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83-1984

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COMSTAFF PROPRIETARY LIMITEDPRELIMINARY REPORT ON RAMSAY GRID CAMEL 5/63 PART 21. INTRODUCTION

This Interim Report outlines the work carried out over Grid CAM during 1981, 1982 and 1983. The grid is located on the western boundary of EL 5/63 Part 2, 2 km north of the southern boundary. The grid was established to facilitate ground follow-up of an airborne EM Input anomaly.

The work has progressed in two phases after the grid was extended north by 240 metres in 1982.

The report consists of general sections on location, access, previous work and regional geology followed by the work completed and results achieved over the grid.

A final section contains a concluding discussion and recommendations for further work.

2. LOCATION AND ACCESS

The western tie line of Grid CAM runs approximately along the western boundary of EL 5/63 Part 2, the southernmost grid line being 2 km north of the EL's southern boundary (Plan TAS/2/1799). This part of the EL is approximately 20 kilometres south west of Waratah and lies in the Webb Creek drainage system, a tributary of the Huskisson River.

Access is by one of two four wheel drive tracks. The first, Ramsay Road, leaves the Waratah-Savage River Highway 8 km south west of Waratah. It joins the South Huskisson Road approximately 17 km from the highway. The walking track to CAM turns off the South Huskisson Road at 4320 metres.

The alternative route is via the Hatfield Road (an Associated Forest Holdings logging access road) which leaves the Murchison Highway immediately north of the Hatfield River.

It too joins the South Huskisson Road approximately 25 km from the Highway.

The walking track is grid line 5000N extended 740m to the east.

3. PREVIOUS WORK

During the 1969-1970 field season an investigation of the alluvium in Webb Creek was carried out approximately 1.5 km to the south of the CAM grid.

The investigations included deep augering, pitting, minor stream sediment sampling and geological mapping.

Robison (1970) identified three rock sequences;

- i) Western Tuffaceous sequence - acid tuff, mudstone, siltstone, shale.
- ii) Arenaceous sequence - quartzite, siltstone, quartz conglomerate.
- iii) Eastern Tuffaceous sequence - micaceous tuff, mudstone, tuff.

He concluded:-

"....the absence of gold and osmiridium and virtual absence of tin in the concentrates obtained from the auger holes and pits, together with the fact that the creeks entering the swamp are not carrying appreciable amounts of these minerals indicate it is most unlikely that a workable alluvial deposit is present here".

Further work was carried out in the Ramsay River drainage area approximately 2 km to the east;

1971-1972 - geological mapping and stream sediment sampling.

1972-1973 - follow up gridding - Ott Creek Grid.

For details of this work see Green, 1982.

In 1975 EL 5/63 Part 2 was flown utilising the Input Electromagnetic (EM) system. Anomaly CAM was defined as;

Flight Line	234 AW
Fiducial	016.97
Channels	5
Ratio	2/0.3
Altitude (m)	200 m
Magnetic Amplitude (nT)	n.r.
Indicated Source	Surficial and poor

The Input survey also outlined anomalies CAI and CAG which were followed up in 1981-1982 and lie 2 km to the east and 2.5 km to the southeast respectively. The work carried out on those grids is outlined in Green 1982. Much of the work in this present report was carried on concurrently with that on grids CAI and CAG following the establishment of the South Huskisson Road in 1981.

4. REGIONAL GEOLOGY (see Green 1981)

In addition to the units outlined in the above report there are two others which outcrop to the west, they are; the Gordon Limestone and basal sandstone unit (Blissett 1962) mapped as O₁ and O₂ on A V Brown's Preliminary map of the region (A V Brown 1982).

5. WORK COMPLETED AND RESULTS ACHIEVED

Grid CAM was cut in February 1981. It consisted of five grid lines approximately 480 metres long and spaced every 120 metres. Line 5000N, the central grid line, was extended 300 metres west and 720 metres east to South Huskisson Road.

Two extra grid lines were added in January 1982 to extend the grid 240 metres north.

Grid lines and tie lines were surveyed using a measuring tape, compass and clinometer and flagged at 20 metre intervals.

5.1 Geology

All grid lines were geologically mapped in detail. These results are presented, as detailed and interpretative geological plans, (TAS/2/2450 and 2451).

Also on the composite sections (TAS/2/2832/2835 and extensions 3297, 3298).

5.1.1 Lithological Units

Cambrian

a) Crimson Creek Hornfels

This unit is comprised of predominantly tuffaceous lithicwackes and siltstones with minor amounts of tuffaceous greywackes, tuffs, cherts and pebbly hornfels. The siltstones in the CAM area contain significant amounts of carbonaceous material which appears to imply that the area is located towards the top of the Crimson Creek Formation. As the strata is facing west this conclusion is consistent with the regional interpretation.

All of these sediments over the CAM grid have been metasomatised and metamorphosed (contact) to a greater or lesser degree. The rock types now consist of metasomatised sediments, graphitic cordierite hornfels, hornblende hornfels, cordierite hornfels, pebbly hornfels and spotted hornfels (see Appendix 1 for Petrological Report).

This unit strikes NW-NE and dips steeply to west. The beds within appear to be tightly folded with steep overturning to the east.

Within this unit and locally diagnostic are porphyritic microdolerites and basalts. The phenocrysts are almost exclusively feldspar in a groundmass of feldspar, pyroxene and magnetite. These basic rocks have also been affected by the granite's proximity being contact metamorphosed, metasomatised and often uralitised.

b) Ordovician Sandstones and Pebbly Grits

This unit which is basal to the Gordon Limestone mapped to the northwest and southwest, marginal to the Huskisson Syncline (Brown, 1982) appears to be faulted across into the CAM area.

The rock types interpreted to belong to this unit are hornfelsed psammites which consist of quartz pebbles and clasts, chert-metaquartzite clasts in a hornfelsed phlogopitic matrix with

minor amounts of chromite, magnetite, tourmaline and zircon. One thin section (T 9951) contains rhyolitic lithic fragments.

c) Meredith Granite

The Meredith Granite outcrops in the extreme northwest corner of the grid. The granite is a composite massif and the phase present at CAM is the marginal porphyritic biotite granite phase (Stockley 1972).

One sample (Z 2625) located right on the contact is described as a low grade greisenised granitic breccia. Unfortunately it contained no anomalous geochemical values.

d) Quaternary Alluvial

Extensive areas of the western and southern portions of the grid are covered by Quaternary alluvium mostly associated with a major tributary of Webb Creek cutting L 5000N and 4510E. The alluvium consists of hornfels, quartz, quartzite, chert and minor granite.

5.1.2 Structure

The CAM area is cut by major N-S and ENE-WSW faults. These faults largely control the drainage system of the area and appear to continue into the granite to the north.

The Ordovician sandstone and pebbly grits appear to have been faulted across by one of the ENE-WSW faults which also truncates the South Huskisson Road (4540N) causing a dramatic shift of strike.

The contact between the Ordovician and Cambrian Crimson Creek sediments is interpreted to be one of the N-S faults which is possibly an extension of the major suture on the eastern margin of the Huskisson Syncline. This suture appears to fault out the upper Cambrian Dundas Group.

5.2 Geophysics

5.2.1 Electromagnetic Surveys (Plans TAS/2/2432-2435, 3297/3298)

The 1975 airborne Input EM (Electromagnetic) survey defined anomaly CAM as being a five channel anomaly attributable to a 'poor' surficial source.

The grid was surveyed in January 1982 with the Crone PEM ground system. The relevant excerpt from D B Trussell's (AAA Ltd, Senior Geophysicist) 1982 Ramsay EM Report is included below;

CAM

Coverage was obtained as follows:

Line 4760N	4790E-5190E
4880N	4810E-5170E
5000N	4470E-5190E
5120N	4790E-5190E
5240N	4830E-5190E
5360N	4830E-5190E
5480N	4790E-5190E

A conductor is present on:

Line 5000N	at 5070E
5120N	at 5030E
5240N	at 5010E

It is cut off to the north by 5360N. It is cut off to the south by 4880N. The dip is near vertical, the depth on line 5120 is 40m. The anomaly should be drilled on line 5120N. A 45° hole to intersect 5030E at a depth of 55m should adequately test the conductor. The conductor is coincident with a broad magnetic anomaly which is 400 nT in amplitude.

Two other EM responses occur on the CAM grid. One is at 4850E on line 5120N. There is no indication of its presence on the adjacent lines. It is very unusual in that the amplitude increases with channel number. It is difficult to envision a real conductor giving a response like this. The other anomaly is located off the west end of 5000N at perhaps 4450E. It is similar to the response at 5120N 4850E in that the amplitude increases with depth.

RECOMMENDATIONS

a) Holes should be drilled as follows:

CAF - to intersect 4220N 4850E at 30m depth
- to intersect 4340N 4545E at 65m depth

CAM - to intersect 5120N 5030E at 55m depth

b) The location of all other conductors should be checked with geological mapping and other data. To make certain that they, indeed, can be attributed to carbonaceous shales or other features of no interest.

5.2.2 Ground Magnetic Surveys

Results of the ground magnetic surveys are presented as a contoured total magnetic field plan of the grid (TAS/2/2458) and as individual line profiles on the composite sections (TAS/2/2432-2435, 3297-3298).

The surveys were run using a Geometrics proton precession magnetometer with the sensor being back packed. Measurements were taken every 20 metres along the grid lines and where the difference between successive measurements exceeded 50 nT an intermediate reading was taken.

The surveying of the grid was undertaken in two parts, the first in 1981 and second in 1982, following the extension of the grid. A portion of L 5240N was rerun in 1982 so the two surveys could be calibrated after diurnal corrections.

The magnetic pattern over the Ordovician quartzose sediments is predictably quiet whereas that over the Crimson Creek hornfels and volcanics is again typically erratic. This erratic pattern has been attributed to the relatively high amount of detrital magnetite in the sediments and primary magnetite in the volcanics. ?

The major feature outlined on the ground magnetic contour plan is a central N-S anomaly truncated by the ENE-WSW fault between lines 4880N and 5000N. As the feature is parallel to the regional strike, it is probably due to formational member containing more magnetite than the surrounding sediments.

It is approximately coincident with the major EM anomaly.

There are a number of small anomalies in the north-eastern portion of the grid, these may be due to buried basic volcanic units.

5.3 Soil Geochemistry

The results of the C horizon soil sampling programme carried out at 20 metre intervals along all grid lines in contoured plan form (TAS/2/2452-2457 plus 2459) and are also plotted on the composite sections. (TAS/2/2432-2435, 3297-3298).

5.3.1 Sn (Plan TAS/2/2456)

The maximum value of 30 ppm is enclosed in an anomaly cutting across the southwest corner of the grid. This anomaly is due to secondary concentration in the Quarternary alluvium associated with the major tributary of Webb Creek and minor creeks draining CAM.

The only other 'anomaly' is an area on L 5480N centred on 5060E. The three values involved are low (max 15 ppm) and as the outcrop in the area is reasonable, the anomaly does not appear to reflect a visible, economic concentration of Sn.

All the other anomalous values are low and scattered.

5.3.2 W (Plan TAS/2/2457)

The anomalous W samples, like Sn, are low and scattered except for minor concentrations owing to the presence of Quarternary alluvium.

The highest value of 40 ppm (L 5000N/4440E) occurs in an anomaly at the western end of L 5000N. Unfortunately this anomaly is located in a swamp on Quarternary alluvium. It also appears to be outside the Exploration Licence.

5.3.3 Cu (Plan TAS/2/2452)

In this case an anomalously low population has been contoured in addition a single anomalously high one.

The low population is approximately coincident with the Ordovician sediments and such values would be expected from a basically quartzose bedrock. Most of the areas containing the anomalously high population are approximately coincident to mapped areas of basic volcanics and as there are no values greater than 135 ppm, the volcanic rocks would probably provide the minimal enhancement required.

The maximum value of 135 ppm (5000N/5640E) and its associated anomaly does not appear to be associated with a basic volcanic unit and is coincident with Pb, As and Zn anomalies. These high values maybe associated with the rare occurrence of quartzite within the Crimson Creek hornfels mapped at 5627E on L 5000N.

5.3.4 Pb (Plan TAS/2/2453)

The Pb anomalies outlined by the contour plan are the most interesting and show significant enhancement over background.

There are three separate anomalies worthy of note. The first, at 5000N/5640E - 60E (eastern anomaly) contain the highest value from the grid 0.196% Pb. It is coincident with Cu, As and Zn anomalies although both Cu, As and Zn are not enhanced to a similar magnitude as the Pb is.

The second anomaly, at 5000N/5180E-5260E (central anomaly), also contains a very high value 0.16% Pb. The anomaly is approximately coincident with a larger Cu anomaly and minor Sn responses.

The third distinct anomaly occurs on L 5120N from 4740-4820 and will be referred to as the western anomaly. The western anomaly like the central is associated with a larger broad Cu anomaly. The Pb values are not as high as in the previous two anomalies, however they are significantly enhanced, max value 580 ppm.

5.3.5 Zn (Plan TAS/2/2454)

The one anomaly outlined on the contour plan is over lines 4760N and 4880N at 4800E and 4840E respectively. Unfortunately there are only two values involved, 240 and 275 ppm which do not reflect significant enhancement ie an order of magnitude.

One other sample (181) is anomalously high in Zn and it is coincident with the eastern, Cu-Pb-As anomaly.

5.3.6 Ni (Plan TAS/2/2455)

The Ni result plan was contoured in a similar manner to Cu. The anomalously low population once again approximately outlines the Ordovician quartzose sediments and is consistent with the low Ni values of quartz rich rocks.

The one anomalously high value of 0.11% from 5000N/4840E is coincident with a basic volcanic body mapped in the area. Although the soil enrichment is very high and greater than soil results over other basic volcanic units it is not considered worthy of extra work.

5.3.7 As (Plan TAS/2/2459)

Unfortunately due to a clerical error As results are not available for parts of the grid specifically L 4760N and L 5000N (5160E-5360E).

The anomalously high As results are again scattered and generally low, maximum 100 ppm.

A two sample anomaly, max 58 ppm, is coincident with the Cu-Pb-Zn eastern anomaly.

The maximum value of 100 ppm occurs at the eastern end of L 4880N and is possibly associated with the alluvium derived from the nearby creek.

Two other minor anomalies occur at L 4880N, 4820E and 5240N, 4740E but are not coincident with any other element and are not considered worthy of extra work.

5.4 Rock Geochemistry

Thirty eight rock samples were dispatched to Analabs for assay of a number of elements, most commonly; Sn, Cu, Pb, Zn, Ni, As, Ag and W, other elements sometimes included were; F, Li, Mo and Bi. The results together with sample locations and brief descriptions are appended as Appendix 11.

A statistical analysis is precluded by the variable nature of the rock types analysed. However by inspection a number of samples are enhanced. The most significant is a sample of float (T 9963) from a creek draining the southern portion of the grid (4760N/4993E) which contained 0.27% Sn. Unfortunately no up-slope soil Sn anomaly was detected nor was the rock type found in outcrop.

Two samples T 9930 and T 9931 from T/L5240E are enhanced in Sn, 170 and 100 ppm respectively. Both samples were float samples and apparently did not originate on the grid. They are composed of quartz and green tourmaline, probably representing a vein from the Meredith granite to the north.

Three samples appear to be significantly enhanced in Cu. They are Z 2610, Z 2621 and Z 2622 and are all associated with traces of chalcopyrite associated with pyrrhotite and pyrite found in metasomatised cherty possibly calcareous rocks adjacent to a major N-S fault.

The remainder of the results are variable and probably represent the fluctuations according to rock type.

6. DISCUSSION AND RECOMMENDATIONS

An electromagnetic conductor of 240 metres strike length has been successfully delineated. It is approximately coincident with a low, broad 400 nT magnetic high and equally low and broad Cu soil anomaly, maximum 99 ppm.

Geological mapping over the grid has outlined units of originally calcareous composition, which have been metasomatised and mineralised with pyrrhotite and chalcopyrite.

In light of these favourable factors one diamond drill-hole is proposed to test the coincident EM - magnetic - Cu anomaly. The drillhole proposal by D B Trussell in his report would appear to be adequate;

Collar Details

Grid Co-ordinates	5120N/4974
National Grid Co-ordinates	539247m N/370617m E
Azimuth	078°M/090°T
Inclination	-45°
RL	+ 240m (approx)
Depth	120 m
Target Depth	75 m

Although a drillhole is proposed for CAM it must be remembered that there is graphite in the pelitic sediments. It is mostly present in the fine groundmass as an accessory, rarely as a major component. As a preliminary action to drilling a number of rock samples should be taken from the drillhole vicinity and tested for conductivity in addition to those already described as containing graphite.

The drill access track could be designed so as to intersect the eastern Pb-Cu-As-Zn and central Pb-Cu-(Sn) anomalies. However the only soil geochemical ^{anomaly} worthy of follow up in its own right is the eastern anomaly by virtue of its polyelemental composition and high Pb values. To facilitate this follow up two short flanking lines to L 5000N are proposed. They would be 100m to the north and south and 200 metres long from 5520E to 5720E.

