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CLIMAX MINING LTD -- AUSTMIN GOLD JOINT VENTURE

ANNUAL REPORT ON EXPLORATION OF EL 12/88, MOUNT BLACK, TASMANIA

FOR THE PERIOD SEPTEMBER 1988 to AUGUST 1989.

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Climax Mining Ltd (Operators)
August, 1989

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Summary

EL 12/88 covers an area of Central Belt Volcanic rocks that are prospective for volcanogenic massive sulphide deposits.

The main aim of the 1988/89 programme was to drill test a number of selected UTEM geophysical anomalies generated by Billiton Aust., previous to the Climax Mining-Austmin Gold joint venture partners involvement.

Four diamond holes were drilled within the Mt Black grid area to test anomalies 6B, 10B, 10A and a stockwork alteration zone in volcanics that were interpreted to be footwall to the UTEM anomalies.

The holes encountered a sequence of massive, variably altered, dacitic lavas and minor breccias. Sediments were not present.

The UTEM anomalies have been attributed to contrasts in rock type imposed by shearing, fracturing and, in one instance, extensive weathering. Sulphide mineralization was restricted to surface coatings on fractures and to quartz-chlorite-calcite veins. No significant zones of mineralization were intersected.

Future work is to be concentrated on the northerly extension of the Rosebery mine host sequence in the vicinity of the old Cutty Sark mine.

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1. Introduction & Exploration Philosophy

EL 12/88, known as the Mt Black area, was aquired through the ETA tender system by the Climax Mining - Austmin Gold joint venture partners following an assessment of Open File data. It was concluded from the review that a number of unexplained UTEM anomalies, which were in part coincident with a broad zone of weakly anomalous Pb-, Zn- and Cu-in-soil, were possibly due to VMS style sulphide mineralization, and were worth drill testing.

A diamond drilling programme to test the anomalies which were all located in steep, thickly forested country on the north-eastern slopes of Mt Black, was drawn up on this basis.

Exploration over the period covered by this report was concentrated in the Mt Black grid area.

The main target, in EL 12/88, is a gold rich, volcanogenic, massive base metal sulphide deposit hosted by units of the Mount Read Volcanics. The target is expected to have similar character to the nearby deposits at Rosebery, Que River and Hellyer. The massive sulphide deposit may have a stockwork feeder zone in the stratigraphic footwall. Mt Lyell style disseminated copper-gold, breccia hosted and epithermal/hydrothermal gold deposits were consequently also considered as targets.

2. Title

EL12/88 of 23 square kilometres was granted on 2nd September, 1988 following the successful joint tender by Climax Mining and Austmin Gold for adjoining parts of ETA's 31, Rosebery and ETA 38, Marionoak River. The Licence area covers parts of three current mining leases, held by Pasminco Ltd., which surround the Rosebery mine.

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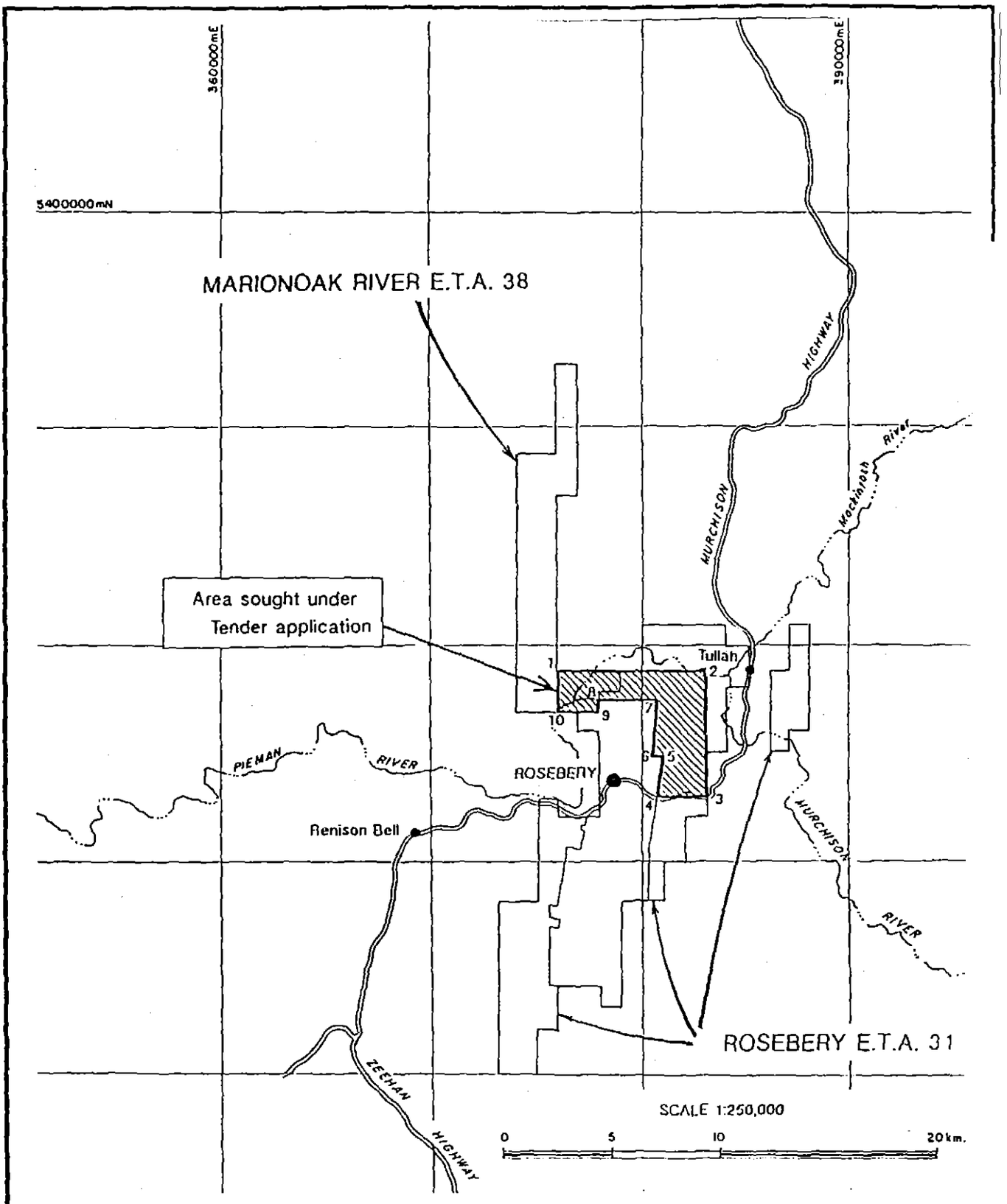

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MT BLACK - EL 12/88

LOCATION MAP

Fig. 1

5 cm

3. Previous Exploration

EL12/88 was once a part of EL 1/62 originally held by the EZ Co and explored in the later years with assistance from joint venture partners Getty and Billiton Aust.(Shell). Previous work, which included geological mapping, geochemical sampling airborne and ground geophysical surveys and drilling had generated a large data-base. This work is summarised in Table 1 and on Figs. 2 to 4.

The area is for the most part heavily vegetated and this, together with a local cover of glacial debris, has made it difficult for previous explorers to make meaningful detailed geological maps of all but relatively small grid areas. In general, exposure is so poor as to often render the interpretative maps meaningless.

Most recent work has been carried out on grid lines that were oriented to AMG grid north and cleared for single file access. The base-line is 582,000 metres east and has been pegged at 100m intervals. East-west cross lines at spacing varying from 100 to 500 metres have been pegged and flagged at 50 metre intervals.

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Table 1

EL 12/88 - Summary of Previous Exploration

TCR #	YEAR	COMPANY	WORK DONE	RESULTS
87-2752	1987	Billiton-EZ...	UTEM, CSAMT Robbies Ck, 1 DDH RED87-1 (607m)	Intersect 41m shear zone with Mag. pyrite
86-2622	1986	Billiton-EZ...	UTEM 22 loops over EL1/62, select SIROTEM, BLEG gravels	Numerous weak UTEM responses recorded
85-2516	1985	EZ-Getty	Map, rk samp., VLF, mags - Mt Black;DDH's Cutty Sark, Bobadil	No signif. min'n in DDH's; weak EM responses
85-2313	1984	EZ-Getty	Dighem III ; UTEM, 2 DDH's-Cutty Sark; VLF - Mt Black; DDH - Bobadil;	No signif. min'n in DDH's Best intercept 20m @ 0.32%Zn
82-1738	1981	EZ-Getty	IP, soil samples,pits at Mt Sale;	No significant anomalies recorded
80-1468	1980	EZ-Getty	Langdons, Mt Sale mapping; soils, grad. IP	
80-1411	1979	EZ-Getty	Aeromagnetics, photogeol; INPUT Rosebery IP, soils., mapping- Cutty Sark; mags, IP soils, map- Mt Sale	Soil anomalies, mags anom. Cutty Sark
79-1366	1979	EZ	Dipole-dipole IP Mt Black	IP responses down-graded
79-1342	1979	EZ	Gradient array EIP, magnetics- Mt Black, Langdons, Mt Sale	Numerous IP responses recorded
75-1126	1975	EZ	IP, soil sampling Bobadil area	Cu,Pb, Zn anomalies recorded
73- 959	1973	EZ	Mapping, TURAM, IP, DDH's Rosebery area	Palaeogeographic model outlined
72- 864	1972	EZ	Selected Turair Airborne EM, magnetics	Several weak conductors defined
71- 785	1971	EZ	Geol. mapping; reg stream sampling Cu,Pb,Zn,Mn	Pb, Zn, Mn anomalies recorded; low density
65- 407	1965	EZ	Selected IP surveys	

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4. Work Completed

In the period July 1988 to August 1989, the following work was undertaken by the joint venture partners:

1) A detailed review of the data generated by EZ, Getty and Billiton during exploration of relevant parts of EL 1/62. The geophysical review involved a thorough re-interpretation of the Billiton UTEM data together with an assessment of the available regional magnetic and gravity data;

2) In-house photogeological study;

3) On the basis of the review, five diamond drill hole sites were selected to test four UTEM anomalies and one stockwork- alteration zone target. Ground follow-up to locate the proposed sites and to evaluate drill access was completed in December.

4) A brief programme of geological reconnaissance mapping and sampling was completed prior to drill access preparation.

5) Existing tracks providing access to the Mount Black grid area were renovated and five helipad/drill sites were prepared for the diamond drilling programme.

6) A programme of shallow hand soil augering was completed on the four grid lines along which drill testing was planned. 129 samples were collected at 25 m intervals to infill gaps in the previous data.

7) Four diamond drill holes, for a total of 869 m, were completed to test selected UTEM geophysical anomalies and geological targets in the Mt Black grid area. The core was logged, photographed, split at selected regular intervals, and assayed for Cu, Pb, Zn, Ag, Mn, As, Ba and Au (Fire Assay). Drill hole collars were recovered by detailed tape, clinometer and compass survey.

8) A programme of shallow hand soil augering was completed on the three grid lines to close off, and verify, a 250 ppm+ Pb soil anomaly in a zone between 75,000N 81500E and 75250N 81000E (previously reported by Getty). 119 samples were collected at 20 m intervals and sieved to minus 80 mesh. Samples were analysed at ANALABS Burnie for Cu, Pb, Zn, Ag, Mn, As, and Au(FA).

9) Petrological descriptions were completed for drill core selected rock samples.

10) Two lines of 10 m ground magnetic surveying were completed on lines 76,000 N and 75700 N.

5. Discussion of Results

5.1 Geology:

a) Regional Geology:

The ore bodies sought are all hosted within elements of the Cambrian, Mt Read Volcanic sequence. The sequence is of calcalkaline character and lavas of basaltic, andesitic, dacitic and rhyolitic composition have been recorded. In the northern part of the central belt which hosts the major VMS deposits, andesite and dacite lavas predominate. All are associated with mineralization to some extent. A suite of intrusive porphyries and granitoids with attendant high temperature vein mineralization is present along the eastern margin of the belt.

Varne & Foden (1987) argue that the Mount Read Volcanics are one of a number of different igneous rock suites in Western Tasmania that were formed in a long period of crustal thinning within an active continental margin. Various episodes of crustal rupturing, magmatism and small scale rifting are envisaged.

The Mt Read belt is structurally complex and at least two deformations have been recorded in most of the VMS deposits. At Que River the banding in the ore may have been structurally induced. At Rosebery, isoclinal folding, transposition of bedding and overturned beds have been recorded. Transposition of at least one of the bedded ore masses has been noted at Hercules (Lees, 1986). The folding cleavage and schistosity post-date the ores and are considered to be Late Silurian to Early Devonian in age (Tabberabberan). Major deformation in the Early Devonian has reset most of the K/Ar and Rb/Sr isotopic systems. Near Rosebery there is some evidence for a Late Cambrian to Early Ordovician cleavage forming event (Adams et al., 1985), and at Mt Lyell a thrust deformation event of Early Ordovician age has been described (Arnold & FitzGerald, 1986).

b) EL 12/88 Geology:

The units within the Mount Black area, the Mt Black Volcanics, form part of the Cambrian Central Volcanic Sequence of the Mount Read Volcanics (Corbett, 1986).

The bulk of the sequence comprises a suite of rhyolitic, dacitic and andesitic lavas with some felsic porphyry intrusives and minor basaltic dykes. Pyroclastic and minor sedimentary units are known to be intercalated with the lavas at Mt Black and along the southern shore of Lake Rosebery.

The sequence has been folded and is believed, on limited evidence, to face to the east, except in the Cutty Sark area where a northerly plunging anticline has been interpreted in Rosebery mine host sequence sediments . Overturned bedding has been recorded locally.

Interpretation of the contoured Dighem II aeromagnetic data over the area east, and south of Mt Black, suggests that the lithologies could be equally as complex where there is no exposure, and that some large scale folds and previously un-mapped faults are present (FitzGerald, et al., 1984).

Felsic lava, silty arenite, tuffaceous pelite and chert form an east dipping, north-north-east trending sequence north of Mt. Black (Randell, et al., 1986). The environment has been interpreted as as one which varies from subaerial dacitic lavas to the west, to possible submarine andesitic lavas to the east, with a boundary marked by periods of local submergence.

Sandy and silty sediments, black shale and chert along with ignimbrite(?) have been recorded at Langdon's Mine.

At Mt Sale, andesite lava and rare andesitic lithic tuff are present, although exposure is apparently so poor as to preclude measurement of bedding attitude.

In the Cutty Sark area, a sequence that correlates with the Rosebery mine stratigraphy has been identified. The latter includes volcaniclastics , similar to those in the hanging-wall at Rosebery and cherty exhalites (Randell, et al., op. cit.).

There appears to be sufficient evidence that interruptions to the cycle of volcanicity, favourable to the deposition and presevation of massive sulphide mineralization, are represented in the lithological assemblage present in the licence area.

Some substantial areas of alteration have been mapped at Mt. Black, at Langdon's mine and in the area of the Cutty Sark mine. At Mt. Black, a chlorite-hematite-magnetite alteration zone has been recognised within weakly pyritized ignimbrites, andesitic lavas and intercalated sediments. Auger soil sampling returned isolated values up to 360 ppm Cu and 0.18 ppm Au in the vicinity of the UTEM anomalies. Weakly anomalous values to 115 ppm Cu, 145 ppm Pb, 220 ppm Zn, 115 ppm As, 0.01 ppm Au and 900 ppm Ba were detected in the rock samples.

A wide zone of silicic alteration with smaller zones of chloritic and sericitic alteration has been recorded in the area around the Langdon's Mine. Here, the lead-zinc-arsenic mineralization, which is anomalous in gold up to 4.8 g/t, is present in a quartz-siderite breccia gangue. The mineralization is believed to be of the fissure fill type and may be of Devonian age.

Further extensive silicification of massive andesite lava is known to the south of the Langdon's occurrence.

Alteration is also present in the area of the Cutty Sark mine and the nearby Robbies Creek prospect, to the north of Rosebery. At Robbies Creek, sericitised and carbonate flooded epiclastics and lavas are known to host a 41 metre wide shear zone with disseminated and massive magnetite-pyrite stringer style mineralization (Randell, et al., 1987).

b) Minus 80 mesh Soil Samples

A series 119 of shallow hand auger soil samples were collected at 20 metre intervals from lines 75,250 mN, 75,100 mN and 75,000 mN between 81,000 mE and 81,800 mE. Samples were sieved to minus 80 mesh at Analabs, Burnie and analysed for Cu, Pb, Zn, Ag, Mn, As by AAS and Au by fire assay. Profiles are presented along with the raw data in Appendix 1. Maximum values in ppm recorded on the above lines were: Cu- 30; Pb- 40; Zn- 155; Ag- 0.5; Mn- 2350; As- 12; Au- 0.011.

The work was designed to confirm the presence of a Pb-in-soil anomaly of up to 250 ppm reported by Getty (TCR 85-2516). The Getty results were interpreted to outline a dual peak anomaly up to 750+ m long, trending in a NNW direction between 76000mN, 80950-81100mE and 752500mN 81350-81550mE(see profiles Appendix 1).

An anomaly of up to 45 ppm Pb and 2500 ppm Mn, with weakly anomalous As and Cu, was recorded on line 75,100 mN near 81,500 to 81550 mE. Results were of considerably lower tenor than those reported by Getty, although the relative positions of the anomalies appear to coincide. A substantial Mn anomaly of up to 1150 ppm with weakly anomalous Zn (125 ppm) and Pb (25 ppm) was recorded on line 75,000 mN between 81,620 to 81,680 mE. A weak, and partly coincident, Zn (105-155 ppm) and Mn (810 ppm) anomaly on line 75,250 mN lies some 300m east of the Getty anomaly.

The results indicate that a narrow mineralized structure, possibly a fissure vein, runs through the area. A coherent, sizeable anomaly was not detected.

c) Previous Soil Sampling

A detailed re-interpretation was made of both the Billiton whole-soil and Getty minus 80 mesh soil samples (see Appendix 1 for profiles.)

The following significant anomalies were recorded by Getty:

- line **75,000N**: a strong co-incident Pb (210 ppm) and Zn (345 ppm) anomaly at 81520E. High Zn (to 295 ppm) was also recorded between 81240E and 81260E.

-line **75,250N** two strong co-incident Pb (to 240 ppm), Zn (to 380ppm) and Cu (to 35 ppm) anomalies were recorded between 81340E to 81380 and 81460 to 81500E.

-line **77,000N** : Zn in the range 200-360 ppm with Cu (20ppm and Pb(45ppm) between 81080 and 81140E; Zn (295 ppm) and Pb (50ppm) at 81200E.

-line **77,250N** : Zn up to 265 ppm in 5 isolated anomalies; Cu (80 ppm) at 81440E.

-line **77,500N** : isolated Cu anomaly of 200 ppm at 81220E within a broad zone of high Zn (to 275ppm) and Pb (to 65 ppm).

-line **78,000N** : isolated Pb anomaly of 105 ppm over a background of 30 ppm at 80760E.

The Billiton results were also coded and profiles plotted. These results were used to calculate the 100 Zn/(Pb+Zn) ratios for the soils of the Mt Black and Mt Sale grid areas. The ratio is purported to give some indication as to the nature of the primary mineralization source (Huston & Large, 1987). In this instance, the bulk of the results plot in the VMS rather than the fissure vein field Fig 5. To date this positive indication from the soil geochemistry has not been borne out by the drilling results.

d) Rock Chip Sample Results

Four rock chip samples were collected from road-cut sites north and south of the inaccessible areas during the early reconnaissance phase. Results are presented in Appendix 2. A sample of silicified, chloritized, fractured grey volcanic lava(?) (MB23) collected from a narrow sub-vertical shear zone(?) at the SW corner of the licence area was anomalous in Au (0.42 ppm), and was high in As (1.15%). The result suggested that similar mineralized structures could be expected to be located throughout the volcanic pile in the Mt Black area.

Rock chip samples were collected from exposures created by the construction of the access track to the site of proposed drill hole 5 (RS1 to RS25- see Fig.6 for locations and Appendix 2 for results). The drill hole was sited to test UTEM anomaly 8B , a shallow sourced anomaly with a coincident VLF response.

All samples, with the exception of RS6, were of variably altered and weathered, fractured dacite porphyry. Considerable limonite staining was noted throughout some samples. Maximum values recorded were: Cu 40 ppm; Pb 30 ppm; Zn 70 ppm; Ag 1.0 ppm; As 18 ppm; Mn 395 ppm; Au 0.012 ppm; and Ba 960 ppm.

Results were not consistent with the presence of mineralized halo about a substantial body of massive mineralization. In view of this and results from drill holes MBD1, 2 and 3. The conductive zone was interpteted to be due to the contrast between massive and more extensively weathered and fractured dacite.

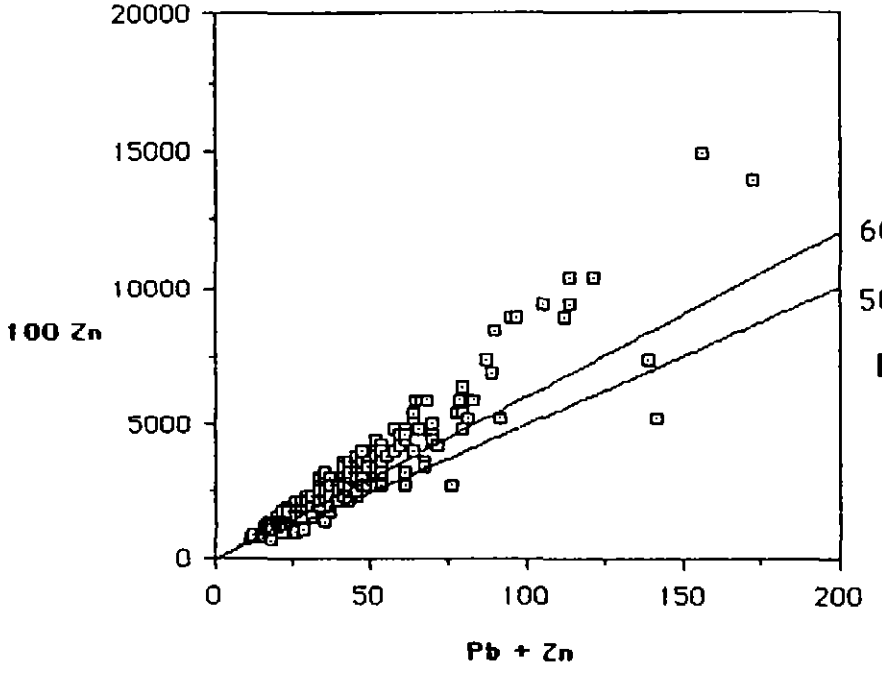
A sample of siliceous breccia (MB28.5) from line 76,000 N with chlorite-magnetite veinlets and rare large pyrite blebs in was not anomalous with respect to base-, precious-, or indicator metals. The sample was collected from within the zone of alteration tested by hole MBD4.

d) Petrology

Petrological descriptions were completed for rock and core samples. (See Appendix 4 for all petrology reports.)

Seven samples, collected from units on strike with the units at Mt Black, during reconnaisssance, were examined to assist with the geological interpretation. Rock types recorded were: schistose meta-tuff, hydrothermal breccia, altered andesite, dacite and rhyolite lava; and altered dacitic ignimbrite.

100 Zn / (Pb+Zn) in Whole Soils- Billiton Data



Cambrian VMS Deposits (> 60)

Devonian & Cambrian Fissure veins (< 60)

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MT BLACK - EL 12/88

100Zn to Pb + Zn IN BILLITON SOIL SAMPLES

Fig. 5

Of the ten samples from the Mt Black grid area, most were described as being typical dacitic to rhyodacitic lavas of the central Volcanic suite. All lacked quartz phenocrysts and were of prehnite-pumpellyite to lower greenschist facies grade. Sericite-carbonate-chlorite alteration of variable intensity was recorded in most samples. The only unequivocal volcaniclastic rocks were collected from the extreme western edge of the Mt Black grid along the vehicle access tracks. These were described as felsic lithic tuff (27/10) with feldspar-phyric dacitic clasts and layered vitric ash exhibiting wet sediment deformation (27/12).

Descriptions were completed for two stream float samples collected from the Mount Black grid area. One was described as a quartz-feldspar phyric rhyolitic lava or tuff with sericite-chlorite shears and streaks defining a weak foliation. This is one of the most felsic rocks so far described from the property. The other was described as a molasse like quartz-rich sandstone with metamorphic derived quartz similar to samples of the Jukes Breccia. It is probable that the rock was derived from a residual deposit of glacial moraine which has obvious implications for interpretation of the soil geochemical data.

5.3 Geophysics

a) Regional Interpretation

Previous geophysical data collected in the tender area comprises:

a) Dept of Mines aeromagnetic survey data;
b) Dighem airborne electromagnetic, resistivity and magnetic data;
c) regional gradient array and selected dipole-dipole IP data;
d) UTEM (fixed loop transient electromagnetic) data;
e) selected VLF, Afmag and other survey data collected during the seventies;

Detailed re-interpretation of the Dighem, UTEM and regional gradient array IP data was undertaken to assist with the geological interpretation and the identification of drill hole sites.

The Dighem aeromagnetic data confirm that the Central Volcanic sequence within the licence area is heterogenous. The main magnetite bearing units are the dacitic lavas and magnetite-hematite rich alteration zones. Some of the magnetic units east of Mt Black have character suggestive of the presence of domal structures. Extensive Dighem resistivity lows are attributed to hydrothermal alteration in the volcanic mass.

Two anomalous UTEM responses in the area east of Mt Black, appear to pass along the eastern margin of the inferred domal structure. These were interpreted to represent a mineralized position along a hiatus.

b) Ground Magnetics

Measurements recorded during the 10m ground magnetic surveying programme undertaken on lines 76,000 N and 77,000 N proved to be too noisy for meaningful interpretation. The work was not considered to be of high enough priority to repeat.

5.4 Diamond Drilling

Four NQ diamond drill holes (MBD 1 to MBD4), for a total of 869 m, were completed in April and May, 1989.

The core was logged, photographed, split at selected regular intervals, and assayed for Cu, Pb, Zn, Ag, Mn, As, Ba and Au (Fire Assay). Each hole was cased from top to bottom with PVC casing for down-hole geophysical logging. (Geopysical logging was not completed due to malfunction of contractor's instruments and bad weather at the end of the programme.)

The holes were sited on the basis of Billiton tags and flagging along the selected cut-lines. Drill hole collars were later picked up by tape, clinometer and compass survey to be tied into controlled survey points.

All holes were drilled to the west on the assumption that the sequence of volcanics was conformable with the known east dipping structure at the Rosebery mine.

The holes were designed to test selected UTEM geophysical anomalies and geological targets in the Mt Black grid area. The holes encountered a sequence of massive, variably altered, dacitic lavas and minor breccias. Sediments were not present.

The UTEM anomalies have been attributed to contrasts in rock type imposed by shearing, fracturing and, in one instance, extensive weathering. Sulphide mineralization was restricted to surface coatings on fractures and to quartz-chlorite-calcite veins. No significant zones of mineralization were intersected.

Relevant details and target information is summarized in Table 2. (See Appendix 3. for core logs and assay data.)

Table 2 **Diamond Drilling - Summary**

HOLE	LENGTH(M)	DIP	DIRECTION	CO-ORDINATES(AMG)	
1	295.5	-70	258 mag.	381494 E	5376972 N
	Target : UTEM Anomaly 6B, broad EZ-Getty geochem. anomaly.				
2	209.7	-55	258	381897 E	5375292 N
	Target : UTEM Anomaly 10B, IP anomaly, Shell geochem. anomaly (Cu).				
3	169.1	-55	258	381588 E	5375737 N
	Target : UTEM Anomaly 10A, VLF anom., IP anomaly, geochem. anomaly.				
4	195.0	-50	258	381504 E	5375998 N
	Target : Stockwork alteration zone; magnetic high; geochem. anomaly (As).				

Hole MBD1:

Hole MBD1 was drilled to test UTEM anomaly 6B a feature interpreted to be 1250 m long with a width of around 100 m and a depth to the top of approximately 150m.

The hole intersected massive feldspar-phyric dacite to 281m, then a coarser grained, slightly oxidised dacite porphyry to 295.5m. Varying degrees of chloritic and potassic? or albite-hematitic alteration were present throughout. Ubiquitous veinlets of quartz-chlorite-calcite were present. Zones of rock with a fragmental appearance were recorded between 137.5 and 173.85m. These consist of dacite porphyry fragments in a thoroughly altered fine grained chloritic matrix. Small dolerite transect the porphyry locally. Layered sedimentary rocks were not encountered.

Sulphide mineralization was restricted to trace pyrite as disseminations and fracture coatings. Minor chalcopyrite was recorded in a qtz-calcite-chlorite vein at 148.0-148.7m. The vein assayed 250 ppm Cu. Maximum assay values were: Cu 250 ppm; Pb 40ppm; Zn 50 ppm; Ag < 0.5 ppm; Au 0.017 ppm; Mn 835 ppm; As 3ppm; Ba 1100 ppm.

The down-hole profiles for base metals, Ba and Mn are plotted in Fig. 7a-d. A zone of feldspar destructive alteration on the up-hole side of the weakly mineralized quartz vein at 148-149 m is evident. Mn, which is probably present in the carbonate shows a distinct tendency to increase over the last 50 m of the hole. This may be an indication of proximity to another vein system.

The UTEM is thought to be due to a contrast in electrical conductivity between the fresh massive dacite porphyry and the slightly oxidised porphyry intersected below 281m.

Nine samples were selected for petrographic description (see Appendix 4).

Hole MBD2:

MBD2 was drilled to test Billiton UTEM anomaly 10B, interpreted to be a shallow, weak conductive body with a strike length in the order of 750m. The hole intersected massive, crowded feldspar-phyric dacite porphyry. Alteration and veinlets as for hole MBD1 were noted. Trace amounts only of pyrite were present. A zone of shearing and brecciation with alteration between 129.8 and 133.6m is believed to be the source of the UTEM anomaly.

Maximum assay values were: Cu 95 ppm; Pb 50ppm; Zn 160 ppm; Ag < 0.5 ppm; Au <0.008 ppm; Mn 2050 ppm; As 5 ppm; Ba 980ppm.

The degree of feldspar destructive alteration in MBD2 between 80 and 180m is apparent from the Ba down-hole profile (Fig. 7b). Mn spikes to 2050 ppm are well below the base of the oxide zone in this hole.

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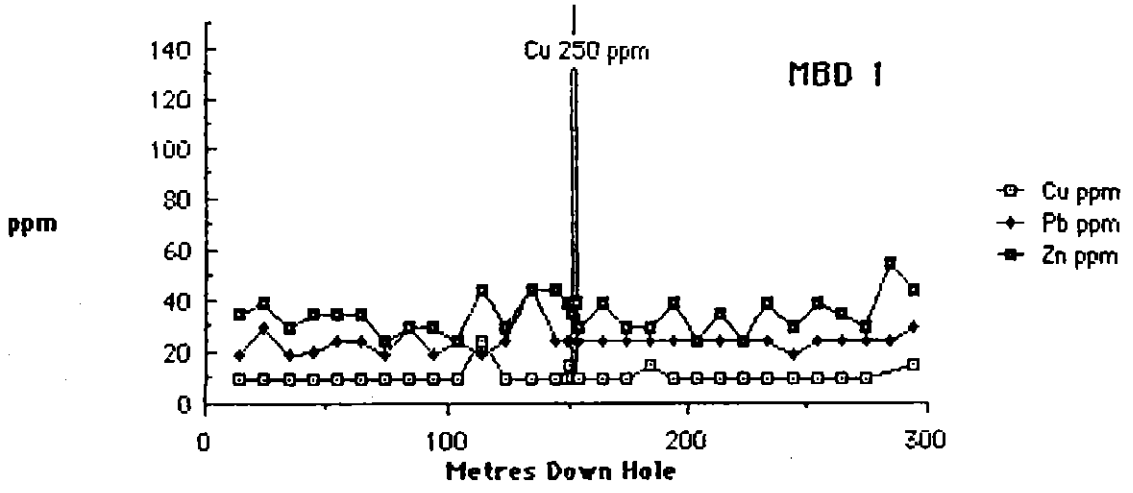
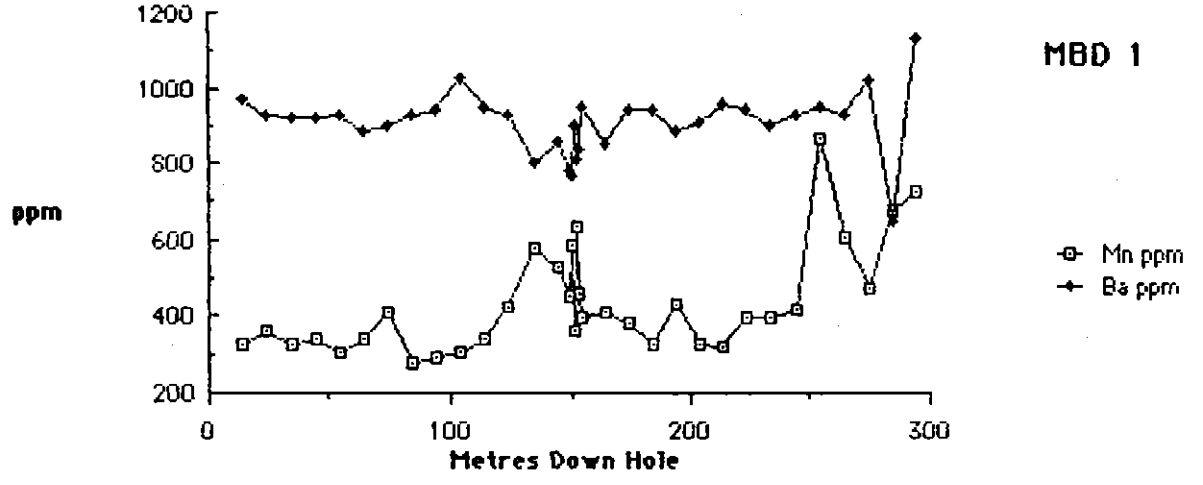
Mt Black EL 12/88 – Drill Hole Geochemical Profiles





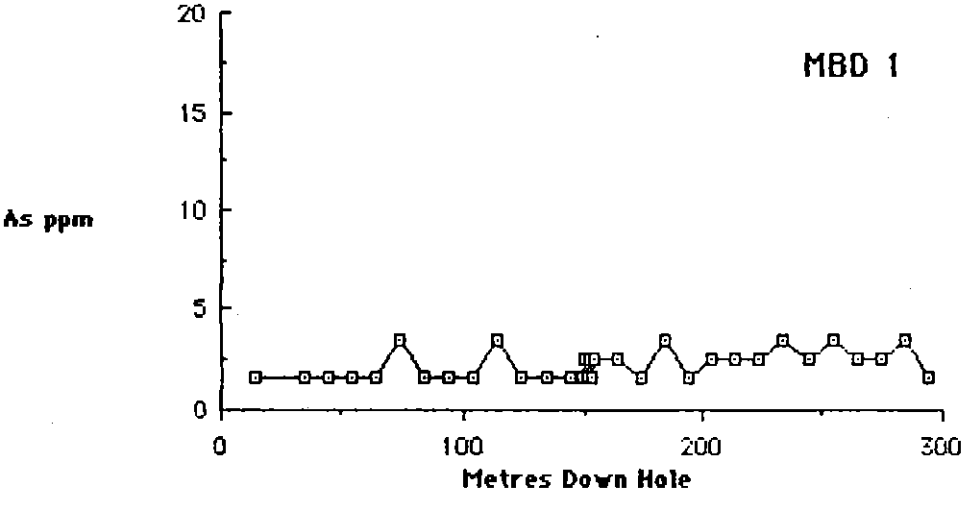


Fig. 7a

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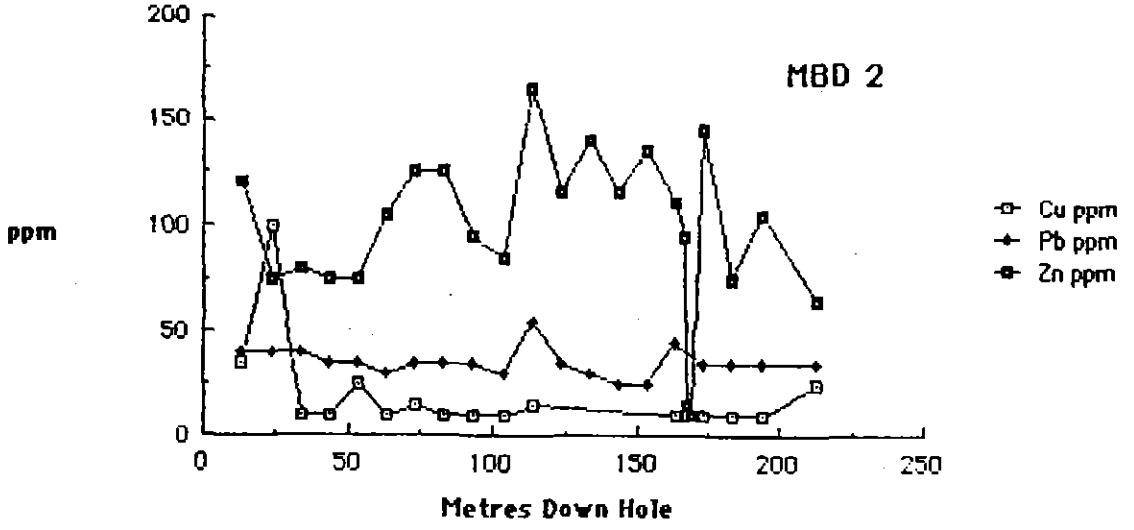
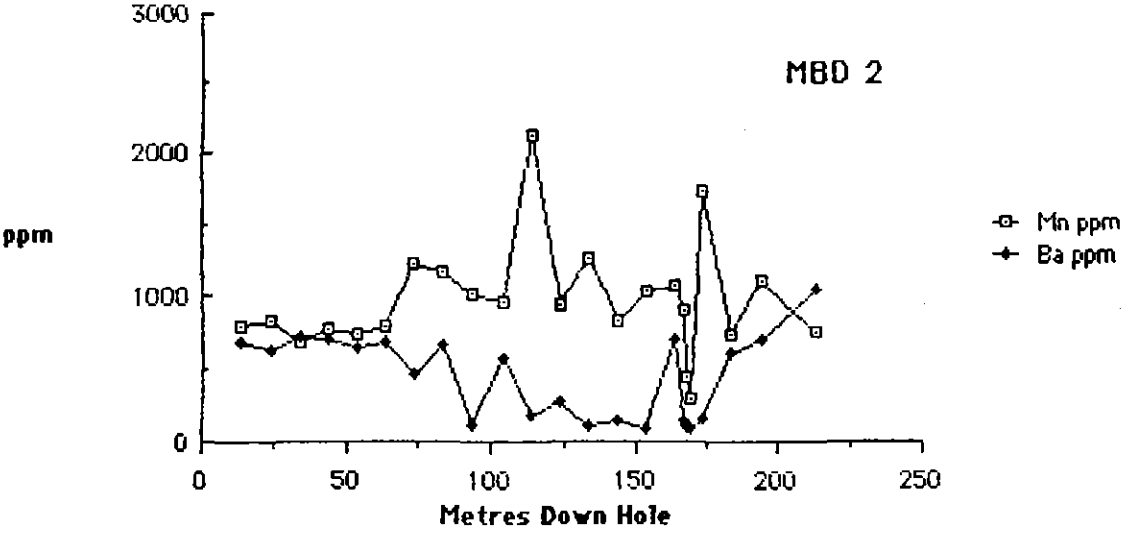
Mt Black EL 12/88 - Drill Hole Geochemical Profiles





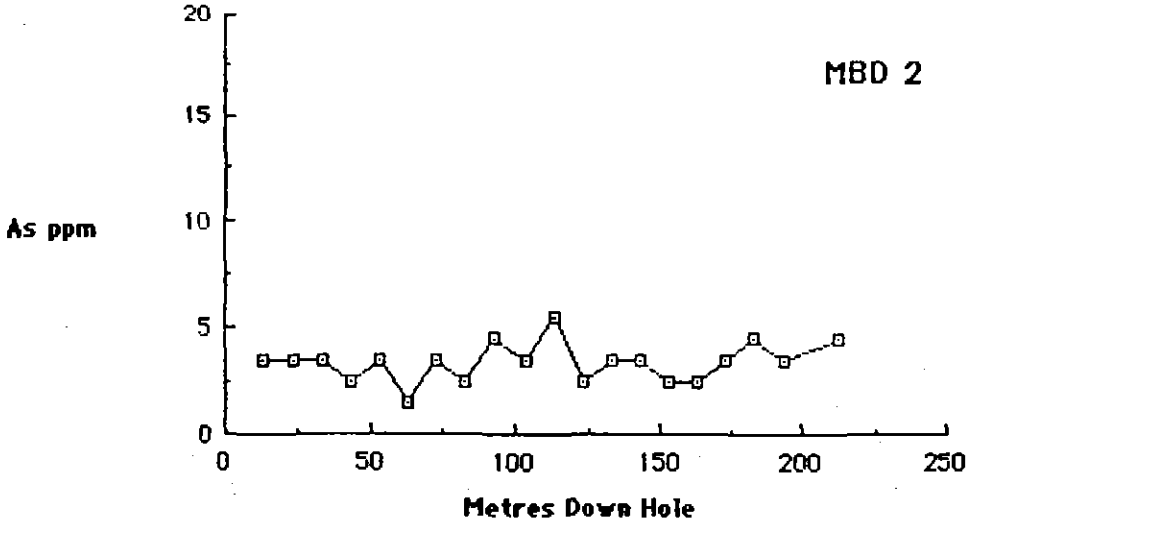
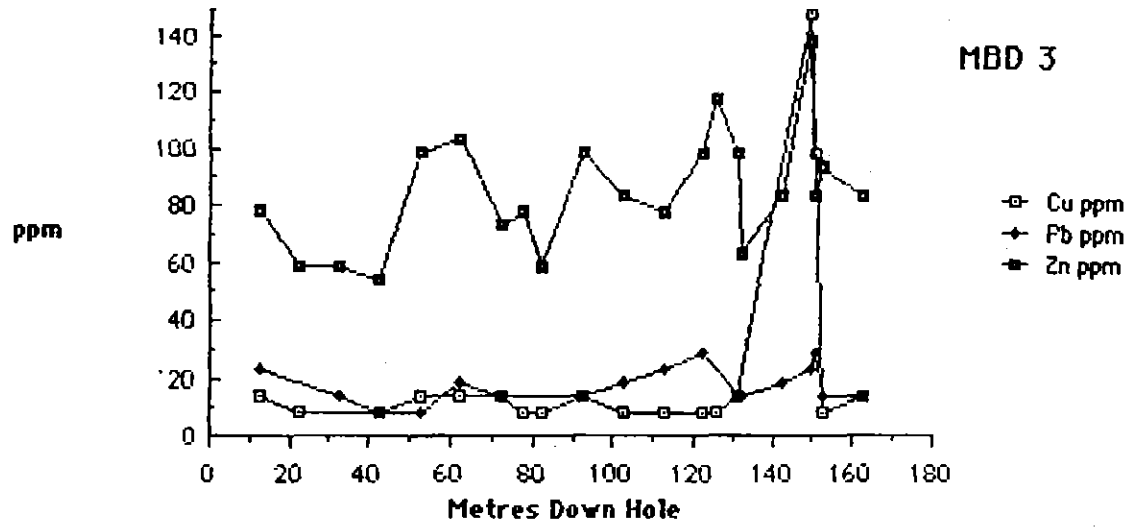
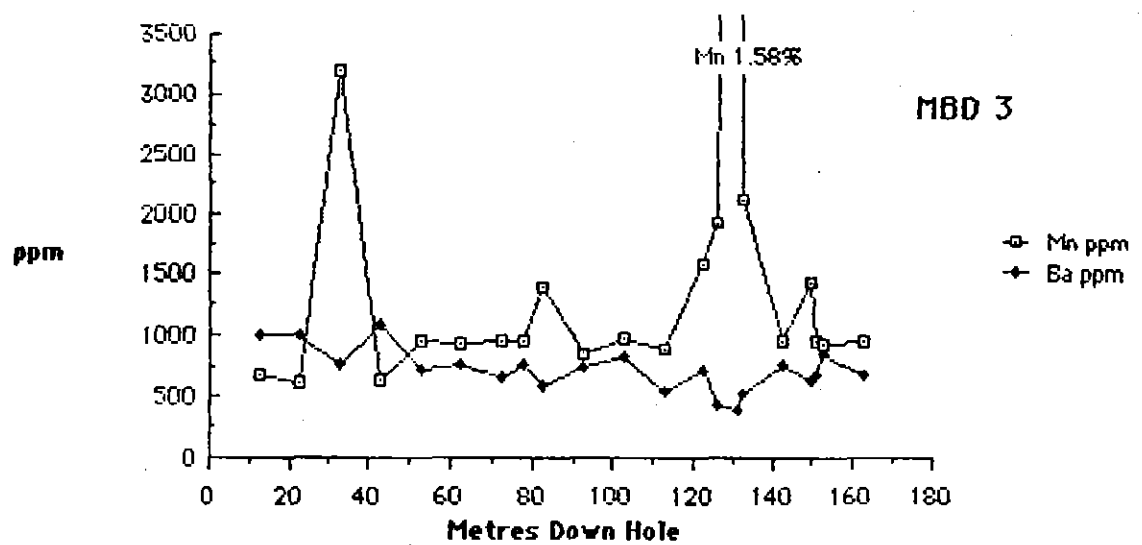


Fig. 7b

Mt Black EL 12/88 - Drill Hole Geochemical Profiles





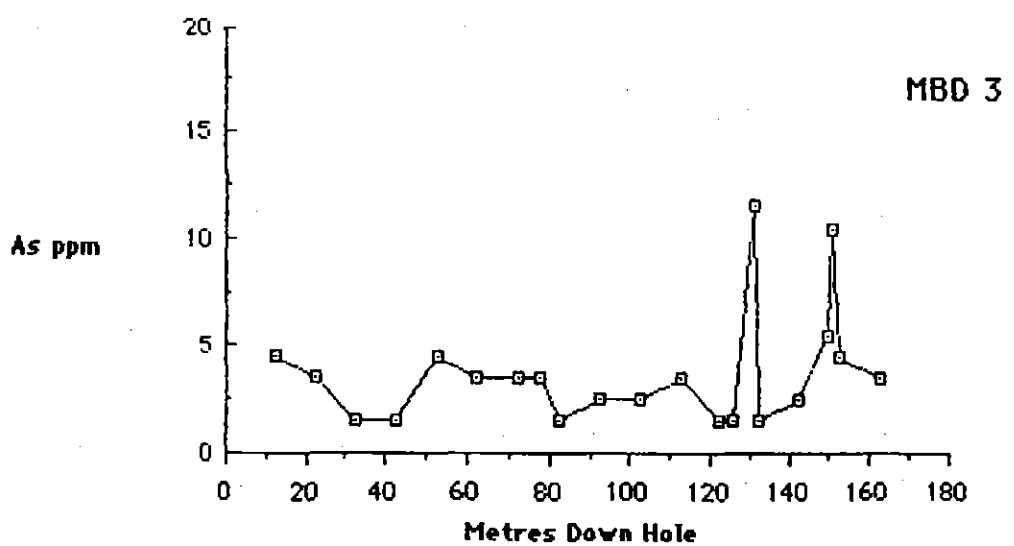
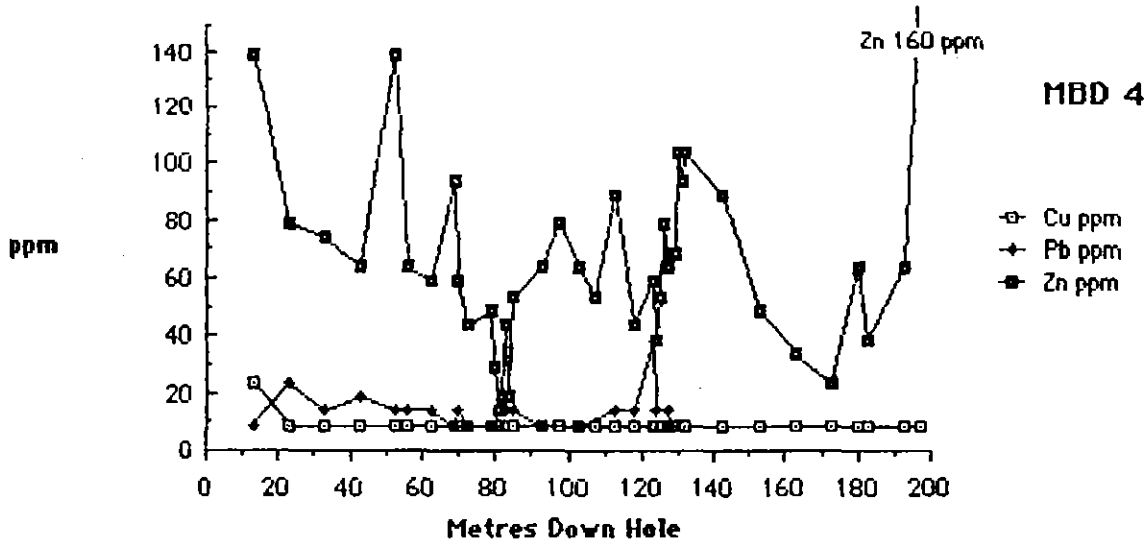
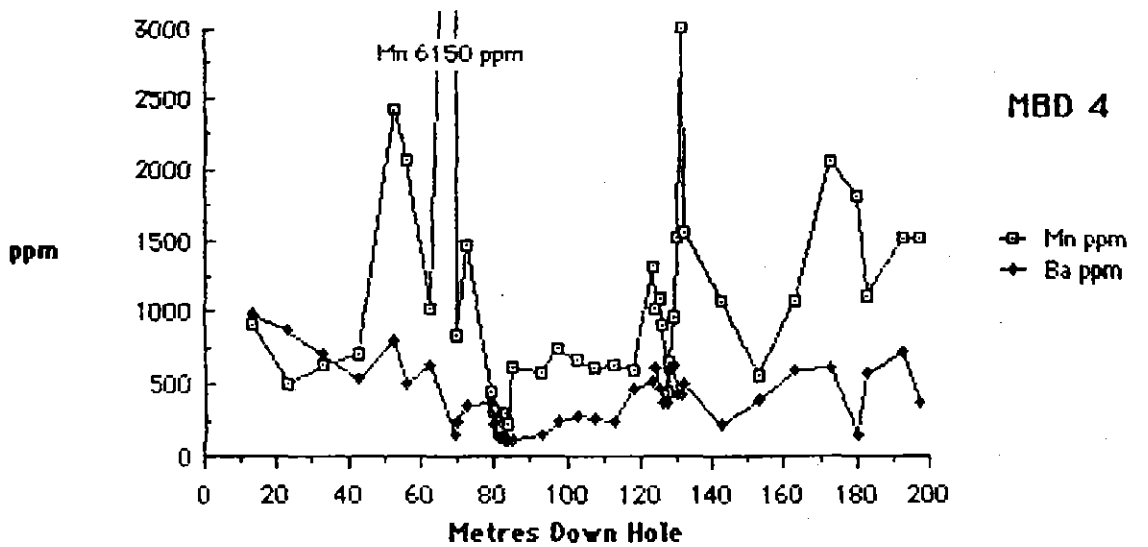


Fig. 7c

Mt Black EL 12/88 - Drill Hole Geochemical Profiles





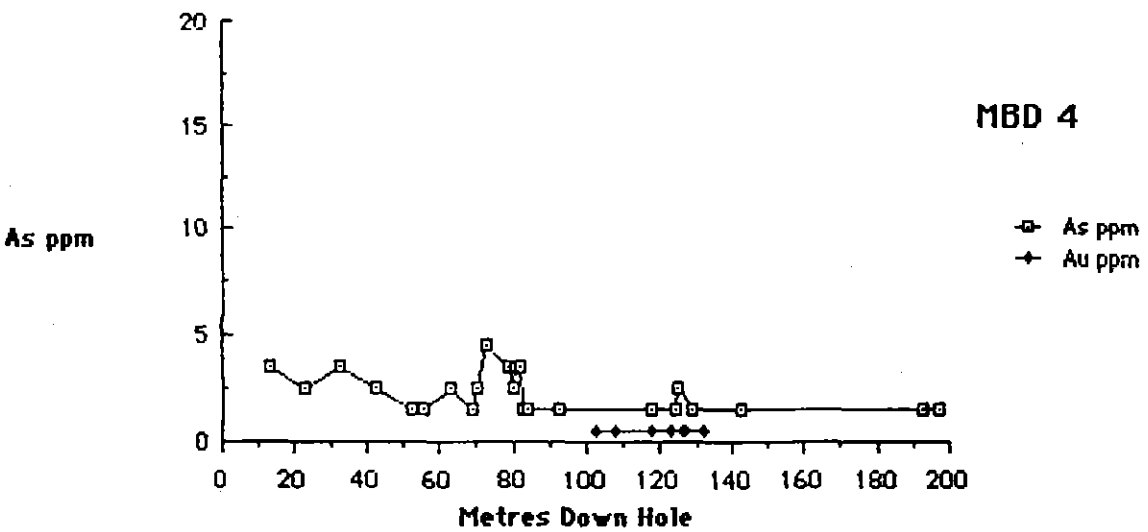


Fig. 7d

Hole MBD3:

MBD3 was drilled to test the northern strike extent of Billiton UTEM anomaly 10A and a concident VLF anomaly. A shallow source was anticipated. As in MBD2 the hole intersected massive, crowded feldspar-phyric dacite porphyry. Alteration again was of the form of green chlorite dominated and orange-brown sericite-K-, Na-feldspar dominated types. Quartz-calcite-chlorite veinlets, mostly at angles less than 45° to the long core axis were judged to be sub-vertical structures. Traces of pyrite and very rare chalcopyrite were associated with the veining and alteration especially at 148m. Minor magnetite was noted in quartz veinlets at 74-75m and 123.5 m. The source of the UTEM anomaly was not positively identified but is considered to be unlikely to be due to massive sulphide mineralization. A considerable amount of shearing was detected in the target zone between 110 and 130m.

Maximum assay values were: Cu 145 ppm; Pb 25 ppm; Zn 135 ppm; Ag 1.0 ppm; Au <0.008 ppm; Mn 15,800 ppm; As 11 ppm; Ba 920 ppm.

The high Mn value was obtained from sample 208075 at 128.5-129m, which included a 30mm gossanous veinlet within sheared, green, chloritized porphyry. The sample was also weakly anomalous in As (11 ppm).

Hole MBD4:

MBD4 was drilled to test a zone of strong, pervasive, chlorite-quartz-magnetite-hematite alteration, previously mapped, but very poorly exposed on line 76,000N. The object was to determine whether or not significant mineralization was associated with the unexposed parts of the target rock-mass.

This hole also intersected massive feldspar-phyric dacite porphyry. However, the alteration was much more intense, and extensive zones with obliterated primary texture were recorded. Ubiquitous quartz-chlorite-calcite veinlets and numerous small, thoroughly altered, dolerite dykes were noted. Magnetite, specular hematite and rare coarse blebs of pyrite occur throughout in veinlets. These veinlets cross cut the dolerite dykes.

