OPEN FILE

Report to the Department of
Mines & Energy on the
Relinquished portions of
Exploration Licences
5605, 5606, 5649, 5650,
5787, 5788 and 5877
McArthur River Project Area, NT

Exploration Licences & Licensees
5605, 5606, 5649, 5650, 5687,
5788 : Quilpie Pty Ltd

5877 : Top End Resources N.L.

Date of Submission: November 1991

1:250,000 Scale Map Sheets

SD 5 19 : Mount Young
SC 53 03: Bauhinia Downs

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Distribution:

Dept of Minerals & Energy	(1)
Noranda Pty Ltd	(1)
MIM	(1)
Top End Resources NL	(1)
Perilya Mines NL	(1)

2353/11/92

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1.0 Introduction

Exploration for base metals in addition to gold on the relinquished portions of the seven exploration licences reported on herein, was conducted as part of a joint venture between Top End Resources N.L., Quilpie Pty Ltd,Noranda Pty Ltd, and Perilya Mines N.L. These areas comprised the compulsory (50%) graticular area reduction of EL's 5605, 5606, 5649, 5650, 5787, 5788 and 5877 of the McArthur River Project Area, effective on 12 July, 1991 (Figure 1).

Exploration Licence 5606 was completely surrendered as part of this compulsory reduction and pursuant to section 32 of the Mining Act, details of all exploration activity in the licence will be provided in a separate final report to be submitted at a later date.

The areas relinquished formed part of a tenement holding covering much of the Batten Trough and was used as a model in formatting Perilya's exploration.

The exploration activities covered in this report represent all the work carried out on the relinquished areas during 1988, 1989 and 1990 dry seasons.

2.0 Location, Access and Tenure

The location of the partly relinquished EL's, in relation to the main geographical features are shown in Figure 1. The main access routes in the district are the sealed Carpentaria and Tablelands Highways and the graded but unsealed roads to the various cattle stations in the district; Nathan River, Lorella Springs, Bauhinia Downs, Billengarrah, Tawallah, Mallpunyah and Kiana. Elsewhere access in by station tracks, many of which are used only sporadically and thus are poorly maintained. The hilly areas are not accessible by vehicle.

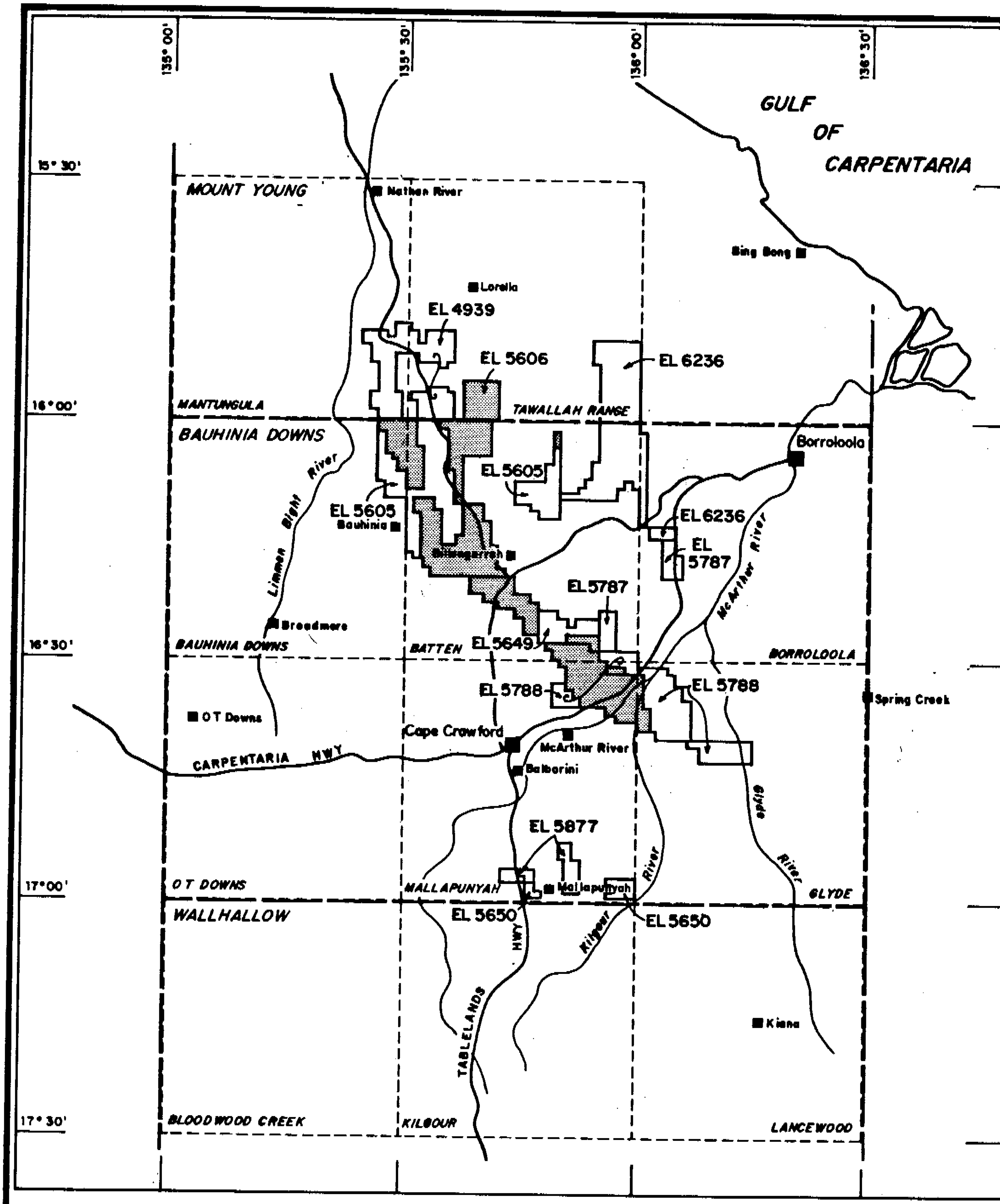
Details of Exploration Licences covered in this report are as follows:

EL No.	Owner*	Date Granted	No. of blocks prior to relinquishment	Blocks Relinquished	Blocks Retained
5605	Q	13.07.88	264	148	116
5606	Q	13.07.88	25	25	0
5649	Q	13.07.88	100	70	30
5650	Q	13.07.88	19	0	19
5787	Q	13.07.88	23	0	23
5788	Q	13.07.88	123	40	83
5877	TE	13.07.88	16	0	16

*Q = Quilpie Pty Ltd
TE= Top End Resources N.L.

3.0 Regional Geology and Geophysics

Complete regional geological mapping coverage is now available for the above EL's at both 1:1,000,000 scale (Geology of the McArthur Basin; Plumb, 1988) and 1:100,000 scale (Geology of the Abner Range Region; Jackson et al, 1987; McArthur River



LEGEND

- - - - 1:100 000 MAP SHEET

——— 1:250 000 MAP SHEET

▒ GROUND SURRENDERED 1992

PERILYA MINES N.L.

McARTHUR RIVER JOINT VENTURE

LOCATION MAP

SHOWING CURRENT EXPLORATION LICENCES AND GROUND SURRENDERED DURING 1992

SCALE 1 : 1 250 000	DATE AUG 92	PLAN No. Figure 1

Region; Pietsch et al, 1991a, and the Preliminary Tawallah Range and Bauhinia Downs Sheets (Pietsch et al, 1991b and De Ross et al, 1988). the northern EL's are also covered by the old 1:250,000 scale geological maps; Bauhinia Downs (Smith, 1964) and Mount Young (Plumb and Paine, 1964).

The above mapping has been used as far a possible for exploration purposes, and where additional mapping has been carried out locally, it has attempted to follow the stratigraphy outlined in Jackson et al (1987).

Bureau of Mineral Resources geophysical coverage of the entire project area is available at 1:250,000 scale in the form of aeromagnetics (pre-1970 survey), gravity (pre-1981) and radiometric contour maps. Digitised gamma-ray spectrometer and magnetic data are also available.