It is also recommended that the source of T 9963 (0.27% Sn) be located by stream sediment sampling and mapping of the creeks in the vicinity.

6.1 Statistical Summary

Diamond Drilling	120m
Drill Access Road	1200m
Grid Cutting	400m
Surveying and Flagging	2000m
Stream Sediment Samples	10
Soil Samples	21

Dr B Trussell

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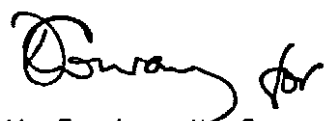
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9th April, 1981

REPORT CMS 81/3/10

YOUR REFERENCE: Letter dated 5.3.1981
DATE RECEIVED: 6th March, 1981
SAMPLE NOS.: 19 Samples
SUBMITTED BY: N.P. Green
WORK REQUESTED: Petrology


H.W. Fander, M. Sc.

REPORT CMS 81/3/10Notes:

Nineteen rock samples were received for thin-section preparation and petrological examination. Results are incorporated in the brief descriptions in the accompanying tables.

Summary

The bulk of this suite comprises contact-metamorphosed and variably metasomatised sediments which, on the basis of relict features, appear correlatable with the Crimson Creek Formation. Characteristic are volcanoclastic wackes with affinities to the Dreadnought Hill Member and a pelite, acid volcanoclastic to chert-clastic psammite association with analogies to the Dalcoath and Renison Bell members. These are represented by specimens T8863-8866-8868, 8873, 8882, 9925, 9946, 9947, 9948 and T9949, 9950, 9951, 9953, 9954, 9956, 9957 and 9958 respectively. A subordinate suite of uranitised (?Cambrian) microgabbros comprises T9952 and T 9955.

Contact-metamorphic assemblages grade from hornblende hornfels facies, typically with marked metasomatic (particularly Mg, Fe) effects to marginal albite-epidote hornfels with relatively minor Mg metasomatism. Skarns are represented by T8863, 8866, 8868 (and 8873, 8882) with a general trend to decreasing metasomatic "grade" in that order. Of this, subsuite T 8868 appears to represent a vein with affinities to previously described specimens T8236 and T 8238. There are affinities, here, with the medium to high grade Fe-Mg skarns and related veins at Mount Lindesay.

Crimson Creek labile sediments, in general, are characterised by conspicuous clastic opaques. The dark opaque grains in, for example, T9956 and 9957 are detrital magnetite and chromite and are conspicuous only by virtue of their fine sand sizing in these rocks.

D. Cowan, B. Sc.

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Sample No.	Classification - Composition	Fabric	Accessories	Comments
T 8863 (T.S. 36282) AF 4520E/4460E	Skarn. Vesuvianite with varying proportions of fine-grained included and intergranular diopside-hedenbergite, actinolite, minor cloudy sphene.	Coarse, granular, semi-orientated vesuvianite. Faint contorted/segmented relict banding.	Minor traces of chloritised biotite or phlogopite.	Brecciated, skarnised sediment, but of uncertain affinities (labile clastic, alternately, less likely carbonate facies). Patchy vein vesuvianite.
T 8866 AF 4520E/4420N	Skarn. Fine granular to coarse poikilitic vesuvianite with closely intergrown diopside, minor actinolite. Sporadic diopside veins with talc (after carbonate).	Distinct relict, weakly bedded, fine sandy clastic fabric.	Traces prehnite, tremolite, ultrafine cloudy semi-opaque sphene. Rare poikilitic arsenopyrite.	Clearly a skarnised labile (?tuffaceous) "wacke" and tends to confirm 8863 as such.
T 8868 AF 4520E/4355N	"Skarn". Coarse granular to radiating vesuvianite with subordinate included and intergranular dark hastingsitic actinolite, minor diopside	Essentially massive with no tangible relict features.	Traces wollastonite, grossular-andradite. Minor Fe-staining (after amphibole).	Probably represents a vein. Assemblage essentially isograde with the above contact-metamorphosed/metasomatised sediments.
T 8873 AF 4460N/4520E	Metasomatised Psammite. Fine-grained grunerite, closely intergrown albite-oligoclase, semi-pervasive ultrafine diopside-hedenbergite, graphite, minor pyritised pyrrhotite.	Contorted to brecciated, relict fine-grained psammitic to pelitic banding.	Traces phlogopite, partly chloritised. Ultrafine cloudy sphene.	contact-metamorphic assemblage is slightly lower-grade in comparison with 8863, 66, 68. Brecciation predates alteration (sim. 8863).
T 8882 AF 4280N/4520-25E	Metasomatised Psammite. Fine Acicular tremolite, closely intergrown phlogopite with recrystallized relict clastic feldspar, intermediate lava clasts, quartz, chert fragments.	Weakly bedded, silty fine to medium sandy clastic fabric. Minor tremolite-quartz veinlets.	Conspicuous opaques (relict clastic). Disseminated fine-grained pyrrhotite.	Hornfelsic recrystallization/magnesian metasomatism at essentially albite-epidote-hornfels facies. Affinities with Crimson Ck. Fm. tuffaceous wackes.
T 9945 with Hudson RD 325m	Metasomatised Psammite. Fe-stained montmorillonite, chlorite with disseminated relict clastic quartz, (degraded) feldspar, oxidised opaques, leucoxenitic semi-opaques.	Relict, weakly bedded, slumped, silty fine to medium sandy clastic fabric.	Vague degraded, angular lava clasts.	Primarily a labile (reworked tuffaceous wacke sim. T 8882 etc.). Clays represent weathered metasomatic mica, amphibole at least in part.
T 9946 with Hudson RD 2817m	Tuffaceous Siltstone. Degraded (kaolinised, chloritised) clastic, splintery to angular feldspar, poorly defined chloritic lava clasts, degraded mica flakes, oxidised opaques, chloritic matrix.	Incipiently sheared, faintly laminated, silty clastic fabric.	Weakly recrystallized, silt-sized clastic quartz. Leucoxenitic semi-opaques.	Conspicuous, mildly abraded microshard components. Chlorite appears in part secondary after metasomatic phlogopite.
T 9947 South Hudson RD 3030m	Tuffaceous Greywacke. Variably chloritised basic-intermediate lava clasts, weakly chloritised, splintery to angular feldspar, conspicuous clastic opaques; hematitic, chloritic matrix.	Weakly bedded, incipiently graded, fine to medium sandy silt/silty sand.	Minor traces clastic quartz, chloritised biotite flakes.	Colouration reflects abundant clastic magnetite-magnetite. Clasts, particularly lavas, moderately reworked. No definite metasomatic features.
T 9948 CAM (T.S. 36290) TLC 5240N/4910N	Metasomatised Tuffaceous Greywacke. Fine to ultrafine actinolite with relict clastic quartz, partly actinolitised feldspar, basic-intermediate lava clasts, frequent leucoxenitic opaques	Weakly bedded, incipiently graded, silty fine to medium sand.	Traces clastic magnetite. Minor late veinlet prehnite.	Textural, compositional affinities with T 9947, but with relatively inconspicuous clastic opaques. Mildly hornfelsed, extensively metasomatised.

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Sample No.	Classification - Composition	Fabric	Accessories	Comments
T 9949 CAM T/L 5240E/4972N (T.S. 36291)	Spotted Hornfels. Ultrafine quartz and kaolin-illite with abundant poikiloblastic cordierite, conspicuous carbonaceous matter, minor Fe-sulphide, pale titaniferous phlogopite.	Relict, slumped, massive to microlaminated pelitic bedding. Poikiloblasts mean 200µ.	Sparse, extremely fine rutile, rare ?metasomatic schorl.	Marginally contact-metamorphosed carbonaceous pelite. Sulphide apparently syngenetic. Phlogopite, rutile reflect mild metasomatism.
T 9950 CAM L 5240N/5023E	Spotted Hornfels. Cordieritic hornfels similar to T 9949. Intercalated quartz-phlogopite hornfels with sparse cordierite representing relatively quartzose silty bands.	Millimetric silty bands in finely laminated pelite, microfaulted, weakly quartz-veined.	Minor traces rutile, ultrafine schorl.	Carbonaceous matter in pelite concentrated into pyritic clots with fringes of muscovite reflecting incipient tectonic overprint.
T 9951 CAM T/L 4760E/5125N	Hornfelsed Psammite. Relict clastic quartz, subordinate, phlogopite-stained feldspar, minor felsite, chert fragments. Hornfelsed, phlogopite-stained quartzofeldspathic matrix with poikilitic cordierite.	Relict, incipiently bedded, silty fine to medium sandy clastic fabric, hornfelsed	Clastic opaques, tourmaline. Minor traces extremely fine-grained Fe-sulphide.	Primarily a volcanomict lithic sandstone with "rhyolitic" components in contrast to T 9947 etc. Weakly metasomatised (phlogopite), isograde with 49, 50.
T 9952 CAM L 5120N/5145E	Uralitised Microgabbro. Sparse saussurite/albitised plagioclase phenocrysts in matrix of similarly altered feldspar, uralitised pyroxene, conspicuous fine magnetite, ilmenite.	Porphyritic, medium-grained doleritic groundmass. Moderately stressed, actinolite-veined.	Minor quartz veinlets. Disseminated pyrrhotite.	Typical uralitised basic minor intrusive, alternately core of flow. Stress effects suggestive of Cambrian facies.
T 9953 CAM L 5120N/5183E	Metasomatised Siltstone. Microgranular, quartzofeldspathic material with pervasive clots of actinolite. Disseminated relict clastic quartz, opaques. Disseminated pyrrhotite.	Essentially massive, fine sandy siltstone. Hornfelsed. Rare cherty intraclasts.	Patchy poikilitic prehnite.	Hornfelsed/metasomatised labile pelite (tuffaceous or basic-volcanomict). Chert zones appear to reflect slumping, but finer details obliterated
T 9954 CAM L 5000N/4740E	Spotted Hornfels. Variably altered (sericitised, muscovitised) cordierite poikiloblasts with interstitial fine phlogopite, quartz. Pervasive graphite; semi-pervasive Fe-staining.	Faint contorted pelitic banding. Poikiloblasts mean 150 µ, approx. 75-80 % of rock.	Minor traces extremely fine schorl, dravite. Late kaolin (+ limonite) veinlets.	Close affinities with T 9949, 50, 51, but with marked retrograde sericitisation of cordierite.
T 9955 CAM L 5000N/4795E	Uralitised Microgabbro. Variably saussurite-actinolite-stained/albitised labradorite laths and completely actinolitised pyroxene. Patchy actinolite + phlogopite veins.	Relict medium-and even-grained doleritic (subophitic).	Leucoxenised opaques. Traces secondary magnetite, sparse pyrrhotite disseminations (in veins).	Close affinities with T 9952. Main contrast is textural. Veins (to 1 cm+) mildly fractured, granulated.
T 9956 CAM L 4880N/4975E	Hornfelsed Psammite. Relict detrital quartz, subordinate chert-met quartzite clasts with hornfelsic quartz-phlogopite matrix, disseminated poikilitic muscovite clots (after cordierite).	Relict, weakly bedded, gritty, sandy clastic fabric.	Detrital fine sand-sized magnetite, chromite, sparse detrital zircon, tourmaline, feldspar.	Affinities with T 9951, but only incipiently volcanomict (trend ortho-quartzite). Detrital opaques partly concentrated into thin placers.
T 9957 CAM L 4880N/4984E (T.S. 36299)	Metasomatised Psammite. Relict detrital quartz, subordinate chert-met quartzite clasts with hornfelsed/tremolite-stained quartz-phlogopite matrix.	Pebbly to gritty, poorly sorted, sandy clastic fabric.	Detrital magnetite, chromite, rare zircon, tourmaline. Sparse chlorite (after tremolite).	Close affinities with T 9956 with main contrast the poorly sorted pebbly fabric. Tremolite probably replaced accessory carbonate cement.

[illegible]

Central Mineralogical Services



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Comstaff Pty. Ltd.
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WARATAH / TAS. 7321

9th March, 1983

REPORT CMS 83/2/17

YOUR REFERENCE:	Consignment No. 83/31
DATE RECEIVED:	21st February, 1983
SAMPLE NOS.:	12 Samples
SUBMITTED BY:	N.P. Green
WORK REQUESTED:	Petrology

H. W. Fander
H.W. Fander, M. Sc.

REPORT CMS 83/2/17

Twelve rock samples were received for petrological examination and comparison; thin-sections were prepared, and offcuts were subjected to potash stain tests where necessary. The rocks are briefly described in the accompanying tables.

Summary

This suite consists almost entirely of metasediments (all except for Z 2625 and Z 2614) of varying types; some show evidence of metasomatism, and it is not always possible to distinguish clearly between contact-metamorphism and metasomatism. The two processes often go hand-in-hand in any case.

Many of the hornfelses, derived from Al-rich sediments, can be assigned to the hornblende-hornfels facies of contact-metamorphism, and in some (e.g. Z 2619, Z 2620) metamorphism appears to have proceeded in progressive stages. Graphite is a fairly widespread component, and sulphides occur sporadically (dominantly pyrrhotite/pyrite); whereas the graphite represents syngenetic carbonaceous matter, the sulphides are either introduced or redistributed.

Most of the original sediments were fine-grained (siltstones, argillites), but with pebbles and sand- to grit-sized grains; in some, soft-sediment deformation features are preserved, indicating turbulent conditions of deposition. One rock, Z 2618, is thought to be of pyroclastic origin and maybe correlatable with the Crimson Creek Formation; this could apply to Z 2616 as well.

Z 2625 is pervasively sericitised and limonitised, hence the interpretation of this rock as a granitic breccia is tentative.

Apart from traces of chalcopyrite identified in Z 2621, no economic minerals were detected; in some instances, sphene may be difficult to distinguish from cassiterite, but it is believed that cassiterite is absent in these rocks.

H.W. Fander, M. Sc.

Sample No.	Rock Type - Composition	Fabric	Minor Minerals	CENTRAL MINERALOGICAL SERVICES Comments
Z 2609 (T.S. 45278) 540E 5425N	<u>Metasomatised Sediment.</u> Bands of micro-crystalline quartz-feldspar with sphene, alternating with coarse diopside bands, and layers of altered lithic (?dolerite) grains.	Less altered portions have cherty fabric; relict igneous textures in lithic grains.	Veins, patches of acicular prehnite. Actinolite aggregates.	Original rock possibly a chert with bands of lithic grains and carbonates; possible Crimson Creek unit.
Z 2611 5360N 5217E	<u>Metasomatised Pebbly Metasediment.</u> Graphitic cordierite-hornfels pebbles; lenses of coarser biotitised sandstone in mass of very fine biotite hornfels, possibly tuffaceous.	Some features of a soft-pebble conglomerate and of turbidites.	Carbonaceous/graphitic material and pyrite. Altered lithic grains.	Fine biotite thought to be metasomatic, postdating mild contact metamorphism of turbiditic sediment.
Z 2612 5360N 5106E	<u>Graphitic Cordierite Hornfels.</u> Small irregular cordierite poikiloblasts set in fine mass of quartz, graphite, fine pyrite; biotite streaks, patches (?younger).	Fine semi-schistose preferred orientation. Finely folded.	None detected.	Original rock was most probably a carbonaceous siltstone, fine laminated; medium-grade contact metamorphism.
Z 2614 5360N 5158E	<u>Metadolerite.</u> Small laths and occasional phenocrysts of andesine, numerous patches of fibrous actinolite replacing pyroxene; conspicuous magnetite.	Medium-grained igneous, typical doleritic fabric; replacement textures.	Substantial veins of matted-fibrous actinolite. Minor phlogopite.	Rock is believed to be contact metamorphosed/metasomatised, not merely uraltised.
Z 2615 5360N 5140E	<u>Graphitic Cordierite Hornfels.</u> Composed mainly of interlocking cordierite poikiloblasts with interstitial and embedded muscovite, biotite, graphite flakes.	Very uniform, medium-grained, with relict banding due to graphite.	Pyrite veins with phlogopite cross-cutting fabric.	Originally a pelitic carbonaceous sediment, moderately contact-metamorphosed, with younger veins (cp. Z 2612).
Z 2616 5360N 4898E	<u>Hornblende Hornfels.</u> Framework of subangular quartz and altered lithic grains; interstitial fine matted amphibole (?tremolite) and intergrown biotite.	Well-sorted, weakly but distinctly bedded, medium-grained.	Fine interstitial sulphides (pyrite, ?pyrrhotite) and ?magnetite/ilmenite.	Unmetamorphosed sediment was 1 ?feldspathic sandstone, perhaps with tuffaceous components.
Z 2617 5240E 5435N	<u>Cordierite Hornfels.</u> Dominantly micro-crystalline quartz, K-feldspar, biotite, graphite, with scattered small cordierite poikiloblasts.	Uniformly fine-grained, with preferred orientation. Crosscutting breccia zones.	Breccia zones contain Ti-biotite and coarser graphite.	No surviving evidence of pyroclastic components, though rock could have been an ash; carbon argillaceous siltstone more likely.
Z 2618 5240E 5459N	<u>Metasomatised ?Tuff.</u> Angular fragments of quartz, andesine, lithic volcanic material extensively replaced by fine matted fibrous actinolite.	Well-sized, medium-grained, distinctly bedded. Relict igneous textures in lithic grains.	Fine leucoxene, altered oxide opaques throughout.	Metasomatised rather than metamorphosed. Could be Crimson Cr subaqueous tuff/tuffaceous grey.