Maximum assay values were: Cu 20 ppm; Pb 35 ppm; Zn 160 ppm; Ag 1.0 ppm; Au 0.010 ppm; Mn 6150 ppm; As 4 ppm; Ba 912 ppm.

the extent of feldspar destructive alteration is also evident from the Ba profile down MBD4 where many values are below 100ppm in comparison with the background for the rock of around 900-1000 ppm (Fig. 7d). Zn and Mn are erratically distributed, no clear pattern is evident.

6 Environmental

Environmental consultants A & D Gray of Hobart were engaged during the course of work on EL12/88. Their brief was to advise on methods to minimize environmental disturbance and to draw up a plan for rehabilitation of the area following completion of the exploration programme. A copy of their report has been filed with the Mines Department.

7 Conclusions and Recommendations

The extensive zones of alteration encountered in the drill programme in the Mt Black area, provide encouraging signs that large scale hydrothermal activity was operative at the time of formation of the volcanic sequence.

It is likely that the dacitic lavas at Mt Black were formed in a sub-marine environment. However, the lack of layered sedimentary rocks in that part of the sequence tested by the drilling is discouraging. There was apparently no still-stand in the sequence within the Mt Black grid target zone.

The weak soil anomalies recorded in minus 4 mm and minus 80 mesh samples are probably due to Mn scavenging in the oxide zone in the vicinity of weakly mineralized quartz-calcite (mangoan?)-chlorite-(barite?) veins and or intensely chloritized shear zones.

The hydrothermal alteration intersected in all of the holes is similar in some respects to that known in the hanging wall at Rosebery. The system however, appears to have been a low sulphur, oxidizing one.

It is concluded that the UTEM anomalies in the Mt Black grid area have been adequately tested by the diamond drilling and that there is no justification for further work in this part of the licence area.

Continued evaluation of the Rosebery Mine sequence in the Cutty Sark area is recommended.

8. Proposed Further Exploration:

The following programme for continued evaluation of massive sulphide targets in EL12/88 is proposed:

a) Carry out detailed re-assessment of the available geological, geochemical and geophysical data centered on the Cutty Sark mine area;

b) Carry out geological mapping on the interpreted trend of the Rosebery host horizon sequence.

c) Drill selected targets.

9 References

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APPENDIX 1

SOIL ANALYTICAL DATA & PROFILES

031

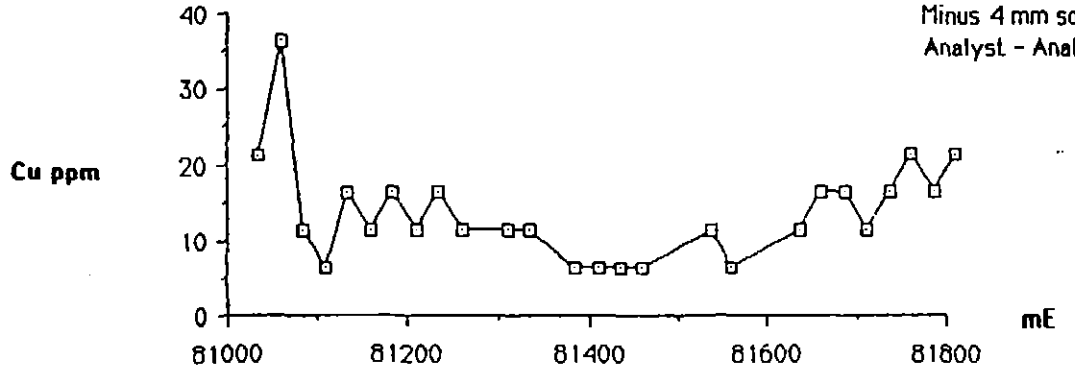
CLIMAX MINING LTD -- SOIL SAMPLE RESULTS

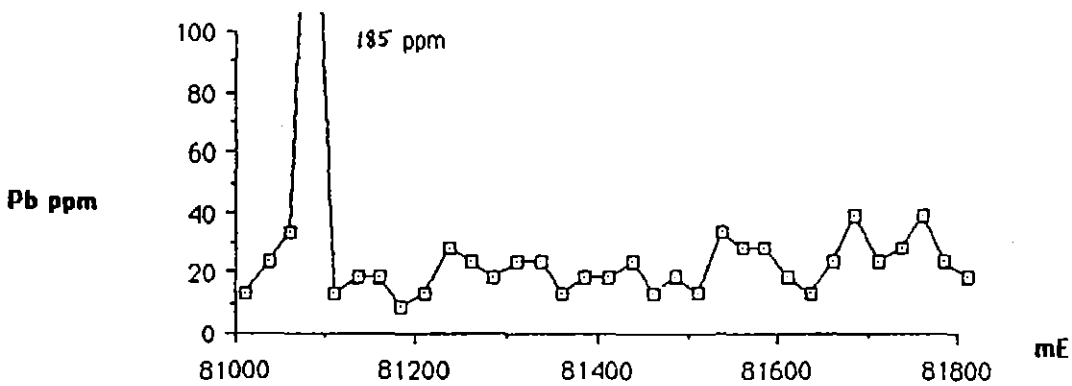
REGION:	Western Tas		MAPSHEET:	Sophia (8014)				CML data- Minus 4mm fraction			
								Analyst - ANALABS			
PROSPECT:	MT BLACK	EL 12/88	Line 75,250 N								
TARGET:											
GEOLOGY:											

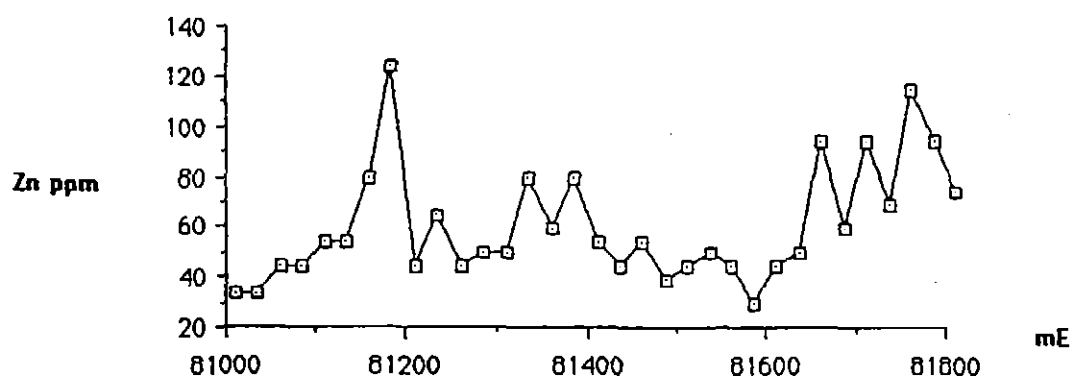
SaNo	EASTING	NORTHING	Cu	Pb	Zn	Ag	Co	Bi	Mn	As	Au	Ba
	81000	75250	<5	10	30	<0.5	5		120	7	<0.005	547
	81025	75250	20	20	30	<0.5	10		230	9	<0.005	391
	81050	75250	35	30	40	<0.5	10		210	14	<0.005	415
	81075	75250	10	185	40	<0.5	5		240	8	<0.005	406
	81100	75250	5	10	50	<0.5	15		300	11	<0.005	284
	81125	75250	15	15	50	<0.5	10		320	9	<0.005	365
	81150	75250	10	15	75	<0.5	15		440	9	0.01	247
	81175	75250	15	5	120	<0.5	20		625	8	<0.005	232
	81200	75250	10	10	40	<0.5	10		250	9	<0.005	301
	81225	75250	15	25	60	<0.5	10		280	16	<0.005	321
	81250	75250	10	20	40	<0.5	10		360	9	<0.005	363
	81275	75250	<5	15	45	<0.5	10		305	7	<0.005	528
	81300	75250	10	20	45	<0.5	10		320	11	<0.005	443
	81325	75250	10	20	75	<0.5	15		525	8	0.01	530
	81350	75250	<5	10	55	<0.5	10		350	7	<0.005	548
	81375	75250	5	15	75	<0.5	15		440	9	<0.005	491
	81400	75250	5	15	50	<0.5	10		330	8	<0.005	472
	81425	75250	5	20	40	<0.5	10		340	9	0.01	407
	81450	75250	5	10	50	<0.5	10		210	7	<0.005	433
	81475	75250	<5	15	35	<0.5	5		190	10	<0.005	317
	81500	75250	<5	10	40	<0.5	10		250	13	0.01	241
	81525	75250	10	30	45	<0.5	<5		155	8	<0.005	203
	81550	75250	5	25	40	<0.5	5		330	9	0.02	325
	81575	75250	<5	25	25	<0.5	5		315	9	0.01	312
	81600	75250	<5	15	40	<0.5	5		335	8	<0.005	280
	81625	75250	10	10	45	<0.5	10		230	11	0.01	240
	81650	75250	15	20	90	<0.5	10		310	10	0.01	202
	81675	75250	15	35	55	<0.5	10		635	7	<0.005	335
	81700	75250	10	20	90	<0.5	5		235	7	0.01	311
	81725	75250	15	25	65	<0.5	10		305	9	<0.005	232
	81750	75250	20	35	110	<0.5	10		375	11	<0.005	180
	81775	75250	15	20	90	<0.5	10		435	12	<0.005	223
	81800	75250	20	15	70	<0.5	10		250	10	0.01	202

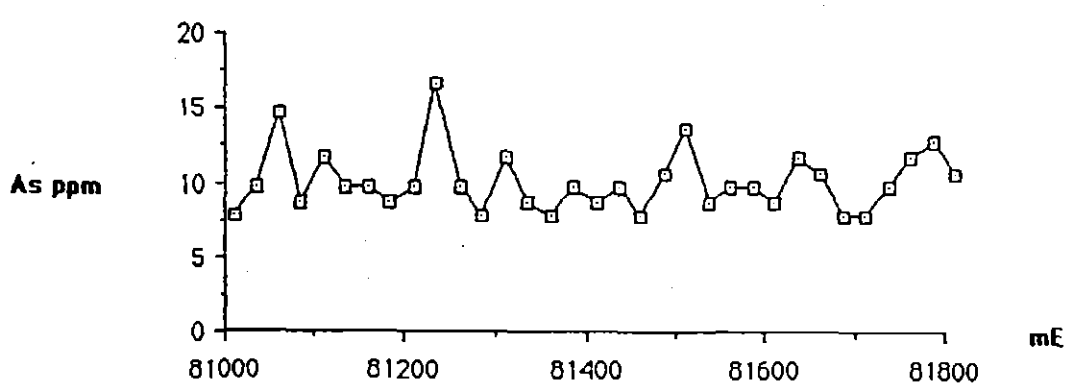
Mt Black EL 12/88 - Line 75,250 mN - Climax Mining Data

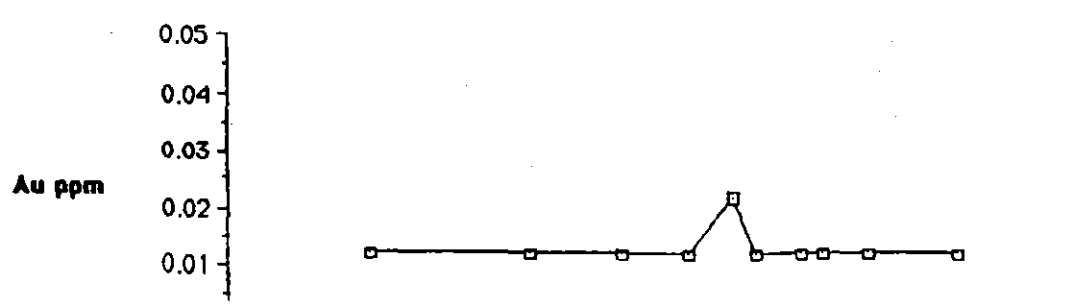
Minus 4 mm soil samples
Analyst - Analabs, Burnie





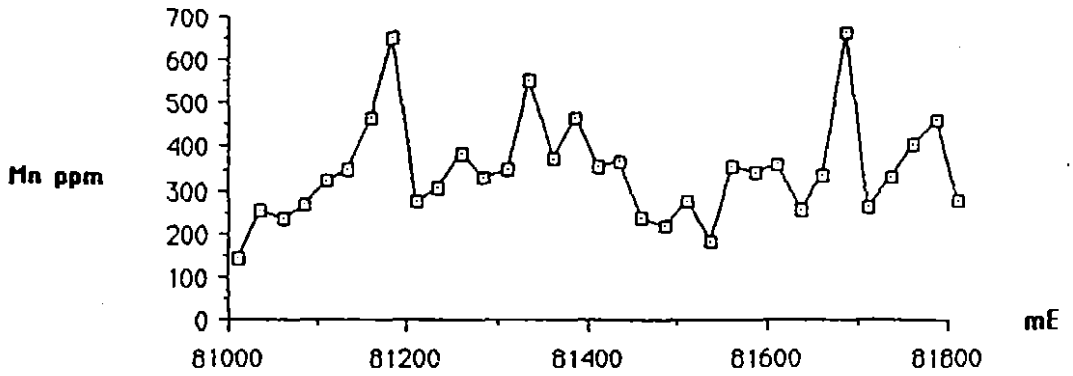


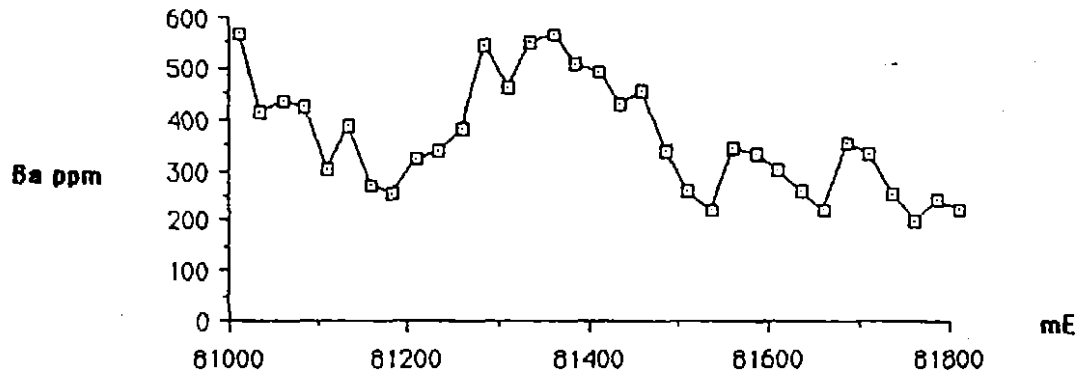


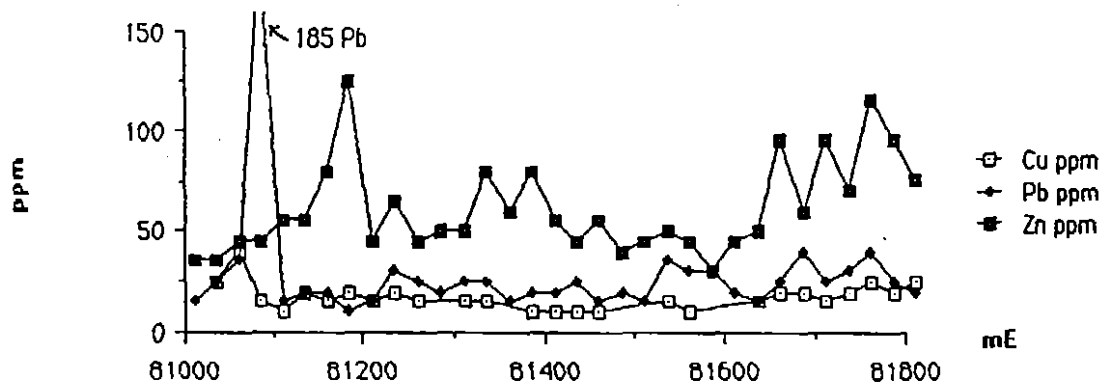


033

Mt Black EL 12/88 - Line 75,250 mN - Climax Mining Data







CLIMAX MINING LTD -- SOIL SAMPLE RESULTS

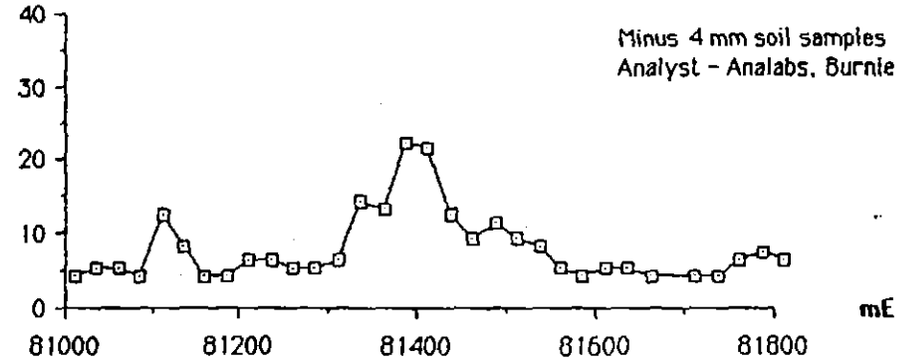
REGION:	Western Tas		MAPSHEET:	Sophia (8014)			CML data- Minus 4mm fraction				
							Analyst - ANALABS				
PROSPECT:	MT BLACK	EL 12/88	Line 75,700 N								
TARGET:											
GEOLOGY:											
SaNo	EASTING	NORTHING	Cu	Pb	Zn	Ag	Co	Bi	Mn	As	Au	Ba
	81000	75700	3	16	22	0.2	1	1	120	<1	<0.005	283
	81025	75700	4	12	22	0.2	2	<1	100	1	<0.005	439
	81050	75700	4	14	16	0.2	6	2	25	<1	<0.005	160
	81075	75700	3	17	26	0.2	5	1	85	<1	<0.005	382
	81100	75700	11	36	43	0.4	8	<1	70	<1	<0.005	329
	81125	75700	7	14	58	0.2	13	<1	600	2	<0.005	1240
	81150	75700	3	10	19	0.2	4	<1	145	1	<0.005	366
	81175	75700	3	10	11	0.3	20	1	90	1	<0.005	316
	81200	75700	5	17	13	0.2	3	1	130	3	<0.005	266
	81225	75700	5	20	19	0.3	5	<1	150	3	<0.005	267
	81250	75700	4	18	23	0.1	3	1	155	3	<0.005	258
	81275	75700	4	9	24	0.2	5	<1	145	3	<0.005	546
	81300	75700	5	10	23	0.2	6	<1	125	2	<0.005	526
	81325	75700	13	10	39	0.2	7	<1	185	2	<0.005	535
	81350	75700	12	20	54	0.4	9	1	400	6	<0.005	511
	81375	75700	21	22	97	0.1	12	2	580	8	<0.005	361
	81400	75700	20	35	75	0.2	11	<1	700	16	<0.005	427
	81425	75700	11	18	45	0.2	11	<1	575	11	<0.005	296
	81450	75700	8	20	30	0.2	7	<1	260	6	<0.005	458
	81475	75700	10	27	34	0.3	8	<1	285	8	<0.005	307
	81500	75700	8	14	68	0.2	12	5	450	7	<0.005	428
	81525	75700	7	14	30	0.3	9	2	280	5	<0.005	461
	81550	75700	4	13	40	0.2	11	<1	190	2	<0.005	674
	81575	75700	3	3	40	0.3	10	<1	265	<1	<0.005	634
	81600	75700	4	15	30	0.4	9	2	105	3	<0.005	584
	81625	75700	4	9	81	0.3	9	3	130	3	<0.005	462
	81650	75700	3	12	26	0.3	6	1	230	5	<0.005	581
	81675	75700	Sample missing									
	81700	75700	3	9	14	0.3	4	<1	200	4	<0.005	59
	81725	75700	3	6	12	0.3	2	<1	95	1	<0.005	192
	81750	75700	5	15	44	0.3	13	1	220	7	<0.005	288
	81775	75700	6	13	91	0.3	7	<1	105	5	<0.005	195
	81800	75700	5	16	35	0.3	8	2	175	3	<0.005	369

035

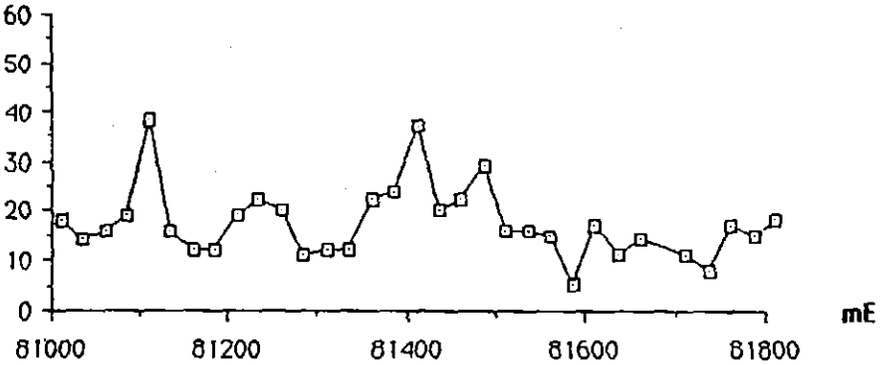
Mt Black EL 12/88 - Line 75,700 mN - Climax Mining Data

Minus 4 mm soil samples
Analyst - Analabs, Burnie

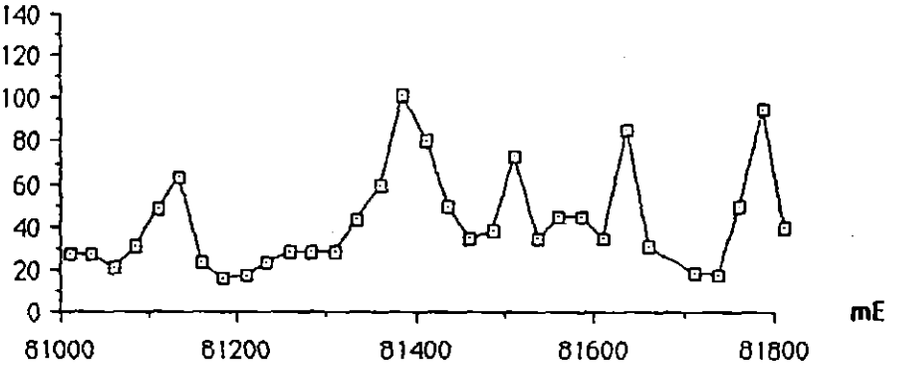
Cu ppm



Pb ppm

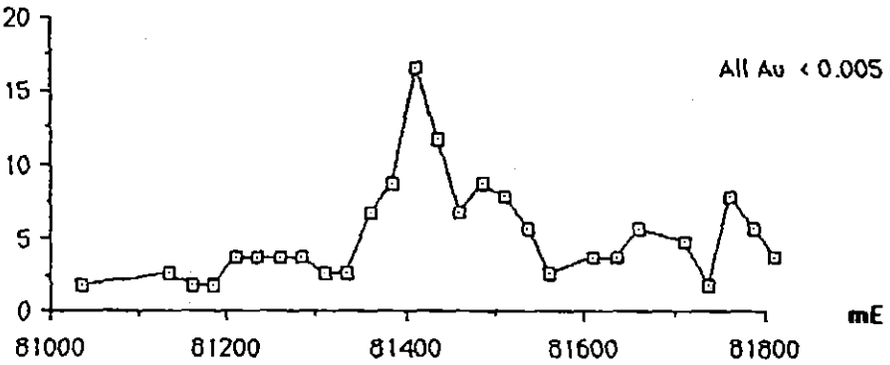


Zn ppm

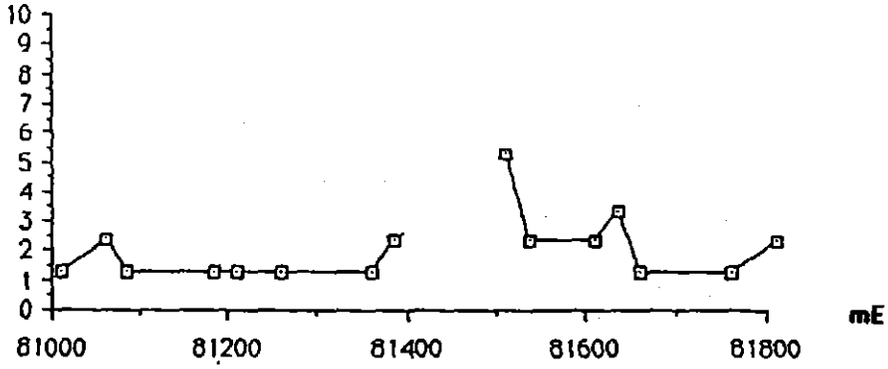


All Au < 0.005 ppm

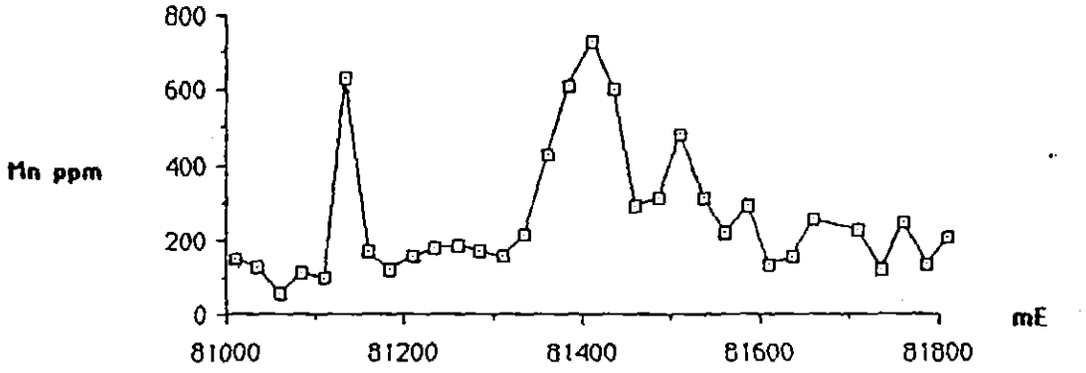
As ppm

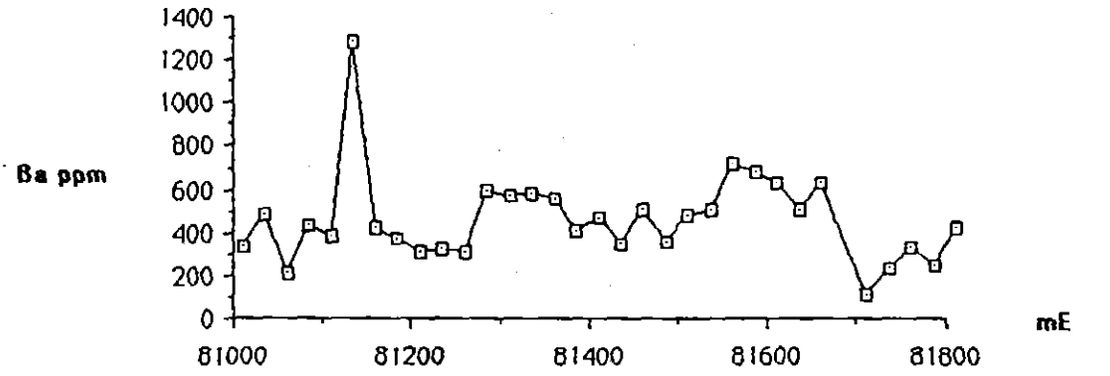


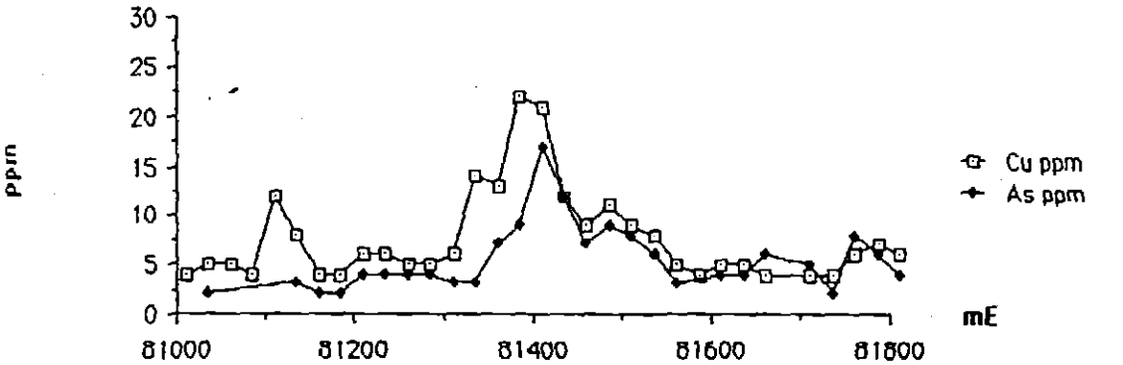
Bi ppm

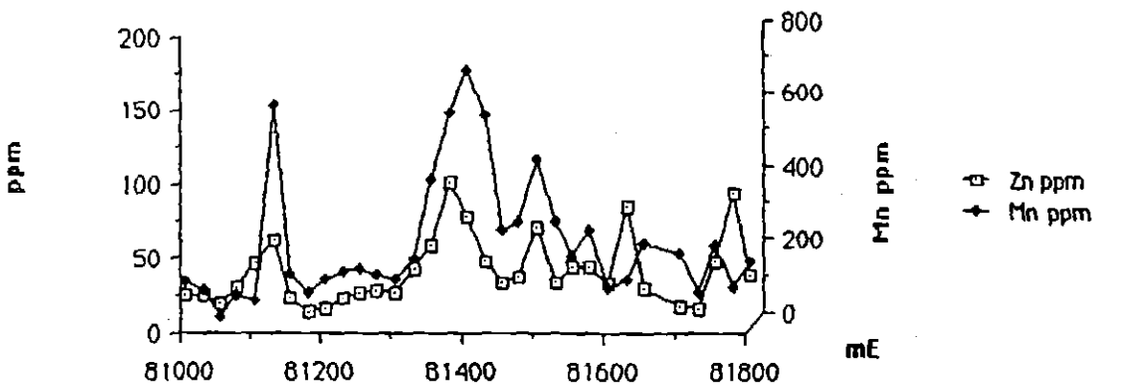


Mt Black EL 12/88 - Line 75,700 mN - Climax Mining Data









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037

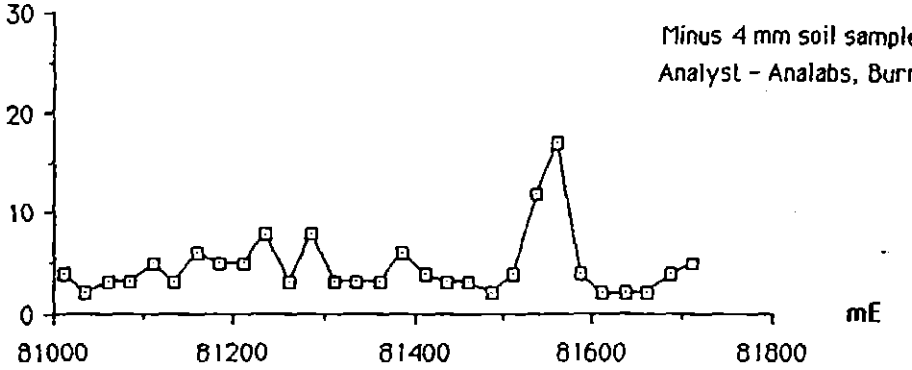
CLIMAX MINING LTD -- SOIL SAMPLE RESULTS

REGION:	Western Tas		MAPSHEET:	Sophia (8014)				CML data- Minus 4mm fraction			
								Analyst - ANALABS			
PROSPECT:	MT BLACK		EL 12/88		Line 76,000 N						
TARGET:											
GEOLOGY:											
SaNo	EASTING	NORTHING	Cu	Pb	Zn	Ag	Co	Bi	Mn	As	Au	Ba
	81000	76000	3	22	31	0.3	2	<1	65	2	<0.005	286
	81025	76000	1	4	16	0.4	3	<1	30	1	<0.005	279
	81050	76000	2	5	23	0.4	3	<1	130	1	<0.005	501
	81075	76000	2	15	23	0.4	5	<1	145	3	<0.005	480
	81100	76000	4	17	32	0.3	5	<1	165	6	<0.005	418
	81125	76000	2	10	27	0.3	5	<1	165	6	<0.005	470
	81150	76000	5	25	30	0.2	7	<1	150	5	<0.005	346
	81175	76000	4	14	16	0.3	4	<1	140	3	<0.005	296
	81200	76000	4	18	21	0.3	6	<1	175	4	<0.005	382
	81225	76000	7	16	29	0.2	8	<1	140	5	<0.005	270
	81250	76000	2	6	29	0.3	6	<1	220	3	<0.005	362
	81275	76000	7	20	56	0.4	18	2	1150	200	<0.005	687
	81300	76000	2	5	39	0.1	10	<1	200	6	<0.005	280
	81325	76000	2	4	54	0.2	10	<1	240	3	<0.005	105
	81350	76000	2	4	48	0.1	10	<1	230	4	<0.005	59
	81375	76000	5	8	64	0.1	12	<1	295	6	<0.005	13
	81400	76000	3	5	65	0.1	10	<1	335	3	<0.005	63
	81425	76000	2	3	34	0.2	8	<1	105	3	<0.005	14
	81450	76000	2	1	30	0.2	8	<1	130	2	<0.005	22
	81475	76000	1		30	0.2	7	<1	130	2	<0.005	50
	81500	76000	3	5	63	<0.1	10	<1	305	2	<0.005	65
	81525	76000	11	11	70	<0.1	17	<1	500	5	<0.005	457
	81550	76000	16	7	100	<0.1	17	<1	395	3	<0.005	486
	81575	76000	3	4	18	0.2	3	<1	85	2	<0.005	474
	81600	76000	1	3	9	0.2	2	1	90	1	<0.005	185
	81625	76000	1	7	20	0.4	1	<1	100	2	<0.005	167
	81650	76000	1	4	22	0.3	4	<1	125	3	<0.005	23
	81675	76000	3	8	28	0.3	9	<1	620	4	<0.005	404
	81700	76000	4	9	26	0.3	6	<1	175	4	<0.005	580

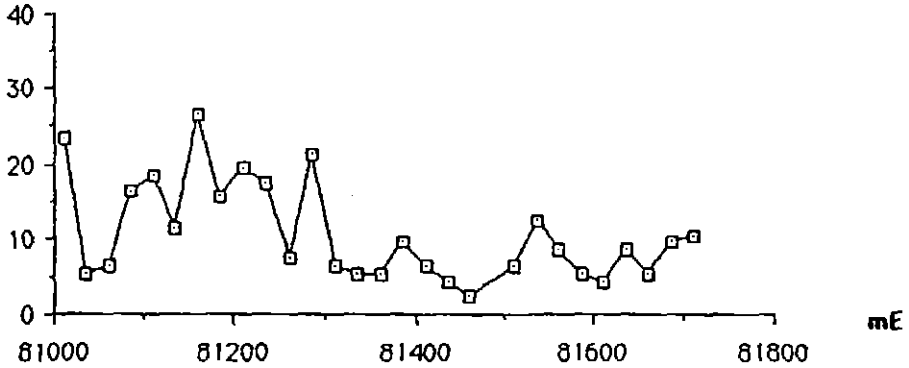
Mt Black EL 12/88 - Line 76,000 mN - Climax Mining Data

Minus 4 mm soil samples
Analyst - Analabs, Burnie

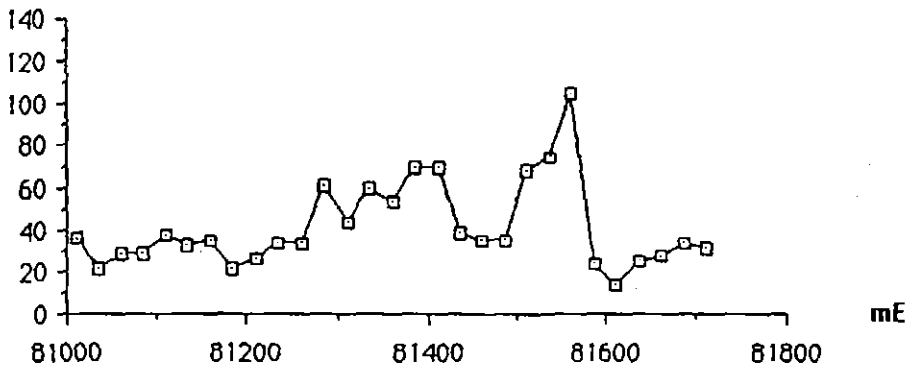
Cu ppm



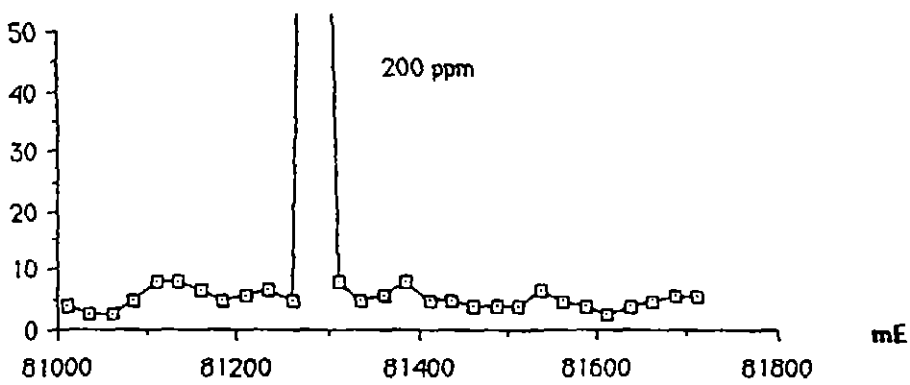
Pb ppm



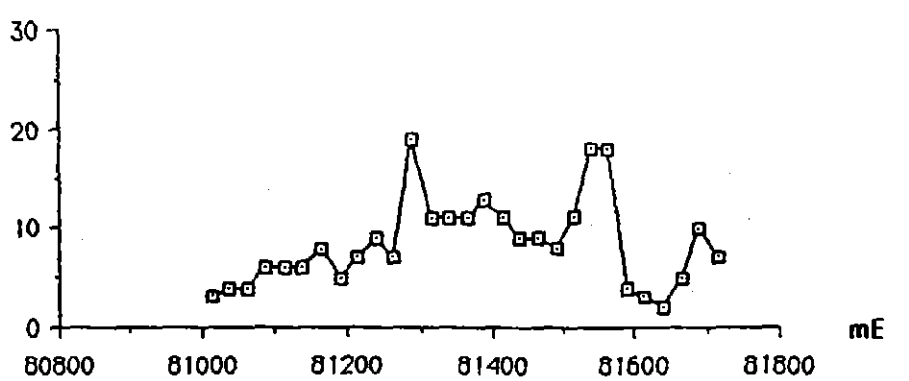
Zn ppm



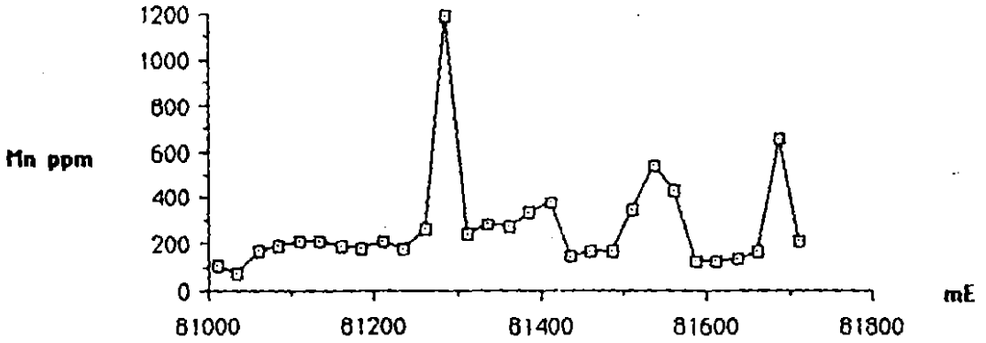
As ppm

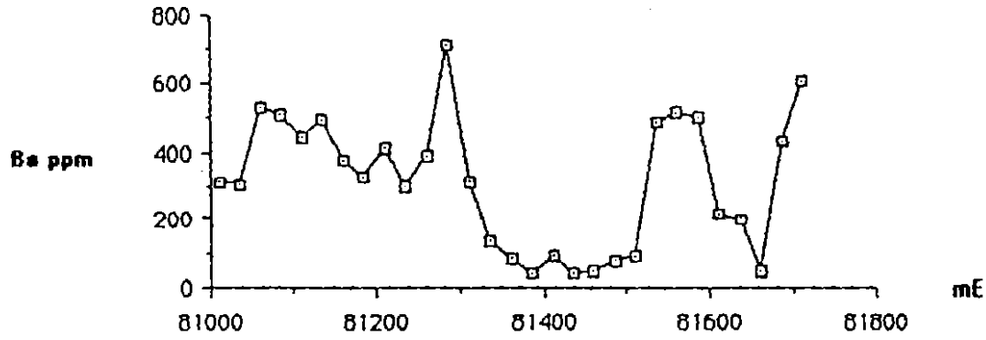


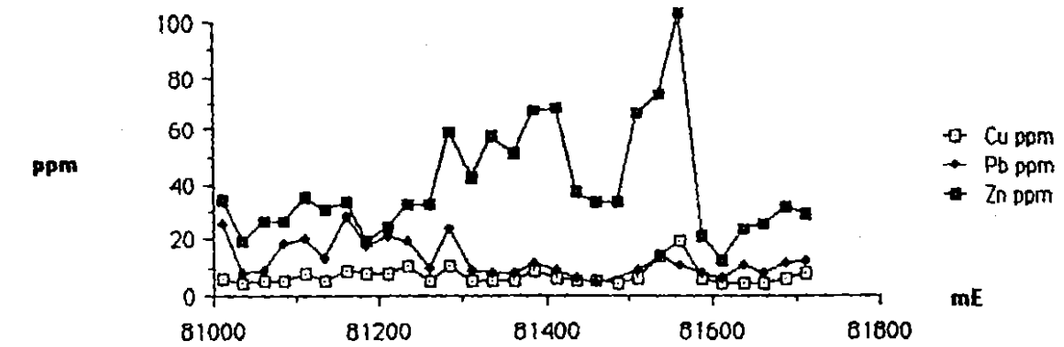
Co ppm



Mt Black EL 12/88 - Line 76,000 mN - Climax Mining Data







040

CLIMAX MINING LTD -- SOIL SAMPLE RESULTS

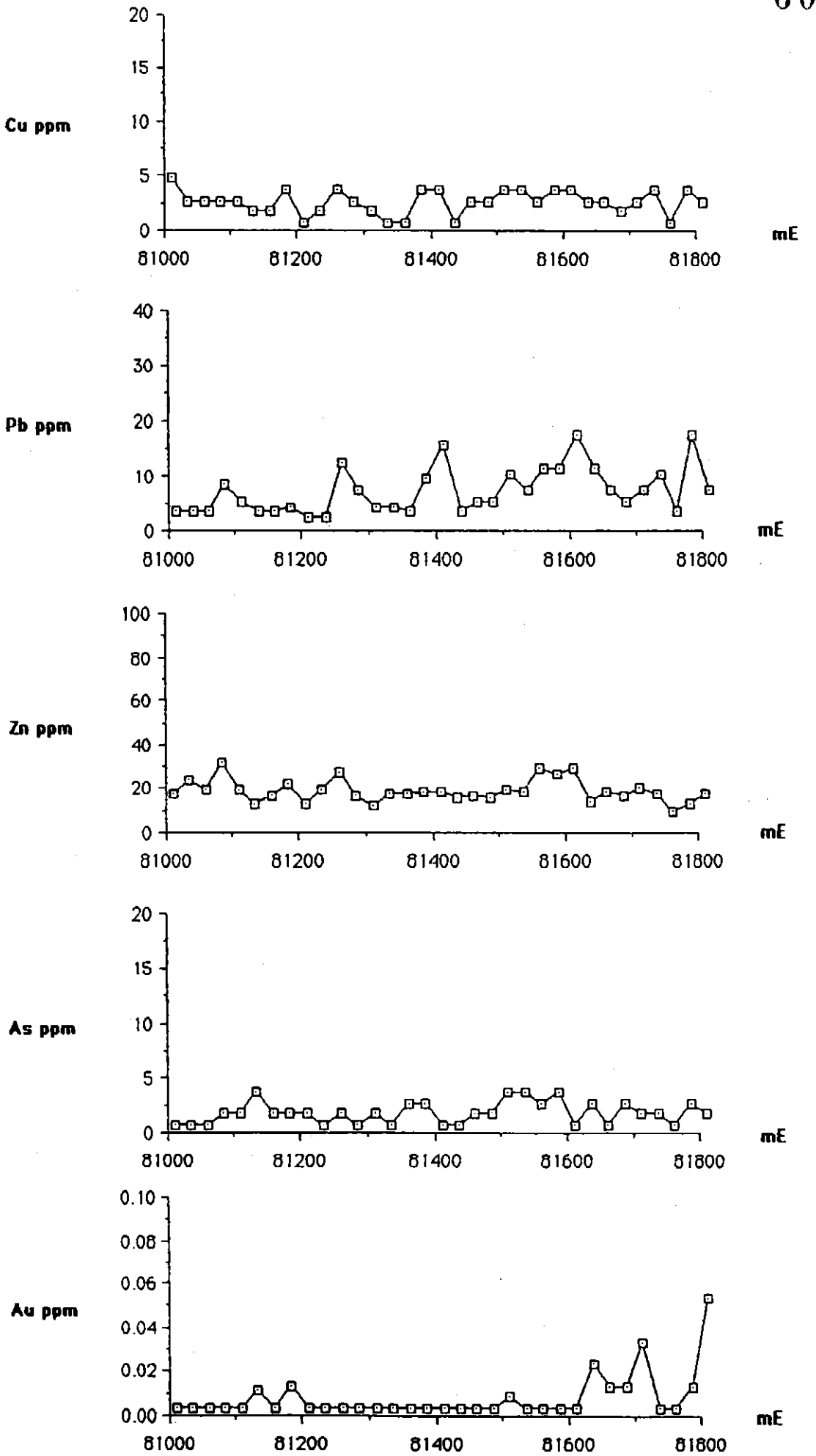
REGION:	Western Tas		MAPSHEET:	Sophia (8014)				CML data- Minus 4mm fraction			
PROSPECT:	MT BLACK	EL 12/88	Line 77,000 N								
TARGET:											
GEOLOGY:											

SaNo	EASTING	NORTHING	Cu	Pb	Zn	Ag	Co	Bi	Mn	As	Au	Ba
	81000	77000	4	2	14	0.7	<1	<1	45	<1	<0.005	546
	81025	77000	2	2	20	1.0	2	<1	80	<1	<0.005	525
	81050	77000	2	2	16	1.0	1	<1	55	<1	<0.005	431
	81075	77000	2	7	28	0.7	3	<1	45	1	<0.005	634
	81100	77000	2	4	16	0.6	2	<1	60	1	<0.005	394
	81125	77000	1	2	10	0.8	1	1	45	3	0.008	405
	81150	77000	1	2	13	1.1	1	<1	40	1	<0.005	341
	81175	77000	3	3	19	0.7	1	<1	45	1	0.010	395
	81200	77000	<1	1	10	0.7	<1	1	35	1	<0.005	390
	81225	77000	1	1	16	0.7	2	1	45	<1	<0.005	584
	81250	77000	3	11	24	0.7	<1	<1	35	1	<0.005	446
	81275	77000	2	6	13	1.1	<1	2	45	<1	<0.005	362
	81300	77000	1	3	9	0.7	<1	<1	45	1	<0.005	169
	81325	77000	<1	3	14	0.6	1	<1	50	<1	<0.005	326
	81350	77000	<1	2	14	0.6	<1	<1	50	2	<0.005	264
	81375	77000	3	8	15	0.7	<1	1	45	2	<0.005	296
	81400	77000	3	14	15	1.1	<1	4	40	<1	<0.005	317
	81425	77000	<1	2	12	0.7	<1	5	35	<1	<0.005	471
	81450	77000	2	4	13	0.7	<1	<1	40	1	<0.005	538
	81475	77000	2	4	12	0.7	1	1	40	1	<0.005	555
	81500	77000	3	9	16	0.8	1	<1	50	3	0.005	577
	81525	77000	3	6	15	1.0	1	<1	50	3	<0.005	606
	81550	77000	2	10	26	0.8	3	<1	105	2	<0.005	1630
	81575	77000	3	10	23	0.8	3	<1	75	3	<0.005	825
	81600	77000	3	16	26	0.6	1	1	110	<1	<0.005	597
	81625	77000	2	10	11	0.8	1	<1	55	2	0.020	269
	81650	77000	2	6	15	0.9	2	<1	75	<1	0.010	398
	81675	77000	1	4	13	0.7	1	<1	65	2	0.010	368
	81700	77000	2	6	17	0.7	2	<1	85	1	0.030	535
	81725	77000	3	9	14	0.8	1	<1	55	1	<0.005	216
	81750	77000	<1	2	6	0.8	<1	<1	45	<1	<0.005	171
	81775	77000	3	16	10	0.9	1	<1	55	2	0.010	440
	81800	77000	2	6	14	0.7	<1	<1	35	1	0.050	311

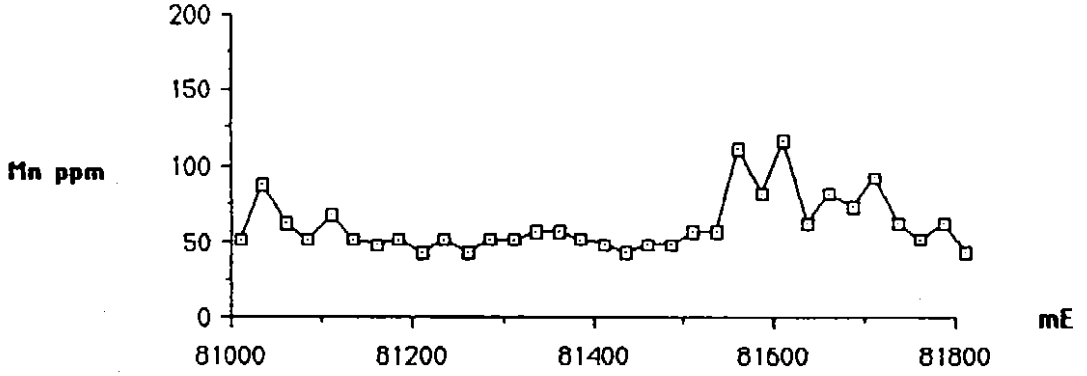
041

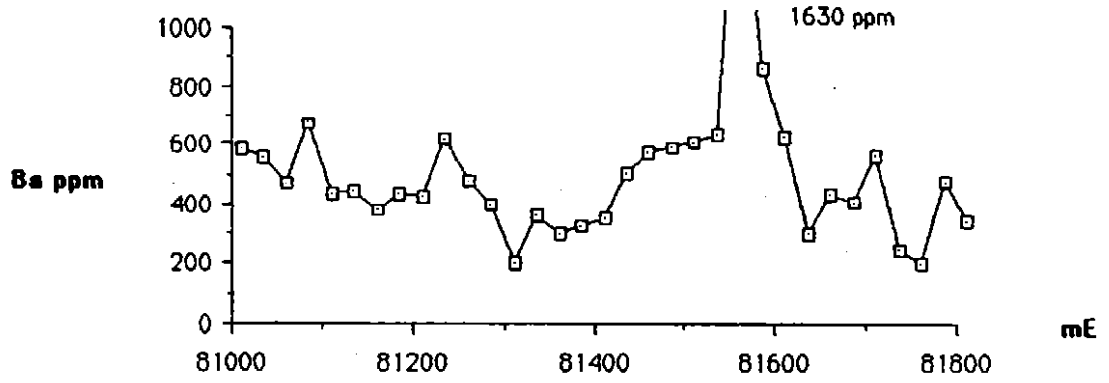
Mt Black EL 12/88 - Line 77,000 mN - Climax Mining Data