4.0 Historical Exploration

The Batten Trough has been extensively explored for base metals since the discovery of the HYC Pb-Zn-Ag deposit in 1955. The major explorers in the region have been Carpentaria Exploration Co. Pty Ltd, BHP Co. Ltd, CRA Exploration Pty Ltd, Amoco Minerals Australia, Shell (Minerals) Australia, Western Mining Corp., and A.O. Australia Pty Ltd. Thorough reviews of this and other exploration in the region have been compiled by Plumb (1977) as well as the Northern Territory Geological Survey in their "Exploration Series" maps and notes. These are available for the Bauhinia Downs and Mt Young 1:250,000 scale sheet areas and the Mallapunyha, Batten and Tawallah Range 1:100,000 scale sheets. Collated exploration data is subdivided into Geology, Geophysics, Geochemistry, Drilling and Mineral Occurrences for tabulated and map presentation. These data have been used extensively in defining and appraising targets.

5.0 Current Exploration Programme

Following the granting of a parcel of eleven exploration licences on 13 July, 1988 (some which have been subsequently surrendered in their entirety) the pastoralists in the area were notified and the Northern Territory Sacred Sites Authority were contacted to determine the location of recorded sites.

The preparatory stage of exploration consisted of:

(i) Inspection and data evaluation on open-file exploration reports held at the Northern Territory Department of Mines and Energy library in Darwin.

(ii) Generating Landsat Thematic Mapper images for the Mantungula and Tawallah Range areas at 1:100,000 scale. At the time, the best geological map coverage available for these areas was at 1:250,000 scale (the Mount Young sheet of Plumb and Paine, 1964). A report on the Landsat Imagery entitled "landsat T.M. Imagery from the McArthur Basin, Northern Territory, Australia" by E. Swarbrick and Associates, has been lodged with the Department of Mines and Energy.

(iii) Compilation of geological interpretation maps at 1:100,000 scale, using all available geological data from published and unpublished sources.

Upon compilation of the above solid geology interpretation maps, areas were targeted for ground inspection, either by vehicle or by helicopter. Target selection was based on the following criteria:

(a) Favourable host rocks or geological setting:

Formations known to host sulphidic mudrock units (eg. Barney Creek formation, Caranbirini Formation, Tooganinie Formation) as well as ferruginous parts of the Emmerugga Dolomite, were selected for detailed investigation, as was the unconformity between the Reward and Balbirini (Nathan Group) Dolomites.

(b) Favourable structural setting:

Special attention was given to areas interpreted as sub basins (c.f. HYC) and to faults known to be associated with mineralisation.

(c) Areas of known mineralisation:

The larger known mineral occurrences were located and inspected.

Targets chosen for ground inspection on the above criteria were geologically evaluated and rock chip and/or soil sampled. Mapping was carried out and deemed necessary and some areas considered favourable on geological ground, but with limited prior stream sediment geochemical coverage, were sampled. If the preliminary investigations were encouraging, follow up rock chip and/or soil sampling and geological mapping were undertaken.

6.0 Geochemistry

Geochemistry analysis was carried out on rock chip, soil and stream sediment samples collected on the exploration licences. Soil and stream sediment samples were sieved to -2mm in the field. All samples were analysed for Cu, Pb and Zn and some samples also analysed for Au, Ag and Ba.

Analysis was carried out by Classic Comlabs Ltd in Darwin using the methods and with claimed detection limits as outlined below:

Element	Detection Limited (ppm)	Method	
Cu	2	AAS1	(Perchlonic acid digest)
Pb	5	AAS1	(Perchloric acid digest)
Zn	2	AAS1	(Perchloric acid digest)
Ag	1	AAS2	(Perchloric acid digest)
Au	0.001	Fire Assay	Graphite Furnace Finish
Ba	10	XRF1	(Pressed Powder)

At the commencement of the 1989 Field Season, all results from the 1988 rock chip and soil samples were graphed and statistically reviewed to determine approximate anomaly thresholds for ongoing use. Broad categories were chosen to define "background", elevated and anomalous values and these were applied to both existing and incoming geochemical results. The selected levels were as follows:

Rock Chip Samples (ppm)

	Cu	Pb	Zn
Background	0 - 500	0 - 100	0 - 500
Elevated	501-1000	101-500	501-1000
Anomalous	>1000	>500	>1000

Soil Samples (ppm)

	Cu	Pb	Zn
Background	0-25	0-25	0-70
Elevated	26-70	26-70	71-140
Anomalous	>70	>70	>140

7.0 Results of Exploration

The following target areas were identified from field work carried out during the 1988-1989 field season and some were subject to follow up evaluations (1989).

A three sheet 1:100,000 geological map compilation referred to in 5(iii) is also presented in the map pocket at the near of this report (Figure 2). It shows the location of the following prospects.

7.1 Johnsons

Cu-Pb
(an ex C.R.A. Prospect)

Location: W part of the Batten 1:100,000 sheet on the S side of the Cape Crawford-Bauhinia Downs Road

Host Rocks: Tooganinie Fm dolomitic siltstones and shales.

Structural Setting: Mineralisation developed along the NW trending Johnsons Fault and previously described as shear controlled

GEOCHEMISTRY

Rock Chip	Soils	Stream Sediments
Cu 74 - 50ppm - 1.6%		
Pb 1.01 - 1.03%	None	None
Zn 27 - 99 ppm		
Au both <0.01 ppm	done	done

Additional Comments: CRA report 2-3m of 6.6% Cu, 1.75% Pb, 420 ppm Zn, 380 ppm Co, 370 ppm Ni and 79 ppm Ag from a shallow constean. Some of the mineralisation appears to be stratiform within thin dolomitic shale units.

7.2 Hot Springs

Location:	On the extreme S edge of the Batten 1:100,000 sheet on Barney Creek
Host Rocks:	Emmerugga Dolomite (ferruginous dolomitic shales)
Structural Setting:	At the intersection of the NW trending Mariner Fault and NE trending Reward Fault.

GEOCHEMISTRY

Rock Chip	Soils	Stream Sediments
Cu 67 - 70 ppm Pb 240-640 ppm Zn 305-405ppm Ba 280-380ppm Au both <0.01 ppm	None done	None done
2 samples		

Additional Comments: Steeply dipping lateritised, ferruginous Pb-Zn anomalous dolomitic shales outcrop poorly at the fault intersection.

8.0 Geophysics

An airborne electromagnetics (EM) survey was planned to provide blanket coverage over the Mariner-Tawallah Belt. To limit costs, surveys were designed to cover only the most prospective areas, and at reconnaissance line spacings (2 or 1km). Airborne EM appeared well suited to the detection of large conductive sulphide bodies and their associated sulphide haloes in the terrain in which:

(i) weathering is commonly shallow
(ii) graphitic bedrock conductors appear to be absent
(iii) saline groundwaters are uncommon.

Furthermore, the capacity to penetrate shallow overburden and the extensive value of targets sought should permit effective reconnaissance usage of time-domain EM methods.

The much delayed survey was finally flown by Aerodata during the second week of October 1991. Six hundred and seventy two (672) line kilometres of EM (and aeromagnetics) were flown over selected areas, as follows:

Area	**Line Km of Survey**	**Line Spacing**
Mariner-Tawallah	672	2km (1km through centre)

Details of methodology, results and interpretation are provided in the appended Aerodata report which is submitted as part of this report.

9.0 References

DE ROSS, G. and OTHERS, 1988: Bauhinia Downs, Northern Territory, 1:100,000 Geological Map (Preliminary) Sheet 5695. Northern Territory Geological Survey

HANNAN, K.W., 1991: A fluid inclusion and stable isotope study of synmetamorphic copper ore formation at Mount Isa, Australia - a discussion. Econ. Geol., 86, p 200-205

HEINRICH, C.A., Andrew, A.S., Wilkins, R.W.T. and Patterson, D.J., 1989: A fluid inclusion and stable isotope study of synmetamorphic copper ore formation at Mount Isa, Australia. Econ. Geol., 84, p 529-550

JACKSON, M.J., MUIR, M.D. and PLUMB, K.A., 1987: Geology of the southern McArthur Basin, Northern Territory. Bureau of Mineral Resources, Australia, Bulletin 220.

