

REINTERPRETATION OF HELICOPTER  
 ELECTROMAGNETIC AND MAGNETIC DATA  
 COLLECTED OVER  
 THE LEAGUE PROPERTY, YUKON TERRITORY,  
 BY AERODAT INC. (NOW FUGRO AIRBORNE SURVEYS)  
 DURING FEBRUARY TO APRIL 1996  
 ON BEHALF OF  
 EXPATRIATE RESOURCES LTD.  
 PROJECT J9603

League  
 Claims: 1-302

NTS: 105 G 07 and 10

	Central UTM Easting	Central UTM Northing
League Center:	407,192.17	6,822,119.37

May 12<sup>th</sup>, 2003  
 Expatriate Resources Ltd.  
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 Vancouver, British Columbia  
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TOTAL FIELD INTENSITY MAGNETIC contours.

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TOTAL FIELD INTENSITY MAGNETIC contours combined with conductor intercepts, axes and zones.

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Plate 5

PROFILES for 4175Hz coplanar and 4600Hz coaxial coil EM results combined with conductor intercepts.

Plate 6

PROFILES for 33,000Hz coplanar coil EM results combined with conductor intercepts.

Plate 7

CALCULATED RESISTIVITY derived from the 865Hz coplanar coil EM data set in contour form combined with conductor intercepts, axes and zones.

Plate 8

CALCULATED RESISTIVITY derived from the 4175Hz coplanar coil EM data set in contour form combined with conductor intercepts, axes and zones.

Plate 9

INTERPRETATION showing conductor intercepts, axes and zones.

## **I. INTRODUCTION**

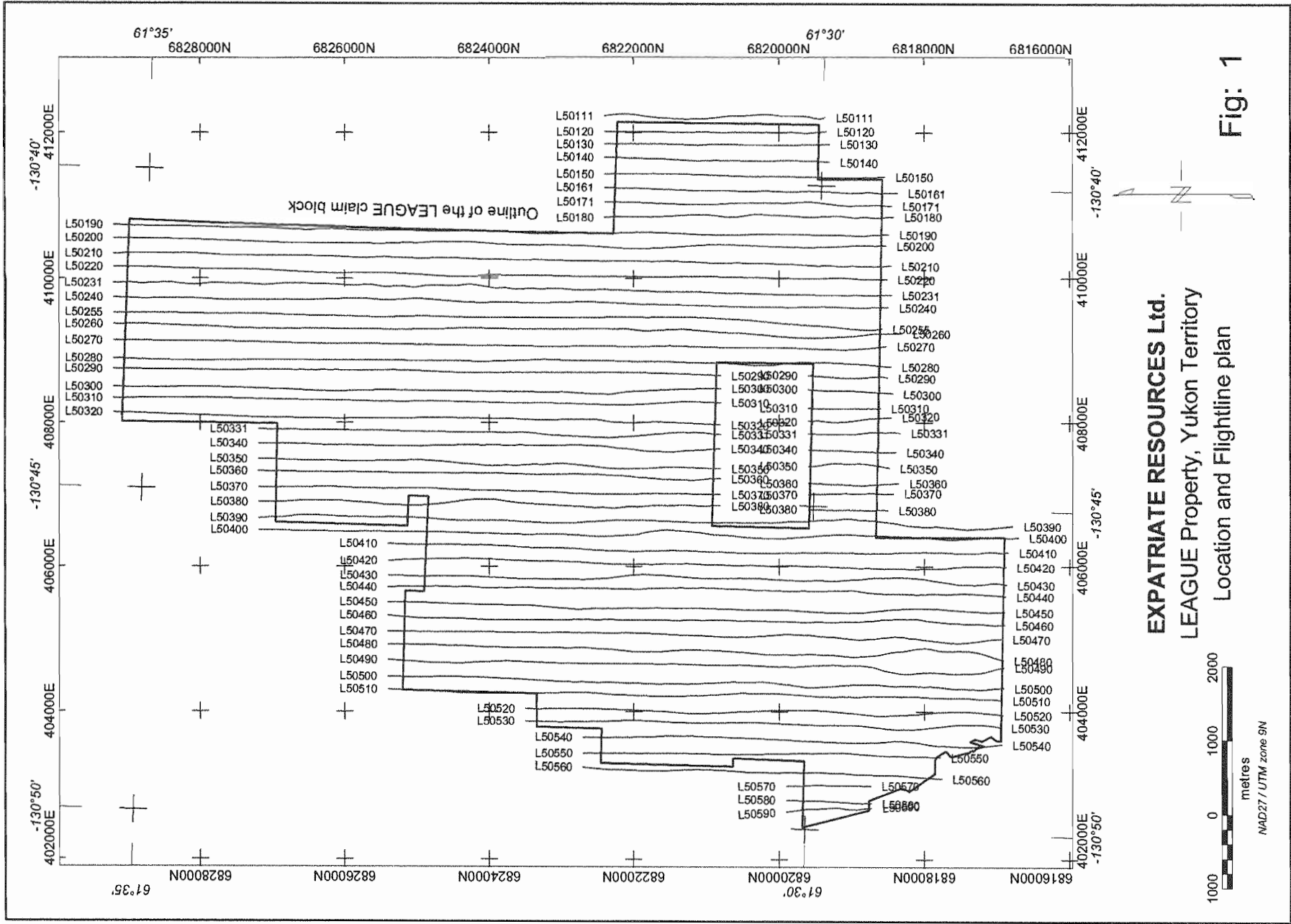
This is a report on an airborne geophysical survey carried out for Expatriate Resources Limited by Aerodat Inc. (currently Fugro Airborne Surveys). A helicopter Electromagnetic (AEM) and Magnetic (mag) survey was flown over the LEAGUE property, Yukon Territory in early 1996 on behalf of Expatriate Resources Ltd. by Aerodat Inc. (now Fugro Airborne Surveys) (project #J9603). Principal geophysical sensors included a five frequency electromagnetic system and a high sensitivity cesium vapor magnetometer. Ancillary equipment included a colour video tracking camera, Global Positioning System (GPS) navigation instrumentation, a radar altimeter, a power line monitor and a base station magnetometer.

The survey over the LEAGUE property is a portion of a survey over a larger grid. A total of 318 line kilometers of AEM/mag data was collected over the LEAGUE property along 48 N-S oriented lines at 200m interval. The property is situated 20 kms south of the Robert Campbell Highway, south of Finlayson Lake and 250 kms northeast of Whitehorse. It is centered at 61° 32'N - 130° 45'W (NTS 105 G/10 and 07). See figure 1 for survey location, outline and flight lines and Figure 1a for location within the Yukon.

This report describes the survey, the data processing, data presentation and interpretation of the geophysical results. Identified electromagnetic anomalies appear on selected map products as EM anomaly symbols with interpreted source characteristics. The interpretation map indicates conductive areas of possible interest. It also shows prominent structural features interpreted from the magnetic results. Significant structural, conductive and/or magnetic associations are the basis for the selection of specific geophysical anomalies for further investigation. General recommendations are made.

## **II. WORK PROGRAM**

Expatriate Resources Ltd. contracted J. Klein to re-evaluate the League property geophysical data. The data, which J. Klein reviewed, was originally from Aerodat of Mississauga, Ontario (Woolham, 1996). The original survey was flown in 1996; it was comprised of electromagnetic and magnetic data. In this survey, the geophysical helicopter operators were J. Cunningham and G. Webster. M. Logotheti, E. Hamilton, and G. McDonald processed the geophysical data; Rod W. Woolham prepared the report (Woolham, 1996). The author of this reports geophysics, J. Klein, acknowledges their work as portions of the text in this report are directly from Woolham (1996).



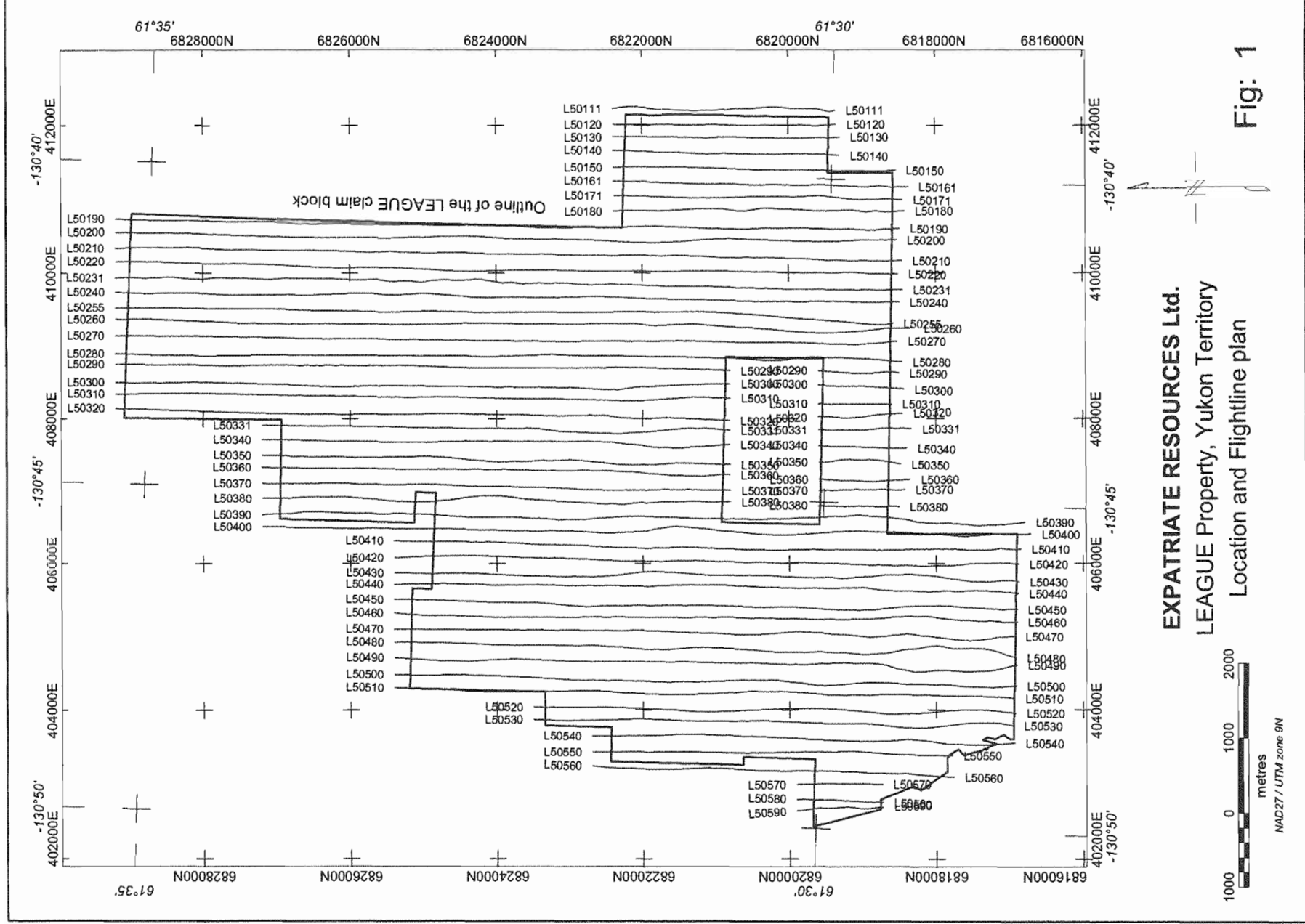


Fig: 1

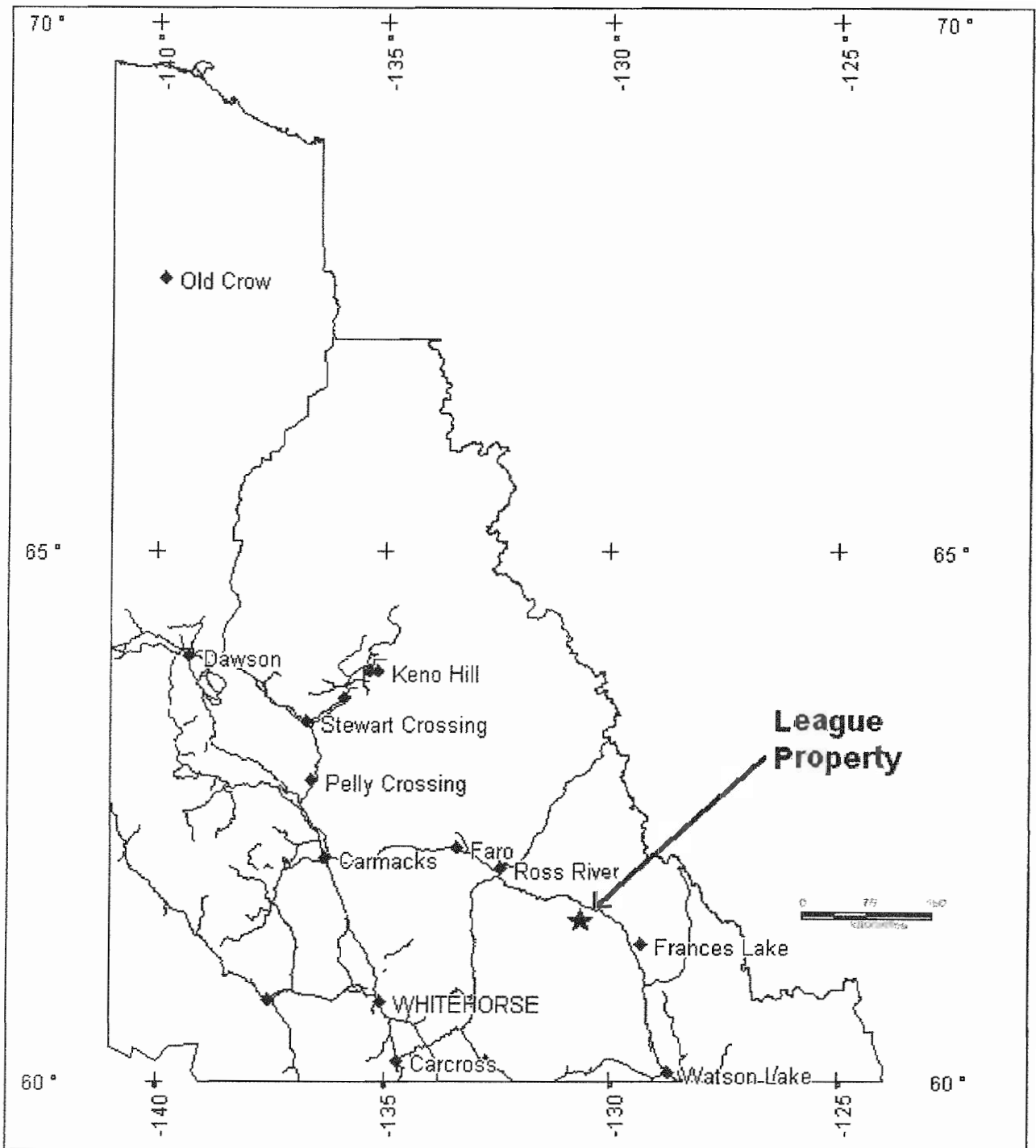


Figure 1a League Property Location Map.

Table 1 League Claims Information.

Grant Number	Claim Name	CLAIM_TYPE	EXPIRY_DATE	NTS_MAP_SH
YB59143	LEAGUE 1	Quartz Claim	03/17/2009	105-G-10
YB59152	LEAGUE 10	Quartz Claim	03/17/2009	105-G-10
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YB60898	LEAGUE 102	Quartz Claim	03/17/2003	105-G-10
YB60899	LEAGUE 103	Quartz Claim	03/17/2003	105-G-10
YB60900	LEAGUE 104	Quartz Claim	03/17/2003	105-G-10
YB60901	LEAGUE 105	Quartz Claim	03/17/2003	105-G-10
YB60902	LEAGUE 106	Quartz Claim	03/17/2003	105-G-10
YB60903	LEAGUE 107	Quartz Claim	03/17/2003	105-G-10
YB60904	LEAGUE 108	Quartz Claim	03/17/2003	105-G-10
YB60905	LEAGUE 109	Quartz Claim	03/17/2003	105-G-10
YB59153	LEAGUE 10	Quartz Claim	03/17/2009	105-G-10
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YB60909	LEAGUE 113	Quartz Claim	03/17/2003	105-G-10
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YB61589	LEAGUE 116	Quartz Claim	03/17/2003	105-G-10
YB61590	LEAGUE 117	Quartz Claim	03/17/2003	105-G-10
YB61591	LEAGUE 118	Quartz Claim	03/17/2003	105-G-10
YB61592	LEAGUE 119	Quartz Claim	03/17/2003	105-G-10
YB59154	LEAGUE 11	Quartz Claim	03/17/2009	105-G-10
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YB61595	LEAGUE 122	Quartz Claim	03/17/2003	105-G-10
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YB61600	LEAGUE 127	Quartz Claim	03/17/2003	105-G-10
YB61601	LEAGUE 128	Quartz Claim	03/17/2003	105-G-10
YB61602	LEAGUE 129	Quartz Claim	03/17/2003	105-G-10
YB59155	LEAGUE 12	Quartz Claim	03/17/2009	105-G-10
YB61603	LEAGUE 130	Quartz Claim	03/17/2003	105-G-10
YB61604	LEAGUE 131	Quartz Claim	03/17/2003	105-G-10
YB61605	LEAGUE 132	Quartz Claim	03/17/2003	105-G-10

YB61606	LEAGUE 133	Quartz Claim	03/17/2003	105-G-10
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YB70670	LEAGUE 267	Quartz Claim	03/17/2003	105-G-07
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YB60212	LEAGUE 29	Quartz Claim	03/17/2005	105-G-10
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YB70659	LEAGUE 296	Quartz Claim	03/17/2003	105-G-07
YB70660	LEAGUE 297	Quartz Claim	03/17/2003	105-G-07
YB70661	LEAGUE 298	Quartz Claim	03/17/2003	105-G-07
YB70662	LEAGUE 299	Quartz Claim	03/17/2003	105-G-07
YB59145	LEAGUE 3	Quartz Claim	03/17/2009	105-G-10
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YB70664	LEAGUE 301	Quartz Claim	03/17/2003	105-G-07
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YB60214	LEAGUE 31	Quartz Claim	03/17/2003	105-G-10
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YB60217	LEAGUE 34	Quartz Claim	03/17/2003	105-G-10
YB60218	LEAGUE 35	Quartz Claim	03/17/2003	105-G-10
YB60219	LEAGUE 36	Quartz Claim	03/17/2003	105-G-10
YB60220	LEAGUE 37	Quartz Claim	03/17/2003	105-G-10
YB60221	LEAGUE 38	Quartz Claim	03/17/2003	105-G-10
YB60222	LEAGUE 39	Quartz Claim	03/17/2003	105-G-10
YB59146	LEAGUE 4	Quartz Claim	03/17/2009	105-G-10
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YB60224	LEAGUE 41	Quartz Claim	03/17/2003	105-G-10
YB60225	LEAGUE 42	Quartz Claim	03/17/2003	105-G-10
YB60226	LEAGUE 43	Quartz Claim	03/17/2003	105-G-10
YB60227	LEAGUE 44	Quartz Claim	03/17/2003	105-G-10
YB60228	LEAGUE 45	Quartz Claim	03/17/2003	105-G-10
YB60229	LEAGUE 46	Quartz Claim	03/17/2003	105-G-10
YB60230	LEAGUE 47	Quartz Claim	03/17/2003	105-G-10
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YB59147	LEAGUE 5	Quartz Claim	03/17/2009	105-G-10