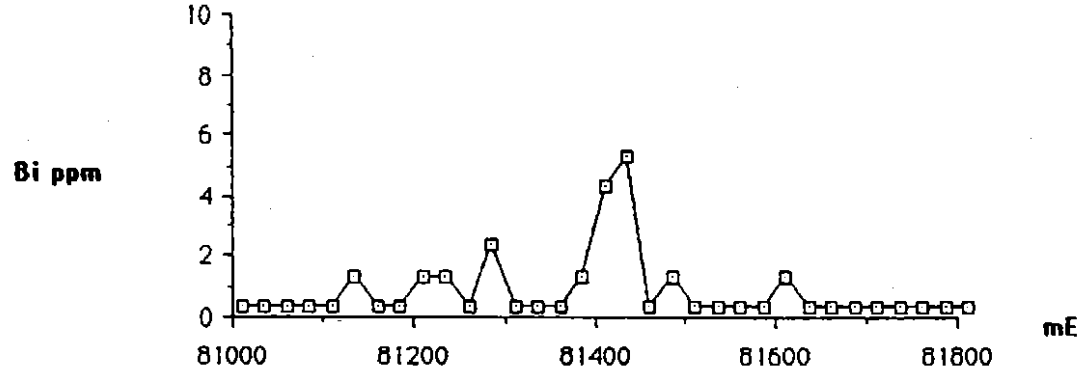
602042

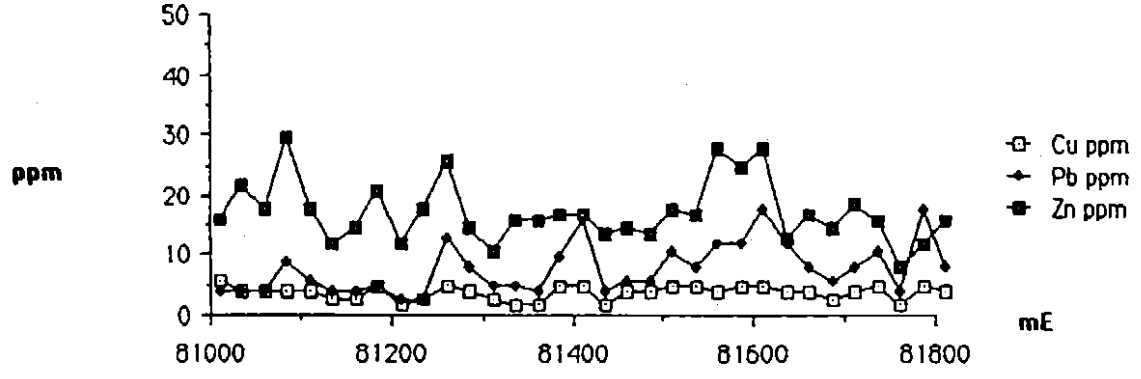


Mt Black EL 12/88 - Line 77,000 mN - Climax Mining Data

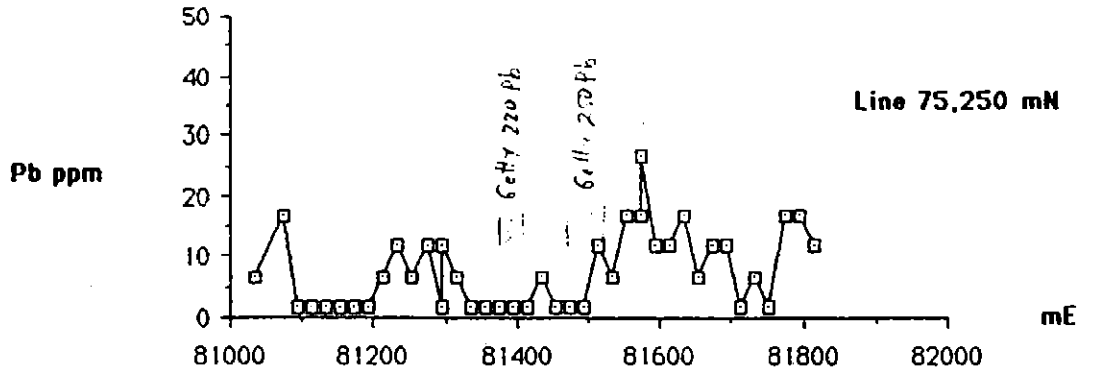


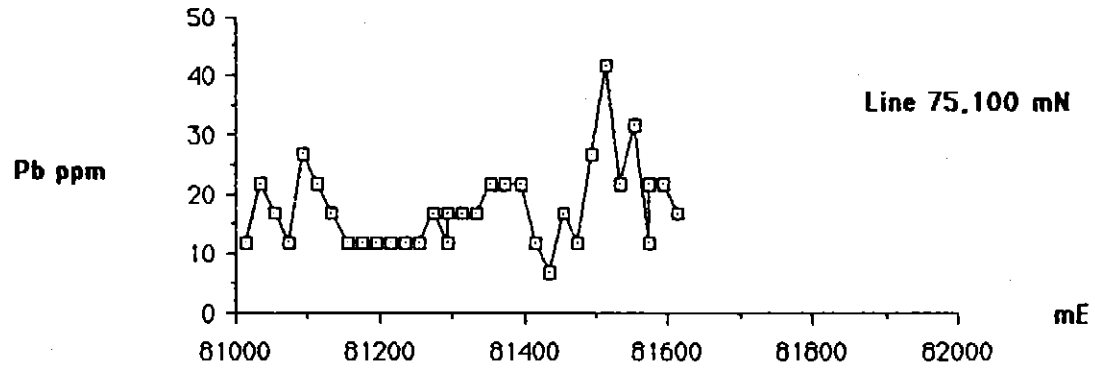


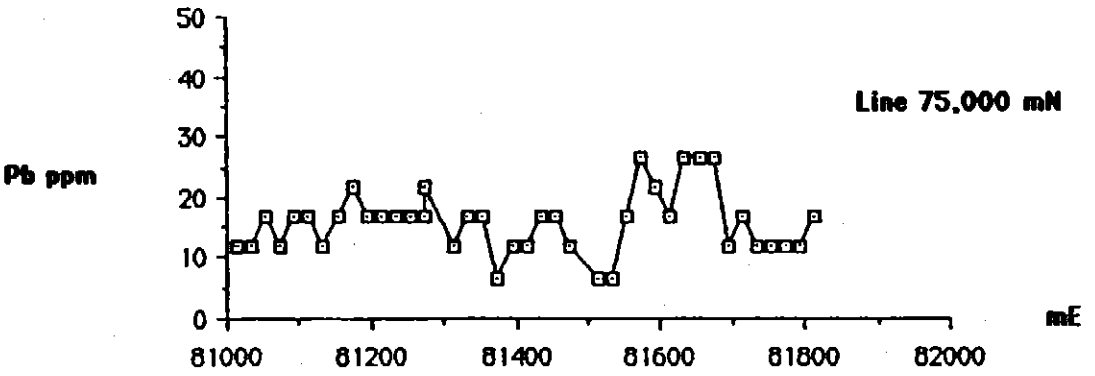


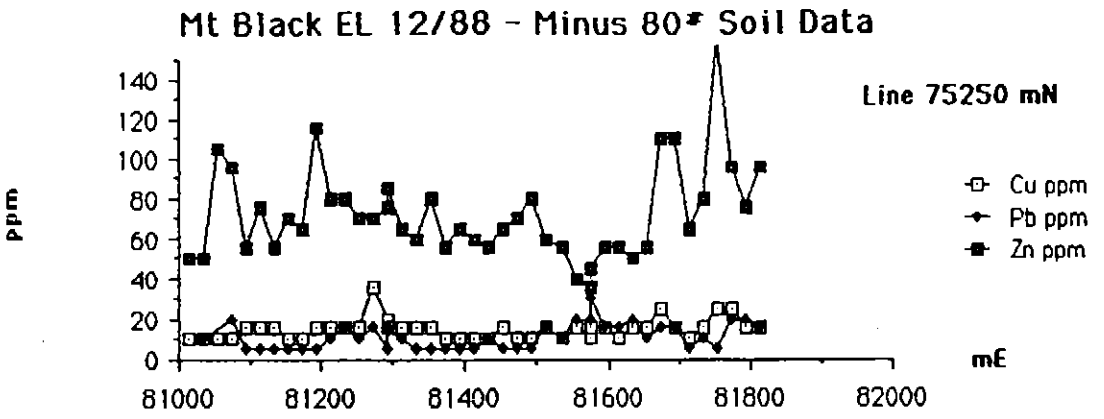


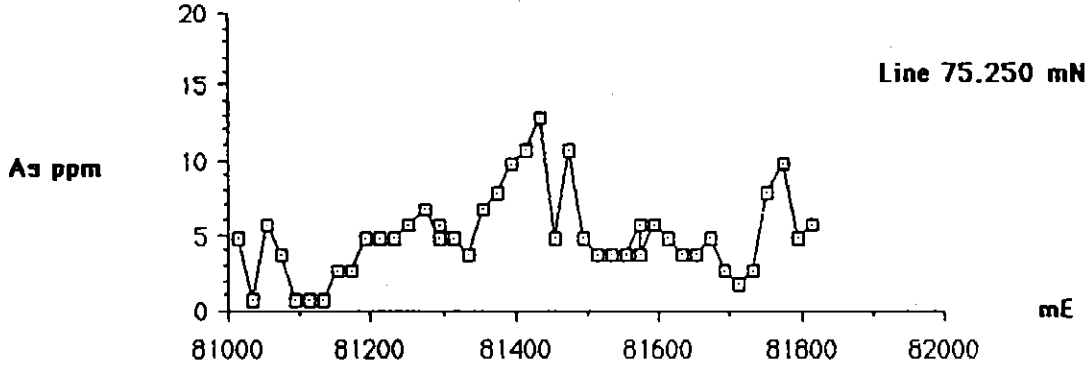
Mt Black EL 12/88 - Minus 80# Soil Data

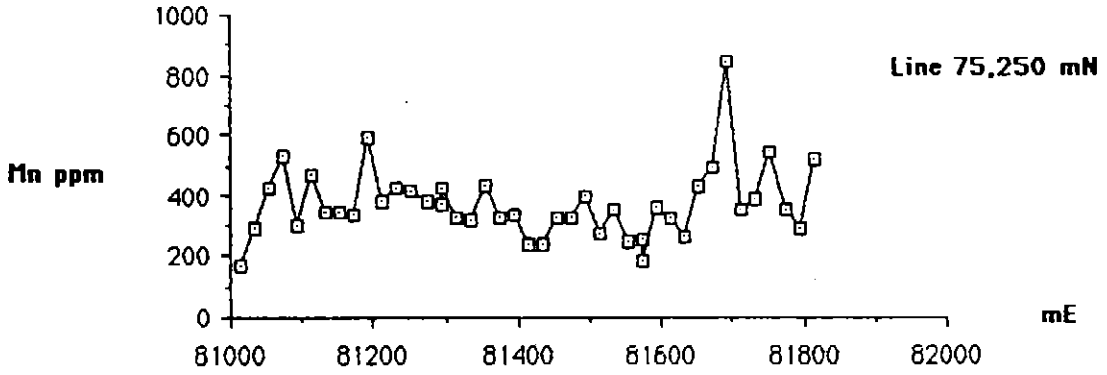






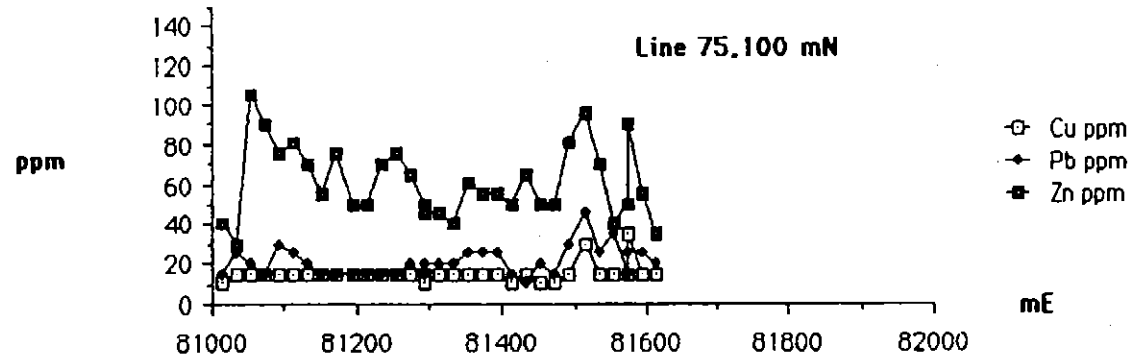

Mt Black EL 12/88 - Minus 80# Soil Data
Line 75250 mN
ppm
140
120
100
80
60
40
20
0
81000
81200
81400
81600
81800
82000
mE
Cu ppm
Pb ppm
Zn ppm

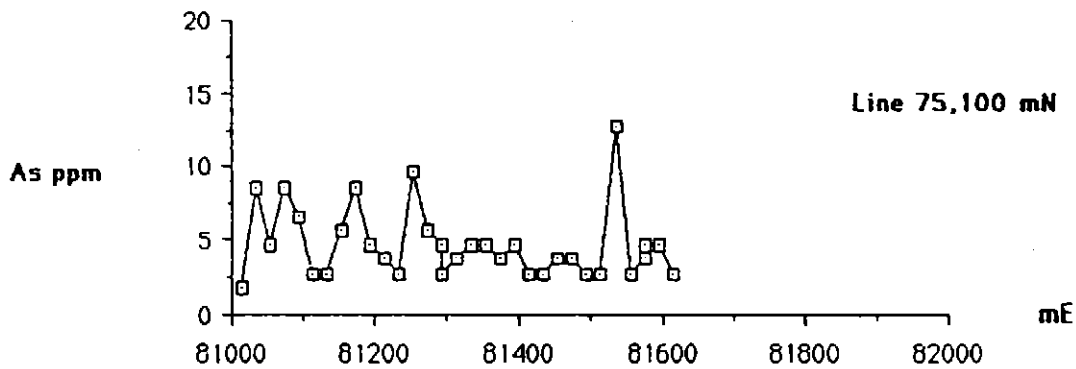

Line 75.250 mN
As ppm
20
15
10
5
0
81000
81200
81400
81600
81800
82000
mE

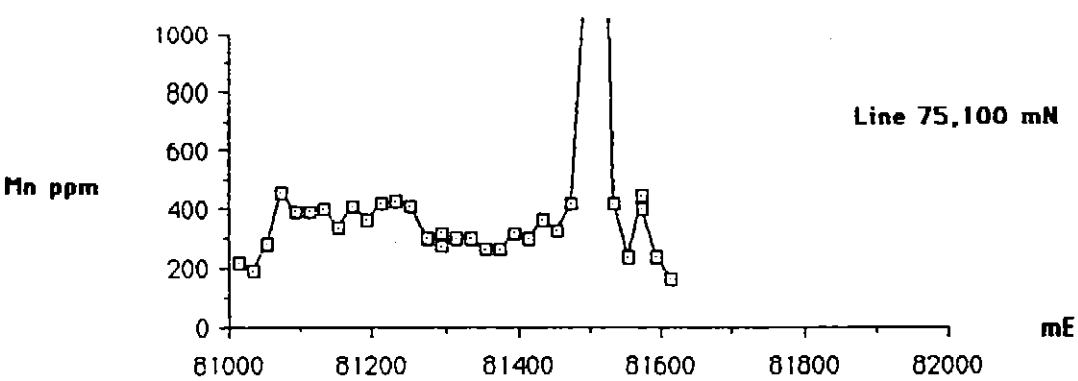

Line 75.250 mN
Mn ppm
1000
800
600
400
200
0
81000
81200
81400
81600
81800
82000
mE

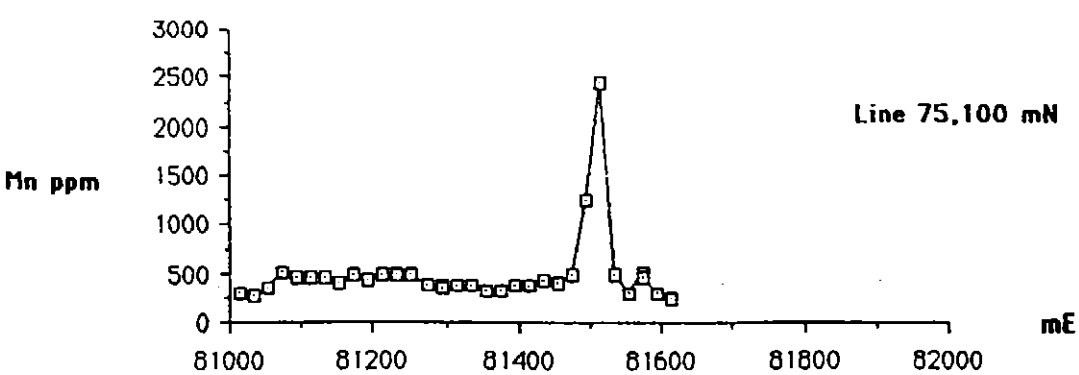
045

Mt Black EL 12/88 - Minus 80# Soil Data

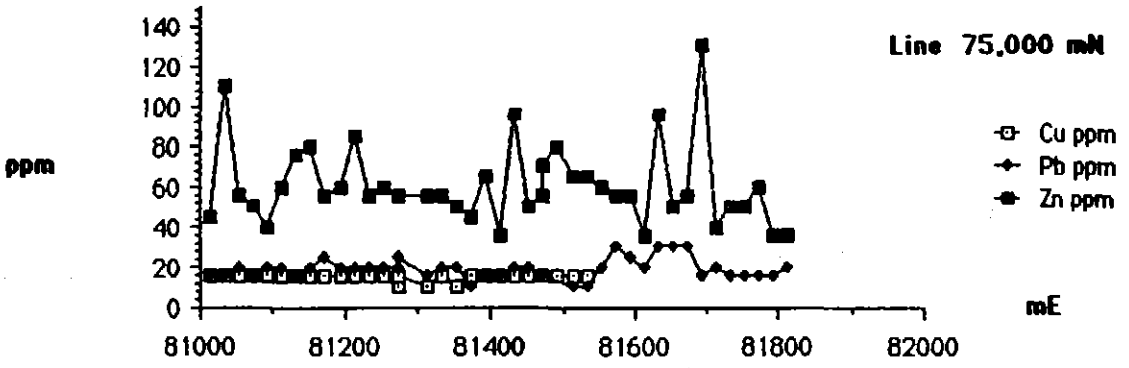


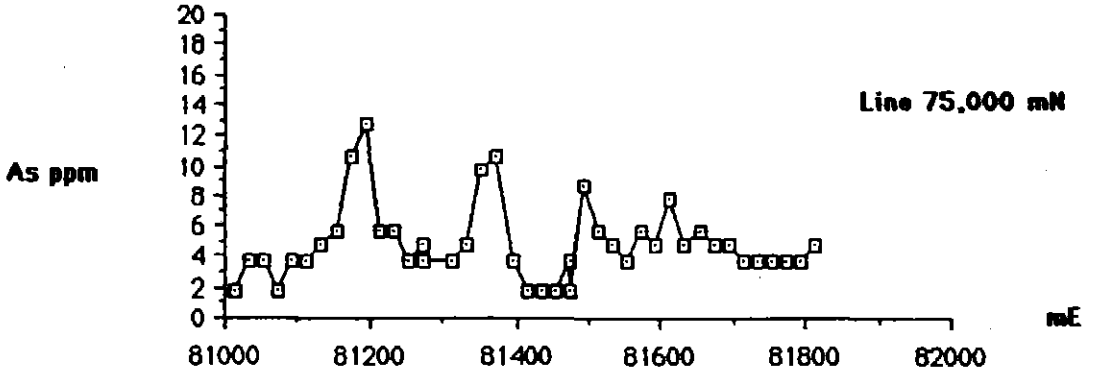


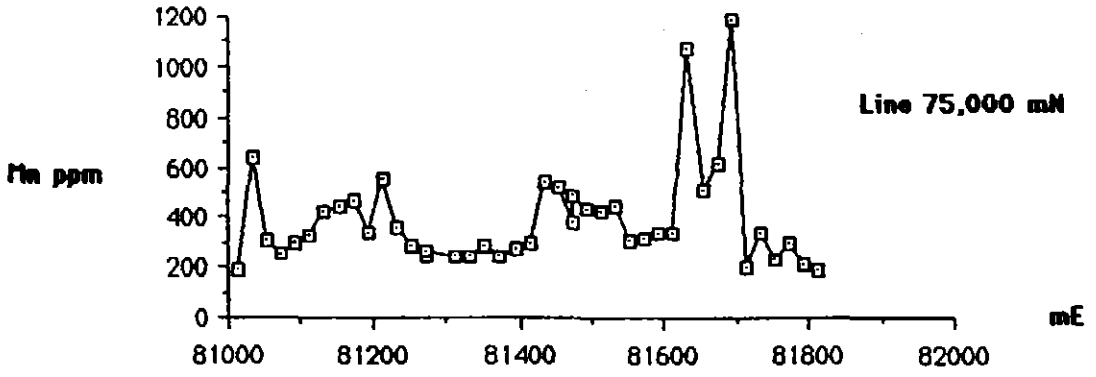




Mt Black EL 12/88 - Minus 80# Soil Data







047

CLIMAX MINING LTD -- SOIL SAMPLE RESULTS

REGION:	Western Tas			MAPSHEET:	Sophia (8014)			CML data- Minus 80# fraction			
								Analyst - ANALABS			
PROSPECT:	MT BLACK	EL 12/88		Line 75,000 N							
TARGET:											
GEOLOGY:											
SaNo	EASTING	NORTHING	Cu	Pb	Zn	Ag	Co	Bi	Mn	As	Au	Ba
	81800	75000	<5	15	30	<0.5			145	4	<0.008	
	81780	75000	<5	10	30	0.5			175	3	<0.008	
	81760	75000	<5	10	55	0.5			260	3	<0.008	
	81740	75000	<5	10	45	0.5			190	3	<0.008	
	81720	75000	<5	10	45	<0.5			300	3	<0.008	
	81700	75000	<5	15	35	<0.5			155	3	<0.008	
	81680	75000	<5	10	125	0.5			1150	4	<0.008	
	81660	75000	<5	25	50	0.5			570	4	<0.008	
	81640	75000	<5	25	45	0.5			465	5	<0.008	
	81620	75000	<5	25	90	0.5			1025	4	<0.008	
	81600	75000	<5	15	30	0.5			300	7	<0.008	
	81580	75000	<5	20	50	1.0			300	4	<0.008	
	81560	75000	<5	25	50	0.5			275	5	<0.008	
	81540	75000	<5	15	55	0.5			265	3	<0.008	
CC1	81520	75000	10	5	60	<0.5			405	4	<0.008	
2	81500	75000	10	5	60	<0.5			385	5	<0.008	
3	81480	75000	10	<5	75	<0.5			390	8	<0.008	
4	81460	75000	10	10	50	<0.5			340	3	<0.008	
5	81440	75000	10	15	45	<0.5			480	1	<0.008	
6	81460	75000	10	10	65	<0.5			450	1	<0.008	
7	81420	75000	10	15	90	<0.5			500	1	<0.008	
8	81400	75000	10	10	30	<0.5			250	1	<0.008	
9	81380	75000	10	10	60	<0.5			230	3	<0.008	
10	81360	75000	10	5	40	<0.5			205	10	<0.008	
11	81340	75000	5	15	45	0.5			245	9	<0.008	
12	81320	75000	10	15	50	0.5			205	4	<0.008	
13	81300	75000	5	10	50	0.5			205	3	<0.008	
14	81280	75000	Missing									
15	81260	75000	5	15	50	0.5			205	4	<0.008	
16	81260	75000	10	20	50	0.5			225	3	<0.008	
17	81240	75000	10	15	55	0.5			245	3	<0.008	
18	81220	75000	10	15	50	<0.5			315	5	<0.008	
19	81200	75000	10	15	80	<0.5			505	5	<0.008	
20	81180	75000	10	15	55	0.5			295	12	<0.008	
21	81160	75000	10	20	50	0.5			425	10	<0.008	
22	81140	75000	10	15	75	<0.5			400	5	<0.008	
23	81120	75000	10	10	70	0.5			385	4	<0.008	
24	81100	75000	10	15	55	<0.5			285	3	<0.008	
25	81080	75000	10	15	35	<0.5			260	3	<0.008	
26	81060	75000	10	10	45	<0.5			215	1	<0.008	
27	81040	75000	10	15	50	<0.5			270	3	<0.008	
28	81020	75000	10	10	105	0.5			590	3	<0.008	
29	81000	75000	10	10	40	<0.5			150	1	<0.008	

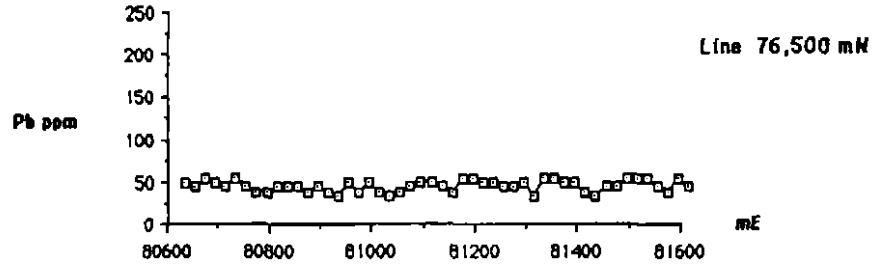
CLIMAX MINING LTD -- SOIL SAMPLE RESULTS

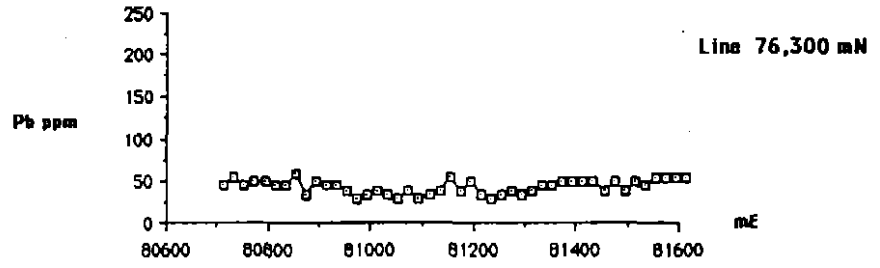
REGION:	Western Tas			MAPSHEET:	Sophia (8014)				CML data- Minus 80# fraction			
									Analyst - ANALABS			
PROSPECT:	MT BLACK	EL 12/88		Line 75,100 N								
SaNo	EASTING	NORTHING	Cu	Pb	Zn	Ag	Co	Bi	Mn	As	Au	Ba
SOB1	81000	75100	5	10	35	<0.5			185	1	<0.008	
2	81020	75100	10	20	25	<0.5			155	8	<0.008	
3	81040	75100	10	15	100	0.5			245	4	<0.008	
4	81060	75100	10	10	85	0.5			420	8	<0.008	
5	81080	75100	10	25	70	<0.5			355	6	<0.008	
6	81100	75100	10	20	75	<0.5			355	2	<0.008	
7	81120	75100	10	15	65	<0.5			365	2	<0.008	
8	81140	75100	10	10	50	<0.5			300	5	<0.008	
9	81160	75100	10	10	70	<0.5			375	8	<0.008	
10	81180	75100	10	10	45	0.5			330	4	<0.008	
11	81200	75100	10	10	45	<0.5			385	3	<0.008	
12	81220	75100	10	10	65	<0.5			390	2	<0.008	
13	81240	75100	10	10	70	0.5			370	9	<0.008	
14	81260	75100	10	15	60	<0.5			265	5	<0.008	
15	81280	75100	10	10	45	<0.5			280	4	<0.008	
16	81280	75100	5	15	40	<0.5			240	2	<0.008	
17	81300	75100	10	15	40	<0.5			265	3	0.011	
18	81320	75100	10	15	35	<0.5			260	4	<0.008	
19	81340	75100	10	20	55	0.5			230	4	<0.008	
20	81360	75100	10	20	50	<0.5			230	3	<0.008	
21	81380	75100	10	20	50	<0.5			280	4	<0.008	
22	81400	75100	5	10	45	<0.5			260	2	<0.008	
23	81420	75100	10	5	60	0.5			330	2	<0.008	
24	81440	75100	5	15	45	<0.5			290	3	<0.008	
25	81460	75100	5	10	45	<0.5			385	3	<0.008	
26	81480	75100	10	25	75	<0.5			1150	2	<0.008	
27	81500	75100	25	40	90	<0.5			2350	2	<0.008	
28	81520	75100	10	20	65	<0.5			380	12	<0.008	
29	81540	75100	10	30	35	<0.5			200	2	<0.008	
30	81560	75100	10	10	45	<0.5			405	3	<0.008	
31	81560	75100	30	20	85	<0.5			365	4	<0.008	
32	81580	75100	10	20	50	<0.5			200	4	<0.008	
33	81600	75100	10	15	30	0.5			130	2	<0.008	

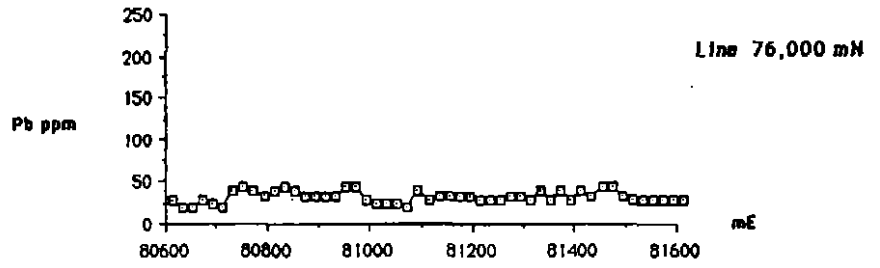
CLIMAX MINING LTD -- SOIL SAMPLE RESULTS

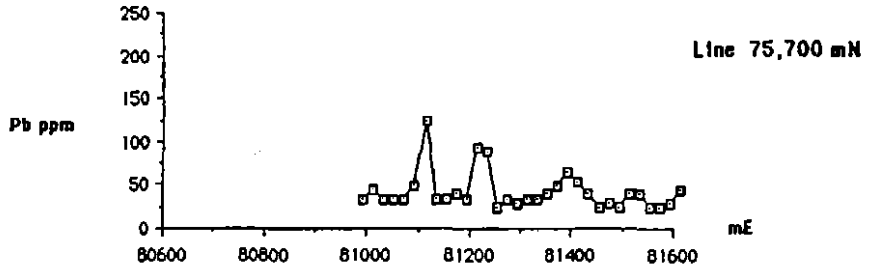
REGION:	Western Tas			MAPSHEET:	Sophia (8014)				CML data- Minus 80# fraction			
									Analyst - ANALABS			
PROSPECT:	MT BLACK	EL 12/88		Line 75,250 N								
TARGET:												
GEOLOGY:												
SaNo	EASTING	NORTHING	Cu	Pb	Zn	Ag	Co	Bi	Mn	As	Au	Ba
TB1	81000	75250	5	<5	45	<0.5			135	4	<0.008	
2	81020	75250	5	5	45	<0.5			255	<1	<0.008	
3	81040	75250	5	<5	100	<0.5			390	5	<0.008	
4	81060	75250	5	15	90	<0.5			500	3	<0.008	
5	81080	75250	10	<5	50	0.5			265	<1	<0.008	
6	81100	75250	10	<5	70	<0.5			430	<1	<0.008	
7	81120	75250	10	<5	50	<0.5			310	<1	<0.008	
8	81140	75250	5	<5	65	<0.5			310	2	<0.008	
9	81160	75250	5	<5	60	<0.5			300	2	<0.008	
10	81180	75250	10	<5	110	<0.5			560	4	<0.008	
11	81200	75250	10	5	75	0.5			345	4	<0.008	
12	81220	75250	10	10	75	0.5			390	4	<0.008	
13	81240	75250	10	5	65	<0.5			380	5	<0.008	
14	81260	75250	30	10	65	<0.5			345	6	<0.008	
15	81280	75250	15	<5	70	<0.5			340	4	<0.008	
16	81280	75250	10	10	80	0.5			390	5	<0.008	
17	81300	75250	10	5	60	0.5			295	4	<0.008	
18	81320	75250	10	<5	55	0.5			285	3	<0.008	
19	81340	75250	10	<5	75	0.5			400	6	<0.008	
20	81360	75250	5	<5	50	<0.5			295	7	<0.008	
21	81380	75250	5	<5	60	0.5			300	9	<0.008	
22	81400	75250	5	<5	55	<0.5			205	10	<0.008	
23	81420	75250	5	5	50	<0.5			200	12	<0.008	
24	81440	75250	10	<5	60	<0.5			290	4	<0.008	
25	81460	75250	5	<5	65	<0.5			295	10	<0.008	
26	81480	75250	5	<5	75	0.5			365	4	<0.008	
27	81500	75250	10	10	55	<0.5			240	3	<0.008	
TB28	81520	75250	5	5	50	0.5			320	3	<0.008	
29	81540	75250	10	15	35	<0.5			215	3	<0.008	
30	81560	75250	5	15	30	<0.5			220	5	<0.008	
31	81560	75250	10	25	40	0.5			150	3	<0.008	
32	81580	75250	10	10	50	<0.5			330	5	<0.008	
33	81600	75250	5	10	50	0.5			290	4	<0.008	
34	81620	75250	10	15	45	0.5			230	3	<0.008	
35	81640	75250	10	5	50	0.5			400	3	<0.008	
36	81660	75250	20	10	105	<0.5			460	4	<0.008	
37	81680	75250	10	10	105	0.5			810	2	<0.008	
38	81700	75250	5	<5	60	<0.5			315	1	<0.008	
39	81720	75250	10	5	75	<0.5			350	2	<0.008	
40	81740	75250	20	<5	155	<0.5			510	7	<0.008	
41	81760	75250	20	15	90	<0.5			320	9	<0.008	
42	81780	75250	10	15	70	<0.5			255	4	<0.008	
43	81800	75250	10	10	90	<0.5			490	5	<0.008	

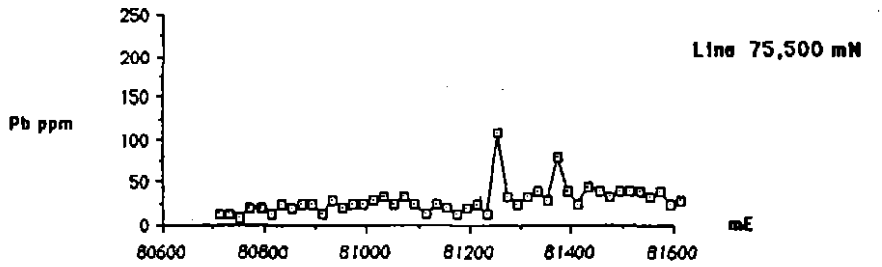
Mt Black El 12/88 - Soil Geochemical Profiles - Gatty Data (-80 # Fraction)

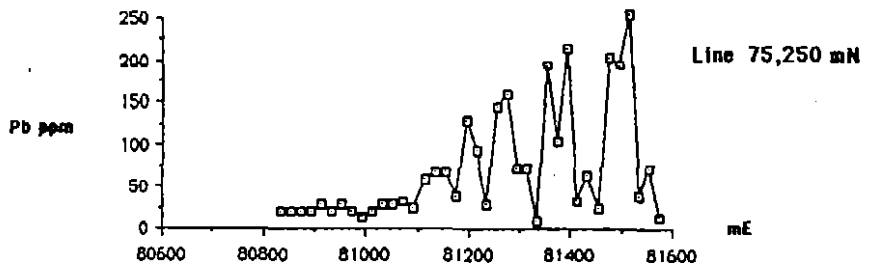


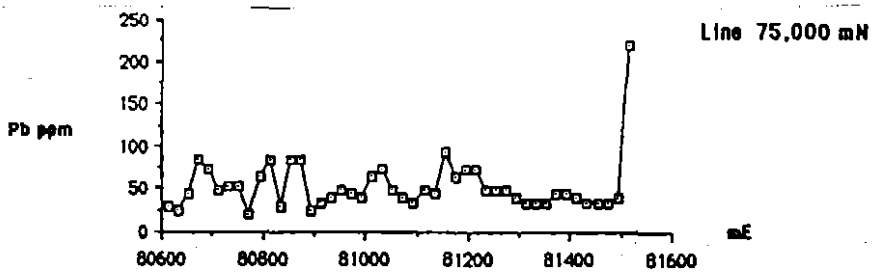


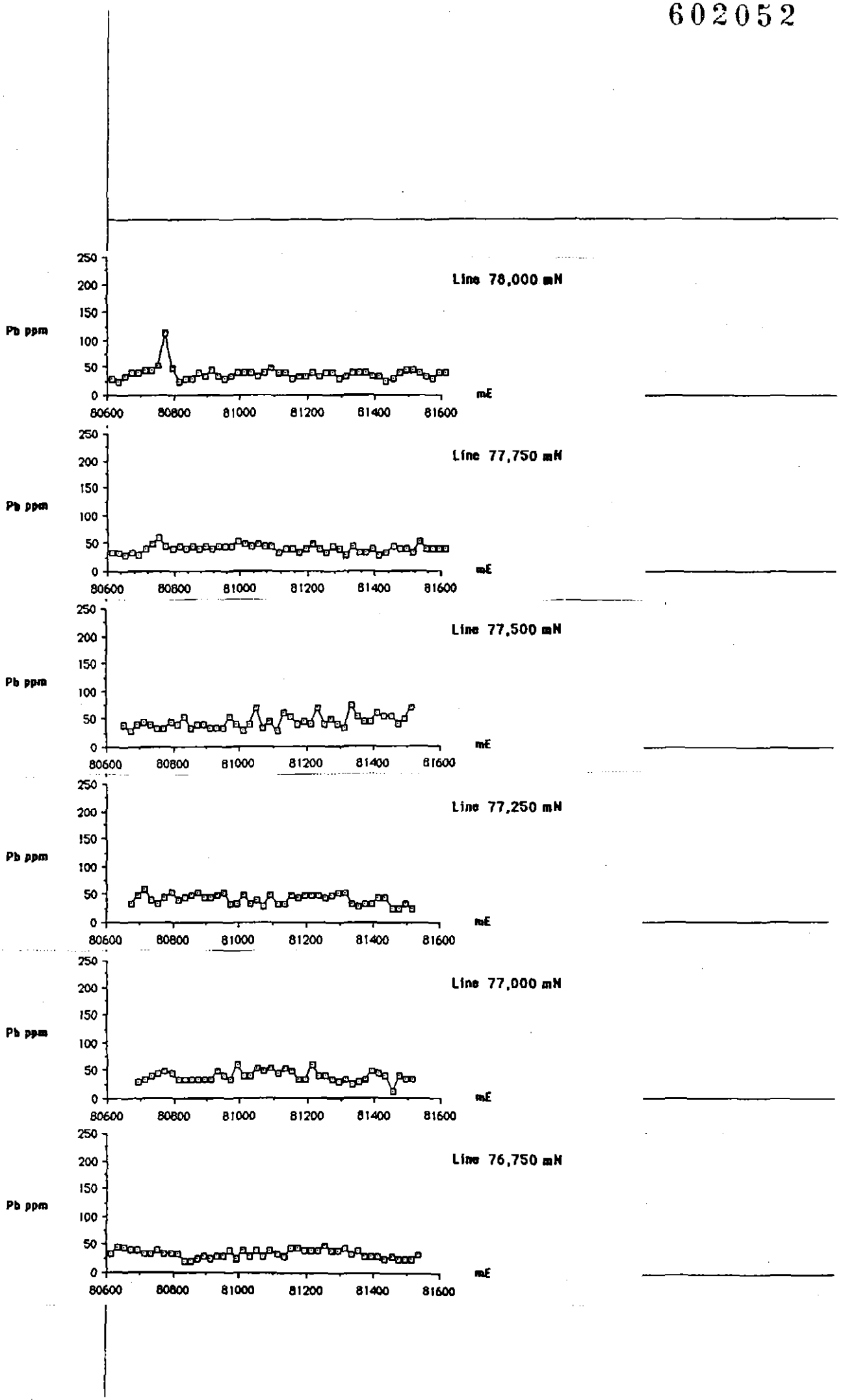






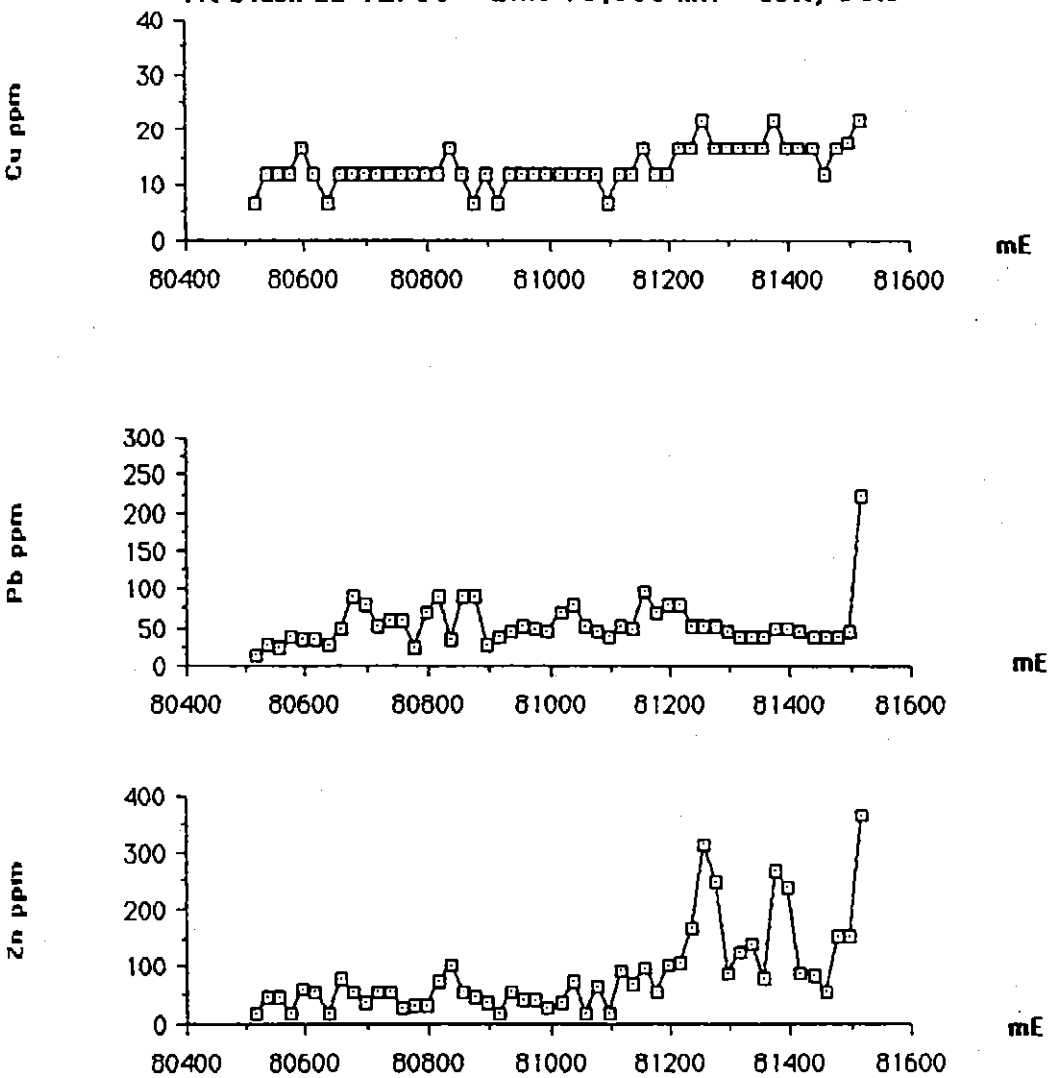


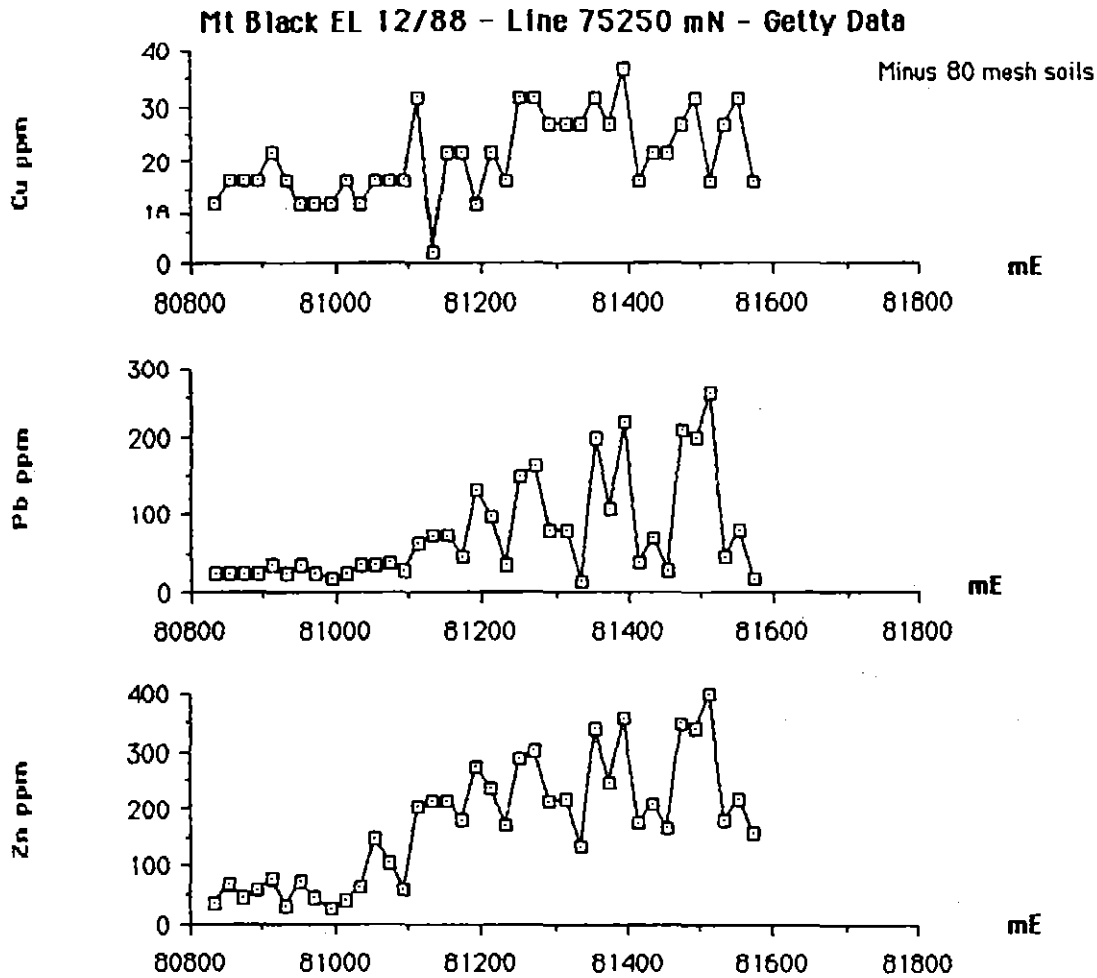



Line 78,000 mN
Line 77,750 mN
Line 77,500 mN
Line 77,250 mN
Line 77,000 mN
Line 76,750 mN
Pb ppm
250
200
150
100
50
0
80600
80800
81000
81200
81400
81600
mE

052

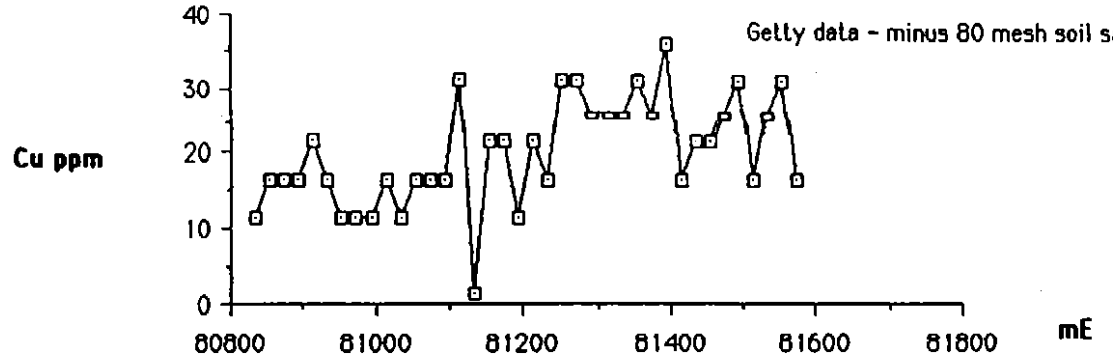
Mt Black EL 12/88 - Line 75,000 mN - Getty Data

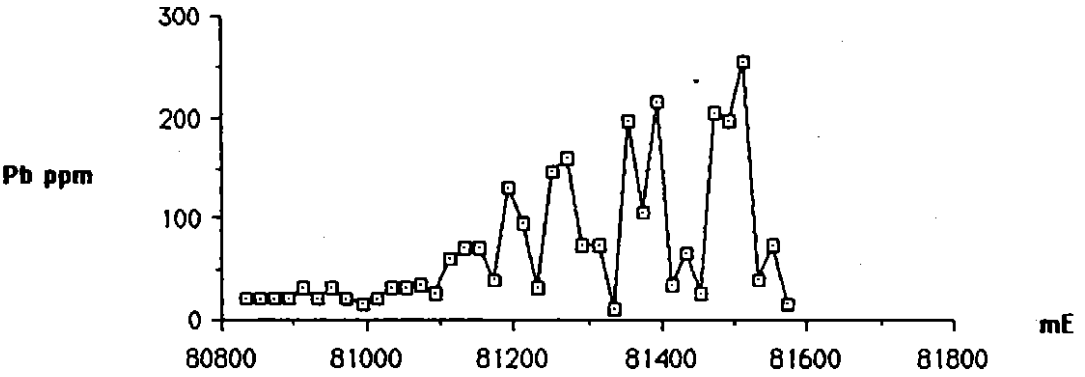


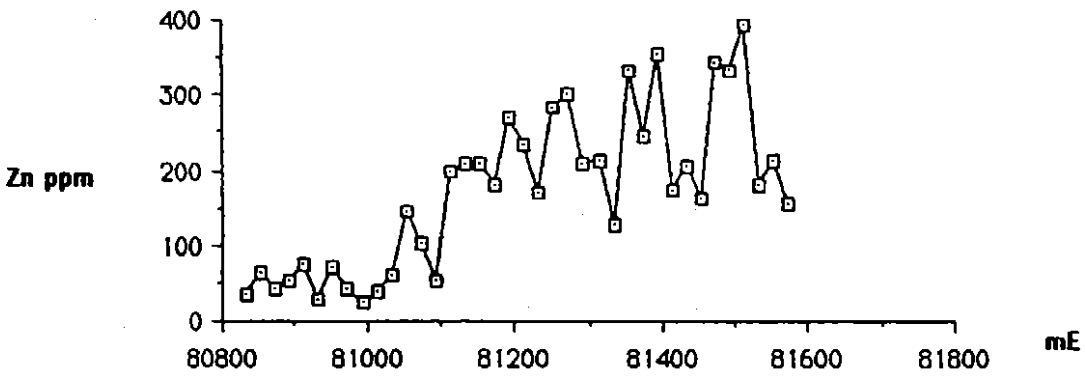

Mt Black EL 12/88 - Line 75250 mN - Getty Data
Minus 80 mesh soils
Cu ppm
Pb ppm
Zn ppm
mE
80800
81000
81200
81400
81600
81800

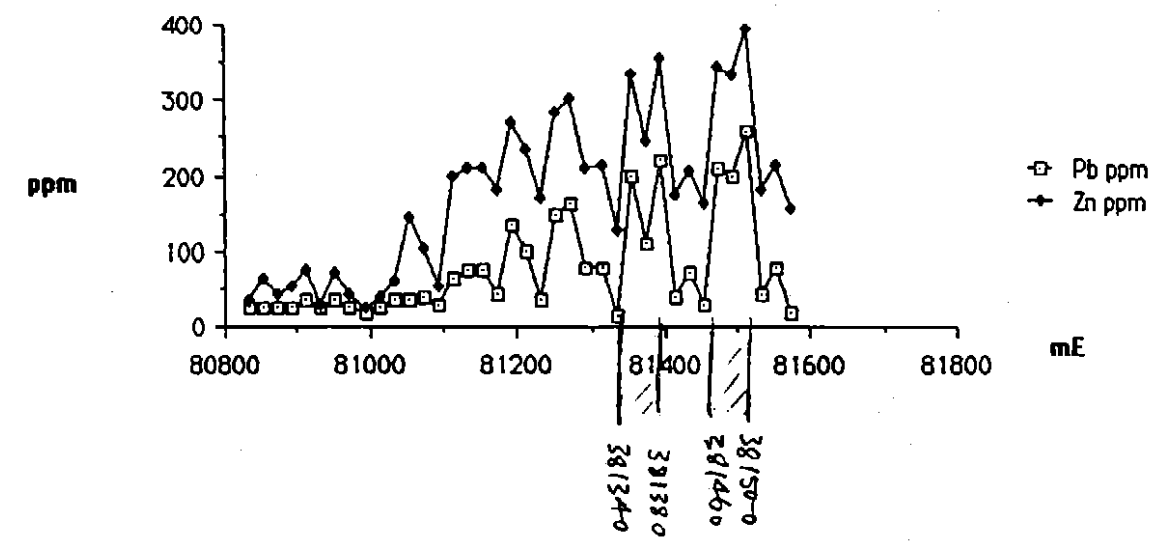
Mt Black Grid - Line 7250 mN

Getty data - minus 80 mesh soil samples

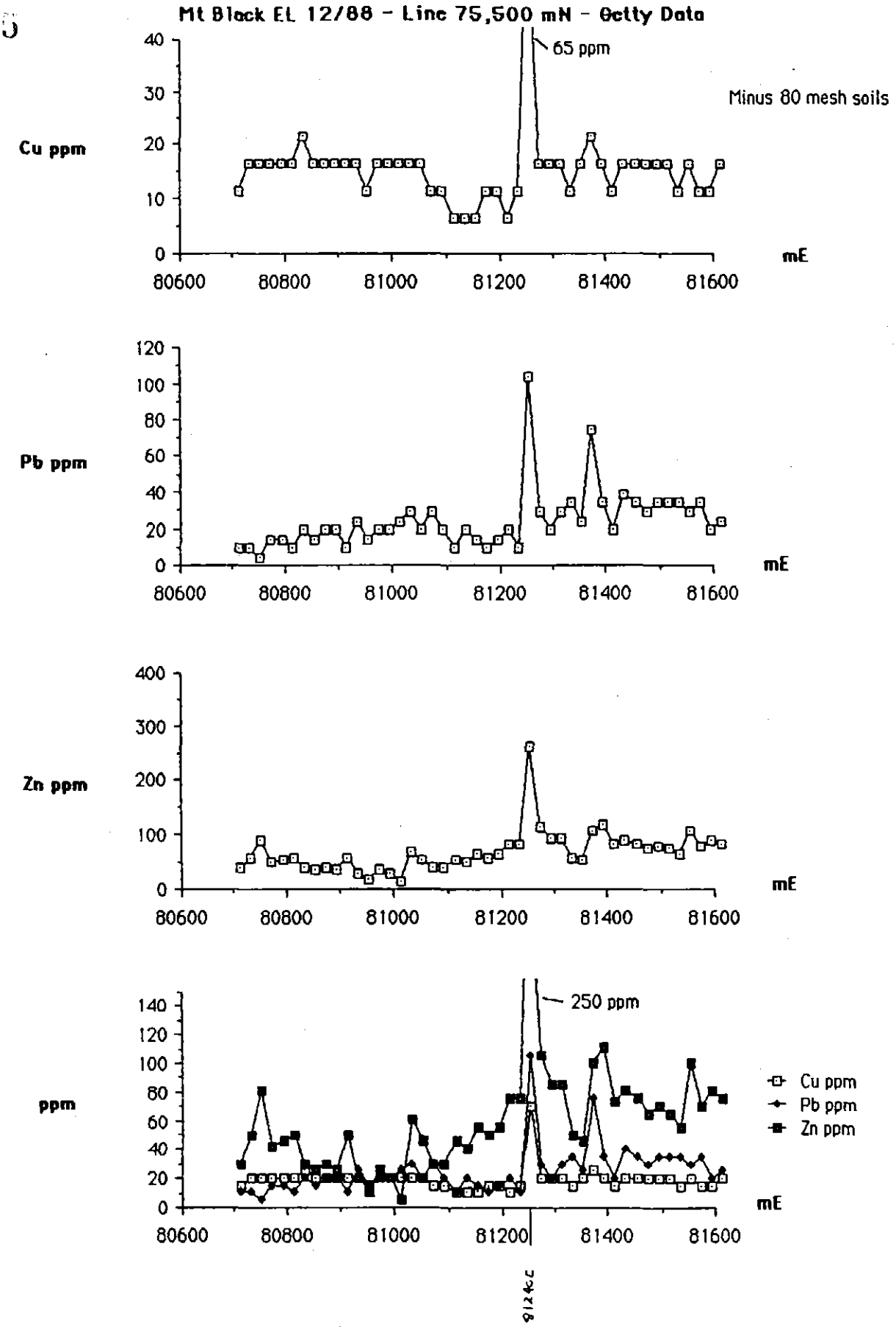




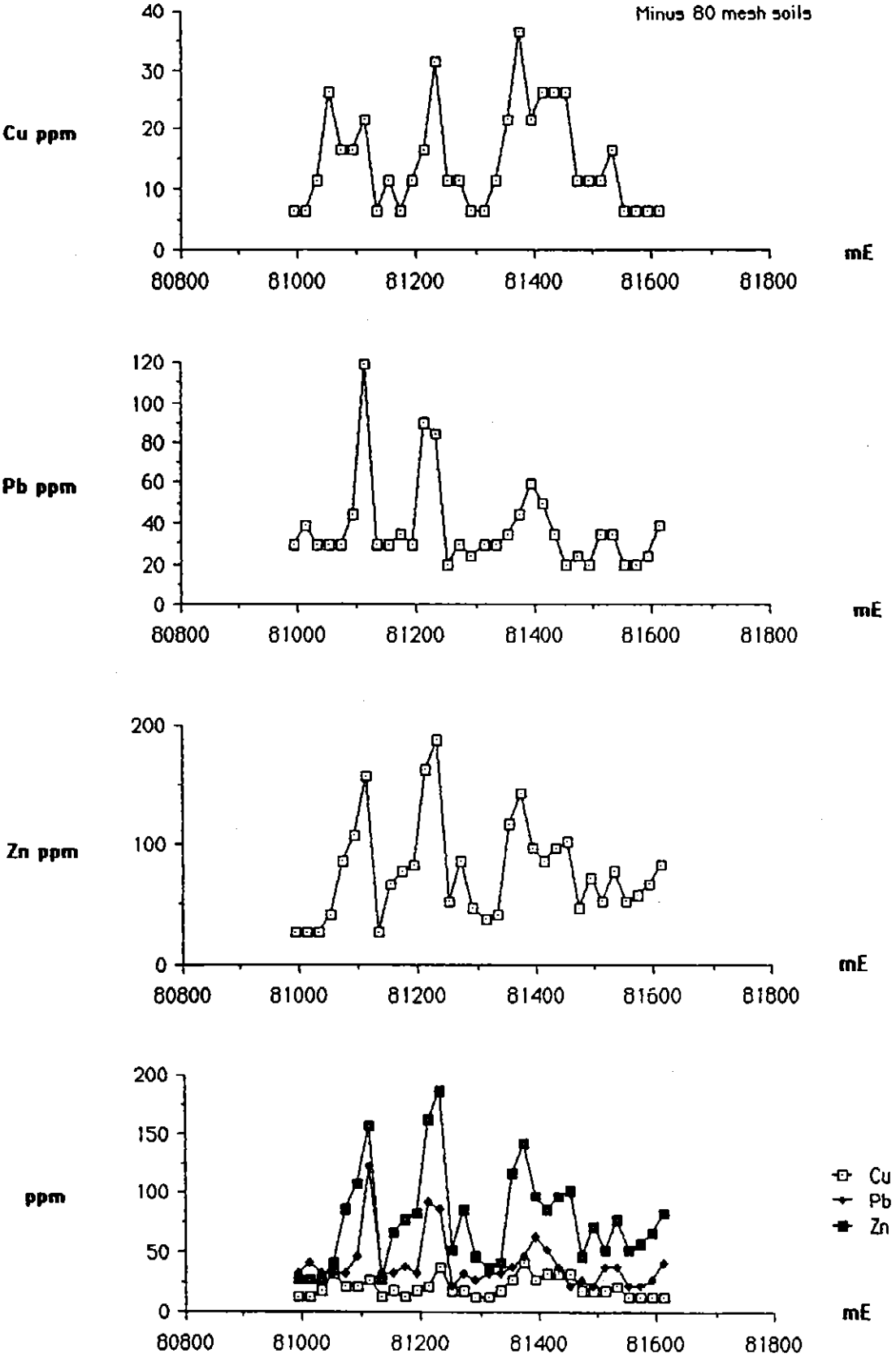




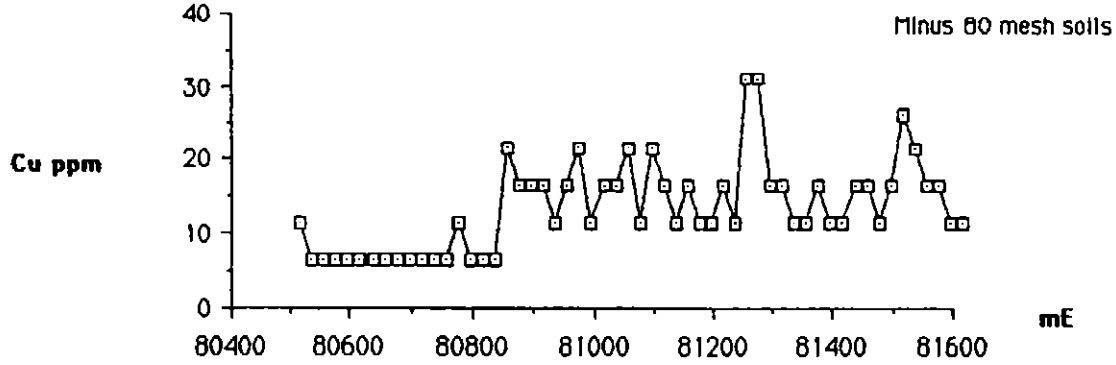
055

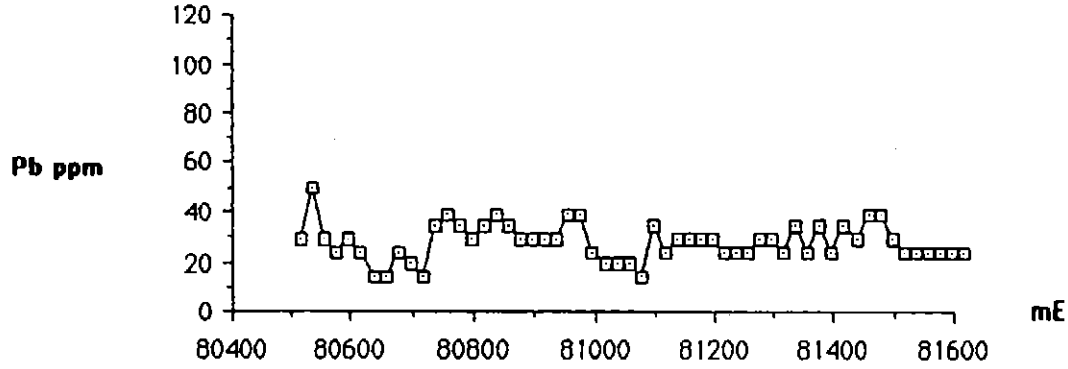

Mt Black EL 12/88 - Line 75,500 mN - Getty Data
Minus 80 mesh soils
Cu ppm
65 ppm
Pb ppm
Zn ppm
ppm
250 ppm
mE
80600
80800
81000
81200
81400
81600
Cu ppm
Pb ppm
Zn ppm