MUIR, M.D., Donnelly, T.H., Wilkins, R.W.T. and Armstrong, K.V., Stable isotopes, petrological and fluid inclusion studies on minor mineral deposits from the McArthur Basin: implications or the genesis of some sediment-based base metal mineralisation from the Northern Territory, Australia. Aust. J. Earth Sci., 32, p239-258.

PIETSCH, B.A., Wyche, S., Rawlings, D.J., Creaser, P.M. and Findhammer, T.L.R., 1991a: McArthur River Region 1:100,000 Geological Map Series and Explanatory Notes. Northern Territory Geological Survey.

PIETSCH, B.A. AND OTHERS, 1991b: Tawallah Range 1:100,000 Geological Map Series (Preliminary), Sheet 6066, Northern Territory Geological Survey

PLUMB, K.A., 1977: McArthur Basin Project. Bureau of Mineral Resources, Australia, Record 1977/33

PLUMB, K.A., 1988: Geology of the McArthur Basin, (1:100,000 scale map). Bureau of Mineral Resources, Canberra

PLUMB, K.A. and Paine, A.G.L., 1964: Mount Young, Northern Territory, 1:250,000 Geological Series. Bureau of Mineral Resources, Australia, Explanatory Notes SD 53 15.

RYE, D.M., and Williams, N., 1981: Studies of the base metal sulphide deposits at McArthur River, Northern Territory, Australia: III. The stable isotope geochemistry of the HYC, Ridge, and Cooley Deposits. Econ. Geol., 76, p1-26.

SMITH, J.W., 1964: Bauhinia Downs, Northern Territory, 1:250,000 Geological Series. Bureau of Mineral Resources, Australia, Explanatory Notes SE 53 03.

Figure 2
Sheet 2
Is Damage

LEGEND

CRETACEOUS
- K — Friable sandstone, claystone & conglomerate.

Regional unconformity

CAMBRIAN
- € — Limestone & sandstone.

Regional unconformity

ADELAIDEIAN (UPPER PROT.) — ROPER GROUP
- Er — Sandstone, minor siltstone, shale.

Regional unconformity

CARPENTARIAN (MIDDLE PROTEROZOIC)

NATHAN GROUP
- En — Dolarenite, dololutite, sandstone, siltstone, minor conglomerate, stromatolites common.

Regional unconformity

BATTEN SUB-GROUP
- Emb — Dolarenite, dololutite, sandstone, siltstone, minor pink K-tuffs near top, stromatolites.
- Embc — CARANBIRINI MEMBER Laminated to thin bedded hematitic dolomitic siltstone, PYRITIC & BITUMINOUS in places.

Local unconformity

UMBOLOOGA SUB-GROUP
- Emx — REWARD DOLOMITE Dololutite, dolarenite, dolorudite & sandstone. Silicification & brecciation common. Hosts Teena & Reward Pb-Zn deposits.
- Emq — BARNEY CREEK FORMN. Laminated to thinly bedded PYRITIC & BITUMINOUS dolomitic siltstone & shale, pink K-tuff beds (dated 1690^{+29}_{-25} m.y.) graded turbidite units. Hosts giant "HYC" stratiform Zn-Pb-Ag deposit at Mc Arthur River.
- Emc — COXCO DOLOMITE MEMBER Thinly bedded dololutites, pink K-tuff beds
- Emp — TEENA DOLOMITE Cherty stromatolitic dololutite, dolomitic shales. Hosts Cooley I & II cross cutting Cu-Pb-Zn deposits.
- Eme — EMMERUGGA DOLOMITE Dololutite, dolomitic siltstone, dolarenite, stromatolites, chertification common.
- Emf — MYRTLE SHALE Thinly bedded to laminated dolomitic siltstone, very fine sandstone & dololutite. Distinctive red-brown colour.
- Emi — LEILA SANDSTONE White silicified dolomitic sandstone.
- Emt — TOOGANINIE FORMN. Dolomitic siltstone & shale with thin interbeds of dololutite & dolarenite, black shale.
- Emd — TATOOLA SANDSTONE Dolomitic sandstone, quartz sandstone, rare tuffaceous beds.
- Ema — AMELIA DOLOMITE Stromatolitic dololutite, dolarenite, shale.
- Eml — MALLAPUNYAH FORMN. Red & purple dolomitic siltstone & shale, cross-bedded dolomitic sandstone, stromatolitic dololutite.
- Ems — MASTERTON SANDSTONE Well sorted quartz-arenite, rare pebbly interbeds. Uppermost beds Fe-rich.

CARPENTARIAN (MID-PROTEROZOIC) — TAWALLAH GROUP
- Et — Undivided Tawallah Group sandstones.
- Etg — GOLD CREEK VOLCANICS Red-pink intermediate volcanics, tuffs, lavas, agglomerate.
- Eto — WOLLOGORANG FORMN. Dolomitic siltstone, red shale, sandstone.
- Ete — SETTLEMENT CREEK VOLCANICS Basic-intermediate volcs, dolerite, potash metasomatism.
- Etl — SLY CREEK SANDSTONE Quartz-arenite, conglomerate.
- Etd — Mc DERMOTT FORMN. Reddish-purple dolostone, fine dolomitic siltstone.
- Ets — SEIGAL VOLCANICS Amygdaloidal basalt. (≡ PETERS CREEK VOLCS)
- Ety — YIYINTI SANDSTONE Quartz-arenite, arkose, conglomerate.

Regional unconformity

LOWER PROTEROZOIC
- Els — SCRUTTON VOLCANICS Porphyritic dacite, feldspathic sandstone tuff, minor dolerite dykes.

Gossan, gossanous rocks
Quartz veins
Brecciation
Mine (abandoned)
Prospect with costeans, drill holes etc.
Mineral occurrence

Cu copper, Pb lead, Zn zinc, Ba baryte, Fe iron

KEY

- Geological contacts
- Dip & strike of beds
- Vertical beds
- Overturned beds
- Lithological trends
- Faults, lineaments definite, inferred (tick indicates downthrow)
- Anticline, syncline
- Plunge of minor fold
- Unconformity

Sheet 3
Sheet 2
Sheet 1

PERILYA - TOP END - NORANDA Joint Venture

SOLID GEOLOGICAL INTERPRETATION
Mc ARTHUR BASIN PROJECT
SHEET 1

Scale 1:100,000 (Sheet 1 of 3)

1:250,000 Map Sheet Ref. BAUHINIA DOWNS/WALHALLOW N.T.	
Compiled F. Fitton	Project No
Drawn F. Fitton (MAPROCK)	Date 26.10.88.
Revised	Plan No

Figure 2

Figure 2
Sheet 3
Is Damage

APPENDIX I

McArthur River Questem Survey

January 1992

By Aerodata

for Perilya Mines N.L.

McARTHUR RIVER QUESTEM SURVEY

PERILYA MINES NL
JANUARY 1992

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ABSTRACT

An Airborne Electromagnetic survey over several prospects in the M^cArthur River Area using the QUESTEM system has not detected any first class targets. A number of smaller features have been marked for follow up, based largely on their location relative to the mapped geology.

INTRODUCTION

In October 1991 Aerodata Holdings Ltd. was contracted to fly an Airborne Electromagnetic (AEM) and magnetic survey over five areas around M^{c}Arthur River in the Northern Territory. The object of the survey was twofold, firstly to detect a large Pb-Zn deposit similar in style to the nearby HYC deposit (without perhaps the metallurgical problems of this deposit) and to map lithologies conducive to this type of mineralisation. As an aside there was a remote chance that one of the coarsely spaced lines might detect a fault controlled, Cu or Pb deposit elsewhere in the area.

