ROAD, APPLECROSS, W.A. 6153

Telephone: 364 8444

Telex: AA 94917

RNF/bt

23rd February, 1982

C R A Exploration Pty. Limited,
P.O. Box 138
G.P.O. Bellerive
Tasmania, 7018

Attention: Mr. Marcus Flis

Reference: Airborne Survey Agreement - Rapid River, Atlas Areas, Tasmania.

Dear Sir,

This letter is in reference to your letter of the 19th February, 1982 regarding the contract alterations as set out in the Memo of T.E. Johanson 27th February, 1982. With regard to:

ITEM 1: CRAE names on pages 1, 5 and 6 shall be shown as CRA Exploration Pty. Limited.

This is acceptable.

ITEM 2: Clause 4. To start:-

"The Contractor is an independant contractor and as such shall accept liability for compliance with all statutes, laws, by-laws and regulations affecting or regulating the manner in which the survey is carried out. In addition the Contractor shall:-

(i) accept responsibility for (a) etc."

This is acceptable.

ITEM 3: Clause 6 - After the word "material" on the seventh line to insert "and any duplicates".

This is acceptable.

ITEM 4: Clause 7 - After the first sentence to insert the words "The Contractor shall use every endeavour to complete this survey by 31st March, 1982.

This is acceptable.

I hope that this letter will cover the alterations to the satisfaction of your legal staff.

With your best interests in mind.

Yours sincerely,



R. FLEETON
ASSISTANT MANAGER



FOR CRA EXPLORATION PM. LTD.

25-2-82

THIS AGREEMENT dated the 25th day of February 1982

BETWEEN

C.R.A. EXPLORATION PTY. LTD. (CRAE)
of Level 4 Bellerive Quay, Cambridge Road,
Bellerive, Tasmania 7018

AND

AUSTIREX INTERNATIONAL LTD. ("The Contractor")
of 41 Kishorn Road, Applecross, Western Australia, 6153.

IT IS HEREBY AGREED:

1. The Contractor shall execute an airborne geophysical survey ("the Survey") for C.R.A.E. over an area near Savage River, Tasmania ("The Area") in accordance with the terms and conditions contained in this Agreement and the Addenda hereto and for the consideration charged at the rates expressed in Addenda D and E. Addenda A to F are deemed to form part of this Agreement.
2. The Contractor shall provide at its own cost and expense the equipment shown in Addendum B plus all the necessary associated equipment and labour and shall ensure that the Survey is carried out and completed in a diligent and workmanlike manner in accordance with the details specified in the Addenda and in accordance with good standard practice appropriate to the airborne geophysical survey industry and by taking advantage so far as is reasonably practicable of the latest developments of techniques in that industry.

3. At its own cost and expense CRAE may arrange for a geologist or geophysicist ("the Site Geologist") to be available in proximity to the Survey. Although it is understood that the Contractor is an independent contractor and shall have full right to direct the performance of the Survey the Site Geologist shall have the right to inspect and review the data as and when collected by the Contractor and the right to vary the Survey within the terms of the variations provided for herein.

4. The Contractor is an independent contractor and as such shall:
 - (1) accept responsibility for
 - (a) all equipment used by it,
 - (b) all personnel employed by it, and
 - (c) all claims against it by third parties;
 - (2) maintain such insurance as is necessary or desirable to protect it from
 - (a) claims and damages for personal injury including death resulting therefrom, and
 - (b) claims for property damage arising from its operations hereunder;
 - (3) accept responsibility for and pay promptly all dues and assessments payable under any workers' compensation legislations whether State or Commonwealth in respect of its employees;
 - (4) insure its equipment against damage and accidents, and
 - (5) keep CRAE indemnified against any claim arising from any neglect of the above requirements except where the claim directly results from the negligence or misconduct of CRAE or its employees.

5. Except upon specific consent by CRAE the Contractor shall not assign or subcontract any part of this Agreement or the Survey.
6. Except upon specific consent by CRAE the Contractor shall not divulge any information regarding this Agreement of the conduct of or the results from the Survey to any person not in the direct employ of CRAE unless or except to fulfil any lawful regulation. Results and data from the Survey shall be the sole property of CRAE and any document, profile, plan, or similar material which the Contractor may hold on behalf of CRAE remains the property of CRAE and shall be returned to it.
7. It is estimated that flying will commence on or before 10th February 1982 and that preliminary contour plans of the magnetic data will be delivered within four weeks of survey completion. Total magnetic contours onto a stable plastic base at a scale of 1:20,000 will be delivered to the Client within two weeks of approval of the preliminary plans.
8. The performance of any obligation under this Agreement shall be reasonably suspended for the time and to the extent that performance is prevented in whole or in part by Force Majeure as defined herein. Notwithstanding Addendum E hereof in the event that the Contractor gives notice of Force Majeure CRAE shall pay only for work which can be completed as a result of work which has been performed up to the time of Force Majeure. Force Majeure means any delay caused by circumstances beyond the

reasonable control of the Contractor including (but not limited to) strike, lockout, riot, sabotage, trade dispute, war, civil unrest, fire, explosion, flood, confiscation, act of God, action of any government or governmental authority defacto or dejure, failure or refusal of any such authority to grant any permit or approval required for the legal conduct of the Survey.

The Contractor undertakes to remedy as soon as practicable any temporary delays attributable to instrument failure, illness or death of personnel, or adverse weather conditions.

If CRAE desires the Contractor's personnel to remain on-site during a period of Force Majeure the Contractor shall charge CRAE the Standby Rate shown in Addendum D. The Standby Rate shall also be charged if flying is suspended at the request of CRAE.

9. This Agreement together with the Addenda hereto is deemed to express, embody, and supersede all understandings, agreements, and commitments, written or oral between CRAE and the Contractor in respect of the Survey.
10. All notices, consents, advices, reports, invoices, or other communications required or authorised by this Agreement shall be in writing or where given by telephone shall be confirmed in writing and shall be hand delivered, or sent by mail, telex, telegram, or telephone addressed to the party concerned at the

following addresses:

CRA EXPLORATION PTY. LTD.

Level 4, Bellerive Quay,

Cambridge Road,

Bellerive, Tasmania 7018

TELEX NO: AA 57144

TELEPHONE NO: (002) 44 3533

AUSTIREX INTERNATIONAL LTD.

41 Kishorn Road,

Applecross, W.A. 6153

TELEX NO: 94917

TELEPHONE NO: (09) 364 8444

Any notice, advice, report, invoice, or other communication hand delivered or sent by mail shall be deemed given when received.

Any notice, advice, report, invoice, or other communication sent by telex, telegram, or telephone shall be deemed given on the date of dispatch.

11. This Agreement shall commence on the date of execution and shall continue and remain in effect whilst any obligation by either party remains outstanding hereunder unless terminated pursuant to paragraph 12 hereof.
12. This Agreement may be terminated upon thirty days notice by either party. Within sixty days of receipt of the notice and notwithstanding Addendum E the Contractor shall invoice CRAE in accordance with

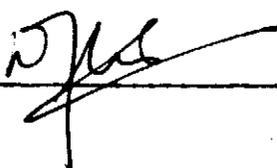
the charges in Addendum D for all work performed prior to the receipt of the notice and shall deliver to CRAE all materials generated during the performance of the terminated Agreement.

- 13. In the event of a dispute arising out of or in relation to this Agreement which is not settled between the parties within a reasonable time that dispute shall be settled by Arbitration in Perth in accordance with the Arbitration Act of Western Australia by an arbitrator to be appointed by agreement between the parties or failing agreement by the President of the Australasian Institute of Mining and Metallurgy. The decision of the arbitrator shall be binding on the parties.

Signed for and on behalf of
C.R.A. EXPLORATION PTY. LTD. by



in the presence of



Witness

Signed for and on behalf of
AUSTIREX INTERNATIONAL LTD. by



in the presence of

Witness

AUSTIREX INTERNATIONAL LTD.C.R.A. EXPLORATION PTY. LTD.ADDENDUM 1SURVEY SPECIFICATIONS

- | | | |
|------|--------------------------------------|--|
| 1.1 | TYPE OF SURVEY | Magnetic and Spectrometric. |
| 1.2 | LOCATION | One block North of Savage River,
Tasmania. |
| 1.3 | FLIGHT LINE SPACING | 250 metres not to exceed 375 metres for
more than 2 km. |
| 1.4 | FLIGHT LINE DIRECTION | East-West (90° - 270°). |
| 1.5 | TIE LINE SPACING | 2500 metres approximately. |
| 1.6 | MEAN TERRAIN CLEARANCE
(DETECTOR) | 90 metres + 20 metres where consistent
with safe flying practice and maintenance
of adequate air speed. |
| 1.7 | SAMPLING INTERVAL | Approximately 23 metres with cycling
rate of 0.5 seconds and an average
aircraft speed of 95 knots. |
| 1.8 | MAGNETOMETER NOISE | <u>+ 1 nT</u> with sensitivity of 0.1 nT. |
| 1.9 | HEADING ERROR | Within 5 nT. |
| 1.10 | DIURNAL VARIATION | Survey data will be deemed unacceptable
within ten minutes of any period when a
magnetic variation exceeds five Nano-
Teslas in ten minutes. <i>D.J.</i>
<i>M.J.</i> |
| 1.11 | SURVEY LINE DISTANCE | Rapid River-Atlas 101 lines ... 2084.0 km
14 ties ... 227.5 km
Total Distance ... <u>2311.5 km</u> |
| 1.12 | FLIGHT PATH RECOVERY | Not to exceed 1 kilometres per fiducial for
survey lines or 2 kilometres per fiducial
for tie lines provided total lack of detail
does not render this impossible. |

AUSTIREX INTERNATIONAL LTD.C.R.A. EXPLORATION PTY. LTD.ADDENDUM 2EQUIPMENT AND PROCEDURES

- 2.1 AIRCRAFT
The Cessna 185E is a reciprocating single-engined high wing aircraft whose tail-wheel configuration provides good performance on short and marginal runways. Good payload characteristics and manouverability enable this light aircraft to carry a complete geophysical system on survey.
- 2.2 MAGNETOMETER
The Varian V85 proton precession magnetometer has the detector head in a towed bird configuration to minimize any aircraft effects on the magnetic field. Sensitivity is .1 nT and a five digit entry to that value is made to magnetic tape. An analogue record at two scales is also made onto chart recorder.
- 2.3 CRYSTAL PACK
The Nuclear Enterprise 8424 gamma-ray spectrometer provides a four channel differential output for total count, Potassium (K40), Uranium (Bi214) and Thorium (Ti208). All windows are recorded onto analogue chart following stripping of both the Potassium and Uranium channels for Compton scattering.
- 2.4 CRYSTAL DETECTORS
The detector crystal is thallium-activated sodium iodide in the Geometrics pack DET-1024. The detector volume is 16,780 c.c. with the crystal elements being optically coupled to matched photomultiplier tubes. Temperature control and a regulated high voltage supply are provided by the GR-900 controller.
- 2.5 RADAR ALTIMETER
A King KRA-10 altimeter displays vertical distance for the pilot's reference. This is output to both analogue and magnetic tapes.
- 2.6 DATA ACQUISITION SYSTEM
The G-714 acquisition system outputs all data from the magnetometer, spectrometer and altimeter together with a fiducial reference to 9 track magnetic tape. This information also goes to a 6 channel chart recorder.

AUSTIREX INTERNATIONAL LTD.

C.R.A. EXPLORATION PTY. LTD.

ADDENDUM 2 (Cont'd)

EQUIPMENT AND PROCEDURES

2.7 TRACKING CAMERA

The Vinten Mark IV 16mm Scientific Camera is vertically mounted with exposure set to give forward frame overlap coverage. A coded fiducial reference is also marked on the film.

2.8 BASE MAGNETOMETER

The Geometrics G826 proton precession base station magnetometer records diurnal variations to 0.25 nT during all survey flights.

AUSTIREX INTERNATIONAL LTD.C.R.A. EXPLORATION PTY. LTD.ADDENDUM 3SURVEY TEST PROCEDURES

- 3.1 GROUND CHECKS Pre and post flight ground spectrometer calibration checks using Cs, Th and U calibration sources are undertaken.
- 3.2 FLIGHT CHECKS A test line is flown at survey height and speed over a selected recoverable location at the commencement of the first flight and termination of the final flight on a daily basis. This check demonstrates system repeatability by producing comparable magnetic record and radiometric responses to within + 20%.
- 3.3 SURVEY CHECKS Periodic in-flight checks are made of magnetometer heading effects by multi-direction flying, also included are altimeter calibration and parallax error.
- 3.4 DATA CHECKS Field tapes are subject to computer verification in the field by listing line numbers and fiducial values.
- 3.5 FILM CHECKS The tracking film is developed, checked and edited for fiducial number and line annotation.
- 3.6 FLIGHT PATH RECOVERY The aircraft flight path is recovered by field data persons to ensure that line separation specifications are met. By this means required reflights or fill-in lines are immediately undertaken.

AUSTIREX INTERNATIONAL LTD.C.R.A. EXPLORATION PTY. LTD.ADDENDUM 4PRESENTATION AND DELIVERY

- 4.1 ANALOGUE CHARTS The analogue records display four channels of radiometric data (with Compton stripping applied), radar altimeter and total field magnetic intensity. These are folded, annotated and supplied during the survey.
- 4.2 DIURNAL CHARTS The base station magnetometer records are fully annotated and available for inspection during the survey.
- 4.3 FIELD TAPES Digital data will be acquired onto magnetic tape and will include all items of section 4 of the Tender specifications.
- 4.4 ANALOGUE PLOTS Computer generated analogue plots of the total field magnetic intensity at two vertical scales together with the radar altimeter values are produced on a fast turn-around basis from the digital tapes. Full scale deviations may be selected which are most suited to the magnetic activity encountered. A third scale may also be added.
- 4.5 FLIGHT PATH MAPS These map sheets overlay a true planimetric base at a scale of 1:20,000. Map sheets will have both A.M.G. co-ordinates and latitudes and longitudes shown in the sheet margins and will be presented as outlined in the Tender specifications.
- 4.6 MAGNETIC CONTOURS Contour plans of total magnetic field, with corrections for diurnal field and I.G.R.F. removed may be produced at a scale of 1:20,000 to overlay the flight path maps.
- 4.7 STACKED PROFILES Profiles of total magnetic intensity with I.G.R.F. removed are to be produced in accordance with the Tender specifications.
- 4.8 LOCATED DATA TAPES These will be provided in accordance with tender specifications in Section 5. (1600 bpi, 9 track, ASCII code).
- 4.9 GRIDDED DATA TAPES These will be provided in accordance with Tender specifications in Section 6 (1600 bpi, 9 track, ASCII code).

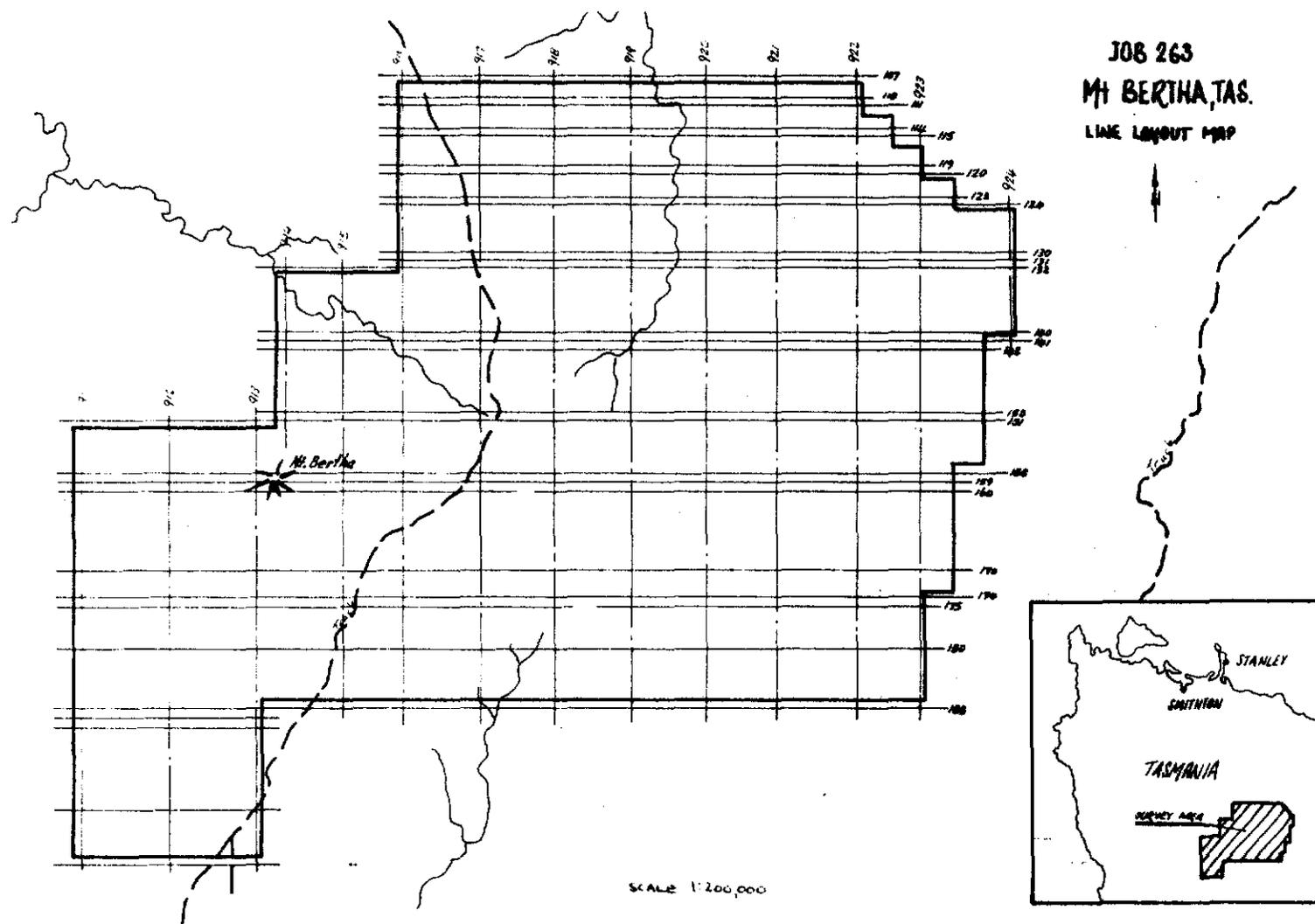
AUSTIREX INTERNATIONAL LTD.C.R.A. EXPLORATION PTY. LTD.ADDENDUM 5PROPOSED UNIT PRICES

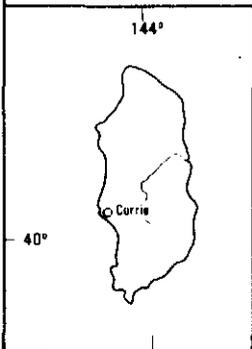
5.1	MOBILIZATION/ DEMOBILIZATION	To position aircraft, personnel and equipment at survey site	\$3,000.00
5.2	SURVEYING	To acquire data with tests and checks as Schedule 3 including recovery of flight path and charts as described in items 4.1, 4.2 and 4.3.	
		Rapid River-Atlas per line km.	\$7.90
5.3	DATA PRESENTATION	To plot flight path plots at a scale of 1:20,000 per line km	\$0.40
		To plot Magnetic Contour Plots at a scale of 1:20,000 per line km	\$2.55
		To plot Magnetic Stacked Profiles at a scale of 1:20,000 per line km	\$0.40
		To prepare Located Data Tapes in required format per line km.	\$0.20
		To prepare Gridded Data Tapes in required format per line km	\$0.20
5.4	STANDBY	The standby charge will apply to full days lost due to weather, diurnal activity or at the client's request. Per day	\$600.00

AUSTIREX INTERNATIONAL LTD.C.R.A. EXPLORATION PTY. LTD.ADDENDUM 6SETTLEMENT TERMS

- 6.1 CHARGEABLE TRAVERSE DISTANCE
The survey traverse lines are measured between the end-limits of the defined survey area only. No overflies, turns or ferries are considered. The outermost traverse lines of the area are planned at approximately one half the line spacing outside the survey boundaries and are included in the total survey distance.
- 6.2 CHARGEABLE TIE LINE DISTANCE
The survey tie lines are charged at the same rate as the traverse lines over line lengths necessary to cover the traverse flight lines.
- 6.3 CHARGEABLE TRAVERSE PROCESSING
This distance is calculated on recovered and plotted flight line length between the first and last record position used. These end fiducials are selected marginally beyond the survey boundary to ensure rational contour plotting to the boundary limits.
- 6.4 CHARGEABLE TIE LINE PROCESSING
Tie lines are charged under the same rates and conditions as traverse lines.
- 6.5 ON-SITE CLAIM
These progress claims are calculated as percentages of the total contract cost estimated at the commencement of the survey. The on-site claim is for 20% of this and is invoiced on effective mobilization to the site.
- 6.6 SURVEY COMPLETION CLAIM
A further 40% of the estimated total cost is invoiced on completion of the survey flying and verified satisfactory acquisition of the geophysical and positional data.
- 6.7 PRELIMINARY PRESENTATION CLAIM
A further 20% of the estimated total cost is payable on presentation of the required data and plans in a preliminary form referenced to recovery photographs or base maps.
- 6.8 FINAL INVOICE
On presentation of the final data a final invoice is made based on the balance of the actual total contract cost as defined by items 4.1 to 4.9 and the rates outlined in Addendum 5.