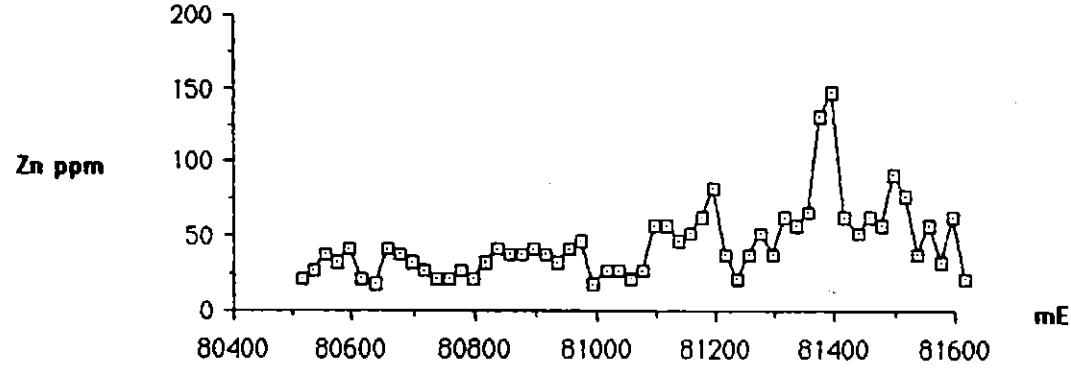
Mt Black EL 12/88 - Line 75,700 mN - Getty Data

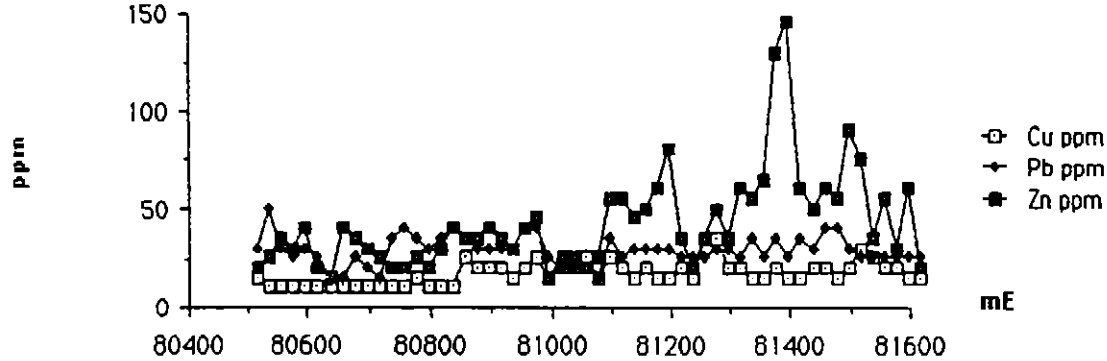


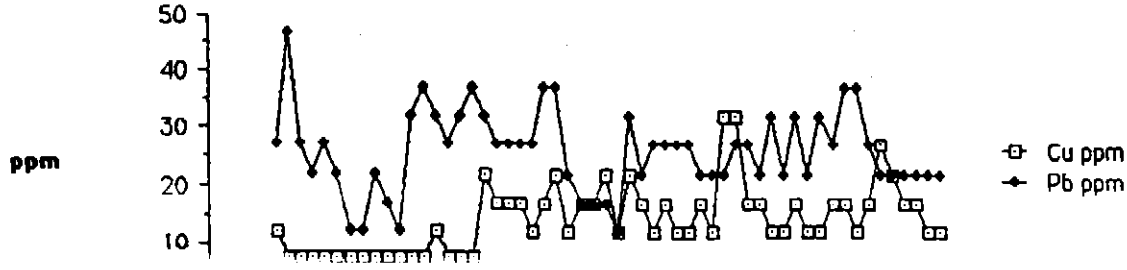
Mt Black EL 12/88 - Line 76,000 mN - Getty Data





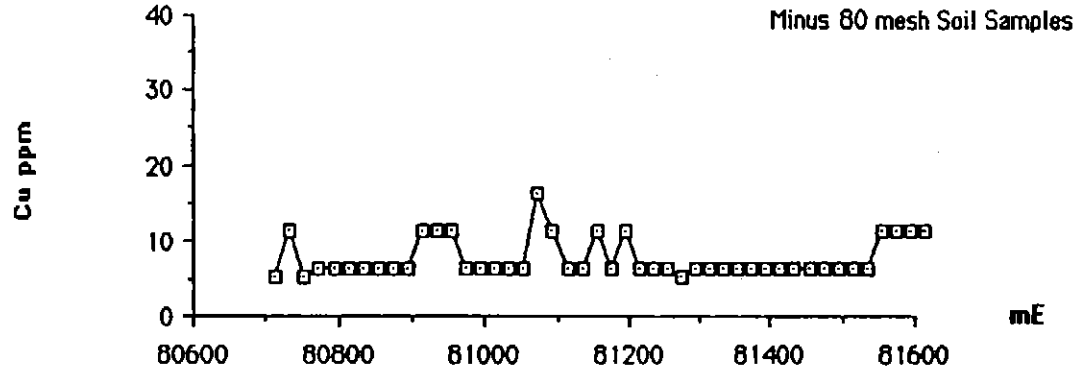


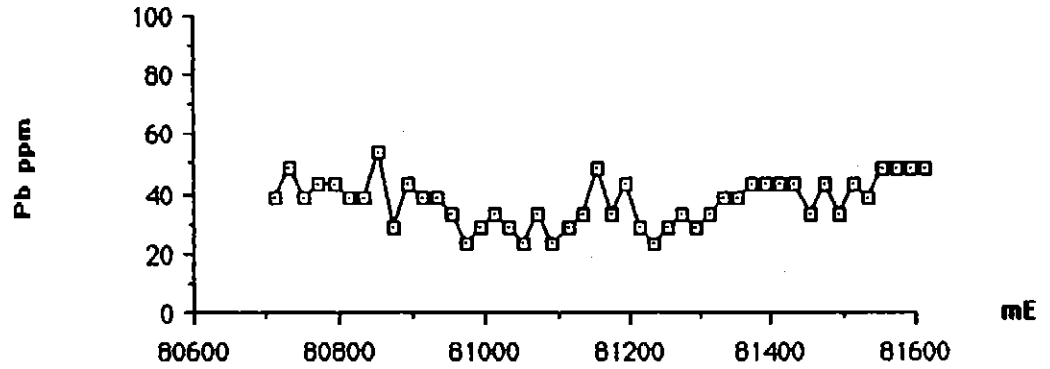


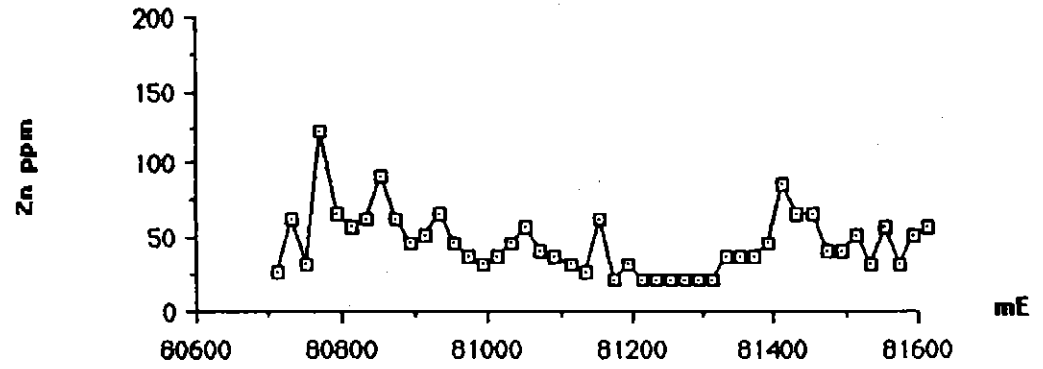


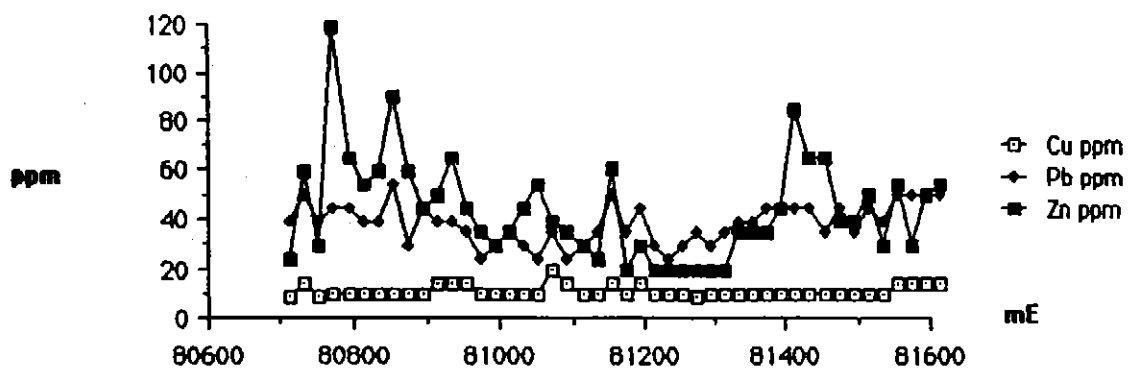
Mt Black EL 12/88 - Line 76,300 N - Getty Data

Minus 80 mesh Soil Samples

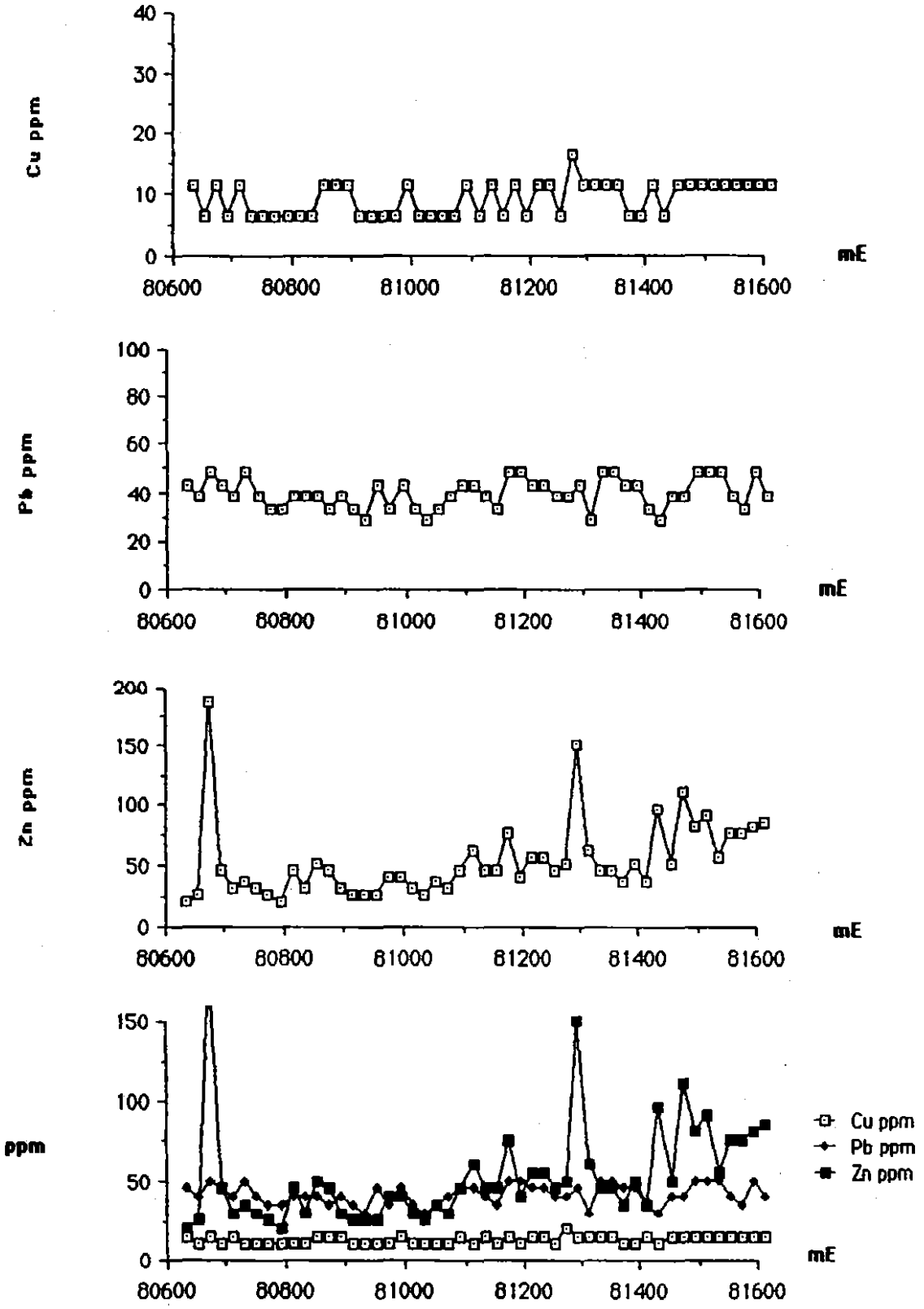




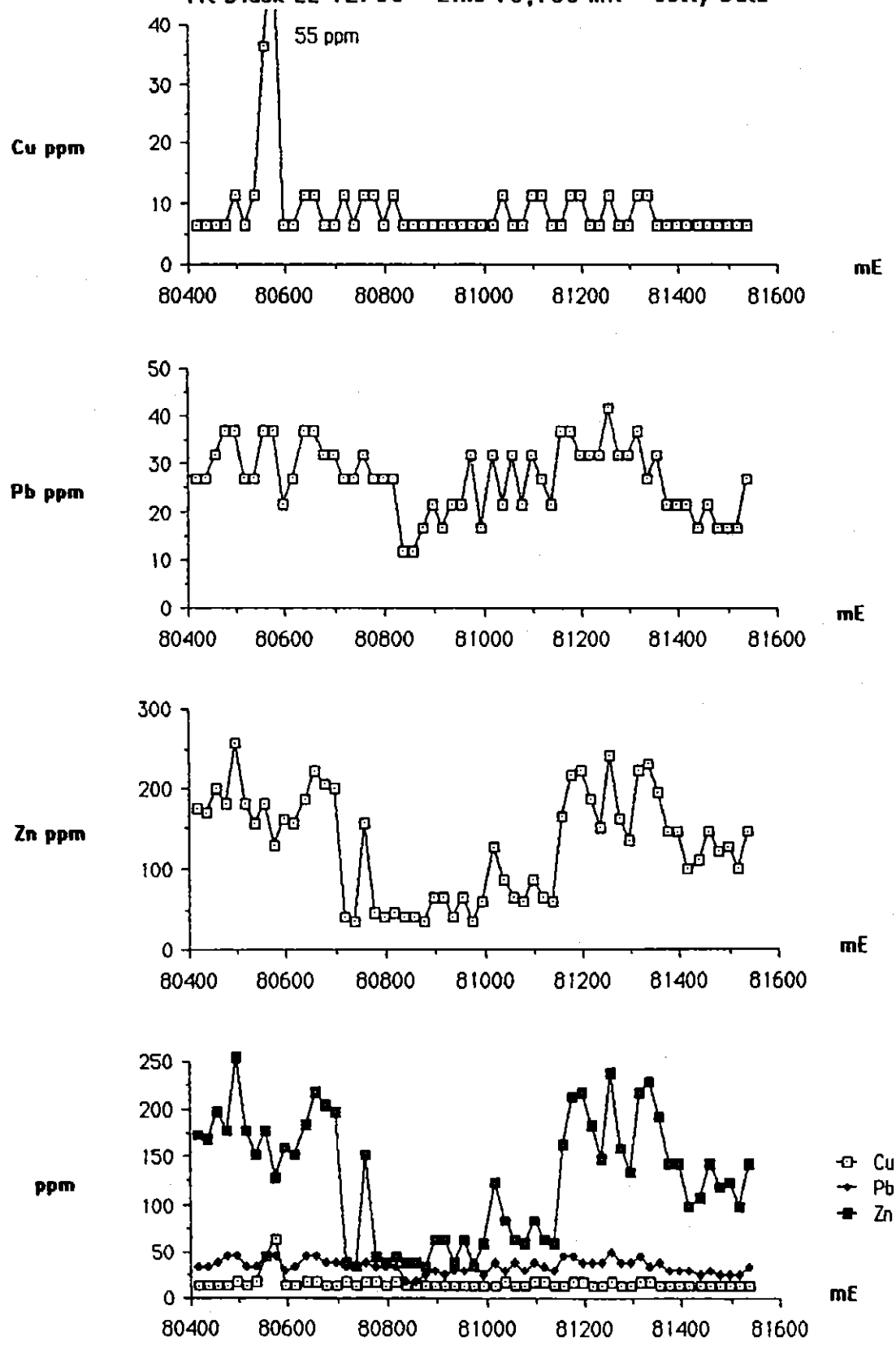




Mt Black EL 12/88 - Line 76,500 mN - Getty Data



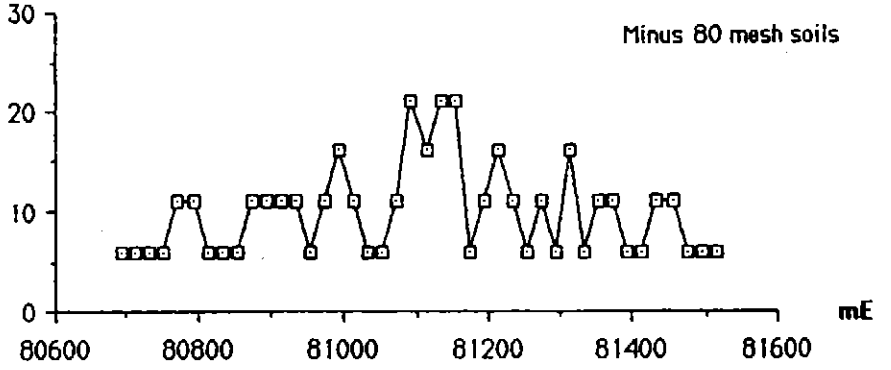
Mt Black EL 12/88 - Line 76,750 mN - Getty Data



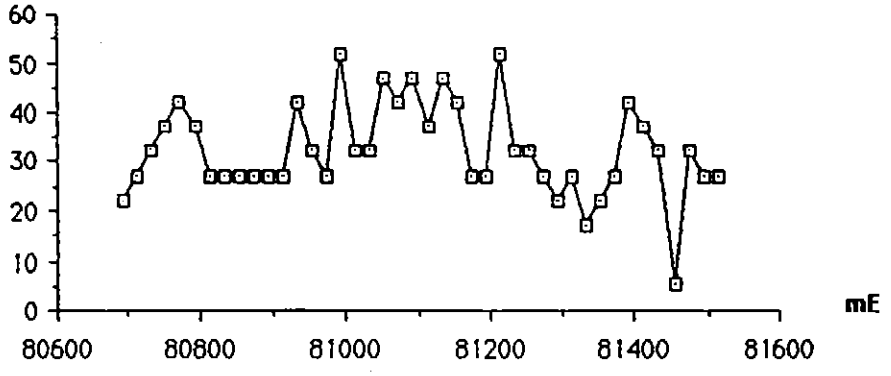
Mt Black EL 12/88 - Line 77,000 mN - Getty Data

Minus 80 mesh soils

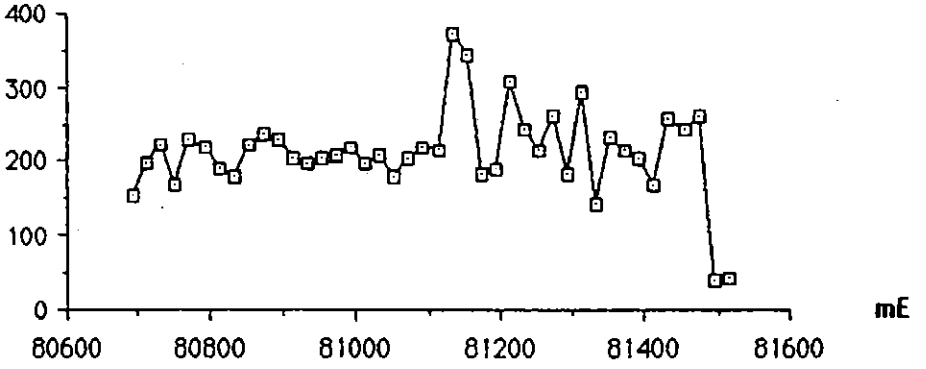
Cu ppm



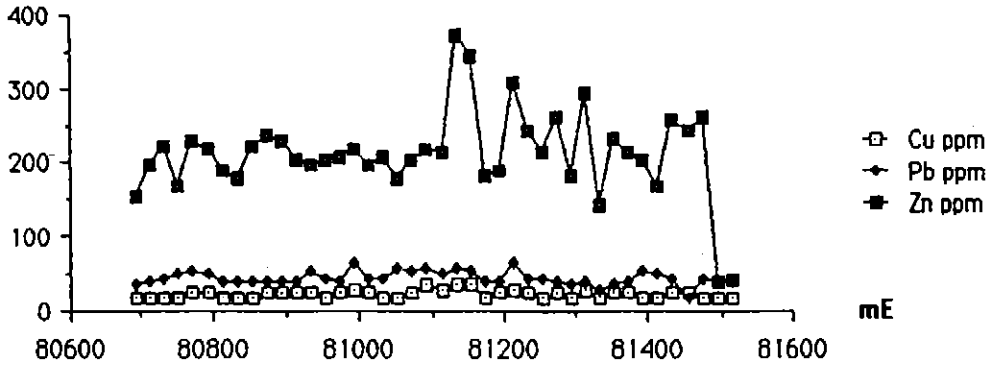
Pb ppm



Zn ppm

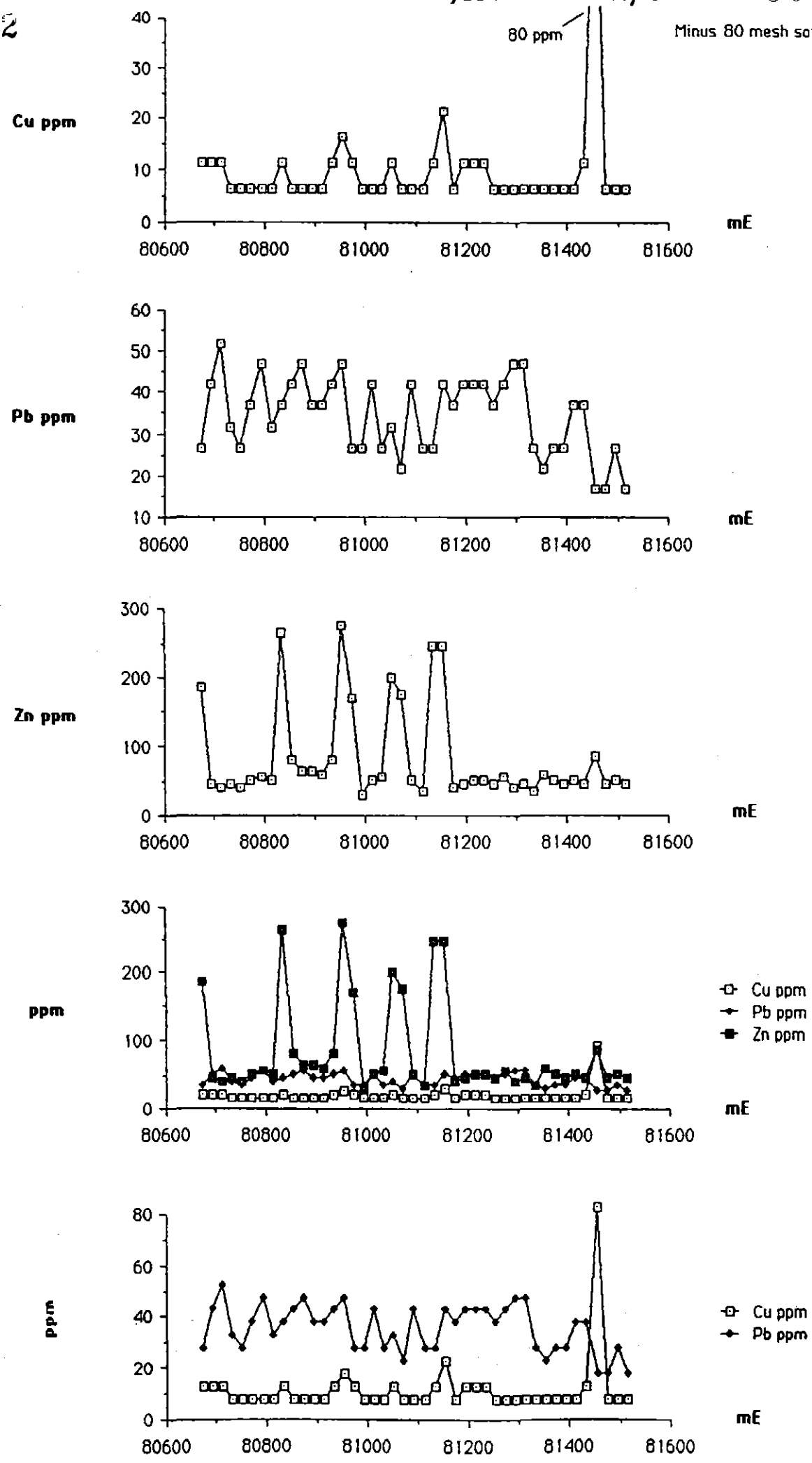


ppm



Mt Black EL 12/88 -Line 77,250 mN - Getty Data

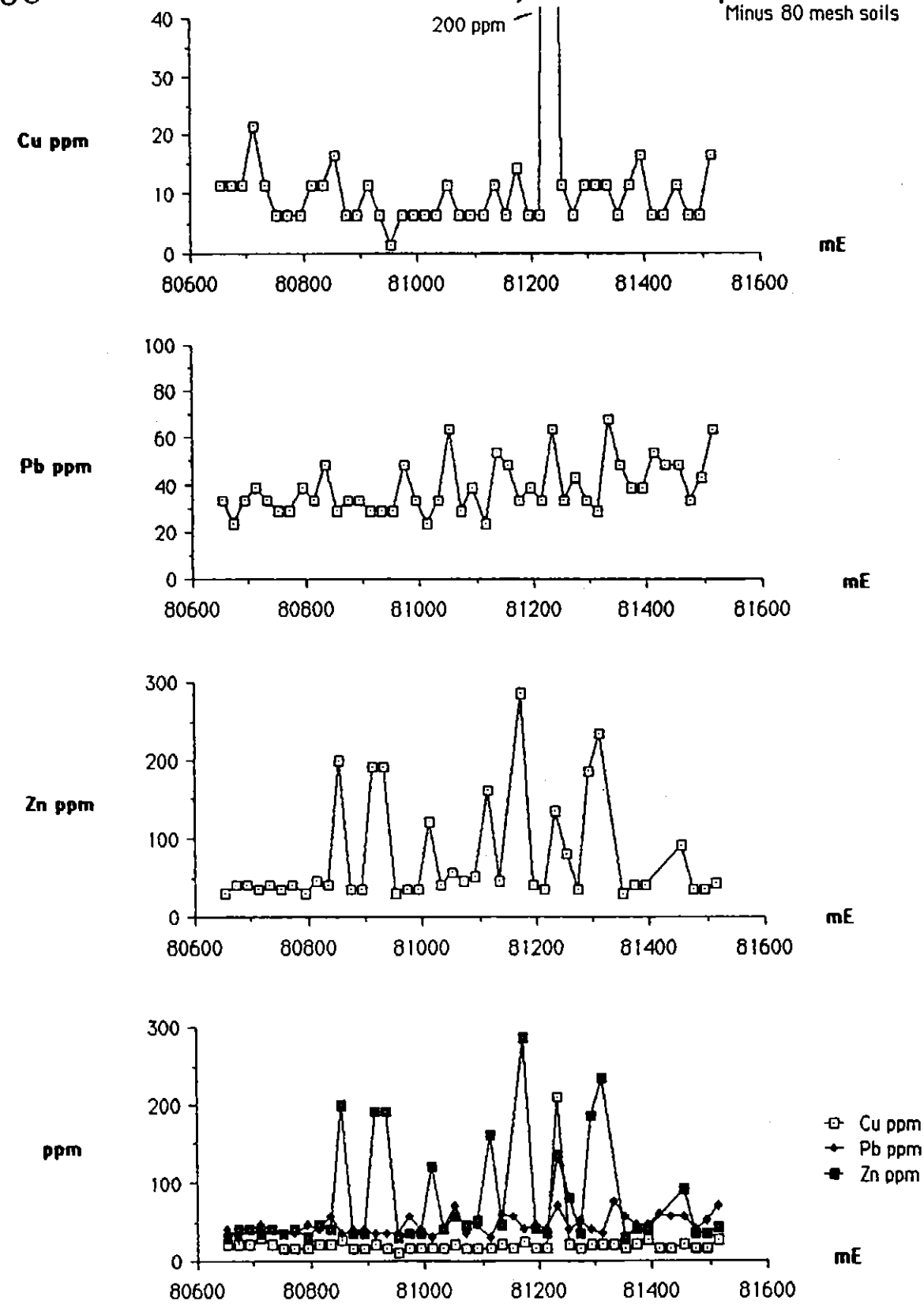
Minus 80 mesh soils



063

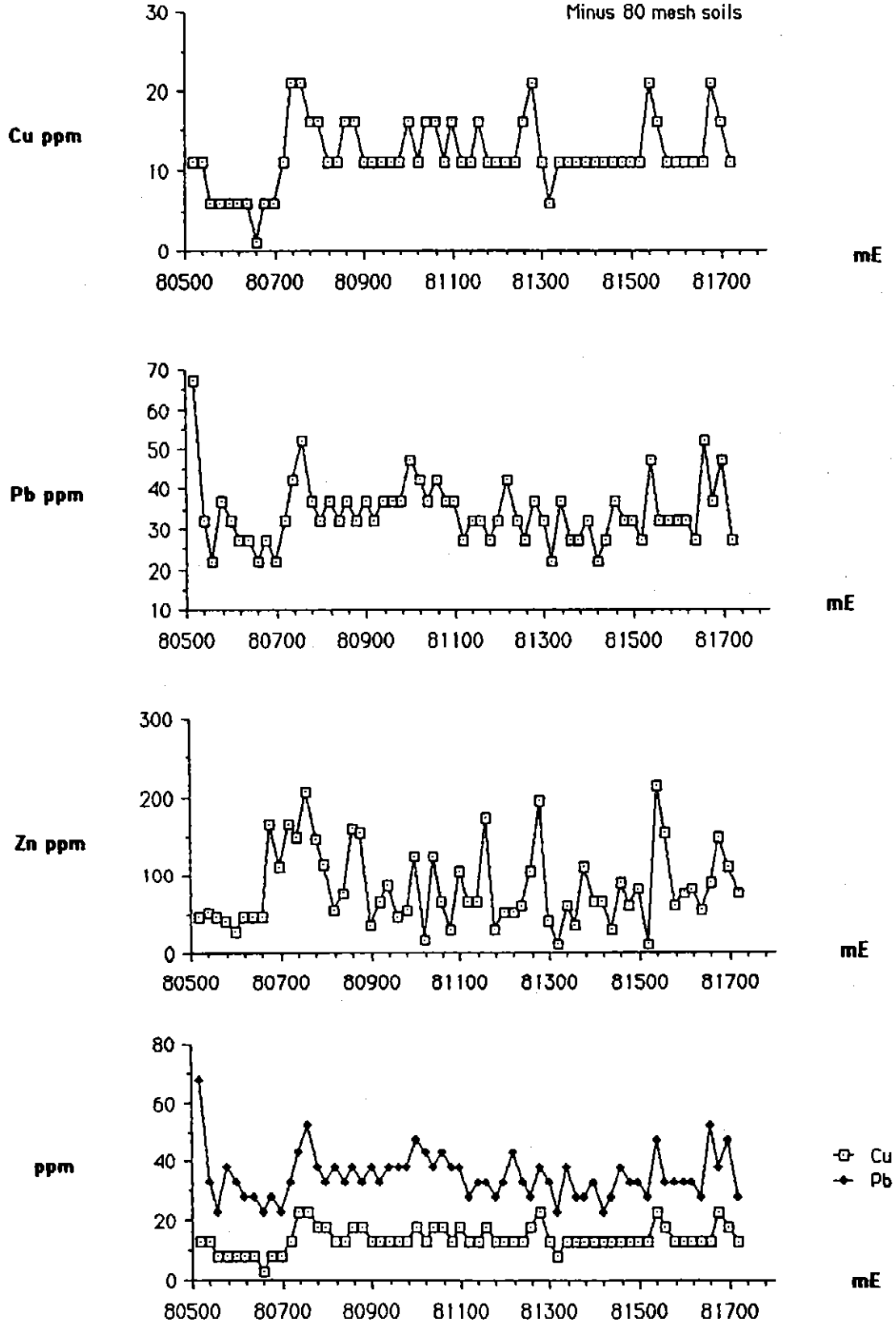
Mt Black EL 12/88 - Line 77,500 mN - Getty Data

Minus 80 mesh soils

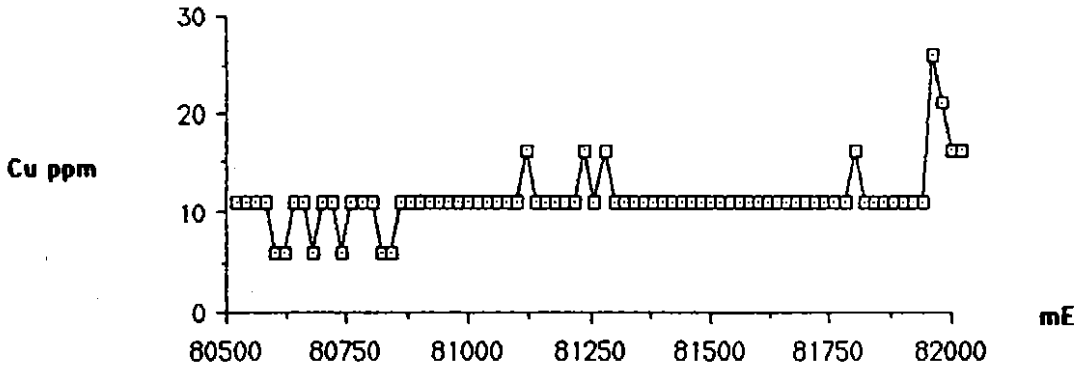


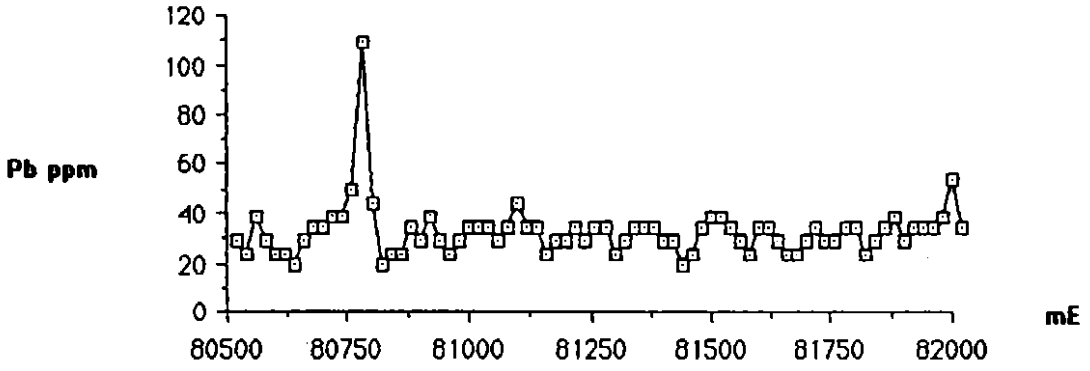
Mt Block EL 12/88 - Line 77,750 mN - Getty Data

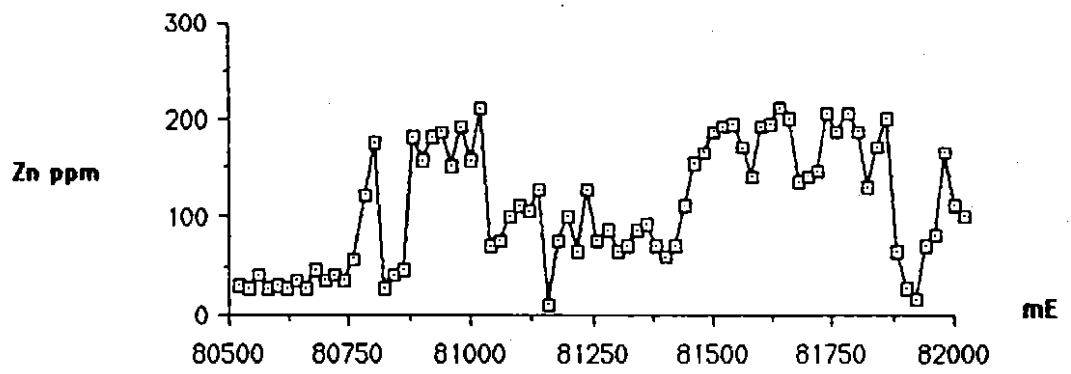
Minus 80 mesh soils

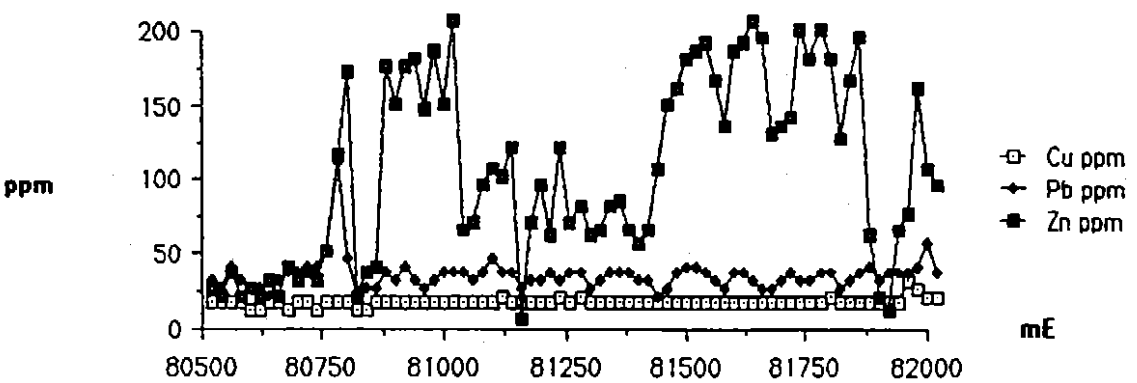


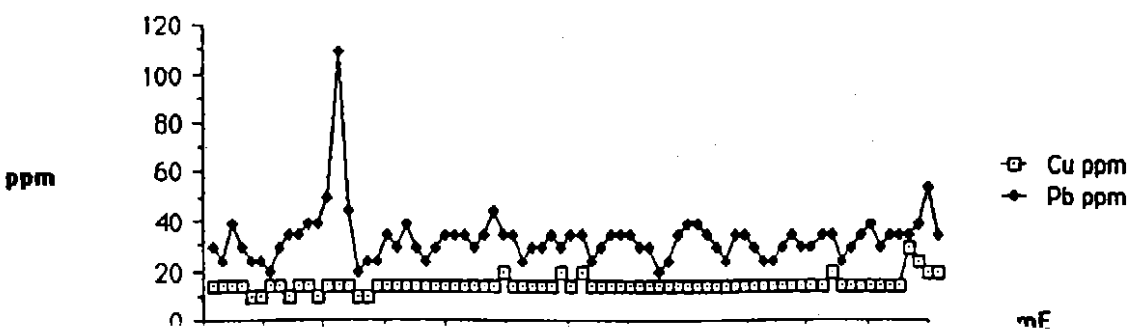
Mt Black EL 12/88 - Line 78,000 mN - Getty Data



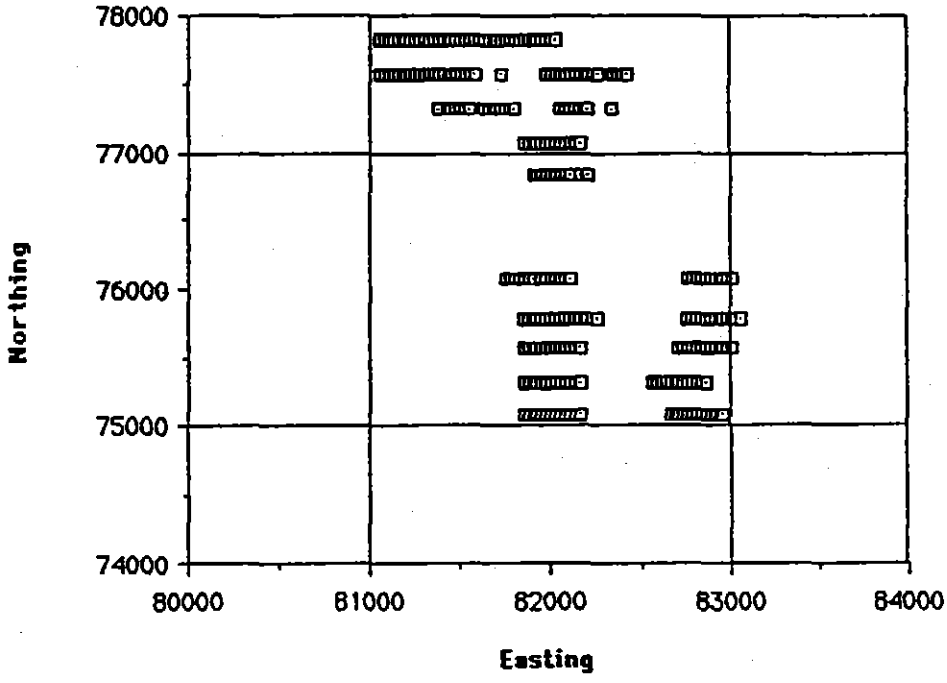


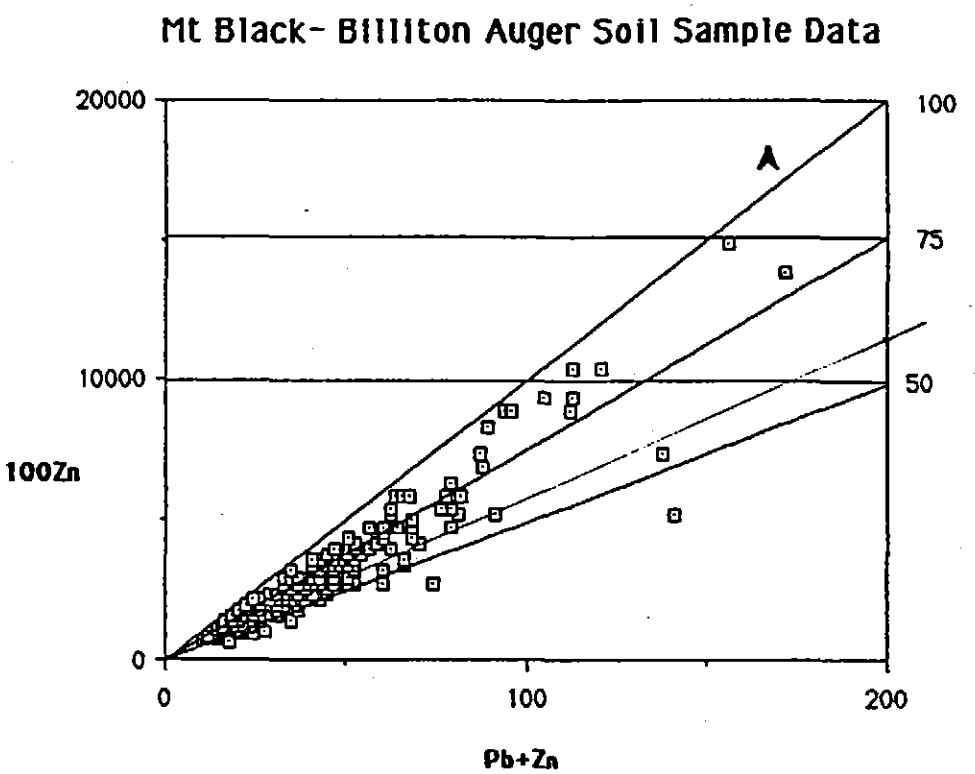




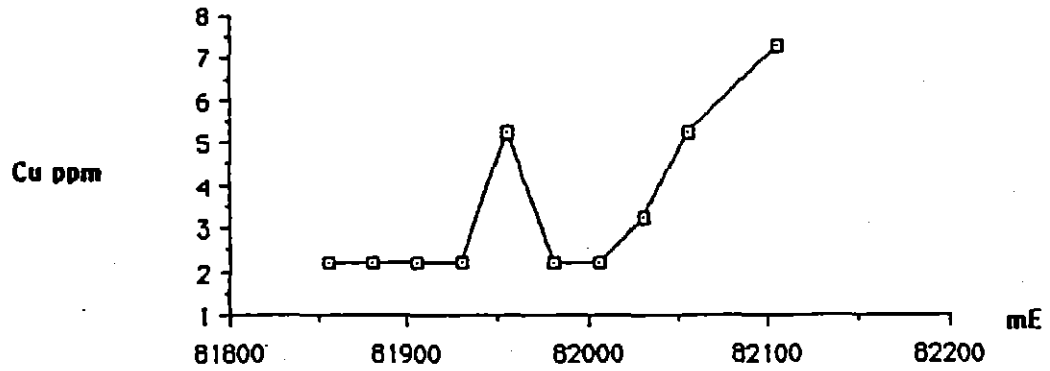


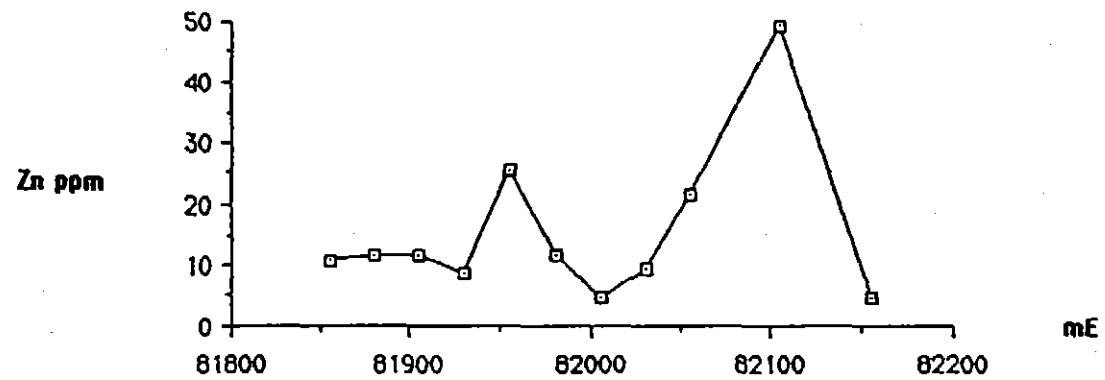
Mt Black EL 12/88 - Billiton Soil Auger Sample Locations

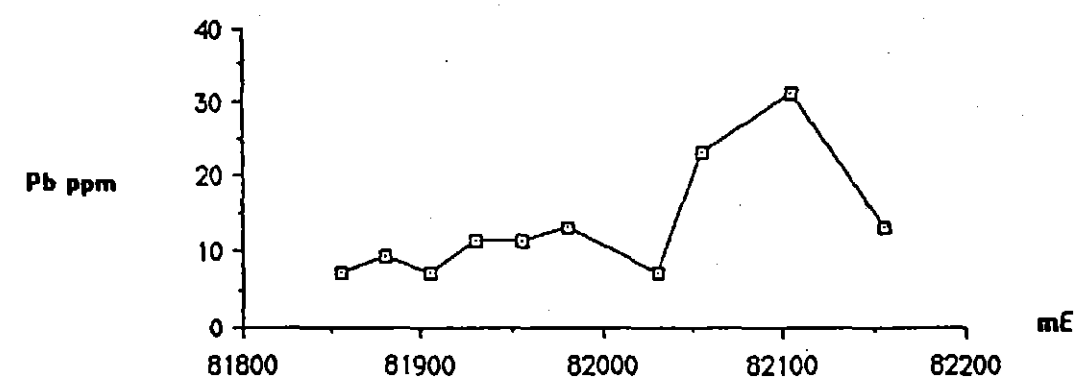


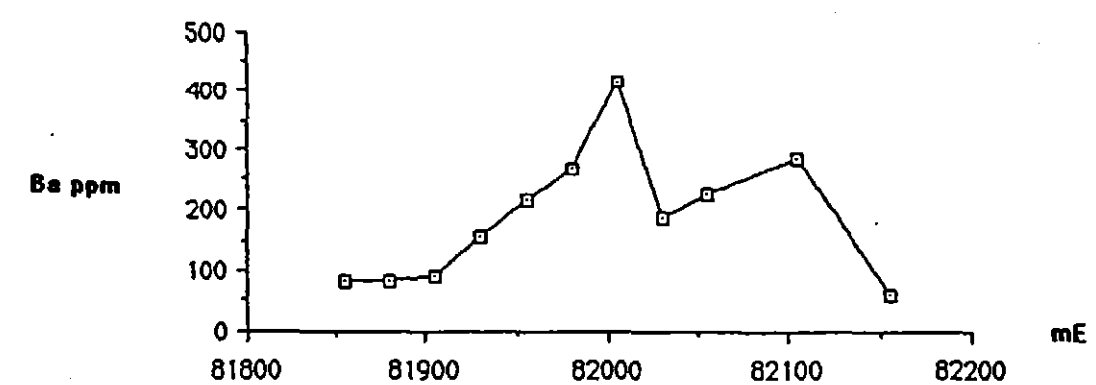

Mt Black- Billiton Auger Soil Sample Data
20000
10000
0
100Zn
0
100
200
Pb+Zn
A
100
75
50