The survey areas bound the Batten Trough, a Lower Proterozoic graben or half graben filled with several kilometres of shallow water carbonates and sandstones of the Tawallah, M^{c}Arthur and Nathan Groups and overlain by sandstones of the Lower Roper River Group. The Tawallah Group at the base of the sequence is interspersed with basaltic and ryolitic extrusives and intrusives. Many of the carbonates were deposited in sabka environments and are rich in stromatolites. These stromatolite bearing units host mineralisation at HYC and neighbouring Pb-Zn deposits. In the area of the HYC deposit the host rocks are also rich in pyrite, a mineral which, when it occurs as massive, electrically continuous veins, is an excellent conductor and should produce a clear Electromagnetic (EM) anomaly.

Dips of both the rocks and mineralisation are generally fairly flat in the survey area. The metamorphic grade is low and considering their age, the rocks remain relatively undeformed.

EQUIPMENT AND FIELD PROCEDURE

The AEM system developed and used by Aerodata is known as QUESTEM. It is a digital progression of the Barringer INPUT time domain airborne electromagnetic system and is mounted on a Britten Norman Trislander. A discussion of the configuration and theoretical basis of INPUT type systems can be found in most basic geophysical texts (eg Telford et al, 1986 pp 549-551).

Features specific to the QUESTEM system and this survey in particular are listed below.

EQUIPMENT

a) Aircraft	-	Britten-Norman Trislander
b) Receiver	-	Questem Time Domain Electromagnetic receiver horizontal axis coil in towed bird. Receiver interfaced to Picodas PDAS 1000 Acquisition system. Transmitter operating at 75 Hz.
c) Magnetometer	-	Optically pumped caesium vapour, split beam which is stinger mounted forward and interfaced to Picodas PDAS 1000 Acquisition system.
d) Radar Altimeter	-	Sperry AA100
e) Chart Recorder	-	RMS GR33
f) Acquisition system	-	Picodas PDAS 1000 written to hard disk with back up to DC300 cartridges.
g) Tracking Camera	-	Colour Video
h) Navigation System	-	Trimble Advanced Navigation Sensor, 2 channel GPS receiver

DATA ACQUISITION

Variable line spacing from 500m to 2000m with no tie lines
125m flying height with bird 40m AGL
EM system resolution 1ppm
EM sample interval nominally 12m (4 Hz sample rate)
Magnetometer Resolution 0.1 nT
Magnetometer sample interval nominally 25m (2 Hz sample rate)
Base station magnetometer cycle time 10 sec

WINDOW CENTRE TIMES

The window centre times used on this survey are:

Window Number	Time in mSecs.
1	0.2465
2	0.351
3	0.455
4	0.559
5	0.7145
6	0.9235
7	1.1315
8	1.392
9	1.600
10	1.860
11	2.1735
12	2.642
13	3.163
14	3.6845
15	4.2045

RESULTS

The data quality is generally good for both the magnetic and electromagnetic record. Because of the deeply incised topography over the sandstones (gorges 100m deep with near vertical sides) and karstic nature of the carbonates it has been impossible to maintain an even 125m terrain clearance. While some terrain effects are obvious in the EM response over deep, alluvium packed gorges the departure from specification has not had as damaging effect as could be expected.

INTERPRETATION

GENERAL:

Because of the generally flat lying nature of the target mineralisation and its electrical contact with the overburden, airborne electromagnetics has its limitations in the M^{c}Arthur River area. In cases where flat lying mineralisation of poor to moderate conductivity contacts the overburden it has a similar response to thickening in the weathering profile. The bulk of AEM anomalies encountered in this area have thus been interpreted as flat lying, surficial conductors, probably overburden. Where a particular rock unit gives a reasonably consistent EM signature the anomalies over it have been downgraded to weathering responses in this interpretation. The remainder are either over alluvium and thought to be due to clays or are over bedrock units which do not normally produce an EM anomaly elsewhere in the area. None of them are particularly exciting as EM anomalies in their own right, however.

If a flat lying, conductive, mineralised target lay beneath and electrically isolated from the overburden, the AEM method should be able to resolve it down to depths of 200 - 300m in this area.

As a caveat to this interpretation, the geology as shown on the maps provided by the client has been assumed to be correct. Errors in the geology may change the relative importance of EM anomalies. The EM should thus be reassessed if mapping indicates errors in lithological boundaries or types in the published geological map.

MARINER TAWALLAH BELT;

As with the other areas the bulk of EM anomalies encountered here are inferred to be due to in situ weathering. This is especially true of Lower Roper River Group rocks and the lowest part of the M^c^Arthur Group sequence (Those units below the Tooganinie Formation). Where these units shed detritus to the nearby alluvium the EM response is often larger than would otherwise be expected. To the west the stratigraphy is similar to the HYC area and some EM anomalies of dubious quality have been shown, picked simply because of the association of lithologies. Nowhere, in this western area, do we see anomalies of the amplitude recorded in the HYC area.

The only other EM anomalies of note are associated with a fault contact between Mallapunya Formation and Amelia Dolomite (Line 112101, Fid 144) and the contact between alluvium and Tooganinie Formation with a nearby fault (Line 110400, Fid 887). While it is not unreasonable to expect an EM response at the contact of a unit with the alluvial cover this particular anomaly has a larger amplitude than would normally be encountered in such an environment, possibly due to deeper weathering on the fault.

The major magnetic feature in this area is the broad relatively high amplitude anomaly over the Scrutton Volcanics in the east. This anomaly extends outside the bounds of the unit, as mapped, covering Tawallah Group rocks to the east, possibly indicating the continuation of the Volcanics down dip. To the north the geological map shows it disappearing under the Basal Tawallah unit (Yiyintyi Sandstone), the magnetic response however dies away quickly in this direction and it appears that the Yiyintyi Sandstone thickens rapidly north of the contact. Still further north an end of line magnetic anomaly may be due to either subcropping Scrutton Volcanics below the Tawallah Group or mafic units within the volcanics of the Tawallah Group.

To the south a series of parallel magnetic features either roughly overlie outcrops of the Tooganinie Formation or the lower part of the Tawallah group or areas of alluvial cover. In the case of the Tawallah Group the magnetic anomaly may again be due to underlying Scrutton Volcanics or mafic units within the Tawallah volcanic rocks. Other anomalies may be due to dolerite sills of the same age as the Seigal Volcanics. In general the 1000m spacing of this survey does not provide as good a detail as the 500m survey flown by Aerodata for the NTGS and published in Pietsch et al, 1991.

CONCLUSIONS

Because of the flat dip of the mineralisation and sediments it is difficult to resolve the response of mineralisation under the weathered rock from that of variations in the weathering profile. If a good conductor were present less than 300m below the surface and electrically isolated from the overburden it would be resolved because of its late time response, no such conductors were detected by this survey. In general those conductors detected are marginal geophysical targets and their ranking is based more on the geology around them than on any EM property. If however, some other exploration tool focuses attention on a particular area the AEM data for that area should be re-evaluated.

The apparent lack of definition of AEM in this area should not prejudice ground follow up methodology. Ground Time Domain EM (TEM) systems, because they remain stationary for each reading and can stack for minutes rather than milliseconds, have better depth penetration and resolution in both a lateral and a vertical sense. A Frequency Domain EM system, such as Max-Min, while responding to the body, would not assist in resolving between thicker overburden and mineralisation below overburden. A Ground TEM system would however, be able to offer some help in this case.