725032

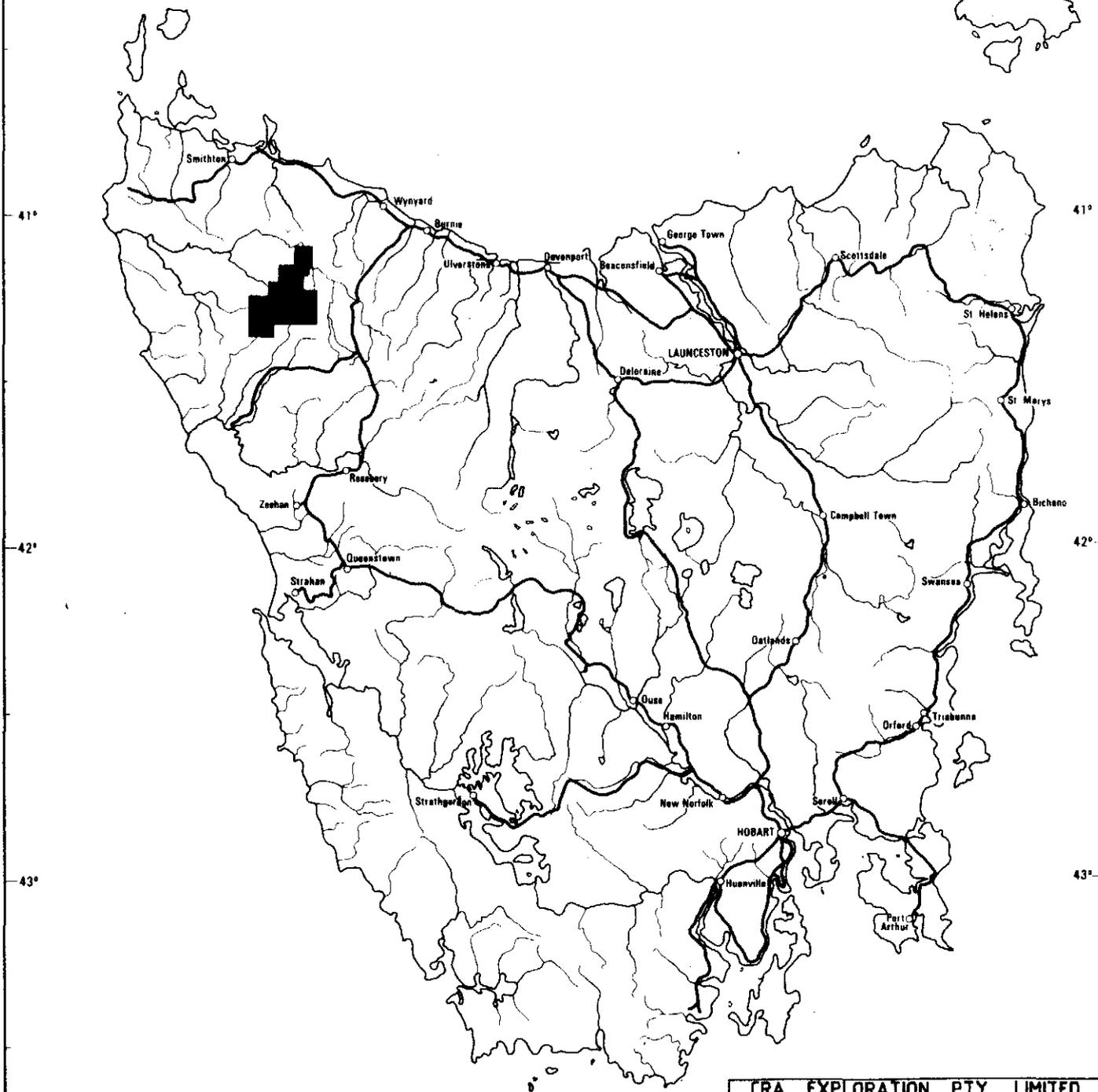




TASMANIA

Scale 1:2 000 000

0 50 100 Kilometres



5 cm

CRA EXPLORATION PTY. LIMITED	
LOCALITY PLAN	
RAPID RIVER E.L. 1/79	
REF. SK55 - 3	
SCALE: 1 : 2 000 000	DRAWN: R. T.
AUTHOR: M. F.	REPORT N ^o . 11637
Date: 30 - 8 - 1982	Plan NO. TASH 842

360 000 E

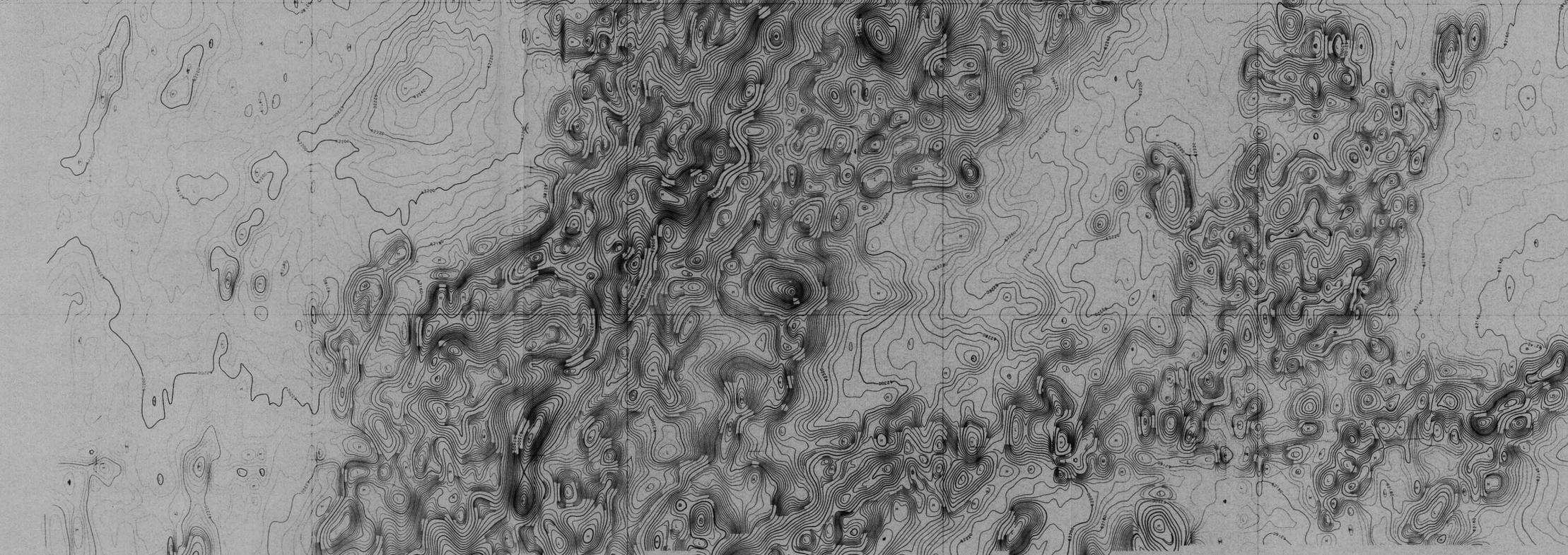
5 440 000 N

370 000 E

5 430 000 N

350 000 E

5 420 000 N



AIRBORNE SURVEY SPECIFICATIONS

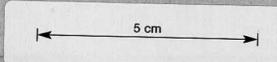
- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECISION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL DIFFERENTIAL RECORDING Th. U. K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

LEGEND

MAGNETIC CONTOUR INTERVAL - 5 NANOTESLA
 GRID MESH - 90m X 90m
 SEARCH RADIUS - 1000m

- 500 NANOTESLA CONTOUR
- 100 NANOTESLA CONTOUR
- 20 NANOTESLA CONTOUR
- 5 NANOTESLA CONTOUR

725034



CRA EXPLORATION PTY. LIMITED

RAPID RIVER E.L. 1/79

TOTAL MAGNETIC INTENSITY MAP

Ref:	SK55 - 3	Drawn:	AUSTREX R. T.
Scale:	1 : 50 000	Report No.:	11637
Author:	M. F. F.	Plan No.:	TASH 843
Date:	30 - 8 - 1982		

*** note ***
 Flown and presented by AUSTIREX INTERNATIONAL LTD.

5 440 000 N

350 000 E

360 000 E

370 000 E

5 430 000 N

5 420 000 N



- Tb** Tertiary Basalts
- Dd** Dolerite Dyke
- S** Sedimentary Rocks (undifferentiated)
- Sm, Sm'** Sedimentary Rocks (metamorphosed)
- Sk1, Sk2** Sedimentary Rocks (potassium rich)
- Sb** Carbonaceous Shales (defined from Input Survey)
- Ps, Ps'** Sedimentary Rocks (Permian)
- Am** Amphibolites
- U** Undetermined
- Interpreted Geological Contact
- Interpreted overlying Permian (from radiometrics)
- - - - - Interpreted fault or magnetic discontinuity

LEGEND

- 1371/5870 Selected magnetic anomaly showing dipole parts (if any) and identification number. (flight line N° / fiducial)
- ESSO Input E.M. Anomaly, showing anomaly peak. (positioning approximate only)
- River
- Road / Track
- E. L. Boundary

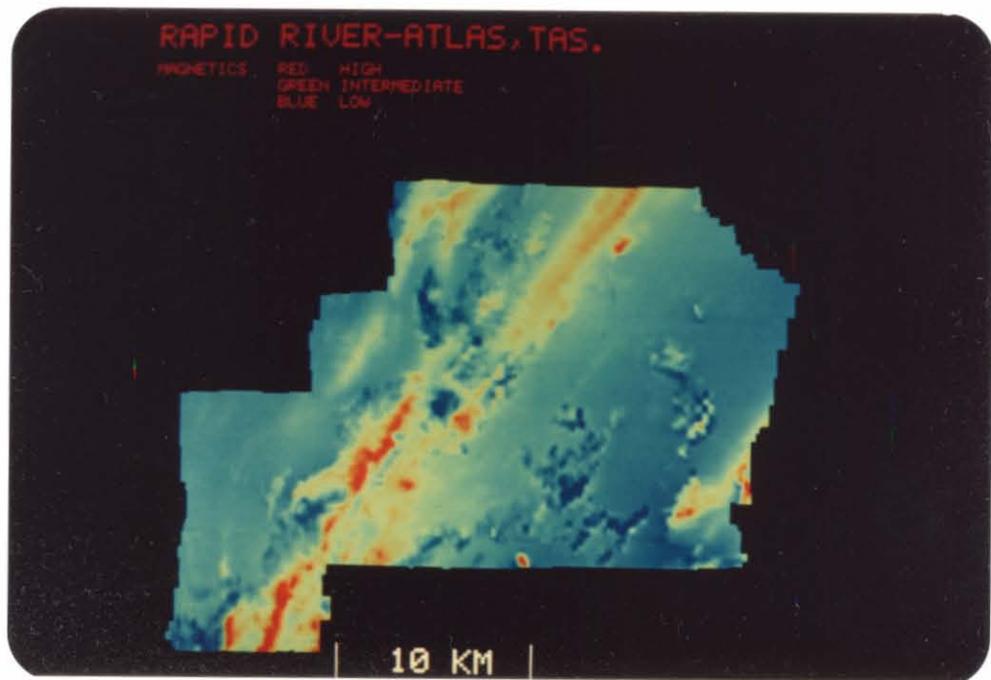
5 cm

82-1816

CRA EXPLORATION PTY. LIMITED
 QUALITATIVE INTERPRETATION MAP
 RAPID RIVER E.L. 1/79

Ref: SK55 - 3	Drawn: R. T.
Scale: 1 : 50 000	Report N°: 11637
Author: M. F. F.	Plan N°: TASH 844
Date: 30 - 8 - 1982	

725035



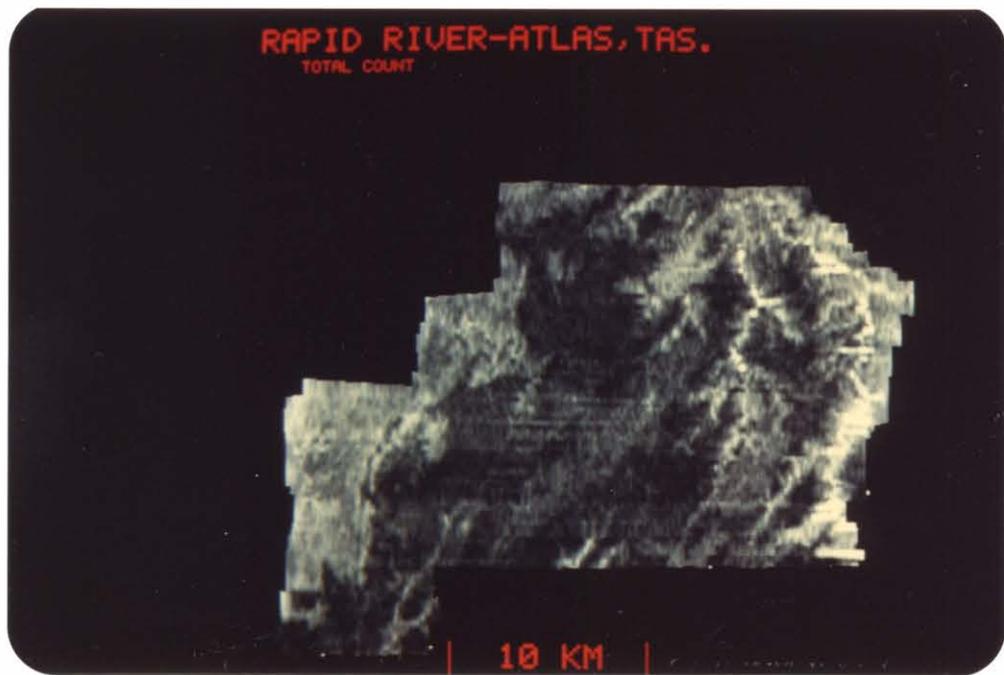
5 cm

*** Note ***

Data is assigned 256 colour shades ranging from 61900nT (blue) to 62800nT (red),

CRA EXPLORATION PTY. LIMITED			
RAPID RIVER E.L. 1/79			
MAGNETIC INTENSITY IMAGE			
REF.	SK55 - 3		
SCALE	AS SHOWN	DRAWN	R. T.
AUTHOR.	M. F. F.	REPORT N°	11637
DATE	31 - 8 - 1982	TASH N°	845

725036A

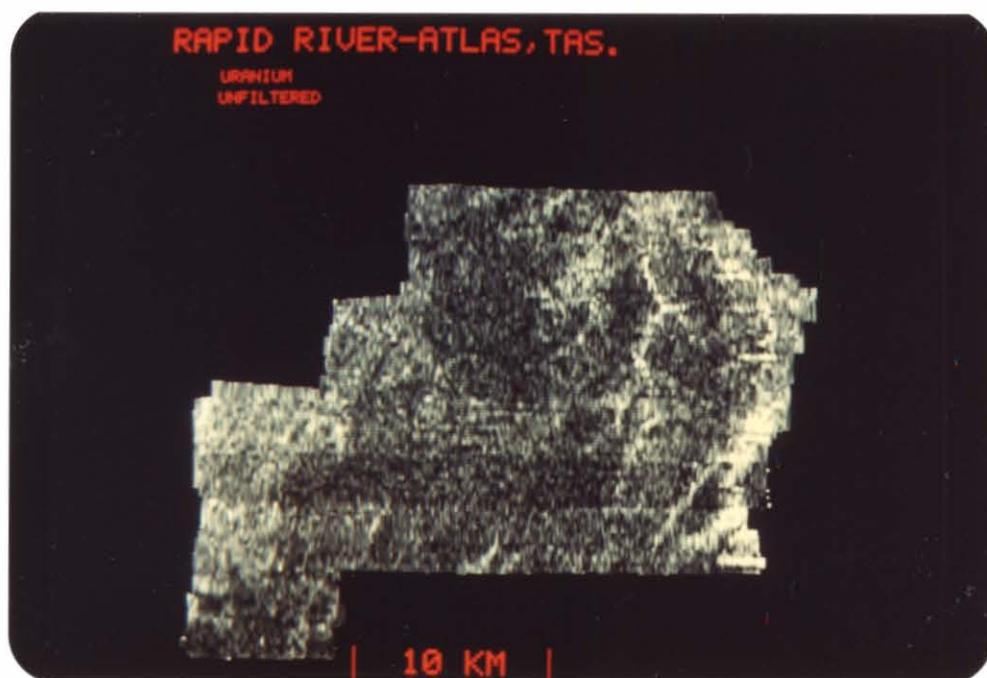


5 cm

*** Note ***

Black areas represent minimum gamma counts per second, white areas represent maximum gamma counts per second.