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Location		Sn	Cu	Pb	Zn	F	Li	As	Ag	Mo	B/Ni	W	Description	SAMPLE NUMBER
5240E	4848N	6	1	11	11	342	14	35	0.2	—	—	—	Py. bi. granite	CAM 001 T9928
5240E	4850N	10	87	33	41			90	—	2.0		—	Silic. pale gr-gy. pelite	CAM 003 T9929
5240E	4886N	170	15	76	38	1076	16	160	—	1.0	—		Alt. qz py. z gr To. veins	CAM 006 T9930
5240E	4890N	100	1	14	9	717	23	47	—	1.0	—		Hvy. qz -gr To rock	CAM 007 T9931
5240E	4972N	4	107	31	141			47	—	13		—	dk. gy. f. bd. graphitic, Py 3%, pelite	CAM 010 T9932
5240E	5143N	10	70	22	61			52	—	1.5		—	v. bd silic & alt. calc.? pelite, tr Py	CAM 014 T9933
5240N	5115E	6	220	23	46			17	—	0.5		—	wthd, bd, qtz. sa. z hvy. FeOx stain.	CAM 018 T9934
5240N	5023E	—	79	24	88			80	—	11.5		—	Spotted ho. graphitic	CAM 019 T9935
5240N	4992E	4	74	47	32			23	—	1.5		—	Hvy. f. bd. mag. s.s. z v.f. Py + Py ~ 20%	CAM 020 T9936
5240N	4988E	—	38	15	140			—	—	—		—	Pseudo Gossan	CAM 021 T9937
4760E	5163N	9	24	12	11	696	5	16	—	0.5	2 ^{Bi}		Py. ser. aplite z qz- to vn.	CAM 023 T9938
5000N	4510E	—	2	11	11	664	28	25	0.1	5.5	—	—	Py. bi. granite	CAM 029A T9939
5000N	4735E	50	113	45	128			57	—	1.5		—	wthd. alt. limonitic rock.	CAM 031 T9940
5000N	5108E	10	16	20	55			11	—	0.5		—	wthd. ser. f. qz. sa. z few Hc. frags.	CAM 034 T9941
4880N	4890E	3	16	16	132			12	—	—		—	Qtz. pebbly grit.	CAM 037 T9942
4880N	4975E	6	6	25	78			6	—	—		—	Bd. qz pebbly grit z litic. frags.	CAM 038 T9943

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ASSAY RESULT SHEET FOR

BDH Grid CAM

ASSAYED BY Analabs

FROM TO

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PAGE 1 OF 3

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Location		Sn	Cu	Pb	Zn	Fe	Ni	Li	As	Ag	Mo	Bi	W	Description	SAMPLE NUMBER
5000N	5512E	7	13	19	67				6		-		-	wld, f. tuf. sa lim-qz vns.	CAM043 T9944
5000N	5840E	-	130	10	160	15					-		-	Pseudo Gossan	T9959
4760E	4840N	9	50	370	175	310			16	1.0	-	-	-	wld. spotted. f. qz. ± bk. MnOx vns.	CAM044 T9960
4760E	4827N	50	90	55	345	70			12	1.0	-	-	-	wld, s, pseudo gossan	CAM046 T9961
4760E	4770N	I/s	5	150	65	15			4	0.5	I/s	I/s	I/s	Qz- to. rock.	CAM046B T9962
4760N	4993E	2700	-	150	30	10			4	0.5	-	-	-	Hvy. qz- to. rock	CAM048 T9963
5000N	5565E	20	30	50	170	365			4	0.5	-	-	-	wld, gr-br, spotted py. mer. dr-bs	CAM051 T9964
5000N	5625E	15	85	40	200	60			44	-	2.0	-	-	wld, bd?, impure- contaminated qtz.	CAM052 T9965
5240E	5265N	15	65	115	125	195			19	-			-	Metasom. ch. ± Hc + chte bands	CAM100 Z 2609
5240E	5340N	25	540	30	90	105			6	-			-	" " "	CAM101 Z 2610
5360N	5217E	8	135	10	170	300			17	-			-	Metasom. Pebbly metass, tr Py	CAM102 Z 2611
5360N	5206E	4	110	15	185	105			7	-			-	Graphitic cordierite ho., Py ~5%	CAM103 (1) Z 2612
"	"	7	140	15	195	265			4	-			10	ho., f. bd. ± tr. Py	CAM103 (2) Z 2613
5360N	5158E	15	20	5	55	25			-	-			-	Py. meta dr. f. Py. vns. ± 1%	CAM104 Z 2614
5240E	5459N	15	20	45	115	25			13	0.5			-	Metasom. tuff ?	CAM108 Z 2618
5480N	5208E	4	330	20	305	385			37	-			-	Pebbly ho.	CAM109 Z 2619

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ASSAY RESULT SHEET FOR

DDH Grid CAM

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PAGE 2 OF 3

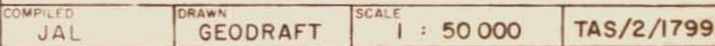
Location		Sn	Cu	Pb	Zn	F	Li	As	Ag	Mo	~~Bi~~ /Ni	W	Description	SAMPLE NUMBER
5480N	5196E	3	100	15	105			20	—		540	—	Pebbly ho	CAM 110 Z 2620
5482N	5194E	15	995	—	20			3	—		180	—	Metasom. calc. ? sed. E Po + tr Coy.	CAM 110a Z 2621
"	"	25	590	5	45			18	—		260	—	" " "	CAM 110a Z 2622
5480N	4836E	8	55	10	240			34	—		95	—	ho. lte wke	CAM 111 Z 2623
5480N	4731E	—	10	5	20			1	—		170	10	wld. py. bi. granite	CAM 112 Z 2624
4760E	5421N	—	10	10	15			84	—		115	—	Grs. Granitic breccia.	CAM 113 Z 2625
														Z 2626

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LIST OF PLANS

<u>Plan No</u>	<u>Description</u>	<u>Scale</u>
TAS/2/1799	EL 5/63 Part 2 Location of CAM grid	1: 50 000 ✓
2 plan 2450	Ramsay Grid CAM Detailed Geological Plan	1: 2 500 ✓
2451	Ramsay Grid CAM Geological Interpretation	1: 2 500 ✓
2431	Ramsay Grid CAM Composite Section L 4760N	1: 2 500 ✓
2432	Ramsay Grid CAM Composite Section L 4880N	1: 2 500 ✓
2433	Ramsay Grid CAM Composite Section L 5000N	1: 2 500 ✓
2434	Ramsay Grid CAM Composite Section L 5120N	1: 2 500 ✓
2435	Ramsay Grid CAM Composite Section L 5240N	1: 2 500 ✓
2458	Ramsay Grid CAM Ground Magnetic Contour Plan	1: 2 500 ✓
2452	Ramsay Grid CAM Copper Results	1: 2 500 ✓
2453	Ramsay Grid CAM Lead Results	1: 2 500 ✓
2454	Ramsay Grid CAM Zinc Results	1: 2 500 ✓
2455	Ramsay Grid CAM Nickel Results	1: 2 500 ✓
2456	Ramsay Grid CAM Tin Results	1: 2 500 ✓
2457	Ramsay Grid CAM Tungsten Results	1: 2 500 ✓
2459	Ramsay Grid CAM Arsenic Results	1: 2 500 ✓



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Received		NOV 1983		E & IL
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REF. No. 11256/83				

APPENDIX 3

REPORT A1:

A TEST OF THE GENIE EM METHOD

By: D B Trussell

24.5.83

L.L. 5/63

OPEN FILE

REPORT A1: A TEST OF THE GENIE EM METHODINTRODUCTION

Due to difficult field conditions most geophysical methods are not well suited to Comstaff exploration areas. Comstaff licences are situated on heavily vegetated ground. Topographic relief is typically quite pronounced. Thus access to grid lines is often time consuming. An additional problem is the generally damp conditions even in the "driest" season of the year. In order for the geophysical survey to traverse grid lines at a reasonable speed, geophysical equipment should be compact, lightweight, and waterproof. Over the past 10 years three ground EM techniques have been used in Comstaff areas; CEM, PEM, and Max-min.

THE GENIE METHOD

The "Genie" instrumentation was developed by Esso in conjunction with Scintrex. It first became available in 1982. Until February 13, 1983 it could only be used with the approval of Esso.

The Genie is essentially a horizontal loop EM method. Only the inphase signal is measured. The advantage of the Genie over conventional horizontal loop equipment is that a wire between the transmitter and receiver is not required. The Genie transmits two frequencies simultaneously. The lower frequency is used to normalise the high frequency. To a first order this removes the effect of topography and an accurately chained grid is unnecessary. An assumption is made that the only response at the normalisation frequency is that due to the transmitter receiver geometry.

WORK DONE

The Genie method was used over three lines at CAF and two lines at CAL. These lines were selected to provide a comparison between Genie data and CEM, PEM, and Max-min data over lines of representative topographic relief. To obtain a clear indication of the noise level a 20m station interval was used. The intercoil spacing was 100m. 105 Hz was used as the normalisation frequency. Measurements were made at 315 Hz, 945 Hz, and 2835 Hz. CEM measurements were taken at 2525Hz. The Max-min frequencies were 222 Hz, 888 Hz, and 1777 Hz.

A copy of all Genie profiles accompanies this report. Max-min profiles are also included for comparison.

CEM and PEM profiles over the Genie test lines have been presented in Comstaff reports and only the relevant plan numbers will be referred to.

GENIE RESULTSCAF line 4400N (4670E-5010E)

A good conductor (ρt is 25 mhos) is located at 4825E. It has a 45° westerly dip. The depth of burial is less than 10m.

CAF line 4640N (4510E-5410E)

At least two conductors occur at the east end of the line. The response is complex since the sources interfere with one another. One appears to be located at 5250E and an other at 5335E. They are very good conductors (t is over 30 mhos) and have a shallow depth of burial (less than 10m).

Outside the anomalous areas the readings are very uniform. The typical background "noise" level is typically less than 1% on 315 Hz, less than 1.5% on 945 Hz and about 2% (peak to peak) on 2835 Hz.

CAF line 4760N (4510E-5390E)

There are three conductors on this line. One is located at 4825E. The source has moderate conductivity (ρt is 10 mhos) and a depth of burial of 15m. The dip is 60° to the east.

The other two conductors are at the far eastern ends of the lines - at 5225E and 5335E. The former may have a steep easterly dip. The sources are too close together for the anomalies to be reliably interpreted. The line does not extend sufficiently far east for the 5335E anomaly to be completely defined.

The background noise levels of the readings is similar to that observed in the line 4640N data.

CAL line 4640N (4750E-5290E)

There is one conductor on this line. It is located at 5150E. The anomaly shape is distorted on the western flank and so interpreted dip may not be correct but it appears to be 60° east. The source is in the moderate to good conductivity range (ρt is 30 mhos). The depth of burial is approximately 20m. The background noise levels are similar to those in the CAF 4640N data.

CAL line 4880N (4730E-5270E)

There are two conductors on this line. One is located at 5065E. The dip is steeply east. The depth of burial is less than 10m. The source has a conductivity width product of 25 mhos.

The other conductor is located at the far eastern end of the line at approximately 5260E. The line does not extend sufficiently far east to define the complete response. The conductivity of the source is good (ρt is over 30 mhos). The depth of burial is less than 10m.

The background noise levels are less than those observed on CAF line 4640N.

DISCUSSIONCAF line 4400N

This line has also been traversed with PEM. The topographic, magnetic, PEM, geochemistry and geologic profiles are shown on plan TAS-2-2469. The interpretation of the Genie data is in close agreement with that of the PEM data presented in the most recent company report ("RAMSAY AREAS - EM REPORT" - by D Trussell, March 1982).

CAF line 4640N

This line was traversed with Max-min and PEM. Complete profile information on the latter is presented on plan TAS-2-2253. The PEM interpretation given in the RAMSAY AREAS - EM REPORT is in agreement with the interpretation of the Genie data.

The Max-min data is presented as raw data and as profiles of inphase response with the amplitude normalised to the lowest frequency. The latter presentation puts the Max-min data in the same form as the Genie results. The raw Max-min inphase data is severely affected by topography even though the grid line was accurately chained and topographic corrections were made. The background noise level of the Max-min data is appreciably higher than that of the Genie data. The Max-min anomaly occurs at 5150E. This is a considerable distance (100m) west of the Genie anomaly location. (There is no obvious reason for the discrepancies). The amplitude of the normalised Max-min anomaly is substantially smaller than that of the similar Genie data. This is probably a result of the conductor being very close to surface and so responding more strongly to the closer spaced coils of the Genie.

CAF line 4760N

This line has been traversed with CEM. Complete profile information is presented on plan TAS-2-1851. The interpretation of the CEM anomaly at 4810E given in the RAMSAY AREAS - EM REPORT is in agreement with the interpretation of the Genie data as is the interpretation of the conductor at 5250E. The conductor at 5335E is not evident in the CEM profile. This is probably due to the wider coil spacing (140m) used in the CEM method. The ratio of anomaly amplitude to background noise is significantly higher in the Genie data even when one compares 315 Hz Genie data to 2525 Hz CEM data.

CAL line 4640N

This line was traversed with Max-min. Complete profile information is presented on plan TAS-2-2246. The Max-min data is difficult to interpret. In the RAMSAY AREAS - EM REPORT an east dipping Max-min conductor was interpreted at 5125E. This is in agreement with the interpretation of the Genie data. The background noise level of the Max-min data is appreciably higher than that of the Genie data. The amplitude of the normalised Max-min data is in good general agreement with that of the Max-min data. It is interesting to note that data from both methods indicate there is some sort of weak conductor 100-150m west of the main conductor.

CAL line 4880N

This line was traversed with CEM. Complete profile information is presented on plan TAS-2-1822. The CEM interpretation given in the RAMSAY AREAS - EM REPORT is in agreement with the interpretation of the Genie data. The interpreted location of the Genie conductor is however 25m west of the CEM conductor.

OPERATIONAL ASPECTS OF THE GENIE METHOD

If six hours or more per day can actually be spent on the survey lines then between 1km and 1½km of line can typically be covered in one day weather permitting. Thus the production rate of the Genie method is considerably higher than that of the other methods compared here. In areas of very easy access substantially higher productivity would be achieved. The Genie instrumentation was routinely used on days of light rain with no ill effects. The other three methods are very much fair weather techniques and hence at great disadvantage in northwest Tasmania. In the company's experience Max-min was particularly prone to breakdown in damp conditions. Elsewhere the PEM equipment has proven unreliable at times.

The Genie method does not require as high quality a grid as PEM or Max-min. This is another important economic advantage to the technique.

CONCLUSIONS

There is very close agreement between the Genie results and those obtained from CEM, PEM and Max-min. The results have as much interpretational information as those from any of the other three methods. The Genie method also has very significant operational advantages over the other techniques. Therefore it is a relatively cost-effective means of acquiring EM data. The Genie except in specialised circumstances (eg. very deep penetration is required) should be the routine EM method in Comstaff areas.