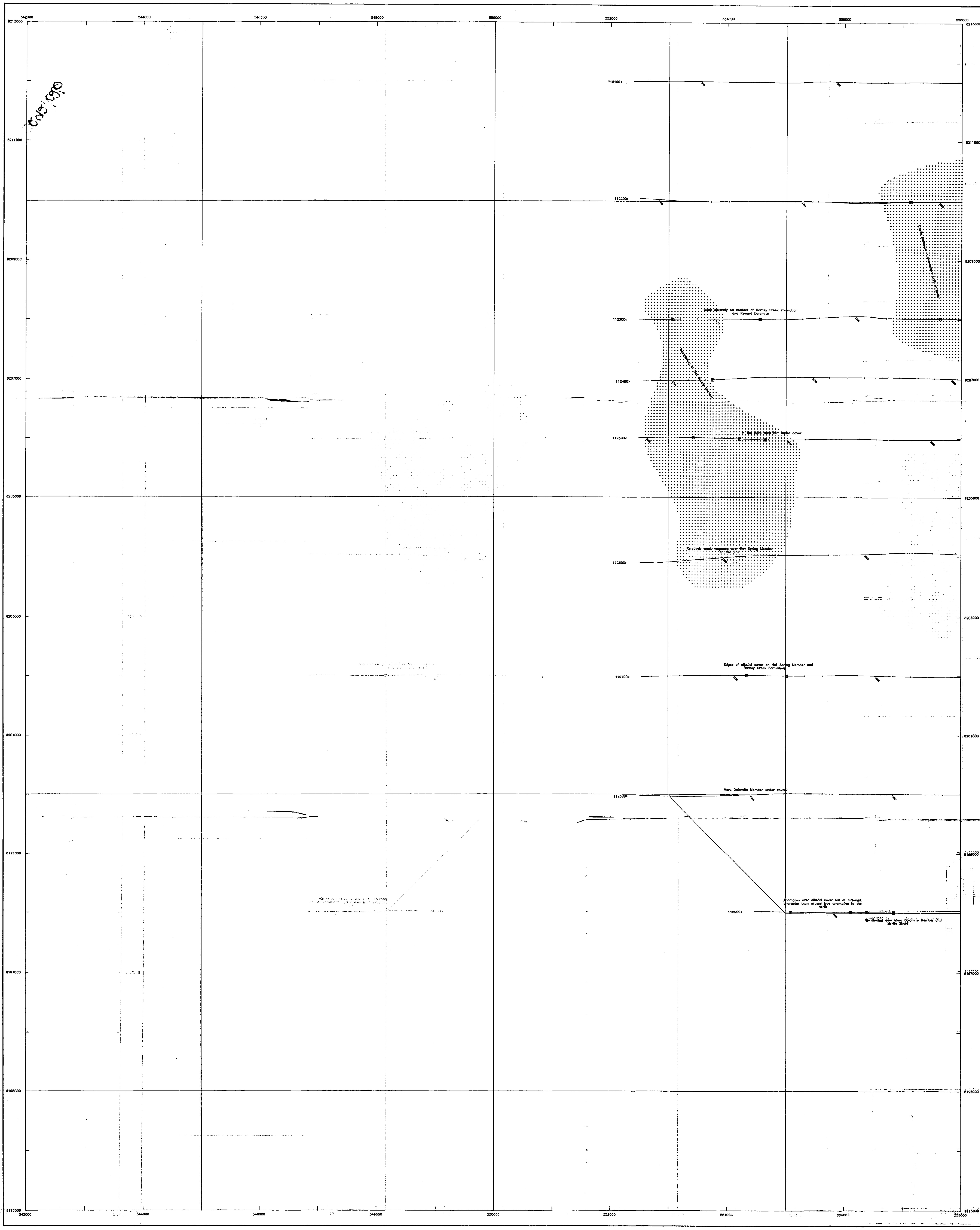
Those anomalies marked for follow up should be inspected to confirm the geological environment is as indicated by the maps held by the client. This may require some confirmation of the anomaly location, the Max-Min system already used would be suitable for this exercise. Where the geology is confirmed as being suitable further follow up (TEM, Geochemistry or drilling) could proceed. It is probable that many of the anomalies are weathering features.

In general the sandstone members of the geological succession in this area weather to form conductive clays, probably because of mudstone beds within them. The Lower Roper River Group in particular weathers to form conductive alluvium and colluvium.

REFERENCES

Pietsch, B.A., Wyche, S., Rawlings, D.J., Creaser, P.M. and Findhammer, T.L.R. 1991: Explanatory Notes of the McArthur River Region 6065-6165. NTGS 1:100000 Geological Map Series.

Telford, W.M., Geldart, L.P., Sherriff, R.E. and Keys, D.A. 1986: Applied Geophysics. Cambridge University Press.



N

AIRBORNE SURVEY SPECIFICATIONS

FLOWN BY	AERODATA HOLDINGS LIMITED Oct 1991
MAGNETOMETER	SPLIT BEAM CESIUM SCINTREX V201 RESOLUTION: 0.1 nano Teslas CYCLE RATE: 0.5 seconds SAMPLE INTERVAL: 25 metres
ELECTROMAGNETIC SYSTEM	QUESTEM time domain EM TRANSMITTER BASE FREQUENCY: 75Hz SAMPLE INTERVAL: 15.5 metres
SURVEY HEIGHT	MEAN TERRAIN CLEARENCE: 120 metres
NAVIGATION	TRIMBLE TANS GPS satellite positioning

E.M. anomaly peak over alluvium — source probably alluvium or weathering of underlying sediments