CRA EXPLORATION PTY. LIMITED			
RAPID RIVER E.L. 1/79			
TOTAL COUNT IMAGE			
REF	SK55 - 3		
SCALE	AS SHOWN	DRAWN	R. T.
AUTHOR	M. F. F.	REPORT N°	11637
DATE	31 - 8 - 1982	TASh N°	846



5 cm

*** Note ***

Black areas represent minimum gamma counts per second, white areas represent maximum gamma counts per second.

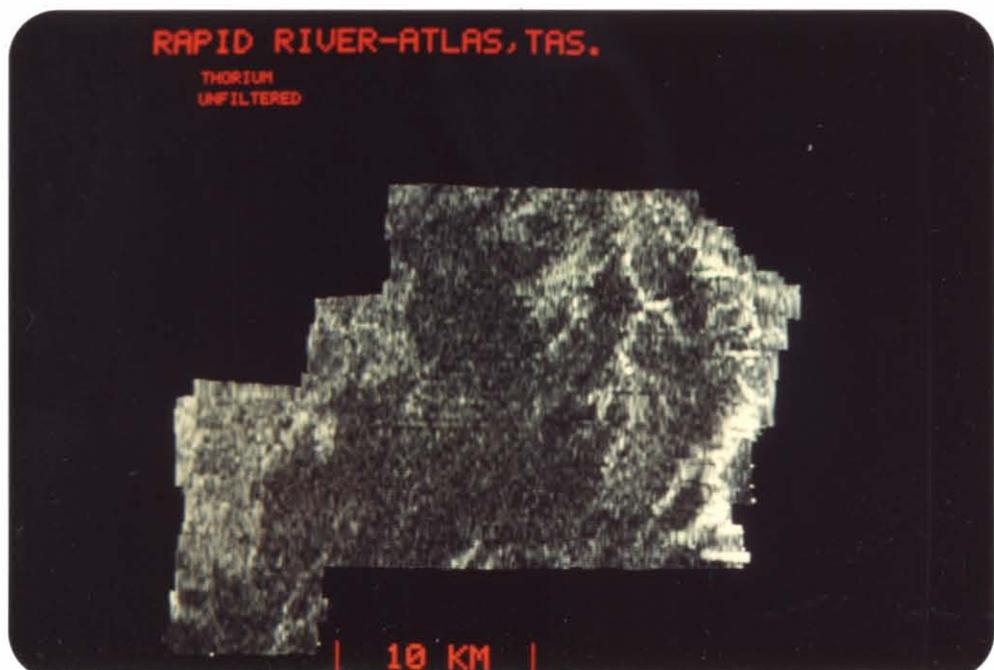
CRA EXPLORATION PTY. LIMITED

RAPID RIVER E.L. 1/79

URANIUM CHANNEL IMAGE

REF	SK55 - 3	DRAWN	R. T.
SCALE	AS SHOWN	REPORT N°	11637
AUTHOR.	M. F. F.	TASH N°	847
DATE	31 - 8 - 1982		

725038



5 cm

*** Note ***

Black areas represent minimum gamma counts per second, white areas represent maximum gamma counts per second.

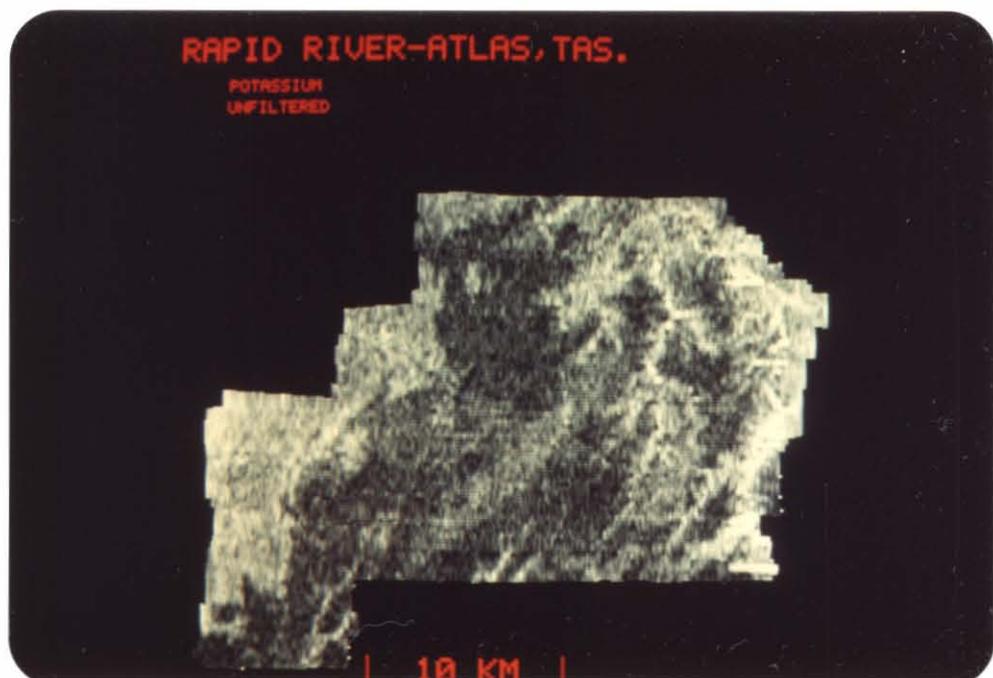
CRA EXPLORATION PTY. LIMITED

RAPID RIVER E.L. 1/79

THORIUM CHANNEL IMAGE

REF.	SK55 - 3		
SCALE	AS SHOWN	DRAWN	R. T.
AUTHOR.	M. F. F.	REPORT N°	11637
DATE	31 - 8 - 1982	TASH N°	848

725039



5 cm

*** Note ***

Black areas represent minimum gamma counts per second, white areas represent maximum gamma counts per second.

CRA EXPLORATION PTY. LIMITED

RAPID RIVER E.L. 1/79

POTASSIUM CHANNEL IMAGE

REF.	SK55 - 3	
SCALE	AS SHOWN	DRAWN R. T.
AUTHOR.	M. F. F.	REPORT N° 11637
DATE.	31 - 8 - 1982	TASh N° 849



5 cm

*** Note ***

Principal components represented

are: PC1 U + Th + K
 PC2 K - U
 PC3 K + U - Th

CRA EXPLORATION PTY. LIMITED

RAPID RIVER E.L. 1/79

PRINCIPAL COMPONENT IMAGE

REF.	SK55 - 3		
SCALE	AS SHOWN	DRAWN	R. T.
AUTHOR	M. F. F.	REPORT N°	11637
DATE	31 - 8 - 1982	TASH N°	850



5 cm

*** Note ***

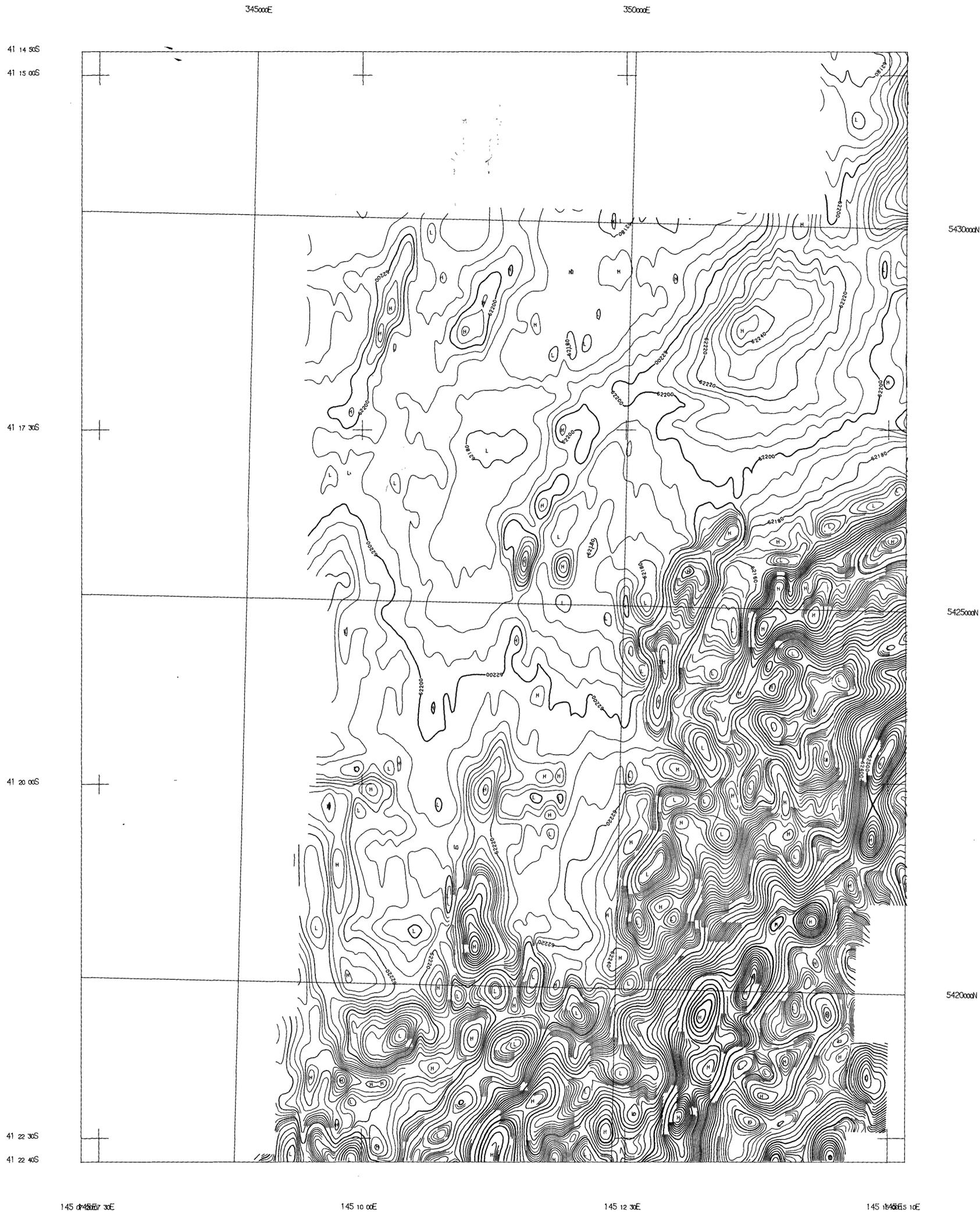
Radiometric data (U, Th, and K)
 normalised to U + Th + K.

CRA EXPLORATION PTY. LIMITED

RAPID RIVER E.L. 1/79

NORMALISED RADIOMETRICS IMAGE

REF.	SK55 - 3		
SCALE	AS SHOWN	DRAWN	R. T.
AUTHOR.	M. F. F.	REPORT N°	11637
DATE.	31 - 8 - 1982	TASH N°	851



82-1816

FLOWN AND PRESENTED BY



JOB NO. 263

AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL DIFFERENTIAL RECORDING Th, U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

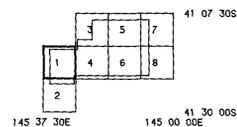
LEGEND

MAGNETIC CONTOUR INTERVAL - 5 NANOTESLA
GRID MESH - 90m X 90m
SEARCH RADIUS - 1000m

- 500 NANOTESLA CONTOUR
- 100 NANOTESLA CONTOUR
- 20 NANOTESLA CONTOUR
- 5 NANOTESLA CONTOUR



LOCATION AND INDEX PLAN



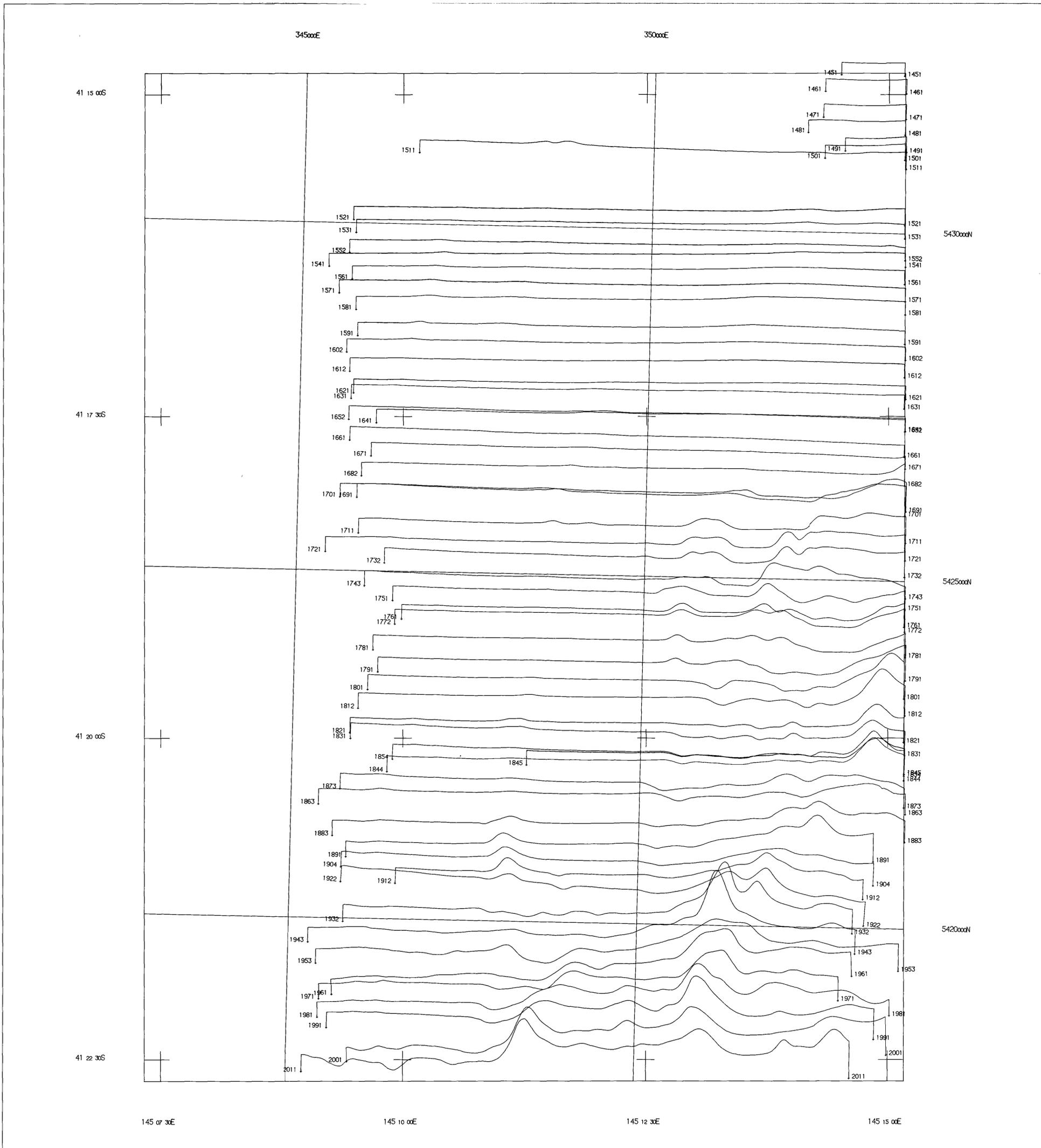
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
MAGNETIC CONTOURS
SHEET 1

PROJ NO.

DATE:

27-MAY-82



FLOWN AND PRESENTED BY



JOB NO. 263

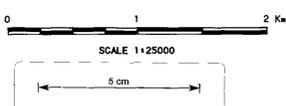
AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL - DIFFERENTIAL RECORDING Th, U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

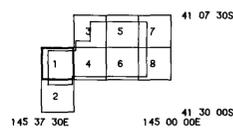


LEGEND

- VERTICAL SCALE : 250 NANOTESLAS/CM
- BASE : 62000 NANOTESLAS



LOCATION AND INDEX PLAN



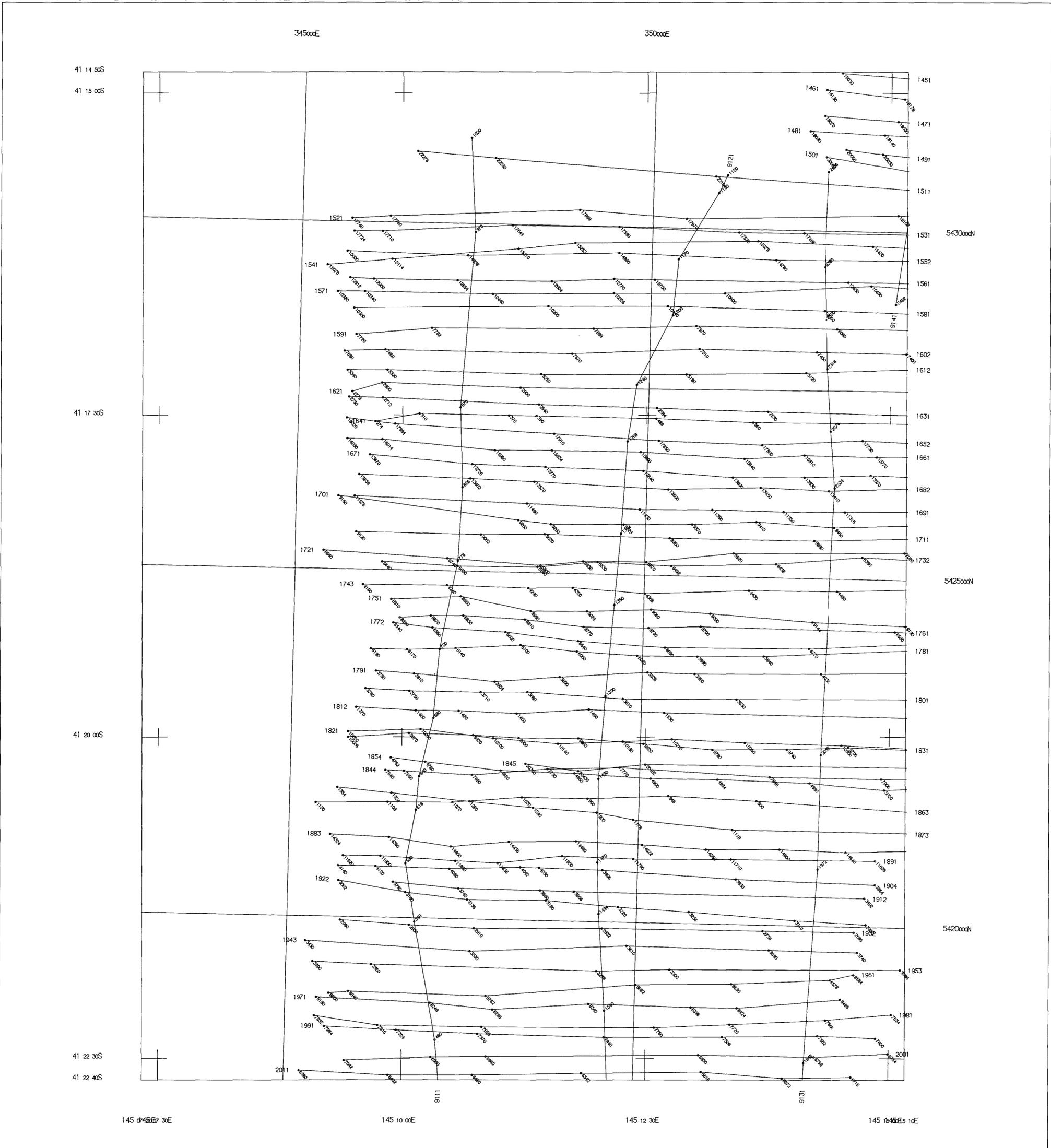
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
MAGNETIC STACKED PROFILES
SHEET 1

PROJ NO.