Devin Trussell

May 11, 1983

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JOB: TAS 108

GENE RREM

GRID: CAF

LINE: 4400N

2235 Hz
20

245 Hz
20

315 Hz
20

4600e
20

2235 Hz

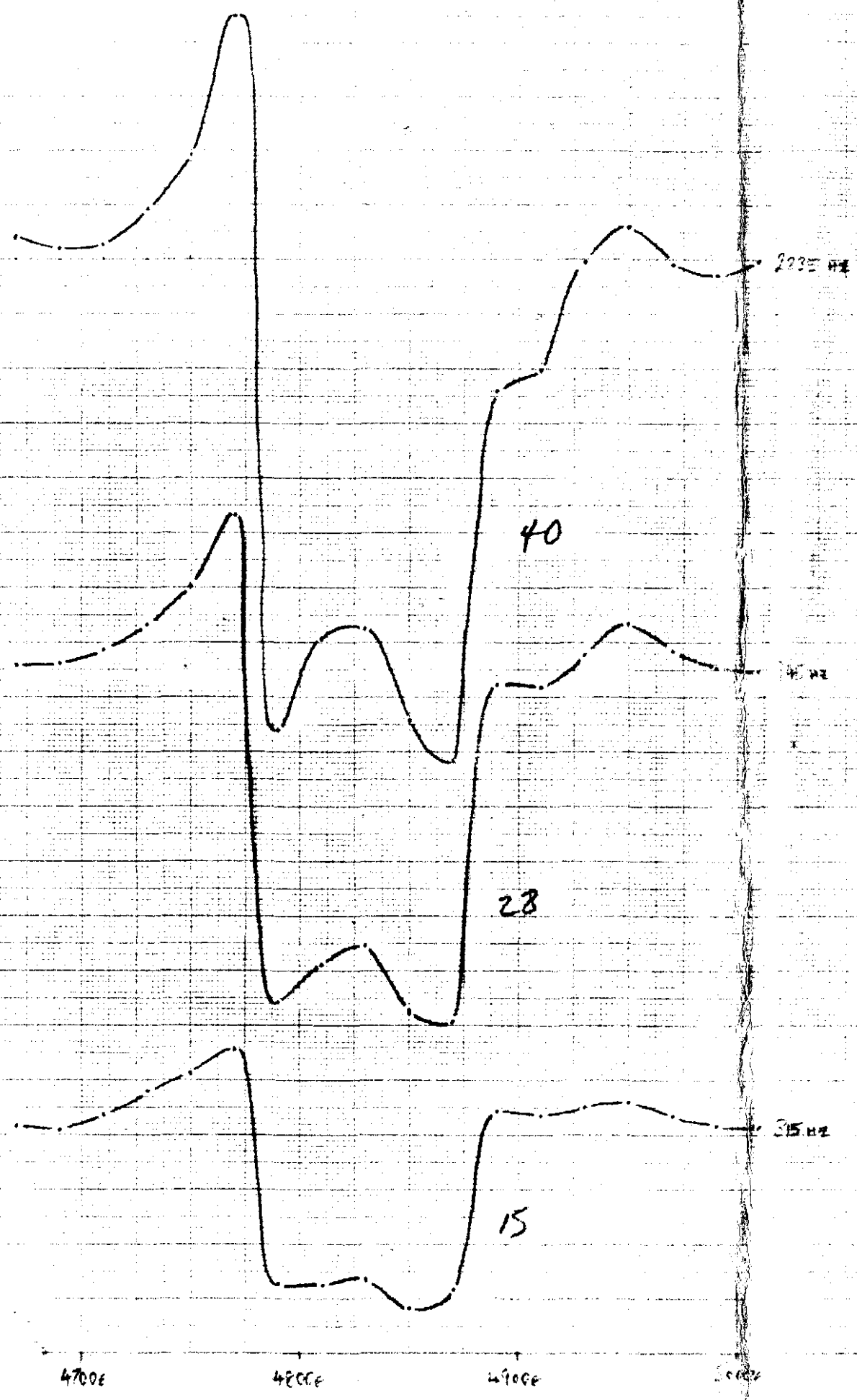
245 Hz

315 Hz

40

28

15



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2835Hz

20-

567037

GENE REM

GRID CAF

LINE 4640N

945Hz
20-

35Hz
20-

-20-

4500c

4600c

4700c

4800c

4900c

5000c

5100c

5200c

315Hz

315Hz

315Hz

315Hz

315Hz

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JOB: TAS 108

GENIE REM

GRID CAF

LINE 4760N

2035Hz
20-

945Hz
20-

315Hz
20- -20-

-20-

4500c

4600c

4700c

4800c

4900c

5000c

5100c

5200c

5300c

5400c

2035Hz

945Hz

315Hz

50

20

50

29

2

8

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JVS: 1AS M8
GENIE REM
GRID CAL
LINE 4640N

2835Hz
20-

945Hz
20- 20-

315Hz
20- 20-

-20

4750e 4850e 4950e 5050e 5150e 5250e 5350e

36

28

2835Hz

945Hz

315Hz

13 12 11 10 9 8 7 6 5 4 3 2 1



567040

JOB: TAS 108

GENE REM

GRID CAL

LINE 4880N

2835 Hz
20-945 Hz
-20- 20-315 Hz
20- 20-

0

-20

4790e

4850e

4950e

5050e

5150e

5250e

5350e

5450e

945 Hz

2835 Hz

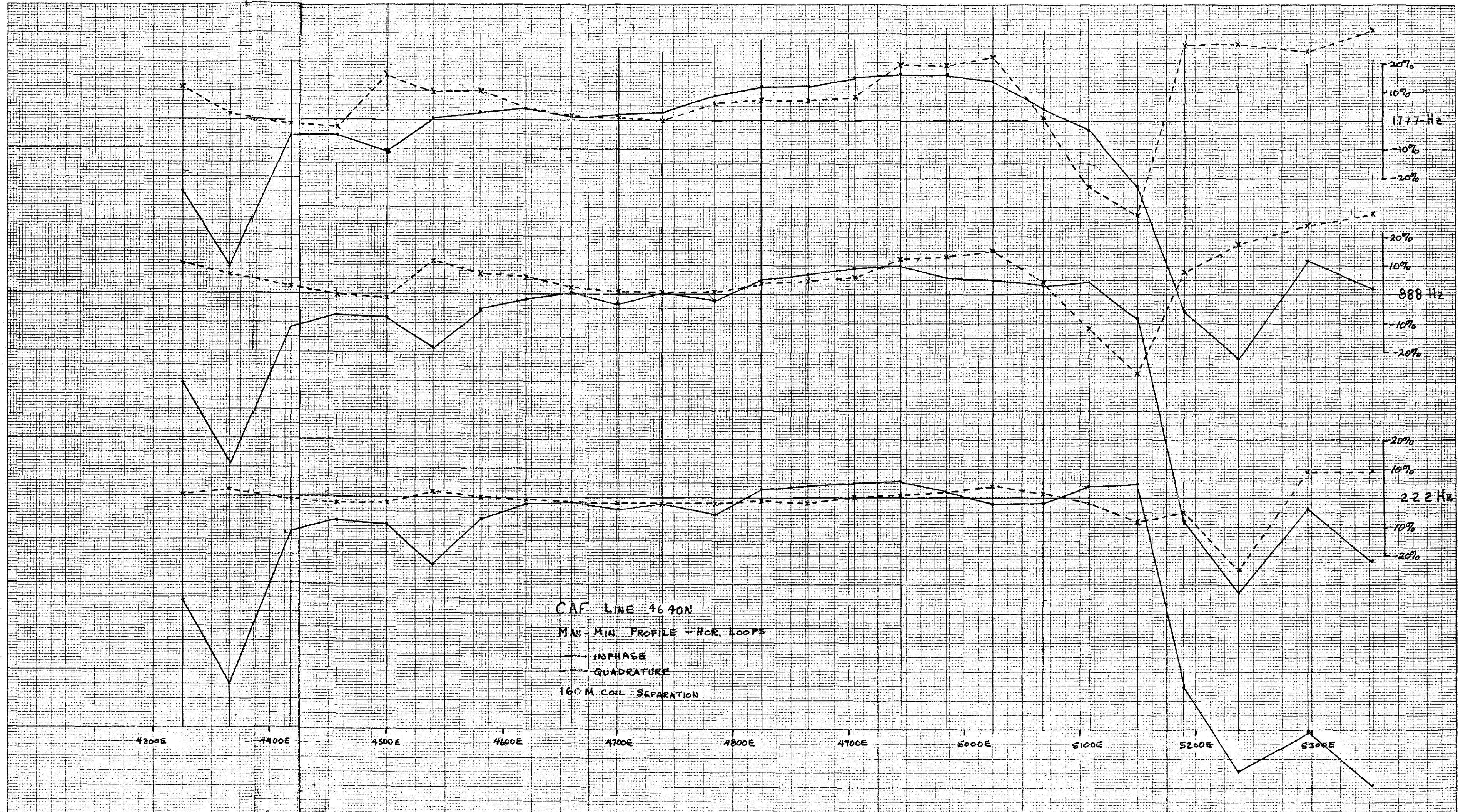
315 Hz

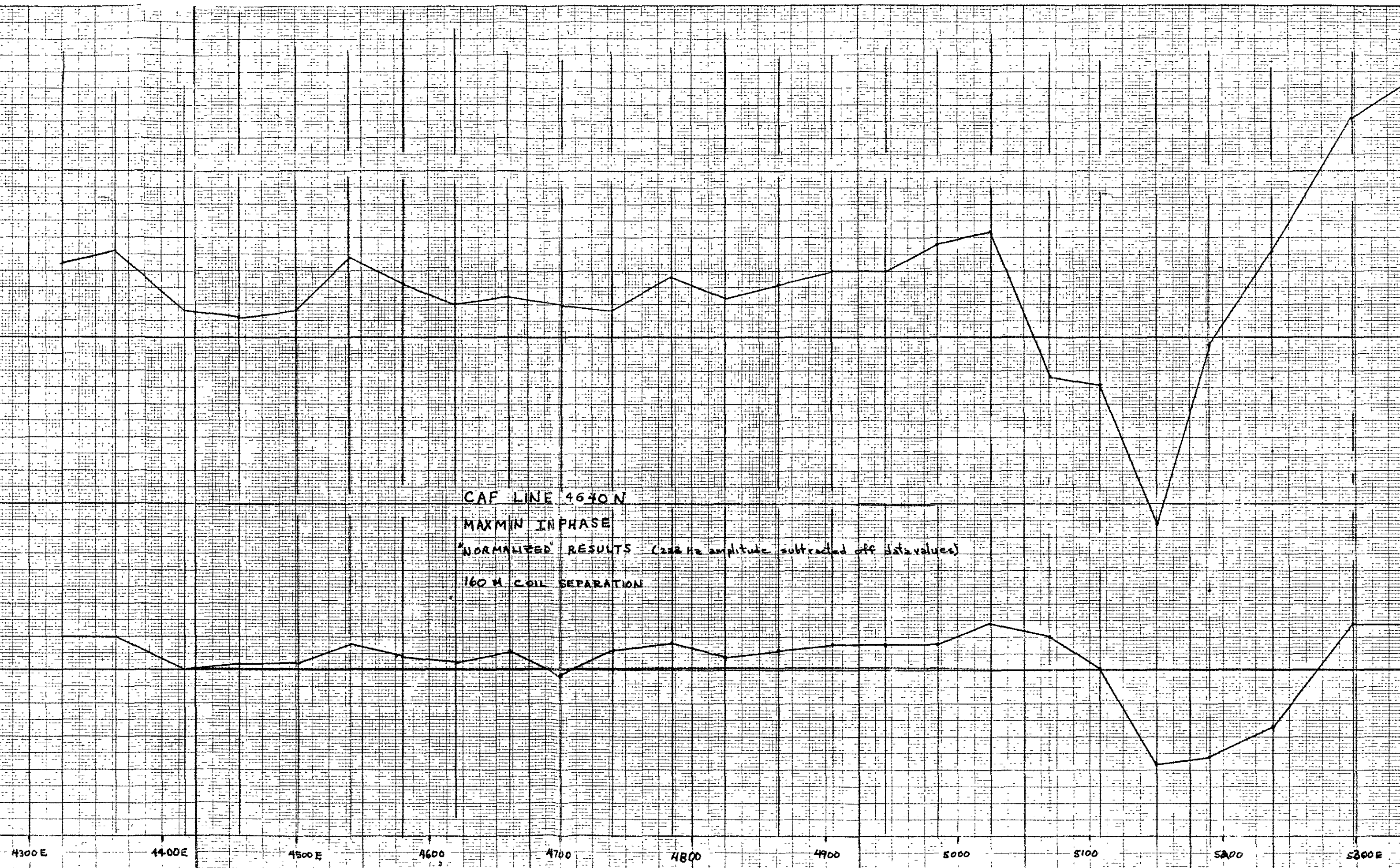
5150e

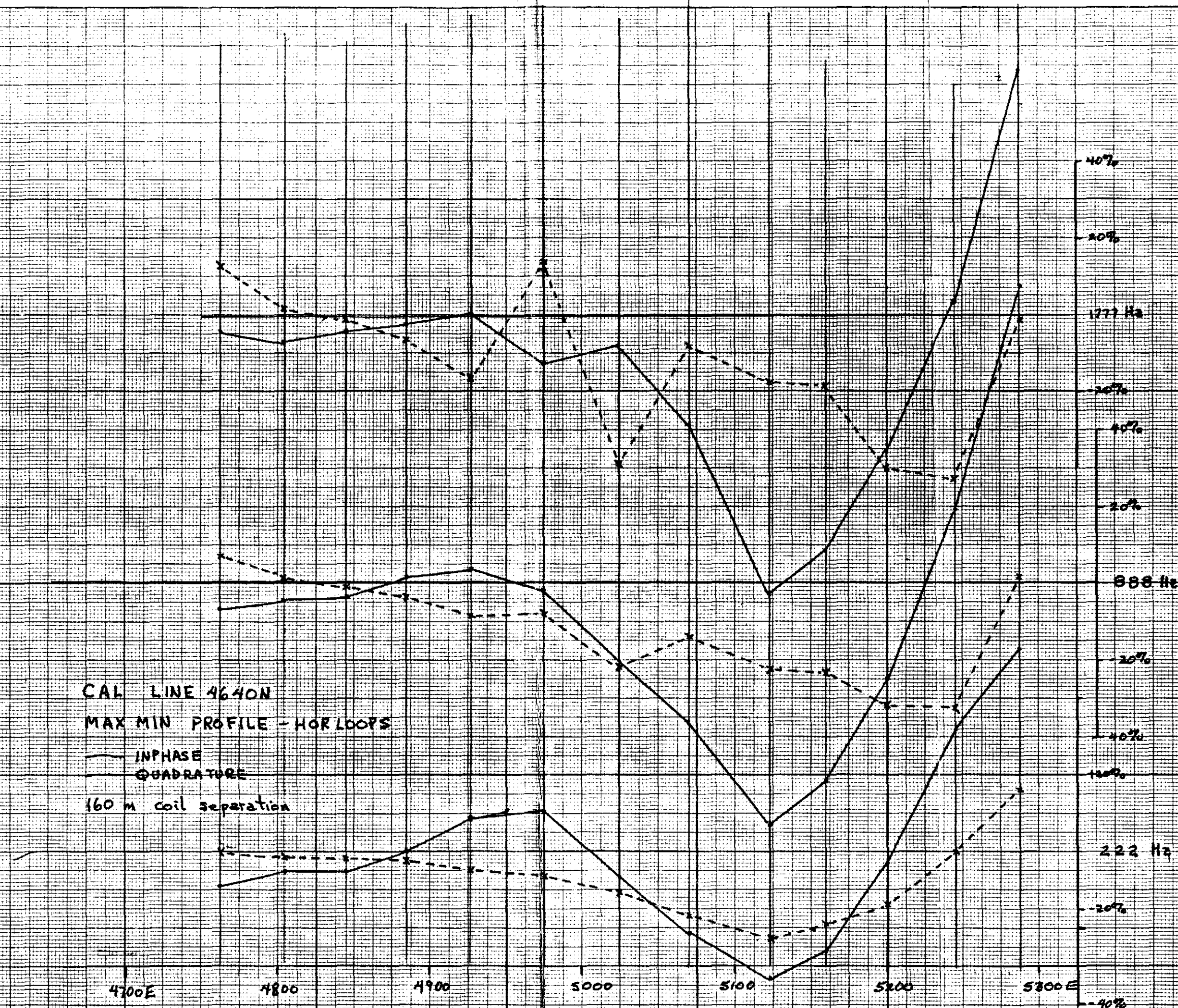
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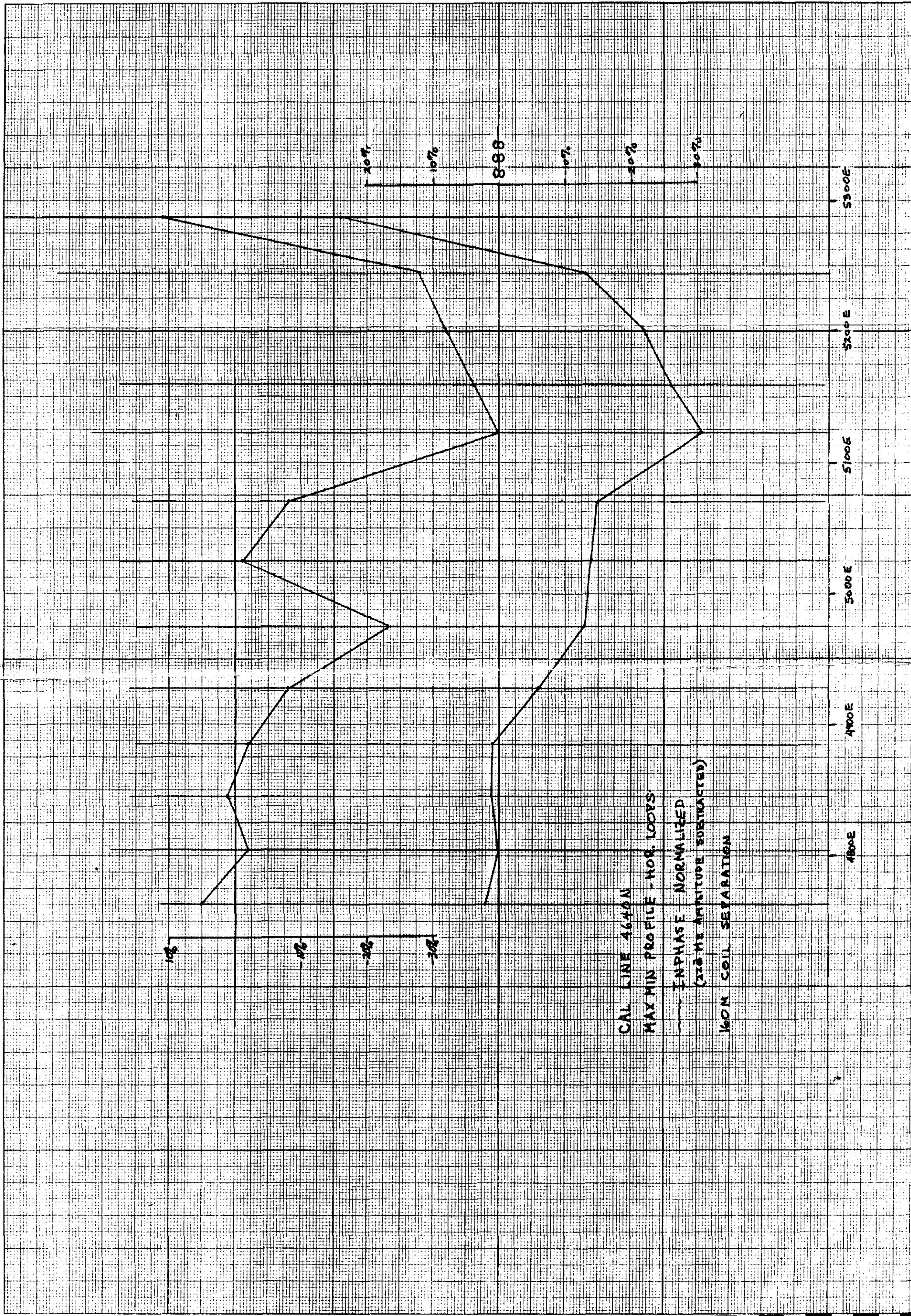
567041

WORMACK GRAPH PAPERS CHRISTCHURCH N.Z. C102A 40 cm x 20 cm x 1 mm









D of M	A.O.	C.G.	E.O.	D.S.M.E.
				Registrar
Received 30 NOV 1983				E & IL
Answered				
DEPT. OF MINES				
REF. No. 11/256/83				

APPENDIX 4

REPORT A2:

GEOPHYSICAL FOLLOW UP OF RAMSAY AEROMAGNETIC SURVEY

By: D B Trussell

24.5.83

EL 5/63

015

567046

REPORT A2:GEOPHYSICAL FOLLOW UP OF
RAMSAY AEROMAGNETIC SURVEYINTRODUCTION

In 1982 Geoex carried out a detailed airborne magnetic survey over the entire Ramsay area (see Comstaff plans TAS/2/3000 to TAS/2/3013) Five discrete anomalies were selected for further examination (see plans TAS/2/3160 to TAS/2/3162). The most easterly anomaly was considered by Comstaff to be too far from a suitable geologic environment for tin mineralisation. Therefore no work was done on this target.