E.M. anomaly peak over outcrop — source probably weathering of rock

E.M. anomaly peak — worthy of some follow up

Magnetic unit or zone

Magnetic lineament

SHEET INDEX

Scale 1 : 25000

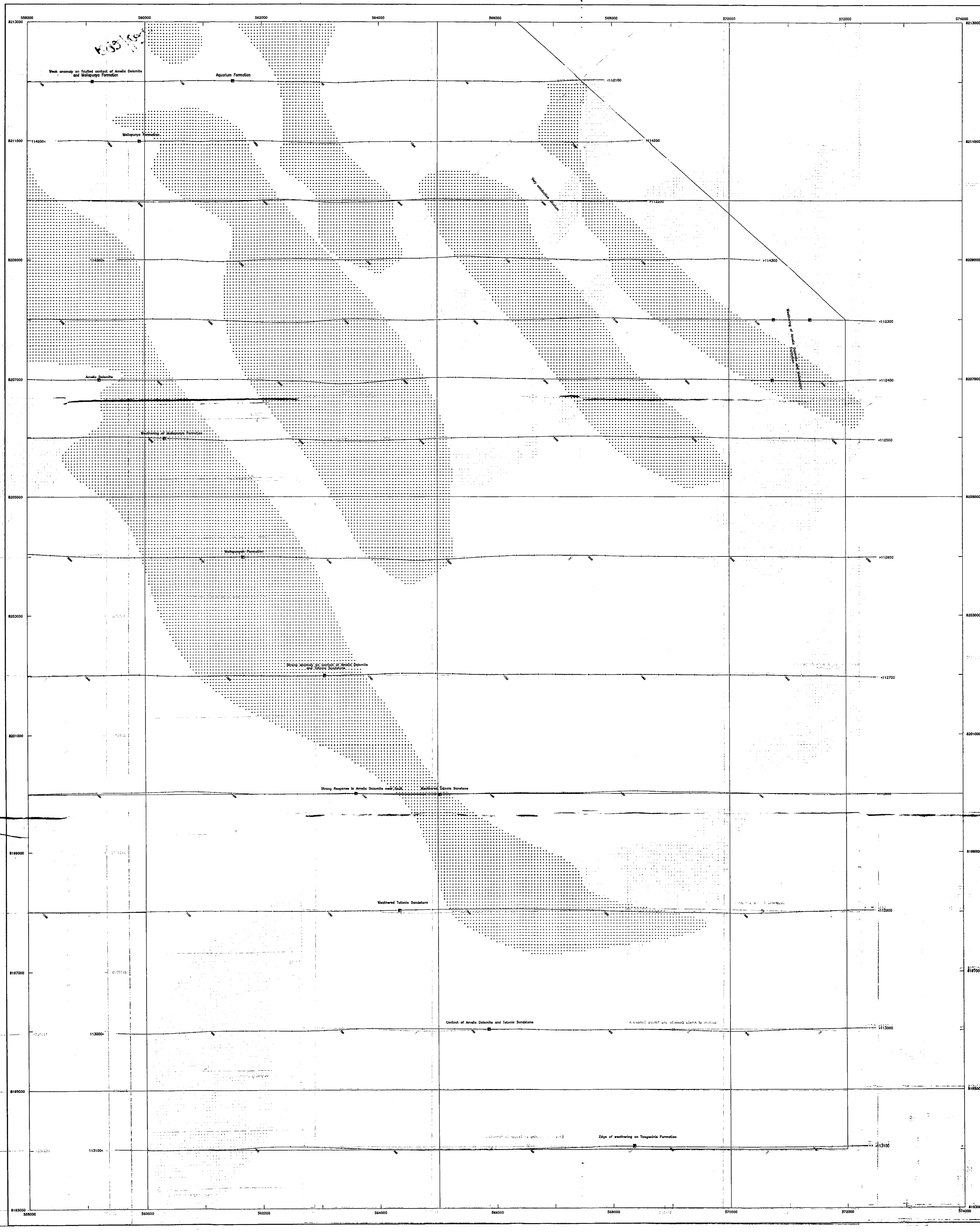
Australian Map Grid

WORLD GEOSCIENCE CORPORATION

Client : PERILYA MINES NL

McARTHUR RIVER
QUESTEM SURVEY
INTERPRETATION OVERLAY
MARINER TAWALLAH BELT
AREA 1

Date : FEBRUARY 1992	Drawn : K.M.F
Job No. : 1260	Dwg. No. : 1260TW1F



N

AIRBORNE SURVEY SPECIFICATIONS

FLOWN BY	AERODATA HOLDINGS LIMITED Oct 1991
MAGNETOMETER	SPLIT BEAM CESIUM SCINTREX V201 RESOLUTION: 0.1 nana Teslas CYCLE RATE: 0.5 seconds SAMPLE INTERVAL: 25 metres
ELECTROMAGNETIC SYSTEM	QUESTEM time domain EM TRANSMITTER BASE FREQUENCY: 75Hz SAMPLE INTERVAL: 15.5 metres
SURVEY HEIGHT	MEAN TERRAIN CLEARENCE: 120 metres
NAVIGATION	TRIMBLE TANS GPS satellite positioning

E.M. anomaly peak over alluvium – source probably alluvium or weathering of underlying sediments

E.M. anomaly peak over outcrop – source probably weathering of rock

E.M. anomaly peak – worthy of some follow up

Magnetic unit or zone

Magnetic lineament

SHEET INDEX

Scale 1 : 25000

0 0.5 1.0 1.5 2.0Km

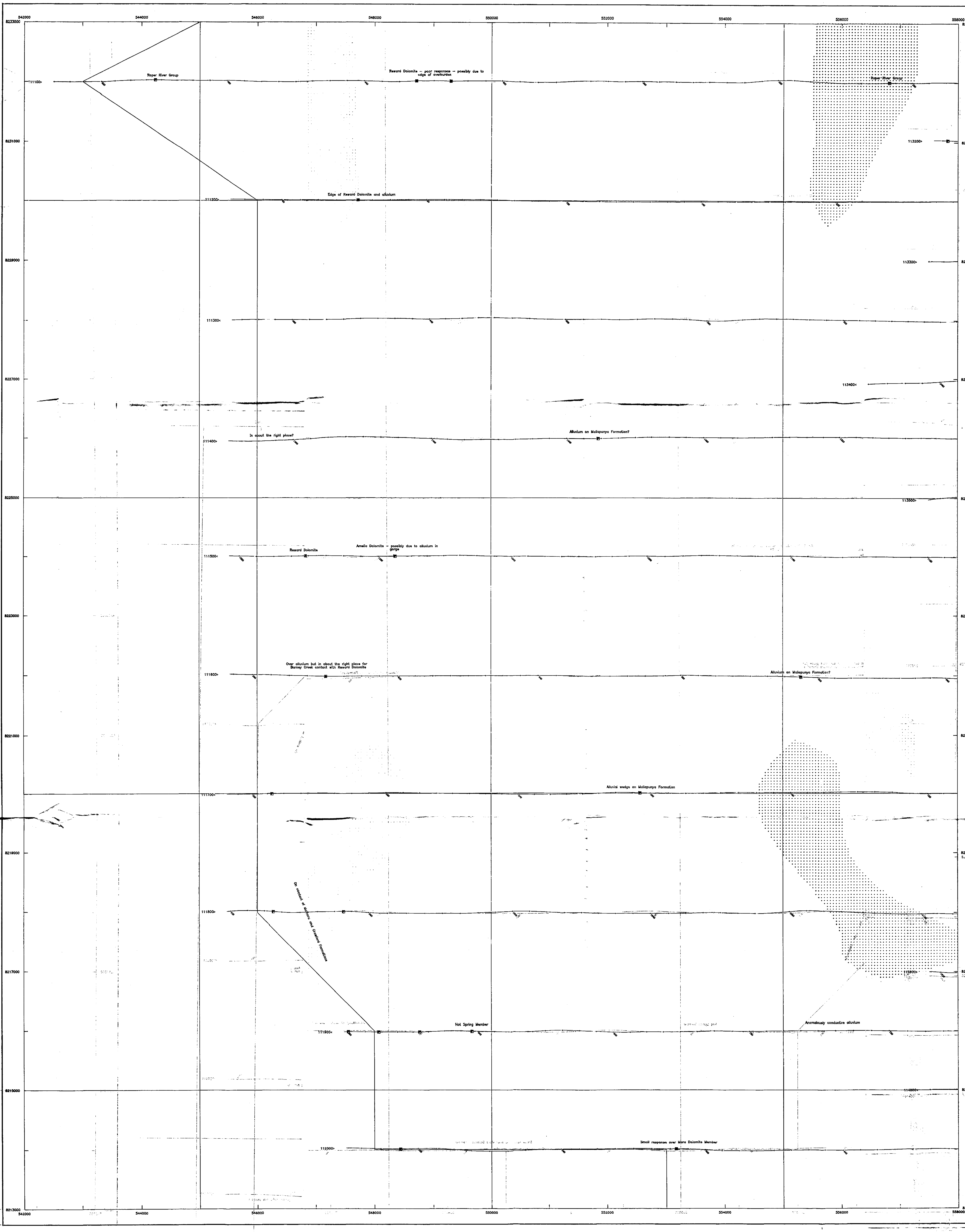
Australian Map Grid

WORLD GEOSCIENCE CORPORATION

Client : PERILYA MINES NL

McARTHUR RIVER
QUESTEM SURVEY
INTERPRETATION OVERLAY
MARINER TAWALLAH BELT
AREA 2

Date : FEBRUARY 1992	Drawn : K.M.F
Job No. : 1260	Dwg. No. : 1260TW2F



AIRBORNE SURVEY SPECIFICATIONS

FLOWN BY	AERODATA HOLDINGS LIMITED Oct 1991
MAGNETOMETER	SPLIT BEAM CESIUM SCINTREX V201 RESOLUTION: 0.1 nano Teslas CYCLE RATE: 0.5 seconds SAMPLE INTERVAL: 25 metres
ELECTROMAGNETIC SYSTEM	QUESTEM time domain EM TRANSMITTER BASE FREQUENCY: 75Hz SAMPLE INTERVAL: 15.5 metres
SURVEY HEIGHT	MEAN TERRAIN CLEARENCE: 120 metres
NAVIGATION	TRIMBLE TANS GPS satellite positioning

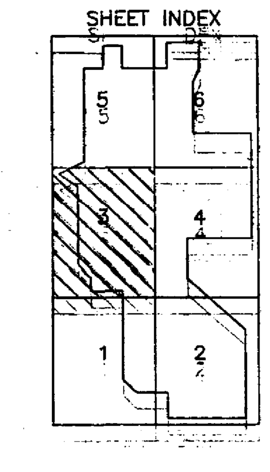
E.M. anomaly peak over alluvium – source probably alluvium or weathering of underlying sediments