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YB60234	LEAGUE 51	Quartz Claim	03/17/2003	105-G-10
YB60235	LEAGUE 52	Quartz Claim	03/17/2003	105-G-10
YB60236	LEAGUE 53	Quartz Claim	03/17/2003	105-G-10
YB60237	LEAGUE 54	Quartz Claim	03/17/2003	105-G-10
YB60238	LEAGUE 55	Quartz Claim	03/17/2003	105-G-10
YB60239	LEAGUE 56	Quartz Claim	03/17/2003	105-G-10
YB60240	LEAGUE 57	Quartz Claim	03/17/2003	105-G-10
YB60241	LEAGUE 58	Quartz Claim	03/17/2003	105-G-10
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YB59148	LEAGUE 6	Quartz Claim	03/17/2009	105-G-10
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YB60859	LEAGUE 63	Quartz Claim	03/17/2003	105-G-10
YB60860	LEAGUE 64	Quartz Claim	03/17/2003	105-G-10
YB60861	LEAGUE 65	Quartz Claim	03/17/2003	105-G-10
YB60862	LEAGUE 66	Quartz Claim	03/17/2003	105-G-10
YB60863	LEAGUE 67	Quartz Claim	03/17/2003	105-G-10
YB60864	LEAGUE 68	Quartz Claim	03/17/2003	105-G-10
YB60865	LEAGUE 69	Quartz Claim	03/17/2003	105-G-10
YB59149	LEAGUE 7	Quartz Claim	03/17/2009	105-G-10
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YB60867	LEAGUE 71	Quartz Claim	03/17/2003	105-G-10
YB60868	LEAGUE 72	Quartz Claim	03/17/2003	105-G-10
YB60869	LEAGUE 73	Quartz Claim	03/17/2003	105-G-10
YB60870	LEAGUE 74	Quartz Claim	03/17/2003	105-G-10
YB60871	LEAGUE 75	Quartz Claim	03/17/2003	105-G-10
YB60872	LEAGUE 76	Quartz Claim	03/17/2003	105-G-10
YB60873	LEAGUE 77	Quartz Claim	03/17/2003	105-G-10
YB60874	LEAGUE 78	Quartz Claim	03/17/2003	105-G-10
YB60875	LEAGUE 79	Quartz Claim	03/17/2003	105-G-10
YB59150	LEAGUE 8	Quartz Claim	03/17/2009	105-G-10
YB60876	LEAGUE 80	Quartz Claim	03/17/2003	105-G-10
YB60877	LEAGUE 81	Quartz Claim	03/17/2003	105-G-10
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YB60881	LEAGUE 85	Quartz Claim	03/17/2003	105-G-10
YB60882	LEAGUE 86	Quartz Claim	03/17/2003	105-G-10
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YB60884	LEAGUE 88	Quartz Claim	03/17/2003	105-G-10


YB60885	LEAGUE 89	Quartz Claim	03/17/2003	105-G-10
YB59151	LEAGUE 9	Quartz Claim	03/17/2009	105-G-10
YB60886	LEAGUE 90	Quartz Claim	03/17/2003	105-G-10
YB60887	LEAGUE 91	Quartz Claim	03/17/2003	105-G-10
YB60888	LEAGUE 92	Quartz Claim	03/17/2003	105-G-10
YB60889	LEAGUE 93	Quartz Claim	03/17/2003	105-G-10
YB60890	LEAGUE 94	Quartz Claim	03/17/2003	105-G-10
YB60891	LEAGUE 95	Quartz Claim	03/17/2003	105-G-10
YB60892	LEAGUE 96	Quartz Claim	03/17/2003	105-G-10
YB60893	LEAGUE 97	Quartz Claim	03/17/2003	105-G-10
YB60894	LEAGUE 98	Quartz Claim	03/17/2003	105-G-10
YB60895	LEAGUE 99	Quartz Claim	03/17/2003	105-G-10

### III. STATEMENT OF EXPENDITURES

I, J. A. Moore, as agent for Expatriate Resources Limited located at 701-475 Howe St., Vancouver, B.C., do solemnly declare that J. Klein reviewed and analyzed geophysical data from a Dighem survey carried out in 1996.

I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of the Canada Evidence Act.

Declared before me at Vancouver in the Province of British Columbia this 12<sup>th</sup> day of May, 2003.



J. A. Moore  
Exploration Geologist

Drafting, Printing & Reproduction	\$750
Wages	\$1500
Geophysical Re-evaluation	\$6000
Report	\$1250
TOTAL	\$9500.

Table 2 Summary of expenditures by category.

#### IV. QUALITY AND REPROCESSING OF THE AEM/MAG RESULTS

The AEM/mag data is presently only available in digital form (line data in ASCII format) and some grid files and maps prepared by the contractor. The data were not micro-leveled but the leveling is adequate. The EM-system employed during the survey was of the standard five-frequency, two-coil configuration type. The 200m-line spacing used for the survey is adequate in the search for VMS deposits. Topographic relief is gentle over most of the property. Elevations range from 1100m in the valley bottom near Big Campbell Creek to 1640m along the crests in the southern part of the claim block. The changes in local relief caused variations in terrain clearance of the EM-bird carrying the transmitter and receiver coils. They ranged from a near disastrous "at surface" to 93.7m. Fortunately the mean of 31.5m (with a s.d. of 9.6m) was close to the planned flying height of 30m. Note that this information is collected with the radar altimeter mounted on the helicopter with the EM and mag birds suspended 30 and 15m below the helicopter respectively.

These variations in EM-bird clearance or height have a strong influence on EM-response amplitudes. Maximum depth penetration of HEM-systems is under ideal circumstances approximately 80m below the surface of the ground. This means that no response can be expected from the ground when the EM-bird is towed at clearances of >80m. EM-response amplitudes of surveys flown with strongly varying clearances are therefore not overly meaningful, conductance values are used instead. These conductances are calculated using frequency, In-Phase (IP) and Out-of-Phase (OP) amplitudes and clearance of the EM-bird as input parameters. This review uses these calculated conductances and resistivities (calculated by the contractor) in selecting targets. (See for details Addendum 2: General Interpretive Considerations).

The EM interpretation presented by the contractor was based on the high frequency (4600Hz) coaxial coil EM data set and not on the low frequency data (935Hz) as stated in its report (Woolham, 1996). Also, some of the contractor's maps showing calculated resistivities were mislabeled. Resistivities are calculated using data obtained with the coplanar coil sets (e.g. 865 and 4175Hz) not from data collected with the coaxial coils.

All conductances were calculated for this review using the information collected with the coaxial coil set at 935Hz. A new table listing all conductor intercepts is provided as Addendum 1 replacing the one attached to the contractor's report (Woolham, 1996 Appendix II). All maps attached to this report display the new conductances. The resistivities calculated by the contractor were used to create new resistivity maps.

The contractor flew three tie lines over the LEAGUE Property. No EM data was collected along these lines. The magnetic results along these lines are slightly different from those along the regular survey lines. That tie line data was not used for leveling the magnetic data. The tie line data is therefore not included and their position is not shown on the maps.

## **V. MAP PRODUCTS**

The following new maps (NAD 27, UTM Zone 9N) were made at a basic scale of 1:20,000 to accompany this review:

Plate 1

Total Field Intensity Magnetic contours.

Plate 2

Total Field Intensity Magnetic contours combined with conductor intercepts, axes and zones.

Plate 3

Calculated Vertical Gradient of the Magnetic results combined with conductor intercepts, axes and zones.

Plate 4

Profiles for 865Hz coplanar and 935Hz coaxial coil EM results combined with conductor intercepts.

Plate 5

Profiles for 4175Hz coplanar and 4600Hz coaxial coil EM results combined with conductor intercepts.

Plate 6

Profiles for 33,000Hz coplanar coil EM results combined with conductor intercepts.

Plate 7

Calculated Resistivity derived from the 865Hz coplanar coil data set in contour form combined with conductor intercepts, axes and zones.

Plate 8

Calculated Resistivity derived from the 4175hz coplanar coil data set in contour form combined with conductor intercepts, axes and zones.

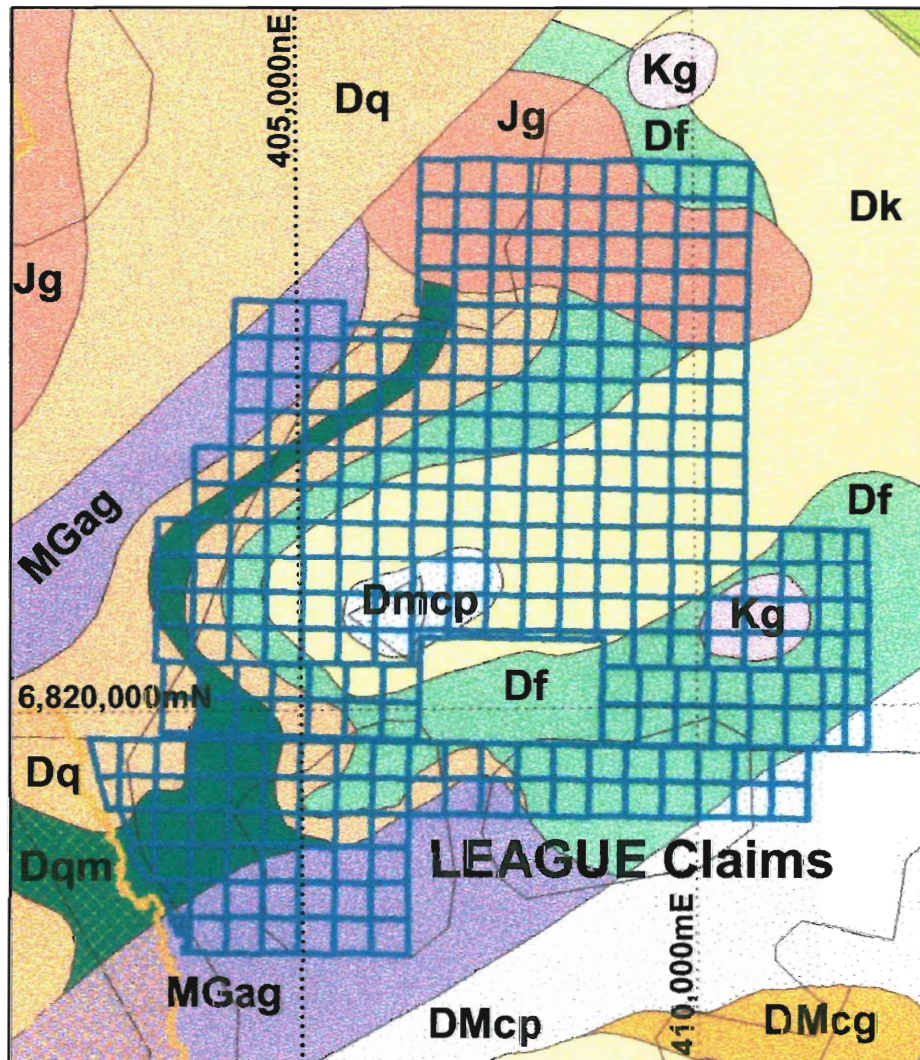
Plate 9

Interpretation showing conductor intercepts, axes and zones.

## VI. GEOLOGY OF THE LEAGUE GRID

Exposures are limited on the LEAGUE property. Lower elevations have extensive till cover with no outcrop while elevated areas are covered with scree and talus.

The LEAGUE property is underlain by a northeast trending syncline comprising from younger to older Kutz Ze Kayah undifferentiated feldspar-mica-quartz schists interbedded with carbonaceous phyllites followed by Fire Lake metavolcanic rocks and older interbedded biotite-mica-feldspar-quartz schists. In the north are Jurassic and Cretaceous granites present and in the south Early Mississippian granites to monzonites. In the west occur micaceous marble and lesser carbonaceous phyllite. The synclinal sequence is of Upper Devonian age (Figure 2).

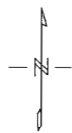


**INTRUSIVE ROCKS**

- Kg Cretaceous granite
- Jg Jurassic granite
- MGag Early Mississippian granite to monzonite

**LAYERED ROCKS**

- Upper Devonian (to Lower Mississippian?)
- DMcg Grass Lake quartzofeldspathic-pebble metaconglomerate
- Dk Kudz Ze Kayah undifferentiated f-m-q schist, interbeds of carbonaceous phyllite are common
- Df Fire Lake metavolcanics
- Upper Devonian aln older?
- Dq interbedded b-m-f-q schist
- Dqm micaceous marble and lesser carbonaceous phyllite



**EXPATRIATE RESOURCES Ltd.**

LEAGUE Property, Yukon Territory

Regional Geology modified from GSC Open File 4243 (2002)

Fig: 2

## VII. INTERPRETATION OF THE AEM/MAG RESULTS

### A. MAGNETIC RESULTS

The values of the gridded magnetic data range from 57,996 to 59,642nT, a range of 1,646nT. Four magnetic domains are visible.

In the northern part of the claim block are strong rather smoothly shaped magnetic anomalies visible coinciding with the mapped Jurassic granites. The shape and amplitudes of these anomalies are however more reminiscent of those from mafic to ultramafic rocks like the formerly called Slide Mountain serpentinized ultramafic rocks present to the NW of the property alternatively they represent Jurassic mafic to ultramafic plugs. These anomalies are accompanied by strong magnetic lows to their south suggesting that there is a strong remanent magnetic component present.

The central part of the grid shows a low magnetic relief of ~50nT. This ~4 x 6km area is suggested to be underlain by the synclinal sequence. Two small isolated highs are present one in the northeast the other one near the western border of the grid. There is a weak N60°E trend visible in the magnetic contours. A similar low relief magnetic area is visible north of the magnetic highs of the first domain. This area is assumed underlain by similar rocks as in this central part of the grid.

The third domain covers most of the southern part of the grid; it shows a broad high trending N60°E with some stronger peaks directly west of the block of unstaked ground. It is possible that a N60°E trending fault separates the two part of this domain. Fire Lake metavolcanic rocks are underlying this magnetic high trend. The southwestern part (and south of the suggested fault) is mapped to be underlain by Early Mississippian granites to monzonites. A broad low amplitude high magnetic zone of similar character as the one over these granites is visible in the western part of the central magnetic domain, similar type granites may underlie it. It is sharply cut in the northwest, which may reflect the thrust fault shown on the geology map.

The magnetic gradient visible in the southeast corner of the grid reflects a thrust fault between metavolcanic rocks and granites and the carbonaceous phyllites and grey quartzites of the Grass Lakes succession (Dmcp) present here.

Very few structures, other than the N60°E ones mentioned, are visible in the magnetic contour plan. One may be a ~N135°E fault visible west of the block of open ground.

The calculated vertical gradient map shows some N – S striping (e.g. along lines 50231 and 50300). This is caused by variations in altitude of the magnetic sensor while flying adjacent lines. The strongest gradients visible in the magnetic contours are enhanced by the vertical gradient patterns.

## B. AEM RESULTS

Large areas of variable conductivities are mapped over the LEAGUE claim block; resistive cover and/or rocks underlie other parts of the claims. The very high frequency 33,000Hz coplanar coil EM data provides mainly information on the cover material and only in areas of thin non-conductive cover also about the bedrock units. That data cannot be used to calculate meaningful conductance values.

The conductive zones display a wide range of conductances. Some clustering or grouping of higher or lower values is seen but most parts of these conductive zones show high and low values side by side. The extent and shape of EM-responses along adjacent lines is rather variable. Conductors can only be selected (and their conductance and depth calculated) when clear peaks or shoulders are visible along EM-profiles. This means that on the LEAGUE property some lines show four or five intercepts over a short section and fewer on the adjacent lines and those that are there do not line up with those on the other lines. The choice to interconnect intercepts to form a conductor (= its axis) is for this data set very subjective and other combinations are as valid as those shown on the maps.

This conductivity pattern is typical for areas where a relatively flat lying sequence containing carbonaceous or graphitic mudstones which layers vary in thickness and graphite content along strike is present like over parts of the LEAGUE claims. Faults and shears and variations in topography will complicate matters.

The northernmost zone of conductivity (labeled I) occurs directly north of the strong magnetic highs in that part of the claim block (Slide Mountain serpentinites? or Jurassic mafic/ultramafic plugs). Its southern boundary follows the zero nT/m contour of the vertical gradient magnetic results from the strongest magnetic highs very closely. This ~one km wide conductive zone is open to the west and east. The zone trends N110-120°E before swinging more N70°E in its eastern part. Conductivities are rather steady and somewhat higher (16-29S) in the northern half of the zone. There is no obvious anomalous magnetic association. It is, based on the magnetic results, possible that similar highly magnetic rocks as to its south underlie this conductive package. The overall character of Zone I is that of a band of formational conductors (possibly within Df to Dq type rocks). There is no "anomaly" within the package that stands out.

Zone II is more complex than Zone I. It displays a much wider range of conductances. The strongest conductances are located in the northwest and southeast (conductors 2a, 2b and 2c). There are a few somewhat resistive windows within the zone (labeled "R"). Zone II has a rather defined contact with the resistive area to its southeast along conductors 2a and 2d, this may be a fault contact (or discontinuity) as is supported by the magnetic data. The eastern border is irregular while the zone is open to the west and north. The conductor

axes shown on the maps are, as mentioned earlier, non-unique other axes can be selected as well. The pattern presented suggests that the conductors trend N60°E in the southern part (e.g. 2d, 2a) but more E-W in the north (e.g. 2c). The magnetic coincidences shown are of very weak amplitude; it is not clear if any emphasis should be placed on them ( e.g. intercepts: line 50390-6 and -7 and 50350-8). The area of Zone II is mapped to be underlain by layered rocks of Df and Dq including carbonaceous phyllites. The more resistive areas within Zone II may be caused by granites (MGag).

Zones II and III merge in the area near UTM 6,821,700N. It is very well possible that both zones are underlain by the same rock types and that they come together in this area of a synclinal nose. If so, conductor axes would have to be reselected and become in the area west of line 50500 more arc-shaped convex to the west (rather than axes in a N70-90°E direction). The south edge of Zone III is again sharp and may reflect a fault zone. Conductances range from 16-50S in the southern part and somewhat less in the north. A few faults are suggested they are supported by the magnetic results. It is, as for Zone II, difficult to interconnect individual intercepts from line to line with any certainty. A few intercepts show a weak magnetic coincidence, not much emphasis should be put on this. The area is underlain by layered rocks of Dk, Df, Dq, Dqm and Dmcp, which include carbonaceous phyllites the most likely source of the conductivity.