WORK DONE

In early 1983 a grid consisting of three lines spaced 100m apart was placed over each anomaly. All lines were traversed with a proton magnetometer and the Genie EM system. A coil spacing of 100m and a station interval of 20m was used for the latter. Profiles of all the geophysical data accompany this report. The line number of the airborne anomaly was used as the grid name for each of the four ground follow up grids.

DISCUSSIONGrid L30

The ground magnetic profiles are in reasonable agreement with the aeromagnetic results. Therefore the grid is in the correct location. The anomaly in the vicinity of 4800E on lines 4900N and 5000N is the selected airborne anomaly. There is no ground EM response on any of the lines. Thus there is not a significant conductor within 60m of the surface on grid L30. The EM data are of very high quality. An anomaly of 2% (peak to peak) would stand out clearly against the background variation.

Grid L80

The ground magnetic profiles bear little resemblance to the aeromagnetic results. There is therefore a reasonable doubt that the grid is located in the correct position. There is one prominent EM anomaly on each line - at 5250E on 5100N, at 5040E on 5000N and at 5030E on 4900N. There is no direct magnetic association with any of these anomalies. The conductivity of all three is quite low. The 315 Hz response is 1% or less. A conductive shear is the most likely explanation for the source of the anomalies. Careful geologic examination should however be carried out.

The background noise level of the 2835 Hz data is quite large - approximately 3% (peak to peak). This is double that encountered on most other grids in this area. The 945 Hz and 315 Hz data are of high quality.

There is some surface conductivity in the area. The 315 Hz background is +4.5%. The 945 Hz background is 7.5%. The 2835 Hz background is about 10%. Variations in surface conductivity may be the reason for the high noise level of the 2835 Hz data.

Grid L211

The ground magnetic profiles are in reasonable agreement with the aeromagnetic results. Therefore the grid is in the correct location. The EM data are of very high quality. No anomalous responses exist on the profiles. There are no conductors within 60m of surface.

Grid L250

The ground magnetic profiles are in reasonable agreement with the aeromagnetic results. Therefore the grid is in the correct location. The only EM anomaly is a very weak response in the vicinity of 5000E on line 4900N. It has near vertical dip. The source may be a conductive shear. There is a very high amplitude (approximately 2,000) near surface magnetic anomaly in the vicinity. It may be related to the EM conductor.

CONCLUSIONS

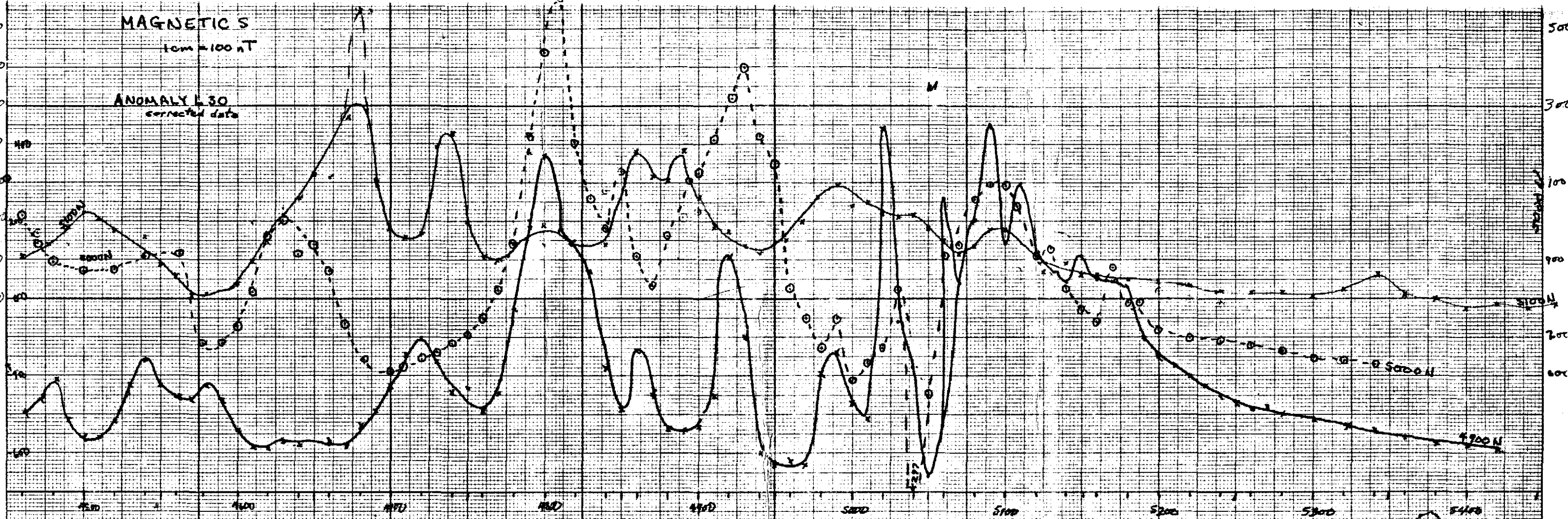
The airborne magnetic anomalies L30, L80, L211 and L250 have been successfully located by ground magnetic surveys. EM traverses over these anomalies have not resulted in the detection of highly conductive bodies. A tin bearing pyrrhotite is unlikely to be the cause of the selected aeromagnetic anomalies.

On grid L80 a weak conductor was detected. The ground in the vicinity should be carefully inspected geologically. A very weak conductor was also detected on the most southerly line of grid L250. It should also be inspected in the field. Neither response appears to hold much promise.

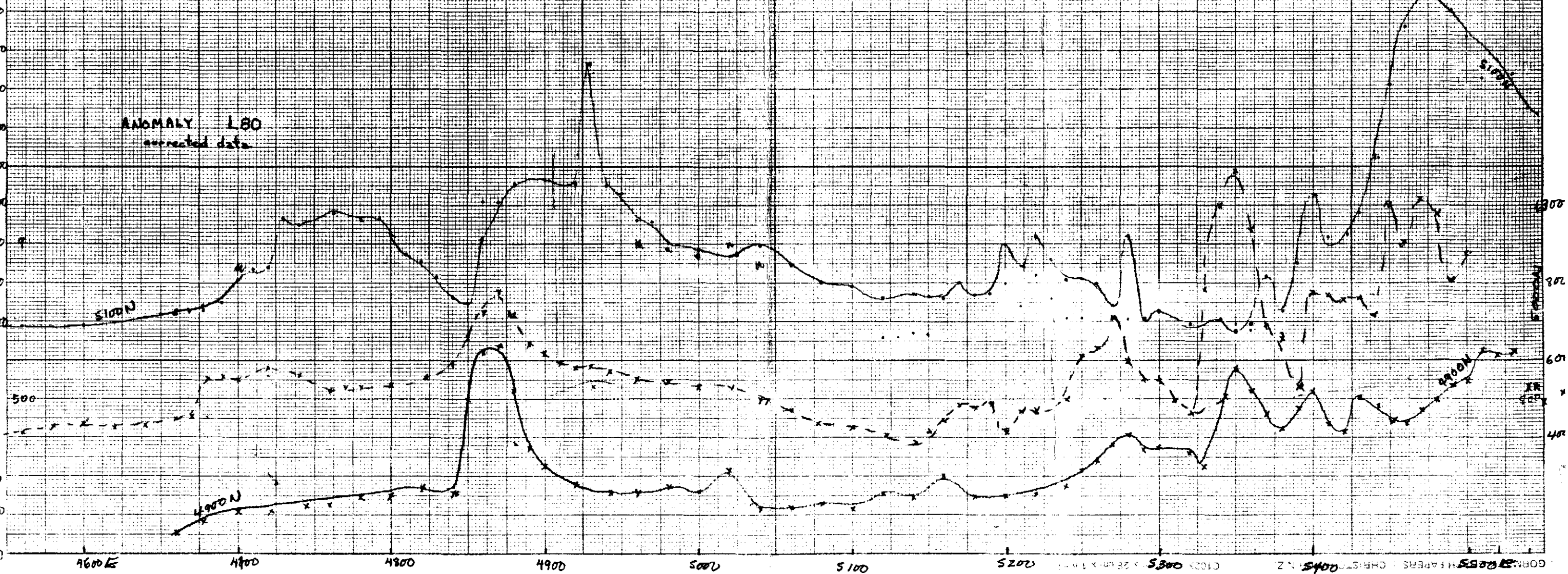
MAGNETIC S

1cm = 100 nT

ANOMALY L30
corrected data



ANOMALY L80
corrected data



Job No: TAS108

GRID L 30

LINE : 4900 N

GENIE REM



KEITH'S ESSER CO. MADE IN U.S.A.
1 1/2" X 10" TO THE CENTIMETER * 1/2" X 3/8" CM

74 J147

567050

JOB No. TAS 108

GRID: L30

LINE 5000N

GENIE PREM.

2875m

20

0

RIVER

2875m

745m

-20

20

0

745m

355m

20

20

0

355m

-20

4500

4600

4700

4800

4900

5000

5100

5200

5300

5400

020

567051

JOB No. 745 108

GRID: L30

LINE 5100 N

GENIE PREM

CROSSHA

20-

0

-20-

74500

20-

3500

20-

-20-

4500

4600

4700

4800

4900

5000

5100

5200

5300

5400

14.0
10.0
7.0
4.0
1.0
0.0
-1.0
-4.0
-7.0
-10.0
-14.0
-18.0
-22.0
-26.0
-30.0
-34.0
-38.0
-42.0
-46.0
-50.0
-54.0
-58.0
-62.0
-66.0
-70.0
-74.0
-78.0
-82.0
-86.0
-90.0
-94.0
-98.0
-100.0

V121 VA

021

567052

JOB No. TAS 108

GRD: L80

LINE 4900N

GENIE REM.

2835 Hz
20

285 Hz
20

315 Hz
20

315 Hz
20

KE
MOUNT & FROM CO. WITH H. D. J.
IN X 10 TO THE CENTIMETER X 10 CM

411213



567053

JOB No: TAS 108

GRID: L80

LINE: 5000N

GENIE PREM.