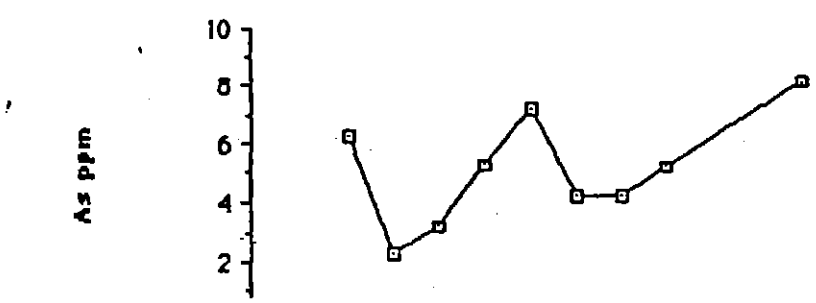
EL 12/88 Line 76750 mN



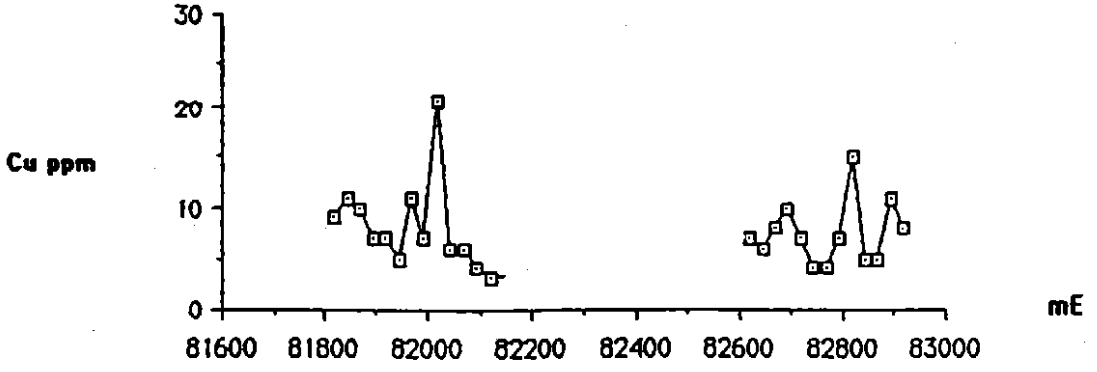


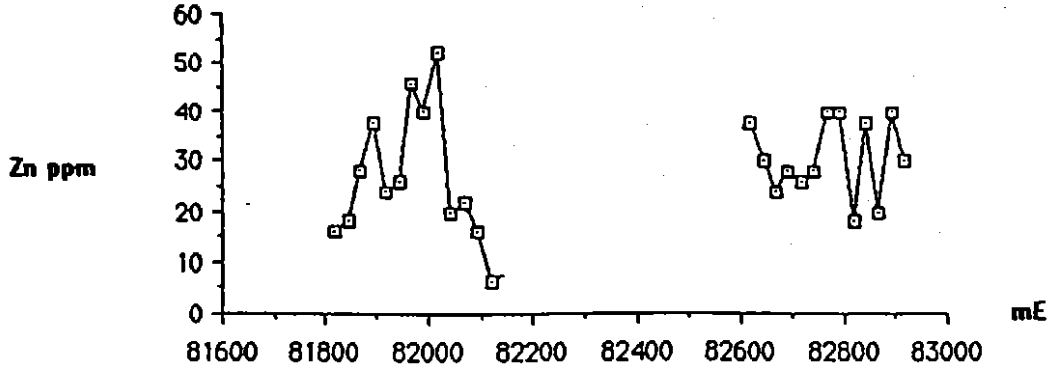


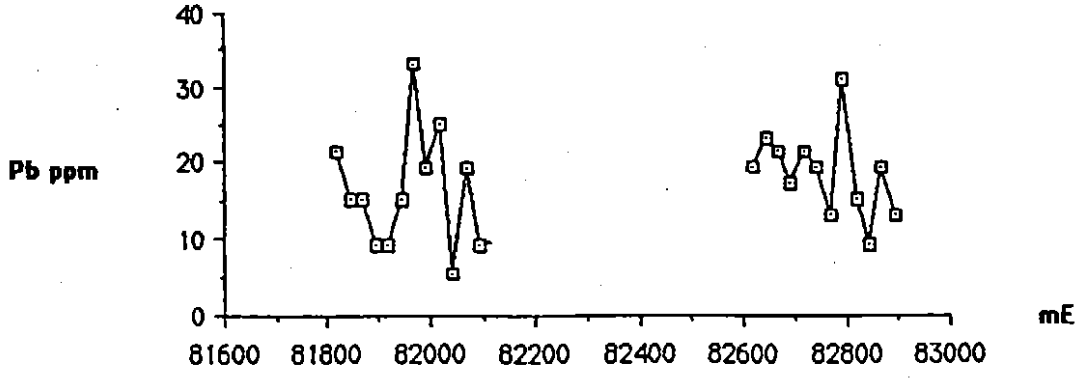


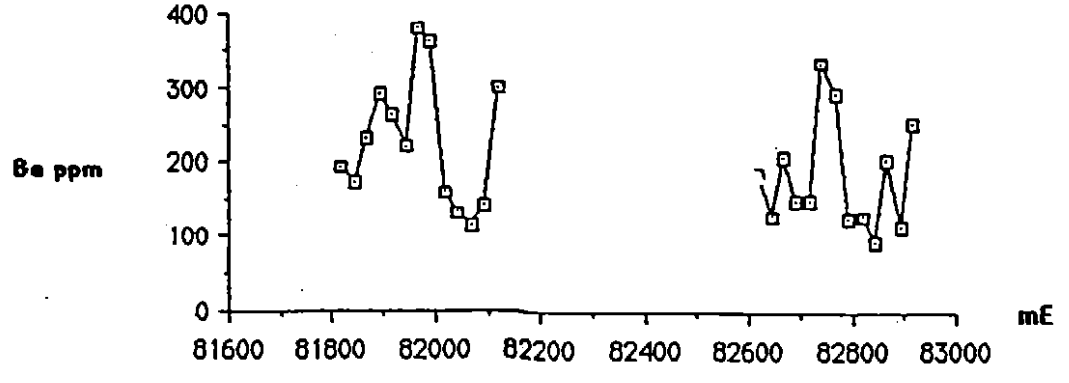


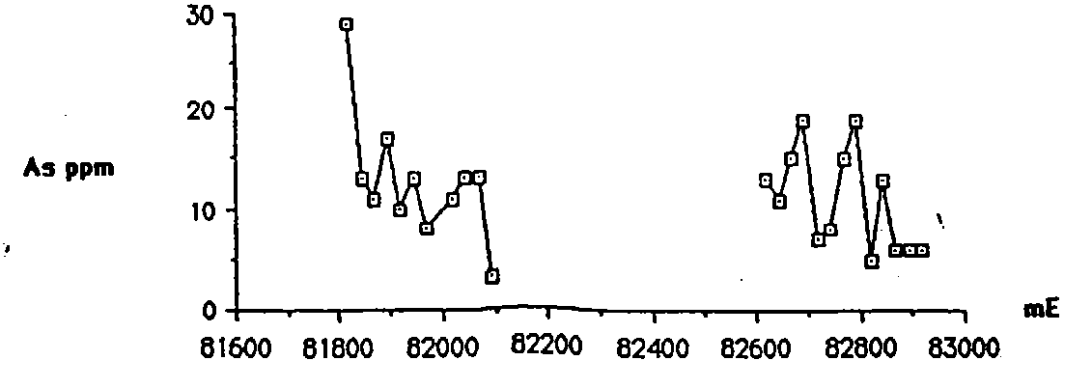
EL 12/88 Line 75000 mN





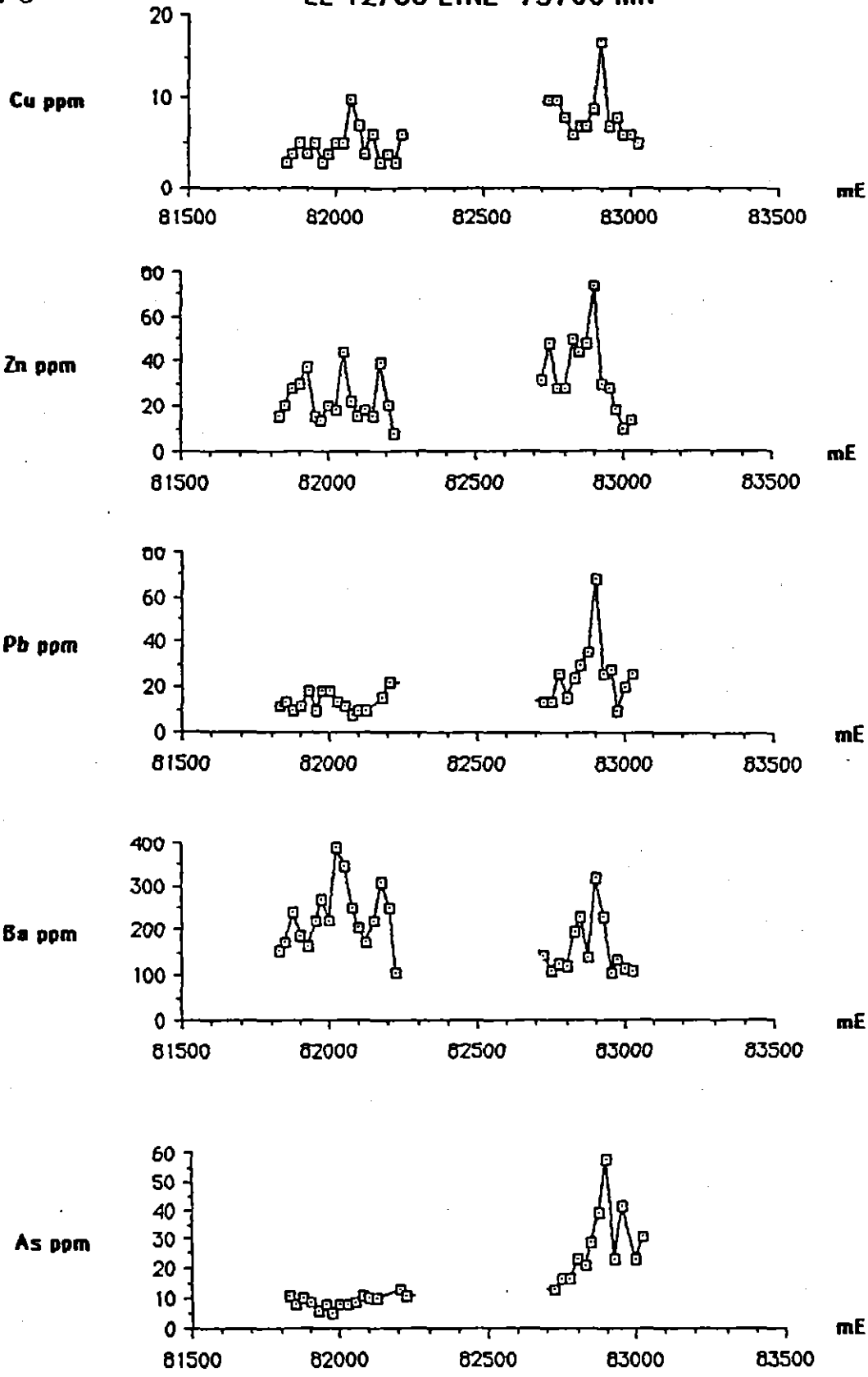




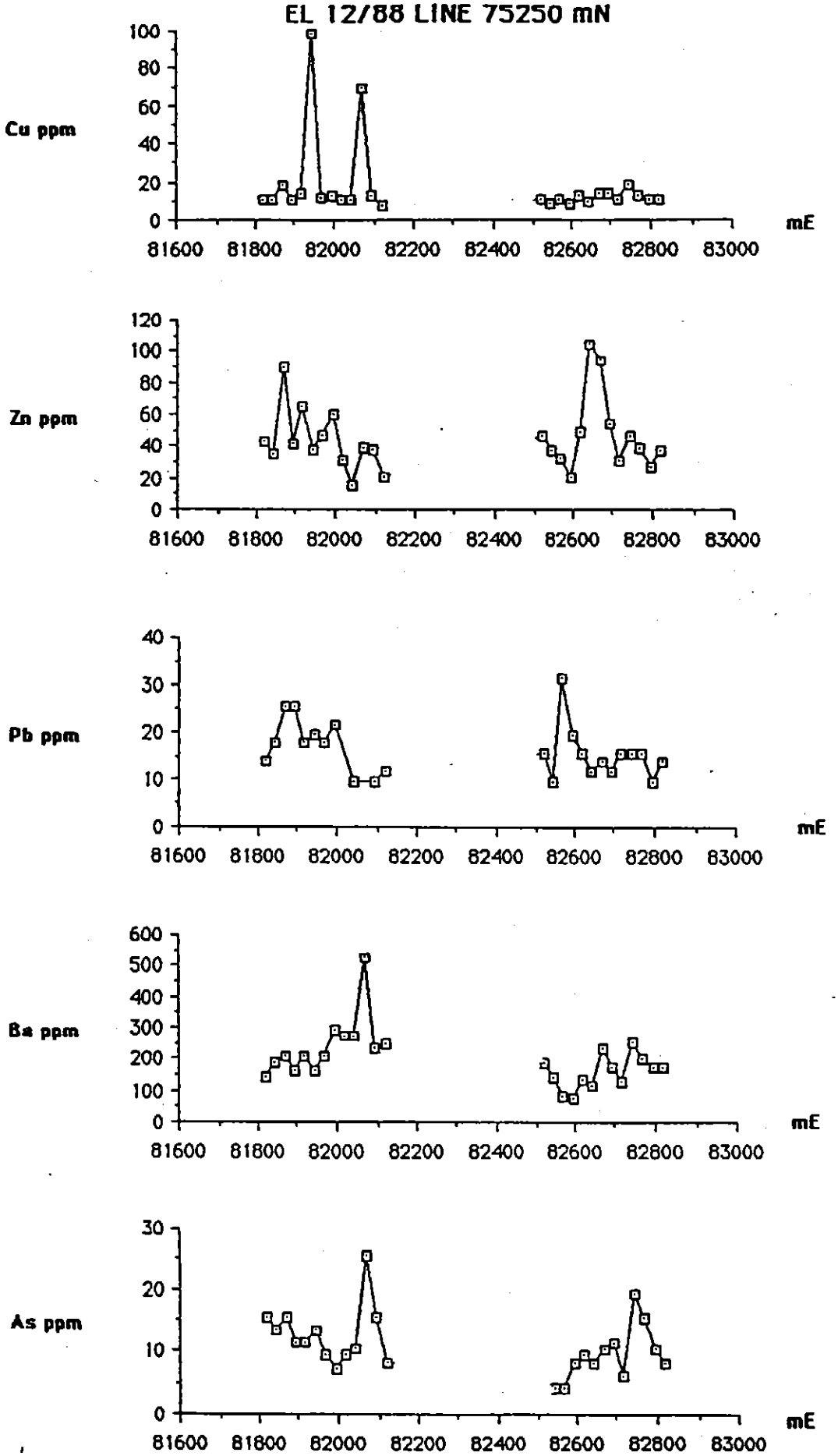


070

EL 12/88 LINE 75700 mN

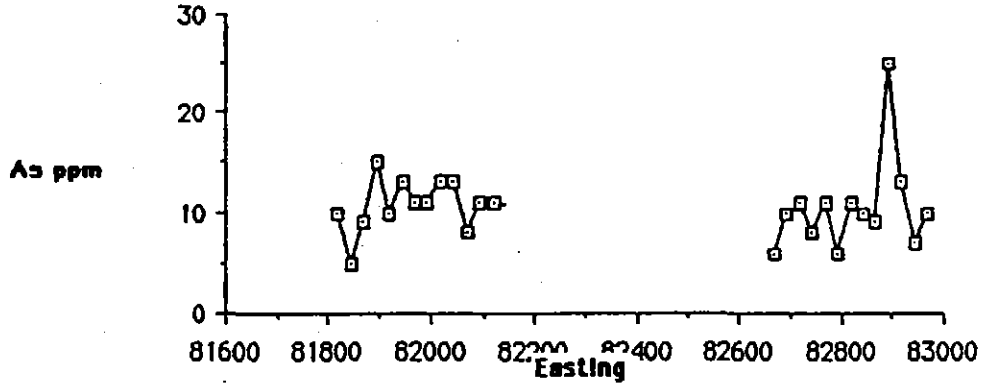


EL 12/88 LINE 75250 mN

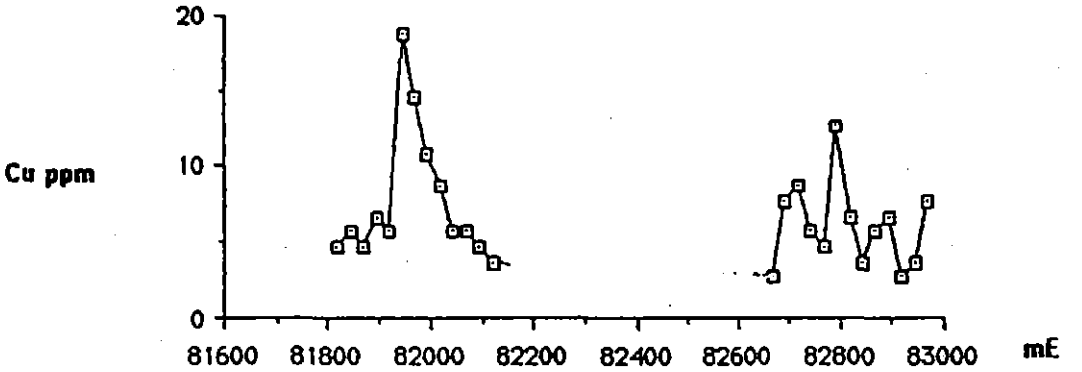


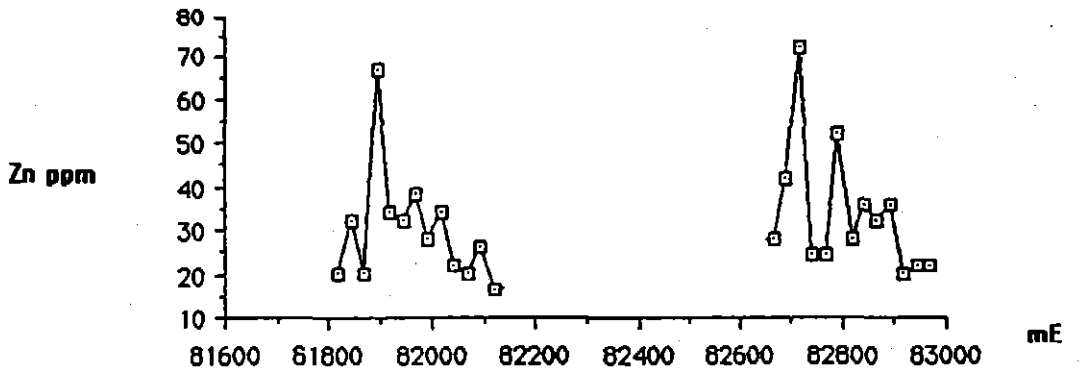
072

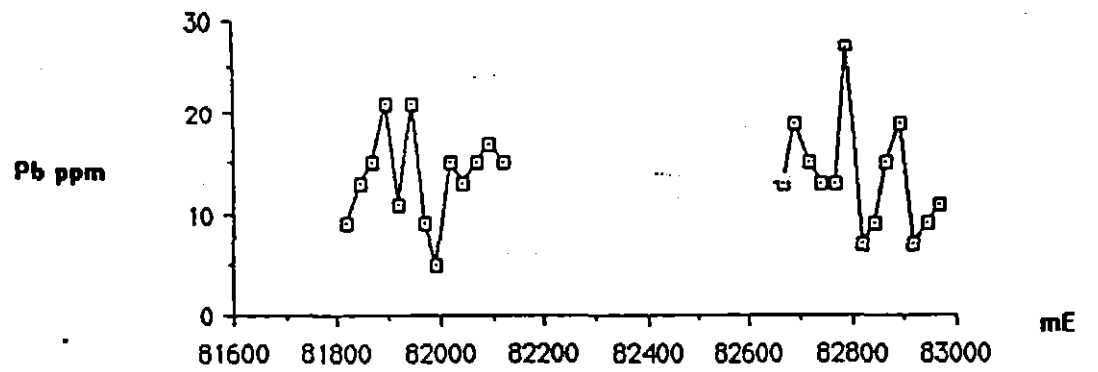
EL 12/88 Line 75500 mN

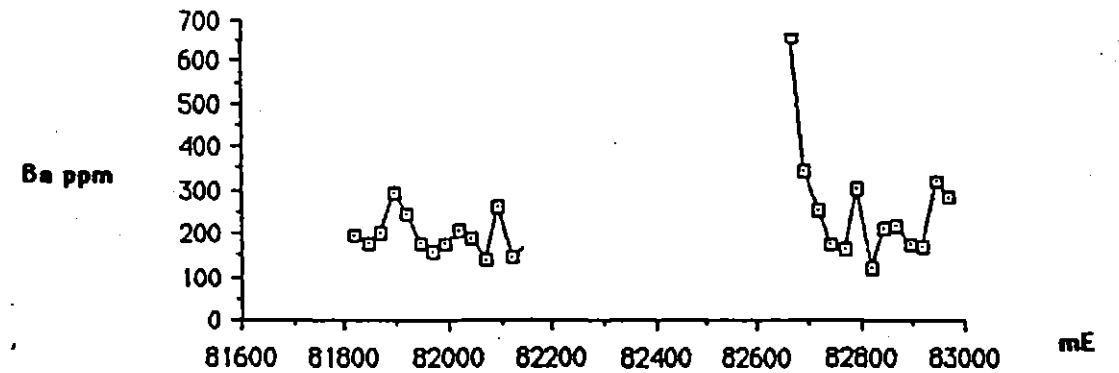


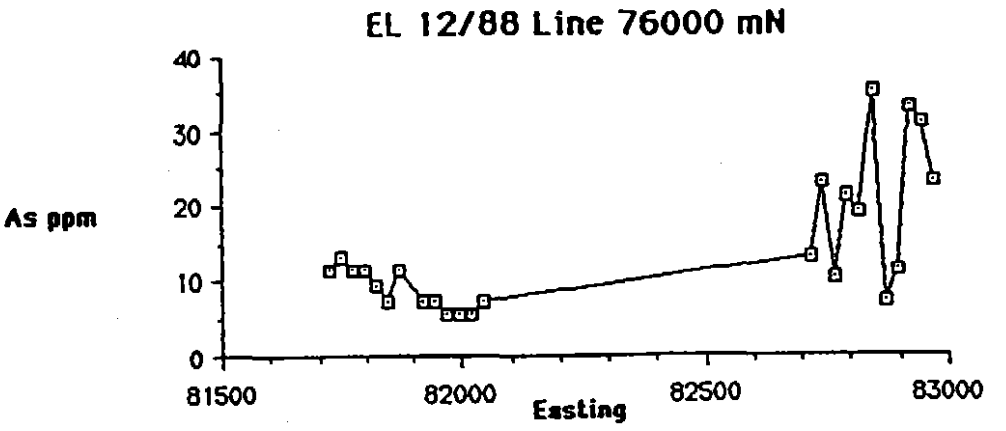
EL 12/88 Line 75500 mN



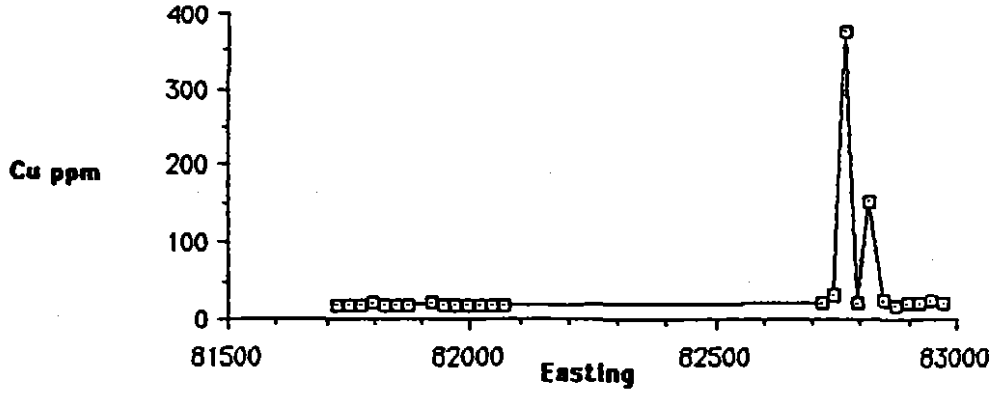


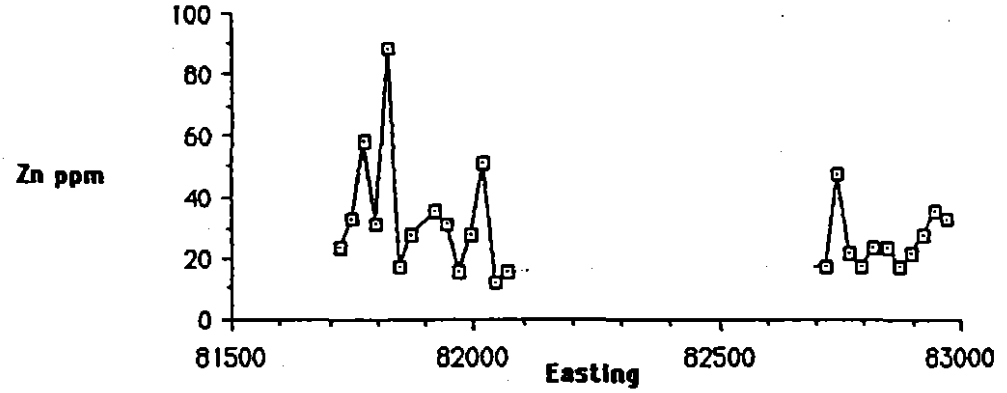


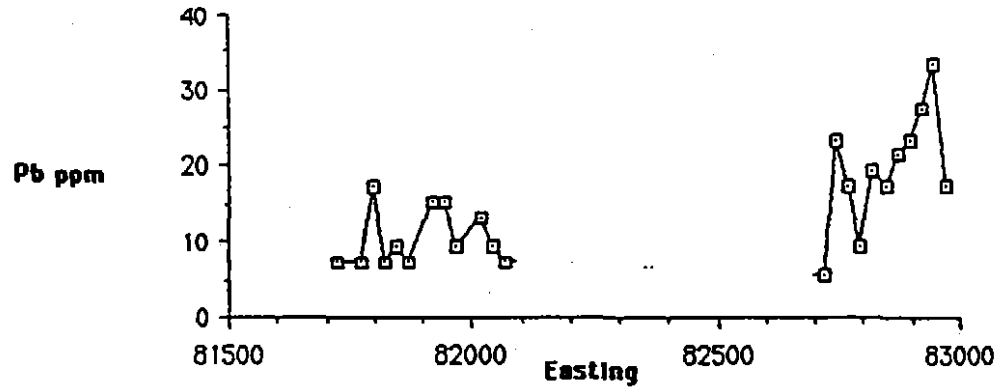


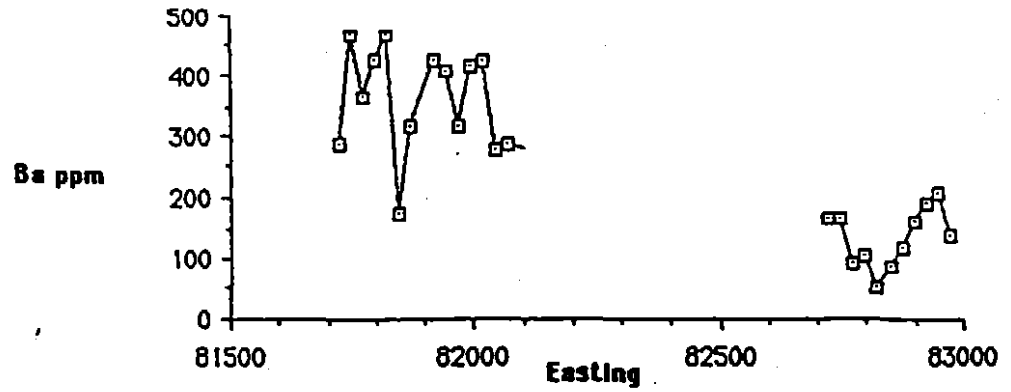

EL 12/88 Line 76000 mN
As ppm
40
30
20
10
0
81500
82000
82500
83000
Easting

EL 12/88 Line 76000mN



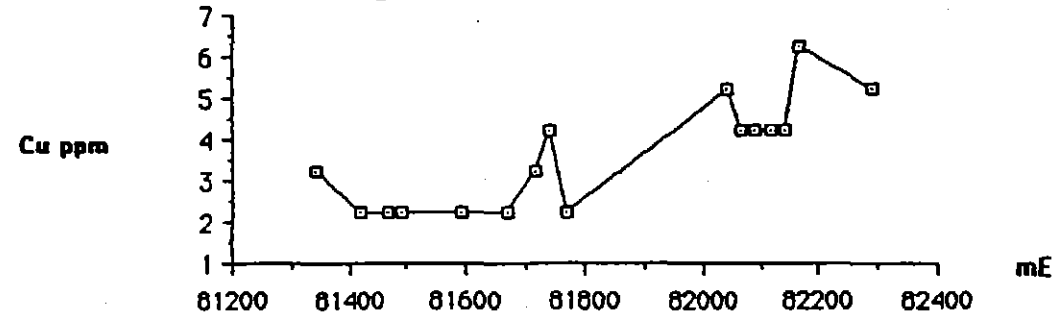


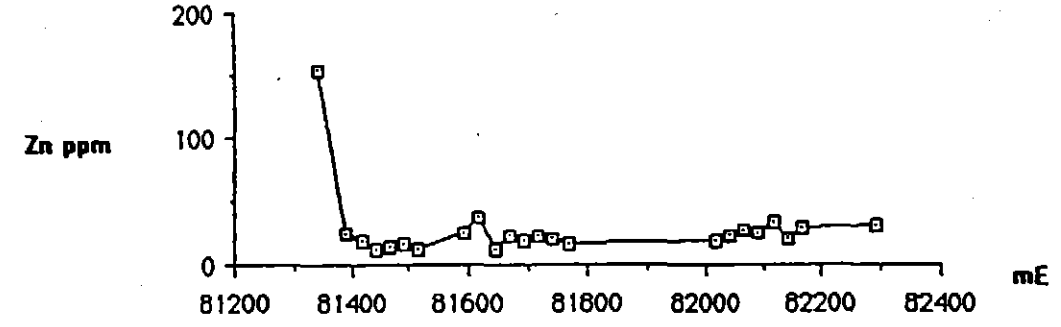


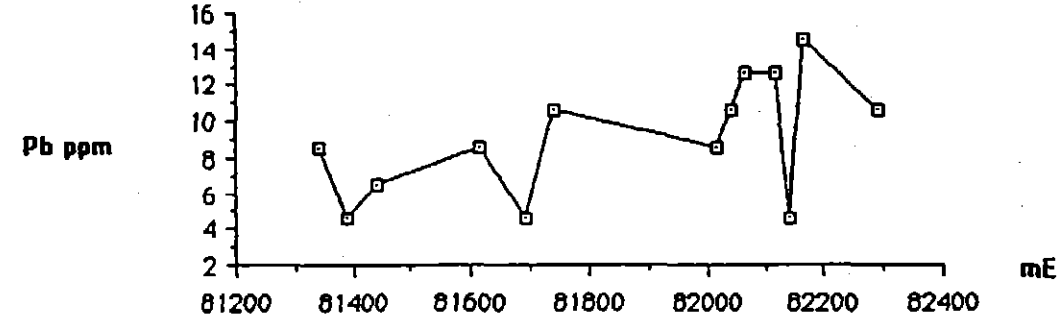


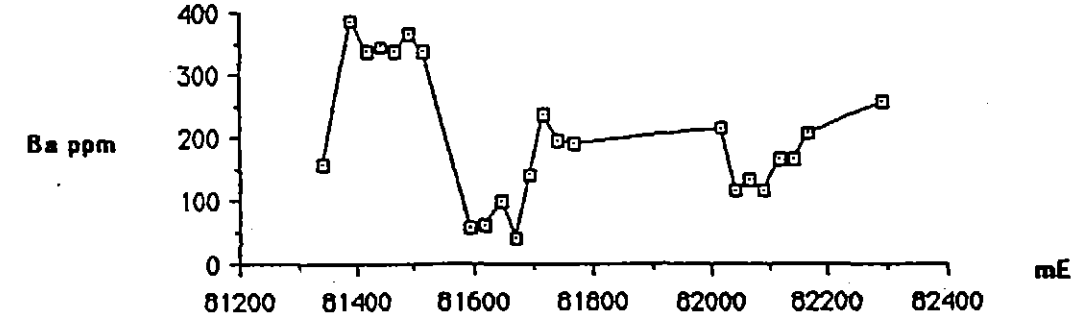
076

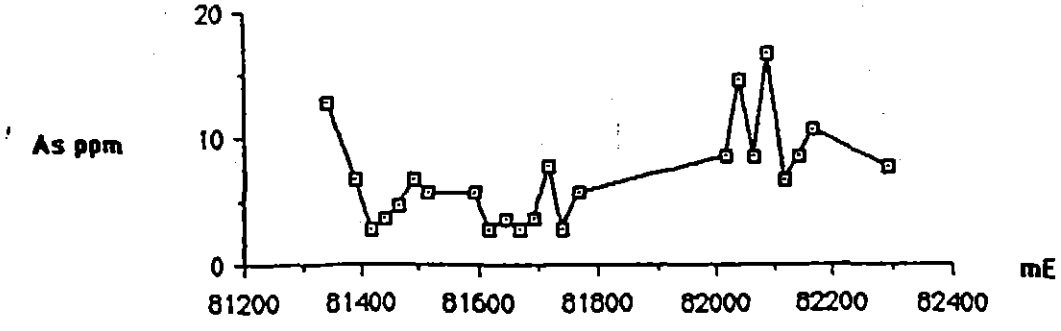
EL 12/88 Line 77250 mN





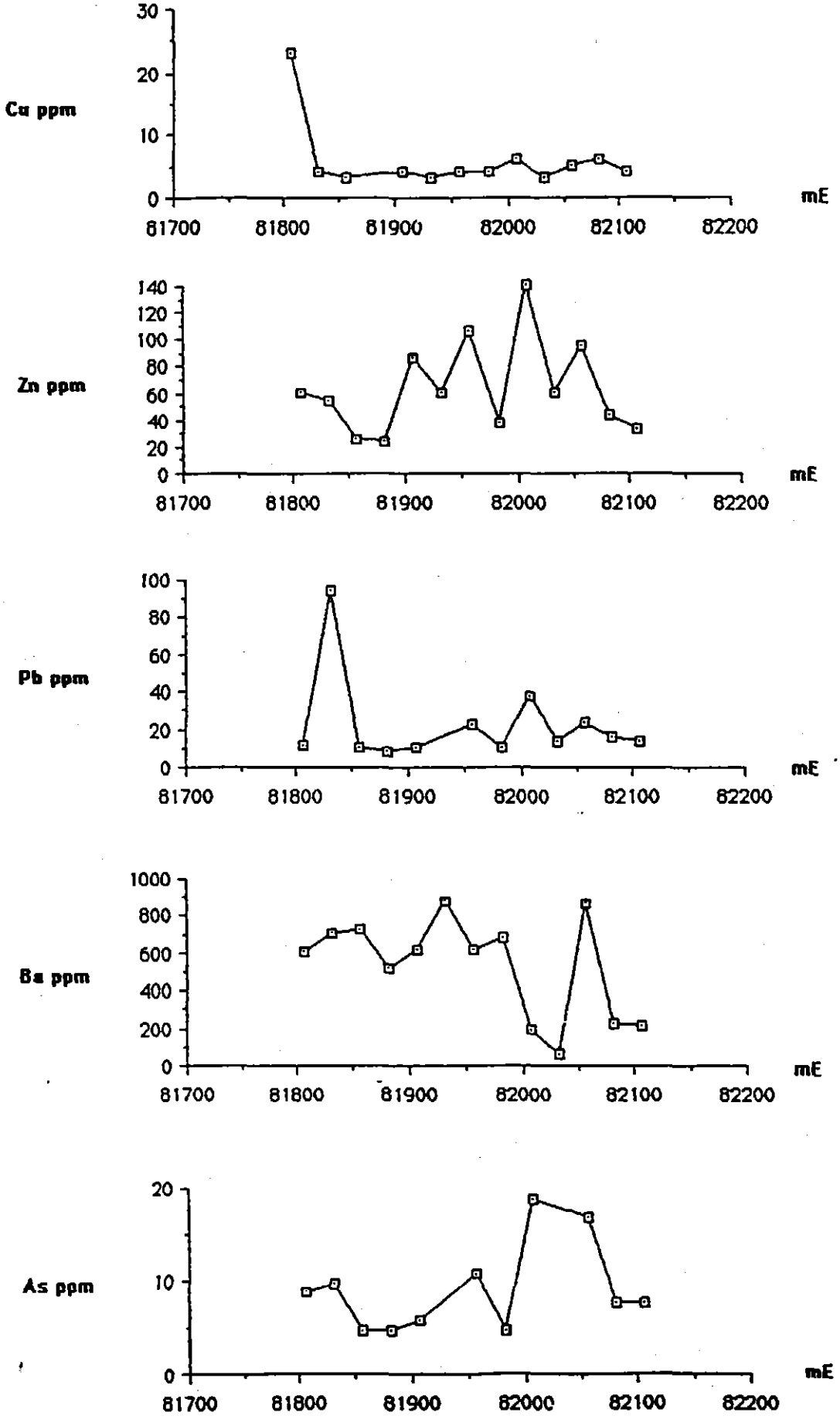




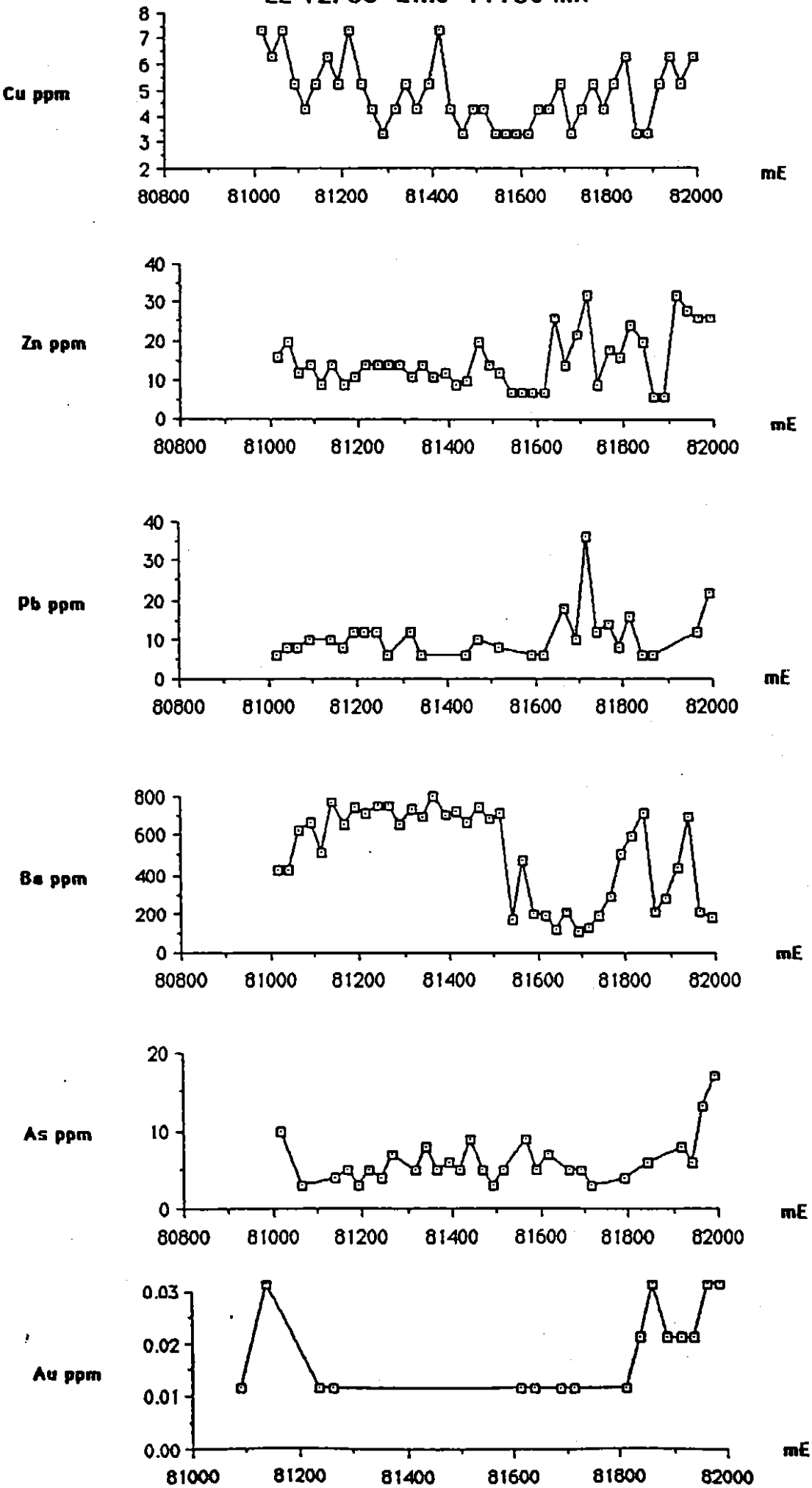


077

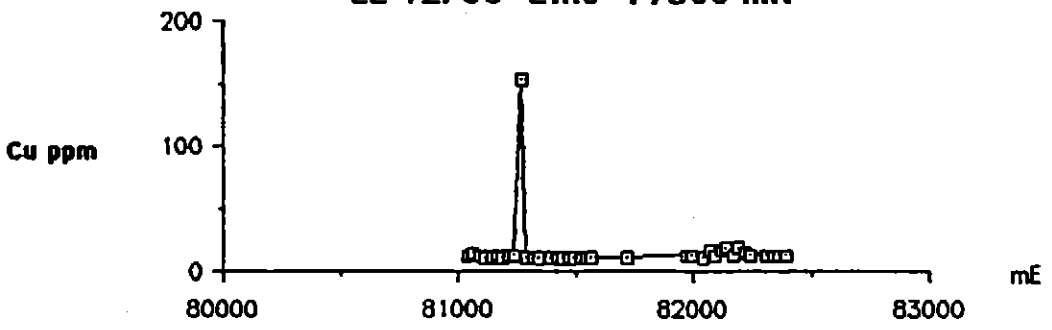
EL 12/88 Line 77000 mN

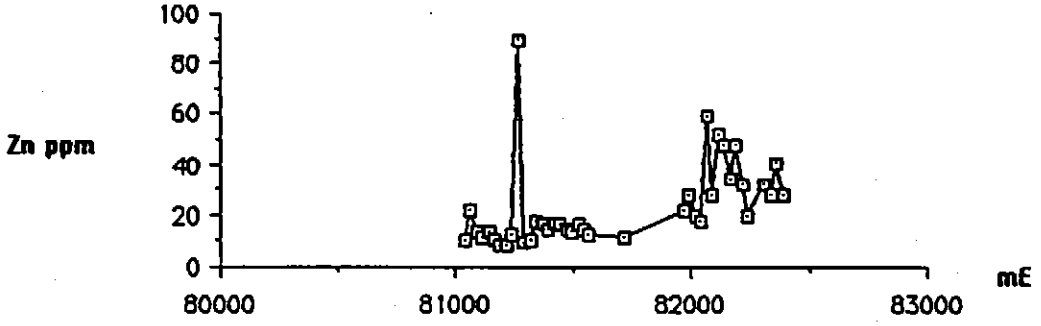


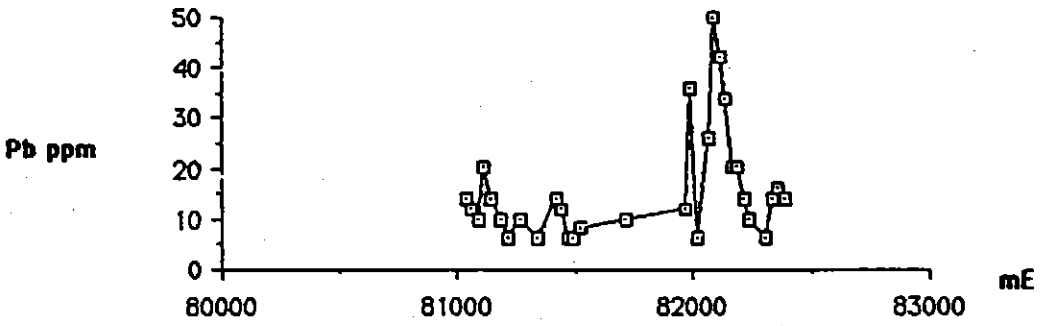
EL 12/88 Line 77750 mN

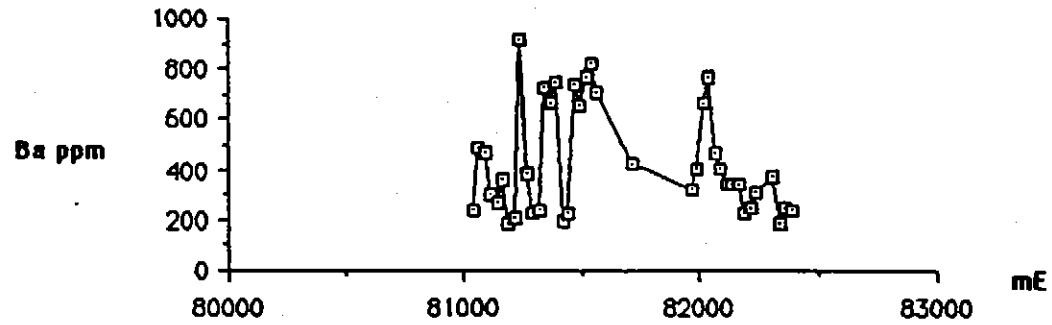


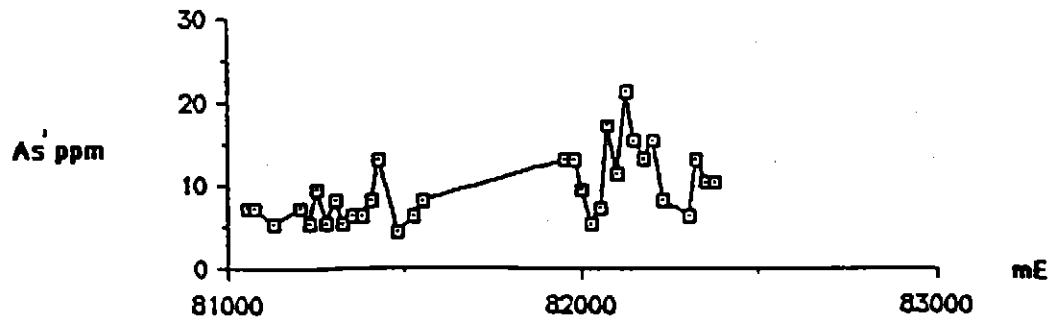
EL 12/88 Line 77500 mN



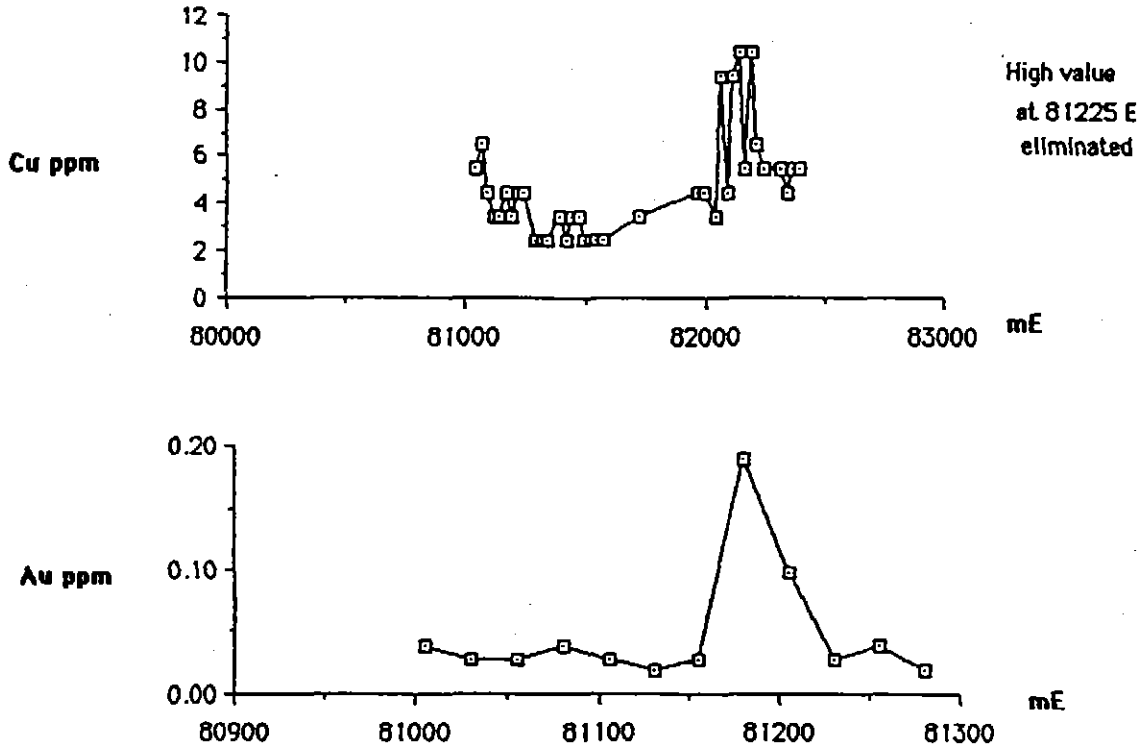




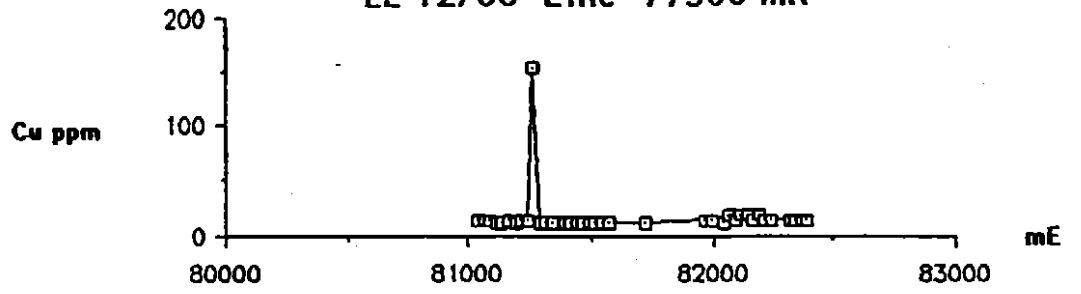


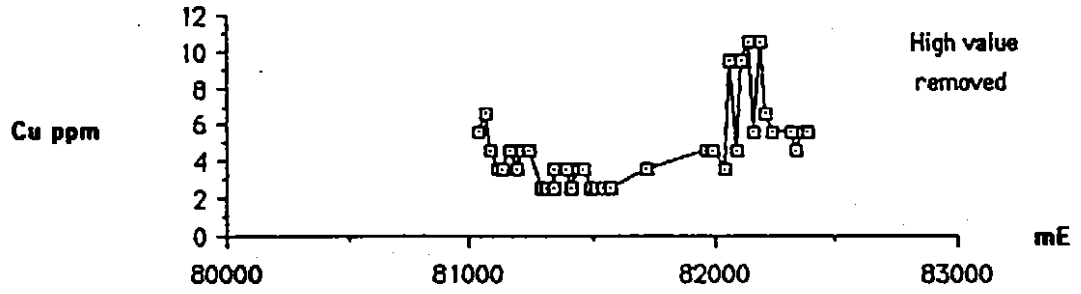


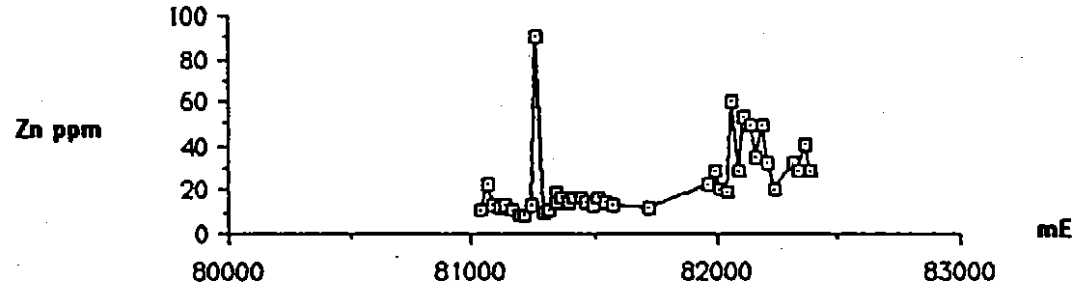
EL 12/88 Line 77500 mN

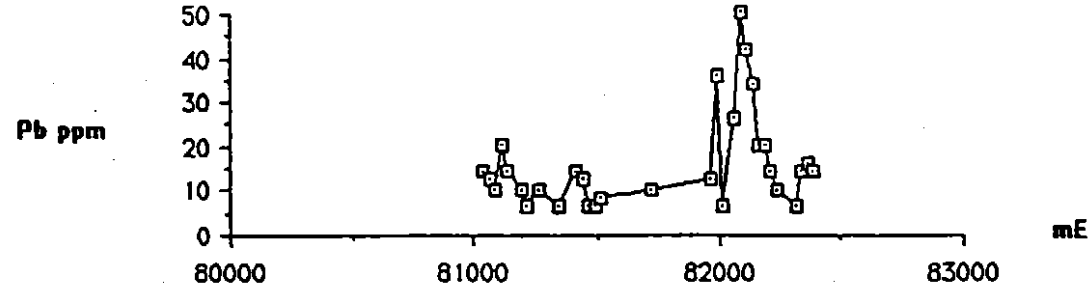


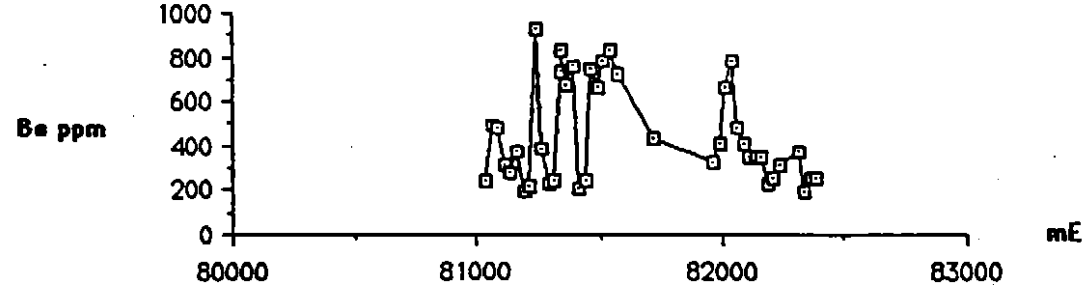
EL 12/88 Line 77500 mN

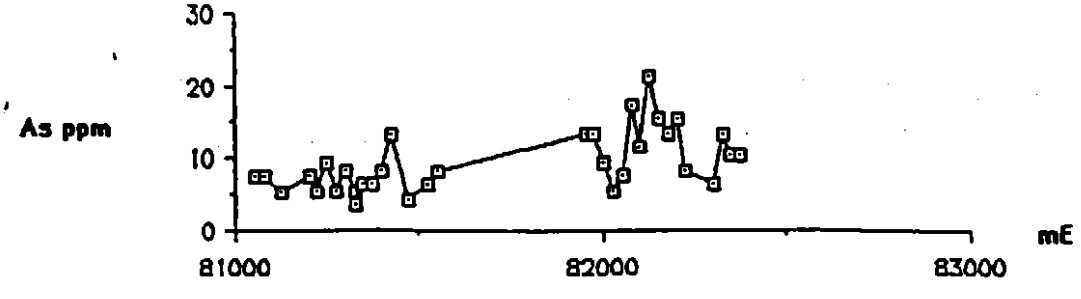


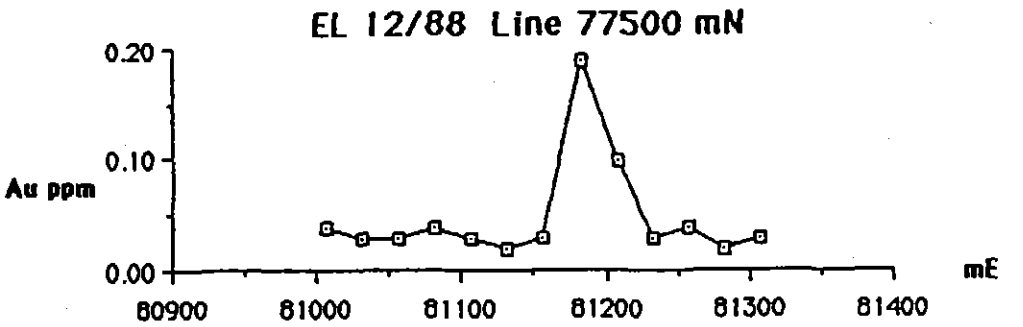











EL 12/88 Line 77500 mN
0.20
0.10
0.00
Au ppm
80900
81000
81100
81200
81300
81400
mE