Zone IV may be the continuation of Zone III. It shows a strong conductive core. Six holes were drilled in this area. Overburden is only a few meters thick. A mixture of layered rocks, including graphitic mudstones, was intersected. These horizons and associated fault gouge are the source of the conductivity. Hole LG96-01 collared directly south of the conductive core zone intersected a flat dipping 2.9m thick graphitic mudstone horizon at a depth of 28m (hole at -60°) and a second one 7.3m thick at a depth of 115.6m. A 3.8m thick fault gouge is immediate adjacent to it. Hole GL96-06 also collared in Zone IV intersected similar graphitic mudstone horizons. The other four holes are a bit further to the north (outside Zone IV) in a sequence with less graphitic mudstone horizons. This confirms the geophysical results, which show less conductivity near the eastern three of these four holes. The complexity due to the various graphitic mudstone bands is also clearly shown in HLEM ground geophysical data collected here. A grid with lines 50-100m apart was surveyed with HLEM over the center core of Zone IV. Several conductors, varying in strength and width, somewhat en-echelon, were mapped. They broaden to the northeast in a similar way as seen in the AEM results (Power and Lee, 1996).

Zone V is a single conductor at least 1800m long located to the south of Zone IV. It has no anomalous magnetic association. Conductance values are in general low (5-15S).

Zone VI is located near the east side of the grid; it is open in that direction. Its character is similar to that of Zones II to IV. It is underlain by Dk and Df layered rocks.

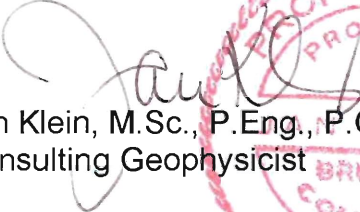
An isolated conductor intercept, line 50350-12, shows a relatively high conductance of 50S at a depth of 34m. It is a low amplitude response and not supported on the adjacent lines. It should not be overemphasized.

## VIII. CONCLUSIONS AND RECOMMENDATIONS

The AEM/mag results over the LEAGUE property show large areas of complex conductivity. This conductivity appears for most part caused by flat dipping graphitic mudstone horizons and related fault gouge. Very few conductor intercepts show an anomalous magnetic association. The interconnection of conductor intercepts on adjacent lines is, due to the complexity in responses, not unique, other patterns of conductor axes can be drawn also.

It is difficult to select from this data set targets for VMS exploration. Areas away from the previously drilled holes should be mapped and prospected. Consideration should be given to further execute geochemical sampling to define targets before further ground geophysical follow-up be undertaken especially in areas where the conductors are at shallow depths.

Respectfully submitted,

  
Jan Klein, M.Sc., P.Eng., P. Geo.  
Consulting Geophysicist

Burnaby, B.C., March 2003.



## IX. REFERENCES

Murphy, D. C. e.a, 2001, Preliminary Bedrock Geological Map of Northern Finlayson Lake Area (NTS 105G) Yukon Territory *by* Indian and Northern Affairs Canada, Open File 2001-33.

Power, M. A., and Lee, C. C., 1996, Expatriate Resources Ltd., Ground Total Field and HLEM Survey of Properties in the Finlayson Allochthon, Yukon Territory. Report and Maps *by* Amerok Geosciences Ltd.

Woolham, R.W., 1996, Report on a Combined Helicopter-borne Electromagnetic and Magnetic Survey, Goal Net, Hat Trick, League, Offside, Power Play, Shutout and Slapshot Properties, Finlayson Lake area, Yukon Territory, NTS 105 G and J *for* Expatriate Resources Ltd. *by* Aerodat Inc, June 13, 1996.

## X. CERTIFICATE OF AUTHOR'S QUALIFICATIONS

I, Jan Klein, of 7025 Dunblane Ave. Burnaby, B.C. V5J 4G1, in the province of British Columbia, do hereby certify that:

- ◆ I am a consulting geophysicist with office and residence in Burnaby, British Columbia.
- ◆ I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia (Member No. 9796).
- ◆ I graduated from the Technological University of Delft, The Netherlands in 1965 with an Honours Master of Science degree in Mining Engineering and Exploration.
- ◆ I have worked for more than 38 years in the mining and exploration industry throughout the world.
- ◆ I am a member in good standing of several Professional Societies including: Society of Exploration Geophysicist, Australian Society of Exploration Geophysicists, Canadian Exploration Geophysical Society, British Columbia Geophysical Society, British Columbia and Yukon Chamber of Mines, etc.
- ◆ I have prepared the accompanying report based on the original data collected by the contractor in 1996.
- ◆ I have no interest, direct or indirect, in the LEAGUE property that is the subject of the accompanying report, nor in securities of Expatriate Resources Ltd., nor do I have interest, direct or indirect, in any mining or exploration property in the vicinity of the LEAGUE property, Yukon Territory.

Dated May 14<sup>th</sup> 2003

Signed Jan Klein  
Jan Klein, M.Sc., P.Eng., P. Geo.  
Consulting Geophysicist



I, J. A. Moore, of 39147-3695 W. 10<sup>th</sup> Ave. Vancouver, V6R 4P1, in the Province of British Columbia, Canada, do hereby certify:

- ◆ I am a graduate of Prescott College in Prescott, Arizona, U.S.A, with a B. A. in Environmental Geology (1996). I completed a postgraduate degree at Rhodes University in Grahamstown, South Africa. I was admitted to the degree of M. Sc. in Mineral Exploration in 2002.
- ◆ Since 1991, I have been involved in the exploration and exploitation of precious metals and diamonds in British Columbia, NWT, Central America, the eastern shields of South America, and West Africa.
- ◆ The information, conclusions, and recommendation in this report are based on collaboration of other professional colleagues involved with various aspects of exploration on the property and in review of the literature stated in the bibliography. I have prepared this report on behalf of Expatriate Resources Ltd.
- ◆ This report may be used for the development of the property, provided that, no portion will be used out of context in such a manner as to convey meanings different from that set out in the whole.
- ◆ I am unaware of any material fact or material change with respect to the technical matter of this report that might cause the technical report to be inaccurate or misleading.
- ◆ Consent is hereby given to the company for which this report was prepared to reproduce the report or any part of it for the purposes of development of the property, or facts relating to the raising of funds by way of a prospectus and/or statement of material facts.

Dated May 14<sup>th</sup> 2003

Signed J. A. Moore  
J. A. Moore, M.Sc.

**XI. ADDENDUM 1 LISTING OF CONDUCTORS FROM THE  
1996 HELICOPTER-BORNE ELECTROMAGNETIC /  
MAGNETIC SURVEY OVER THE LEAGUE PROPERTY,  
YUKON TERRITORY (PROJECT # J9603)**

LINE	UTM-X	UTM-Y	ANOMAL Y	CONDUCTANCE	CONDUCTOR	935 HZ	935 HZ	EM-BIRD
number			label	in Siemens	depth	In-Phase	Out-of-Phase	height
					in meters	in ppm*10	in ppm*10	in meters
50120	412037	6823035	20	27	25	248	121	22.1
50120	412006	6820247	21	2	7	81	240	25.5
50120	412006	6820125	22	5.5	10	115	210	26.6
50161	411248	6822203	13	27	5	560	309	30.3
50161	411249	6822068	14	25	8	335	183	31.3
50171	411051	6822037	1	45	1	476	168	36.4
50171	411054	6822157	2	50	2	553	201	34.7
50171	411056	6822372	3	35	4	374	150	37.3
50180	410854	6822180	12	50	0	872	364	29.7
50180	410855	6822049	13	50	4	938	364	26.6
50180	410853	6821913	14	48	6	561	230	29.1
50190	410632	6821628	1	24	16	200	100	35.2
50190	410628	6822189	2	30	0	1301	717	24.4
50190	410625	6822622	3	10	5	261	233	31.2
50190	410623	6822830	4	12	20	124	86	32.6
50190	410649	6824556	5	15	23	147	86	30
50190	410650	6824814	6	10	19	113	101	32.3
50190	410665	6825819	7	7	10	233	294	24.7
50190	410668	6825911	8	12	12	268	265	23.5
50190	410676	6826093	9	30	15	280	257	28.3
50190	410675	6826315	10	13	5	325	292	31.7
50200	410429	6821485	1	13	11	118	76	41.3
50200	410423	6821582	2	13	11	116	75	41.8
50200	410414	6821882	3	25	8	252	126	39
50200	410414	6821999	4	26	9	239	108	40.5
50200	410480	6825429	5	4	4	132	193	32.6
50200	410483	6825734	6	10	0	200	194	38.3
50200	410482	6825860	7	13	7	177	134	40.7
50200	410485	6826167	8	16	1	300	218	37.4

LINE	UTM-X	UTM-Y	ANOMAL	CONDUCTA	CONDUCT	935 HZ	935 HZ	EM-BIRD
number			label	in Siemens	depth	In-Phase	Out-of-Phase	height
					in meters	in ppm*10	in ppm*10	in meters
50210	410309	6826404	4	5	18	107	143	26.8
50210	410296	6826038	5	14	6	258	197	33.7
50210	410292	6825935	6	13	1	396	362	32.1
50210	410284	6825672	7	14	10	381	337	24.2
50210	410296	6825494	8	13	4	287	258	32.6
50210	410251	6823152	9	13	22	158	134	27.3
50220	410028	6822197	1	7	24	91	83	27.1
50220	410041	6823649	2	20	17	118	66	37.1
50220	410080	6825620	3	17	7	422	341	27.1
50220	410076	6825878	4	26	6	324	178	33.7
50231	409905	6825852	1	16	8	379	289	28.4
50231	409916	6825650	3	13	13	315	281	23.8
50231	409897	6825526	3	12	17	277	290	19.1
50231	409889	6825362	4	8	17	214	253	18.9
50231	409893	6825302	5	8	20	191	237	16.8
50231	409860	6823489	6	4.5	25	94	136	16.8
50240	409703	6825351	1	7	9	79	81	44.2
50240	409714	6825608	2	12	16	134	85	36.4
50240	409723	6825796	3	13	13	202	145	31.3
50240	409722	6825965	4	13	4	188	145	38.9
50240	409721	6826025	5	14	10	188	137	36.8
50255	409483	6826043	1	24	3	186	104	48.3
50255	409490	6826526	2	13	26	87	50	35.8
50260	409307	6826551	4	11	5	92	67	49.4
50260	409304	6826080	5	20	2	254	150	41.9
50260	409301	6825655	6	9	15	65	60	44.4
50270	409067	6822580	1	5	29	60	63	30.1
50270	409063	6823285	2	10	24	89	73	30.8
50270	409100	6825894	3	10	5	124	120	44
50270	409100	6826132	4	17	0	278	213	40.7
50270	409101	6826248	5	16	0	323	215	37.2
50270	409107	6826561	6	16	6	246	158	36.1

LINE	UTM-X	UTM-Y	ANOMAL	CONDUCTA	CONDUCT	935 HZ	935 HZ	EM-BIRD
number			Y	NCE	TOR			
			label	in Siemens	depth	In-Phase	Out-of-Phase	height
					in meters	in ppm*10	in ppm*10	in meters
50280	408872	6826364	2	20	3	457	317	33.1
50280	408872	6826024	3	18	0	343	240	37
50280	408881	6823307	4	18	21	174	97	30.8
50280	408878	6823155	5	12	24	154	104	28.5
50280	408865	6822589	6	17	30	154	79	28.3
50280	408823	6818993	7	0	0	-109	65	-1.4
50290	408703	6822484	1	22	12	169	81	39.7
50290	408702	6822608	2	32	8	236	90	43.1
50290	408700	6822763	3	24	4	147	66	48.7
50290	408699	6823114	4	12	2	100	66	52.4
50290	408701	6823361	5	17	13	120	64	41.1
50290	408731	6825644	6	8	15	130	124	34.4
50290	408729	6825833	7	10	0	198	197	39.3
50290	408733	6826005	8	11	0	202	198	44
50290	408734	6826237	9	25	0	343	181	43.5
50290	408735	6826477	10	18	0	356	231	41.3
50290	408735	6826663	11	18	0	295	209	39.2
50290	408737	6826832	12	17	10	213	137	36.5
50300	408473	6826944	4	21	3	218	121	45.7
50300	408464	6826751	5	22	0	212	120	51.3
50300	408447	6826417	6	11	0	133	104	56.4
50300	408442	6825966	7	6	0	83	85	61.5
50300	408442	6824203	8	7	23	74	63	32.3
50300	408429	6822973	9	26	1	453	241	35.1
50300	408423	6822885	10	26.3	3	505	294	33.7
50300	408414	6822735	11	44	1	513	195	35.3
50300	408401	6822534	12	50	0	931	411	27.2
50300	408397	6822372	13	40	8	745	305	25.1
50310	408286	6820886	1	9	20	76	60	40.4
50310	408251	6821966	2	7.6	16	119	116	33.1
50310	408250	6822067	3	6.7	17	128	137	29.7
50310	408248	6822381	4	39	3	464	166	35.1
50310	408252	6822485	5	39	2	445	163	37.4
50310	408259	6822694	6	28	0	373	128	43.3
50310	408263	6822803	7	42	0	290	110	48.4

50310	408310	6825946	8	6.9	0	183	209	38.1
50310	408312	6826025	9	11	0	209	205	37.8

LINE	UTM-X	UTM-Y	ANOMAL	CONDUCTA	CONDUCT	935 HZ	935 HZ	EM-BIRD
number			Y	NCE	TOR			
			label	in Siemens	depth	In-Phase	Out-of-Phase	height
					in meters	in ppm*10	in ppm*10	in meters
50310	408316	6826266	10	6	0	128	163	43.4
50310	408323	6826783	11	16	0	196	131	51.6
50310	408327	6826967	12	24	1	232	122	46.7
50320	408180	6833077	1	10	14	81	61	45.8
50320	408171	6832739	2	12	14	83	54	47.3
50320	408069	6827010	3	26	3	205	101	48.9
50320	408068	6826892	4	20	5	183	105	46.7
50320	408065	6826503	5	13	6	154	111	45.2
50320	408063	6826377	6	16	5	180	124	44.3
50320	408061	6826163	7	11	0	156	128	48.7
50320	408060	6826019	8	15	0	177	114	50.8
50320	408062	6825823	9	14	2	124	76	51.1
50320	408062	6824197	10	26	14	198	89	37.8
50320	408061	6824123	11	35	14	239	91	36.2
50320	408047	6822670	12	36	4	1218	668	21.9
50320	408046	6822631	13	44	3	1329	684	21
50320	408045	6822553	14	35	4	1488	785	19.5
50320	408033	6822444	15	33	6	905	450	22.2
50320	408021	6822370	16	48	4	915	380	25.6
50320	408004	6821993	17	10	13	226	221	23.7
50320	407974	6820848	18	35	16	185	59	37.7
50331	407840	6820836	1	50	26	141	30	43.7
50331	407843	6820885	2	33	12	141	44	44.7
50331	407858	6821013	3	26	19	114	47	40.4
50331	407823	6821872	4	8	24	105	115	25.9
50331	407812	6822016	5	25	23	111	109	26.2
50331	407793	6822305	6	32	8	293	130	35.7
50331	407793	6822428	7	36	6	409	170	34.4
50331	407797	6822503	8	47	5	495	175	32.7
50331	407867	6824055	9	43	13	310	98	33.3
50331	407900	6826520	10	12	10	191	157	32.3
50331	407904	6826651	11	13	15	177	140	32.1

50331	407907	6826937	12	14	11	216	155	31.3
50331	407909	6827073	14	26	20	223	114	29.6
50331	407909	6827223	15	22	18	190	95	34
50331	407909	6827316	16	22	29	196	108	35.2

Line number	UTM-X	UTM-Y	Anomaly label	Conductance in Siemens	Conductor depth in meters	935 Hz In-Phase in ppm*10	935 Hz Out-of-Phase in ppm*10	EM-bird height in meters
50340	407710	6827138	4	20	10	343	220	27.4
50340	407709	6826991	5	18	12	239	177	27.5
50340	407704	6826614	6	10	8	202	187	31.2
50340	407704	6826567	7	9	8	202	205	31
50340	407699	6826466	8	8	11	169	188	29.4
50340	407685	6824507	9	24	24	194	87	27.5
50340	407689	6824167	10	27	10	424	199	28.3
50340	407688	6823986	11	53	10	493	153	27.7
50340	407688	6823883	12	51	14	322	114	28.1
50340	407679	6822487	13	76	12	707	210	23.5
50340	407673	6822400	14	48	11	569	210	25.7
50340	407661	6822327	15	45	12	502	194	24.6
50340	407649	6822248	16	40	13	567	244	23.2
50340	407612	6821912	17	5	18	121	165	19.3
50340	407603	6821759	18	8	20	131	137	24.4
50340	407618	6821104	19	13	17	107	71	38
50340	407643	6820799	20	65	15	624	173	21.8
50340	407642	6820732	21	50	15	624	215	21.5
50350	407369	6820641	1	35	17	362	121	25.7
50350	407367	6820786	2	52	20	383	106	32.3
50350	407377	6821194	3	7	18	92	88	34.3
50350	407370	6821738	4	6	17	167	241	18.3
50350	407364	6821845	5	5.3	17	171	278	17.7
50350	407361	6822039	6	31	16	345	147	24.4
50350	407361	6822143	7	37	11	389	138	29.7
50350	407407	6823825	8	26	16	277	137	26.1
50350	407401	6823924	9	50	8	572	204	28.9
50350	407430	6824342	10	32	9	173	63	43.8
50350	407448	6824516	11	50	11	146	37	46.2
50350	407472	6825499	12	50	34	94	19	40.1
50350	407481	6826745	13	13	10	232	192	28.7
50350	407485	6826867	14	16	13	244	178	29.9

50360	407324	6826876	2	9	13	165	164	29.4
50360	407322	6826764	3	6	8	147	184	30.2
50360	407315	6826589	4	3.5	5	77	132	32.8
50360	407303	6824812	5	38	29	139	44	28
50360	407298	6824453	6	35	20	259	95	29.9

Line number	UTM-X	UTM-Y	Anomaly label	Conductance in Siemens	Conductor depth in meters	935 Hz In-Phase in ppm*10	935 Hz Out-of-Phase in ppm*10	EM-bird height in meters
50360	407298	6824160	7	18	15	362	233	22.1
50360	407297	6824034	8	33	12	702	376	20.5
50360	407300	6823938	9	38	10	838	382	20.4
50360	407292	6823757	10	28	17	234	102	32.9
50360	407260	6822083	11	18	19	429	320	17.5
50360	407250	6822013	12	30	17	440	222	19.2
50360	407228	6821731	13	7	13	181	227	24.1
50360	407203	6821214	14	6.5	22	108	124	26.7
50360	407219	6820706	15	54	13	520	164	33.6
50370	407015	6821278	2	6	16	151	192	21.2
50370	407020	6821756	3	4	16	105	160	22.8
50370	407012	6821934	4	13	12	214	162	28.2
50370	407011	6822185	5	16	31	95	51	28.9
50370	407043	6823295	6	6	10	164	220	26.8
50370	407048	6823438	7	6	25	83	83	27.5
50370	407052	6823710	8	31	8	334	147	33.7
50370	407063	6823929	9	22	10	488	306	26.3
50370	407062	6824085	10	22	18	306	155	23.6
50370	407062	6824193	11	35	21	290	111	25.3
50370	407068	6824402	12	38	9	438	161	29.9
50370	407071	6824520	13	33	16	321	141	26.1
50370	407082	6824681	14	28	32	222	98	19.8
50370	407090	6824982	15	31	30	129	45	29.6
50370	407092	6825640	16	18	25	120	57	31.5
50370	407090	6825770	17	25	31	138	60	23.7
50370	407105	6826806	18	7	9	201	246	27.1
50380	406920	6826414	2	5	12	80	94	39.2
50380	406921	6826093	3	15	19	100	56	39.2