DATE:

16-JUN-82



FLOWN AND PRESENTED BY

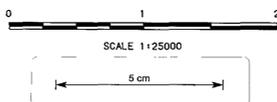


AIRBORNE SURVEY SPECIFICATIONS

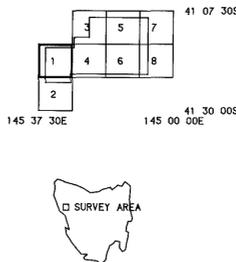
- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL DIFFERENTIAL RECORDING Th, U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

LEGEND

FLIGHT PATH LINE



LOCATION AND INDEX PLAN



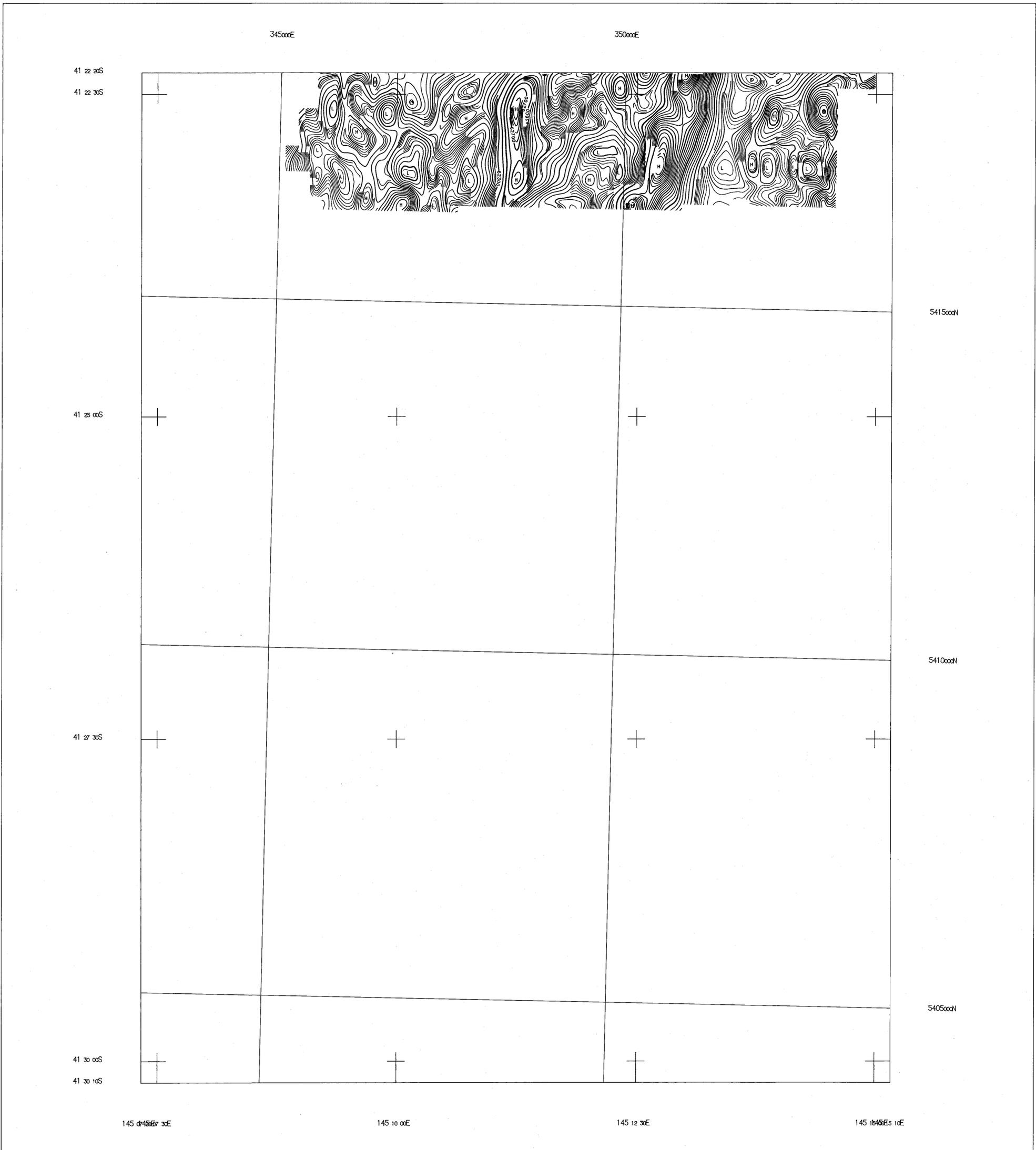
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS FLIGHT PATH SHEET 1

PROJ NO.

DATE:

01-JUN-82



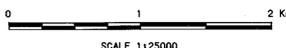
AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECISION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI (TI) CRYSTAL DIFFERENTIAL RECORDING Tl, U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

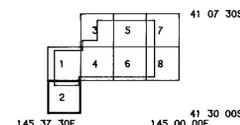
LEGEND

MAGNETIC CONTOUR INTERVAL - 5 NANOTESLA
GRID MESH - 90m X 90m
SEARCH RADIUS - 1000m

- 500 NANOTESLA CONTOUR
- 100 NANOTESLA CONTOUR
- 20 NANOTESLA CONTOUR
- 5 NANOTESLA CONTOUR



LOCATION AND INDEX PLAN

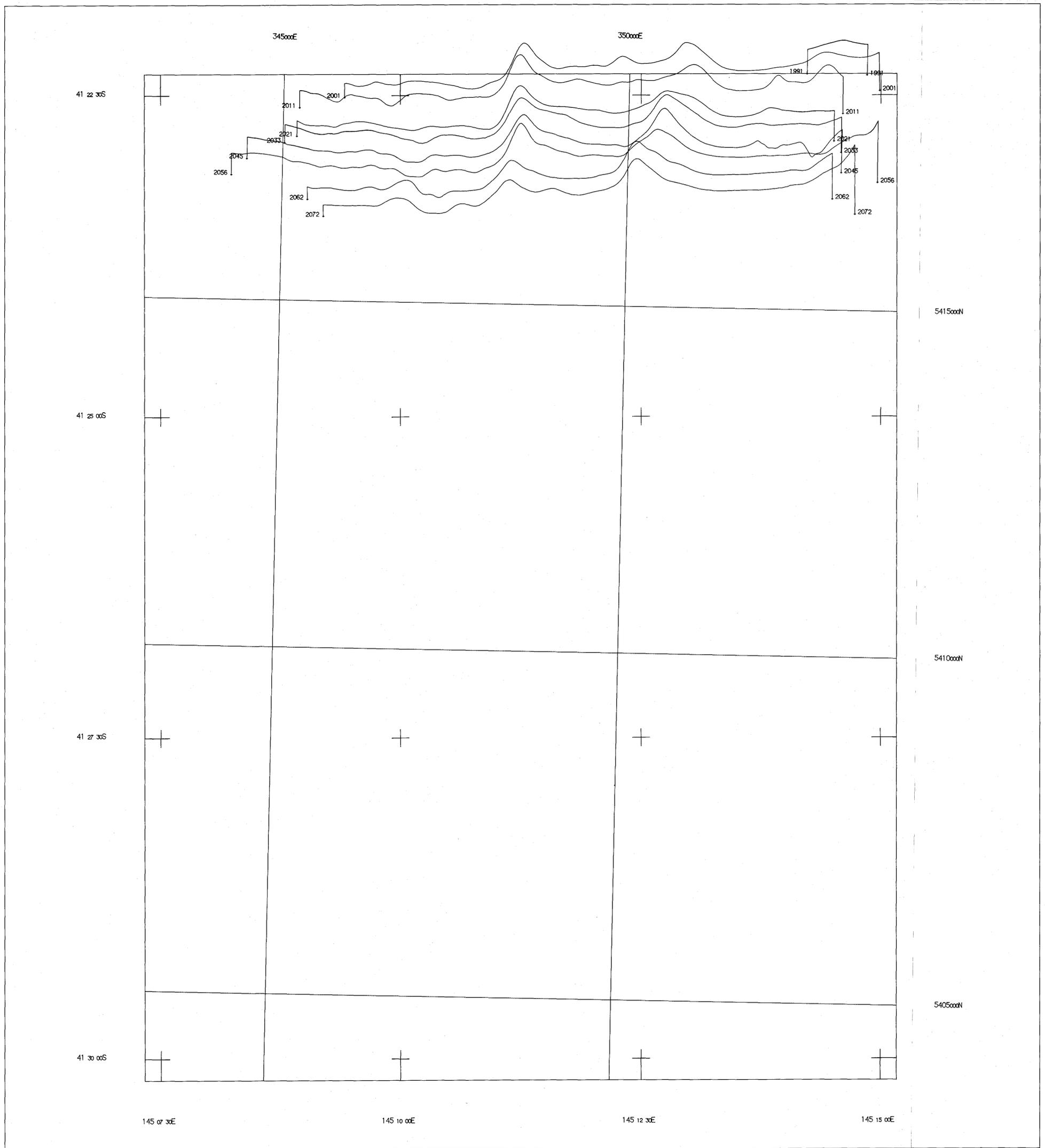


FLOWN AND PRESENTED BY



C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
MAGNETIC CONTOURS
SHEET 2



FLOWN AND PRESENTED BY

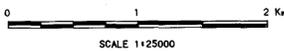


AIRBORNE SURVEY SPECIFICATIONS

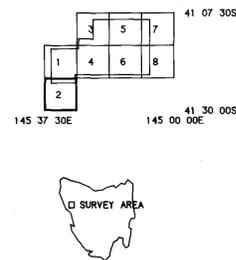
- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL. DIFFERENTIAL RECORDING Th. U. K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : YINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

LEGEND

- VERTICAL SCALE : 250 NANOTESLAS/CM
- BASE : 62000 NANOTESLAS



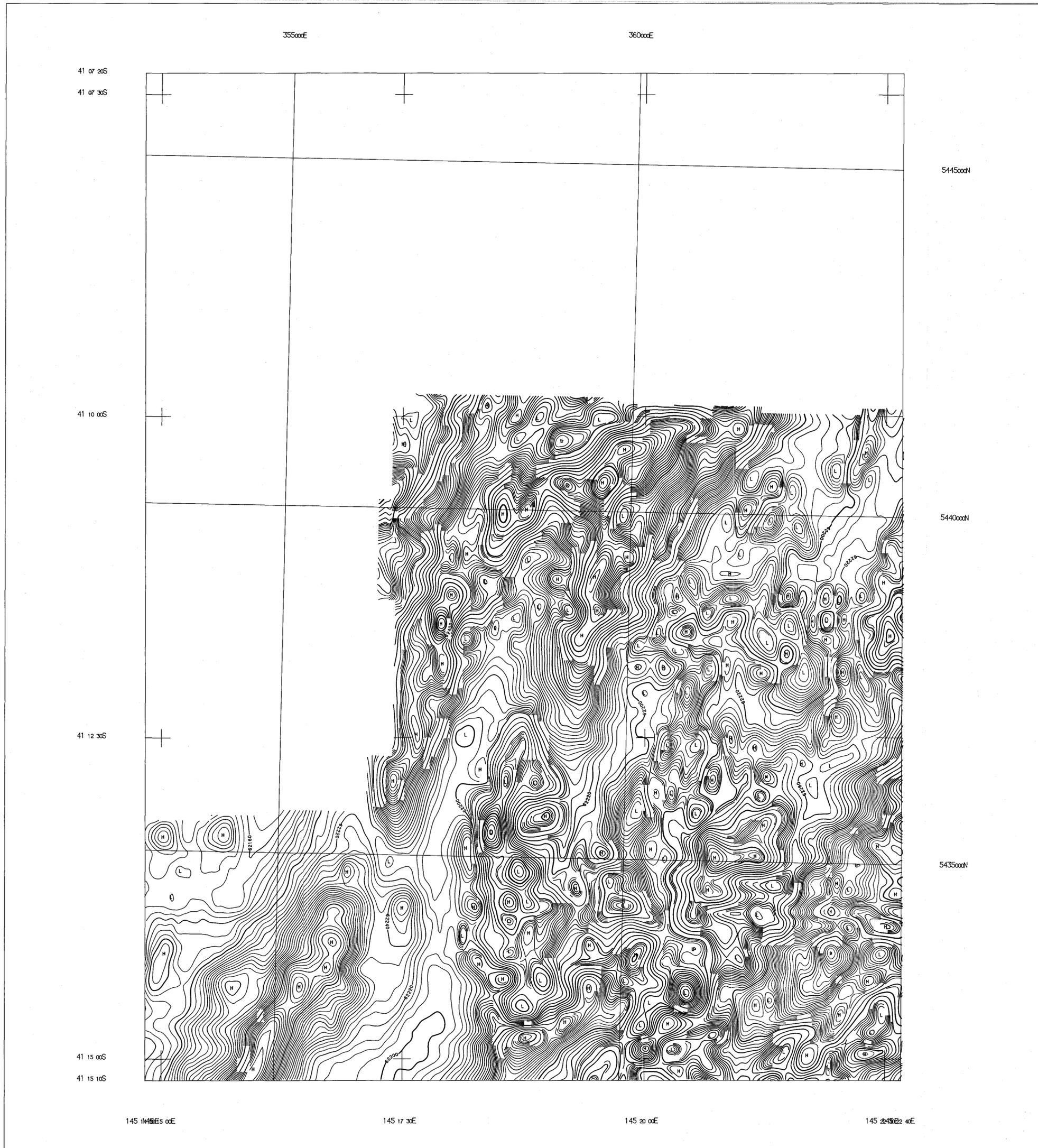
LOCATION AND INDEX PLAN



C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
MAGNETIC STACKED PROFILES
SHEET 2

PROJ NO. : DATE : 16-JUN-82



FLOWN AND PRESENTED BY



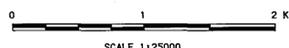
AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL DIFFERENTIAL RECORDING Th, U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

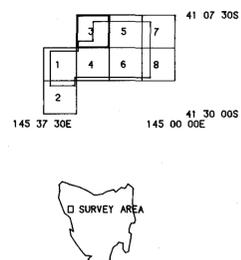
LEGEND

MAGNETIC CONTOUR INTERVAL - 5 NANOTESLA
GRID MESH - 90m X 90m
SEARCH RADIUS - 1000m

- 500 NANOTESLA CONTOUR
- 100 NANOTESLA CONTOUR
- 20 NANOTESLA CONTOUR
- 5 NANOTESLA CONTOUR



LOCATION AND INDEX PLAN



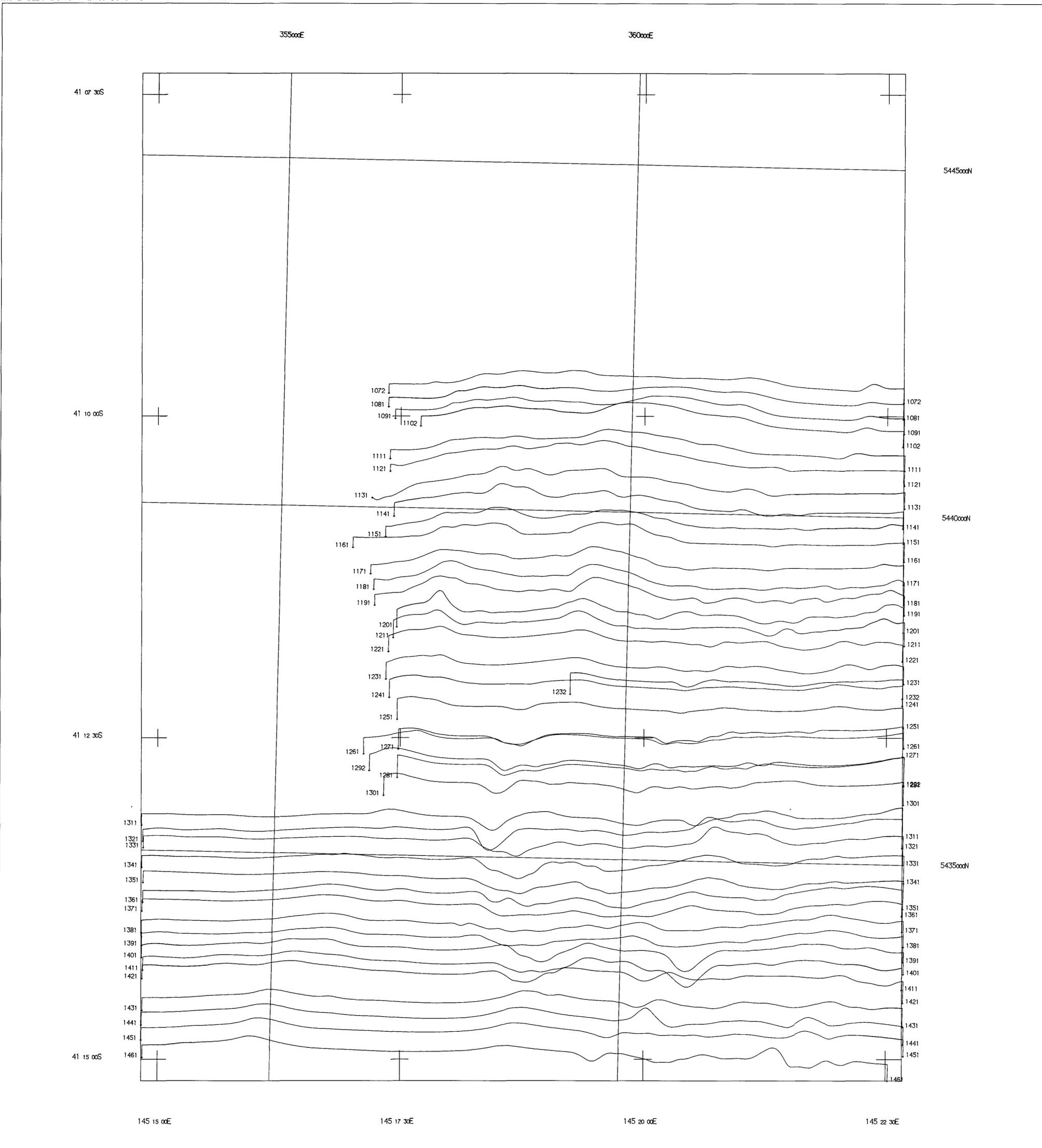
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
MAGNETIC CONTOURS
SHEET 3

PROJ NO.