APPENDIX 2

ROCK CHIP SAMPLE DATA

602085

084

SAMPLE DESCRIPTION SHEET

1 of 5

REGION: W. TASMANIA MAP SHEET: SOPHIA (8014)

PROSPECT: Line 11000N (Road west of pad 5) PROJECT #: MT BLACK

Sample #	Grid Ref. Loc/AMG	Description (Rock Chip Samples)
RS1		Brown and grey oxidised porphyritic volcanic (dacite) cut by network of fine Fe coated veins
RS2		Green-grey slightly weathered porphyritic dacite with light orange-brown feldspar phenocrysts
RS3		Soft green-grey weathed dacite?
RS4		Soft brown oxidised rock - mottled appearance with distinct lighter patches (weathered fragments? - possibly differential weathering)
RS5		Hard green grey feldspar-phyric dacite.
RS6		Sub-rounded pebbles and cobbles of porphyritic

ANALYSIS:

Lab: ANALABS (BURNIE) Batch # Date Submitted: 4/5/89 Date Analysed:

Element	Cu	Pb	Zn	Ag	As	Mn	Au	Ba		
Method Sample#	AAS	AAS	AAS	AAS	AAS	AAS	Fire	XRF		
RS1	<5	15	45	<0.5	3	65	<0.005	820		
RS2	40	10	65	0.5	4	395	<0.005	500		
RS3	<5	10	40	<0.5	2	35	<0.005	710		
RS4	15	<5	55	0.5	4	110	<0.005	360		
RS5	<5	<5	35	<0.5	3	260	0.012	610		
RS6	15	10	70	<0.5	9	223	<0.005	520		

REMARKS:

Logged/Sampled by: A.G. Scott/R. Buffington-A. Hage Date: 3/5/89

085

602086

SAMPLE DESCRIPTION SHEET

2 of 5

REGION: W. TASMANIA MAP SHEET: SOPHIA (8014)

PROSPECT: Line 77000N (Road west of pad 5) PROJECT #: MT. BLACK

Sample #	Grid Ref. Loc/AMG	Description
RS 6 (Cont)		dacite and brecciated cherty volcanic in brown weathered matrix – glacial till?
RS 7		Light Brown ferruginous weathered massive porphyritic dacite.
RS 8		light grey weathered massive porphyritic dacite with strong ferruginous staining around fractures
RS 9		Speckled grey-brown weathered porphyritic volcanic – possibly with inclusions of small rock fragments (tuffaceous?) Weak ferruginous staining
RS 10		Strongly foliated speckled feldspathic volcanic

ANALYSIS:

Lab: ANALABS (BURNIE) Batch # Date Submitted: 4/5/89 Date Analysed:

Element	Cu	Pb	Zn	Ag	As	Mn	Au	Ba		
Method Sample#	AAS	AAS	AAS	AAS	AAS	AAS	Fire	XRF		
RS 7	5	10	40	<0.5	3	30	<0.005	570		
RS 8	<5	15	35	<0.5	9	35	<0.005	710		
RS 9	<5	25	70	0.5	9	165	<0.005	440		
RS 10	<5	5	45	0.5	6	85	<0005	670		

REMARKS:

Logged/Sampled by: A.G. South / R Buffington - Allage Date: 3/5/89

086

602087

SAMPLE DESCRIPTION SHEET

3 of 5

REGION: W. TASMANIA MAP SHEET: SOPHIA (8014)

PROSPECT: Line 77000N (Road west of Rod 5) PROJECT #: MT BLACK

Sample #	Grid Ref. Loc/AMG	Description
RS10 (Cont)		(tuffaceous?). Weak - moderate ferruginous staining
RS11		Similar to RS10 but not foliated.
RS12		Weathered grey feldspar - phyric porphyry
RS13		Green - grey porphyritic volcanic with coarse feldspar phenocrysts.
RS14		As for RS 13
RS15		Foliated grey porphyritic volcanic
RS16		Massive grey - brown feldspar - phyric porphyry
RS17		Dark green - grey porphyritic volcanic
RS18		Fine grained grey - brown volcanic. Foliated with

ANALYSIS:

Lab: ANALABS (BURNIE) Batch # Date Submitted: 4/5/89 Date Analysed:

Element	Cu	Pb	Zn	Ag	As	Mn	Au	Ba		
Method Sample#	AAS	AAS	AAS	AAS	AAS	AAS	Fire	XRF		
RS11	<5	30	55	0·5	18	75	<0·005	580		
RS12	<5	<5	30	<0·5	3	60	<0·005	720		
RS13	<5	<5	30	<0·5	2	75	<0·005	770		
RS14	<5	<5	40	<0·5	3	110	<0·005	910		
RS15	<5	<5	35	<0·5	3	100	<0·005	690		
RS16	<5	10	20	<0·5	3	65	<0·005	960		
RS17	<5	<5	20	<0·5	3	80	<0·005	840		
RS18	<5	20	20	<0·5	2	90	<0·005	740		

REMARKS:

Logged/Sampled by: A.G. Scott / R Beffington - A Hagl Date: 3/5/89

602088

SAMPLE DESCRIPTION SHEET

REGION: W. TASMANIA MAP SHEET: SOPHIA (8014)

PROSPECT: Line 77000N (Road west of pad 5) PROJECT #: MT BLACK

Sample #	Grid Ref. Loc/AMG	Description
RS18 (Cont)		dark green chloritic material.
RS19		Hard green-grey massive volcanic. Weathered to white on surfaces.
RS20		As for RS19
RS21		Speckled light green-grey porphyritic volcanic with minor coarse feldspar phenocrysts.
RS22		Massive soft weathered speckled feldspar porphyritic volcanic with moderate to strong ferruginous staining
RS23		As for RS 22, but no ferruginous staining
RS24		Weathered brown ferruginous porphyritic volcan

ANALYSIS:

Lab: ANALABS (BURNIE) Batch # Date Submitted: 4/5/89 Date Analysed:

Element	Cu	Pb	Zn	Ag	As	Mn	Au	Ba		
Method / Sample #	AAS	AAS	AAS	AAS	AAS	AAS	Fire	XRF		
RS19	<5	10	25	0·5	3	105	<0·005	920		
RS20	<5	5	35	0·5	3	120	<0·005	830		
RS21	<5	15	30	<0·5	2	100	<0·005	660		
RS22	<5	25	35	1·0	2	105	<0·005	610		
RS23	<5	20	40	0·5	3	175	<0·005	740		
RS24	<5	30	40	0·5	4	130	<0·005	580		

REMARKS:

Logged/Sampled by: A G Scott / R Buffington - A. Hage Date: 3/5/89

088

602089

SAMPLE DESCRIPTION SHEET 5 of 5

REGION: W. TASMANIA MAP SHEET: SOPHIA (8014)

PROSPECT: Line 77000N (Rand West of Lad 5) PROJECT #: MT. BLACK

Sample #	Grid Ref. Loc/AMG	Description
RS 25		Weathered, weakly foliated sofc grey-brown porphyritic volcanic - slightly oxidised

ANALYSIS:

Lab: ANALABS (BOWNE) Batch # Date Submitted: 4/5/89 Date Analysed:

Element	Cu	Pb	Zn	Ag	As	Mn	Au	Ba		
Method Sample#	AAS	AAS	AAS	AAS	AAS	AAS	Fire	XRF		
RS25	<5	20	25	0.5	3	115	<0.005	490		

REMARKS: .....

Logged/Sampled by: A.G Scott / R Buffington + A Hoogh.. Date: 3/5/89

089

602090

SAMPLE DESCRIPTION SHEET

REGION: WEST TASMANIA MAP SHEET: SOPHIA 1:100,000 (8014)

PROSPECT: MOUNT BLACK PROJECT #: EL 12/88

Sample #	Grid Ref. Loc/AMG	Description
MB 23	8014 803734	Silic'd volcanic, grey, v. fine grained, non-magnetic foc'd, chloritic mnlts; carbonate free,
26	" 807730	Silic'd volcanic, foc'd extensively, cut by v. fine dk chloritic vnlts, possible lava, fine pale grey.
27	" 809729	Fault gouge, mylonitic fabric, vertical shear with blue-green schist, Fe staining;
36	" 775785	Fault gouge, all'd sheared grey/blk slate, clay rich in footwall of 45° east dipping fault; ½ m channel (near shell sample 12838)

ANALYSIS:

Lab: AAL Batch # 4641 Date Submitted: Date Analysed: 8/8/88

Element	Au	Cu	Pb	Zn	Ag	As				
Method / Sample #	FA50	Di00	"	"	"	"				
MB 23	0·03	41	30	89	<1	11				
26	0·03	11	31	29	<1	6				
27	0·42	380	152	275	4	1·15%				
36	0·03	38	1970	342	5	130				

REMARKS: MB 23 – from cutting on Murchison Hwy at S.W. corner of EL 12/88
MB 27 – Shear zone from cutting on Murchison Hwy on Sth" lease bdry

Logged/Sampled by: R.H. Date: 16– –88

602091

090

SAMPLE DESCRIPTION SHEET

REGION: WEST TASMANIA	MAP SHEET: SOPHIA (100,000)
PROSPECT:	PROJECT #:

Sample #	Grid Ref. Loc/~~Area~~	Description
MB 28·5	81,400E 76000N	Silic's breccia; chl, magnetite vnlts, rare pyrite blebs weakly oxid'd ; float near T1363

ANALYSIS :

Lab: AAL ORANGE Batch # 5693 Date Submitted: Date Analysed : 23/12/88

Element	Au	Cu	Pb	Zn	Ag	As	Mn	Sb	Ba	W
Method Sample#	FA50									
MB 28·5	0·01	29	<5	50	<1	<2	360	1·1	<10	<10

Element	Mo	Co	Ni
MB 28·5	<5	5	27

REMARKS: .....

Logged/Sampled by: R. Hine Date: .....

APPENDIX 3

DRILL CORE LOGS & ASSAY RESULTS

092

602093

CLIMAX MINING LTD - DRILL HOLE HEADER SHEET

PROJECT MT. BLACK AREA W. TAS MAP SHEET SOPHIA (8014)

HOLE # MBD 4 LOGGED BY G SCOTT

COLLAR CO-ORDINATES- (AMG)

EASTING	NORTHING	REDUCED LEVEL
381 504	5 375 998	549 m

DOWN HOLE SURVEY -

DEPTH	AZIMUTH	DIP
Collar	258°	50°
50 m	262°	49°
100 m	264°	48°
150 m	266°	45°30'
195 m	266°	43°

TOTAL DEPTH 195.0 m

Core Size 0-21 m H.Q. 21-195 m NQ

DEPTH TO WATER

DEPTH of OXIDATION 14.8 (Strong) 27.3 (Moderate)

CONTRACTOR DIAMOND DRILLERS, ZEEHAN

MACHINE LONGYEAR 38

COMMENCED 18/5/89 COMPLETED 23/5/89

CASING

FROM	TO	TYPE
0	21	HQ (recovered)
0	195	40 mm PVC

SUMMARY LOG

FROM	TO	DESCRIPTION
0	14.8	Strongly oxidised massive coarse feldspar-phyric porphyry
14.8	27.3	Moderately oxidised massive coarse feldspar-phyric porphyry
27.3	76.4	Fresh feldspar-phyric porphyry with varying intensity of chloritic and orange-brown alteration. Magnetite, hematite, pyrite veining 66.0 - 68.0
76.4	82.8	Quartz vein cut by network of magnetite-hematite fractures
82.8	96.0	Feldspar porphyry with intense chloritic alteration. Thin magnetite, pyrite chlorite veins
96.0	164.8	Massive coarse feldspar porphyry, less altered than above. Local dolerite dyke and magnetite vein
164.8	189.9	Altered feldspar porphyry. Magnetite veins rare.
189.9	195.0	Sheared porphyry and dolerite. Minor magnetite veins

COMMENTS

SAMPLE DATA

NUMBERS: FROM E 208029

TO E 208069

LAB ANALABS, BURNIE

BATCH # 06259

ELEMENTS Cu Pb Zn Ag Mn As (AAS) Au (Fire) Ba (XRF)

OTHER LOGS

FROM	TO	TYPE

093

CLIMAX MINING LTD DRILL HOLE LOG HOLE # 89 MBD2 Page 1 of 6

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n	ASSAYS Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
0	6.0	6.0	16.7	Badly broken core. Poor recovery. Grey feldspar porphyry with medium to coarse grained feldspar phenocrysts. Small patches of chalcedonic quartz and minor small vesicles? - possible surface silicification.											
6.0	20.3	14.3	99.33	Soft brown strongly oxidised porphyry as above. Network of Mn coated fractures at variable angles (20°, 30°, 60° common) 14.7 - 15.0 Sub-rounded patches of pink, less weathered porphyry give fragmental appearance, but may be weathering effect. 18.3 - 19.4 Extremely soft and broken, tending to sail in places.			207993	10.0	10.5	0.5	30/35	115/405	730	3/bld	610
20.3	35.0	14.70	96.8	Grey-brown moderately oxidised porphyry as above, with sub rounded patches of pink weathered porphyry. Mn stained fractures common and minor clear quartz chlorite filled fractures. 29.0 - 29.2 Sub rounded patches of coarse grained porphyry in matrix of finer grained porphyry			207994	20.0	20.5	0.5	95/35	70/405	755	3/bld	560
							207995	30.0	30.5	0.5	5/30	75/405	610	3/bld	650
35.0	50.0	15.0	80.70	Porphyry as above, moderate to strongly oxidised to brown colour. Badly broken below 42.5 m			207996	40.0	40.5	0.5	5/30	70/405	705	2/bld	640

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094

CLIMAX MINING LTD DRILL HOLE LOG HOLE # 89MBD2 Page 2 of 6

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
50.0	74.0	24.0	94.4	Weakly to moderately oxidised grey to grey/brown porphyry as above. Heavily fractured and broken throughout. 67.5-67.6 Sheared green possible dolerite dyke.		
74.0	82.5	8.5	104.4	Fresh grey feldspar porphyry. Well broken with abundant Fe stained fractures at 0-10°, 30°, 40°.		
82.5	108.1	25.6	101.4	Hard, massive grey-green feldspar porphyry as above with chlorite rimmed, calcite filled pseudo phenocryste (possibly vesicles? - amygdaloidal?). Trace pyrite as tiny rounded crystal inclusions. 1-5mm quartz calcite veining (10-20°) common throughout. 91.51 Quartz calcite vein breccia (40°) 99.0-100.5 Core badly broken (by drilling?). Abundant pinkish quartz calcite veins, 0-10°, 20-30°, 90°. 100.5-103.5 Abundant 5-10mm pinkish quartz calcite veins (0-10°)		
108.1	111.45	3.35	95	Porphyry, similar to above but greener colour. Top and bottom 10cm is fine grained resembling dolerite.		

ASSAYS									
Sample #	From	To	Int.	Cu / Pb	Zn / Ag	Mn	As / Au	Ba
207997	50.0	50.5	0.5	20 / 30	70 / <0.5	680	3 / bld	580
207998	60.0	60.5	0.5	5 / 25	100 / <0.5	735	1 / bld	610
207999	70.0	70.5	0.5	10 / 30	120 / <0.5	1150	3 / bld	400
208000	80.0	80.5	0.5	5 / 30	120 / <0.5	1100	2 / bld	590
208001	90	90.5	0.5	5 / 30	90 / <0.5	950	4 / bld	30
208002	100	100.5	0.5	5 / 25	80 / <0.5	995	3 / bld	500
208003	110.0	110.5	0.5	10 / 50	160 / <0.5	2050	5 / bld	110

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CLIMAX MINING LTD — DRILL HOLE LOG — HOLE # 89 MBD2 — Page 3 of 6

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
108.1	111.45			(Cont) Boundaries sharp at 50°. Abundant 1-5mm quartz, calcite veins at variable angles, especially 0-10°, 30°		
111.45	129.85	18.4	100.8	Massive grey-green feldspar porphyry 111.45 - 112.3 Abundant quartz calcite veining (0-10°, 30° common) 119.95 - 120.05 Dalesite dyke. Sharp contacts at 80°. 124.5 - 129.45 Well broken with abundant quartz calcite filled fractures at 0°, 20°, 60° 129.45 - 129.85 Quartz, calcite vein breccia, sub parallel to core.		
129.85	133.55	3.7	107.1	Fault or shear zone. Porphyry as above, sheared and brecciated to soft green fuggy material, interspersed with patches of hard porphyry brecciated by network of quartz, calcite veining at 90°. Sericite common in fractures.	possible E.M. anomaly Source (Guido Staltoni - hons comm)	
133.55	142.10	8.55	94.6	Fractured and brecciated massive feldspar porphyry with abundant sericite rich fractures and quartz calcite veining (0-10° & 20-30° common) 140.0 - 142.1 Orange - brown (K?) alteration.		

Sample #	From	To	Int.	ASSAYS Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208004	120.0	120.5	0.5	<5/30	110/20.5	880	2/bld	210
208005	130.0	130.5	0.5	<5/25	135/20.5	1200	3/bld	30
208006	140.0	140.5	0.5	<5/20	110/20.5	715	3/bld	75

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CLIMAX MINING LTD — DRILL HOLE LOG — HOLE # 89-MBD2 — Page 4 of 6

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
142.1	147.0	4.9	99.2	Massive feldspar porphyry. 144.3 8mm quartz calcite chlorite vein (30°) 144.4 10 mm quartz chlorite minor calcite vein (45°) 145.6-146.1, 146.4-146.5. Paler green colour associated with abundant fine fractures and quartz calcite veining (20-30° from 146.4-146.5)		
147.0	163.8	16.8	98.7	Massive green porphyry. Similar texture to feldspar porphyry but feldspar phenocrysts rare to absent. 147-153.9 Paler green-grey colour associated with fine network of quartz calcite veins at 0-20° 153.9-159.5 Darker green and finer grained. 159.5-161.8 Paler green with abundant quartz calcite veining. Feldspathic phenocrysts more abundant. 161.8-162.4 Shear zone. Abundant sericitic buggy rock. 162.4-163.8 Dark green massive porphyry with patches of feldspar phenocrysts and abundant quartz calcite veining (20-30°)		

ASSAYS

Sample #	From	To	Int.	Cu / Pb	Zn / Ag	Mn	As / Au	Ba
MBD2-1 Petrology	142.50	142.55	0.05					
208007	150.0	150.5	0.5	<5 / 20	130 / <05	970	2 / bld	20
MBD2-2 Petrology	152.50	152.55	0.05					
208008	160.0	160.5	0.5	5 / 40	105 / <05	1000	2 / bld	630

From	To	Length	Recov %	Geological Description
163.8	165.95	2.15	95.6	White quartz, orange-brown feldspar vein with minor calcite (contacts at 30°)
165.95	167.4	1.45	95.6	Green-grey volcanic?, tending porphyritic. Heavily veined c qtz, feldspar, calcite veins at 20-30°.
167.4	209.7	42.3	99.6	Massive grey-green feldspar porphyry as in top 130 m of hole. 167.4-168.9 greener colour with badly broken core and abundant fractures and veins. 172.5-180.5 Well broken with abundant fractures + veins. 174.9-175.0 10mm breccia zone at 20-30°. Small rounded pyrite inclusions. 177.5-177.6 Quartz calcite vein breccia. 187.1-189.8 Common quartz calcite veins at 10-20° 189.2 - sericite rich sheared quartz feldspar vein (30-40°) 189.8-191.3 Well broken with abundant fractures and shears. 192.7-193.0 as for 189.8-191.3 197.2-197.9 irregular network of quartz calcite veining. 205.1-205.2 10mm quartz calcite vein (0-10°)

Graph. Log: Geol. | Min'n

ASSAYS

Sample #	From	To	Int.	Cu / Pb	Zn / Ag	Mn	As / Au	Ba
208070	163.0	164.0	1.0	5 / <5	90 / <.5	840	<1 / bld	68
208071	164.0	165.0	1.0	5 / <5	10 / <.5	380	<1 / bld	32
208072	165.0	166.0	1.0	5 / <5	5 / <.5	230	<1 / bld	15
208009	170.0	170.5	0.5	5 / 30	140 / .05	1650	3 / bld	95
208010	180.0	180.5	0.5	5 / 30	70 / <.5	670	4 / bld	540
208011	190.0	190.5	0.5	5 / 30	100 / .05	1050	3 / bld	630
208012	209.0	209.5	0.5	20 / 30	60 / .05	685	4 / bld	980

CLIMAX MINING LTD DRILL HOLE LOG HOLE # 89MBD2 Page 6 of 6

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n	ASSAYS Sample#	From	To	Int.
167.4	209.7			(Cont) 208.45-209.05 Dolerite dyke. Sheared contacts at 45°. E.O.H.						

099

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE • MBD-3 — Page 1 of 9

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
0	2.5m	2.5m	20	Hard, broken coarsely feldspar-phenic porphyry with minor chalcedonic quartz (surface silicification) Core well broken		
2.5	3.6	1.1m	94	Soft brown strongly oxidised material with consistency of soil. Contains pebbles and layers of hard grey-brown coarsely feldspar-phenic porphyry.		
3.6	6.2	2.6m	94	Hard, moderately oxidised brown and grey-brown massive coarse feldspar-phenic with 30-50% feldspar phenocrysts. Core well broken with dark brown to black ferruginous coating on fracture faces.		
6.2	10.5	4.3m	97	Fresh to weakly oxidised hard, grey, massive, coarse-grained feldspar-phenic porphyry. Moderate fracturing at 0-10°, 30°, 60° with brown ferruginous stained fracture surfaces.		
10.5	17.0	6.5m	99	Massive, coarsely feldspar-phenic porphyry as above, but slightly more oxidised and increased fracture density. Fractures 0-10°, 40-50°		

Sample #	From	To	Int.	ASSAYS Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208013	10.0	10.5	0.5	10/20	75/.5	580	4/bld	920

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CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD-3 Page 2 of 9

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From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
17.0	32.0	15.0	106	Fresh to slightly oxidised massive, coarse grained feldspar-phenic porphyry as above. 18.5-19.1 - slight to moderately oxidised. Well broken, with pinkish feldspathic veining. 19.1-23.85 - core well broken with 10-20° and 30° fractures common 22.8 - 1.5cm vuggy quartz vein (45-50°) with euhedral quartz 25.8-26.3 - Well broken with abundant fine quartz, calcite sericite ? fractures. 26.4-27.0 - Patchy brown alteration associated with quartz and minor calcite veining at 0 and 45° 27.0-29.1 - occasional narrow (1-5mm) quartz, calcite vein (50°-60°) 29.1-29.3 Brown alteration associated with irregular quartz veins (0-10°) 30.9-31.45 Quartz, calcite vein network at 0-10°, with brown alteration 31.45-31.5 fracture zone, tending to shear, at 40°.		
32.0	49.8	17.8	88	Porphyry as above, well broken tending to gravel in places with abundant variable fractures. Weak to moderate oxidation to 35.0m, then fresh to weakly oxidised. Fractures		

ASSAYS

Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208014	20.0	20.5	0.5	5/<5	55/.5	520	3/bd	920
208015	30.0	30.5	0.5	<5/10	55/<5	3100	1/bd	680

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CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD-3 Page 3 of 9

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From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n	Sample#	From	To	Int.	ASSAYS Cu/Pb	Zn/Ag	Mn	As/Au	Ba
32.0	49.8			(Cont.) are commonly heavily Fe-stained - possibly after sulphides? and often have open vuggy appearance, especially in the top 3 m.											
				41.3 - 41.8 Vuggy quartz vein with remnant porphyritic texture. Top bounding 10° Bottom indeterminant due to broken core			208016	40.0	40.5	0.5	5/5	50/<.5	550	1/bld	990
49.8	62.3	12.50m	102	Fresh grey, massive, coarse feldspar - phenic porphyry. Fine irregular crush zones with chlorite, sericite? replacement scattered throughout.			208017	50.0	50.5	0.5	10/5	95/<.5	880	4/bld	630
				53.0 - 54.9 Sets of 10-20 mm quartz and quartz calcite veins and vein breccia at 10°-20°											
				55.4 - 55.8 . Quartz calcite chlorite veining at 10°											
				56.8 - 57.3. Narrow quartz calcite veining at 10°-20°											
				58.5 - 58.6. Quartz, Calcite, chlorite vein at 20°-25°											
				59.2 - 59.3. as for 58.5 - 58.6.											
				59.7 - 59.9. Three 5-10 mm. quartz calcite chlorite veins at 30°			208018	60.0	60.5	0.5	10/15	100/.5	840	3/bld	680
				61.9 - 62.3. Core well broken with dark brown ferruginous coating on small											

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CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD-3 Page ...4... of ...9...

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
49.80	62.30			(Cont.) subhedral quartz crystals in fractures.		
62.30	62.60	0.3	93	Sheared green fine grained dolerite? Schistosity at 30°		
62.60	121.40	58.80	100	Fresh, green-grey, coarse feldspar-phenic porphyry.		
				62.6-62.8 Network of quartz calcite veins veins forming breccia, 30°, parallel to sheared contact above.		
				62.8-63.0. Narrow quartz, pink calcite vein at 0-10°		
				64.0-64.2. 5mm quartz, pink calcite vein at 10°		
				64.8. 5mm quartz calcite vein at 40°.		
				66.3-67.6. Fine network of quartz calcite veining. Cuts off thicker (5-10 mm) quartz, calcite vein at 66.8m. Fine veins dominantly 5-20°. Thick vein at 30° in opposite direction. Porphyry is brecciated and "healed" by fine grained chlorite-sericite? alteration		
				68.1-68.9. Five 2-5 mm subparallel quartz calcite veins 10-15cm apart at 30°.		
				70.7-70.9. 3 quartz calcite fractures		

Sample #	From	To	Int.	ASSAYS Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208019	70.0	70.5	0.5	10/10	70/1	875	3/612	560

602103

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
62.60	121.40			(Cont) at 20-30°		
				71.3-71.5. 5mm quartz calcite veins at 20°		
				72.5-72.7. Quartz calcite veining at 30°		
				73.0-73.6 Abundant quartz calcite veins at 30°		
				74.4. Minor magnetite in quartz calcite vein at 30°		mag
				75.0-75.2. Network of quartz, calcite veins at 0°, cut by set of planar quartz calcite veins at (30-40°) and quartz magnetite vein at 75.1m		mag.
				76.5-79.3. Core cut by open Fe-coated fractures with clouse of sub-bedoal quartz, at 0-10°		
				79.3-80.2. Set of quartz, calcite veins 0-10°, tending to vein breccia in place		
				83.4. 15-20mm quartz calcite vein at 30°		
				85.3 Diffuse quartz vein at 40°		
				86.4-86.9 Network of quartz, calcite veins at 0°, 10° & 30°, cut by 30° quartz calcite vein at 86.9m.		
				90.7. 10mm quartz calcite vein at 30°		
				98.3-98.8 Core well broken with fine fractures at 40°		
				98.8-106.7. Fine quartz, calcite fracture		

ASSAYS

Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208073	75.0	75.5	0.5	5/<5	75/<.5	880	3/bd	664
208020	80.0	90.5	0.5	5/<5	55/<.5	1300	1/bd	490
208021	90.0	90.5	0.5	10/10	95/1	755	2/bd	650
208022	100.0	100.5	0.5	5/15	80/1	900	2/bd	730

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CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD-3 Page ...6..... of ...9.....

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From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
62.6	121.4			(Cont) at 10-20° and 60° common to abundant. Core moderately to strongly broken.		
				108.5-109.0. Core broken. No obvious fractures - possibly due to drilling		
				109.55-109.7. Fine pink quartz feldspar veining at 20°		
				115.4-116.2. Strongly fractured, tending to sheared, at 40°-60°		
				116.6. 10 cm qtz, calcite vein at 45°		
				117.4. 10 cm quartz, calcite vein at 30°		
				121.2-121.4. Vuggy quartz veining in badly broken core. Angle indeterminate)		
121.4	130.3	8.9	98	Grey-green feldspar-phyric porphyry, similar to above but feldspar phenocrysts less well defined, possibly due to an increase in chloritic material		
				123.4-123.6. Thin, irregular veins of magnetite at 0-10°		
				123.7-123.9. 20 and 10 mm calcite, quartz, chlorite veins at 20-30°		
				124.8-125.1. Quartz, chlorite veins at 0-10° and 60°		

ASSAYS								
Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208023	110.0	110.5	0.5	5/20	75/1	805	3/bld	460
208024	120.0	120.5	0.5	5/25	95/1	1500	1/bld	630
208074	123.2	123.7	0.5	5/<5	115/<5	1850	1/bld	343

602105

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE • MBD-3. — Page 7 of 9

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
121.4	130.3			(Cont.) 125.3-125.9 Pale, bleached alteration zone around network of ruggy quartz veins. Rock is speckled by fine grained yellow-white mineral. Speckling extends 15 cm above bleached zone.		
				126.15-126.4 Quartz veins at 0°, cut by quartz, chlorite veining (40°) at 126.4		
				127.42-127.55. 10 cm wide crush zone with chloritic? alteration at 20°-30°		
				127.6-128.55. 2-3 mm quartz vein parallel to core, cuts thinner 30° quartz calcite veins.		
				128.55-128.9 Sheared porphyry with green chloritic alteration and 30 mm very ferruginous, gossanous in places (after pyrite?) vein at 30°-40°.		30mm gossanous vein
				128.85-130.0 Sheared porphyry with chloritic alteration and fine quartz, calcite chlorite veins parallel to shearing at 40°		
130.3	145.6	15.3	101	Coarse, green-grey, massive feldspathic porphyry. Small angular inclusions of finer grained, more chloritic material, generally 0.5-1.0 cm, but up to		

ASSAYS								
Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn_{11}	As/Au	Ba
208075	129.5	129.0	0.5	10/10	95/<.5	1.58%	11/bld	296
208025	130.0	130.5	0.5	<5/10	60/<.5	2050	1/bld	440

602106

(10b CLIMAX MINING LTD DRILL HOLE LOG HOLE # .M.B.D:3 Page ...8.... of ...9....

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
130.3	145.6			(Cont) 7 cm. in places. 130.95-131.3 Narrow quartz vein, sub parallel to core 132.2 10 cm pinkish (due to Fe) quartz calcite vein at 30° 132.9-134.2. 0-10° pinkish quartz calcite veins 135.3 10 mm pinkish quartz calcite vein at 30° 144.6-144.65 Fine grained dolerite at 45° 143.9-145.6. Patchy brown (potassic?) and green (chloritic?) alteration.		
145.6	147.6	2.0	98	Green fine to medium grained dolerite. Fine grained at boundaries, tending porphyritic elsewhere with dark green phenocrysts. 5 cm quartz calcite chlorite vein (40°) at 147.2 and quartz vein (30°) with pale green alteration at 146.4		
147.6	169.1	21.5	99	Coarse, massive feldspar-phenic porphyry as above. Altered to pale green colour with pinkish (ferruginous) quartz, calcite veinings to 148.6. Trace of chalcopyrite and		tr chpy " py.

Sample #	From	To	Int.	ASSAYS Cu/Pb	Zn/Ag	Mn	As/Au	Ba
2 08026	140.0	140.5	0.5	<5/15	80/.5	870	2/bld	680

602107

CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD-3. Page 9 of 9

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From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
147.6	169.1			(Cont.) minor pyrite with some of the veining.		
				147.9 30mm quartz, minor calcite vein with red ferruginous staining and trace chalcopyrite and pyrite.		tr. cpy ± py.
				154.5-169.1 Thin quartz calcite veining at 40° distributed throughout at low-moderate density (3-5/m), becoming more abundant below 168m.		
				158-158.3. Quartz veining with red-brown ferruginous (hematitic?) staining (20°-30°)		
				167.5 6cm wide indistinct band of finer grained porphyry at 40°-45°		
				EOH		

ASSAYS									
Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208076	147.0	149.0	1.0	145/20	135/2.5	1350	5/bld	549
208077	148.0	149.0	1.0	95/25	80/2.5	880	10/Hd	583
208027	150.0	150.5	0.5	5/10	90/1	850	4/bld	770
208028	160.0	160.5	0.5	10/10	80/.5	880	3/bld	580

602108

602109

CLIMAX MINING LTD - DRILL HOLE HEADER SHEET

PROJECT MT BLACK AREA W. TAS MAP SHEET SOPHIA (8014)

HOLE # 89MBD1 LOGGED BY G. SCOTT

COLLAR CO-ORDINATES- (AMG)

EASTING	NORTHING	REDUCED LEVEL
381 494 E	5 376 972	562 m

DOWN HOLE SURVEY -

DEPTH	AZIMUTH	DIP
0m	258	-70
50m	257	-68
100m	260	-67.5
150m	262°	-67
200	264°	-67
250	266°	-67
295	267°	-66.5

TOTAL DEPTH 295.5 m

Core Size 0 - 24.0 HQ 24.0 - 295.5 NQ

DEPTH TO WATER

DEPTH of OXIDATION 0.2m

CONTRACTOR DIAMOND DRILLERS, ZEEHAN

MACHINE LONGYEAR 38

COMMENCED 9/4/89 COMPLETED 20/4/89

CASING

FROM	TO	TYPE
0	24	HQ (Recovered)
0	295.5	P.V.C. tube (40mm)

SUMMARY LOG

FROM	TO	DESCRIPTION
0	101.8m	Porphyritic andesite
101.8m	137.5m	Massive to weakly banded, generally non-porphyritic andesite?
137.5m	173.85m	Mixed zone - porphyritic andesite and fragmental volcanic? (Possible flow breccia?)
173.85m	281.0	Porphyritic andesite and massive altered intermediate volcanic
281.0	281.4	Shear zone
281.4	295.5	Brown oxidised in part feldspar porphyry. Fragmental in places. Possibly tuffaceous?
		E.O.H

COMMENTS

SAMPLE DATA

NUMBERS: FROM 207959

TO 207992

LAB ANALABS, BURNIE

BATCH #

ELEMENTS Cu Pb Zn Ag Mn As (AAS) Au (Fire) Ba (XRF)

(n.s. Au detection limit 0.003 ppm)

OTHER LOGS

FROM	TO	TYPE

109

602110

CLIMAX MINING LTD - DRILL HOLE HEADER SHEET

PROJECT Mt. BLACK AREA W. TAS MAP SHEET SOPHIA (8014)

HOLE # 89.M.B.D.2 LOGGED BY A.G. SCOTT

COLLAR CO-ORDINATES- (AMG)

EASTING	NORTHING	REDUCED LEVEL
381 897	5 375 292	466 m

DOWN HOLE SURVEY -

DEPTH	AZIMUTH	DIP
Collar	258°	-55°
70 m	in rods	-54°
124 m	264°	-53°
184 m	266°	-52°
209 m	267°	-51°

TOTAL DEPTH 209.7 m

Core Size 0-30.0m H.Q. 30.0-209.7m NQ

DEPTH TO WATER

DEPTH of OXIDATION strong to 50 m, weak-mod 50-74m

CONTRACTOR DIAMOND DRILLERS, ZEEHAN

MACHINE LONGYEAR 38

COMMENCED 24/4/89 COMPLETED 29/4/89

CASING

FROM	TO	TYPE
9.0	30.0	H.Q. rods stuck in hole
0	203.0	40 mm PVC tube

SUMMARY LOG

FROM	TO	DESCRIPTION
0	50.0	Feldspar porphyry heavily fractured and moderately to strongly oxidised
50.00	74.00	Feldspar porphyry, heavily fractured with weak to moderate oxidation
74.00	92.50	Feldspar porphyry - fresh and heavily fractured. Possibly amygdaloidal?
92.50	129.85	Feldspar porphyry - fresh, grey-green
129.85	142.10	Fault or shear zone to 133.55, Fractured and brecciated feldspar porphyry 133.55-142.10
142.10	147.00	Massive feldspar porphyry
147.00	163.80	Green porphyry - feldspar phenocrysts rare to absent
163.80	167.40	Heavy qtz, feldspar, calcite veining in green/grey volcanic? (Veining at 20-30°)
167.40	209.70	Feldspar porphyry
		E.O.H.

COMMENTS

SAMPLE DATA

NUMBERS: FROM 207993

TO 208012

LAB ANALABS, BURNIE

BATCH #

ELEMENTS Cu Pb Zn Ag Mn As (AAS) Au (Fire) Ba (XRF)

(NB. Au detection limit of 0.008ppm)

OTHER LOGS

FROM	TO	TYPE

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE #89-MBD1 — Page 1 of 14

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
0	0.1	0.1	100	Broken core. Fine grained slightly oxidised porphyry (andesite?)		
0.1	0.2	0.1	100	Grey - brown massive feldspar porphyry. Phenocrysts are slightly oxidised 0.5-3mm plagioclase? laths. Thin (< 1mm) vein quartz + chlorite? parallel to core.		
0.2	2.0	1.8	100	Dark grey fine grained porphyry as above. Thin quartz/chlorite filled fractures sub parallel to core have 0.5-1.0 cm lighter grey alteration zone. Core moderately fractured. 1.9m - Poorly defined banding (45°)		
2.0	2.2	0.2	100	Pinkish grey porphyry as above. - Alteration zone surrounding 1 cm quartz chlorite vein @ 60°.		
2.2	13.7	11.5	100	Porphyritic andesite? - as above. Quartz and quartz chlorite? fractures throughout, commonly vuggy with brown ferruginous coating, and associated with pinkish (K?) alteration 5.0-6.9 Moderate fracturing 6.9-7.4 Heavy " 7.4-11.2 Moderate " 11.2-12.0 Heavy " 12.0-12.3 Core broken to coarse gravel. 12.2 13.7 Heavy fracturing		

ASSAYS									
Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
207959	10.0	10.5	0.5	5/15	30/<0.5	295	1/0.017	940

6021111

111 CLIMAX MINING LTD DRILL HOLE LOG HOLE # 99.MBD1 Page 2 of 14

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
13.70	15.6	1.9	100	Porphyritic andesite? - as above, grading to chocolate brown colour. 14.8 - 15.6 - Core badly broken.		
15.6	17.5	1.9	100	Fine grained green altered dacite? Sharp contact with porphyry (50°), plus alteration in porphyry suggests intrusion (dyke). Strongly fractured to badly broken throughout. Fractures have soft red ferruginous coating. Minor pyrite as fracture coating and disseminated 1-2 mm patches from 17.4 - 17.5 m.		
17.5	81.5	64.0	100.4	Porphyritic andesite? Grey and dark grey-brown colour. Quartz, chlorite, calcite veining, 2 generations of fracturing evident, ubiquitous. Variable patches of brown, orange-brown and pink alteration throughout. 17.5 - 19.0 - Heavily fractured with common gouge chlorite veining. 23.7 - Minor pyrite in open fracture at 20°. 24.0 Changed to N.Q. 24.0 - 27.8 Heavily fractured at variable angles 0-60°. Slight oxidation around fractures + green (chlorite?) coating.		

ASSAYS								
Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
207960	20.0	20.5	0.5	5/25	35/<0.5	330	<1/bld	900
207961	30.0	30.5	0.5	5/15	25/<0.5	300	1/bld	890
MBD1-1 (Petrology)	36.7	36.8	0.1	Feldspar-phyric dacitic lava or shallow intrusive				

6021112

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE # 89MBD1 — Page 3 of 14

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
17.5	81.5			(Cont) 32.4-33.1 - Poorly defined banding (20-30°)		
				37.75 - 4 mm quartz chlorite vein (40°)		
				37.95 - 4 mm quartz chlorite vein (60°)		
				42.1-42.3 Heavily veined and fractured with brown alteration		
				43.0 - 45.0 " " "		
				46.5 - quartz chlorite vein (50°)		
				45.0 - 51.0 - moderate veining and alteration		
				49.5 - 6 mm quartz chlorite vein (60°) with strong brown alteration.		
				54.5 - 54.7 Breccia with porphyry fragments in chloritic matrix		
				58.15 2.5 cm quartz chlorite vein (45°) has 5 cm upper and 15 cm lower pink alteration zone.		
				61.65 6 cm quartz calcite chlorite vein (50°) has 6 cm upper and 20 cm lower pink alteration zone.		
				63.7-63.9 10 mm and 30 mm quartz calcite chlorite veins (45°) in pink alteration zone.		
				66.7-67.1 Network of fine quartz & quartz chlorite with minor calcite veining		
				67.1-67.5 Poorly developed banding (45°)		

ASSAYS

Sample #	From	To	Int.	Cu / Pb	Zn / Ag	Mn	As / Au	Ba
207962	40.0	40.5	0.5	5 / 15	30 / <0.5	310	1 / 0.013	890
MBD-2 Petrology	43.04	43.10	0.06	Feldspar-phyric Dacite lava or shallow intrusive				
207963	50.0	50.5	0.5	5 / 20	30 / <0.5	275	1 / Bd	900
MBD-3 Petrology	58.08	58.20	0.12	Feldspar-phyric Dacite lava cut by 2 cm quartz chlorite vein causing bleaching and sericite alteration.				
207964	60.0	60.5	0.5	5 / 20	30 / <0.5	310	1 / Bd	960
207965	70.0	70.5	0.5	5 / 15	20 / <0.5	380	3 / Bd	870
MBD-4 Petrology	77.11	77.19	0.08	Brecciated and chloritized feldspar-phyric Dacite				
MBD-5 XRD (Pink Zone)	79.15	79.16	0.01	Calcite + quartz.				
207966	80.0	80.5	0.5	5 / 25	25 / <0.5	250	1 / Bd	900

6021113

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE # 89-MBD-1 — Page 4 of 14

From	To	Length	Recov %	Geological Description
17.5	81.5			(Cont) 79.15 - 5 cm quartz, pink calcite chlorite vein below 20 cm of brown alteration.
81.5	93.0	11.5	101.3	Porphyritic andesite as above with patchy moderate brown alteration associated with quartz, chlorite and minor carbonate veining sub-parallel to core. Fine quartz veins at variable angles common throughout. 91.6 - 16 mm quartz vein (60°) 86.4 - 12 mm quartz, pink calcite, chlorite vein (70°) 86.95 - 22 mm quartz, white calcite chlorite vein (60°) 88.70 - 55 mm quartz, calcite chlorite vein 60°
93.0	94.3	1.3	120.0	Andesite? with fine weakly to moderately developed foliation (15-20°) apparently due to alteration and shearing? of originally massive andesite. Phenocrysts poorly defined.
94.3	97.0	2.7	93	Porphyritic andesite. Dark grey-brown with minor patches similar to 93.0 - 94.3. Fine quartz and quartz, calcite, chlorite veins common to abundant (50 - 60°)

Graph. Log: Geol. | Min'n

ASSAYS

Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
207967	90.0	90.5	0.5	5/15	25/<05	265	1/WI	910
MBD-1-6 Petrology	93.55	93.6	0.05	weakly feldspar-phyric Dacitic lava				

114 CLIMAX MINING LTD DRILL HOLE LOG HOLE # 89116D1 Page 5 of 14

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
97.0	97.2	0.2	100	Dark green porphyritic basic (tending to ultrabasic?) dyke with irregular boundaries at 20°. Thin calcite veining sub parallel to boundaries common. Sheared chlorite coated fractures with slickenside (30°) at 97.15m.		
97.2	101.8	4.6	97	Porphyritic andesite? Dark grey-brown with sheared textures similar to 93.0-94.3m developed in patches throughout, tending to breccia in places, especially 99.0, 99.4, 99.9. Sheared foliation is 20°-40° to core. Fine quartz, carbonate, chlorite veins common.		
101.8	113.2	11.4	100.6	Grey, massive to weakly foliated andesite? Generally non porphyritic but remnant phenocrysts discernable in places. Foliation defined by alignment of mafic minerals, generally at 20-30° from 110-112 m. Pink alteration (+ silicification?) associated with quartz, calcite, minor chlorite veining is common, especially 102.1, 102.9-103.1, 103.9-104.2, 106.7-106.9, 108.8-109.1, 109.6-109.9.		

Sample#	From	To	Int.	ASSAYS Cu/Pb	Zn/Ag	Mn	As/Au	Ba
207968	100.0	100.5	0.5	5/20	20/205	280	1/Nil	1000
207969	110.0	110.5	0.5	20/15	40/205	315	3/Nil	920
MBD1-9 Petrology	110.04	110.16	0.12	Feldspar-phyric Dacite Lava.				

602115

115 CLIMAX MINING LTD DRILL HOLE LOG HOLE # 89 MBD1 Page 6 of 14

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
113·2	118·5	5·3	98·7	As above but porphyritic texture more dominant. Thin quartz, calcite, minor chlorite veins common at variable angles, generally 20-30°, less often up to 60° and sub parallel to core. 116·5 - 117·9 Strong pink - brown alteration. (less intense, similar alteration in patches elsewhere)		
118·5	122·25	3·75	100·2	Grey, massive to weakly foliated andesite? with weak development of phenocrysts. Tending fragmental (breccia?) in places. 120·12 - 120·23 Strong foliation (40° below 4 cm brecciated zone. Fine fractures common throughout at 20°, and sub parallel to core.		
122·25	122·4	0·15	100	Sheared green - grey basic dyke with abundant quartz calcite veining parallel to contacts at 40°.		
122·4	131·0	8·6	101·7	As for 118·5 - 122·25. 130 - 131·0 Intense fracturing tending to brecciation with quartz, calcite matrix (vein breccia)		

ASSAYS								
Sample #	From	To	Int.	Cu / Pb	Zn / Ag	Mn	As / Au	Ba
207970	120·0	120·5	0·5	5 / 20	25 / <05	395	1 / bd	900
MBD1-8 petrology	120·12	120·23	0·11	Feldspar-phyric locally brecciated & intense alteration			Basaltic lava & intense sericite	
207971	130·0	130·5	0·5	5 / 40	40 / <05	550	1 / bd	770

602116

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE # 89MBD1 — Page 7 of 14

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
131.0	131.7	0.7	100	Grey-brown altered andesite?, tending to fragmental. Non porphyritic with abundant fine fractures at 40° and irregular network of quartz, calcite veining, tending to breccia.		
131.7	132.95	1.25	96.7	Network of quartz, calcite veining forming matrix of brecciated and intensely fractured grey andesite?		
132.95	137.5	4.55	103.3	Brown-grey altered andesite?, generally non porphyritic but weak development of phenocrysts in places. Heavily veined by dark green-grey material tends to give brecciated appearance. Abundant fine quartz, calcite, chlorite veins, 0-20° common, but variable to 60°. 5-10 mm quartz, calcite, chlorite veins cut core at 40-60° at 133.3, 133.65, 133.95-134.15, 135.25, 136.25.		
137.5	141.4	3.90	100	Fragmental rock - possibly a flow breccia? Fragments are 5-20 mm sub rounded grey-brown andesite?,		

ASSAYS								
Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
207972	140.0	140.5	0.5	5/20	40/405	500	1/Nd	830

602117

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE # 89-MBD1 — Page 8 of 14

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
137.5	141.4	3.9		(Cont) similar to porphyritic andesite? Matrix is grey-green chloritic? material, tending weakly porphyritic. Trace pyrite disseminated in places, and as "paint" on fractures.		trtg
				137.5-138.5 - 5mm quartz, calcite, chlorite veins form. broad network, 20°, 80° & 0°.		
				139.5-140.1 - abundant fine quartz calcite filled fractures (60°)		
				140.5-141.4 - 10 cm wide breccia zone formed by network of fractures is sub parallel to core.		
141.4	151.2	9.8	101.9	Brown andesite? Non to weakly porphyritic to 139.6, with phenocrysts becoming more distinct below 139.6. Trace of pyrite in disseminated specs in places. Fractures common at 0-20°, and less abundant at 45°-80°. Minor irregular zones of dark green-grey material give fragmental appearance in places.		trtg
				148.0-148.7 - 5-10 mm quartz calcite chlorite vein sub parallel to core has minor chalcopyrite and traces of pyrite in small patches		minor chty trtg
151.2	152.9	1.7	100	Grey-brown fragmental rock with fragments of brown andesite? in matrix of greenish material. Boundaries are		

Sample #	From	To	Int.	Cu / Pb	Zn / Ag	Mn	As / Ag	Ba
207973	145.0	146.0	1.0	5 / 20	35 / 205	425	1 / Nil	750
207974	146.0	147.0	1.0	10 / 20	35 / 205	560	2 / Nil	740
207975	147.0	148.0	1.0	5 / 20	30 / 205	330	1 / Nil	870
207976	148.0	149.0	1.0	250 / 30	35 / 205	65	2 / Nil	780
207977	149.0	150.0	1.0	5 / 20	35 / 205	430	1 / Nil	810
207978	150.0	150.7	0.7	5 / 20	25 / 205	365	2 / Nil	920

602118

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE #89MBD1 —

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n	Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
151.2	152.9			(Cont) irregular vein-like protrusion into massive porphyritic andesite above and below. Fine quartz; calcite veins common at variable angles from 0-40°											
152.9	154.7	1.8	100	Massive porphyritic andesite, brown to 143.3, grading to dark grey down-hole. Minor fine quartz carbonate veining at 0-20° & 40-50°											
154.7	156.5	1.8	100	Brown massive porphyritic andesite, impregnated with green-grey material tending to give fragmental appearance in places. Fine quartz, calcite veins common at 30°, 0-10° in places.											
156.5	162.1	5.6	101.3	Grey-brown fragmental as for 151.2-152.9. Gradational contact from unit above. 157.2 weak foliation (60°)			207979	160.15	160.5	0.35	5/20	35/<0.5	380	2/bld	820
							MBD1-9 Petrology	160.0	160.15	0.15	Brecciated & granulated poorly feldspar-phyric dacite. Extensively altered & sericitised, with "islands" of unaltered rock.				
162.1	169.4	7.3	98.6	Massive to weakly foliated grey-brown porphyritic andesite. 162.5 .. weak foliation (40-45°) 163.9-164.35 - Band of fragmental (flow breccia?) as above (40-45°) 166.95-167.6 - as for 163.9-164.35 (50°)											

602119

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
169.4	173.85	4.45	102.5	Brown fragmental (flow breccia?) as above. Patches of massive porphyritic andesite? 170.2-170.5, 171.05-171.15 171.45-171.65. 2-3 mm quartz calcite veining at 40-45° common, + very fine fractures at 0-10° in places. 171.0-171.2 - moderate foliation (40-45°)		
173.85	215.3	41.45	100.8	Massive orange-brown porphyritic andesite?, gradational from unit above to 176 m. Fine tight fractures (quartz, calcite, minor chlorite) throughout. Dominant directions are 0-10°, 30-45°, 60-80°. Weakly foliated in places, eg 184.7 (30°), 207.2 (50°), 209.1 (40°, parallel to fracture), 211.55 (45-50°), 214.6-214.8 (distinct banding at 20°). 192.5-193.5 - Close spaced set of fine quartz calcite fractures (45°-90°) 195.4 - Soft, green clay filled fracture (shear?) at 20 195.5-196.5 - zone of densely spaced fine tight fractures, tending to breccia appearance. 208.1-208.15 - quartz, calcite, chlorite vein (70°) below 10 cm of heavily fractured and broken core. 209.1-210.5 Core broken by sets of fractures at 40°, 40° and 0°. 215.0-215.2 - Zone of abundant fine chloritic fractures, tending to breccia		

ASSAYS								
Sample #	From	To	Int.	Cu / Pb	Zn / Ag	Mn	As / Au	Ba
207980	170.0	170.5	0.5	5 / 20	25 / 2.05	355	1 / Nil	910
207981	180.0	180.5	0.5	10 / 20	25 / 2.05	300	3 / Nil	910
207982	190.0	190.5	0.5	5 / 20	35 / 2.05	400	1 / Nil	860
207983	200.0	200.5	0.5	5 / 20	20 / 2.05	295	2 / Nil	880
207984	210.0	210.5	0.5	5 / 20	30 / 2.05	290	2 / Nil	930

120

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE # 89-MBD-1 — Page 11 of 14

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
215·3	223·4	8·1	100·6	Porphyritic andesite. Dark grey, grading to dark grey-brown. 216·4, 217·3-217·6 - Distinct 40cm wide bands of darker and lighter grey rock @ 40-45°		
223·4	224·3	0·9	66·7	Mottled orange-brown and grey massive altered volcanic. 223·6 - 20 mm quartz vein (80°) 223·85 - 10 " " Calcite, dolerite vein (45°) 223·9-224·0 - Heavily fractured core with sheared dark green to black material at 224·0 (30°). Sheared material has greasy feel and trace pyrite. 224·0-224·3 0·3m core lost.		top
224·3	224·5	0·2	100	50% brown mud & chips of altered volcanic, 50% small chips of altered volcanic		
224·5	226·15	1·65	113·60	Mottled brown and grey altered volcanic. Abundant fractures at variable angles, commonly with greasy feel.		
226·15	227·2	1·05	99·2	Massive fine grained green dolerite dyke. Sheared contacts at 40-45°		
227·2	235·25	8·05	100·70	Porphyritic andesite. Massive to weakly foliated in places. Grades from orange-brown to grey in top 50 cm, then grey with patches of brown and orange-brown alteration.		