293.412
20-

50
0

945 Hz
20-

50
0

315 Hz
20-

50
0

20-

4600e

4700e

4800e

4900e

5000e

5100e

5200e

5300e

5400e

5500e

$\leftarrow T_x \leftarrow R_x$

$R_x \rightarrow T_x \rightarrow$

29/3/83

HEAVY D'ALIGHT
RAW 117

30/3/83

293.412

945 Hz

315 Hz

K.E. KENNEL & FERRIS CO. MADE IN U.S.A.
10 X 10 IN. CENTIMETER 20 X 20 CM

411211

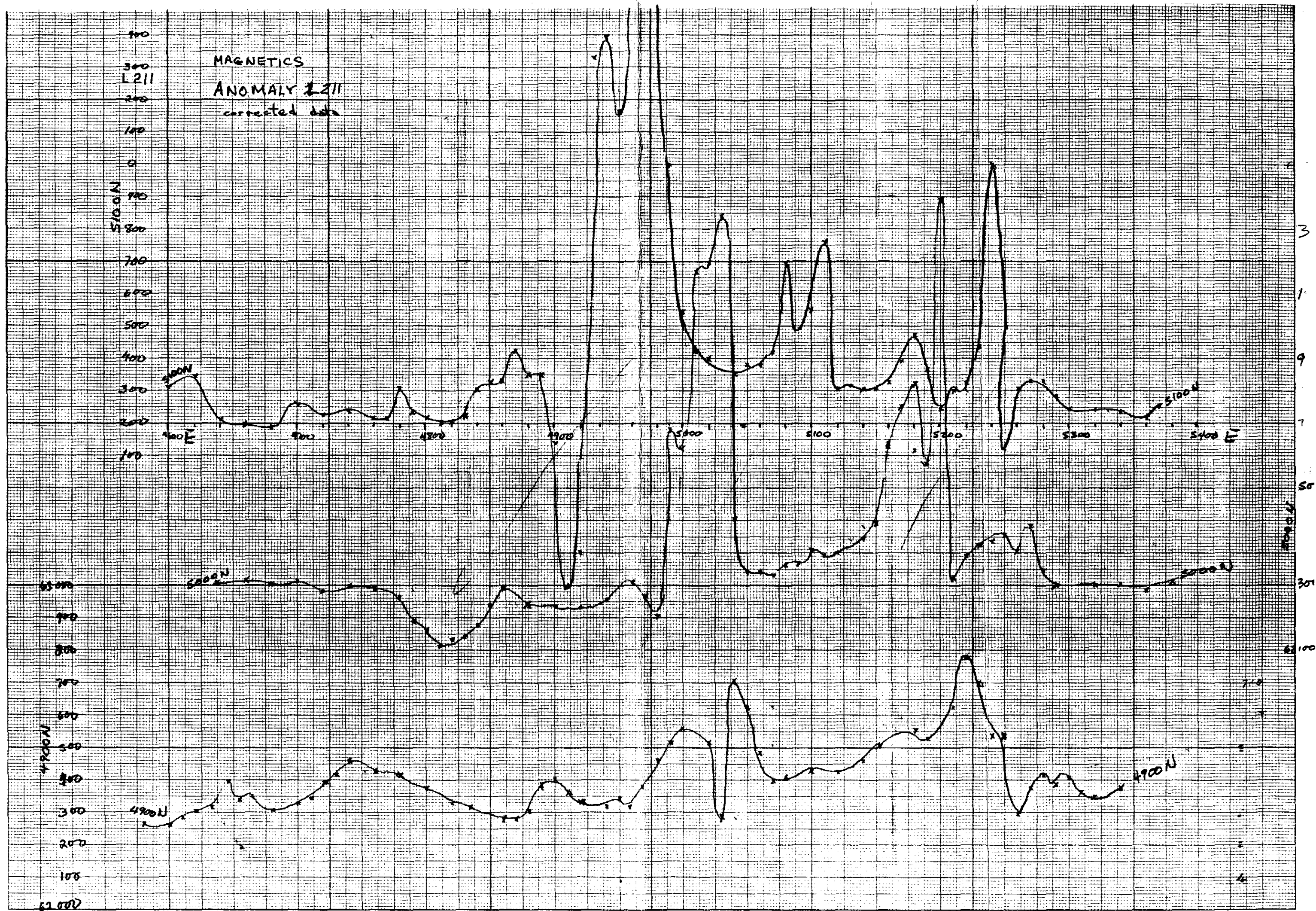
JOB No: TAS 108

GRID : L 80

LINE: 5100N

GENIE ARAM





567056

Job No: TAS 108

GRD: L211

LINE: 4900N

GENIE REM

2025H
20

LAST READING
FOR DAY

LEVEL SHIFT DURING DAY ON THIS (SAG LINE SECTION)
FREQUENCY ONLY

LAST READING
FOR DAY

1450
20

3150
20

4600E

4700E

4800E

4900E

5000E

5100E

5200E

5300E

KE
10 X 10 LINE GENIE REM

41711

026

567057

JOB No: TAS 108

GRID: L211

LINE 5000N

GENIE PREM

28362

20

Rx → Tx →

28362

20

3542

20

20

4600e

4700e

4800e

4900e

5000e

5100e

5200e

5300e

K.O.F. KENTLET & FERNER CO. MIN. & A.V. 10710 10 THE BALTIMORE X 30 CM

41121A

029

567060

JOB: TAS 108

GRID: L250

LINE: 4900N

GENE REM

2835 Hz
20

945 Hz
20

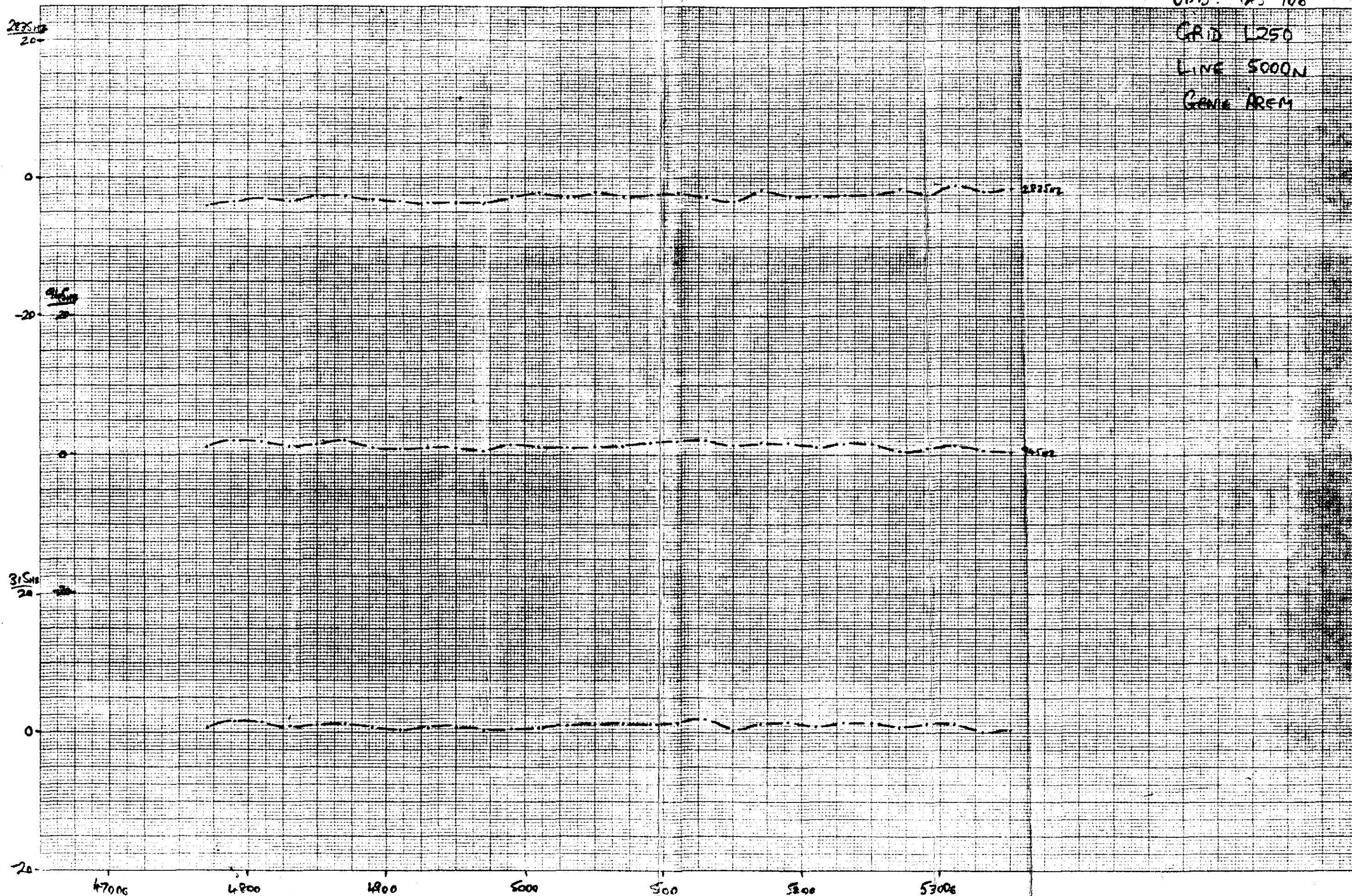
315 Hz
20

K&S KENTON & SPENCER CO. MADE IN U.S.A. 10 INCH CENTIMETER X 30 CM

41 1211



GENIE AREM



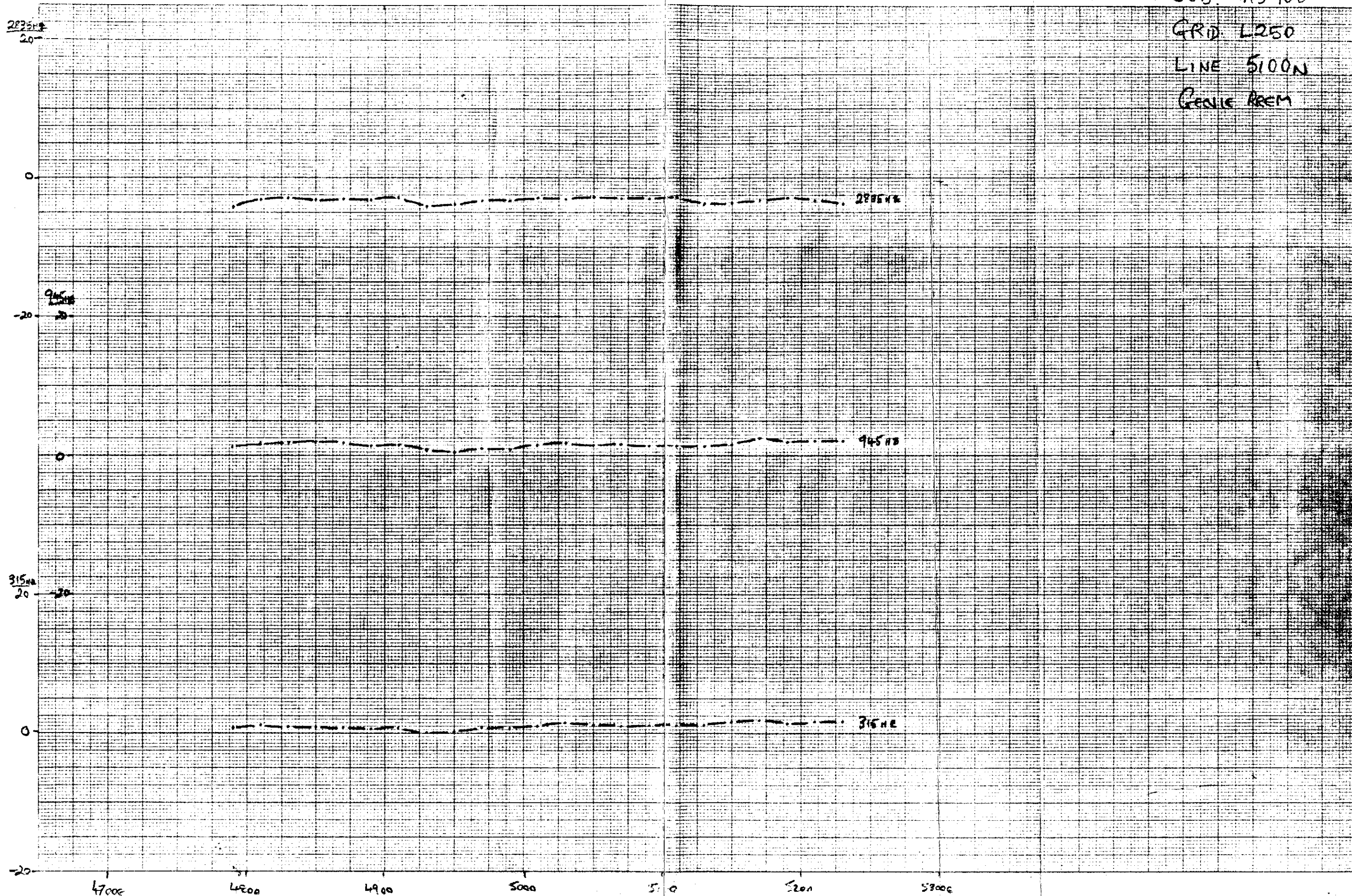
567062

JOB: TAS 108

GRID: L250

LINE 5100N

GENIE REM



031

K.E. KODAK & EPPER CO. MADE IN U.S.A. 10 X 10 TO THE CENTIMETER 25 X 38 CM

41 1213

5 392 000 m N

370 000 m E

371 000 m E

COMSTAFF PROPRIETARY LIMITED

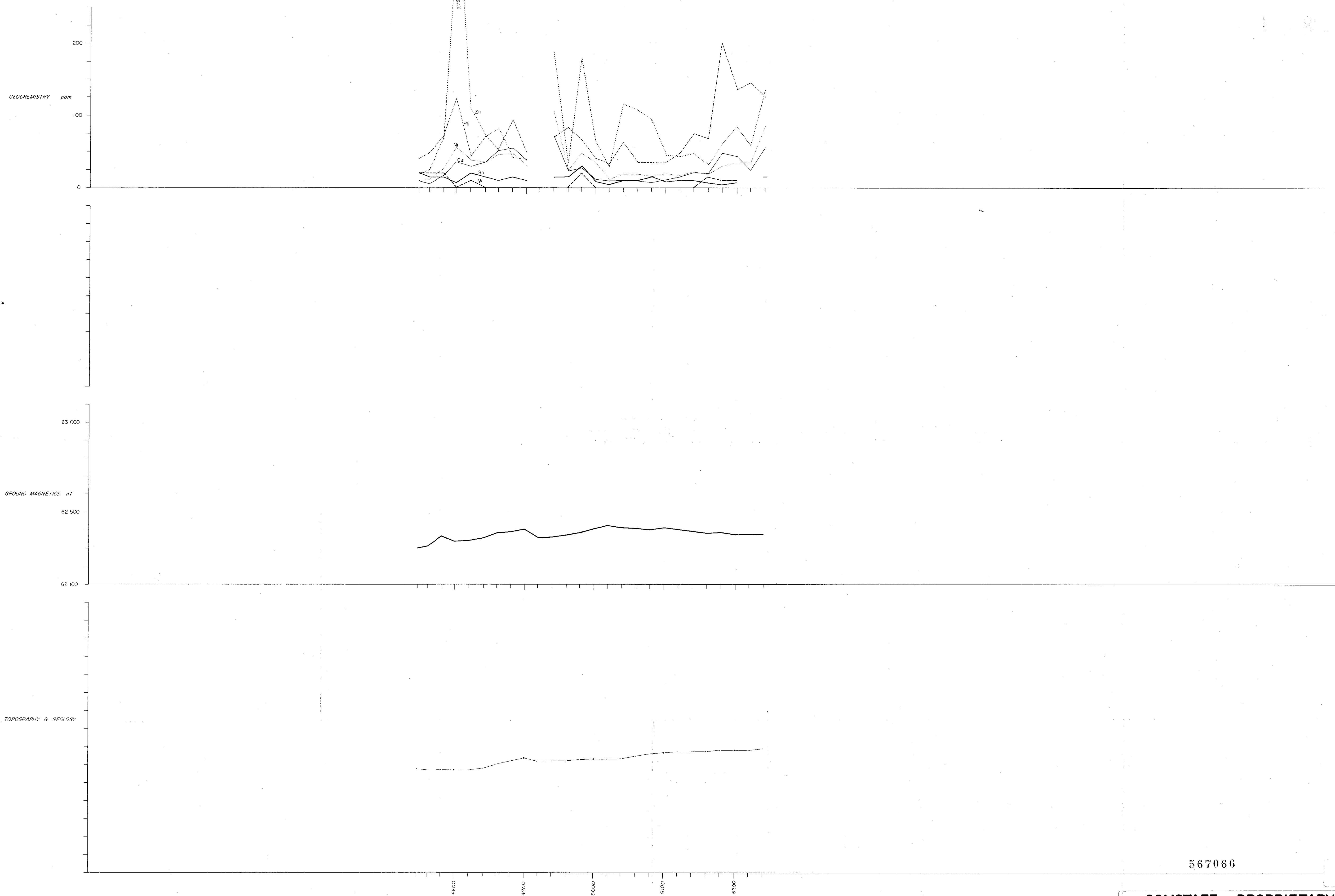
RAMSAY GRID - CAM 1758

DETAILED GEOLOGICAL PLAN

COMPILED
N.P.G.
DATE
16/3/81
DRAWN
N.P.G.
AMENDED
SCALE
1 : 2500
PLAN No
TAS/2/2450

567063

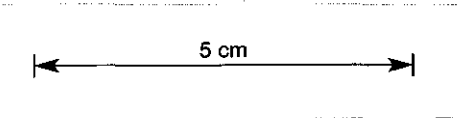
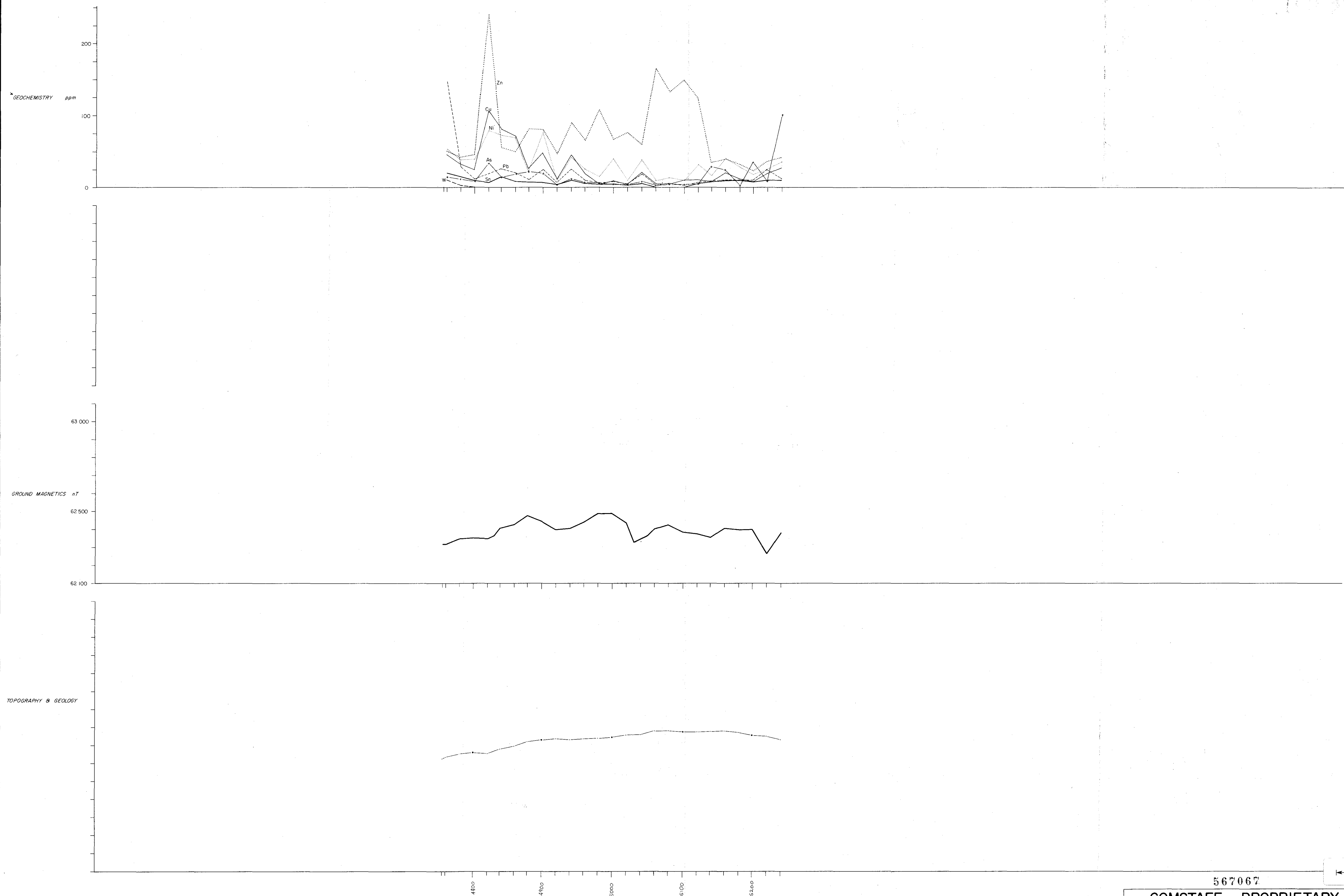
5 cm