DATE:

27-MAY-82



FLOWN AND PRESENTED BY



JOB NO. 263

AIRBORNE SURVEY SPECIFICATIONS

AIRCRAFT : CESSNA 185E VH-KPF
 MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
 SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL. DIFFERENTIAL RECORDING Th, U, K AND TOTAL COUNT.
 ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
 FLIGHT PATH : VINTEN MARK IV 16mm
 DETECTOR HEIGHT : 100 METRES
 FLIGHT LINE SPACING : 250 METRES

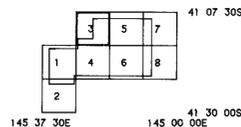
LEGEND

VERTICAL SCALE : 250 NANOTESLAS/CM
 BASE : 62000 NANOTESLAS



0 1 2 Km
 SCALE 1:25000
 5 cm

LOCATION AND INDEX PLAN



C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
 MAGNETIC STACKED PROFILES
 SHEET 3

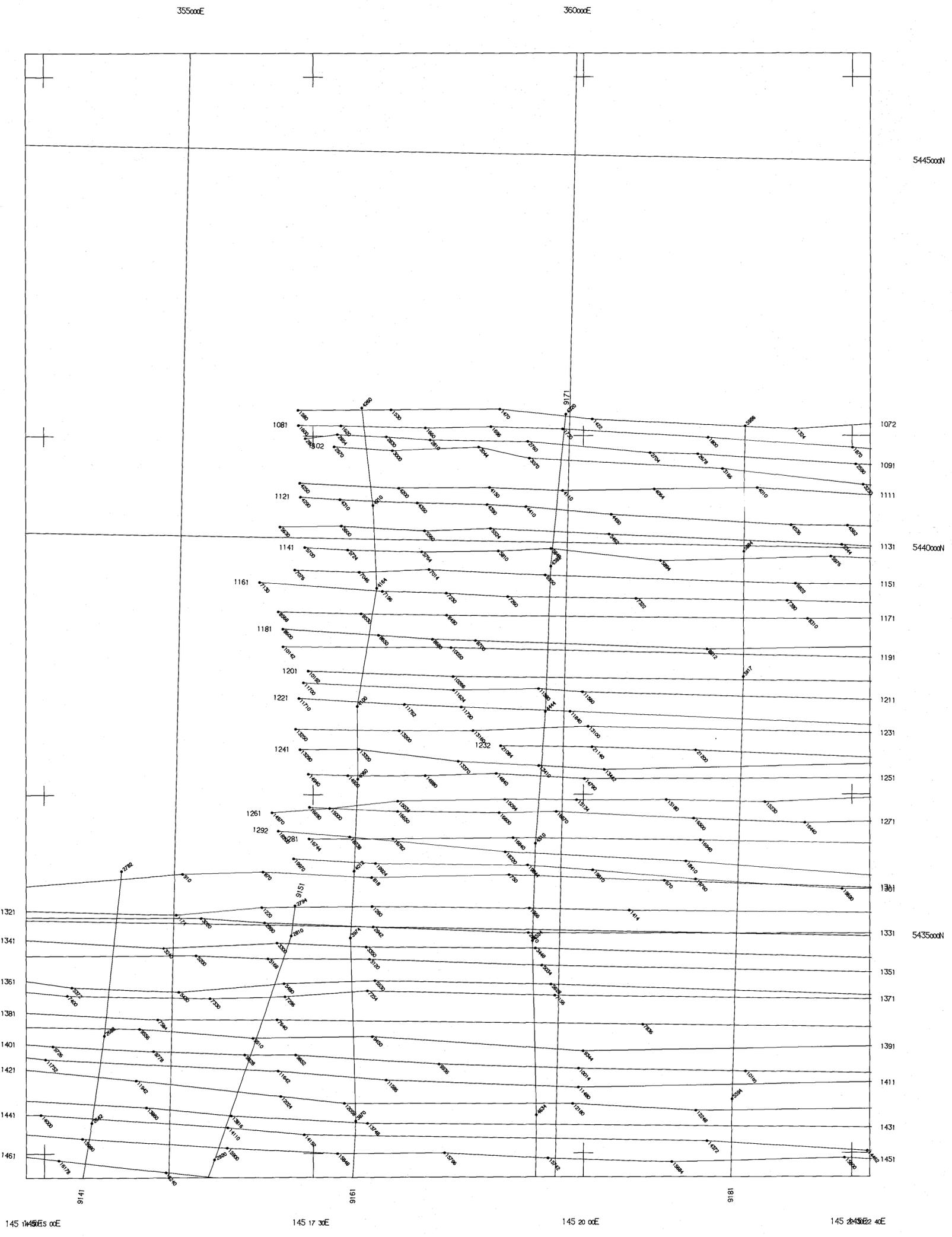
PROJ NO. DATE: 16-JUN-82

41 07 20S
41 07 30S

41 10 00S

41 12 30S

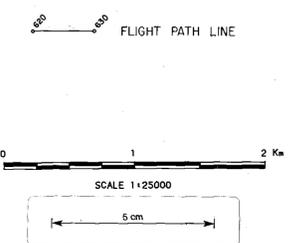
41 15 00S
41 15 10S



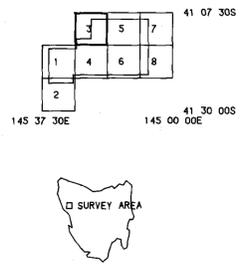
AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL. DIFFERENTIAL RECORDING. Th. U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

LEGEND



LOCATION AND INDEX PLAN



FLOWN AND PRESENTED BY



JOB NO. 263

C.R.A. EXPLORATION PTY. LTD.

**RAPID RIVER - ATLAS
FLIGHT PATH
SHEET 3**

PROJ NO.

DATE:

02-JUN-82

41 14 30S
41 15 00S

41 17 30S

41 20 00S

41 22 30S
41 22 45S

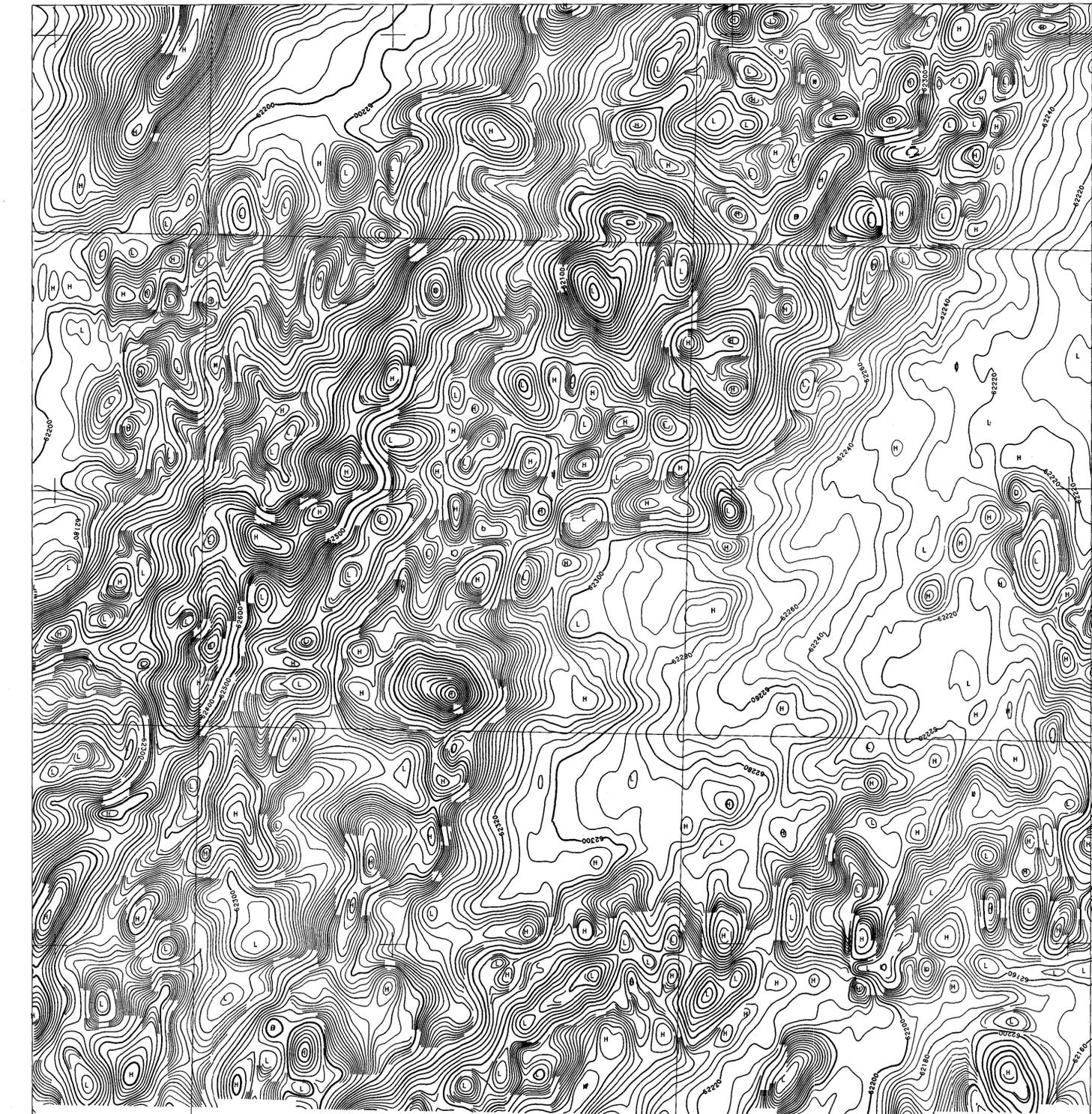
355000E

360000E

543000N

542500N

542000N



145 14 30E

145 17 30E

145 20 00E

145 22 45E

FLOWN AND PRESENTED BY



AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI (TI) CRYSTAL. DIFFERENTIAL RECORDING Th, U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

LEGEND

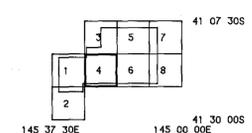
MAGNETIC CONTOUR INTERVAL - 5 NANOTESLA
GRID MESH - 90m X 90m
SEARCH RADIUS - 1000m

- 500 NANOTESLA CONTOUR
- 100 NANOTESLA CONTOUR
- 20 NANOTESLA CONTOUR
- 5 NANOTESLA CONTOUR

SCALE 1:25000



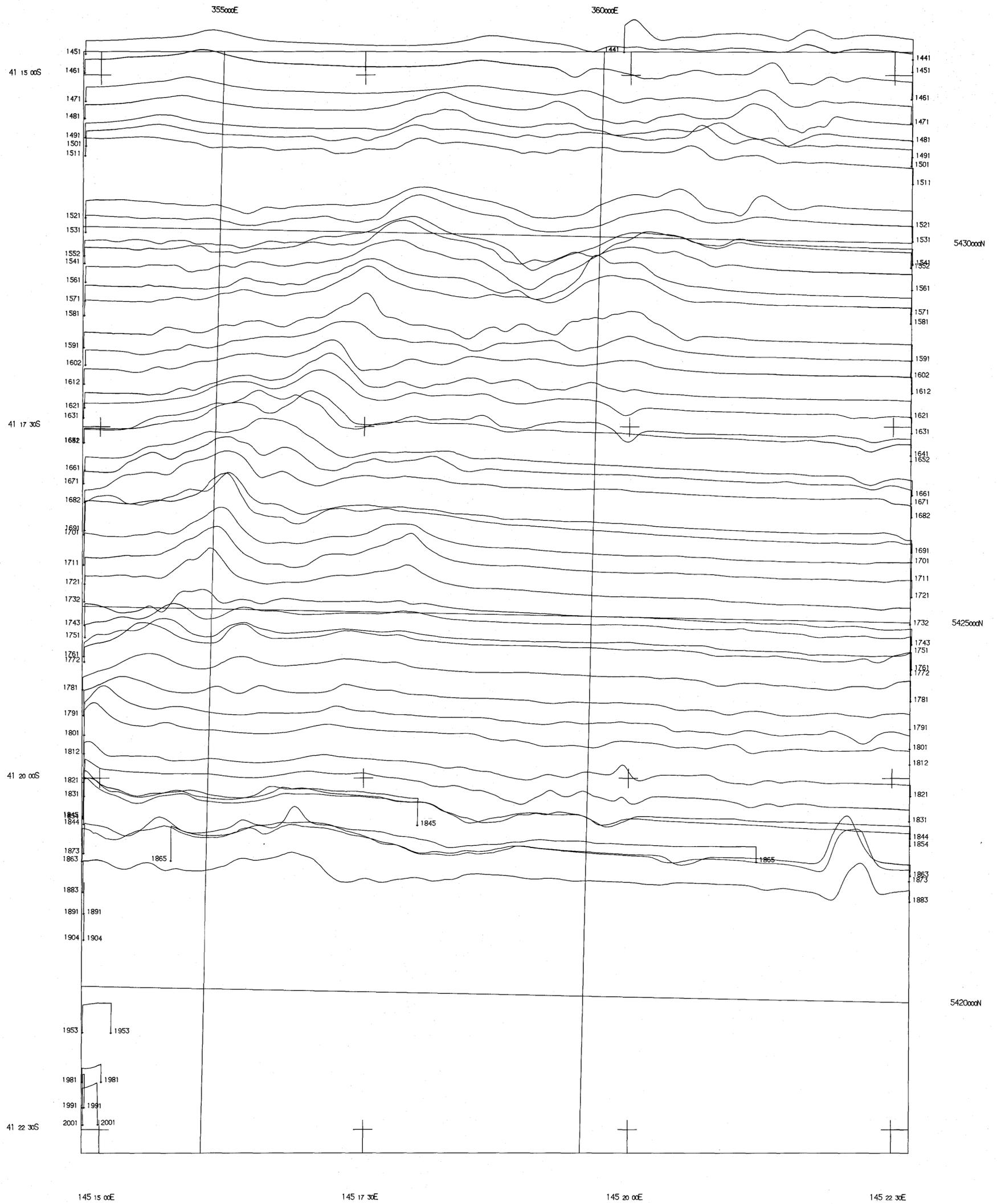
LOCATION AND INDEX PLAN



C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
MAGNETIC CONTOURS
SHEET 4

PROJ NO. DATE: 27-MAY-82



AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL. DIFFERENTIAL RECORDING Th, U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

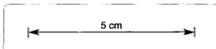
LEGEND

VERTICAL SCALE : 250 NANOTESLAS/CM
BASE : 62000 NANOTESLAS

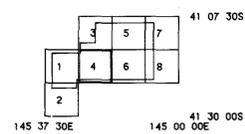


0 1 2 Km

SCALE 1:25000



LOCATION AND INDEX PLAN



FLOWN AND PRESENTED BY



JOB NO. 263

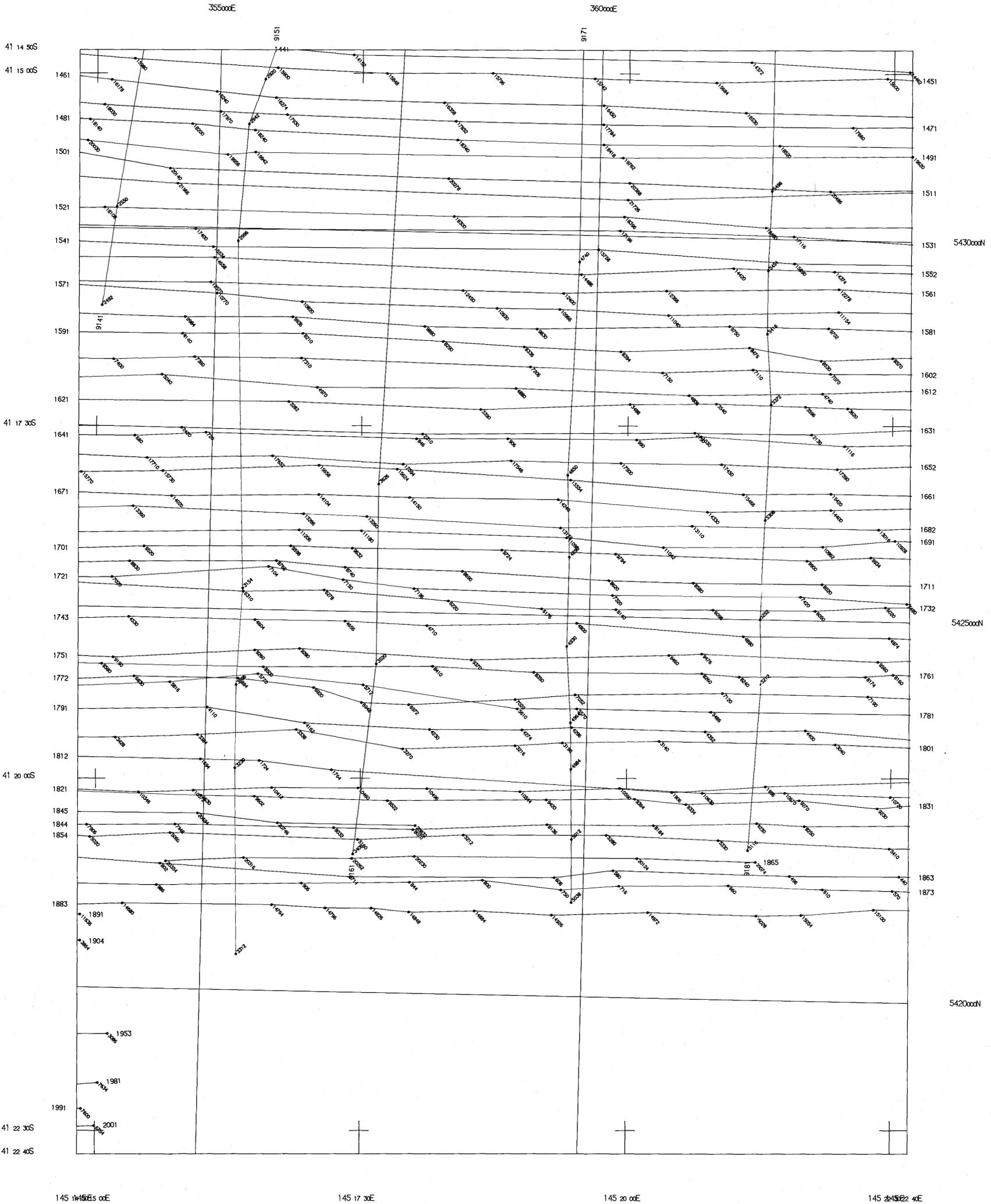
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
MAGNETIC STACKED PROFILES
SHEET 4

PROJ NO.