50380	406898	6825807	4	28	20	120	45	39.8
50380	406868	6825485	5	16	31	101	54	28.1
50380	406864	6824805	6	15	27	101	56	32.5
50380	406880	6824626	7	13	21	132	91	30.7
50380	406917	6824387	8	31	9	370	167	32.1
50380	406926	6824315	10	35	8	466	194	30.2
50380	406933	6824221	11	54	8	621	189	28.6
50380	406936	6824044	12	52	12	429	130	27.7
50380	406894	6823655	13	20	8	159	80	43.6
50380	406840	6821856	14	10	25	123	101	27
50380	406850	6821610	15	4.8	13	132	216	22.4

Line number	UTM-X	UTM-Y	Anomaly label	Conductance in Siemens	Conductor depth in meters	935 Hz In-Phase in ppm*10	935 Hz Out-of-Phase in ppm*10	EM-bird height in meters
50380	406857	6821244	16	5	20	95	118	28
50390	406609	6820499	1	25	13	277	160	29.8
50390	406612	6820550	2	25	10	308	164	31.4
50390	406619	6821162	3	3.4	16	94	173	21.1
50390	406643	6821764	4	7	16	99	104	35.4
50390	406647	6821921	5	6	17	82	81	35.8
50390	406621	6823421	6	26	15	258	132	30.6
50390	406627	6823579	7	26	6	428	241	30.4
50390	406640	6823794	8	37	16	549	327	20.2
50390	406642	6824275	9	38	9	613	239	27.7
50390	406653	6824615	10	20	12	240	123	34.8
50390	406685	6825143	11	10	25	91	72	28.8
50390	406691	6825378	12	14	26	103	63	29.2
50390	406701	6826092	13	12	21	133	104	31
50390	406721	6826515	14	9	19	165	162	25.7
50400	406499	6826562	1	6	20	74	84	32.7
50400	406494	6826299	2	5.5	19	86	100	31.7
50400	406489	6825774	3	13	27	146	100	25.1
50400	406489	6825577	4	16	29	139	86	23.8
50400	406486	6824856	5	22	13	319	194	24.7
50400	406482	6824755	6	33	11	492	235	26
50400	406479	6824680	7	32	9	464	227	27.2
50400	406476	6824473	8	13	9	243	191	30.6
50400	406465	6824148	9	18	8	324	208	29.3
50400	406462	6824016	10	25	10	335	167	31

50400	406457	6823924	11	33	10	357	134	31.4
50400	406452	6823687	12	18	17	202	120	32.7
50400	406446	6823396	13	8	20	136	133	26.8
50400	406425	6822590	14	27	21	617	377	12
50400	406442	6821979	15	6	9	133	146	32.5
50400	406464	6821893	16	5	13	206	332	19.9
50400	406503	6821668	17	4	19	77	115	27.4
50400	406411	6820475	18	32	5	434	208	32.2
50410	406192	6820515	1	38	8	1301	625	19.9
50410	406210	6822037	2	5	0	143	102	46.8
50410	406216	6822147	3	17	0	185	111	30
50410	406216	6822279	4	26	0	222	116	24.8

Line number	UTM-X	UTM-Y	Anomaly label	Conductance in Siemens	Conductor depth in meters	935 Hz In-Phase in ppm*10	935 Hz Out-of-Phase in ppm*10	EM-bird height in meters
50410	406275	6823597	5	24	10	354	200	28.9
50410	406284	6823755	6	33	10	574	278	25.7
50410	406296	6823967	7	18	14	253	171	29.5
50410	406302	6824188	8	8	7	174	191	31.8
50410	406303	6824404	9	18	12	302	190	28.8
50410	406306	6824803	10	24	16	177	92	35.8
50410	406308	6824911	11	20	21	187	102	31.2
50410	406307	6825123	12	11	22	123	93	31.3
50420	406084	6825319	4	11	23	132	98	28.2
50420	406100	6825006	5	19	27	179	100	24.8
50420	406107	6824700	6	24	15	247	125	31.4
50420	406111	6824428	7	7.3	16	110	114	34
50420	406102	6824009	8	4	13	117	191	23.8
50420	406083	6823644	9	18	12	283	168	30.2
50420	406082	6823568	10	24	14	246	135	31
50420	406075	6823366	11	33	8	303	130	35.6
50420	406073	6823269	12	37	5	326	134	36.8
50420	406034	6822166	13	17	25	152	103	27
50420	406035	6822090	14	13	25	131	86	26.7
50420	406028	6821759	15	5	28	92	110	20.8
50420	406028	6821724	16	6.8	32	102	102	19.5
50420	406035	6821469	17	8	26	109	93	25.6
50420	406039	6821380	18	7.5	18	152	161	25.1

50420	406014	6820536	19	33	6	384	173	34.5
50430	405837	6820494	1	36	8	1423	804	16.4
50430	405838	6820601	2	35	5	2664	1712	12.3
50430	405850	6821266	3	9	18	188	184	20.6
50430	405861	6821401	4	15	15	404	338	20.3
50430	405879	6821621	5	5	21	132	202	15.6
50430	405882	6821703	6	7.4	21	222	256	15.2
50430	405874	6822084	7	11	14	248	223	24.3
50430	405858	6822188	8	10.5	13	293	278	22.8
50430	405821	6823166	9	10.3	8	189	170	31.2
50430	405831	6823608	10	4	10	84	146	28
50430	405846	6823880	11	6	16	83	77	36
50430	405868	6824373	12	24	19	163	71	32.3
50430	405865	6824699	13	25	17	331	179	24
50430	405863	6824838	14	26	21	263	122	25.4
50430	405872	6825309	15	28	17	200	83	34.5

Line number	UTM-X	UTM-Y	Anomaly label	Conductance in Siemens	Conductor depth in meters	935 Hz In-Phase in ppm*10	935 Hz Out-of-Phase in ppm*10	EM-bird height in meters
50440	405716	6825307	7	26.3	22	204	95	28.4
50440	405718	6824951	8	13.3	17	103	63	38.9
50440	405725	6824742	9	17.6	13	154	97	38.5
50440	405720	6824601	10	5.6	16	93	105	34.4
50440	405713	6824196	11	32	14	288	112	32.2
50440	405703	6823969	12	39	16	296	103	30.6
50440	405702	6823708	13	14	22	98	56	37.1
50440	405707	6823592	14	6	17	87	84	36
50440	405700	6823282	15	9.5	7	168	162	32.5
50440	405700	6823190	16	11	7	211	193	31.8
50440	405698	6823093	17	15	11	239	172	31.5
50440	405696	6822670	18	5.7	27	54	49	39.2
50440	405690	6822093	19	17	0	101	89	28.7
50440	405687	6822038	20	14	16	217	151	25.8
50440	405697	6821699	21	10	28	114	83	24.4
50440	405701	6821574	22	11	29	77	50	32.6
50440	405705	6821237	23	33	9	495	252	28.8
50440	405687	6820650	24	26	8	478	276	29.3
50440	405686	6820571	25	37	8	601	295	27.6
50450	405410	6820808	1	26	20	367	199	19.9

50450	405419	6821052	2	26	12	581	338	22.4
50450	405421	6821370	3	32	9	539	258	28.1
50450	405418	6821866	4	5.3	24	69	75	30
50450	405409	6822648	5	3	28	56	90	21.9
50450	405411	6822877	6	3.5	20	76	110	27.7
50450	405420	6822976	7	5.2	22	69	74	31.1
50450	405435	6823166	8	6	13	129	146	30.8
50450	405457	6823408	9	3.5	17	68	107	30.1
50450	405460	6823574	10	5.6	23	89	97	27.9
50450	405459	6823705	11	16	13	234	159	29.4
50450	405463	6823793	12	13	13	204	161	29.3
50450	405482	6824471	13	5.5	32	62	60	27.9
50450	405497	6824862	14	5	25	59	64	29.4
50450	405505	6825278	15	11	9	184	75	35.9
50460	405312	6825321	3	10	22	117	93	29.6
50460	405300	6825188	4	21	18	168	80	33.2
50460	405281	6824806	5	34	22	210	66	29.5
50460	405278	6824528	6	27	13	224	103	37.8
50460	405276	6824420	7	40	9	307	109	36.4

Line number	UTM-X	UTM-Y	Anomaly label	Conductance in Siemens	Conductor depth in meters	935 Hz In-Phase in ppm*10	935 Hz Out-of-Phase in ppm*10	EM-bird height in meters
50460	405257	6823547	8	22	13	271	160	30.8
50460	405259	6823090	9	5	12	98	134	31.9
50460	405263	6822722	10	3.4	22	65	103	28.2
50460	405257	6821749	11	7.6	25	87	78	27.7
50460	405252	6821480	12	18	10	306	217	27.9
50460	405256	6821307	13	39	9	828	370	22.8
50460	405257	6821204	14	26	11	607	360	25.9
50460	405254	6820979	15	22	12	361	202	26.9
50460	405256	6820914	16	33	8	455	204	30.1
50470	405030	6820891	1	26	8	807	540	20
50470	405036	6820966	2	32	7	1243	759	18.9
50470	405039	6821044	3	28	8	1246	803	18
50470	405043	6821200	4	28	10	771	461	20.5
50470	405046	6821288	5	17	9	530	405	22.5
50470	405051	6821389	6	26	14	408	241	22.4
50470	405054	6821495	7	22	12	354	201	26.7
50470	405074	6821883	8	20	37	91	41	27.5

50470	405079	6822827	9	6	20	79	74	32.7
50470	405085	6822988	10	12.4	17	185	145	32.1
50470	405084	6823455	11	17	17	157	89	35
50470	405083	6823597	12	14	13	185	123	36
50470	405092	6824174	13	17	14	199	128	32.1
50470	405093	6824911	14	52	216	323	89	28.4
50470	405100	6825145	15	30	20	195	77	31.3
50470	405098	6825279	16	25	16	162	72	35.3
50480	404919	6825191	4	33	27	258	94	22.3
50480	404918	6825125	5	33	21	260	94	28.8
50480	404912	6824968	6	110	15	241	40	37.8
50480	404913	6824738	7	60	15	124	25	50.4
50480	404886	6824134	8	22	22	95	98	29.4
50480	404883	6823918	9	10.5	21	141	106	29.4
50480	404876	6823576	10	55	4	575	181	32.7
50480	404874	6823346	11	32	9	344	129	33.7
50480	404875	6822743	12	17	14	108	55	44.2
50480	404820	6821865	14	15	8	249	179	33.7
50480	404827	6821533	15	18	10	438	306	25.5
50480	404844	6821323	16	26	11	429	244	25.2
50480	404839	6820981	17	55	1	871	316	30.3

Line number	UTM-X	UTM-Y	Anomaly label	Conductance in Siemens	Conductor depth in meters	935 Hz In-Phase in ppm*10	935 Hz Out-of-Phase in ppm*10	EM-bird height in meters
50490	404641	6821185	1	39	7	528	230	30.4
50490	404650	6821576	2	10	6	309	319	27.4
50490	404651	6821724	3	10	8	220	220	29.8
50490	404651	6822481	4	17	13	135	78	39.9
50490	404652	6822566	5	18	14	145	90	38.8
50490	404658	6822850	6	21	16	190	98	35.3
50490	404662	6823081	7	31	11	417	192	28.1
50490	404670	6823246	8	32	9	492	216	28
50490	404676	6823392	9	45	6	579	220	30.6
50490	404679	6823449	10	39	4	609	250	31.6
50490	404685	6823600	11	29	5	466	239	32.1
50490	404683	6823916	12	10	23	111	93	29
50490	404660	6824442	13	6	22	76	79	31.3
50490	404667	6824702	14	48	20	251	71	32.2
50490	404669	6824839	15	53	15	304	74	31.4

50490	404684	6825007	16	50	8	365	114	33.2
50490	404690	6825086	17	38	10	363	118	32.7
50500	404476	6825265	13	12	17	181	144	30
50500	404470	6825056	14	20	14	263	154	30
50500	404472	6824850	15	33	10	334	116	33.2
50500	404473	6824745	16	50	14	321	88	35.4
50500	404476	6824529	17	47	9	167	47	45.2
50500	404442	6823573	18	10	16	110	83	36.3
50500	404420	6823161	19	38	1	436	173	37.2
50500	404407	6822970	20	50	4	612	222	32.4
50500	404395	6822203	21	8	13	96	76	39.3
50500	404388	6822099	22	10	15	98	68	40
50500	404380	6821541	23	40	9	623	235	26.6
50500	404378	6821201	24	26	11	295	149	31.4
50510	404210	6821446	1	50	2	980	391	28
50510	404213	6821823	2	31	19	202	85	32.3
50510	404214	6821899	3	28	20	205	93	31.8
50510	404230	6822286	4	5	20	117	141	25
50510	404250	6822489	5	26	16	455	238	19.9
50510	404258	6822722	6	33	10	685	350	22.3
50510	404259	6822850	7	26	9	782	469	20.7
50510	404260	6822903	8	26	9	779	489	20.3
50510	404256	6823048	9	24	8	764	537	20.7
50510	404249	6823370	10	15	15	309	235	23.1

Line number	UTM-X	UTM-Y	Anomaly label	Conductance in Siemens	Conductor depth in meters	935 Hz In-Phase in ppm*10	935 Hz Out-of-Phase in ppm*10	EM-bird height in meters
50510	404247	6823983	11	7	21	102	92	30.9
50510	404254	6824309	12	20	12	117	54	40.5
50510	404276	6824711	13	46	14	556	205	23.1
50510	404278	6824826	14	34	15	391	151	25.5
50510	404282	6824902	15	35	13	379	146	27.6
50520	404039	6823581	21	9	11	99	79	42.2
50520	404036	6823052	22	16	11	201	131	35.7
50520	404035	6822980	23	7.4	14	136	140	33.1
50520	404037	6822787	25	8	8	162	167	34.6
50520	404033	6822364	26	40	7	459	169	32.3
50520	404023	6822018	27	18	20	204	118	29.4

50520	404009	6821773	28	32	11	376	183	28.8
50520	403994	6821494	29	38	4	464	179	34.3
50530	403861	6821587	1	52	10	1145	451	19.2
50530	403865	6821648	2	54	5	1156	478	18.3
50530	403876	6821872	3	26	17	431	250	19.1
50530	403880	6822069	4	33	13	518	271	23.7
50530	403876	6822168	5	17	11	456	366	22.8
50530	403865	6822493	6	7	20	173	190	20.4
50530	403858	6822880	7	18	22	141	127	31.3
50540	403651	6822624	25	4	19	97	145	23.8
50540	403650	6822494	26	1.8	23	67	115	24.6
50540	403649	6822251	27	7	19	138	162	23.3
50540	403656	6821935	28	13.4	16	330	302	19.1
50540	403661	6821669	29	26	13	693	435	16.3
50540	403668	6821417	30	47	8	630	233	27.4
50540	403668	6821274	31	33	12	378	165	28.3
50550	403435	6821360	1	53	8	696	225	27.6
50550	403437	6821602	2	10	19	185	170	24.3
50550	403432	6821810	3	10	26	126	103	25.7
50560	403237	6822563	22	27	17	502	273	19.7
50560	403220	6822371	23	25	12	348	191	26.4
50560	403217	6822186	24	26	17	353	180	23
50560	403206	6821901	25	35	17	1232	626	11
50560	403205	6821824	26	43	17	1190	500	10.9
50560	403208	6821552	27	29	10	651	355	22.4

**XII. ADDENDUM 2 GENERAL INTERPRETIVE  
CONSIDERATIONS OF HELICOPTER-BORNE MAGNETIC,  
ELECTROMAGNETIC AND VLF-EM DATA.**

Prepared by the staff of Aerodat Inc.

## GENERAL INTERPRETIVE CONSIDERATIONS

### Electromagnetic

The Aerodat electromagnetic system utilized two different transmitter-receiver coil geometries. The traditional coaxial coil configuration is operated at widely separated frequencies. The horizontal coplanar coil configuration is similarly operated at different frequencies where at least one pair is approximately aligned with one of the coaxial frequencies.

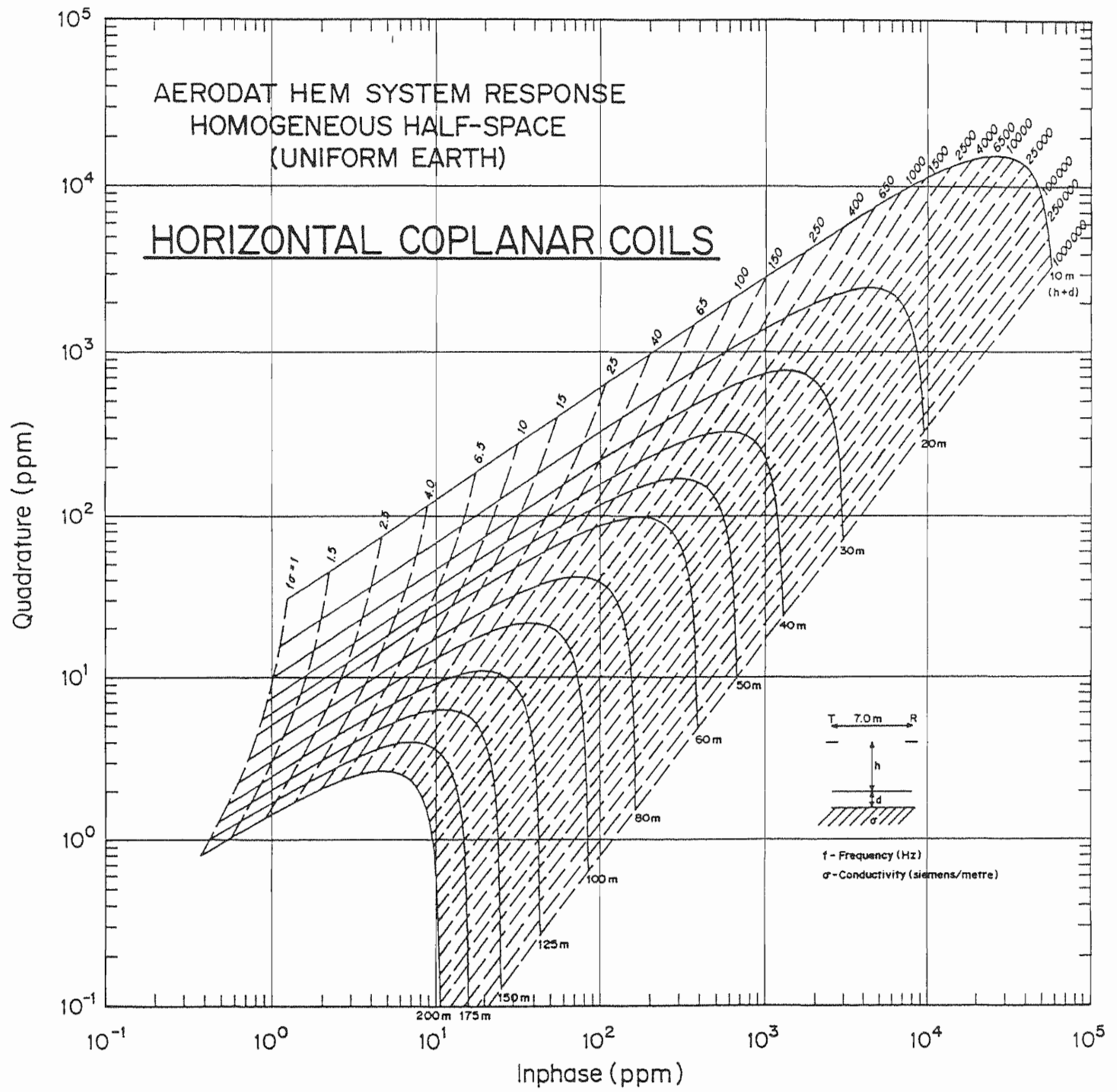
The electromagnetic response measured by the helicopter system is a function of the "electrical" and "geometrical" properties of the conductor. The "electrical" property of a conductor is determined largely by its electrical conductivity, magnetic susceptibility and its size and shape; the "geometrical" property of the response is largely a function of the conductor's shape and orientation with respect to the measuring transmitter and receiver.