ASSAYS								
Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
207985	220·0	220·5	0·5	5/20	20/20·5	370	2/bld	
207986	229·5	230·0	0·5	5/20	35/20·5	370	3/bld	870

6021121

121 CLIMAX MINING LTD DRILL HOLE LOG HOLE # 89-116D1. Page 12 of 14

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
				(cont)		
227.2	235.25			227.35 7mm quartz, calcite, chlorite vein (45°)		
				227.75-228.05 - weak foliation (40°)		
				228.3 quartz, calcite vein breccia (20-30°)		
235.25	261.0	25.75	101.7	Medium grey non porphyritic intermediate volcanic? Massive, fine grained throughout with abundant orange and orange-brown alteration.		
				235.9-50mm quartz vein (35-40°) below 10 cm orange alteration zone.		
				237.2 - 15mm quartz, calcite, chlorite vein (50°)		
				237.65 quartz calcite vein breccia (10-20°) cut off by set of 5mm quartz veins (30°)		
				238.95 3 close spaced 5mm quartz calcite chlorite veins (10-20°) + 8mm quartz carbonate vein (40°)		
				238.95-239.4 Set of veins at 0°, bending to 10-20°, tending to breccia.		
				240.20-240.5 Set of tight fractures and calcite, quartz veins (20-30°)		
				241.9-241.9 5mm quartz, calcite, chlorite vein (0°)		
				249.5-252.0 Abundant fine veins and fractured core, especially 250.3-252.0. Dominant angle 60°, + some sub parallel to core.		
				252.2 - irregular quartz carbonate chlorite veining.		
				252.65 - Quartz carbonate vein with hematite stain (70°)		

ASSAYS								
Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
207987	240.0	240.5	0.5	5/15	25/2.05	390	2/bld	900
207988	250.0	250.5	0.5	5/20	35/2.05	835	3/0.016	920
207989	260.0	260.5	0.5	5/20	30/2.05	580	2/bld	900

6021122

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE # 89-MBD1 — Page 13 of 14

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
235.25	261.0			(Cont) 253.40 20mm quartz, calcite chlorite vein (70°) 253.70 20 mm quartz vein (60°) 253.8-254.2. Fine, black (Mn?) coated fractures (0-10°) 255.15-255.95 Abundant quartz chlorite veining tending to breccia		
261.0	267.0	6.0	101.3	Similar to above but colour is darker and more even brown. Veining common at 0-10°, 20° and 40°.		
267.0	267.2	0.2	100	Pale orange-brown porphyritic intermediate volcanic (or dyke?). Narrow black rim at contacts (40°)		
267.2	281.0	13.80	100.60	Fine grained massive intermediate volcanic as for 261-267, tending porphyritic in places. Grades to darker grey-brown from 273-276 and greenish grey 276-281. Quartz, carbonate veining common to abundant. Angles variable with 0-10° and 20-30° most common.		
281.0	281.4	0.4	100	Sheared green chloritic rock, tending schistose (40°)		
281.4	283.4	2.0	100	Light brown-grey fine-medium grained porphyritic volcanic? (Possibly tuffaceous? in places) Bonding at 40° from 283-283.4.		
283.4	284.1	0.70	100	Dark green-grey volcanic? with		

ASSAYS

Sample#	From	To	Int.	Cu / Pb	Zn / Ag	Mn	As / Au	Ba
207990	270.0	270.5	0.5	5 / 20	25 / 205	445	2 / bld	990
207991	280.0	280.5	0.5	<5 / 20	50 / 205	650	3 / bld	620

602123

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
283.4	284.1			(Cont) mottled pinkish patches. Intensely fractured and sheared. Bottom 5cm is brown oxidised fragmental? material (45°).		
				284.1 10mm soft green clay.		
284.1	285.6	1.5	100	Dark green-grey volcanic? similar to above but more mafic. Intensely sheared and fractured.		
285.6	290.9	5.3	119.3	Massive orange-light brown-grey altered volcanic? Core broken with abundant fractures at variable angles, tending brecciated in places.		
				287.6 40mm quartz, chlorite, minor calcite vein (50°)		
				288.75-288.95 10cm quartz vein (75°)		
290.9	293.15	2.25	105.9	Fragmental rock (tuffaceous?) with reddish-brown and greenish fragments of massive volcanic?, up to 30mm in places, but mainly 5-10mm. Weak to moderately oxidised and well broken by abundant fractures.		
293.15	295.5	2.35	102.2	Green-grey and light brown fragmental as above but less oxidised		
				EOH		

ASSAYS								
Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
207992	290.0	290.5	0.5	10/25	40/205	695	1/bld	1100

6021124

124

602125

CLIMAX MINING LTD - DRILL HOLE HEADER SHEET

PROJECT ..MT. BLACK.. AREA ..W. TAS.. MAP SHEET ..SOPHIA (8014)..

HOLE # 89MBD2 LOGGED BY A.G. SCOTT

COLLAR CO-ORDINATES- (AMG)

EASTING	NORTHING	REDUCED LEVEL
381 897	5 375 293	466 m

DOWN HOLE SURVEY -

DEPTH	AZIMUTH	DIP
Collar	258°	-55°
70 m	in rods	-54°
124 m	264°	-53°
184 m	266°	-52°
209 m	267°	-51°

TOTAL DEPTH ..209.7 m..

Core Size ..0-30.0m H.Q. 30.0-209.7m NQ

DEPTH TO WATER ..

DEPTH of OXIDATION strong to 50 m, weak-mod. 50-74m

CONTRACTOR ..DIAMOND DRILLERS, ZEEHAN..

MACHINE ..LONGYEAR 38..

COMMENCED 24/4/89.. COMPLETED 29/4/89..

CASING

FROM	TO	TYPE
9.0	30.0	H.Q. rods stuck in hole
0	203.0	40 mm PVC tube

SUMMARY LOG

FROM	TO	DESCRIPTION
0	50.0	Feldspar porphyry heavily fractured and moderately to strongly oxidised
50.00	74.00	Feldspar porphyry, heavily fractured with weak to moderate oxidation
74.00	92.50	Feldspar porphyry - fresh and heavily fractured. Possibly amygdaloidal?
92.50	129.95	Feldspar porphyry - fresh, grey-green
129.95	142.10	Fault or shear zone to 133.55, Fractured and brecciated feldspar porphyry 133.55-142.10
142.10	147.00	Massive feldspar porphyry
147.00	163.80	Green porphyry - feldspar phenocrysts rare to absent
163.80	167.40	Heavy qtz, feldspar, calcite veining in green/grey volconic? (Veining at 20-30°)
167.40	209.70	Feldspar porphyry
		E.O.H.

COMMENTS

SAMPLE DATA

NUMBERS: FROM 207993

TO 208012

LAB ..ANALABS, BURNIE..

BATCH # ..

ELEMENTS ..Cu Pb Zn Ag Mn As (AAS) Au (Fire) Ba (XRF)

(NB. Au detection limit of 0.008 ppm)

OTHER LOGS

FROM	TO	TYPE

125 CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD4 Page 1 of 16

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
0	1.0	1.0	18	Core broken. Hard, grey massive coarsely feldspar-phyric porphyry. Possibly surface silicified zone or surface boulders.		
1.00	14.80	13.80	72	Strongly oxidised soft brown massive coarse feldspar-phyric porphyry. Core well broken, tending to gravel in places. Abundant Fe-Mn stained fractures at variable angles, 10-20°, 40-45°, 80-90°		
				10.0-10.2 Soft, fine grained weathered clayey material. Possibly weathered dolerite.		
14.80	27.30	12.50	91	Grey-brown moderately weathered massive coarse feldspar-phyric porphyry as above. Core well broken. Abundant open vuggy quartz-filled ferruginous fractures and veins at variable angles, 10-20°, 40-45°, 70-80°		
27.30	32.60	5.30	98	Hard, massive, grey-brown and green feldspathic, chloritic rock with feldspar phenocrysts ranging from indistinct to relatively distinct.		

ASSAYS								
Sample#	From	To	Int.	Cu / Pb	Zn / Ag	Mn	As / Au	Ba
208029	10.0	10.5	0.5	20 / 5	135 / <.5	830	3 / bd	912
208030	20.0	20.5	0.5	5 / 20	75 / <.5	425	2 / bd	795

602126

126 CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD4. Page 2 of 16

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
				(Cont) Probably coarse feldspar-phyric porphyry with moderate to heavy chloritic alteration.		
				27.30-30.40 Abundant veggy quartz and minor quartz calcite veining, with host rock apparently more silicic (veins at 0, 30°, 60-90°)		
				31.65-31.90. Irregular 1.5-2.0 cm pinkish (ferruginous) quartz calcite veins, tending to vein breccia, sub parallel to core dip tending to 45° at 31.8-31.9.		
32.60	35.25	2.65	99	Mottled green, brown and grey massive feldspathic, chloritic rock with remnant angular fragments of dark green material. Boundary with unit above is diffuse over 1-2 cm where indistinct foliation occurs at 30°-40°. Possibly brecciated and more intensely chloritic, potassic? altered variety of unit above. Thin irregular quartz calcite veins throughout, tending to network in places.		
				34.7-34.9 Fine grained dolerite dyke at 45°.		
				35.0-35.25 Quartz calcite vein breccia.		

ASSAYS								
Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208031	30.0	30.5	0.5	5/10	70/2.5	550	3/44	634

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CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBP.4. Page 3 of 16

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From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
35.25	36.90	1.65	99	Massive green fine-medium grained dolerite dyke. Top boundary disrupted by quartz calcite vein breccia, lower boundary distinct along fracture at 30°. Abundant quartz, calcite veining throughout at variable angles, tending to form network.		
36.90	39.00	2.10	100	Mottled chloritic, feldspathic rock as for 32.6 - 35.25. 2 sets of quartz calcite veining intersecting at approximately 60° (both 60° to core) with thicker (5mm) more planar set post dating thin (1-2 mm) set from 36.9-37.5.		
39.00	47.40	8.40	87	Dark brown - grey massive porphyritic intermediate rock with indistinct feldspar phenocrysts discernable throughout. Phenocrysts have pale green colour and groundmass is abundantly chloritic. Possibly coarse grained feldspar-phyric porphyry with heavy chloritic alteration. Fine quartz calcite veins at 10-20°, 40° and 90° common throughout.		

ASSAYS									
Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208032	40.0	40.5	0.5				2/bld	460

602128

CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD4. Page 4 of 16

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n	ASSAYS Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
39.0	47.4			(Cont) 39.5-39.6 Paler green chloritic material associated with shearing at 30°. Core well broken. 41.75-42.00 5-10 mm quartz calcite vein at 10-20°, displaced by fine fractures in places. 46.0-46.2 Core broken. Brown alteration associated with slightly sheared quartz veining at 20-30°											
47.40	65.10	17.70	94	Mottled greenish grey chloritic, feldspathic massive rock, similar to 32.60-35.25. 49.70-49.80 Orange and white quartz, feldspar calcite vein. Top boundary diffuse and at high angle to compositional banding (20-30°) in vein. Latter is at 10° to contact with dolerite below. 49.8-50.6 Fine grained dark green dolerite cut by 2 sets of quartz and quartz, calcite veining. Lower contact is sheared at 20-30° 53.2-53.3 Schistose, oxidised quartz veining at 40° 55.2-55.55. Schistose, with 5cm foliated quartz chlorite vein from 55.3. Schistosity and vein at 30°			208033	50.0	50.5	0.5	5/10	135/2.5	2350	1/old	726
							208034	53.0	53.5	0.5	5/10	60/2.5	2000	1/old	434

6021129

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE # MBD4 — Page 5 of 16

From	To	Length	Recov %	Geological Description
47.40	65.10			(Cont) 56.5-56.7 - Core badly broken
				57.55 10 cm quartz calcite vein with fragments of host rock (20°)
				59.30 1.0 cm quartz calcite vein parallel to schistosity of host at 20°
				60.10 as for 59.3
				60.93 5.0 cm quartz vein at 50°
				61.10 Quartz calcite vein breccia parallel to core
				63.0-65.1 Brown (potassic?) alteration associated with fine fracture network.
65.10	68.00	2.90	100	Mottled brown and grey coarse massive feldspar porphyry.
				66.0-66.3 1.0 cm zone of fine fractures at 0-10°, cut off by irregular 5 cm quartz magnetite vein (45°) at 66.3.
				66.5-66.9 Zone of highly altered rock with quartz, magnetite, hematite, coarse pyrite and calcite veining at top and bottom
				67.7 2.5 cm quartz magnetite vein at 40°
				67.7-68.0 Fine stringers of quartz magnetite in broken core.

Graph. Log Geol.	Min'n
	vein magnetite
	mag, hem, py.
	mag.
	mag.

ASSAYS								
Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208035	60.0	60.5	0.5	5/10	55/<.5	950	2/bld	555
208036	66.0	67.0	1.0	5/5	90/<.5	6150	1/bld	72
208037	67.0	68.0	1.0	5/10	55/<.5	760	2/bld	172

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CLIMAX MINING LTD DRILL HOLE LOG HOLE # M504 Page ...6.... of ...16....

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
68.00	76.40	8.40	102	Mottled, brecciated intermediate volcanic or intrusive. Generally non porphyritic but with patches of well developed coarse feldspar phenocrysts suggesting that original rock was coarse grained ~~massive~~ massive porphyry which has been highly altered. Quartz and quartz calcite veining and fine fracturing abundant throughout. Commonly weakly to moderately magnetic throughout with magnetite disseminated and in thin quartz chlorite veins. 71.4-71.5 Sheared chloritic fracture at 20° 72.3-72.5 as for 71.4-71.5. 75.9-76.4 Core well broken with black chloritic slickensided fractures		
76.40	82.80	6.40	93	Heavily fractured and iron stained (oxidised) quartz with network of magnetite and hematite filled fractures. Becomes less oxidised and more chloritic below 80.0 m and has blocks and bands of chloritised country rock from 82.5-82.9 at 40°. Abundant magnetite		

Sample#	From	To	Int.	ASSAYS Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208038	70.0	70.5	0.5	5/5	40/<.5	1400	4/bld	274
208039	76.0	77.0	1.0	5/<5	45/<.5	370	3/bld	291
208040	77.0	78.0	1.0	5/5	25/<.5	235	2/bld	148
208041	78.0	79.0	1.0	5/10	10/0.5	85	3/bld	61
208042	79.0	80.0	1.0	5/10	15/<.5	130	2/bld	47
208043	80.0	81.0	1.0	5/10	40/0.5	220	1/bld	36
208044	81.0	82.0	1.0	5/<5	15/0.5	145	1/bld	29
208045	82.0	83.0	1.0	5/10	50/0.5	540	<1/bll	38

6021131

CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD4 Page 7 of 16

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
76.40	82.80			(Cont) in quartz, chlorite from 826-824		mag
82.80	84.85	2.05	100	Mottled green-grey chloritic rock as for 68.0 - 76.4. Patchy weak-moderate magnetism.		
84.85	89.90	5.05	102	Green-grey and brown massive coarse feldspar porphyry. Chloritic throughout with occasional thin quartz, magnetite, minor pyrite veins at variable angles but commonly 40°-50°		mag. trg.
89.90	96.00	6.10	99	Mottled green, grey and brown chloritic, feldspathic rock, similar to 68.0-76.4 but brown feldspathic material more abundant.		
				89.90-90.10 3.0cm chlorite, magnetite quartz vein at 30-40°		mag
				91.40-91.50 Core well broken with black chloritic (sheared?) fractures at 30°-40°		
				92.25-92.35 Heavily chloritised fracture network.		
				92.35-92.70 Zone of increased brown (potassic?) alteration with fine fracture network and abundant chlorite.		
				92.80-93.35 Chloritic sheared rock with well developed fault breccia of silicic and minor hematite		Tr. trg

ASSAYS									
Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208046	90.0	90.5	0.5	5/5	60/0.5	510	1/bld	73

602132

132

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n	ASSAYS Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
89.90	96.00			(Cont.) fragments in chloritic matrix. Trace of pyrite in places. Schistosity angle indeterminate due to broken core. Top and bottom contacts at 46°											
				93.35-94.70 Massive orange - brown feldspathic rock, cut by abundant thin quartz and chlorite veins, commonly at 40-45°. Unit becomes darker below 94.15m. Minor pyrite disseminated and as occasional coarse crystals.		minor hg.									
				94.9-95.15 2.5-3.0cm chlorite magnetite quartz, minor pyrite vein at 10°.		mag. minor hg.	208047	95.0	95.5	0.5	5/<5	75/<5	665	<1/bdl	167
96.00	164.80	68.80	100	Massive coarse grained altered feldspar-phyric porphyry. Similar texture to porphyry in MBD2 and 3 but chloritic and red - brown (potassic?) phases are more abundant and phenocrysts are less distinct in general and obliterated in places. Unit is weakly magnetic and cut by quartz chlorite veining throughout and locally by dolerite dykes and chlorite, quartz, magnetite, hematite, minor pyrite veins.											

6021133

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n	ASSAYS Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
96.0	164.8			(Cont) 97.1 Thin quartz magnetite vein (45°)											
				97.6-97.7-2 " " " " "											
				97.85-99.3 Patches of brown (potassic?) alteration cut by network of fine chloritic veins, generally at 30-40°. Trace magnetite in white feldspar patch in vein		Tr. mag.									
				101.25 Chlorite, magnetite, minor pyrite vein at 30°		mag py.	208048	100.0	100.5	0.5	5/5	60/0.5	590	<1/0.01	204
				101.25-102.7 Zone of increased chloritic banding to resemble breccia. Feldspar phenocrysts indistinct to absent. Slightly magnetic											
				105.7-109.9 Orange brown feldspathic zone with well developed fine chloritic fracture network, associated with minor magnetite and trace pyrite in places. Chlorite magnetite ± pyrite zones increasing down-hole.		minor mag Tr. Py.	208049	105.0	105.5	0.5	5/<5	50/<5	540	<1/0.01	191
				108.9-109.8 Fine grained dark green dolerite? dyke. Very chloritic with abundant veinlets of magnetite and minor pyrite		mag. minor py.									
				109.8-111.6 Heavy chloritic and orange-brown alteration zone with phenocrysts absent or indistinct.											
				Coarse pyrite crystals scattered through chlorite rich patch at 109.9		Py.									
				2.5cm coarse magnetite, pyrite at 110.2m (50°) in py chloritic zone		mag. py.									

CLIMAX MINING LTD — DRILL HOLE LOG — HOLE # MBD4. — Page 10 of 16

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
96.0	164.8			(Cont.) Coarse pyrite scattered through chloritic patch at 110.4. Core broken along 20°-30° thin magnetite veins in heavy chloritic zone at 111.3-111.9		py.
						mag.
				111.6-115.3 Porphyry with abundant chloritic and brown alteration. Minor pyrite in chloritic veins. Slightly magnetic		tr mag
				115.3-115.9 Heavy chloritic alteration zone with feldspar phenocrysts absent. Thin chlorite vein network gives rock a brecciated appearance		minor py
				115.9-116.4 Dolerite dyke sub parallel to core.		
				116.5-116.7 Dolerite dyke. Top boundary at 50°, lower boundary jagged. Minor medium-coarse grained pyrite at 116.7		minor py.
				117.5-118.8 Quartz and quartz feldspar veins common at 50° in brown porphyry (slightly magnetic).		
				Quartz magnetite vein (50°) at 118.45		mag.
				120.0-120.1 Chlorite rich sheared and brecciated zone at 40°. Medium-coarse grained disseminated pyrite throughout.		py.
				120.75-122.6 Patchy heavy orang-		

ASSAYS

Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208050	110.0	110.5	0.5	5/10	85/2.5	565	<1/bd	162
208051	115.0	115.5	0.5	5/10	40/2.5	525	1/0.01	396

6021135

CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD4 Page ...11.... of ...16....

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
96.0	164.8			(Cont.) brown alteration in porphyry. Boundaries diffuse but appear to be at low angle to core. Altered feldspathic zones cut by fine network of chloritic fractures. 30° quartz calcite vein breccia at 122.5		
				122.6 - 124.6 Porphyry with heavy chloritic alteration and weak foliation at 20°-30° due to alignment of phenocrysts.		
				Coarse pyrite in very chloritic zone (20-30°) from 123.5-123.7		py.
				2 cm coarse magnetite vein at 30°, with coarse pyrite crystals — 123.7 - 123.8		mag. py.
				Coarse pyrite disseminated in chloritic zone from 124.4-124.6		py.
				124.6 - 125.2 Coarse vein network of coarse grained magnetite, pyrite and chlorite		mag py
				125.2 - 125.6 Core well broken along chloritic sheared fractures with coarse disseminated pyrite and minor magnetite		py. minor mag
				126.0 - 126.4 Contact between highly altered porphyry and fine grained dolerite dyke at 5°-10°		
				126.4 - 132.6. Fine grained dolerite dyke at 5°-10° cut by thin quartz, quartz-		

ASSAYS

Sample #	From	To	Int.	Cu / Pb	Zn / Ag	Mn	As / Au	Ba
208052	120.0	121.0	1.0	5 / 35	55 / 1	1250	<1 / 0.01	439
208053	121.0	122.0	1.0	5 / 10	35 / 0.5	945	1 / bld	540
208054	122.0	123.0	1.0	5 / <5	50 / <5	1030	2 / bld	386
208055	123.0	124.0	1.0	5 / <5	75 / <5	830	<1 / 0.01	304
208056	124.0	125.0	1.0	5 / 10	60 / <5	380	<1 / 0.01	296
208057	125.0	126.0	1.0	5 / 5	65 / <5	585	<1 / bld	531
208058	126.0	127.0	1.0	5 / <5	65 / <5	890	1 / bld	557
208059	127.0	128.0	1.0	<5 / <5	100 / <5	1450	<1 / bld	348
208060	128.0	129.0	1.0	5 / <5	90 / <5	2950	<1 / bld	359

CLIMAX MINING LTD DRILL HOLE LOG HOLE # NBD4. Page 12 of 16

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
96.0	164.8			(Cont.) feldspar and occasional quartz magnetite veins at 40-65°.		
				132.6-132.9 2-3 cm fine grained chloritic vein extending from dyke above, sub parallel to core		
				142.9-143.7 Chloritic alteration associated with coarse vein network of quartz and white feldspar at 20°-30°		
				144.6-144.9 Chloritic alteration with quartz feldspar vein network at 20°		
				146.2-148.0 Fine speckling of cream-white mineral (clay?) through porphyry.		
				148.0-150.05 Patches of orange-brown alteration with network of fine chloritic fractures. Fine pale green chloritic material (similar to contact edge of dolerite dyke) forms vein breccia at 149.1-149.2		
				150.25-150.50 Vein breccia of fine pale green chloritic material, resembles contact edge of dolerite dyke.		
				152.1 5mm quartz feldspar vein at 40°		

ASSAYS								
Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208061	129.0	130.0	1.0	5/25	100/2.5	1500	<1/0.01	427
208062	140.0	140.5	0.5	5/25	85/2.5	1000	1/tr	142
208063	150.0	150.5	0.5	5/25	45/0.5	480	<1/tr	325

6021137

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
96.0	164.8			(Cont.) 152.6-157.2 Weak foliation at 40°, increasing to 45° down-hole, due to poorly developed schistosity brecciating porphyry.		
				40° magnetite vein at 153.95		mag.
				Magnetite in 30° white feldspar veins at 156.0 & 156.3		mag.
				157.7-158.1 Fine quartz feldspar vein network and vein breccia at 20°-30°		
				158.3-158.5 Quartz feldspar vein at 20°		
				158.85-158.95 Fine grained dolerite dyke at 40° contains terminated feldspar, magnetite vein at 158.90		mag.
164.80	166.80	2.0	102	Fine to medium grained dolerite at 60° (Top) and 5°-10° (bottom). Cut by abundant quartz feldspar veins at 30°-40° and 90° from 164.8 to 165.4		
				166.35-166.45 Fine feldspar quartz magnetite veins at 30°		mag.
166.80	172.65	5.85	102	Zone of heavy chloritic and and red-brown alteration with feldspar phenocrysts absent to indistinct. Weak		

ASSAYS

Sample#	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208064	160.0	160.5	0.5	5/25	30/0.5	1000	41/60	517
208065	170.0	170.5	0.5	5/25	20/0.5	2000	41/60	545

CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD4. Page 14 of 16

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
166.80	172.65			(Cont.) schistosity developed at 40°-45°		
172.65	172.90	0.25	93	Shear zone. Soft, buggy and chloritic with core well broken to gravel size.		
172.90	175.00	2.10	93	Dolerite dyke. Fine grained, sheared in places, especially 173.8-174.1 and 174.8-175.0. Quartz feldspar veining and patches at 40°, 173.4-173.6 and 174.4-174.6.		
175.00	177.35	2.35	98	Highly altered chloritic rock with weak to moderately developed schistosity at 30°-40°.		
177.35	177.75	0.40	98	Orange-brown feldspar rich rock, brecciated by chloritic material in top 20 cm. Cut by white feldspar, quartz veins. Medium to coarse grained pyrite disseminated and on fractures.		py.
177.75	189.90	12.15	101	Medium grained to coarse grained feldspar porphyry. Generally massive but schistose in places. Variable orange-brown and chloritic alteration throughout. Phenocrysts commonly indistinct but rarely absent.		

ASSAYS								
Sample #	From	To	Int.					
208066	177.30	177.90	0.5	5/<5	60/2.5	1750	<1/Nil	81

6021139

From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
177.75	189.90			(Cont.) 178.5-179.9 Core well broken on network of fine fractures. 3 cm. quartz, white feldspar vein (45°) at 179.15		
				182.5-182.6 Core well broken on clay lined fractures (sheared?) at 20°		
				182.95-183.20 Schistosity at 30°		
				183.40 2.0 cm quartz feldspar vein at 45°		
				183.9-184.9 Zone of chloritic alteration with red-brown alteration in bottom 0.4m. Phenocrysts very indistinct. 1.5 cm quartz vein (45°) at 184.47		
				Lower boundary of alteration on fracture at 20°		
				187.5-189.9 Stronger orange-brown alteration. Core well broken 188.9-189.2		
189.90	195.00	5.10	99	Mixed zone of abundant chlorite altered porphyry? and dolerite. Sheared with strong schistosity at 35°-40°.		
				190.0-190.4 Core well broken. Fuzzy sericite, chlorite sheared material.		

ASSAYS								
Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208067	180.0	180.5	0.5	5/<5	35/<5	1050	<1/tr	500
208068	190.0	190.5	0.5	5/<5	60/<5	1450	1/tr	656

602140

CLIMAX MINING LTD DRILL HOLE LOG HOLE # MBD4 Page 16 of 16

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From	To	Length	Recov %	Geological Description	Graph. Log Geol.	Graph. Log Min'n
189.90	195.00			(Cont.) 191.45–193.30 Strongly sheared dolerite and altered porphyry? 193.3–194.3 Dark green-grey chlorite rich rock (altered porphyry?) 194.3–195.0 Interbanded altered porphyry? and dark green sheared dolerite? or intense chloritic alteration zones. 2 cm coarse grained magnetite, feldspar vein (20°) from 194.8–194.9 E.O.H.		mag.

ASSAYS								
Sample #	From	To	Int.	Cu/Pb	Zn/Ag	Mn	As/Au	Ba
208069	194.5	195.0	0.5	5/<5	160/2.5	1450	1/bld	290

6021441

REGION:	Western Tas			MAPSHEET:	Sophie (8014)					
									Analyst - ANALABS	
PROSPECT:	MT BLACK EL 12/88			MBD1 Core Samples						
SaNo	From (m)	To (m)	Cu	Pb	Zn	Ag	Mn	As	Au	Ba
E207959	10.0	10.5	5	15	30	<0.5	295	1	0.017	940
207960	20.0	20.5	5	25	35	<0.5	330	<1	<0.008	900
207961	30.0	30.5	5	15	25	<0.5	300	1	<0.008	890
207962	40.0	40.5	5	16	30	<0.5	310	1	0.013	890
207963	50.0	50.5	5	20	30	<0.5	275	1	<0.008	900
207964	60.0	60.5	5	20	30	<0.5	310	1	<0.008	860
207965	70.0	70.5	5	15	20	<0.5	380	3	<0.008	870
207966	80.0	80.5	5	25	25	<0.5	250	1	<0.008	900
207967	90.0	90.5	5	15	25	<0.5	265	1	<0.008	910
207968	100.0	100.5	5	20	20	<0.5	280	1	<0.008	1000
207969	110.0	110.5	20	15	40	<0.5	315	3	<0.008	920
207970	120.0	120.5	5	20	25	<0.5	395	1	<0.008	900
207971	130.0	130.5	5	40	40	<0.5	550	1	<0.008	770
207972	140.0	140.5	5	20	40	<0.5	500	1	<0.008	830
207973	145.0	146.0	5	20	35	<0.5	425	1	<0.008	750
207974	146.0	147.0	10	20	35	<0.5	560	2	<0.008	740
207975	147.0	148.0	5	20	30	<0.5	330	1	<0.008	870
207976	148.0	149.0	250	30	35	<0.5	605	2	<0.008	780
207977	149.0	150.0	5	20	35	<0.5	430	1	<0.008	810
207978	150.0	150.7	5	20	25	<0.5	365	2	<0.008	920
207979	160.2	160.5	5	20	35	<0.5	380	2	<0.008	820
207980	170.0	170.5	5	20	25	<0.5	355	1	<0.008	910
207981	180.0	180.5	10	20	25	<0.5	300	3	<0.008	910
207982	190.0	190.5	5	20	35	<0.5	400	1	<0.008	860
207983	200.0	200.5	5	20	20	<0.5	295	2	<0.008	880
207984	210.0	210.5	5	20	30	<0.5	290	2	<0.008	930
207985	220.0	220.5	5	20	20	<0.5	370	2	<0.008	910
207986	229.5	230.5	5	20	35	<0.5	370	3	<0.008	870
207987	240.0	240.5	5	15	25	<0.5	390	2	<0.008	900
207988	250.0	250.5	5	20	35	<0.5	835	3	0.016	920
207989	260.0	260.5	5	20	30	<0.5	580	2	<0.008	900
207990	270.0	270.5	5	20	25	<0.5	445	2	<0.008	990
207991	280.0	280.5	<5	20	50	<0.5	650	3	<0.008	620
207992	290.0	290.5	10	25	40	<0.5	695	1	<0.008	1100

REGION:	Western Tas			MAPSHEET:	Sophia (8014)				Analyst - ANALABS	
PROSPECT:	MT BLACK EL 12/88			MBD2 Core Samples						
SaNo	From (m)	To (m)	Cu	Pb	Zn	Ag	Mn	As	Au	Ba
E207993	10.0	10.5	30	35	115	<0.5	730	3	<0.008	610
207994	20.0	20.5	95	35	70	<0.5	755	3	<0.008	560
207995	30.0	30.5	5	35	75	<0.5	610	3	<0.008	650
207996	40.0	40.5	5	30	70	<0.5	705	2	<0.008	640
207997	50.0	50.5	20	30	70	<0.5	680	3	<0.008	580
207998	60.0	60.5	5	25	100	<0.5	735	1	<0.008	610
207999	70.0	70.5	10	30	120	<0.5	1150	3	<0.008	400
208000	80.0	80.5	5	30	120	<0.5	1100	2	<0.008	590
208001	90.0	90.5	5	30	90	<0.5	950	4	<0.008	30
208002	100.0	100.5	5	25	80	<0.5	895	3	<0.008	500
208003	110.0	110.5	10	50	160	<0.5	2050	5	<0.008	110
208004	120.0	120.5	<5	30	110	<0.5	880	2	<0.008	210
208005	130.0	130.5	<5	25	135	<0.5	1200	3	<0.008	30
208006	140.0	140.5	<5	20	110	<0.5	765	3	<0.008	75
208007	150.0	150.5	<5	20	130	<0.5	970	2	<0.008	20
208008	160.0	160.5	5	40	105	<0.5	1000	2	<0.008	630
208070	163.0	164.0	5	<5	90	<0.5	840	<1	<0.008	68
208071	164.0	165.0	5	<5	10	<0.5	380	<1	<0.008	32
208072	165.0	166.0	5	<5	5	<0.5	230	<1	<0.008	15
208009	170.0	170.5	5	30	140	<0.5	1650	3	<0.008	95
208010	180.0	180.5	5	30	70	<0.5	670	4	<0.008	540
208011	190.0	190.5	5	30	100	<0.5	1050	3	<0.008	630
208012	209.0	209.5	20	30	60	<0.5	685	4	<0.008	980

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REGION:	Western Tas			MAPSHEET:	Sophia (8014)					
									Analyst - ANALABS	
PROSPECT:	MT BLACK EL 12/88			MBD3 Core Samples						
SaNo	From (m)	To (m)	Cu	Pb	Zn	Ag	Mn	As	Au	Ba
E208013	10.0	10.5	10	20	75	0.5	580	4	<0.008	920
208014	20.0	20.5	5	<5	55	0.5	520	3	<0.008	920
208015	30.0	30.5	<5	10	55	<0.5	3100	1	<0.008	680
208016	40.0	40.5	5	5	50	<0.5	550	1	<0.008	990
208017	50.0	50.5	10	5	95	<0.5	880	4	<0.008	630
208018	60.0	60.5	10	15	100	0.5	840	3	<0.008	680
208019	70.0	70.5	10	10	70	1.0	875	3	<0.008	560
208073	75.0	75.5	5	<5	75	<0.5	880	3	<0.008	664
208020	80.0	80.5	5	<5	55	<0.5	1300	1	<0.008	490
208021	90.0	90.5	10	10	95	1.0	755	2	<0.008	650
208022	100.0	100.5	5	15	80	1.0	900	2	<0.008	730
208023	110.0	110.5	5	20	75	1.0	805	3	<0.008	460
208024	120.0	120.5	5	25	95	1.0	1500	1	<0.008	630
208074	123.2	123.7	5	<5	115	<0.5	1850	1	<0.008	343
208075	128.5	129.0	10	10	95	<0.5	15800	11	<0.008	296
208025	130.0	130.5	<5	10	60	<0.5	2050	1	<0.008	440
208026	140.0	140.5	<5	15	80	0.5	870	2	<0.008	680
208076	147.0	148.0	145	20	135	<0.5	1350	5	<0.008	549
208077	148.0	149.0	95	25	80	<0.5	880	10	<0.008	583
208027	150.0	150.5	5	10	90	1.0	850	4	<0.008	770
208028	160.0	160.5	10	10	80	0.5	880	3	<0.008	580

REGION:	Western Tas			MAPSHEET:	Sophia (8014)				Analyst - ANALABS	
PROSPECT:	MT BLACK EL 12/88			MBD4 Core Samples						
SaNo	From (m)	To (m)	Cu	Pb	Zn	Ag	Mn	As	Au	Ba
E208029	10.0	10.5	20	5	135	<0.5	830	3	<0.008	912
208030	20.0	20.5	5	20	75	<0.5	425	2	<0.008	795
208031	30.0	30.5	5	10	70	<0.5	550	3	<0.008	634
208032	40.0	40.5	5	15	60	0.5	640	2	<0.008	460
208033	50.0	50.5	5	10	135	<0.5	2350	1	<0.008	726
208034	53.0	53.5	5	10	60	<0.5	2000	1	<0.008	434
208035	60.0	60.5	5	10	55	<0.5	950	2	<0.008	555
208036	66.0	67.0	5	5	90	<0.5	6150	1	<0.008	72
208037	67.0	68.0	5	10	55	<0.5	760	2	<0.008	172
208038	70.0	70.5	5	5	40	<0.5	1400	4	<0.008	274
208039	76.0	77.0	5	<5	45	<0.5	370	3	<0.008	291
208040	77.0	78.0	5	5	25	<0.5	235	2	<0.008	148
208041	78.0	79.0	5	10	10	0.5	85	3	<0.008	61
208042	79.0	80.0	5	10	15	<0.5	130	3	<0.008	47
208043	80.0	81.0	5	10	40	<0.5	220	1	<0.008	36
208044	81.0	82.0	5	<5	15	0.5	145	1	<0.008	29
208045	82.0	83.0	5	10	50	0.5	540	<1	<0.008	38
208046	90.0	90.5	5	5	60	0.5	510	1	<0.008	73
208047	95.0	95.5	5	<5	75	<0.5	665	<1	<0.008	167
208048	100.0	100.5	5	5	60	0.5	590	<1	0.010	204
208049	105.0	105.5	5	<5	50	<0.5	540	<1	0.010	191
208050	110.0	110.5	5	10	85	<0.5	565	<1	<0.008	162
208051	115.0	115.5	5	10	40	<0.5	525	1	0.010	396
208052	120.0	121.0	5	35	55	1.0	1250	<1	0.010	439
208053	121.0	122.0	5	10	35	0.5	945	1	<0.008	540
208054	122.0	123.0	5	<5	50	<0.5	1030	2	<0.008	386
208055	123.0	124.0	5	<5	75	<0.5	830	<1	0.010	304
208056	124.0	125.0	5	10	60	<0.5	380	<1	0.010	296
208057	125.0	126.0	5	5	65	<0.5	585	<1	<0.008	531
208058	126.0	127.0	5	<5	65	<0.5	890	1	<0.008	557
208059	127.0	128.0	<5	<5	100	<0.5	1450	<1	<0.008	348
208060	128.0	129.0	5	<5	90	<0.5	2950	<1	<0.008	359
208061	129.0	130.0	5	<5	100	<0.5	1500	<1	0.010	427
208062	140.0	140.5	5	<5	85	<0.5	1000	1	<0.008	142
208063	150.0	150.5	5	<5	45	0.5	480	<1	<0.008	325
208064	160.0	160.5	5	<5	30	0.5	1000	<1	<0.008	517
208065	170.0	170.5	5	<5	20	0.5	2000	<1	<0.008	545
208066	177.3	177.8	5	<5	60	<0.5	1750	<1	<0.008	81
208067	180.0	180.5	5	<5	35	<0.5	1050	<1	<0.008	500
208068	190.0	190.5	5	<5	60	<0.5	1450	1	<0.008	656
208069	194.5	195.0	5	<5	160	<0.5	1450	1	<0.008	290

APPENDIX 4

PETROLOGICAL REPORTS

PETROGRAPHIC REPORT

Rocks from Mt. Black EL 12/88

For Climax Mining Ltd. 18/12/88

by

Anthony J. Crawford

Geology Department

University of Tasmania

SAMPLE: 27/2 81,535E 77,000N

SUMMARY:

This is a feldspar-phyric formerly glassy dacitic to rhyodacitic lava.

HAND SPECIMEN:

This sample is a massive, very fine-grained dark grey feldspar-phyric dacite or rhyodacite, bleaching to almost white on weathere surfaces.

THIN SECTION DESCRIPTION:

This sample consists of around 5 modal% of euhedral to slightly rounded and resorbed feldspar phenocrysts in a very uniform, even-textured felsic groundmass. Feldspar phenocrysts are generally less than 1mm long blocky to slightly elongate euhedra of albite which shows slight sericite flecking and occasional small pools of calcite. Sparse FeTi oxide microphenocryst are mainly fresh, but often have a sercite-chlorite intergrowth at their margins. A single altered phenocryst now composed of calcite within a rim of fine-grained FeTi oxides and chlorite has the typical appearance of an opacite-rimmed former hornblende phenocryst. Also present are several quite large apatite microphenocrysts and an unusual number of relatively large zircon crystals.

The very uniform-textured groundmass of this sample is a fine-grained intergrowth of quartz and albite, with interstitial pale sericite and greenish chlorite flakes. Occasional larger compound crystals of secondary quartz have grown from the finer-grained groundmass, and tiny pools of calcite are quite common. The uniform texture is typical of devitrified glassy rhyolitic groundmasses in the Mount Read felsic lavas.

SAMPLE: 27/4 81,550 E 77,000 N

SUMMARY:

This sample is a well-preserved feldspar-phyric rhyodacitic or dacitic lava, virtually identical to 27/2.

HAND SPECIMEN:

On a freshly-cut surface, this sample is a very uniform-textured dark grey-brown, feldspar-phyric rhyodacite or dacite lava.

THIN SECTION DESCRIPTION:

This sample shows an excellent porphyritic volcanic texture defined by albite phenocrysts in a fine-grained equigranular groundmass. The phenocrysts total around 5 modal% of the rock and are euhedral to subhedral prisms up to 1mm across. Feldspar phenocrysts are albitized plagioclase, and show minor sericite and subordinate calcite alteration; they often occur in multi-grain clots. Sparse FeTi oxide microphenocrysts have marginal alteration to a fine-grained chlorite-leucoxene assemblage.

The groundmass of this sample is very uniform and equigranular, composed of a mosaic of quartz and albite grains surrounded by narrow rims of pale green to light brown chlorite and minor sericite. The texture suggests that the groundmass may have developed from devitrification of rhyolitic glass. This sample is clearly a rhyodacitic to dacitic lava, and even down to the presence of rather large and common zircon crystals, is virtually identical to sample 27/2. I suggest that these two samples are so similar that they may well be from the same unit.

149

SAMPLE: 27/7 80740E 77235N

SUMMARY:

This is a sericitized and carbonated, hydrothermally-altered, formerly feldspar+minor hornblende-phyric dacitic lava.

HAND SPECIMEN:

On a freshly-cut surface, this sample is a dark grey dense feldspar-phyric lava with sparse quartz- or calcite-filled vesicles.

THIN SECTION DESCRIPTION:

This sample is a a formerly feldspar-phyric dacite lava which ahas been fairly extensively sericitized and carbonate-altered. Large euhedral albite phenocrysts to 1mm long occur singly and in crystal clusters. They have been largely replaced by sericite, calcite and minor chlorite. Subordinate phenocrysts to around 0.5mm are now composed of a very fine-grained quartz-chlorite intergrowth within an opacite rim and were probably hornblende. Euhedral apatite microphenocrysts are also present.

The groundmass of this sample, although fairly thoroughly sericitized, shows clear evidence of having been a recrystallized, almost 'snowflake' mosaic of quartz and albite after uniform felsic glass. Almost perfectly spherical polycrystalline secondary quartz bodies have grown in the groundmass and resemble fine vesicles, but are invariably rimmed by sericite which has been pushed outwards as the quartz balls grew. However, larger calcite-filled 'vesicles' are slightly flattened in the plane of dominant sericitization, and may well have been vesicles.

There is little doubt that this was a feldspar+minor hornblende-phyric dacite lava. The extent of secondary alteration is far greater than that developed during 'normal' burial metamorphic degradation of similar lavas in the Mount Reads, suggesting that this is localized hydrothermal alteration.

SAMPLE NUMBER: 27/10 80700E 76820N

SUMMARY:

This is a felsic lithic tuff composed of fragments of feldspar-phyric rhyodacite or dacite in a formerly vitric tuffaceous matrix of the same composition.

HAND SPECIMEN:

This is a buff to light grey and cream coloured fragmental felsic volcanic rock . It contains a variety of lithic clasts to 1cm across of feldspar-phyric felsic lava or crystal tuff.

THIN SECTION DESCRIPTION:

As is frequently the case for fragmental Mount Read Volcanics, the pronounced fragmental texture in hand specimen is considerably less obvious in thin section. Only three or four distinct lithic clasts are discernible in this thin section. They are all feldspar-phyric formerly glassy dacitic to rhyodacitic lava, and show the same primary and secondary mineral assemblages as the groundmass. Feldspar phenocrysts are slightly rounded and often fragmentary blocky euhedra of albite (pseudomorphing more calcic plagioclase). They are either clear and fresh, or show minor flecking by sericite. A single broken euhedral crystal now composed of strongly pleochroic green chlorite may have originally been augite.

The groundmass of the lithic fragments and the matrix of the entire rock sample consist of a fine-grained to microcrystalline quartz-albite mosaic, which has probably grown from devitrification of rhyolitic glass. The matrix is permeated by a fine meshwork of colourless to very pale green sericite. The main features distinguishing the lithic fragments from the remainder of the rock are small variations in the both the average grainsize of quartz-albite intergrowths and the amount of sericite in the groundmass. The lithic fragments and groundmass are not all products of a single explosive eruption, as at least three different lithologies are represented.

This sample differs strongly from otherwise very similar (in hand specimen) lithic crystal tuffs from the younger part of the Mount Read Volcanics (Tyndall Group and Southwell Subgroup) in the abundance of quartz phenocrysts in the latter, and their absence from this rock.

SAMPLE: 27/12 ~ 80650E 76,650N

SUMMARY:

This is a layered vitric ash or epiclastic sediment with a large vitric component which was wet-sediment deformed and has devitrified and recrystallized to a quartz-albite-sericite dominated assemblage.

HAND SPECIMEN:

On a freshly-cut surface, this sample is a finely-interbedded grey and white siltstone that shows excellent small-scale folds of wavelength from 1-2cm, and highly disturbed bedding. The folding is wet-sediment slump style folding rather than folding associated with brittle deformation. At least in hand specimen, this sample is more reminiscent of the Oonah Formation to me than fine-grained sediments interbedded with the Mount Read Volcanics.

THIN SECTION DESCRIPTION:

In thin section, the folded layering in this sample is defined by somewhat 'dirtier' more sericite+clay-rich layers and 'cleaner', more clay-poor and quartz-rich layers. Layering varies from less than 1mm thick to around 3mm thick. The bulk of the rock consists of fine-grained recrystallized quartz with minor albite and green chlorite. Although no former phenocryst outlines are noted, the groundmass textures in many places are suggestive of a formerly glassy ash or vitric tuff texture. True glass shard shapes have not been observed, yet the texture is unlike a typical detrital siltstone or shale. Much of it may be devitrified and recrystallized vitric ash layers. So despite the hand specimen similarity to the Oonah Formation (multiply-deformed Late Proterozoic passive margin deposit), in thin section the rock seems to have some formerly glassy volcanic component, and thus be part of the Mount Read Volcanics.

152

SAMPLE: 28/2 (float)

SUMMARY:

This is a well-preserved feldspar-phyric dacitic lava which had a glassy groundmass, now devitrified to quartz-albite-sericite-chlorite.

HAND SPECIMEN:

On a freshly cut surface, this is a pale-grey to pinkish, even-texture massive felsic lava with abundant feldspar phenocrysts, and sparse veining by black chlorite.

THIN SECTION DESCRIPTION:

Thin section examination shows this sample to be a well-preserved feldspar-phyric dacite. It contains around 5-8 modal% of well-formed to slightly resorbed and rounded albite phenocrysts. These often occur in glomeroporphyritic clots and show perhaps 30-50% alteration to sericite and olive green chlorite, together with minor epidote. Euhedral microphenocrysts of FeTi oxide are present but not abundant, and are generally altered at their margins to a leucoxene-type phase, probably composed of a microcrystalline aggregate of chlorite, biotite, epidote and possibly sphene. Crystalline green biotite has developed around some larger FeTi oxide grains.

The groundmass of this sample shows a chequered quartz-albite (±sericite ± chlorite) intergrowth texture characteristic of crystallization from devitrified felsic glass. Growth of irregular rosette-like quartz-albite intergrowths reminiscent of poorly-formed spherulites has pushed sericite-chlorite towards the margins of the growing rosettes, so that where well-developed (in plane polarized light), the greenish micas define almost a snakeskin-type texture separating adjacent cells of quartz-albite. I have not seen this texture develop from the fine-grained fragmental groundmass of a vitric tuffs, which usually show a far more heterogeneous groundmass texture; it seems characteristic of the devitrification of felsic glassy lava. In addition, the generally euhedral, non crystal fragment nature of the feldspar phenocrysts, plus their paucity relative to most crystal tuffs, suggest that this was a lava.

The sample is cut by several anastomosing veinlets of green chlorite-biotite.

153

SAMPLE: 28/5 8140OE 76000N

SUMMARY:

This sample was probably formerly a fragmental felsic volcanic or epiclastic rock which has been totally silicified. Pyrite is distributed throughout the rock, and also occurs in a hematite vein which cuts the rock.

HAND SPECIMEN:

This is a mottled grey-green fragmental volcanic rock which has been thoroughly silicified so that only a few dark green fine-grained lithic fragments are still discernible in a chalcedonic matrix. The rock is traversed by a hematite-vein up to 5mm thick, and contains plenty of dispersed pyrite euhedra.

THIN SECTION DESCRIPTION:

This sample consists almost entirely of a fine- to medium grained intergrowth of polycrystalline secondary quartz with intimately sutured grain boundaries and no fabric or preferred orientation. Occasional fans of strongly pleochroic green chlorite with anomalous deep purple (rock joke) birefringence are scattered throughout the quartz intergrowth, and generally associated with discrete pyrite cubes. The vein hematite mostly ocurs as bladed crystals intergrown with quartz and chlorite, but pyrite euhedra are not uncommon in the hematite vein.

SAMPLE: 28/6 8140E 76000N

SUMMARY:

This sample is thoroughly chloritized, and was probably a feldspar-phyric felsic lava or tuff; it contains relatively abundant pyrite.

HAND SPECIMEN:

This is a dark grey-green rather mafic-looking fine-grained and structureless rock cut by a number of quartz-pyrite veinlets, and showing several large (to 3mm) fresh and oxidized pyrite crystals.

THIN SECTION DESCRIPTION:

This sample is clearly highly altered in thin section. It consists of a weakly-foliated dense intergrowth of green chlorite and quartz (+minor albite). All the quartz is anhedral secondary aggregates, generally less than 0.2mm across, that probably grew together with the chlorite during the alteration event. There is no sign of relic primary phases or textures, except for a few possible 'ghost' outlines of former feldspar phenocrysts. Quartz-pyrite veins transect the rock both parallel to the weak foliation and almost perpendicular to it. They are composed of fine-grained polycrystalline mosaic intergrowths of quartz, often grown elongate perpendicular to the veins, together with minor albite and abundant pyrite. Pyrite euhedral are generally concentrated along the cores of veins, but are also plentiful as dispersed euhedra throughout the chlorite-quartz matrix of the rock.

Although a few ghost feldspar crystals may be present in this rock, it is impossible to tell whether it was formerly a lava, a crystal tuff or an epiclastic sediment; all primary textural features have been obliterated. The intensity of the chloritization is notable, and the degree of hydrothermal alteration of this rock is considerably greater in this rock than the majority of Mount Read Volcanics from the Mount Black-Tullah area which I have examined.

SAMPLE: 28/8 81555E 76,000N

SUMMARY:

This is a lithic tuff composed of lithic fragments derived from several different felsic to intermediate lavas or vitric crystal tuffs; it may have suffered strong leaching of potassium.

HAND SPECIMEN:

On a freshly-cut surface, this sample is a mottled cream and green felsic lithic tuff with a variety of feldspar-phyric felsic volcanic fragments to over 1cm long, with rather diffuse margins, in a fragmental tuffaceous matrix.

THIN SECTION DESCRIPTION:

As was already noted for sample 27/10, the fairly large volcanic fragments easily visible in hand specimen are mostly much less obvious in thin section. The rock is dominated by dacitic lithic fragments containing usually more than 15 modal% of feldspar crystal fragments in a fine-grained quartz-feldspar-chlorite groundmass. Unlike sample 27/10, the albite feldspars in this sample contain abundant small epidote granules, but no sericite alteration. A less abundant but easily discerned lithic fragment type consists of a trachytic-textured vitrophyric dacite or andesite with abundant tiny FeTi oxides in the groundmass.

The groundmass of this sample is heterogeneous and dominated by a quartz-chlorite-albite intergrowth probably largely after a vitric ash component. The style of alteration of this sample is one in which Ca released by calcic plagioclase alteration is retained in epidote as albite forms, but K has probably been totally leached from the system. The possibility exists that K, normally located in sericite in these samples, has been taken up in K feldspar in the groundmass; however, without further analytical work, the presence of very fine-grained K feldspar in the quartz-albite matrix cannot be verified (at least by me). The decided lack of pinkish tones in the hand specimen of this rock is unlike those pink-red Central Volcanic Sequence lavas from south of Queenstown which contain plentiful K feldspar in the groundmass.

SAMPLE: 28/9 ~ 80550E 77750N

SUMMARY:

This is a feldspar-phyric felsic crystal lithic tuff with lithic fragments of strongly-chloritized dacite or rhyodacite.

HAND SPECIMEN:

This is a massive, pink coloured felsic tuff containing several angular dark green lithic fragments to 1cm across, and diffuse chloritic veinlets.

THIN SECTION DESCRIPTION:

This rock is composed of abundant feldspar crystal fragments totalling at least 20 modal% of the rock which are all unaltered albite. They are set in a 'clean' fairly even-textured groundmass composed of a very fine-grained mosaic intergrowth of quartz, albite and possibly K feldspar (judging only by the lack of sericite in this sample and the pink colour of the rock). The groundmass is almost certainly derived from a felsic vitric ash that devitrified and crystallized as albite and quartz. Sparse FeTi oxide microphenocrysts are present, usually with altered margins.

The dark green lithic fragments visible in hand specimen are strongly chloritic feldspar-phyric crystal tuff similar to the bulk of the rock except for the abundance of chlorite. Veinlets composed of strongly pleochroic green chlorite and pleochroic very Fe-rich epidote cut the rock.

The angular nature and abundance of the feldspar crystals in this rock suggest it is a crystal lithic tuff

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SAMPLE No. 21/4 82000E 75420N (float)

LOCATION: Mount Black

SUMMARY:

This sample is a 'molasse-like' quartz-rich sandstone dominated by angular metamorphic-derived quartz grains and hematitized slatey, schistose or shaley rock fragments. It is probably a part of the Jukes Breccia, although ot is along way out of place on Mount Black.

HAND SPECIMEN:

This sample is a strongly ferruginized red and purple coarse sandstone or fine-grained conglomerate with abundant angular quartz and reddish cherty or shaley fragments to almost 1cm long.

THIN SECTION:

This sample is clearly a quartz-rich sandstone in thin section. Clasts are dominantly of two types, namely angular to subrounded quartz grains and fine-grained sedimentary or slate lithic fragments. Occasional large quartz grains are complex strained milky reef (?) quartz. Most quartz grains were angular, stressed metamorphic quartz, but have been thoroughly overgrown by silica-cement, so that grains interlock intimately, and a matrix component is virtually absent.

Lithic clasts are dominantly of the same lithology; these are more rounded fine-grained sedimentary or metasedimentary clasts in which individual minerals are not discernible with the exception of tiny muscovite or sericite flakes and very fine-grained Fe oxide dust. Sparse coarser-grained lithic clasts are strongly deformed and mineralogically

layered quartz-muscovite schists. Strongly zoned brown-, green and blue-pleochroic tourmaline are also likely to be derived from the same metamorphic source, or from a granitic terrain.

This sample is either a rather fine-grained version of the Misery Conglomerate (upper Dundas Group) which has more angular clasts than normal Misery Conglomerate, or else a sample of Jukes Breccia. If it is either of the above, it is a long way 'out of place', and may therefore represent float or a moraine pebble. I do not believe it is like anything I have ever seen within the Mount Read Volcanics. There is a total absence of volcanogenic detritus, with most grains being derived from a pelitic metamorphic source.