567066

5 cm

COMSTAFF PROPRIETARY LIMITED	
RAMSAY GRID - CAM 1761	
L 4760 N PROFILES	
TOPO, MAG, E.M., GEOCHEMISTRY, GEOLOGY	
COMPILED N.P.G. & GEODRAFT	DATE 8/3/81
AMENDED	
SCALE 1 : 2500	
PLAN NO. TAS / 2 / 2431	



567067

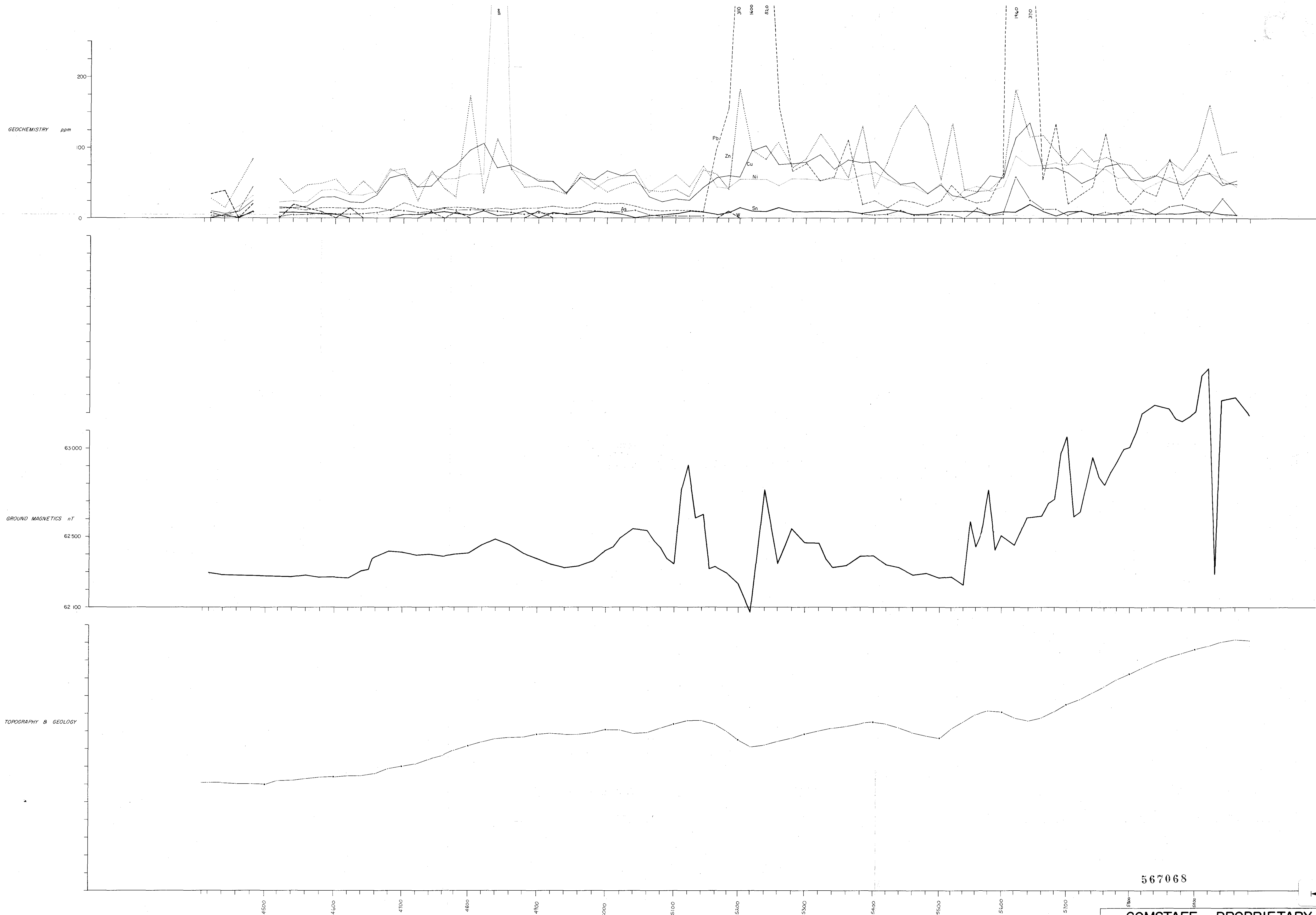
COMSTAFF PROPRIETARY LIMITED

RAMSAY GRID - CAM 1762

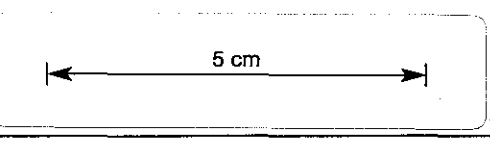
L 4880 N PROFILES

TOPO, MAG, E.M., GEOCHEMISTRY, GEOLOGY

COMPILED	N.P.G. & GEODRAFT
DRAWN	DATE 8/3/81
AMENDED	
SCALE	1 : 2 500
PLAN No	TAS /2/2432

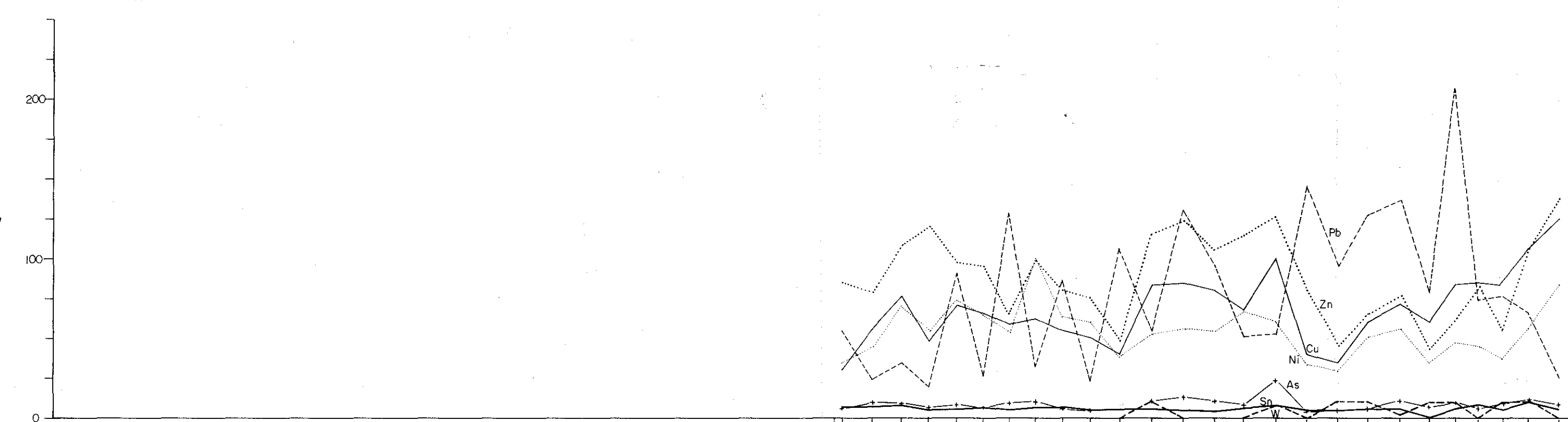


567068

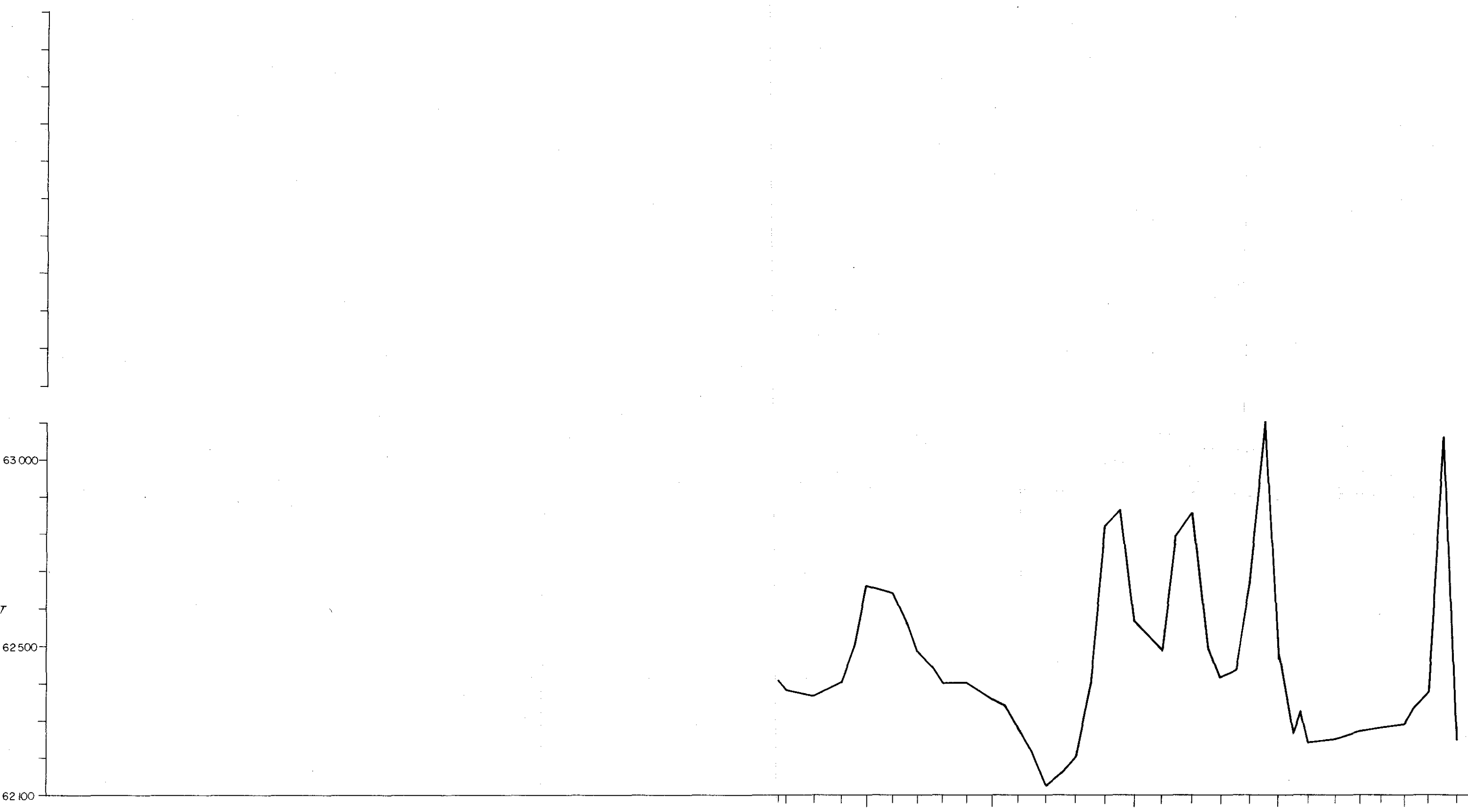


COMSTAFF PROPRIETARY LIMITED	
RAMSAY GRID - CAM 1763	
L 5000 N PROFILES	
TOPO, MAG, E.M., GEOCHEMISTRY, GEOLOGY	
COMPILED N.P.G. & GEODRAFT	DATE 8/3/81
DRAWN	AMENDED
SCALE 1 : 2500	PLAN NO TAS /2 /2433

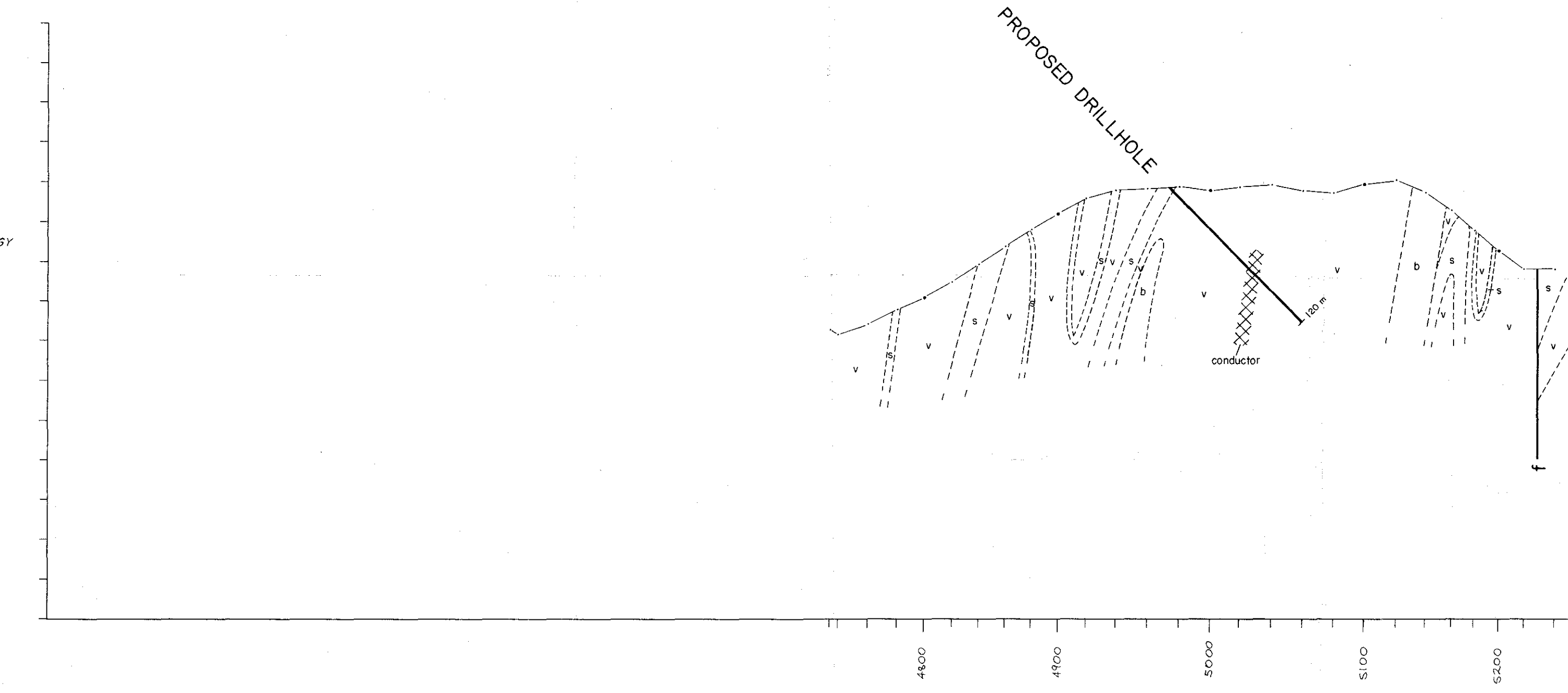
GEOCHEMISTRY ppm



GROUND MAGNETICS nT



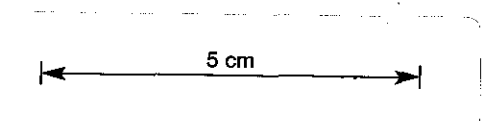
TOPOGRAPHY & GEOLOGY



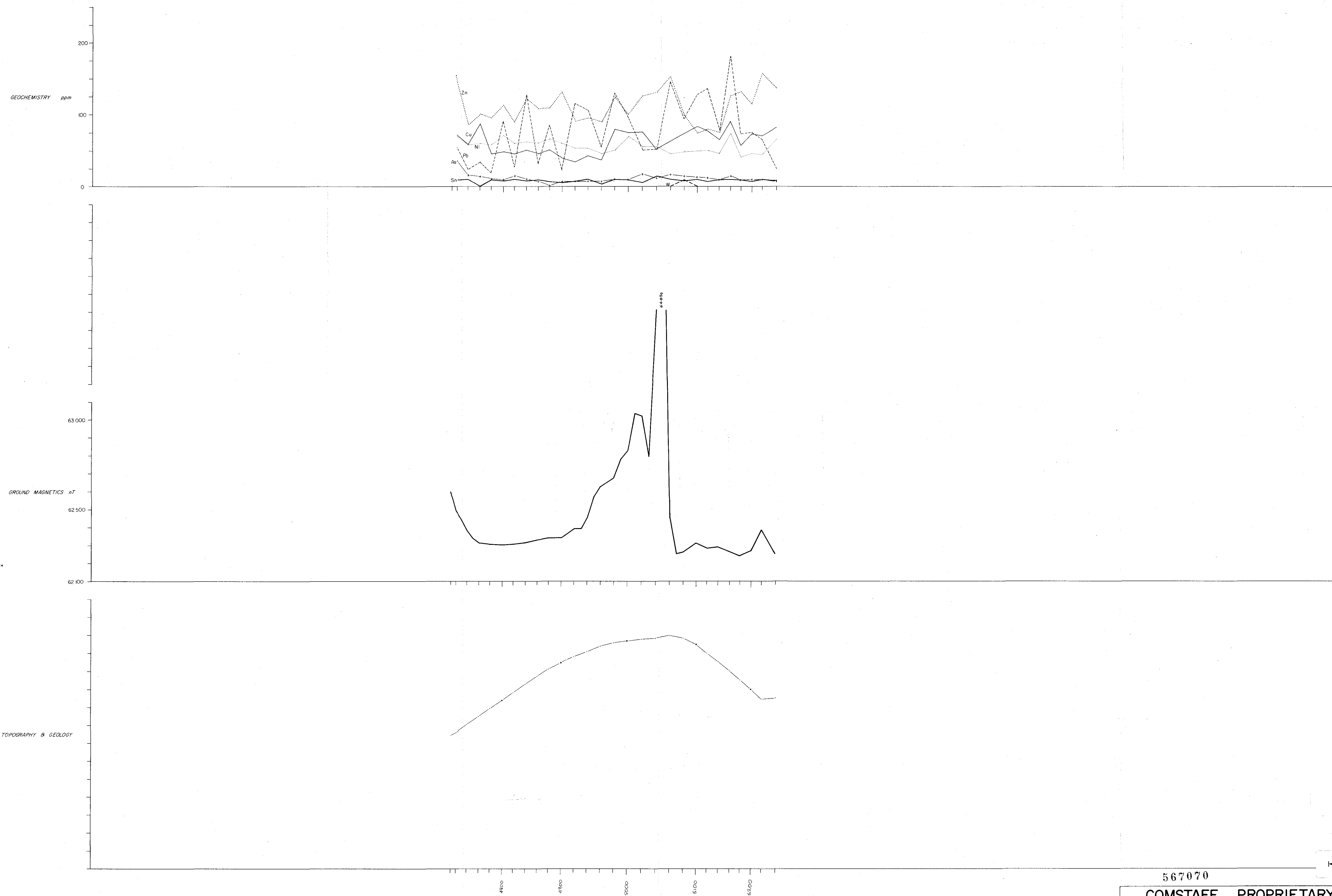
GEOLOGICAL LEGEND

b	Cambrian - basalt/dolerite
s	Crimson Creek Formation - metasediments
v	Crimson Creek Formation - metavolcanics