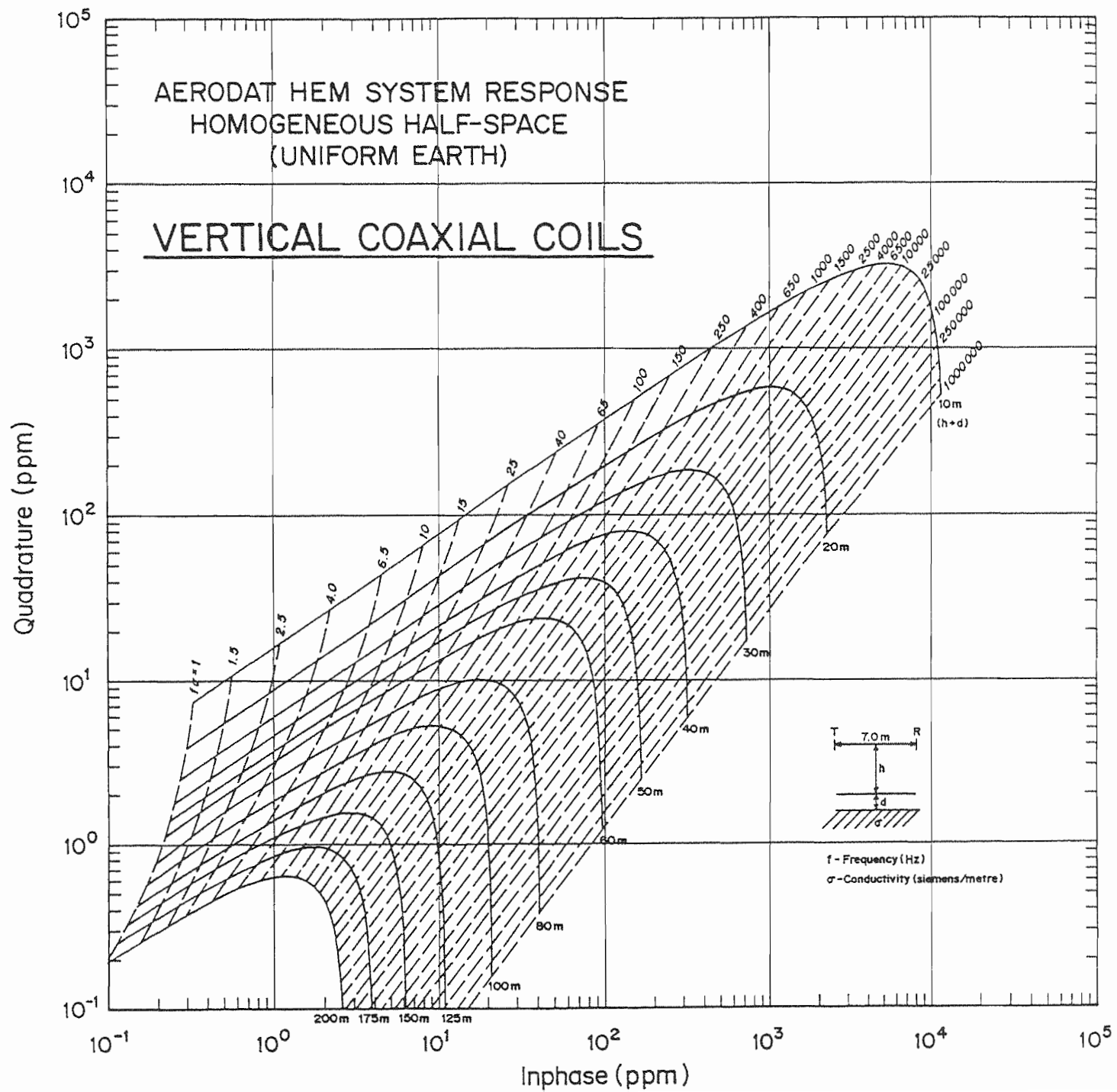
### Electrical Considerations

For a given conductive body the measure of its conductivity or conductance is closely related to the measured phase shift between the received and transmitted electromagnetic field. A small phase shift indicates a relatively high conductance, a large phase shift lower conductance. A small phase shift results in a large inphase to quadrature ratio and a large phase shift a low ratio. This relationship is shown quantitatively for a non-magnetic vertical half-plane and half space models on the accompanying phasor diagrams. Other physical models will show the same trend but different quantitative relationships.

The phasor diagram for the vertical half-plane model, as presented, is for the coaxial coil configuration with the amplitudes in parts per million (ppm) of the primary field as measured at the response peak over the conductor. To assist the interpretation of the survey results the computer is used to identify the apparent conductance and depth at selected anomalies. The results of this calculation are presented in anomaly listings included in the survey report and the conductance and inphase amplitude are presented in symbolized form on the map presentation.

The conductance estimate is most reliable when anomaly amplitudes are large and background resistivities are high. Where the anomaly is of low amplitude and background resistivities are low, the conductance estimates are much less reliable. In such situations, the conductance estimate is often quite low regardless of the true nature of the conductor. This is due to the elevated background response levels in the quadrature channel. In an extreme case, the conductance estimate should be discounted and should not prejudice target selection.







The conductance and depth values as presented are correct only as far as the model approximates the real geological situation. The actual geological source may be of limited length, have significant dip, may be strongly magnetic. Its conductivity and thickness may vary with depth and/or strike and adjacent bodies and overburden may have modified the response. In general the conductance estimate is less affected by these limitations than is the depth estimate, but both should be considered as relative rather than absolute guides to the anomaly's properties.

Conductance in mhos is the reciprocal of resistance in ohms and in the case of narrow slab-like bodies is the product of electrical conductivity and thickness.

The higher ranges of conductance, greater than 2-4 mhos, indicate that a significant fraction of the electrical conduction is electronic rather than electrolytic in nature. Materials that conduct electronically are limited to certain metallic sulphides and to graphite. High conductance anomalies, roughly 10 mhos or greater, are generally limited to massive sulphides or graphites.

Sulphide minerals, with the exception of such ore minerals as sphalerite, cinnabar and stibnite, are good conductors. Sulphides may occur in a disseminated manner that inhibits electrical conduction through the rock mass. In this case the apparent conductance can seriously underrate the quality of the conductor in geological terms. In a similar sense the relatively non-conducting sulphide minerals noted above may be present in significant concentrations in association with minor conductive sulphides, and the electromagnetic response will only relate to the minor associated mineralization. Indicated conductance is also of little direct significance for the identification of gold mineralization. Although gold is highly conductive, it would not be expected to exist in sufficient quantity to create a recognizable anomaly. Minor accessory sulphide mineralization may however provide a useful indirect indication.

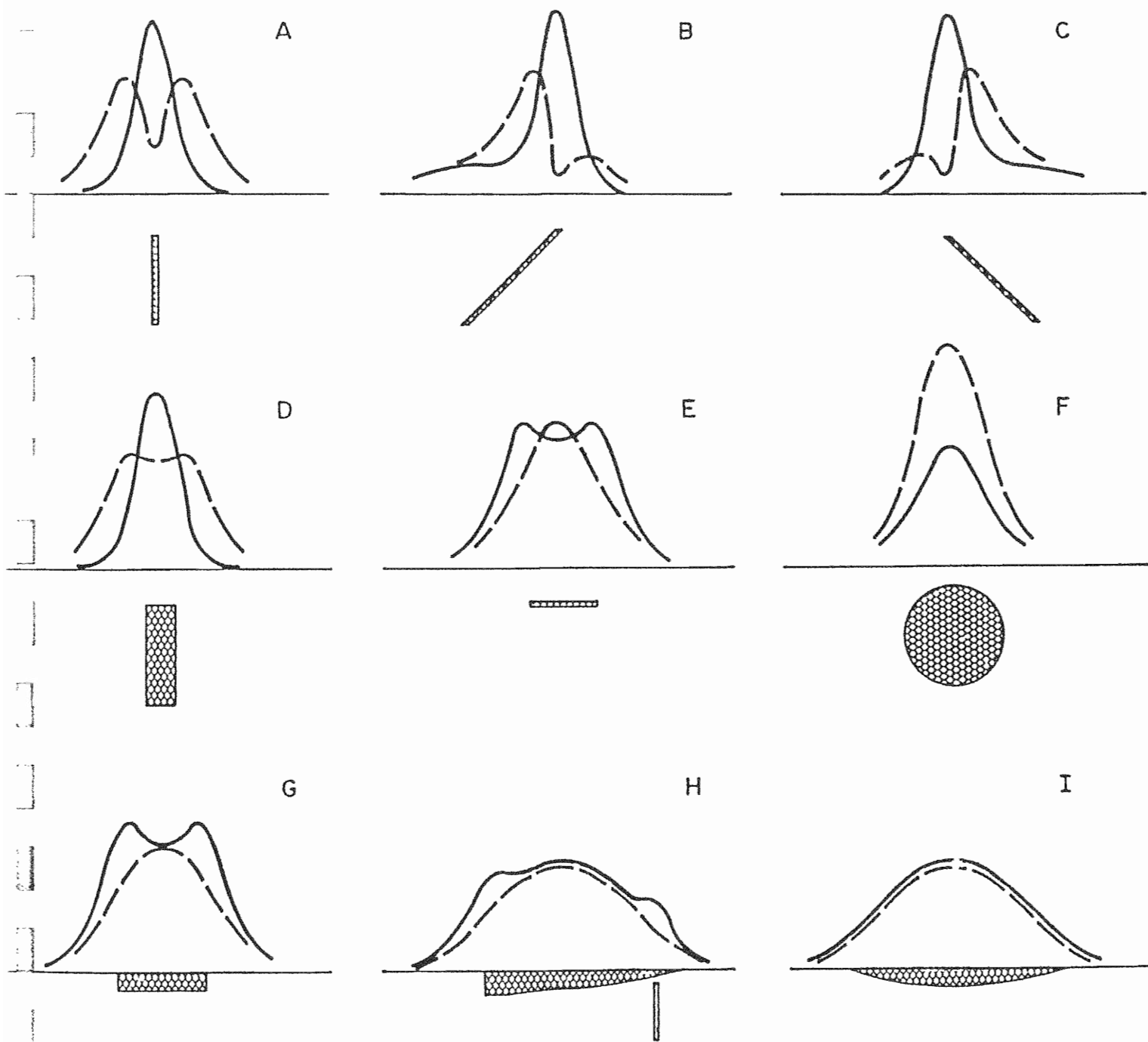
In summary, the estimated conductance of a conductor can provide a relatively positive identification of significant sulphide or graphite mineralization. A moderate to low conductance value does not rule out the possibility of significant economic mineralization.

### **Geometrical Considerations**

Geometrical information about the geologic conductor can often be interpreted from the profile shape of the anomaly. The change in shape is primarily related to the change in inductive coupling among the transmitter, the target, and the receiver. The accompanying figure shows a selection of HEM response profile shapes from nine idealized targets. Response profiles are labelled A through I. These labels are used in the discussion which follows.

# HEM RESPONSE PROFILE SHAPE AS AN INDICATOR OF CONDUCTOR GEOMETRY

——— COAXIAL vertical scale 1 ppm/unit  
 - - - COPLANAR vertical scale 4 ppm/unit



In the case of a thin, steeply dipping, sheet-like conductor, the coaxial coil pair will yield a near symmetric peak over the conductor. On the other hand, the coplanar coil pair will pass through a null couple relationship and yield a minimum over the conductor, flanked by positive side lobes (Profile A). As the dip of the conductor decrease from vertical, the coaxial anomaly shape changes only slightly, but in the case of the coplanar coil pair the side lobe on the down dip side strengthens relative to that on the up dip side (Profiles B and C).

As the thickness of the conductor increases, induced current flow across the thickness of the conductor becomes relatively significant and complete null coupling with the coplanar coils is no longer possible (Profile D). As a result, the apparent minimum of the coplanar response over the conductor diminishes with increasing thickness, and in the limiting case of a fully 3 dimensional body or a horizontal layer or half-space, the minimum disappears completely.

A horizontal conducting layer such as a horizontal thin sheet or overburden will produce a response in the coaxial and coplanar coils that is a function of altitude (and conductivity if not uniform). The profile shape will be similar in both coil configurations with an amplitude ratio (coplanar:coaxial) of about 4:1\* (Profiles E and G).

In the case of a spherical conductor, the induced currents are confined to the volume of the sphere, but not relatively restricted to any arbitrary plane as in the case of a sheet-like form. The response of the coplanar coil pair directly over the sphere may be up to 8\* times greater than that of the coaxial pair (Profile F).

In summary, a steeply dipping, sheet-like conductor will display a decrease in the coplanar response coincident with the peak of the coaxial response. The relative strength of this coplanar null is related inversely to the thickness of the conductor. A pronounced null indicates a relatively thin conductor. The dip of such a conductor can be inferred from the relative amplitudes of the side-lobes.

Massive conductors that could be approximated by a conducting sphere will display a simple single peak profile form on both coaxial and coplanar coils, with a ratio between the coplanar to coaxial response amplitudes as high as 8\*.

Overburden anomalies often produce broad poorly defined anomaly profiles (Profile I). In most cases, the response of the coplanar coils closely follows that of the coaxial coils with a relative amplitude ration of 4\*.

Occasionally, if the edge of an overburden zone is sharply defined with some significant depth extent, an edge effect will occur in the coaxial coils. In the case of a horizontal conductive ring or ribbon, the coaxial response will consist of two peaks, one over each edge; whereas the coplanar coil will yield a single peak (Profile H).

\* It should be noted at this point that Aerodat's definition of the measured ppm unit is related to the primary field sensed in the receiving coil without normalization to the maximum coupled (coaxial configuration). If such normalization were applied to the Aerodat units, the amplitude of the coplanar coil pair would be halved.

## Magnetics

The Total Field Magnetic Map shows contours of the total magnetic field, uncorrected for regional variation. Whether an EM anomaly with a magnetic correlation is more likely to be caused by a sulphide deposit than one without depends on the type of mineralization. An apparent coincidence between an EM and a magnetic anomaly may be caused by a conductor which is also magnetic, or by a conductor which lies in close proximity to a magnetic body. The majority of conductors which are also magnetic are sulphides containing pyrrhotite and/or magnetite. Conductive and magnetic bodies in close association can be, and often are, graphite and magnetite. It is often very difficult to distinguish between these cases. If the conductor is also magnetic, it will usually produce an EM anomaly whose general pattern resembles that of the magnetics. Depending on the magnetic permeability of the conducting body, the amplitude of the inphase EM anomaly will be weakened, and if the conductivity is also weak, the inphase EM anomaly may even be reversed in sign.

The interpretation of contoured aeromagnetic data is a subject on its own involving an array of methods and attitudes. The interpretation of source characteristics for example from total field results is often based on some numerical modelling scheme. The vertical gradient data is more legible in some aspects however and useful inferences about source characteristics can often be read off the contoured VG map.

The zero contour lines in contoured VG data are often sited as a good approximation to the outline of the top of the magnetic source. This only applies to wide (relative to depth of burial) near vertical sources at high magnetic latitudes. It will give an incorrect interpretation in most other cases.

Theoretical profiles of total field and vertical gradient anomalies from tabular sources at a variety of magnetic inclinations are shown in the attached figure. Sources are 10, 50 and 200 m wide. The source-sensor separation is 50 m. The thin line is the total field profile. The thick line is the vertical gradient profile.

The following comments about source geometry apply to contoured vertical gradient data for magnetic inclinations of 70 to 80°.

## **Outline**

Where the VG anomaly has a single sharp peak, the source may be a thin near-vertical tabular source. It may be represented as a magnetic axis or as a tabular source of measurable width - the choice is one of geological preference.

Where the VG anomaly has a broad, flat or inclined top, the source may be a thick tabular source. It may be represented as a thick body where the width is taken from the zero contour lines if the body dips to magnetic north. If the source appears to be dipping to the south (i.e. the VG anomaly is asymmetric), the zero contours are less reliable indicators of outline. The southern most zero contour line should be ignored and the outline taken from the northern zero contour line and the extent of the anomaly peak width.

## **Dip**

A symmetrical vertical gradient response is produced by a body dipping to magnetic north. An asymmetrical response is produced by a body which is vertical or dipping to the south. For southern dips, the southern most zero contour line may be several hundred meters south of the source.