DATE:

16-JUN-82



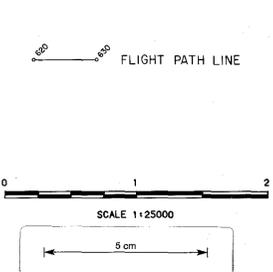
FLOWN AND PRESENTED BY

 JOB NO. 263

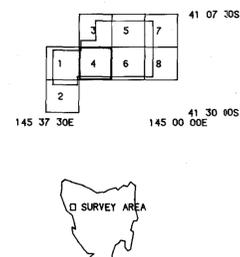
AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL. DIFFERENTIAL RECORDING. Th, U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

LEGEND



LOCATION AND INDEX PLAN



C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
 FLIGHT PATH
 SHEET 4

PROJ. NO. DATE: 02-JUN-82

41 07 20S
41 07 30S

365000E

370000E

5445000N

41 10 00S

5440000N

41 12 30S

5435000N

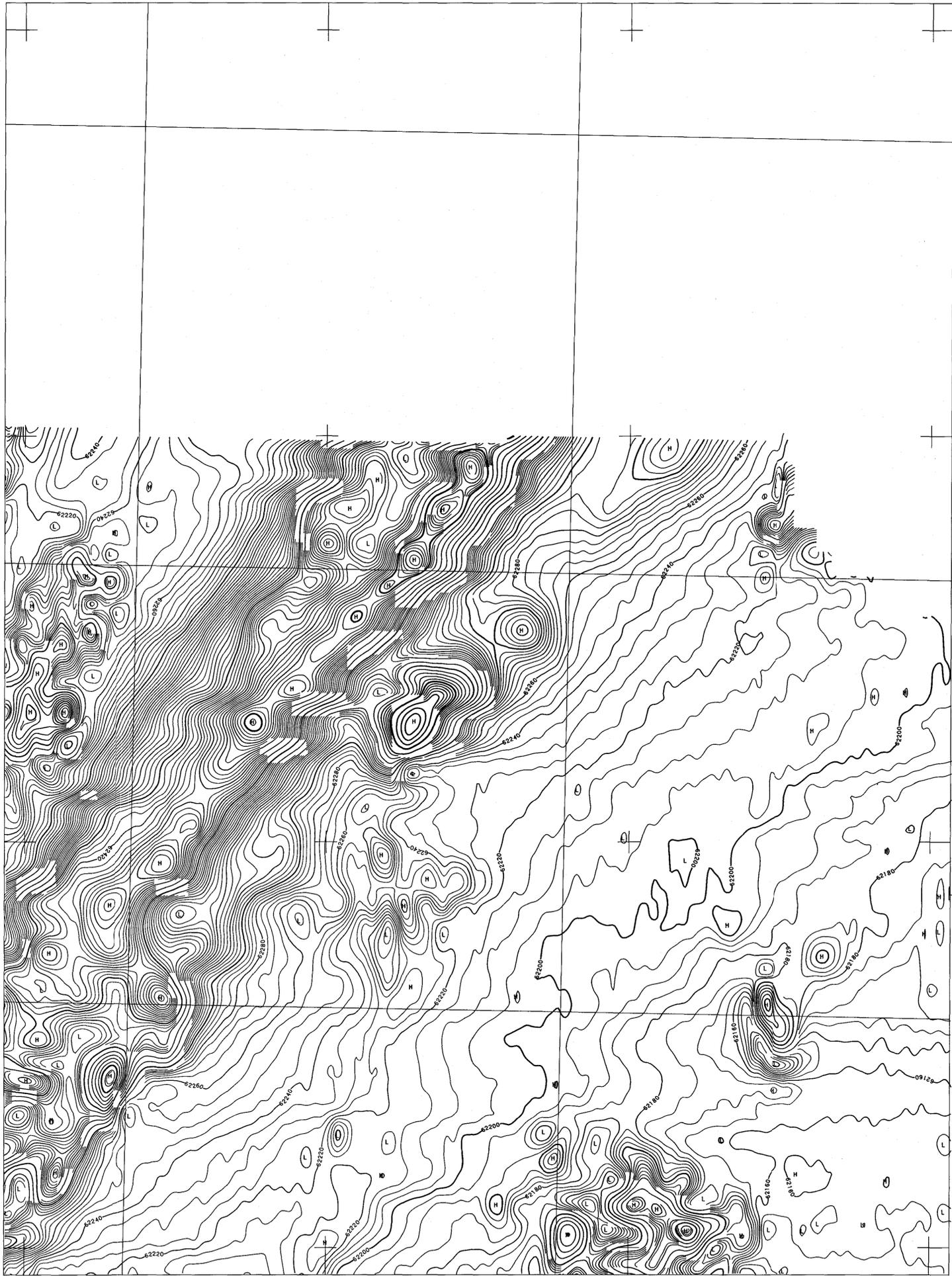
41 15 00S
41 15 10S

145 24 00E

145 25 00E

145 27 30E

145 30 00E



FLOWN AND PRESENTED BY



JOB NO. 263

AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI (TI) CRYSTAL. DIFFERENTIAL RECORDING T.K. U. K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

LEGEND

MAGNETIC CONTOUR INTERVAL - 5 NANOTESLA
GRID MESH - 90m X 90m
SEARCH RADIUS - 1000m

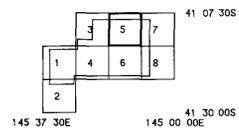
- 500 NANOTESLA CONTOUR
- 100 NANOTESLA CONTOUR
- 20 NANOTESLA CONTOUR
- 5 NANOTESLA CONTOUR



SCALE 1:25000



LOCATION AND INDEX PLAN



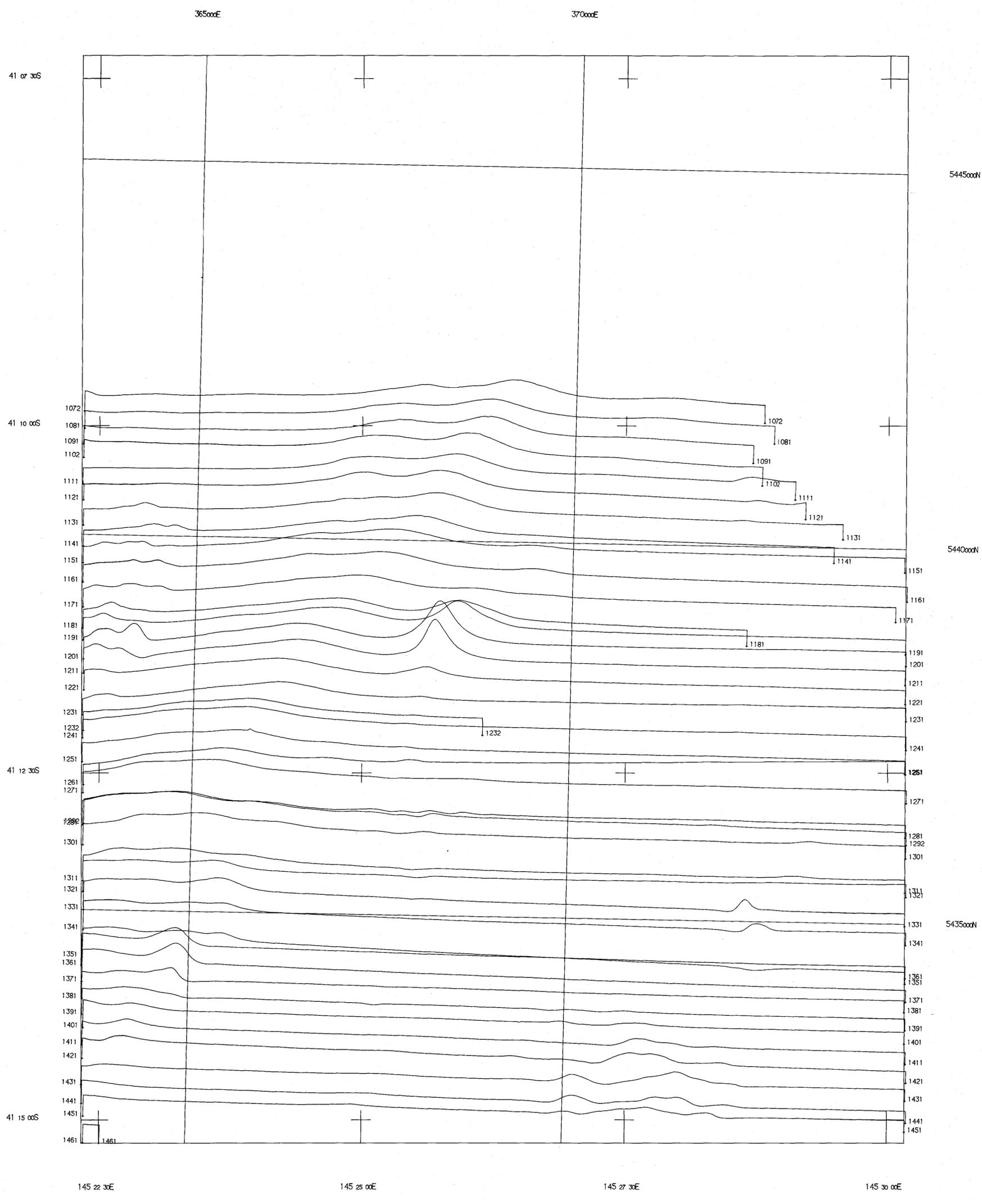
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
MAGNETIC CONTOURS
SHEET 5

PROJ NO.

DATE:

28-MAY-82



AIRBORNE SURVEY SPECIFICATIONS

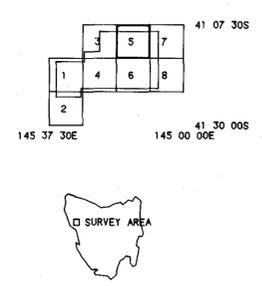
AIRCRAFT : CESSNA 185E VH-KPF
 MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT
 SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL. DIFFERENTIAL RECORDING Th. U. K AND TOTAL COUNT.
 ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
 FLIGHT PATH : VINTEN MARK IV 16mm
 DETECTOR HEIGHT : 100 METRES
 FLIGHT LINE SPACING : 250 METRES

LEGEND

VERTICAL SCALE : 250 NANOTESLAS/CM
 BASE : 62000 NANOTESLAS

0 1 2 Km
 SCALE 1:25000
 5 cm

LOCATION AND INDEX PLAN



FLOWN AND PRESENTED BY

 JOB NO. 263

C.R.A. EXPLORATION PTY. LTD.
 RAPID RIVER - ATLAS
 MAGNETIC STACKED PROFILES
 SHEET 5
 PROJ NO. _____ DATE: 16-JUN-82

41 07 30S
41 07 30S

365000E

370000E

5445000N

41 10 00S

1102

1121

1141

1161

1181

1201

1221

1232

1241

41 12 30S

1261

1281

1292

1321

1341

1361

1381

1401

1421

41 15 00S

1441

41 15 10S

5440000N

1151

1171

1191

1211

1231

1251

1271

1301

1311

1331

1351

1371

1391

1411

1431

1451

5435000N

145 24 50 30E

145 25 00E

145 27 30E

145 30 00 10E

AIRBORNE SURVEY SPECIFICATIONS

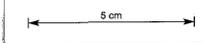
- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECISION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL-DIFFERENTIAL RECORDING TR. U. K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

LEGEND

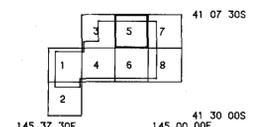
800 → 800 FLIGHT PATH LINE

0 1 2 Km

SCALE 1:25000



LOCATION AND INDEX PLAN



FLOWN AND PRESENTED BY



JOB NO. 263

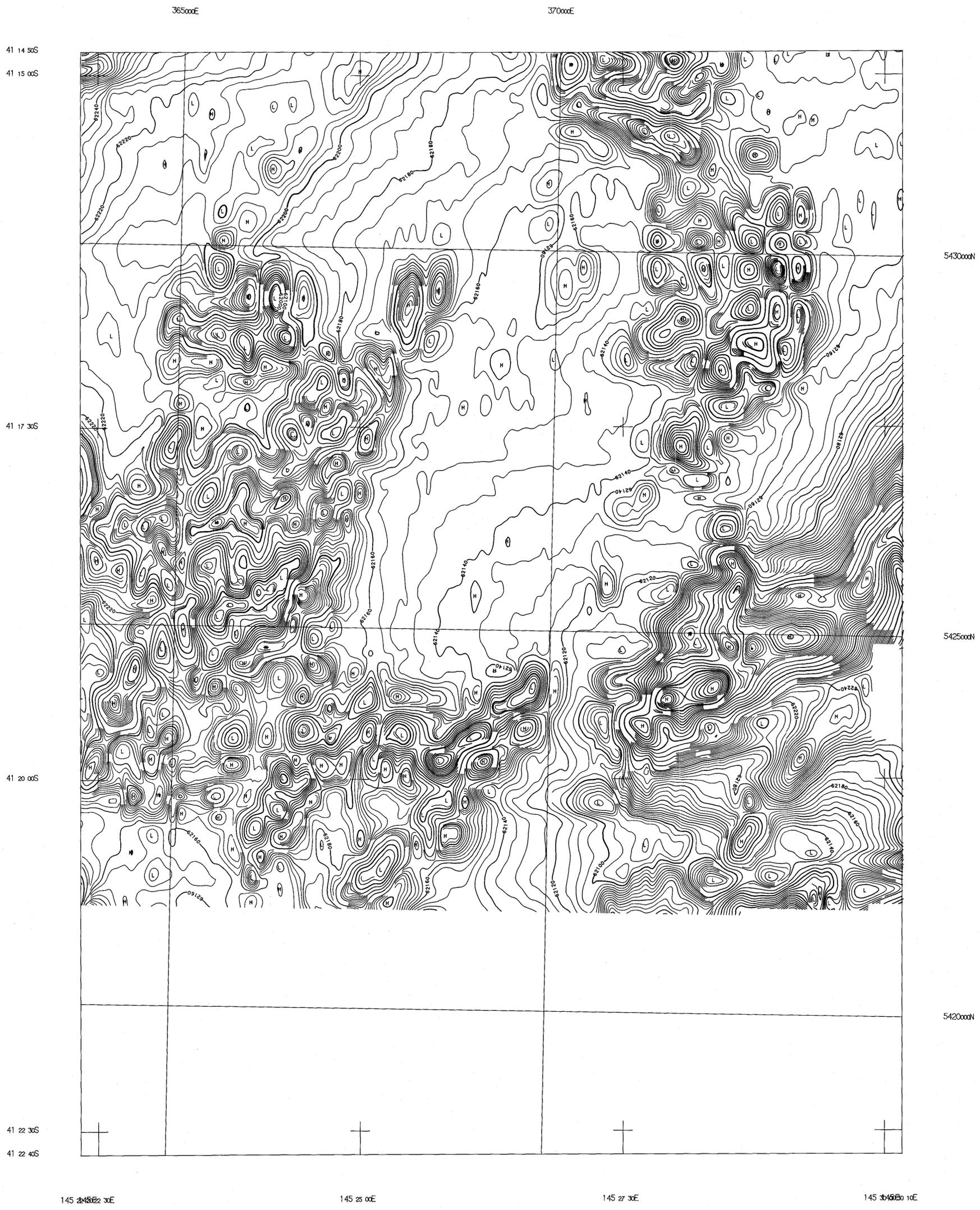
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
FLIGHT PATH
SHEET 5

PROJ NO.

DATE:

02-JUN-82



FLOWN AND PRESENTED BY
austirex
JOB NO. 263

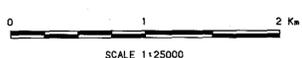
AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECISION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL. DIFFERENTIAL RECORDING TH, U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

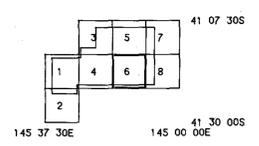
LEGEND

MAGNETIC CONTOUR INTERVAL - 5 NANOTESLA
GRID MESH - 90m X 90m
SEARCH RADIUS - 1000m

- 500 NANOTESLA CONTOUR
- 100 NANOTESLA CONTOUR
- 20 NANOTESLA CONTOUR
- 5 NANOTESLA CONTOUR



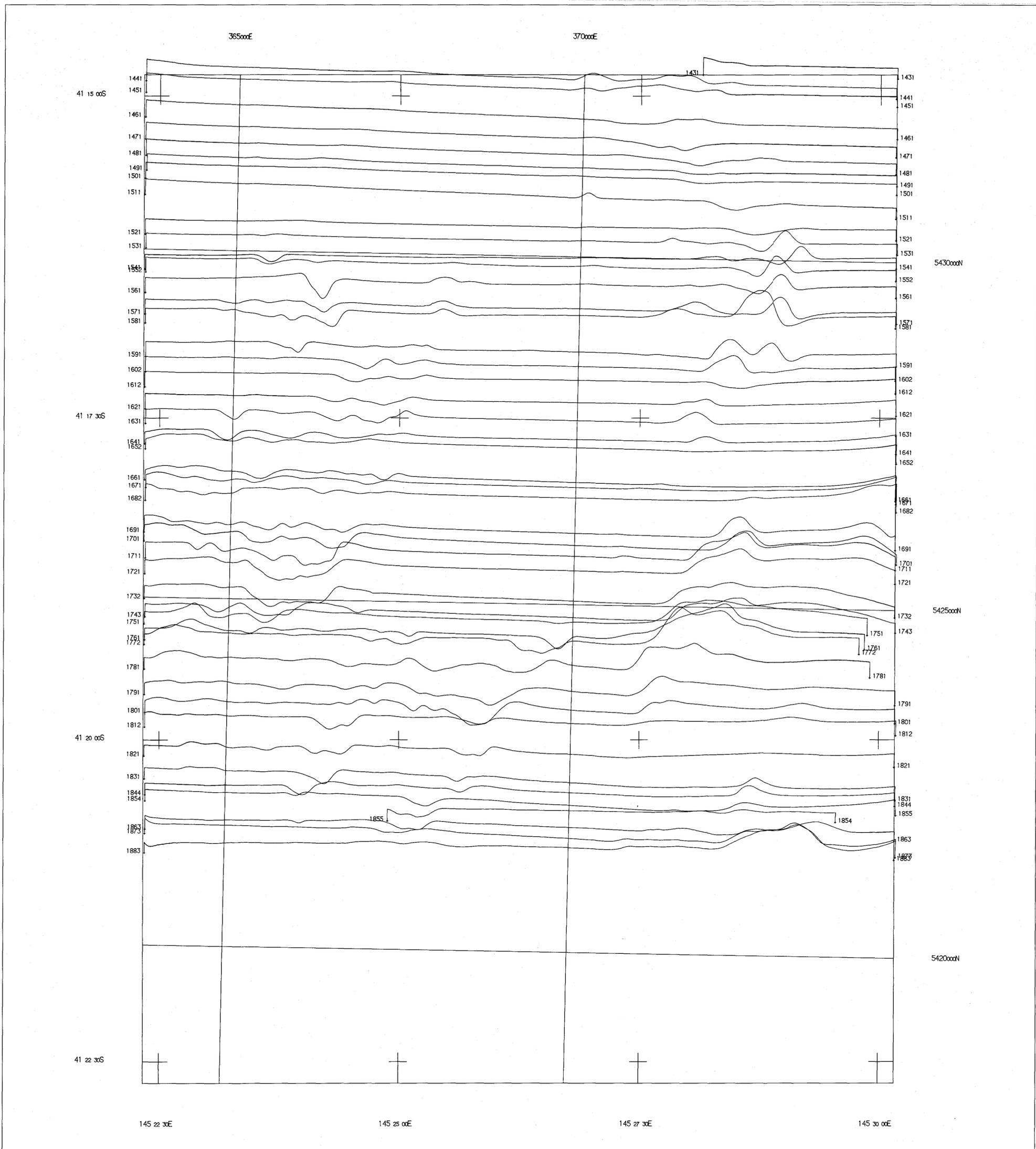
LOCATION AND INDEX PLAN



C.R.A. EXPLORATION PTY. LTD.