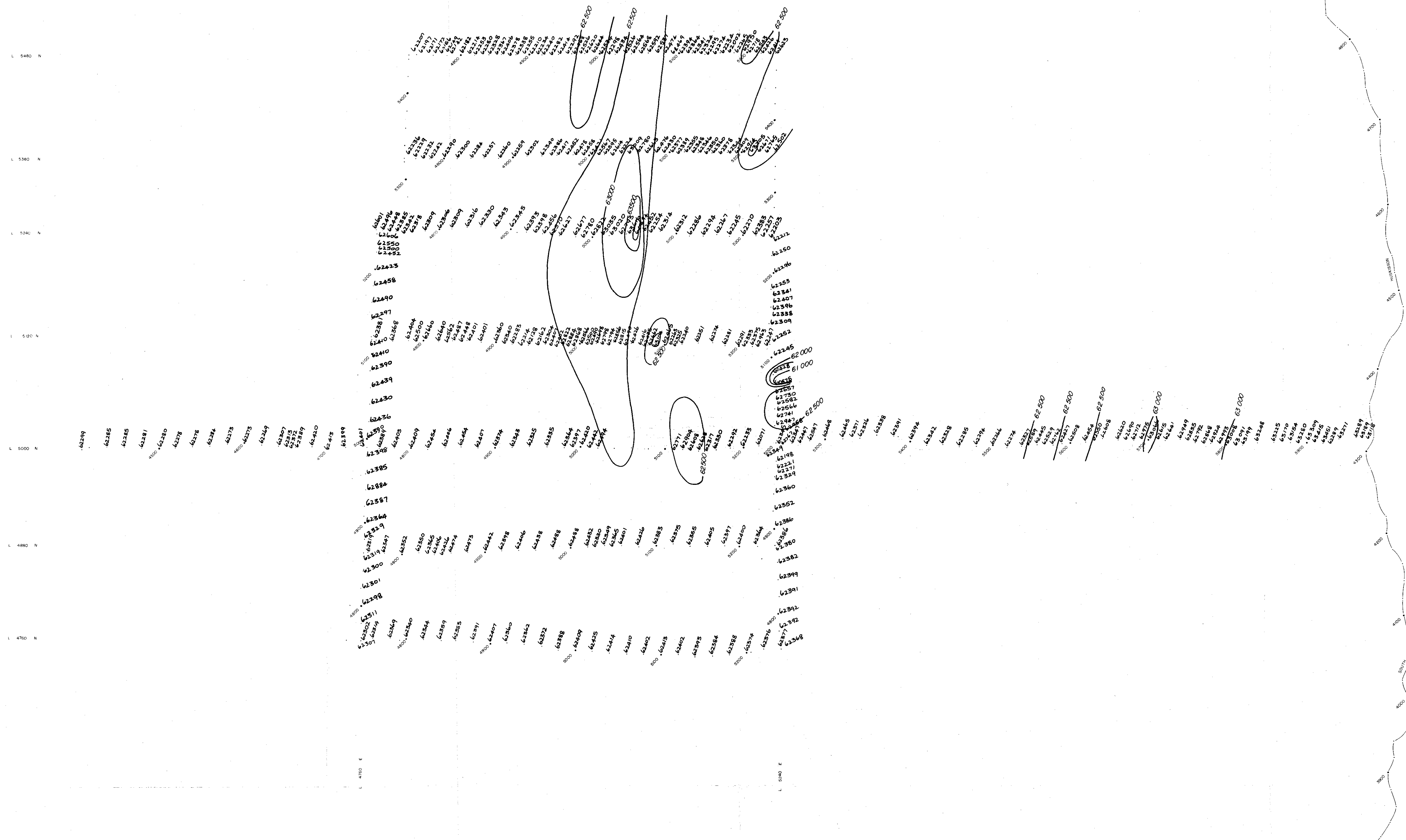
567069



COMSTAFF PROPRIETARY LIMITED	
RAMSAY GRID - CAM 1784	
L 5120 N PROFILES	
TOPO, MAG, E.M., GEOCHEMISTRY, GEOLOGY	
COMPILED N.P.G. & GEODRAFT	DATE 8/3/81
DRAWN GEODRAFT	AMENDED 13/5/83
SCALE 1 : 2500	PLAN NO. TAS/2/2434



COMSTAFF PROPRIETARY LIMITED	
RAMSAY GRID - CAM 1765	
L 5240 N PROFILES	
TOPO, MAG, E.M., GEOCHEMISTRY, GEOLOGY	
COMPILED N.P.G. & GEODRAFT	DATE 8/3/81
AMENDED	
SCALE 1 : 2500	
PLAN No TAS/2/2435	



567071

COMSTAFF PROPRIETARY LIMITED

RAMSAY GRID - CAM 1766

GROUND MAGNETIC CONTOUR PLAN

COMPILED	
N. P. GREEN	
DRAWN	DATE
H. PAPAS	1/3/83
AMENDED	
SCALE	
1 : 2500	
PLAN No	
TAS/2/2458	

5 392 000 m N

370 000 m E

371 000 m E

567072

5 cm

COMSTAFF PROPRIETARY LIMITED

RAMSAY GRID - CAM 1767
GEOCHEMICAL GRID AUGER SAMPLING
COPPER RESULTS in ppm

COMPILED	H. PAPAS
DRAWN	H. PAPAS
DATE	1/3/93
AMENDED	
SCALE	1 : 2500
PLAN NO	TAS/2/2452

5 392 000 m N

370 000 m E

371 000 m E

567073

5 cm

COMSTAFF PROPRIETARY LIMITED

RAMSAY GRID - CAM 1768

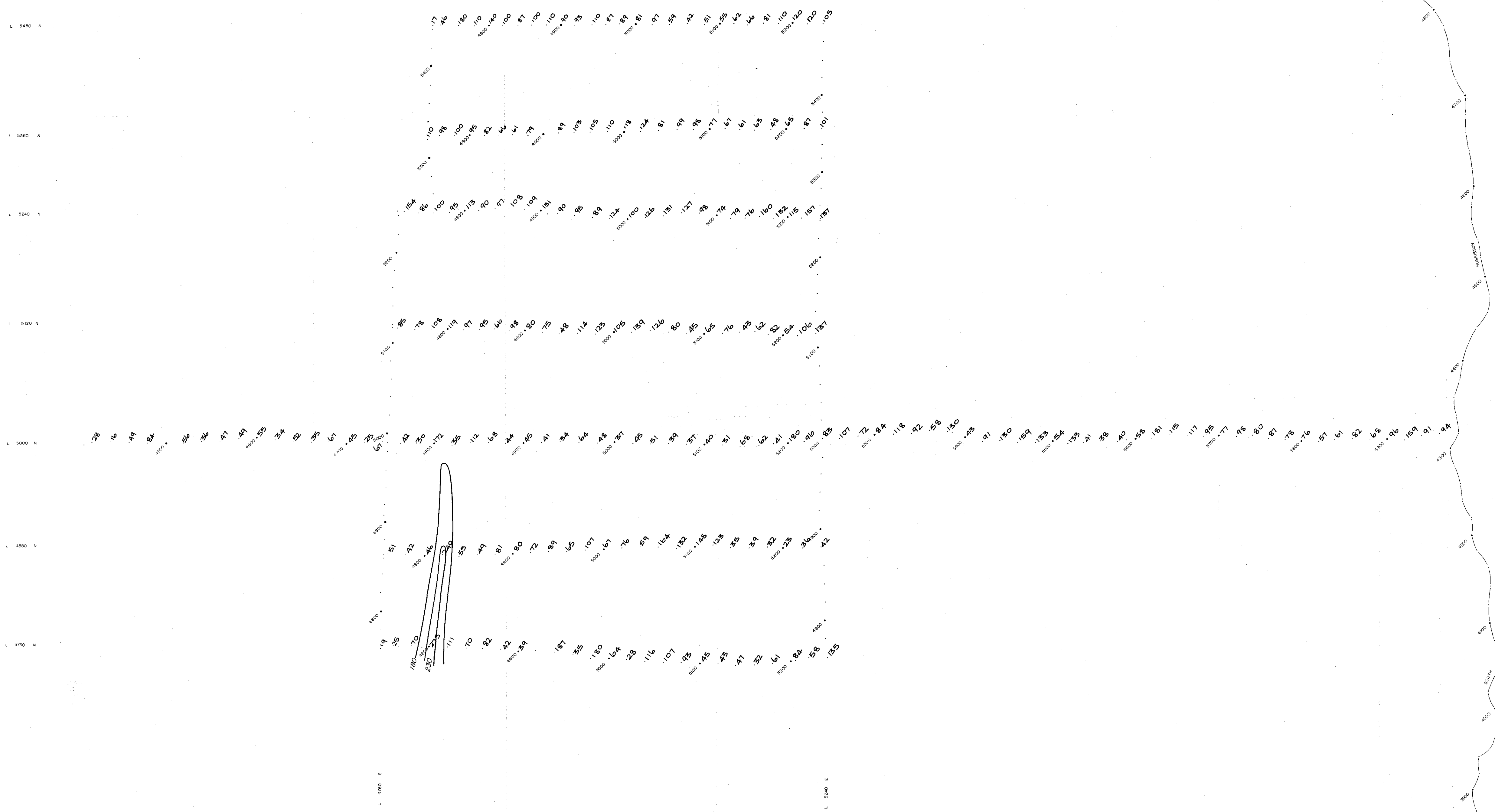
GEOCHEMICAL GRID AUGER SAMPLING
LEAD RESULTS in ppm

COMPILED	H. PAPAS
DRAWN	H. PAPAS
DATE	1/3/83
AMENDED	
SCALE	1 : 2500
PLAN No	TAS/2/2453

5 392 000 m N

370 000 m E

371 000 m E



567074

5 cm

COMSTAFF PROPRIETARY LIMITED

RAMSAY GRID - CAM 1769
GEOCHEMICAL GRID AUGER SAMPLING
ZINC RESULTS in ppm

COMPILED	H. PAPAS
DRAWN	H. PAPAS
DATE	1/3/83
AMENDED	
SCALE	1 : 2500
PLAN No	TAS/2/2454

5 392 000 m N

370 000 m E

371 000 m E

567075

5 cm

COMSTAFF PROPRIETARY LIMITED

RAMSAY GRID - CAM 1770

GEOCHEMICAL GRID AUGER SAMPLING

NICKEL RESULTS in ppm

COMPILED	H. PAPAS
DRAWN	H. PAPAS
DATE	1/3/83
AMENDED	
SCALE	1 : 2500
PLAN NO.	TAS/2/2455

5 392 000 m N

370 000 m E

L 4760 N

L 4980 N

L 5000 N

L 5120 N

L 5240 N

L 5360 N

L 5480 N

L 4760 E

L 5280 E

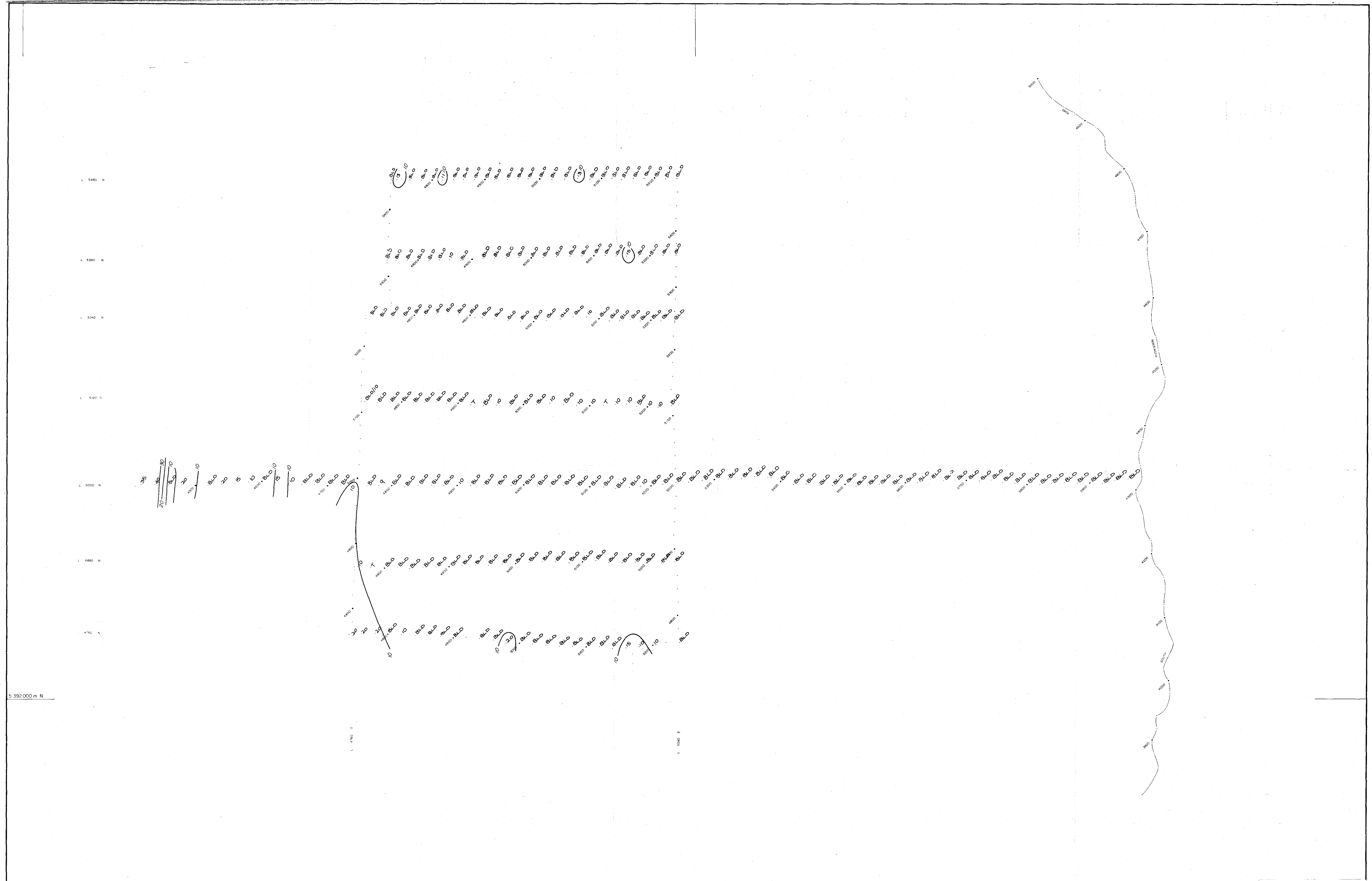
567076

5 cm

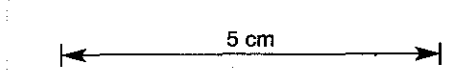
COMSTAFF PROPRIETARY LIMITED

RAMSAY GRID - CAM 1771
GEOCHEMICAL GRID AUGER SAMPLING
TIN RESULTS in ppm

COMPILED	H. PAPAS
DRAWN	H. PAPAS
DATE	1/3/83
AMENDED	
SCALE	1 : 2500
PLAN NO.	TAS/2/2456



567077



COMSTAFF PROPRIETARY LIMITED

RAMSAY GRID - CAM 1772

GEOCHEMICAL GRID AUGER SAMPLING
TUNGSTEN RESULTS in ppm

COMPILED	H. PAPAS
DRAWN	H. PAPAS
DATE	1/3/83
AMENDED	3/2/82
SCALE	1 : 2500
PLAN No	TAS/2/2457