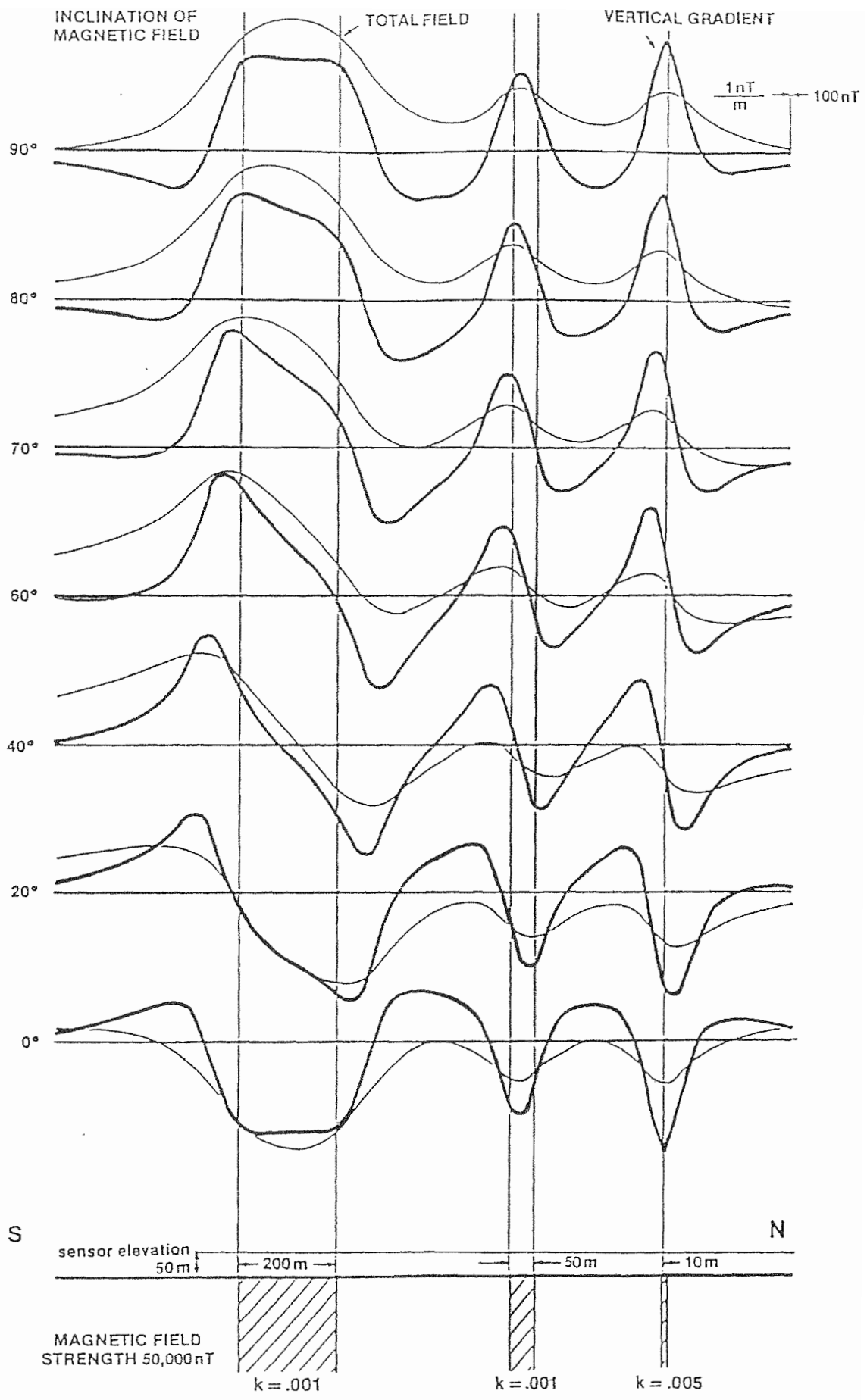
## **Depth of Burial**

The source-sensor separation is about equal to half of the distance between the zero contour lines for thin near-vertical sources. The estimated depth of burial for such sources is this separation minus 50 m. If a variety of VG anomaly widths are seen in an area, use the narrowest width seen to estimate local depths.

## **VLF Electromagnetics**

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is locally horizontal and normal to a line pointing at the transmitter.

The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component from two VLF stations. These stations are designated Line and Ortho. The line station is ideally in a direction from the survey area at right angles to the flight line direction. Conductors normal to the flight line direction point at the line station and are therefore optimally coupled to VLF magnetic fields and in the best situation to gather secondary VLF currents. The ortho station is ideally 90 degrees in azimuth from the line station.



The relatively high frequency of VLF (15-25) kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measurable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground to depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically, it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field anomaly is an indicator of the existence and position of a conductor. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

Conversely a negative total field anomaly is often seen over local resistivity highs. This is because the VLF field produces electrical currents which flow towards (or away from) the transmitter. These currents are gathered into a conductor and are taken from resistive bodies. The VLF system sees the currents gathered into the conductor as a total field high. It sees the relative absence of secondary currents in the resistor as a total field low.

As noted, VLF anomaly trends show a strong bias towards the VLF transmitter. Structure which is normal to this direction may have no associated VLF anomaly but may be seen as a break or interruption in VLF anomalies. If these structures are of particular interest, maps of the ortho station data may be worthwhile.

Conductive overburden will obscure VLF responses from bedrock sources and may produce low amplitude, broad anomalies which reflect variations in the resistivity of thickness of the overburden.

Extreme topographic relief will produce VLF anomalies which may bear no relationship to variations in electrical conductivity. Deep gullies which are too narrow to have been surveyed at a uniform sensor height often show up as VLF total field lows. Sharp ridges show up as total field highs.

The vertical quadrature component over steeply dipping sheet-like conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

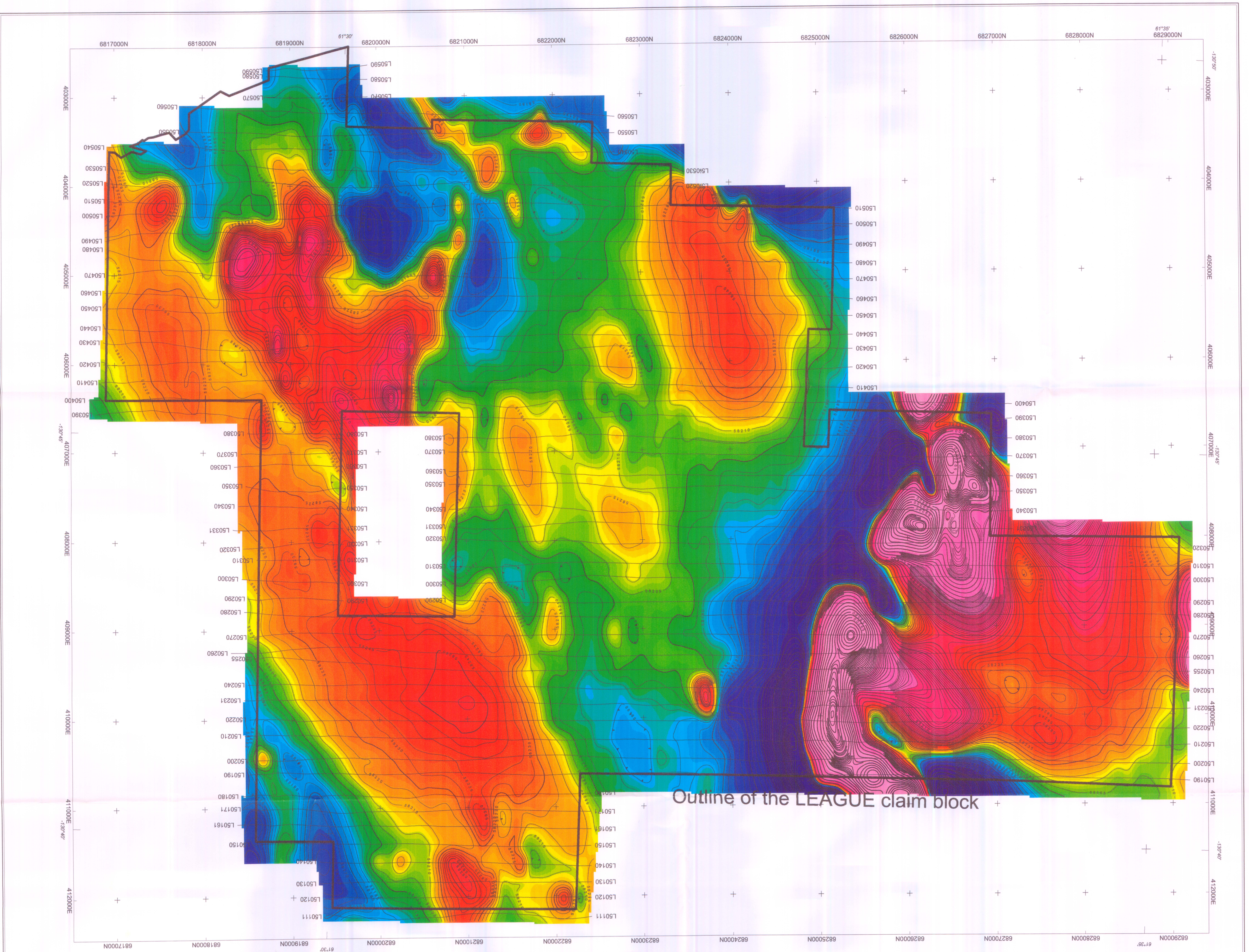
The vertical quadrature component is rarely presented. Experience has shown the total field to be more sensitive to bedrock conductors and less affected by variations in conductive overburden.

### **Apparent Resistivity/Conductivity Maps**

Overburden and different types of bedrock may be modelled as a large area horizontal conductor of fixed thickness. A phasor diagram may be constructed, in the same fashion as for the vertical sheet, to convert the measured HEM in-phase and quadrature response to a depth and conductivity value for a horizontal layer. Traditionally if the thickness is large, an infinite half-space, the associated conductivity value is referred to as "apparent conductivity". We have generalized the use of the word "apparent" to include any model where the thickness of the layer is a fixed as opposed to a variable parameter. The units of apparent resistivity are ohm-m and those of apparent conductivity are the inverse mhos/m or siemen/m. If the chosen model layer thickness is close to the true thickness of the conductor then the apparent conductivity will closely conform to the true value; however, if the thickness is inappropriate the apparent value may be considerably different from the true value.

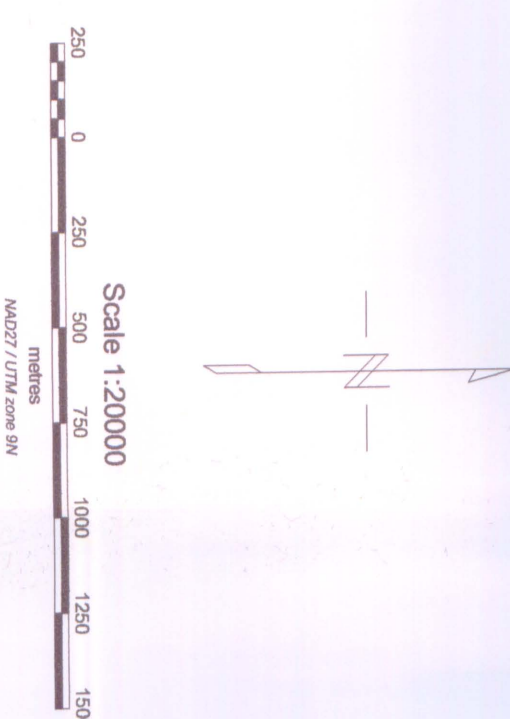
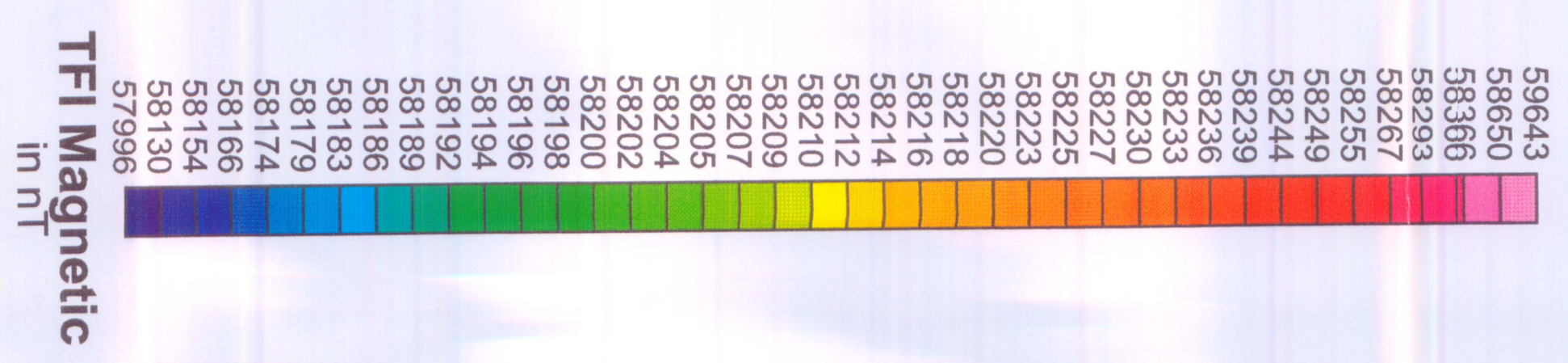
The benefit of the apparent conductivity mapping is that it provides a simple robust method of converting the HEM in-phase and quadrature response to apparent change in ground conductivity.

A phasor diagram for several apparent resistivity models is presented. The general forms for the various thicknesses is very similar and also closely resembles the diagram for the vertical sheet. The diagrams also show the curves for apparent depth. As with the conductivity value the depth value is meaningful if the model thickness closely resembles the true conductive layer thickness. If the HEM response from a thin conducting layer is applied to a thick layer model the apparent conductivity and depth will be less than the true conductivity and depth.

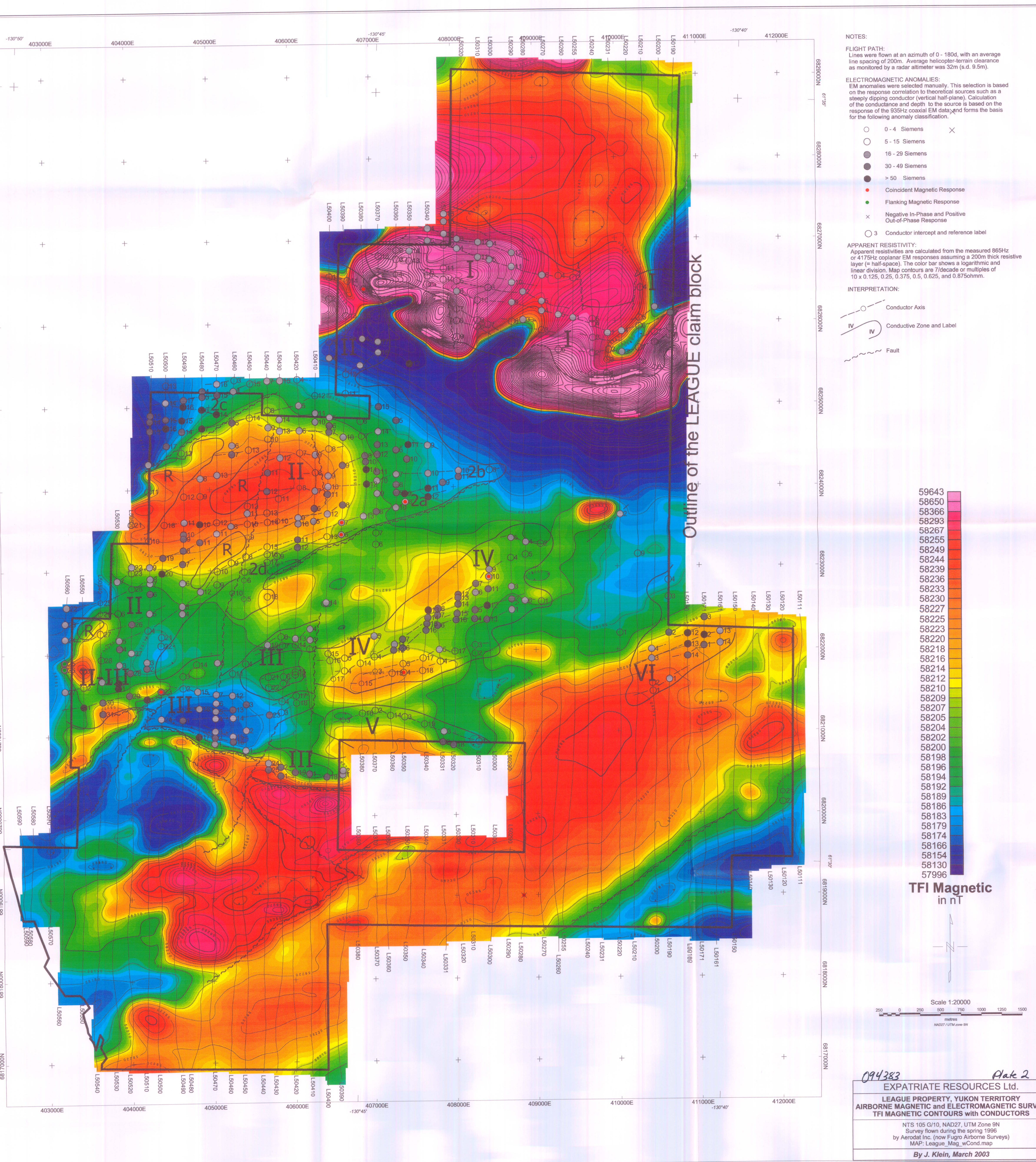


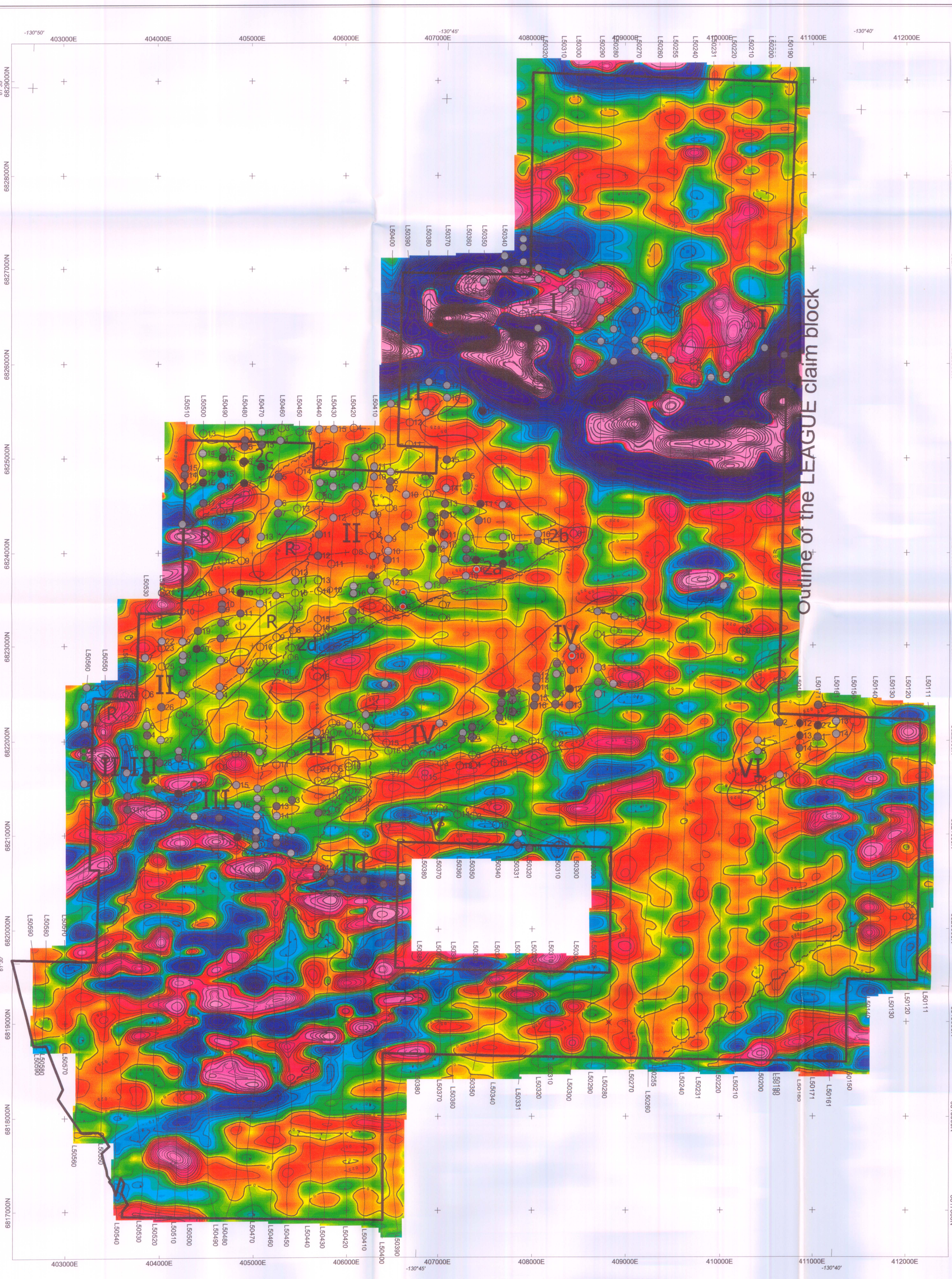
Outline of the LEAGUE claim block

NOTES  
 FLIGHT PATH  
 Lines starting from an azimuth of 0 - 180, with an average  
 line spacing of 200m. Average in-sensor terrain clearance  
 as measured by a laser altimeter was 4m (± 0.5m).  
 TOTAL FIELD INTENSITY MAGNETIC CONTOURS  
 Contours are drawn at 10 nT intervals. Contours are  
 plotted with a 50% probability of an average sensor  
 elevation of 40m, and corrected for sensor elevation  
 of 5, 25 and 100 metres (N1).