**RAPID RIVER - ATLAS
MAGNETIC CONTOURS
SHEET 6**

PROJ NO. _____ DATE: 28-MAY-82



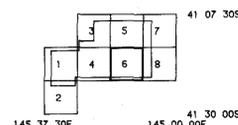
AIRBORNE SURVEY SPECIFICATIONS

AIRCRAFT : CESSNA 185E VH-KPF
 MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
 SPECTROMETER : NUCLEAR ENTERPRISE 8424 15780 cc NaI(Tl) CRYSTAL DIFFERENTIAL RECORDING T_h, U, K AND TOTAL COUNT.
 ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
 FLIGHT PATH : VINTEN MARK IV 16mm
 DETECTOR HEIGHT : 100 METRES
 FLIGHT LINE SPACING : 250 METRES

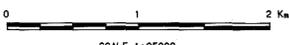
LEGEND

VERTICAL SCALE : 250 NANOTESLAS/CM
 BASE : 62000 NANOTESLAS

LOCATION AND INDEX PLAN



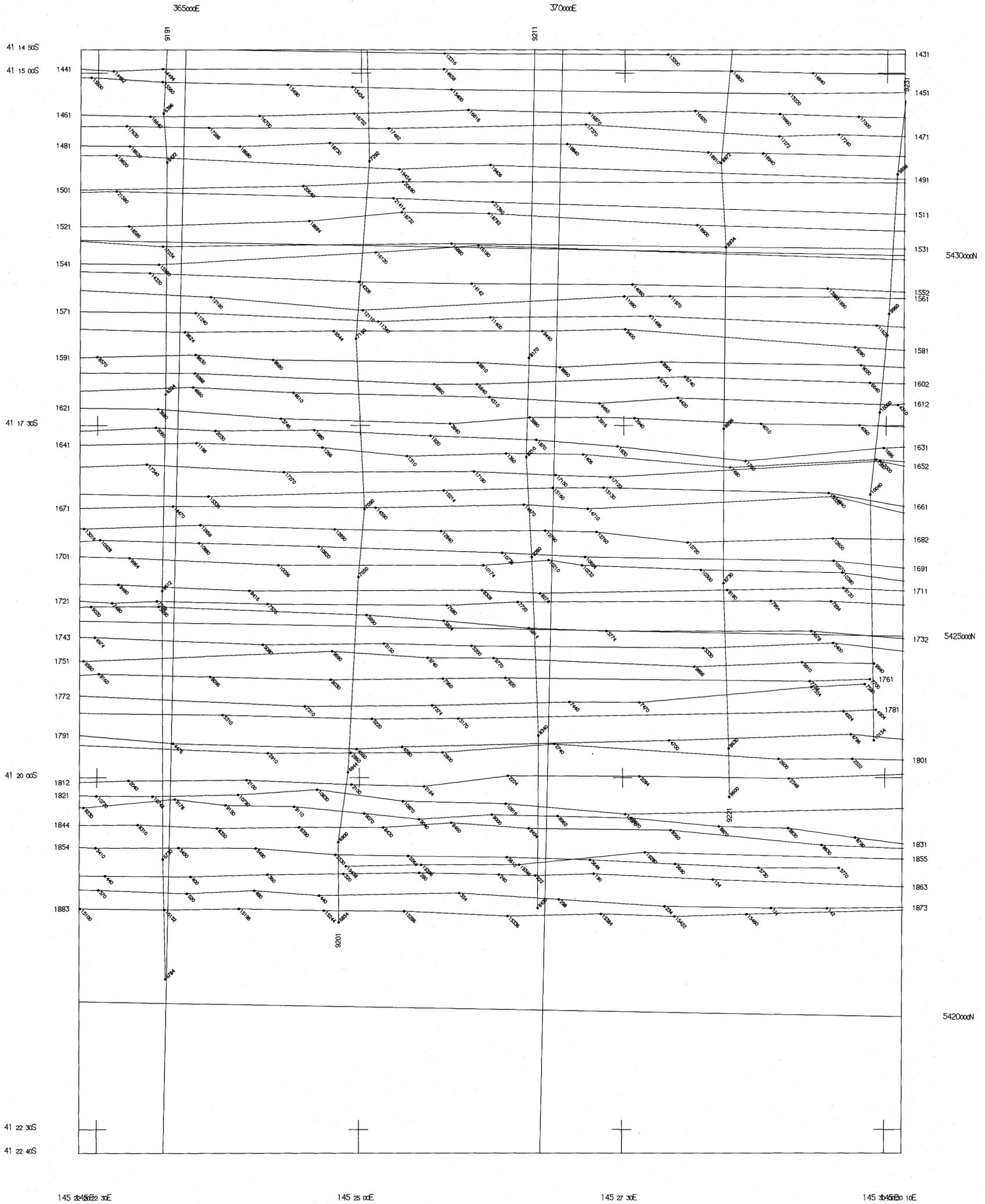
FLOWN AND PRESENTED BY



C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
 MAGNETIC STACKED PROFILES
 SHEET 6

PROJ NO. DATE: 16-JUN-82

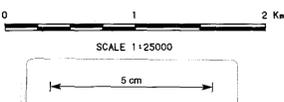


AIRBORNE SURVEY SPECIFICATIONS

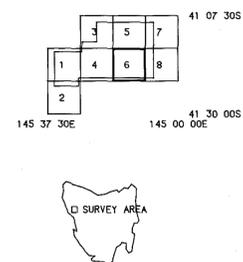
AIRCRAFT : CESSNA 185E VH-KPF
 MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
 SPECTROMETER : NUCLEAR ENTERPRISE B424 16780 cc NaI (TI) CRYSTAL. DIFFERENTIAL RECORDING Th, U, K AND TOTAL COUNT.
 ACQUISITION : 10 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
 FLIGHT PATH : VINTEN MARK IV 16mm
 DETECTOR HEIGHT : 100 METRES
 FLIGHT LINE SPACING : 250 METRES

LEGEND

— FLIGHT PATH LINE



LOCATION AND INDEX PLAN



FLOWN AND PRESENTED BY



JOB NO. 263

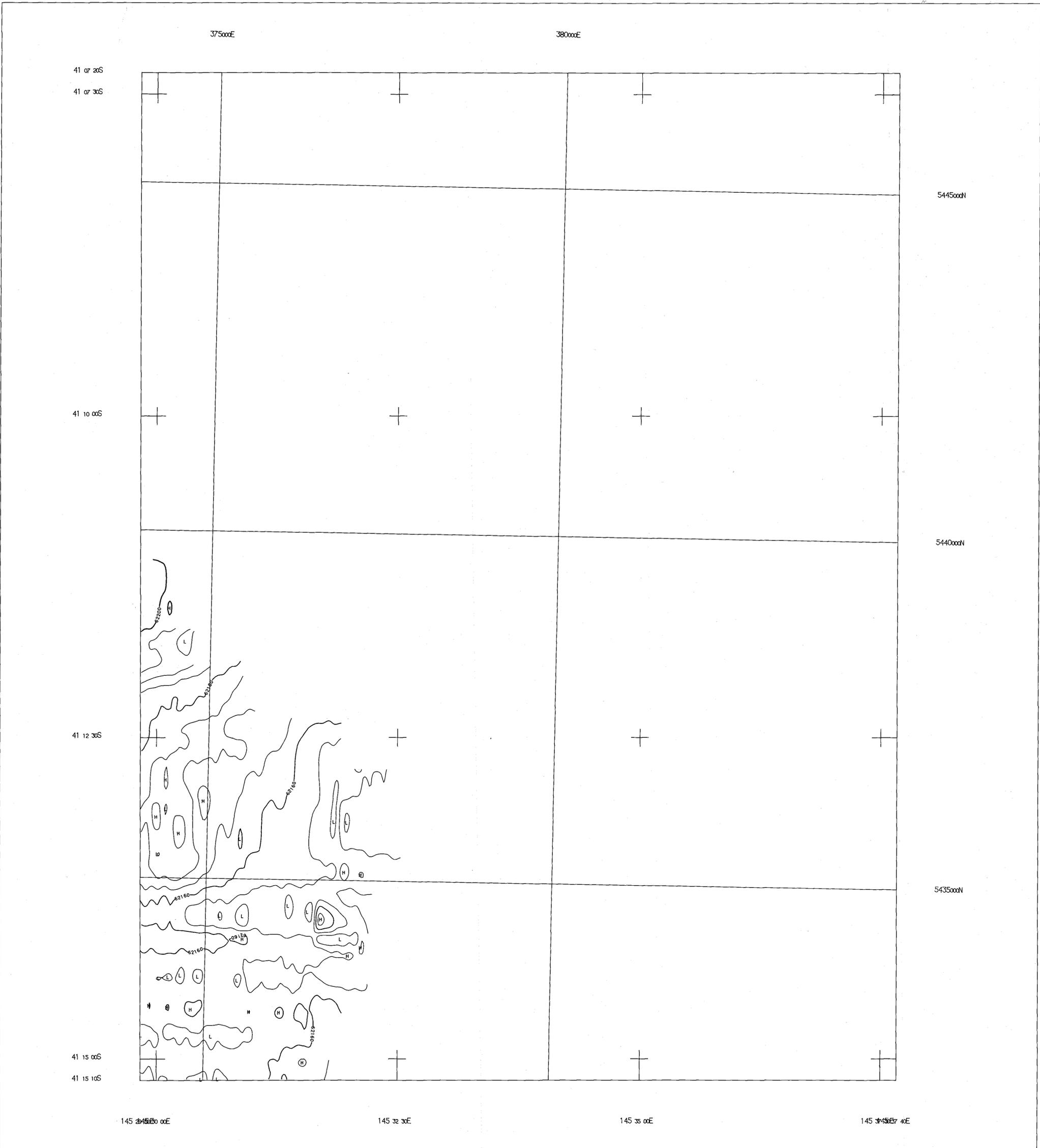
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
 FLIGHT PATH
 SHEET 6

PROJ NO.

DATE:

02-JUN-82



AIRBORNE SURVEY SPECIFICATIONS

AIRCRAFT : CESSNA 185E VH-KPF
 MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
 SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI (TI) CRYSTAL DIFFERENTIAL RECORDING Th, U, K AND TOTAL COUNT.
 ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
 FLIGHT PATH : VINTEN MARK IV 16mm
 DETECTOR HEIGHT : 100 METRES
 FLIGHT LINE SPACING : 250 METRES

LEGEND

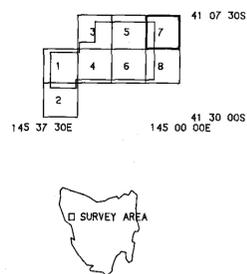
MAGNETIC CONTOUR INTERVAL - 5 NANOTESLA
 GRID MESH - 90m X 90m
 SEARCH RADIUS - 1000m

———— 500 NANOTESLA CONTOUR
 ———— 100 NANOTESLA CONTOUR
 ———— 20 NANOTESLA CONTOUR
 ———— 5 NANOTESLA CONTOUR

0 1 2 Km
 SCALE 1:25000



LOCATION AND INDEX PLAN



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JOB NO. 263

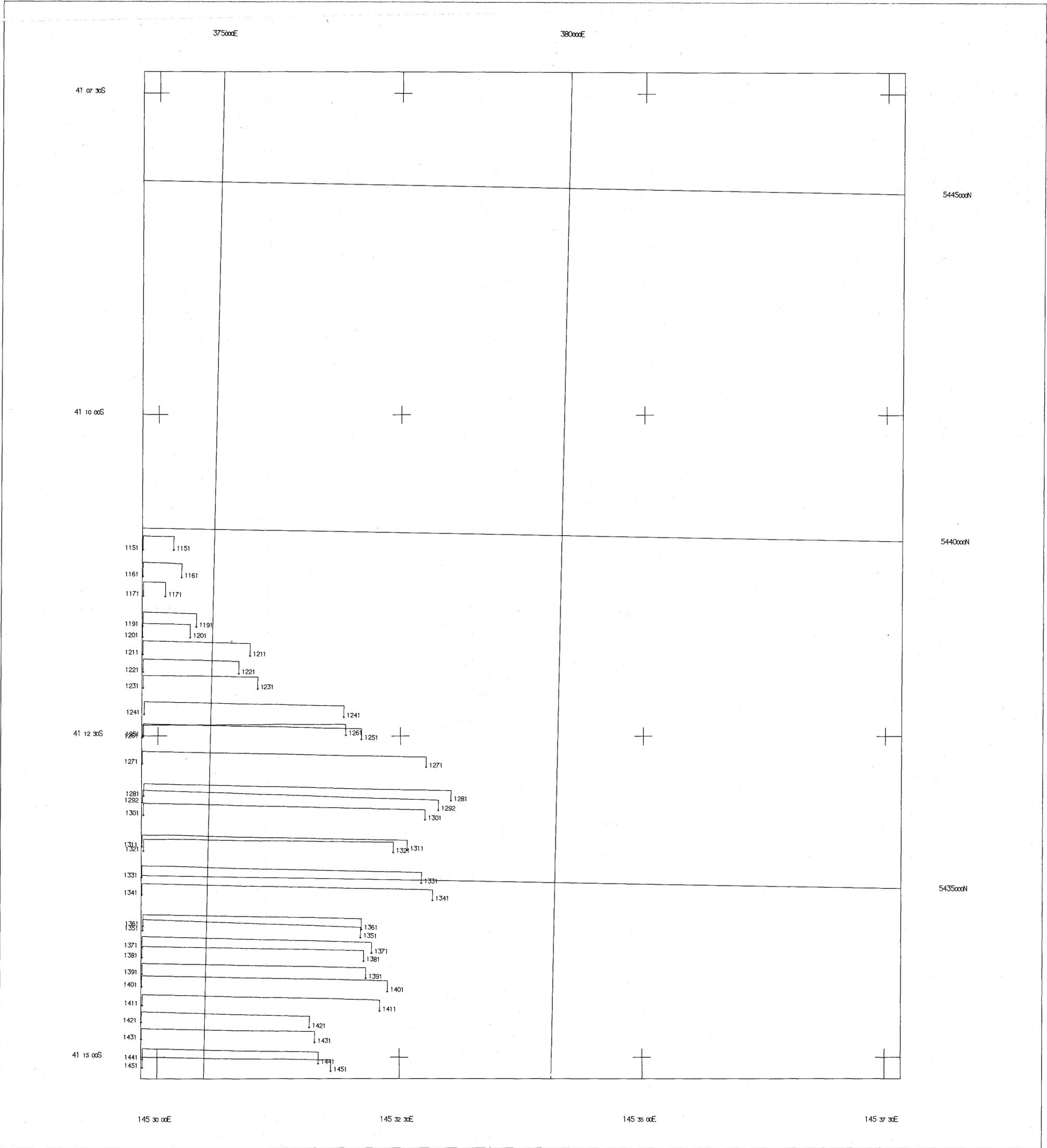
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
 MAGNETIC CONTOURS
 SHEET 7

PROJ NO.