E.M. anomaly peak over outcrop – source probably weathering of rock

E.M. anomaly peak – worthy of some follow up

Magnetic unit or zone

Magnetic lineament



Scale 1 : 25000

0 0.5 1.0 1.5 2.0Km

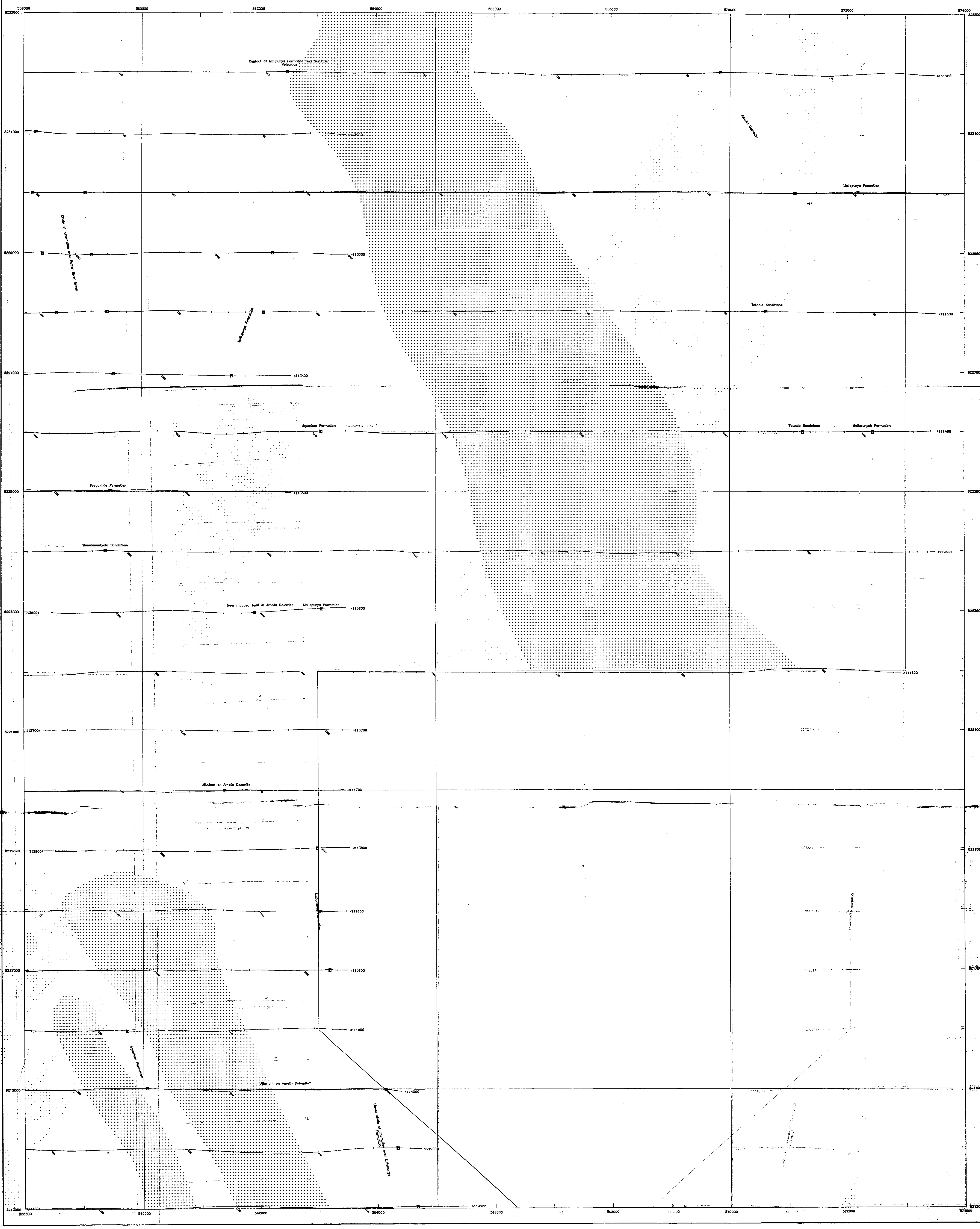
Australian Map Grid

WORLD GEOSCIENCE CORPORATION

Client : PERILYA MINES NL.

McARTHUR RIVER
QUESTEM SURVEY
INTERPRETATION OVERLAY
MARINER TAWALLAH BELT
AREA 3

Date : FEBRUARY 1992	Drawn : K.M.F
Job No. 1260	Dwg. No. 1260RW3F



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AIRBORNE SURVEY SPECIFICATIONS

FLOWN BY	AERODATA HOLDINGS LIMITED Oct 1991
MAGNETOMETER	SPLIT BEAM CESIUM SCINTREX V201 RESOLUTION: 0.1 nano Teslas CYCLE RATE: 0.5 seconds SAMPLE INTERVAL: 25 metres
ELECTROMAGNETIC SYSTEM	QUESTEM time domain EM TRANSMITTER BASE FREQUENCY: 75Hz SAMPLE INTERVAL: 15.5 metres
SURVEY HEIGHT	MEAN TERRAIN CLEARENCE: 120 metres
NAVIGATION	TRIMBLE TANS GPS satellite positioning

E.M. anomaly peak over alluvium — source probably alluvium or weathering of underlying sediments

E.M. anomaly peak over outcrop — source probably weathering of rock

E.M. anomaly peak — worthy of some follow up

Magnetic unit or zone

Magnetic lineament

SHEET INDEX

Scale 1 : 25000

0 0.5 1.0 1.5 2.0Km

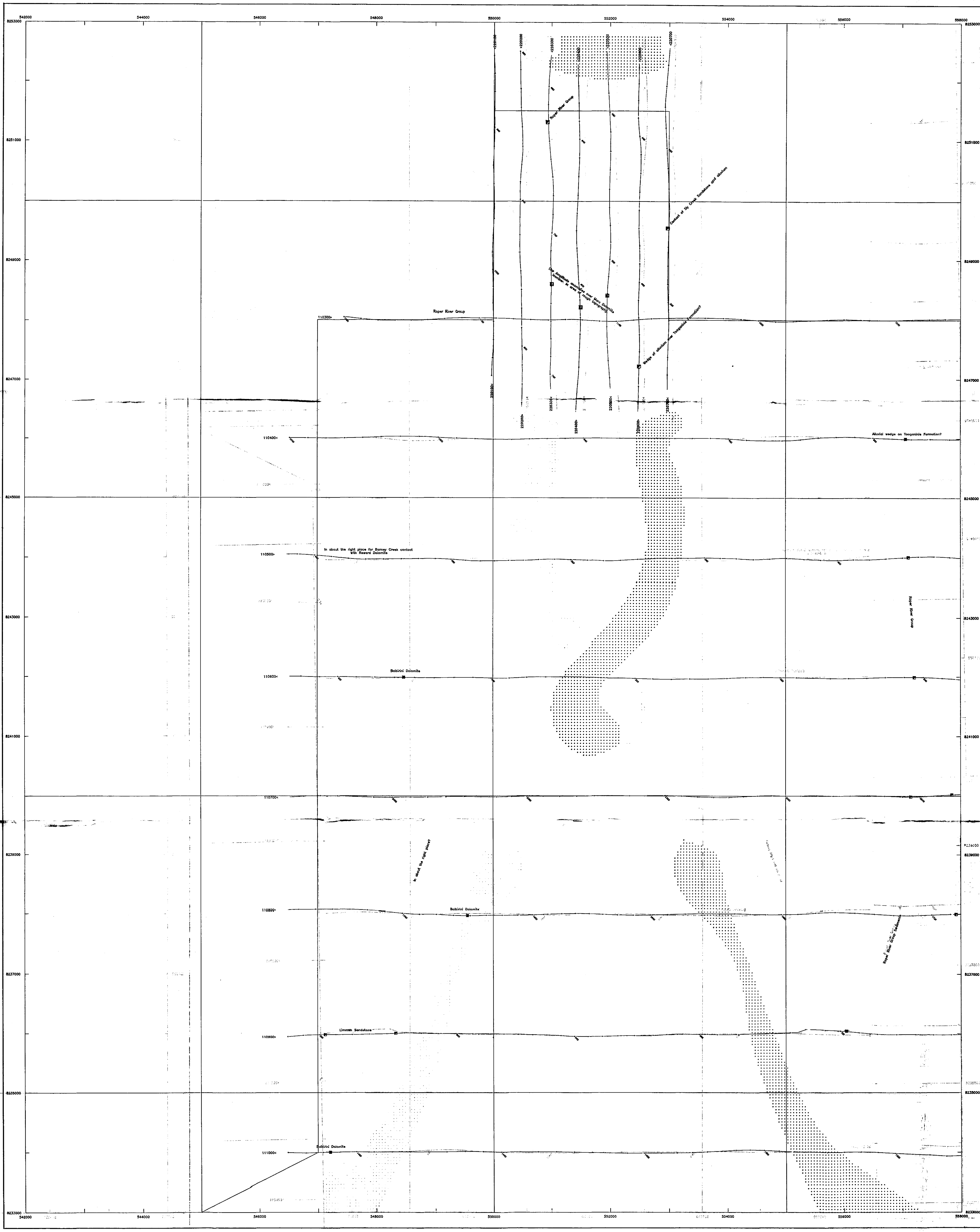
Australian Map Grid

WORLD GEOSCIENCE CORPORATION

Client : PERILYA MINES NL.