094383 Page 1  
 EXPATRIATE RESOURCES Ltd.  
 LEAGUE PROPERTY, YUKON TERRITORY  
 AIRBORNE MAGNETIC AND ELECTROMAGNETIC SURVEY  
 TOTAL FIELD INTENSITY MAGNETIC CONTOURS  
 NTS 050-010-NAD27 UTM Zone 18N  
 By Aerodiv Inc. (now Siga Airborne Surveys)  
 1875, Airport Road  
 Whitehorse, Yukon  
 By J. Kuhn, March 2003





**NOTES:**

**FLIGHT PATH:**  
Lines were flown at an azimuth of 0-180°, with an average line spacing of 200m. Average helicopter-terrain clearance as monitored by a radar altimeter was 32m (s.d. 9.5m).

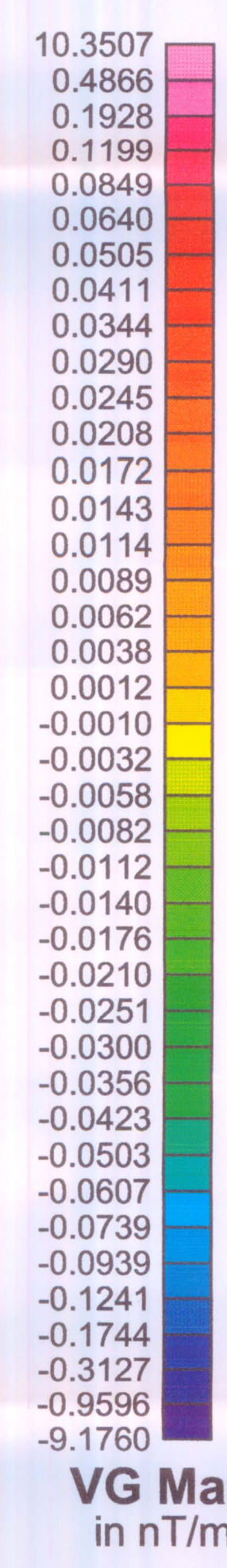
**ELECTROMAGNETIC ANOMALIES:**  
EM anomalies were selected manually. This selection is based on the response correlation to theoretical sources such as a steeply dipping conductor (vertical half-plane). Calculation of the conductance and depth to the source is based on the response of the 93Hz coaxial EM data and forms the basis for the following anomaly classification:

- 0-4 Siemens
- 5-15 Siemens
- 16-29 Siemens
- 30-49 Siemens
- > 50 Siemens
- Coincident Magnetic Response
- Flanking Magnetic Response
- × Negative In-Phase and Positive Out-of-Phase Response
- 3 Conductor intercept and reference label

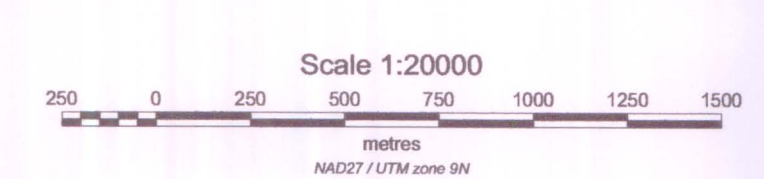
**APPARENT RESISTIVITY:**  
Apparent resistivities are calculated from the measured 969Hz or 4179Hz coplanar EM responses assuming a 200m thick resistive layer (z-half-space). The color bar shows a logarithmic and linear division. Map contours are 7/decade or multiples of 10 x 0.125, 0.25, 0.375, 0.5, 0.625, and 0.875ohm/m.

**INTERPRETATION:**

- Conductor Axis
- IV Conductive Zone and Label
- ~ Fault



**VG Mag**  
in nT/m



094383 *Plk 3*

**EXPATRIATE RESOURCES Ltd.**

**LEAGUE PROPERTY, YUKON TERRITORY**  
**AIRBORNE MAGNETIC and ELECTROMAGNETIC SURVEY**  
**CALCULATED VERTICAL GRADIENT OF TFI MAGNETIC RESULTS**

NTS 105 G/10, NAD27, UTM Zone 9N  
Survey flown during the spring 1996  
by Aerodat Inc. (now Fugro Airborne Surveys)  
MAP: League\_VG\_Mag.map

*By J. Klein, March 2003*



**NOTES:**

**FLIGHT PATH:**  
Lines were flown at an azimuth of 0 - 180d, with an average line spacing of 200m. Average helicopter-terrain clearance as monitored by a radar altimeter was 62m (s.d. 9.6m).

**ELECTROMAGNETIC ANOMALIES:**  
EM anomalies were selected manually. This selection is based on the response correlation to theoretical sources such as a steeply dipping conductor (vertical half-plane). Calculation of the conductance and depth to the source is based on the response of the 935Hz coaxial EM data, and forms the basis for the following anomaly classification.

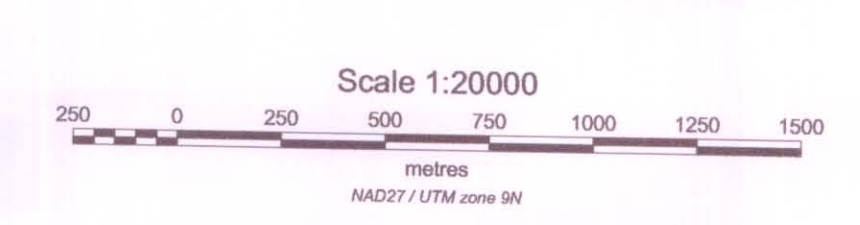
- 0 - 4 Siemens
- 5 - 15 Siemens
- 16 - 29 Siemens
- 30 - 49 Siemens
- > 50 Siemens
- Coincident Magnetic Response
- Flanking Magnetic Response
- × Negative In-Phase and Positive Out-of-Phase Response
- 3 Conductor intercept and reference label

**ELECTROMAGNETIC PROFILES:**  
In-Phase and Out-of-Phase (Quadrature) components (solid and dashed lines) of measured EM responses. Coaxial and coplanar coil pairs operating at fixed frequencies are mounted in a towed bird, with an average coil separation of 6.4m and an average sensor elevation of 32m (s.d. 9.6m).

Profiles are presented as offsets from the flightlines using the following vertical scales:

Coaxial coils:  
935 Hz 4ppm/mm red  
4800Hz 4ppm/mm red

Coplanar coils:  
865Hz 16ppm/mm black  
4175Hz 16ppm/mm black  
33,000Hz 32ppm/mm black

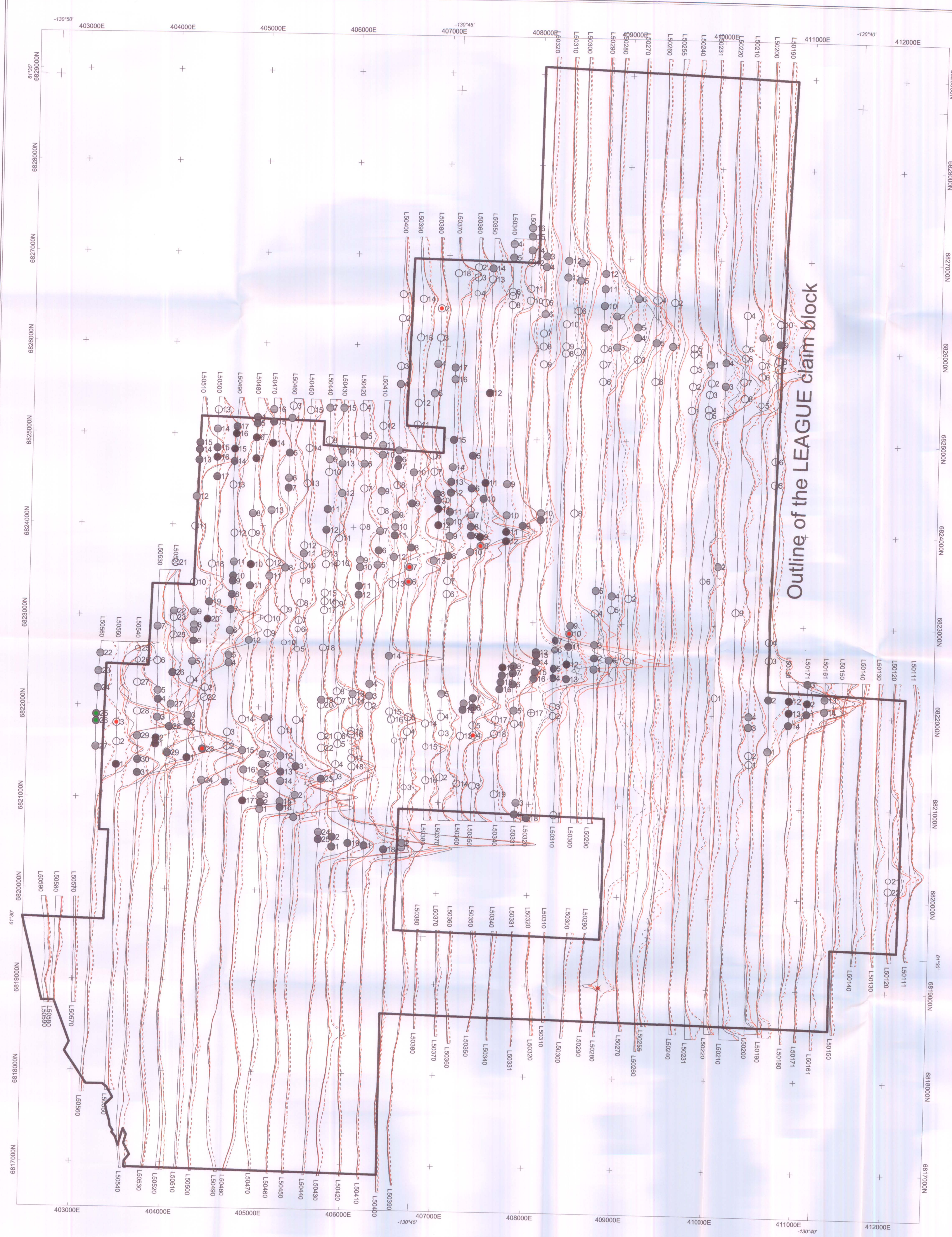


094383 plate 4

**EXPATRIATE RESOURCES Ltd.**  
LEAGUE PROPERTY, YUKON TERRITORY  
**AIRBORNE MAGNETIC and ELECTROMAGNETIC SURVEY**  
935Hz COAXIAL and 865Hz COPLANAR COIL EM PROFILES

NTS 105 G/10, NAD27, UTM Zone 8N  
Survey flown during the spring 1996  
by Aerodial Inc. (now Fugro Airborne Surveys)  
MAP: League\_935\_865Prof.map

**By J. Klein, March 2003**



**NOTES:**

**FLIGHT PATH:**  
Lines were flown at an azimuth of 0 - 180d, with an average line spacing of 200m. Average helicopter-terrain clearance as monitored by a radar altimeter was 62m (s.d. 9.6m).

**ELECTROMAGNETIC ANOMALIES:**  
EM anomalies were selected manually. This selection is based on the response correlation to theoretical sources such as a steeply dipping conductor (vertical half-plane). Calculation of the conductivity and depth to the source is based on the response of the 935Hz coaxial EM data and forms the basis for the following anomaly classification.

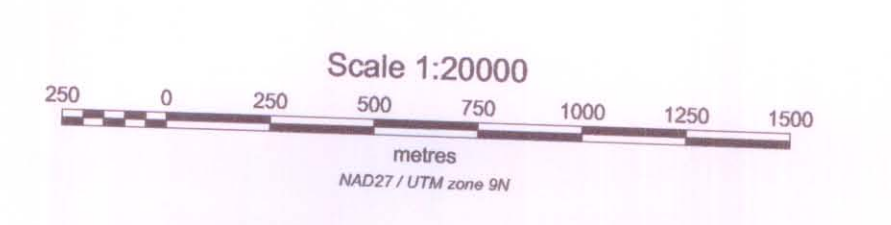
- 0 - 4 Siemens
- 5 - 15 Siemens
- 16 - 29 Siemens
- 30 - 49 Siemens
- > 50 Siemens
- Coincident Magnetic Response
- Flanking Magnetic Response
- × Negative In-Phase and Positive Out-of-Phase Response
- 3 Conductor intercept and reference label

**ELECTROMAGNETIC PROFILES:**  
In-Phase and Out-of-Phase (Quadrature) components (solid and dashed lines) of measured EM responses. Coaxial and coplanar coil pairs operating at fixed frequencies are mounted in a towed bird, with an average coil separation of 6.4m and an average sensor elevation of 32m (s.d.: 9.6m).

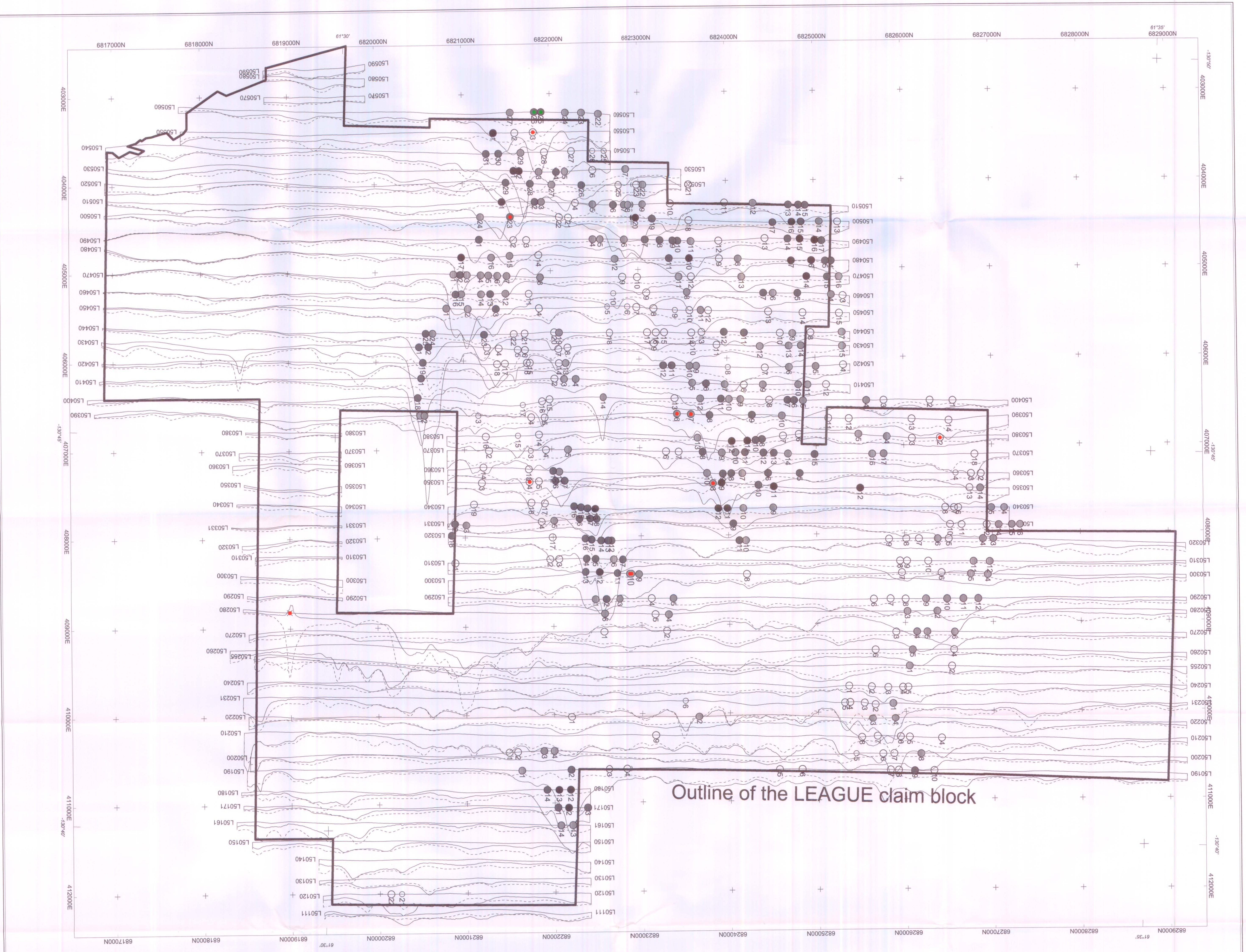
Profiles are presented as offsets from the flightlines using the following vertical scales:

Coaxial coils:  
935 Hz 4ppm/mm red  
4600Hz 4ppm/mm red

Coplanar coils:  
85Hz 16ppm/mm black  
4175Hz 16ppm/mm black  
33,000Hz 32ppm/mm black



094383 Plate 5  
**EXPATRIATE RESOURCES Ltd.**  
 LEAGUE PROPERTY, YUKON TERRITORY  
 AIRBORNE MAGNETIC and ELECTROMAGNETIC SURVEY  
 4600Hz COAXIAL and 4175Hz COPLANAR COIL EM PROFILES  
 NTS 105 G/10, NAD27, UTM Zone 9N  
 Survey flown during the spring 1998  
 by Aerodat Inc. (now Fugro Airborne Surveys)  
 MAP: League\_4175\_4600Prof.map  
 By J. Klein, March 2003



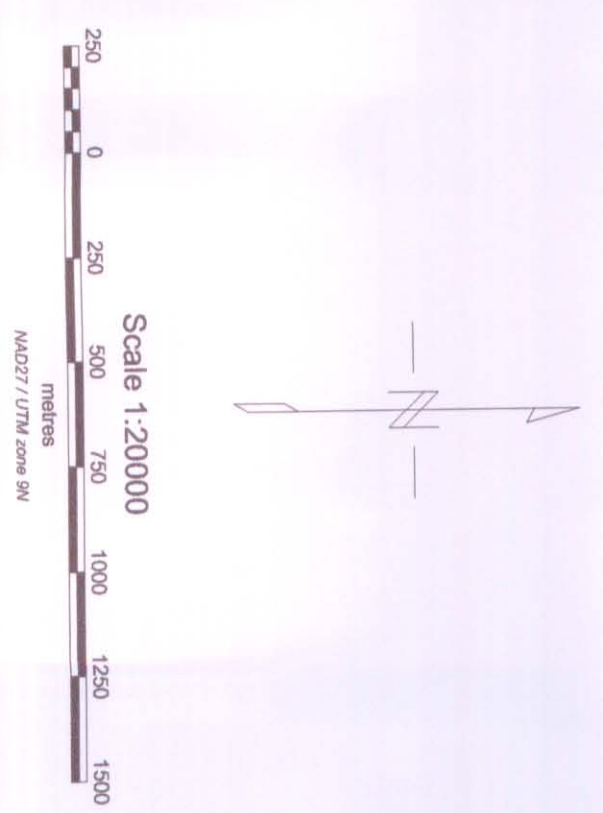
Outline of the LEAGUE claim block

**NOTES:**

**FLIGHT PATH:**  
Lines were flown at an azimuth of 0 - 180°, with an average ground speed of 100 km/h. The flight path is indicated by a dashed line with a 50m spacing.