DATE:

28-MAY-82



AIRBORNE SURVEY SPECIFICATIONS

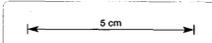
AIRCRAFT : CESSNA 185E VH-KPF
 MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT
 SPECTROMETER : NUCLEAR ENTERPRISE 8424 RECORDING TO 0.1nT
 ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
 FLIGHT PATH : VINTEN MARK IV 16mm
 DETECTOR HEIGHT : 100 METRES
 FLIGHT LINE SPACING : 250 METRES

LEGEND

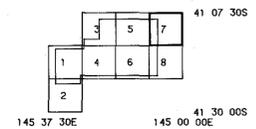
VERTICAL SCALE : 250 NANOTESLAS/CM
 BASE : 62000 NANOTESLAS



0 1 2 Km
 SCALE 1:25000



LOCATION AND INDEX PLAN



FLOWN AND PRESENTED BY



JOB NO. 263

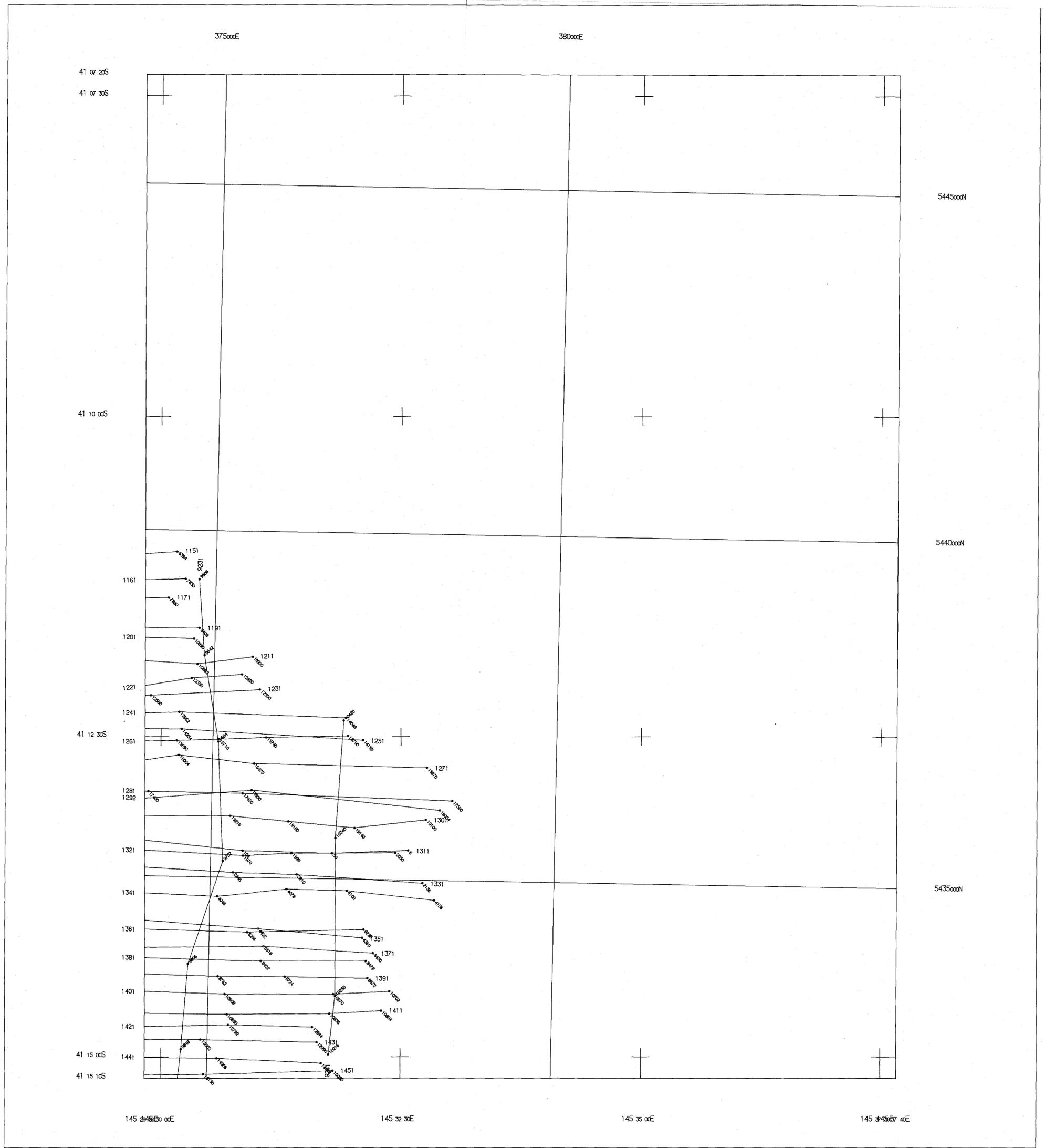
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
 MAGNETIC STACKED PROFILES
 SHEET 7

PROJ NO.

DATE:

16-JUN-82



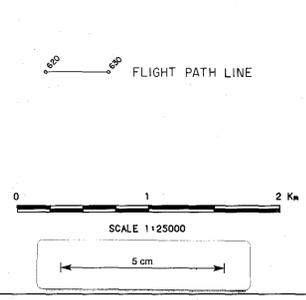
FLOWN AND PRESENTED BY
austirex
JOB NO. 263

AIRBORNE SURVEY SPECIFICATIONS

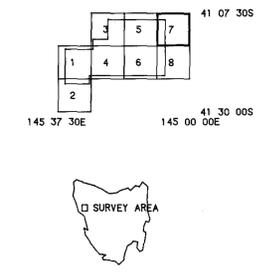
- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI (TI) CRYSTAL - DIFFERENTIAL RECORDING Th. U. K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES



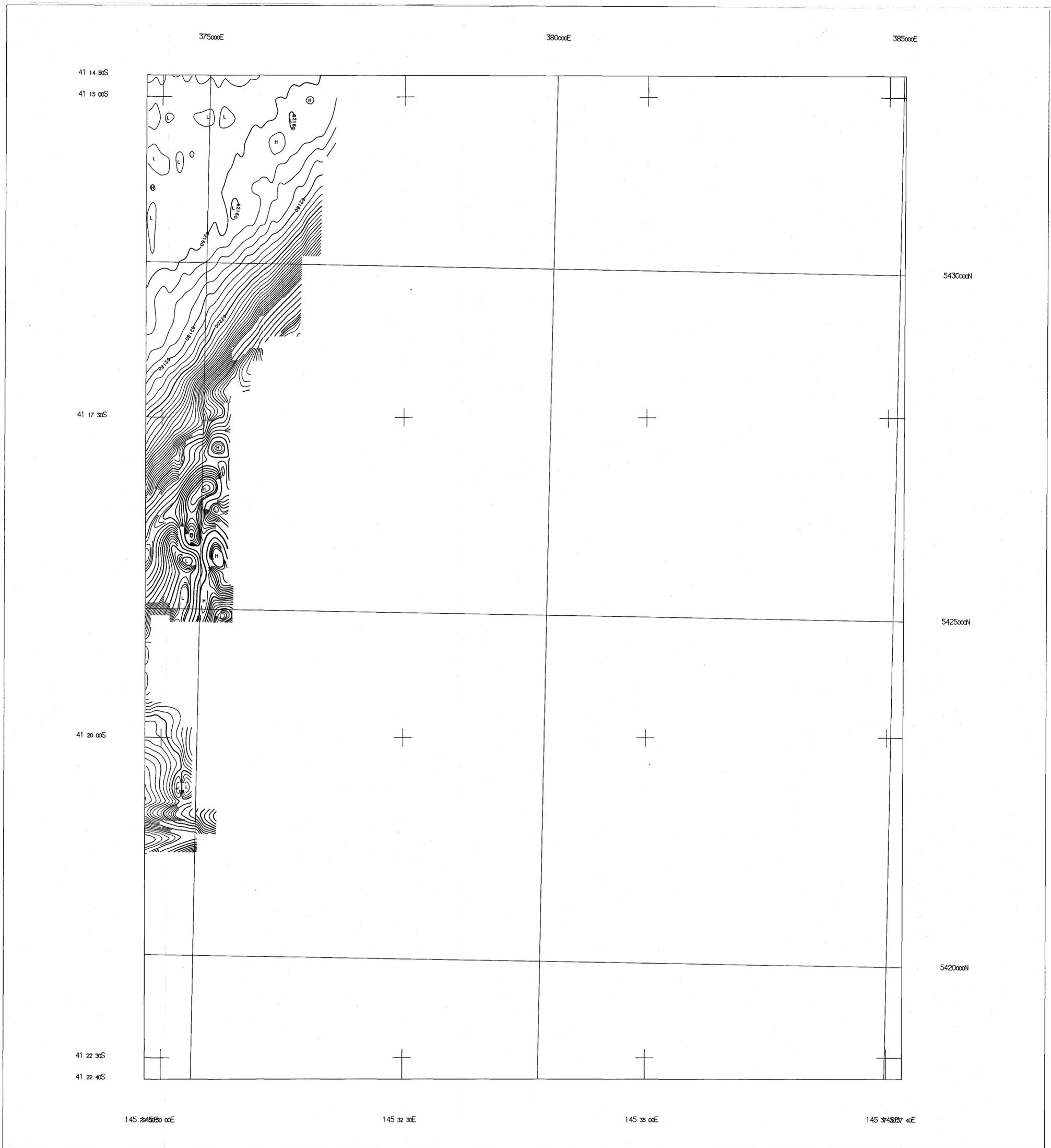
LEGEND



LOCATION AND INDEX PLAN



C.R.A. EXPLORATION PTY. LTD.
**RAPID RIVER - ATLAS
FLIGHT PATH
SHEET 7**
PROJ NO. _____ DATE: 02-JUN-82



FLOWN AND PRESENTED BY
austirex
JOB NO. 263

AIRBORNE SURVEY SPECIFICATIONS

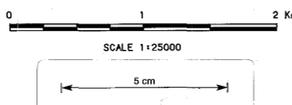
- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL DIFFERENTIAL RECORDING T_h, U, K AND TOTAL COUNT. TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- ACQUISITION : VINTEN MARK IV 16mm
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES



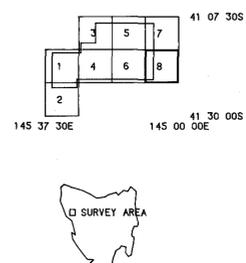
LEGEND

MAGNETIC CONTOUR INTERVAL - 5 NANOTESLA
GRID MESH - 90m X 90m
SEARCH RADIUS - 1000m

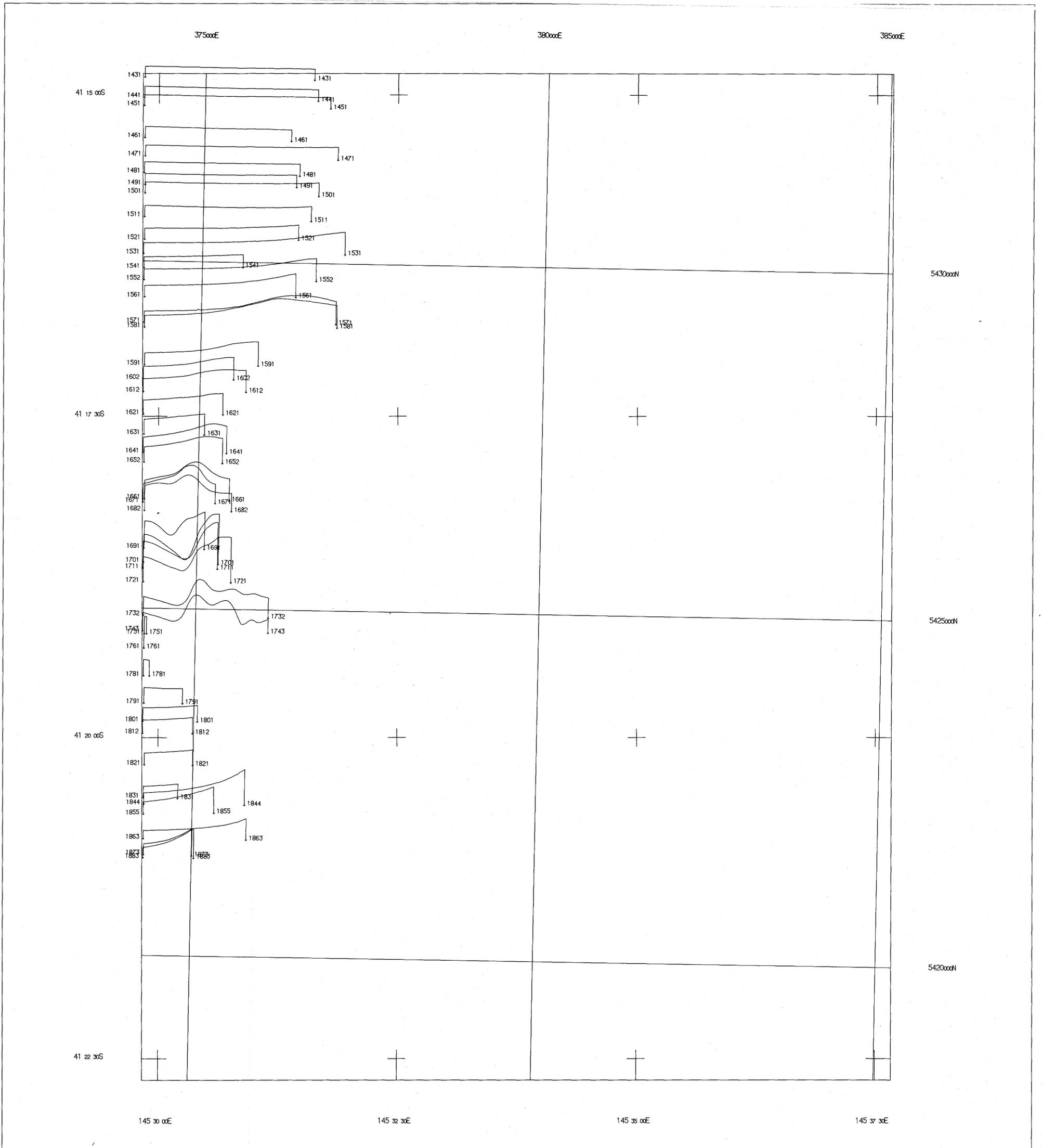
- 500 NANOTESLA CONTOUR
- 100 NANOTESLA CONTOUR
- 20 NANOTESLA CONTOUR
- 5 NANOTESLA CONTOUR



LOCATION AND INDEX PLAN



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**RAPID RIVER - ATLAS
MAGNETIC CONTOURS
SHEET 8**

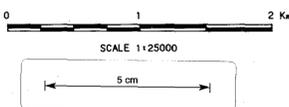


AIRBORNE SURVEY SPECIFICATIONS

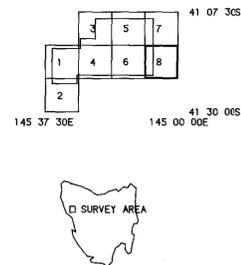
AIRCRAFT : CESSNA 185E VH-KPF
 MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
 SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL. DIFFERENTIAL RECORDING Th. U. K AND TOTAL COUNT.
 ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
 FLIGHT PATH : VINTEN MARK IV 16mm
 DETECTOR HEIGHT : 100 METRES
 FLIGHT LINE SPACING : 250 METRES

LEGEND

VERTICAL SCALE : 250 NANOTESLAS/CM
 BASE : 62000 NANOTESLAS



LOCATION AND INDEX PLAN



FLOWN AND PRESENTED BY



JOB NO. 263

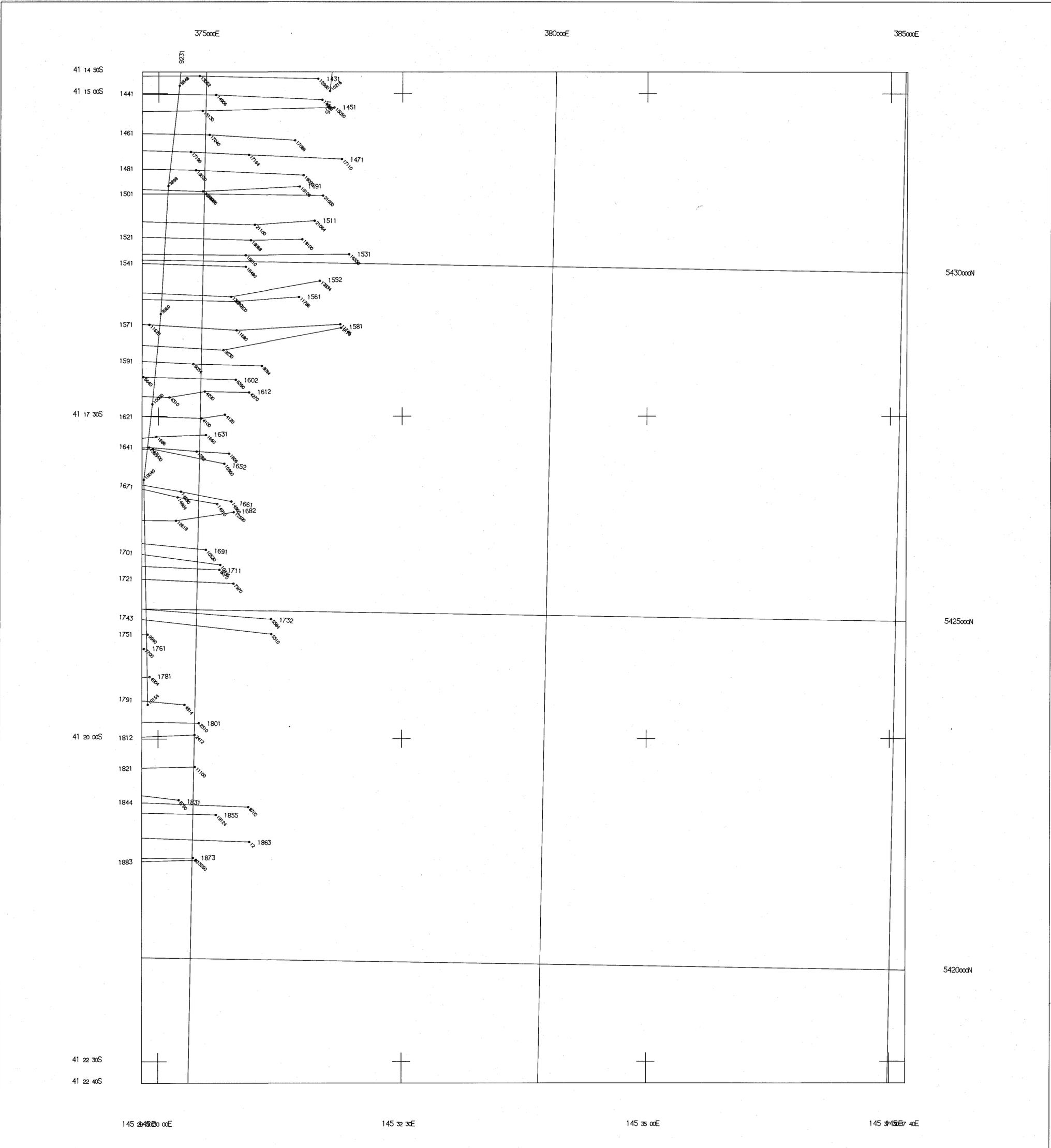
C.R.A. EXPLORATION PTY. LTD.

RAPID RIVER - ATLAS
 MAGNETIC STACKED PROFILES
 SHEET 8

PROJ. NO.

DATE:

16-JUN-82

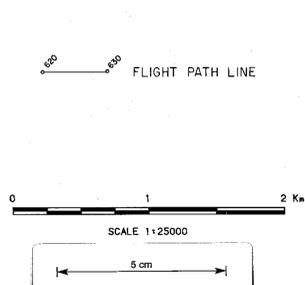


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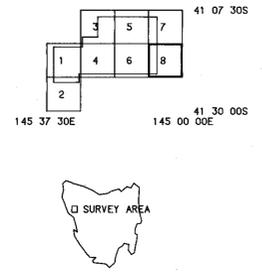
AIRBORNE SURVEY SPECIFICATIONS

- AIRCRAFT : CESSNA 185E VH-KPF
- MAGNETOMETER : VARIAN V85 PROTON PRECESSION UNIT RECORDING TO 0.1nT
- SPECTROMETER : NUCLEAR ENTERPRISE 8424 16780 cc NaI(Tl) CRYSTAL. DIFFERENTIAL RECORDING Th, U, K AND TOTAL COUNT.
- ACQUISITION : TO 9 TRACK MAGNETIC TAPE AND GARS 6 MULTI-CHANNEL CHART RECORDER.
- FLIGHT PATH : VINTEN MARK IV 16mm
- DETECTOR HEIGHT : 100 METRES
- FLIGHT LINE SPACING : 250 METRES

LEGEND



LOCATION AND INDEX PLAN



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RAPID RIVER - ATLAS
FLIGHT PATH
SHEET 8