McARTHUR RIVER QUESTEM SURVEY INTERPRETATION OVERLAY MARINER TAWALLAH BELT AREA 4

Date : FEBRUARY 1992	Drawn. : K.M.F.
Job No. : 1260	Dwg. No. : 1260TW4F



AIRBORNE SURVEY SPECIFICATIONS

FLOWN BY	AERODATA HOLDINGS LIMITED Oct 1991
MAGNETOMETER	SPLIT BEAM CESIUM SCINTREX V201 RESOLUTION: 0.1 nano Teslas CYCLE RATE: 0.5 seconds SAMPLE INTERVAL: 25 metres
ELECTROMAGNETIC SYSTEM	QUESTEM time domain EM TRANSMITTER BASE FREQUENCY: 75Hz SAMPLE INTERVAL: 15.5 metres
SURVEY HEIGHT	MEAN TERRAIN CLEARENCE: 120 metres
NAVIGATION	TRIMBLE TANS GPS satellite positioning

E.M. anomaly peak over alluvium – source probably alluvium or weathering of underlying sediments

E.M. anomaly peak over outcrop – source probably weathering of rock

E.M. anomaly peak – worthy of some follow up

Magnetic unit or zone

Magnetic lineament

SHEET INDEX

Scale 1 : 25000

0 0.5 1.0 1.5 2.0Km

Australian Map Grid

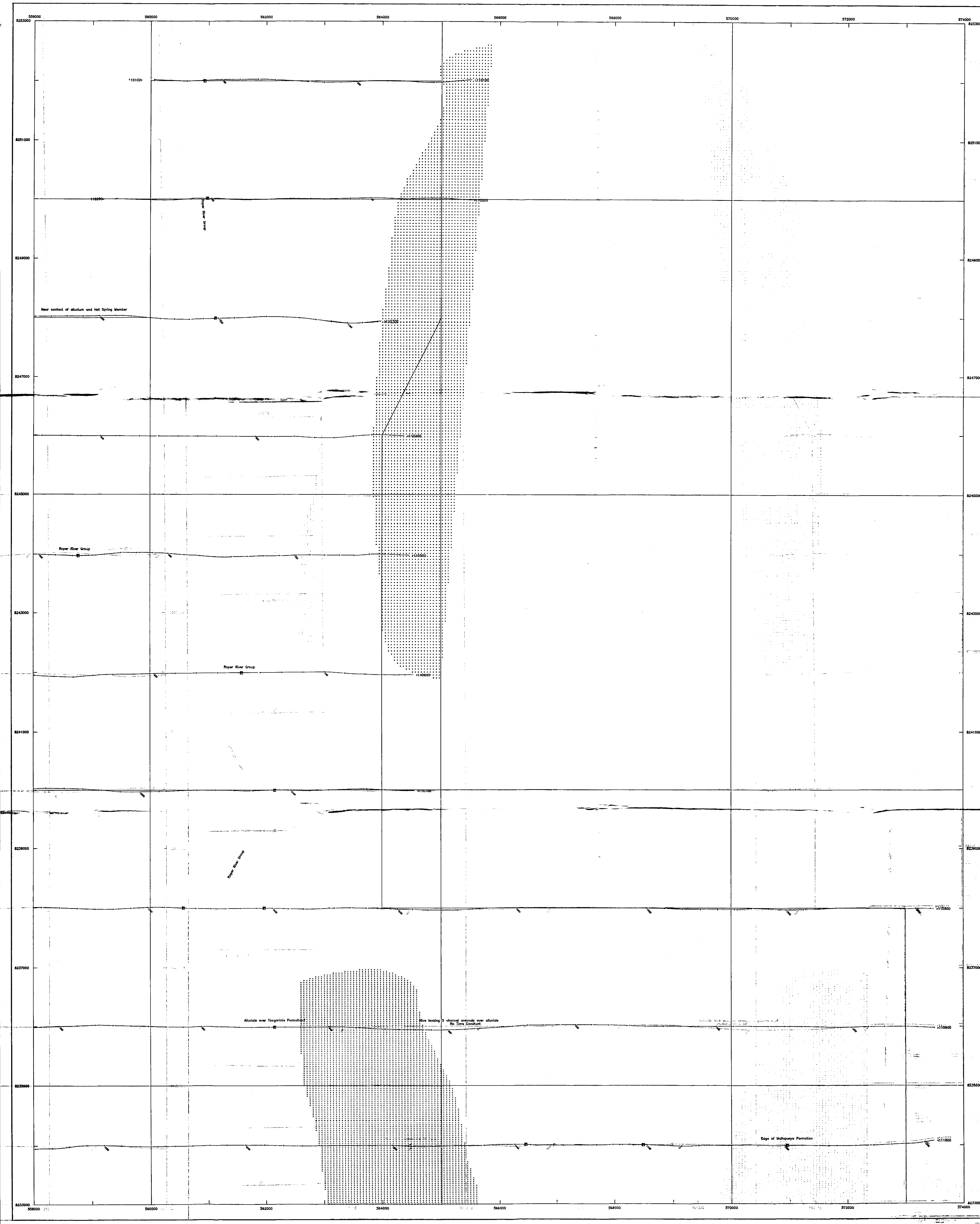
WORLD GEOSCIENCE CORPORATION

Client : PERILYA MINES NL.

McARTHUR RIVER
QUESTEM SURVEY
INTERPRETATION OVERLAY
MARINER TAWALLAH BELT
AREA 5

Date : FEBRUARY 1992	Drawn : K.M.F
Job No. : 1260	Dwg. No. : 1260IW5F

CR92/626



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AIRBORNE SURVEY SPECIFICATIONS

FLOWN BY	AERODATA HOLDINGS LIMITED Oct 1991
MAGNETOMETER	SPLIT BEAM CESIUM SCINTREX V201 RESOLUTION: 0.1 nano Teslas CYCLE RATE: 0.5 seconds SAMPLE INTERVAL: 25 metres
ELECTROMAGNETIC SYSTEM	QUESTEM time domain EM TRANSMITTER BASE FREQUENCY: 75Hz SAMPLE INTERVAL: 15.5 metres
SURVEY HEIGHT	MEAN TERRAIN CLEARENCE: 120 metres
NAVIGATION	TRIMBLE TANS GPS satellite positioning

E.M. anomaly peak over alluvium — source probably alluvium or weathering of underlying sediments

E.M. anomaly peak over outcrop — source probably weathering of rock

E.M. anomaly peak — worthy of some follow up

Magnetic unit or zone

Magnetic lineament

SHEET INDEX

Scale 1 : 25000

0 0.5 1.0 1.5 2.0Km

Australian Map Grid

WORLD GEOSCIENCE CORPORATION

Client : PERILYA MINES NL.

McARTHUR RIVER
QUESTEM SURVEY
INTERPRETATION OVERLAY
MARINER TAWALLAH BELT
AREA 6

Date : FEBRUARY 1992 | Drawn : K.M.F
Job No. : 1260 | Dwg. No. : 1260TW6F

CR 92/0236