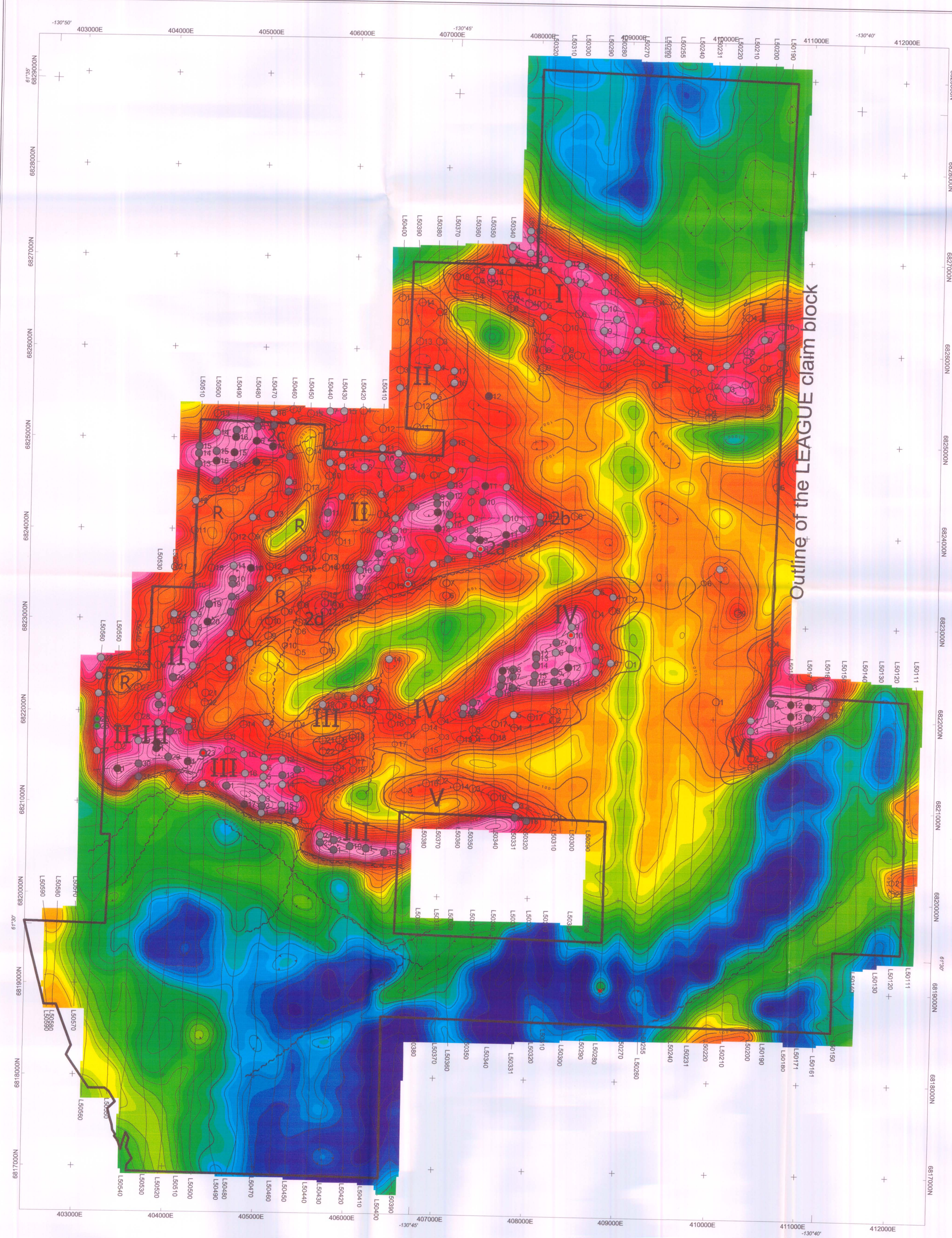
**ELECTROMAGNETIC ANOMALIES:**  
EM anomalies were selected manually. This selection is based on the response to the theoretical source such as a conductor, magnetic material, or a magnetic dipole. The response of the 300Hz coil EM data is based on the response of the 300Hz coil EM data and is based on the following vertical scales:

- 0 - 4 Siemens
  - 5 - 15 Siemens
  - 16 - 29 Siemens
  - 30 - 49 Siemens
  - > 50 Siemens
  - Conductive Magnetic Response
  - Flanking Magnetic Response
  - Magnetic Dipole Response
  - Magnetic Dipole Response
  - 3 Conductor footprint and reference label
- ELECTROMAGNETIC PROFILES:**  
The profiles are presented as follows:  
 - 300Hz: 300 Hz (approx. red)  
 - 4500Hz: 4500 Hz (approx. red)  
 - 4750Hz: 4750 Hz (approx. black)  
 - 33000Hz: 33000 Hz (approx. black)



**094383** **Plate 6**  
 EXPATRIATE RESOURCES LTD.  
 LEAGUE PROPERTY, YUKON TERRITORY  
 AIRBORNE MAGNETIC and ELECTROMAGNETIC SURVEY  
 33,000HZ COPLANAR COIL EM PROFILES  
 NTS 105 G10, NAD27 UTM Zone 8N  
 Survey flown during the spring 1998  
 By Andrew M. Leung, Skidport  
 By J. Klein, March 2003





**NOTES:**

**FLIGHT PATH:**  
Lines were flown at an azimuth of 0 - 180d, with an average line spacing of 200m. Average helicopter-terrain clearance as monitored by a radar altimeter was 32m (s.d. 9.5m).

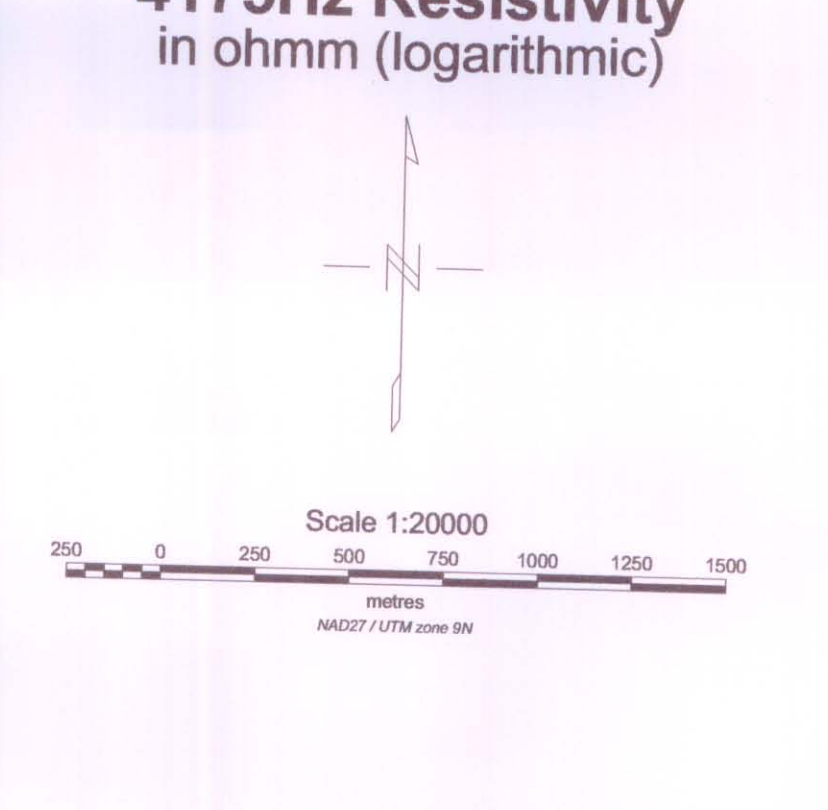
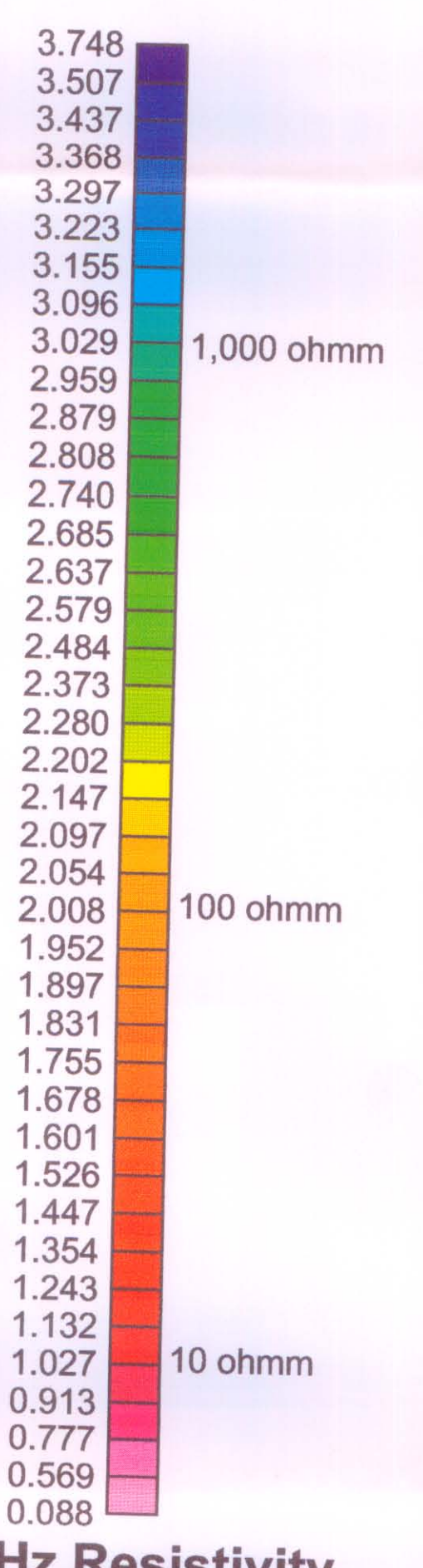
**ELECTROMAGNETIC ANOMALIES:**  
EM anomalies were selected manually. This selection is based on the response correlation to theoretical sources such as a steeply dipping conductor (vertical half-plane). Calculation of the conductance and depth to the source is based on the response of the 555Hz coastal EM data, and forms the basis for the following anomaly classification.

- 0 - 4 Siemens
- 5 - 15 Siemens
- 16 - 29 Siemens
- 30 - 49 Siemens
- > 50 Siemens
- Coincident Magnetic Response
- Flanking Magnetic Response
- × Negative In-Phase and Positive Out-of-Phase Response
- Conductor intercept and reference label

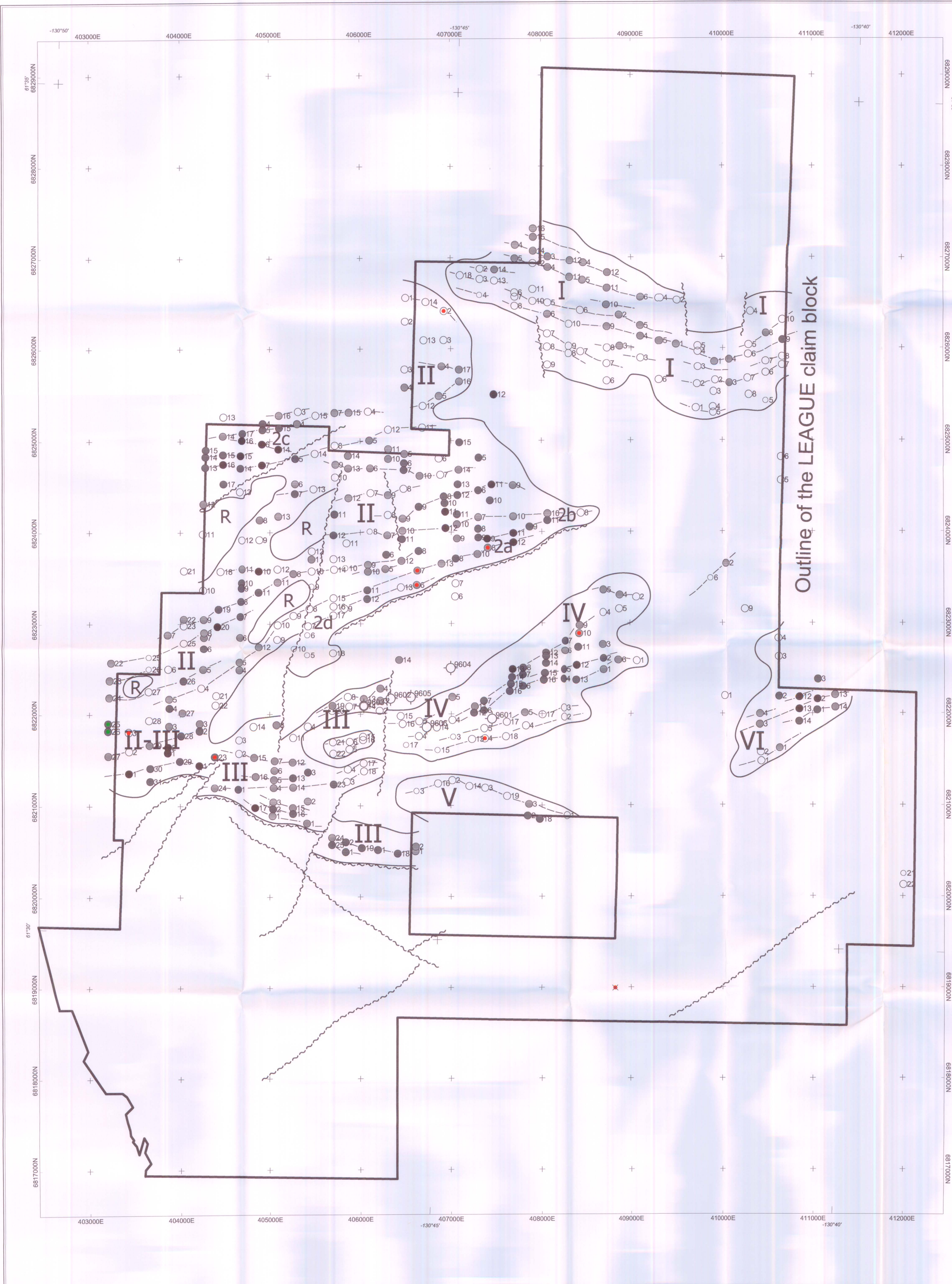
**APPARENT RESISTIVITY:**  
Apparent resistivities are calculated from the measured 865Hz or 4175Hz coplanar EM responses assuming a 200m thick resistive layer (= half-space). The color bar shows a logarithmic and linear division. Map contours are 7/decade or multiples of 10 x 0.125, 0.25, 0.375, 0.5, 0.625, and 0.875ohm.

**INTERPRETATION:**

- Conductor Axis
- IV Conductive Zone and Label
- Fault



094383 Plate 8  
**EXPATRIATE RESOURCES Ltd.**  
 LEAGUE PROPERTY, YUKON TERRITORY  
 AIRBORNE MAGNETIC and ELECTROMAGNETIC SURVEY  
 CALCULATED RESISTIVITY from 4175 COPPLANAR COIL EM DATA  
 NTS 105 G10, NAD27, UTM Zone 8N  
 Survey flown during the spring 1996  
 by Aerodit Inc. (now Fugro Airborne Surveys)  
 MAP: League\_4175Copl\_Res.mpg  
 By J. Klein, March 2003



NOTES:

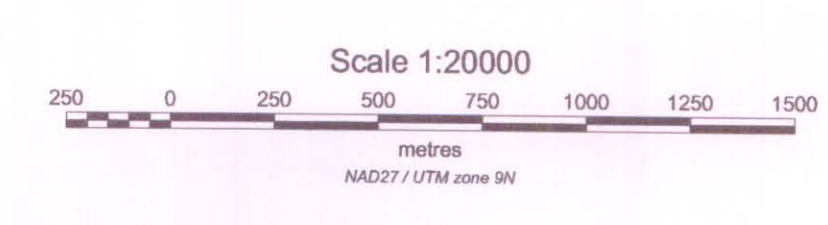
FLIGHT PATH:  
Lines were flown at an azimuth of 0 - 180d, with an average line spacing of 200m. Average helicopter-terrain clearance as monitored by a radar altimeter was 32m (s.d. 9.5m).

ELECTROMAGNETIC ANOMALIES:  
EM anomalies were selected manually. This selection is based on the response correlation to theoretical sources such as a steeply dipping conductor (vertical half-plane). Calculation of the conductance and depth to the source is based on the response of the 95kHz coaxial EM data, and forms the basis for the following anomaly classification.

- 0 - 4 Siemens
- 5 - 15 Siemens
- 16 - 29 Siemens
- 30 - 49 Siemens
- > 50 Siemens
- Coincident Magnetic Response
- Flanking Magnetic Response
- × Negative In-Phase and Positive Out-of-Phase Response
- 3 Conductor intercept and reference label

INTERPRETATION:

- Conductor Axis
- IV Conductive Zone and Label
- ~ Fault
- Drillhole and number



094383 *Plat. 9*

EXPATRIATE RESOURCES Ltd.

LEAGUE PROPERTY, YUKON TERRITORY  
AIRBORNE MAGNETIC and ELECTROMAGNETIC SURVEY  
INTERPRETATION OF GEOPHYSICAL DATA

NTS 105 G/10, NAD27, UTM Zone 9N  
Survey flown during the spring 1996  
by Aerodat Inc. (now Fugro Airborne Surveys)  
MAP: League\_Interp.map

By J. Klein, March 2003