SAMPLE No. 21/3 82000E 75815N (float)

LOCATION: Mount Black

SUMMARY:

This sample is a sheared and chloritized rhyolitic lava dominated by quartz and sericitized feldspar phenocrysts, and abundant sericitic shears and streaks defining a weak foliation.

HAND SPECIMEN:

This is a deep grey-green sheared and chloritized crystal lithic tuff with a few dark lithic fragments to almost 1cm long in a foliated fine-grained matrix.

THIN SECTION:

In thin section, no lithic fragments could be discerned, suggesting that those indicated in the hand specimen description may be an artifact of curved, chlorite-rich domains enclosing less foliated, less chlorite-rich areas. The rock is a sheared and foliated sparsely quartz- and feldspar-phyric vitric crystal tuff or rhyolitic lava. Quartz phenocrysts are up to 1mm long and are generally fractured, resorbed subhedra. Feldspar phenocrysts are totally replaced by fine-grained sericite which have been smeared out to varying extents into the foliation. Sparse FeTi oxide phenocrysts are skeletal, and derived from former titanomagnetite phenocrysts exsolving ilmenite along octahedral planes, and having the remaining magnetite replaced by chlorite.

The groundmass of this sample was probably formerly glassy. It devitrified and recrystallized to an equigranular intergrowth of quartz, chlorite and albite and was then quite strongly sheared. Intense localized sericitization in veins and swirling masses broadly defining a foliation, and a fine-grained mesh of sericite pervades the groundmass.

I would argue that this was originally a rhyolitic lava rather than a tuff, since most of the (relatively sparse) phenocrysts are not angular fragments, as is typical of Mount Read crystal tuffs. It is perhaps atypical of the Central Volcanic Complex felsic lavas in being quartz-phyric; in this respect, it is more typical of the Tyndall-Southwell -upper Dundas Group felsic lavas, although these usually have quite a lot of zircons which I couldn't see in this sample. It is undoubtedly part of the Mount Read Volcanics.

PETROGRAPHIC REPORT

Rocks from Mt. BLACK E.L.

For Climax Mining Ltd. 23/4/89

by

Anthony J. Crawford
Geology Department
University of Tasmania
28/4/89

SAMPLE NUMBER: MBD1-1 36.7c - 36.8c m

SUMMARY:

This rock is a well-preserved feldspar-phyric dacitic lava or shallow intrusive very typical of the Central Volcanic Complex lavas of the central portion of the Mount Read belt.

HAND SPECIMEN:

This is a massive brown felsic lava containing about 5 modal% of feldspar phenocrysts in a uniform dark brown groundmass.

THIN SECTION DESCRIPTION:

This rock in thin seen is clearly a feldspar-phyric dacitic lava or shallow intrusive composed of around 5-10 modal% of albitized plagioclase phenocrysts in a homogeneous, uniform very fine-grained matrix. The plagioclase phenocrysts are euhedral to subhedral prisms to about 3mm maximum length which are sometimes intergrown in two- or three crystal glomerocrystic clots. They are occasionally broken crystals, and rounding of phenocrysts is minimal. The former calcic plagioclase phenocrysts have been thoroghly albitized, and minor streaking and flecking of the albite with sericite is common. Most phenocrysts are partially replaced by almost isotropic to highly birefringent granular epidote, which is almost colourless, implying a low Fe (Fe^{3+}) content. Some albite also contains small pools of clear calcite, and many phenocrysts are fractured and have narrow concentrations and bands of olive green chlorite along the fractures. The only other significant phenocryst phase is sparse equigranular crystals of FeTi oxide, always less than 0.5mm across. These appear homogeneous and unaltered in plane polarized light, but only a reflected light examination would show whether the more typical breakdown features (ilmenite exsolution and replacement by chlorite or sphene) of Mount Read Volcanics' FeTi oxides are present. Well-former zircon grains are commonly adhered to the FeTi oxide phenocrysts, and several quite large elongate zircon prisms are notable scattered through the groundmass. Sparse concentrations of bright green pleochroic chlorite may represent former ferroaugite crystal sites; shapes and replacement features of these grains are unlike a biotite precursor.

The groundmass of this sample is particularly uniform and even-textured, and composed of a fine-grained equigranular intergrowth of quartz and albite, with minor sericite flecking and more abundant green chlorite distributed evenly throughout. It is unlike groundmass textures developed in Mount Read Volcanics dacites which were originally glassy. No former flow banding or perlitic cracks are present and the texture is so uniform that an origin via devitrification of a former glass is unlikely.

Rather, I think the texture is more reminiscent of a very shallow intrusive (dyke?) dacite, or alternatively, of a lava originating in the central portion of a thick, massive flow.

The metamorphic assemblage albite-chlorite-quartz-epidote-calcite -sphene suggests conditions near the top of the prehnite-pumpellyite facies.

SAMPLE NUMBER: MBD1-2 43.04 - 43.10 m

SUMMARY:

This rock is almost identical to MBD1-1 in that it is a well-preserved feldspar-phyric dacitic lava or shallow intrusive very typical of the Central Volcanic Complex lavas. However, it shows prominent local zones of brittle fracturing *and calcite filling voids between jigsaw-fit breccia fragments.*

HAND SPECIMEN:

This is a massive, formerly glassy brown felsic almost aphyric lava which has been brittle fractured and brecciated in discrete zones at least1cm wide, with the development of fine-grained calcite in the brecciated matrix.

THIN SECTION DESCRIPTION:

In thin section, this sample is seen to be a feldspar-phyric dacitic lava with most features identical to MBD1-1, except for one important point. That is, this sample shows well-developed brittle fractures and angular intersticies which have opened up as small fracture-bounded fragments have rotated away from each other. These fractures and voids have been filled with fairly coarsely-crystalline calcite and minor euhedral secondary quartz crystallites. The maximum width of the calcite veins in thin section is around 1mm, but wider veins are obvious in the hand specimen. In other respects, such as phenocryst modal abundance and mineralogy, metamorphic assemblage, and groundmass grainsize and texture, this sample is so similar to #1 that they could well be from the same thick flow.

SAMPLE NUMBER: MBD1-3 58.08 - 58.20

SUMMARY:

This rock is a feldspar-phyric dacitic lava which has been transected by a 2cm thick zoned quartz-chlorite vein; this has bleached the dacite and produced more extensive sericitization in the dacite adjacent to the chlorite-rich side of the vein.

HAND SPECIMEN:

This is a contact rock between a massive but fractured brown felsic lava and a more pinkish, bleached felsic lava, with a 2cm thick quartz-calcite-chlorite vein developed along the contact. Chlorite in the vein occurs as irregular black masses concentrated along the lower (down-hole) side of the vein close to the bleached pink dacite.

THIN SECTION DESCRIPTION:

The unbleached brown dacitic section of this rock is virtually identical to the previous two samples, being a feldspar-phyric dacite with a groundmass texture slightly coarser-grained than normally seen in formerly glassy Mount Read dacites. The more pink, bleached area of the rock, on the opposite side of the quartz vein, is almost certainly part of the same original lithologic unit, but it shows notably more extensive sericitization of the groundmass, which is far murkier than in the fresher rock opposite. However, green chlorite is still relatively abundant in the groundmass of the more sericitized variant.

The quartz vein is seen to be composed dominantly of polygonal quartz, with grainsize varying irregularly along the vein. Coarse calcite grains are intergrown with the quartz and are almost always seen to be replacing and overgrowing the quartz. Quartz has been strained, and undergone subgrain recrystallization along many grain boundaries. Intergrown with the quartz and calcite is variably abundant masses of beautiful strongly pleochroic green chlorite, which occurs in the form of masses of small books and cleavage flakes. Chlorite, also, seems to be being replaced by calcite. This chlorite is clearly not replacing another phase, but has crystallized together with quartz from the fluids which formed the vein. In this respect, it may be considered as primary chlorite. There are no sulphides associated with either the vein or the bleached dacite.

SAMPLE NUMBER: MBD1-4 77.11 – 77.19 m

SUMMARY:

This rock is a feldspar-phyric dacite identical to the previous samples, which has been brecciated and chloritized. The order of crystallization of the secondary (vein) phases is quartz-> chlorite+quartz-> calcite+chlorite.

HAND SPECIMEN:

This is a massive brown felsic lava which has been pervasively fractured and veined by almost black chlorite and minor quartz over a width of around 2 cm.

THIN SECTION DESCRIPTION:

Like the previously described three samples, this rock was formerly a dacitic lava containing around 5 modal% of albitized plagioclase phenocrysts which show slight flecking by sericite. This rock has been fairly pervasively fractured over the area of the thin section, with dilatant zones opening between adjacent rotating fragments, which are rarely larger than 5mm. These angular dilatant zones are filled largely by strongly pleochroic green chlorite identical to that in the previously described section (#3). Variations in the (modal) density of chlorite produce the most obvious textural difference over the slide. In the cores of the widest veins, chlorite forms a dense mass of intergrown small plates in which minor calcite is the only other phase. Moving towards the margins of these veins, the brecciated texture of the rock becomes more pronounced as tiny fragments of dacite occur increasingly frequently embedded in the chlorite, until out into the body of the rock, chlorite becomes subordinate as a mesh through only slightly brecciated host rock. Narrow quartz veinlets are also common, and meander across the rock fragments, always stopping at fragment boundaries. This suggests that the episode of quartz veining preceded the main brecciation-chloritization event. Most of the quartz veins appear to be simply high strain zones within the rock along which groundmass quartz recrystallized, rather than being zones of introduction of quartz-rich fluids. Calcite has clearly followed both quartz and albite in the secondary mineral paragenesis. No sulphides have been observed in the rock.

SAMPLE NUMBER: MBD1-6 93-55 - 93-60

SUMMARY:

This rock is a well-preserved dark grey weakly feldspar-phyric dacitic lava.

HAND SPECIMEN:

This is a massive brown felsic lava containing about 2-5 modal% of feldspar phenocrysts in a uniform dark brown very fine-grained groundmass.

THIN SECTION DESCRIPTION:

This rock in thin section is seen to be almost identical to sample #1. It contains around 5 modal% of albitized feldspar phenocrysts to about 1mm long, that are slightly flecked by chlorite and sericite, and sparse FeTi oxide microphenocrysts which are altered to sphene and almost isotropic leucoxene in places.. The groundmass shows no features indicative of a formerly glassy nature, but shows an irregularly-developed slightly autobrecciated-looking texture, defined mainly by narrow and meandering discontinuous chlorite concentrations . This may be a weak fracture cleavage.

Veinlets of quartz and calcite and green chlorite transect the rock, and show evidence of grain growth under high strain. Minor calcite and sericite is speckled through the groundmass.

SAMPLE NUMBER: MBD1-7 110.04 - 110.16 m

SUMMARY:

This rock is a well-preserved massive feldspar-phyric dacitic lava or shallow intrusive very typical of the Central Volcanic Complex lavas, and identical to the better preserved dacites #1 and #6 described above..

HAND SPECIMEN:

This is an apparently remarkably fresh massive dark grey felsic lava containing about 3 modal% of feldspar phenocrysts in a uniform dark grey groundmass.

THIN SECTION DESCRIPTION:

Although this sample in hand specimen looks incredibly fresh, like any poorly-phyric Quaternary dacite or rhyolite from the SW Pacific, in thin section it is seen to be slightly more altered than samples #1 and #6. Nevertheless, with respect to most of the Central Volcanic Complex Mount Read Volcanics that I have seen, these lavas show notably minor alteration. In this sample, the groundmass is a mosaic of quartz, albite and minor sericite and chlorite with no sign of perlitic cracks or the characteristic patchy quartz-albite intergrowths typical of devitrification and recrystallization of former rhyolitic glass. However, as in the previous slide, parts of the thin section show almost brecciated-looking mottled groundmass textures, with "fragment" boundaries defined by extremely narrow chlorite concentrations. I think this texture is simply an expression of a fracture cleavage that cuts the core length at about 45^{o}.

This dacite is almost identical in every respect to the other less brecciated lavas described above, Several pseudomorphed small mafic phenocrysts now composed of chlorite with margins of opacite were probably biotite originally. This is supported by the occurrence of zircon crystals in several of the small altered phenocrysts. Sericite flecks both albite phenocrysts and the groundmass, as does very small patches of calcite.

SAMPLE NUMBER: MBD1-8 120.12 — 120.23

SUMMARY:

This rock is a feldspar-phyric dacitic lava virtually identical originally to the others described above. However, it has undergone local brecciation which was accompanied by intense sericitization of granulated areas. Quartz-calcite-chlorite veins obviously post-date the sericitization-brecciation event.

HAND SPECIMEN:

This is a massive dark grey felsic lava containing a few modal% of feldspar phenocrysts in a uniform dark groundmass. The rock shows a slight mottled appearance of the groundmass, and is cut by several narrow quartz veinlets.

THIN SECTION DESCRIPTION:

This rock was almost certainly a poorly feldspar-phyric dacite identical to the other rocks described above, However, it displays an unusual texture, evidenced by the mottling in hand specimen, which is rather difficult to interpret. Essentially, the rock contains large areas of what appears to be autobrecciation, although the homogeneous fragments are rarely larger than one or two mm. Many fragments show jigsaw fits along boundaries separated by intense sericite meshes and stockworks. Weaving throughout the rock, but generally cutting the core length at 30-45^{o} is a variably intense mesh of pale sericite that dominates the messy areas between fragments. Quartz-chlorite-calcite veins identical to those in samples described above clearly transect the sericite mesh.

I am not certain, but I think the apparent autobrecciation of this sample is an artifact of the alteration. That is, the rock comes from a 'hard-to-see-in hand specimen' crush zone within the dacite pile, and potassic fluids circulating through the rock at this time generated intense sericitization within the granulated rock between 'larger' fragments, as well as producing an orientated mesh of sericite along a poor fracture cleavage developed in the rock at this time. The quartz-chlorite-calcite veining is unrelated to, and post-dates the sericitization event.

SAMPLE NUMBER: MBD1-9 160.00 – 160.15 m

SUMMARY:

This rock was formerly a poorly feldspar-phyric dacitic lava, but intense localize brecciation and granulation permitted invasion by potassic fluids which extensively altered and sericitized the crushed rock, but left some fragments up to 1cm across asalmost unaffected 'islands' in the more altered and recrystallized rock.

HAND SPECIMEN:

This is an altered brown felsic lava showing strong and patchy sericitization and the presence of numerous 0.5-1cm fragments of less sericitized massive dark brown very fine-grained lava. Very thin layers of fine-grained pyrite occur on chloritized slickensides in the rock.

THIN SECTION DESCRIPTION:

The least-altered parts of this rock are identical to sample #1 described above. It was clearly a poorly feldspar-phyric dacitic lava but unlike the well-preserved sample #1, this rock has suffered brecciation and intense sericitization, leaving only cores of 'unaltered' dacite that in hand specimen look like non-cognate (exotic) fragments of very fine-grained lava in a slightly more coarse-grained tuffaceous matrix. In fact, I believe that the rock represents part of a dacitic lava flow which has been locally brecciated and granulated, allowing passage of superheated K-rich fluids which further brecciated, 'cooked-up' and reacted with the rock to produce large areas of paler-coloured and relatively coarser-grained recrystallized quartz-albite 'fragments' which have been pervaded by sericite. Larger fragments remained less susceptible to the alteration and probably rotated in the fluid-rich crush zones. As in the samples described above, the quartz-calcite-chlorite veinlets that also cut this sample clearly post-date the sericitization and brecciation, and in this sample contain minor pyrite.

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Petrography

of a

Suite of Rock Samples

for
Climax Mining Limited
PO Box 256, ~~Weston~~ Woden ACT 2606

by
Dr. Douglas R. Mason - MASON & MASON
PO Box 78, Glenside SA 5065

October 5, 1988

PETROGRAPHY OF SAMPLE MB6

Rock Name: Sericite schist (meta-tuff)

Petrography:

Volume percent	Component	Origin
80	sericite	metamorphic
15	cryptocrystalline quartz + feldspar	metamorphic
tr	rutile	metamorphic
5	carbonate+chlorite+quartz (after ferromag.)	metamorphic
100		

This sample is dominated by a weakly foliated matrix composed of sericite and minor cryptocrystalline quartz and feldspar. Traces of rutile are disseminated throughout.

Scattered through the rock are blocky aggregates of coarser grained carbonate, chlorite and minor quartz. The shapes of these aggregates and their mineralogy suggest that they represent altered ferromagnesian crystals.

The rock is likely to have been a tuffaceous volcanogenic rock, of intermediate composition.

PETROGRAPHY OF SAMPLE MB8

Rock Name: Hydrothermal breccia (meta-rhyolite fragments in hydrothermal quartz + chlorite matrix)

Petrography:

Volume percent	Component	Origin
	Fragments (meta-rhyolite)	
55	orthoclase	relict igneous
20	plagioclase	relict igneous
15	quartz	relict igneous
10	sericite	metamorphic
100		
	Matrix	
90-45	quartz	hydrothermal
5-50	chlorite	hydrothermal
5	plagioclase	hydrothermal
tr	rutile	hydrothermal
100		

This sample is composed of variable proportions of angular fragments of meta-volcanic rock in a matrix dominated by quartz and chlorite. Different modes are given above for the fragments and matrix.

The fragments, pale pink in hand specimen, are composed of small, flow-aligned plagioclase laths in anhedral grains of orthoclase and irregular grains of quartz. Fine grained sericite has partly replaced feldspar, and also forms irregular trails through the fragments.

The matrix is composed of variable amounts of quartz and rosettes of chlorite, with minor twinned plagioclase.

The mineralogy and textures suggest that rhyolitic lava suffered low grade regional metamorphism, with subsequent fragmentation during a hydrothermal event that resulted in deposition of the quartz + chlorite matrix.

PETROGRAPHY OF SAMPLE MB11

Rock Name: Xenolithic, hydrothermally-altered meta-andesite lava.

Petrography:

Volume percent	Component	Origin
20	plagioclase phenocrysts	relict igneous
40	quartzo-feldspathic groundmass	relict igneous
10	sericite	metamorphic
12	chlorite (incl. incipient biotite)	hydrothermal
10	carbonate	hydrothermal
tr	rutile	hydrothermal
5(-15)	xenoliths (meta-acid volcanic)	xenoliths in lava
100		

The rock is composed of pale, off-white, angular to subrounded xenoliths in a dark matrix.

Texturally the rock is dominated by relatively large plagioclase phenocrysts, sometimes in glomerophyric aggregates, that lie in a fine grained quartzo-feldspathic groundmass. Fine grained sericite, probably of regional metamorphic origin, has partly replaced the groundmass feldspar.

Significant amounts of green chlorite, with incipient brownish biotite patches, have partly replaced the groundmass in patches and irregular trails. Patches of relatively coarse grained carbonate have partly replaced plagioclase phenocrysts.

The textures and mineralogy are consistent with this sample having formed by eruption of andesitic lava with rhyolitic xenoliths, subsequent low grade regional metamorphism, and late hydrothermal alteration.

PETROGRAPHY OF SAMPLE MB17

Rock Name: Altered meta-dacite lava

Petrography:

Volume percent	Component	Origin
15	plagioclase	igneous phenocrysts
2	quartz	igneous phenocrysts
1	rutile (after igneous Fe-Ti oxide)	hydrothermal
42	groundmass feldspar + quartz	relict igneous groundmass
25	sericite (after groundmass feldspar)	metamorphic
10	carbonate (after plag. phenocrysts)	hydrothermal
5	chlorite (after plag. phenocrysts)	hydrothermal
100		

Phenocrysts of resorbed quartz and altered plagioclase are scattered through an altered quartzo-feldspathic groundmass.

The dacitic bulk composition is evident from the mineralogy of the phenocrysts and the felsic groundmass. The non-fragmented, glomerophyric nature of the plagioclase phenocrysts strongly suggests a lava origin, not a pyroclastic.

Alteration may have occurred in two separate events. Earlier low grade regional metamorphism generated the fine grained sericite that pervades the groundmass, and later hydrothermal alteration caused partial replacement of plagioclase phenocrysts by carbonate and chlorite.

PETROGRAPHY OF SAMPLE MB26 8014 807731

Rock Name: Altered meta-rhyolite lava

Petrography:

Volume percent	Component	Origin
15	plagioclase	igneous phenocrysts
54	quartzo-feldspathic groundmass	relict igneous
25	sericite (after feldspar)	metamorphic
5	biotite	hydrothermal
tr	chlorite	hydrothermal
tr	opaques (?sulphide)	hydrothermal
tr	rutile (after igneous Fe-Ti oxides)	hydrothermal
tr	epidote (zoisite) (after plag. phenos.)	hydrothermal
100		

The rhyolitic bulk composition of this rock is evident in the abundance of quartzo-feldspathic groundmass. The non-fragmented, glomerophyric plagioclase phenocrysts indicate extrusion as a lava.

Fine grained sericite has pervasively altered the rock, affecting both groundmass and phenocrystic feldspar. The weak foliation defined by sericite in the groundmass suggests that it may have formed in response to a low grade regional metamorphic event.

Other alteration minerals may have formed in response to a later hydrothermal event. Greenish brown biotite developed in irregular scattered patches, and also as flakes in discordant veinlets. Also present in the thin veinlets is quartz, minor green chlorite, and opaque granules (?sulphide) partly oxidized to reddish brown iron oxides.

PETROGRAPHY OF SAMPLE MB30 8014 829730

Rock Name: Altered dacitic ignimbrite

Petrography:

Volume percent	Component	Origin
20	plagioclase crystal fragments	dacitic volcanic origin
21	dacitic lava fragments	dacitic volcanic origin
15	attenuated pumice fragments	ignimbritic volcanic origin
23	matrix chlorite	alteration (metamorphic/hydrothermal)
2	clinozoisite	alteration (metamorphic/hydrothermal)
2	sericite	alteration (metamorphic/hydrothermal)
15	matrix quartz + feldspar	relict volcanic fragments
2	rutile (after Fe-Ti oxide)	alteration (metamorphic/hydrothermal)
100		

Several textural features suggest an ignimbritic origin for this rock: abundant crystal fragments, abundant volcanogenic lithic fragments, and attenuated pumice fragments (best seen on sawn surface in hand specimen).

Alteration has generated abundant green chlorite, which forms foliated mats and anhedral aggregates in the matrix of the rock. Anhedral grains of clinozoisite have partly replaced plagioclase crystals. Traces of very fine grained sericite are also present in the plagioclase crystals. Very fine grained rutile has completely replaced crystal fragments of Fe-Ti oxide.

PETROGRAPHY OF SAMPLE MB28 8014 912728

Rock Name: Meta-dacite lava

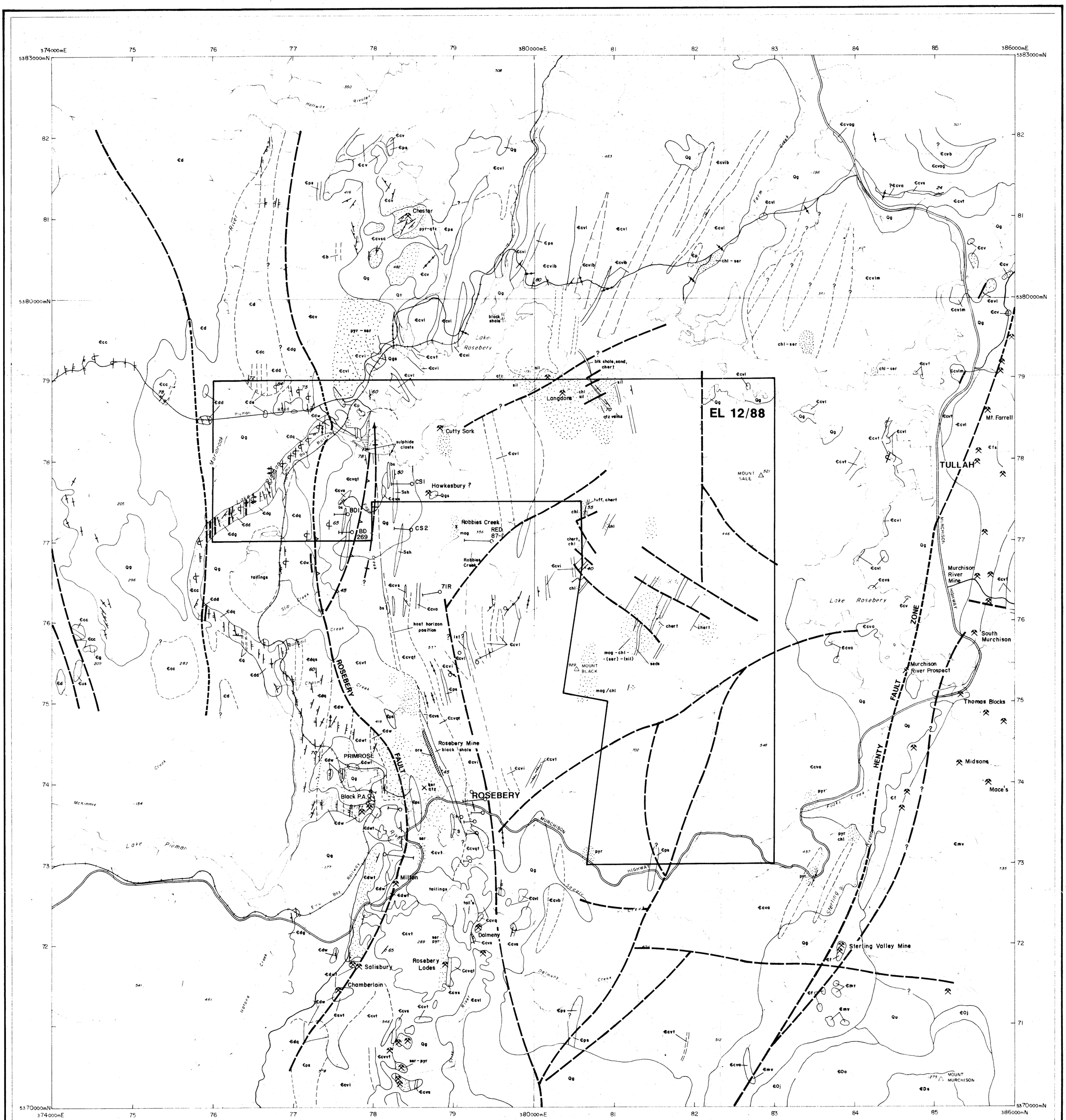
Petrography:

Volume percent	Component	Origin
20	plagioclase	relict igneous phenocrysts
44	groundmass feldspar + quartz	relict igneous groundmass
20	sericite	metamorphic
10	green biotite	metamorphic
5	epidote (clinozoisite)	metamorphic
tr	chlorite	metamorphic
1	rutile (after igneous Fe-Ti oxides)	metamorphic
100		

The relict mineralogy and texture of this sample indicates that it is an acid lava of dacitic bulk composition.

Alteration mineralogy includes sericite (after phenocrystic and groundmass feldspar), green biotite and chlorite (commonly as anhedral groundmass patches, but also as blocky patches after primary ferromagnesian grains), clinozoisite (after phenocrystic plagioclase), and rutile (after primary Fe-Ti oxide euhedra).

There is no evidence in this rock to distinguish different alteration events, as in other MB-series samples. It is possible that all alteration phases were formed in response to a single metamorphic/hydrothermal event.



QUATERNARY

Qu	Qg	Talus and scree deposits
	Qt	Glacial deposits mostly till

EARLY ORDOVICIAN / LATE CAMBRIAN

€Oo	€Oj	Volcaniclastic conglomerate, sandstone, breccia, minor siltstone - correlate of Jukes Conglomerate

CAMBRIAN

€d	€p	Quartz-feldspar porphyry
	€ps	Felsic intrusive, commonly spherulitic, feldspar-qtz-phyric
	€g	Gabbro dolerite
	€b	Basalt
	€us	Ultramafic rocks and serpentine
	€dc	Conglomerate, polymict, with fuchsite clasts in some units
	€dd	Dolomitic siltstone and sandstone with minor conglomerate
	€ds	Dominantly shale and siltstone, usually micaceous
	€dq < €dqs	Quartzwacke interbedded with black phyllitic mudstone, grey siltstone, minor conglomerate (€dq). Some dominantly siltstone units (€dqs)
	€dw < €dwf	Lower sequence of interbedded lithicwacke, siltstone, mudstone and quartz-feldspar-phyric tuff of White Spur Formation (€dw). Some tuff units (€dwt) indicated

CAMBRIAN

€cv	€cvi	Felsic pyroclastic rocks, including tuff, breccia, vitric ash. Generally feldspar-phyric (€cvt)
	€cvag	Fiamme-bearing eutaxitic tuff of ignimbrite type. Some block-and-ash flow units shown (€cvib)
	€cvt	Lithic breccia and agglomerate
	€cvxt	Crystal tuff, crystal-lithic tuff, commonly bedded
	€cvvt	Fine grained vitric tuff
	€cvql	Quartz-feldspar-phyric tuff, often with lithic clasts
	€cvs	Shale, siltstone, minor tuff. Units of chert or chert-pyrite rock as indicated (€cvsc)
	€cvi < €cva	Dominantly feldspar-phyric lava of rhyolitic, dacitic or andesitic composition (€cvt). Some units of andesitic lava (€cva). Sequence of hornblende-phyric lava and minor tuff at Mackintosh Bridge area (€cvlm)
	€cvb	Basaltic lava
€f	€fs	Slate, sandstone and tuff sequence of Farell Slates (€f). Some dominantly slates units (€fs)
€mv	€mvt	Felsic volcanics, dominantly quartz-feldspar-phyric, of Murchison Gorge area (€mv). Some units of dominantly tuff (€mvt)

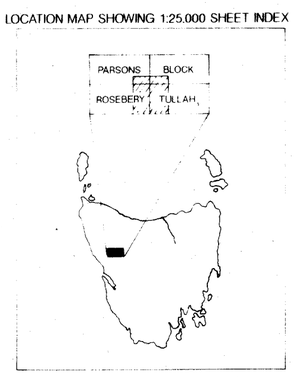
ser	sericite
pyr	pyrite
chl	chlorite
qtz	quartz

- Geological boundary - accurate or approximate
- Geological boundary - inferred or concealed
- Fault - accurate or approximate
- Fault - inferred
- Fault - concealed
- Major fold - axial surface trace
- Strike and dip of bedding - facing known, overturned, facing unknown, vertical
- Banding in volcanic or igneous rock
- Minor fold with plunge
- Diamond Drill Hole
- Mine
- Dyke or vein

Geology compiled from

1. **Corbett & McNeil 1986. Geological** Survey of Tasmania - Rosebery - Mt Black area
2. Billiton (Aust) 1986 TCR 86:2622
3. EZ Co 1979 TCR 82:1738
4. EZ Co 1985 TCR 85:2516

LOCATION MAP SHOWING 1:25,000 SHEET INDEX



SCALE 1:25,000

0 500 1000 2000 m.

AUSTMIN GOLD - CLIMAX MINING JOINT VENTURE

TASMANIA

MOUNT BLACK PROJECT

EL 12/88

5 cm

GEOLOGY

89-3000

602179

Fig. 2

AUTHOR: R.Hine	DATE: September.1988	PROJECT No.
SCALE: 1:25,000	DRAWN BY: W.H.S.	DRAWING No.

AUSTMIN GOLD - CLIMAX MINING JOINT VENTURE

TASMANIA
MOUNT BLACK PROJECT
EL 12/88

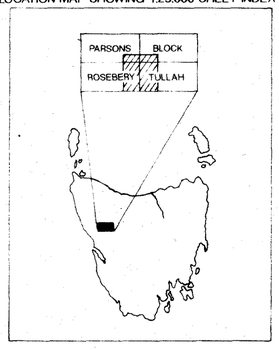
5 cm

GEOCHEMISTRY / MINERALIZATION

Fig. 3

AUTHOR : R.Hine	DATE : September.1988	PROJECT No. :
SCALE : 1:25,000	DRAWN BY : W.H.S.	DRAWING No. :

LOCATION MAP SHOWING 1:25,000 SHEET INDEX



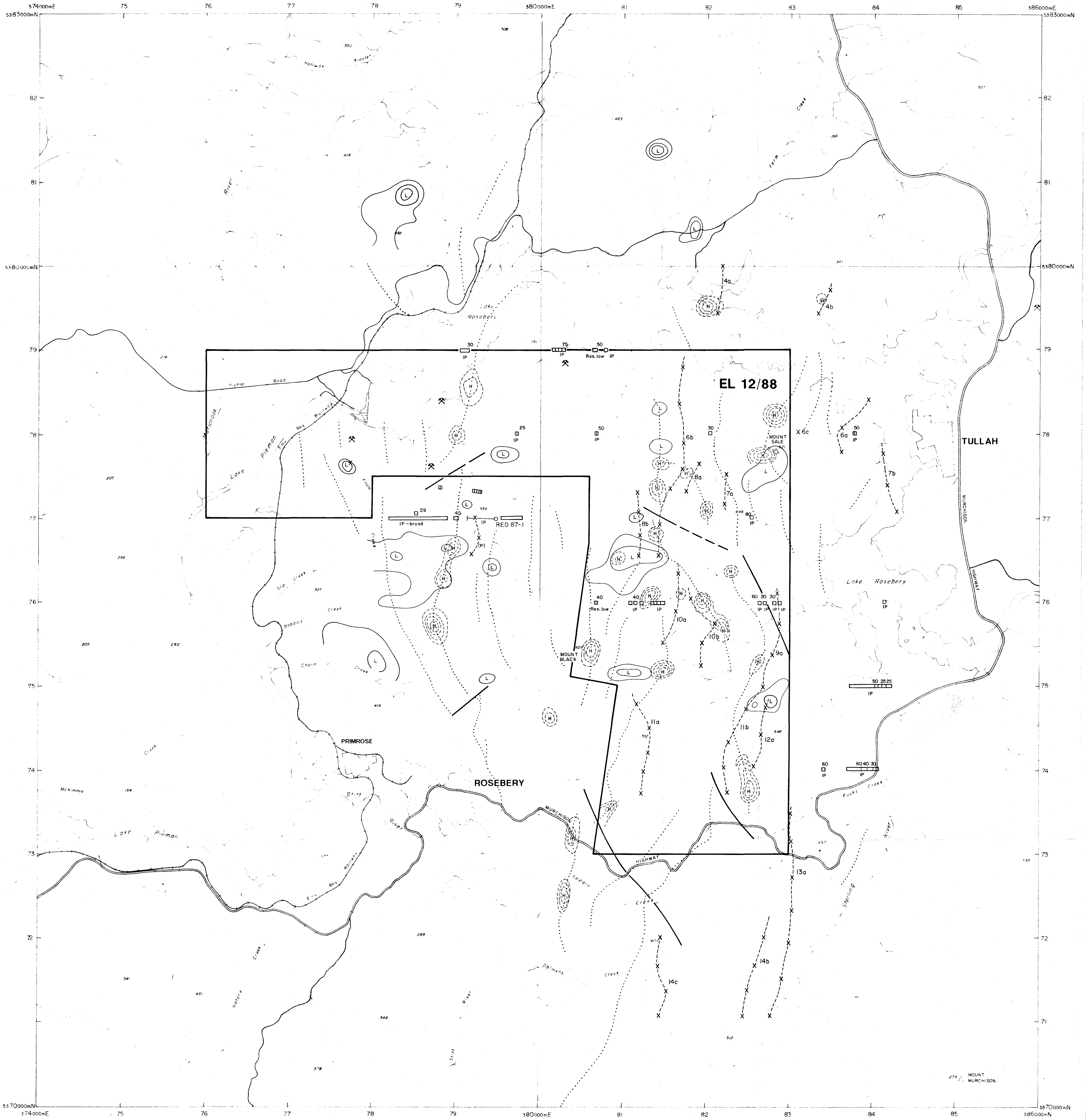
SCALE 1:25,000

0 500 1000 2000 m.

- o 50 Pb EZ Pb in soil
- 100 Pb EZ Pb in soil
- 100 . Zn EZ Zn in soil
- 35 . Cu EZ Cu in soil
- x 900 Ba Rock sample site
- Bulk cyanide leach Au results in ppb
- Stream sample site results in ppm
  - ( ) = -120#
  - [ ] = -20 + 40#
  - { } = -40 + 80#
- EZ stream sample site (TCR 71/785) Anomalous results (-80#) (TCR 82/1738)

602180

89-3000



UTEM Anomaly (p) projected

CSAMT Conductive zone

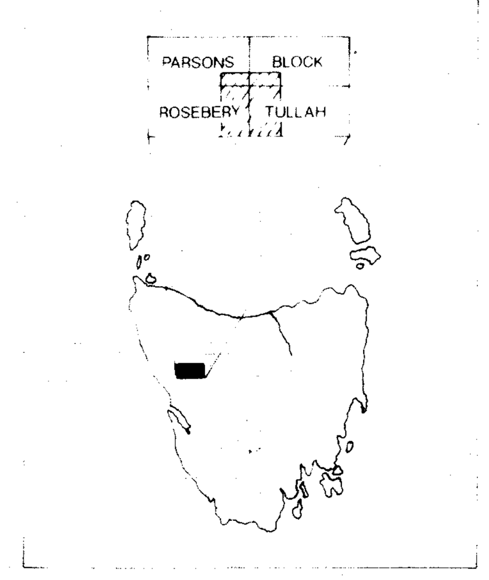
□ 29 TURAIR Anomaly (TCR 72-864)

IP 30 IP Anomaly with depth to source metres

Dighem Magnetic anomalies and trends

Dighem Resistivity contours

LOCATION MAP SHOWING 1:25,000 SHEET INDEX



SCALE 1:25,000

0 500 1000 2000 m

AUSTMIN GOLD - CLIMAX MINING JOINT VENTURE

TASMANIA

MOUNT BLACK PROJECT

EL 12/88

5 cm

602181

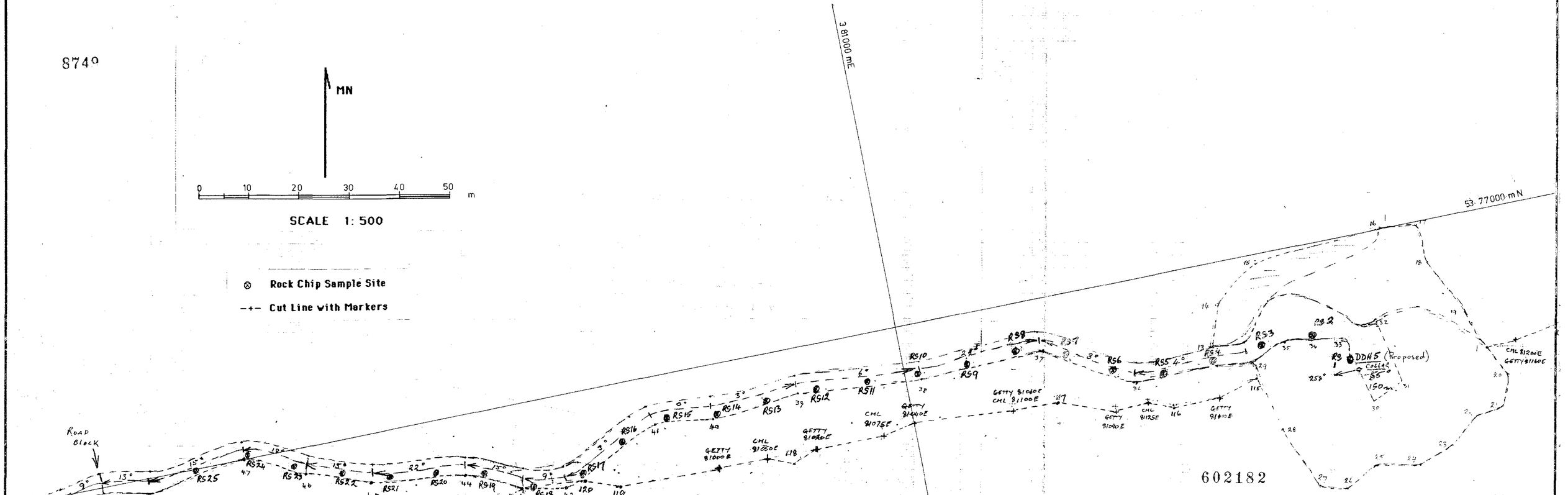
GEOPHYSICS

Fig. 4

AUTHOR R.Hine	DATE September, 1988	PROJECT No.
SCALE 1:25,000	DRAWN BY W.H.S.	DRAWING No.

89-3000

8749



602182

CLIMAX MINING - AUSTRIN GOLD JV

MT BLACK EL 12/88

ROCK CHIP SAMPLE LOCATIONS

Line 77,000 mN

Drawn: R. Hina	Project No. EL 12/88	Date: June '88
Traced:		Drawing No. Fig 6

8750

81000 E

82000 E

83000 E

78000 N

77500 N

77000 N

76500 N

76000 N

75500 N

75000 N

6B

8B

10A

10B

MBD 1

MBD 2

MBD 3

MBD 4

H

MT BLACK

BOUNDARY

EL 12/88

LEGEND

- Feldspar-phyric dacite lava / altered
- Tuffaceous sediments
- Dolerite dykes
- H — Dighem magnetic anomalies
- UTEM anomalies (positions recovered from) Shell flagging
- Diamond drill hole
- Vehicle track
- Surveyed cutline

5 cm

GN MN

12.1°

0 100 200 300 400 500 m

SCALE 1:5,000

602183

8750

CLIMAX MINING – AUSTMIN GOLD
Joint Venture

Mt Black Grid
DRILL HOLE LOCATIONS
GEOLOGY

DRAWN: R Hine	DATE: July '89
Drawing: Fig. 8	Project: EL12/88

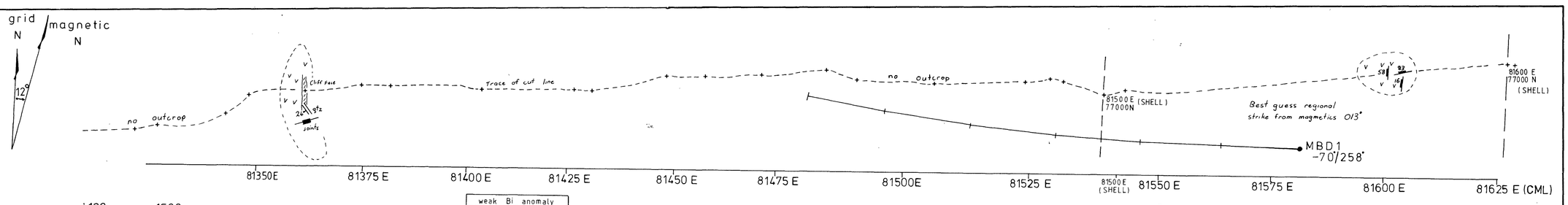
89-3000

8751

PLAN

5377000 N

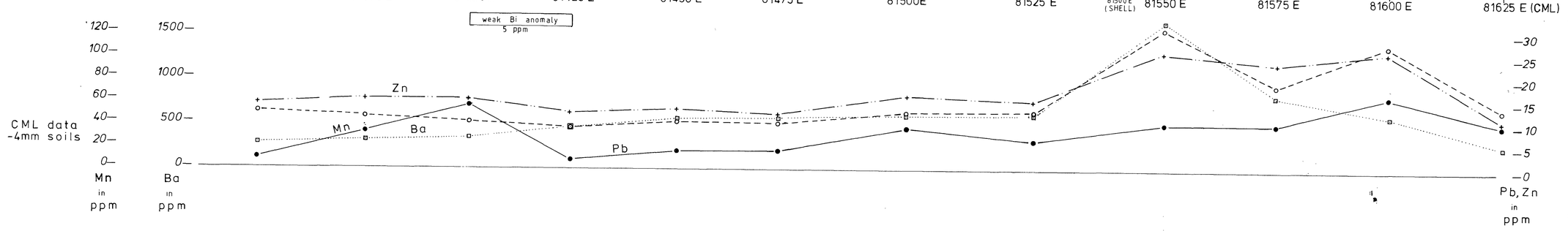
Scale 1:500



PROFILES

5377000 N

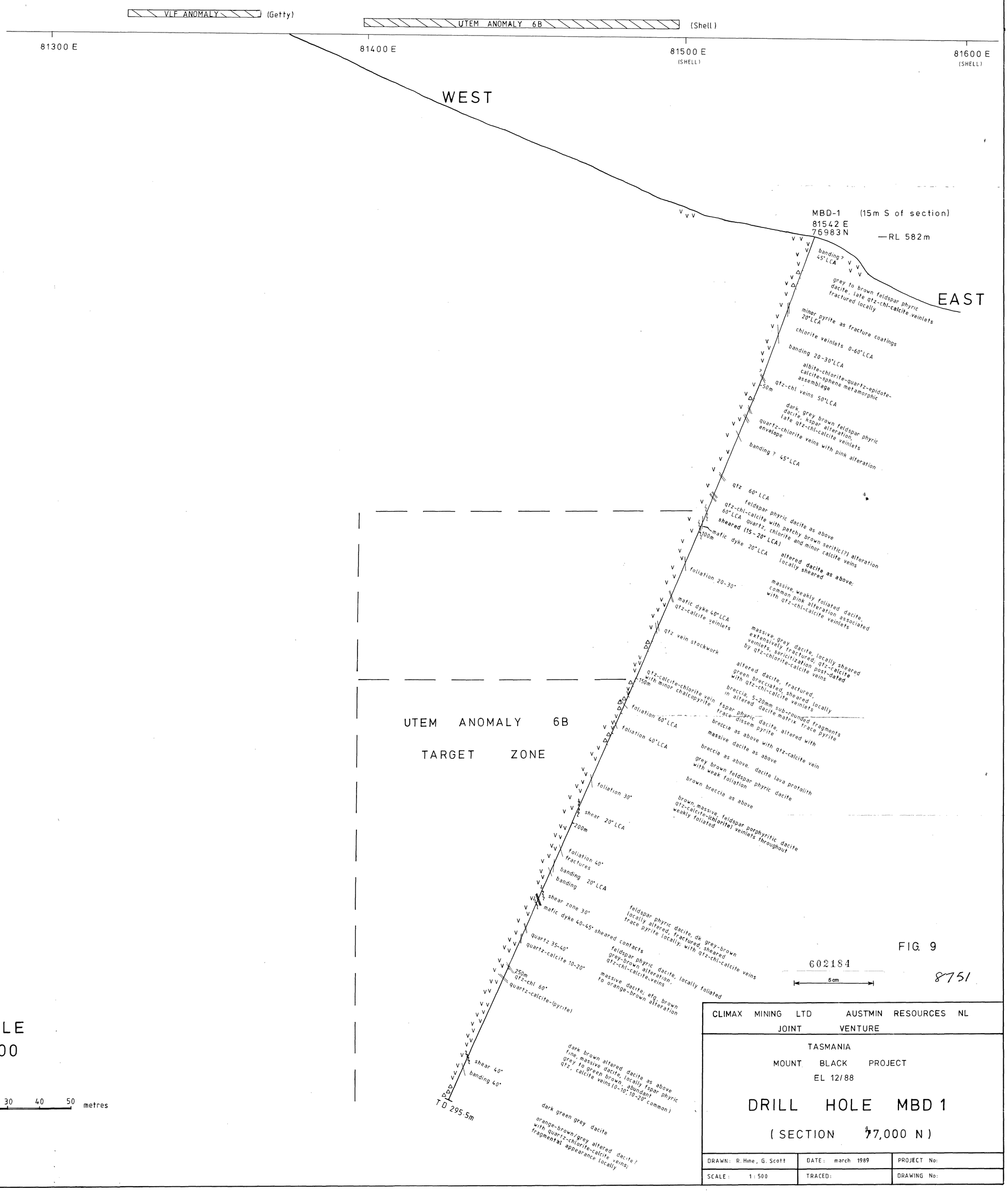
Scale 1:500



SECTION

5377000 N

Scale 1:500



SCALE
1:500

0 10 20 30 40 50 metres

FIG. 9

602184

5cm

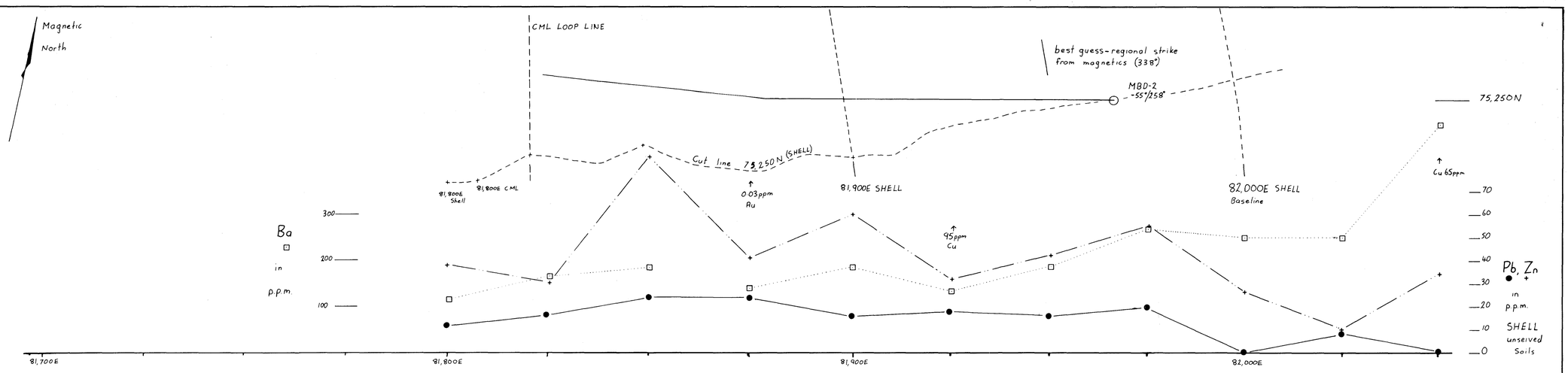
8751

CLIMAX MINING LTD / AUSTMIN RESOURCES NL JOINT VENTURE		
TASMANIA MOUNT BLACK PROJECT EL 12/88		
DRILL HOLE MBD 1 (SECTION 77,000 N)		
DRAWN: R. Hine, G. Scott	DATE: march 1989	PROJECT No:
SCALE: 1:500	TRACED:	DRAWING No:

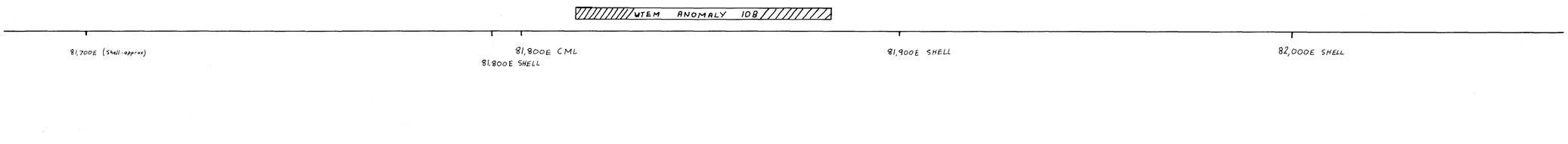
89-3000

8752

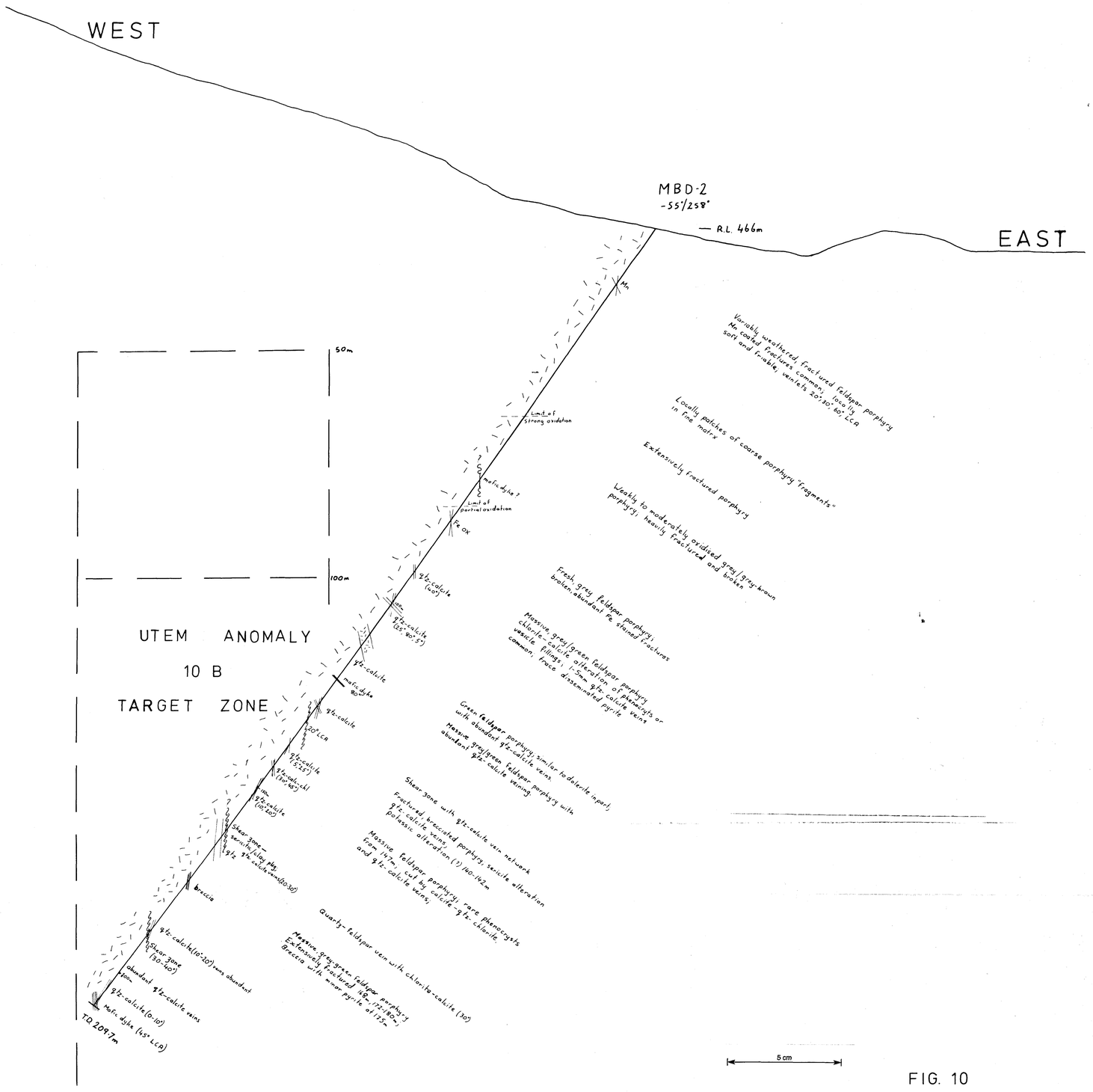
PLAN
75,250 N



PROFILES
75,250 N



SECTION
75,250 N



SCALE
1:500

0 10 20 30 40 50 metres

5 cm

FIG. 10

8752.

602185

CLIMAX MINING LTD JOINT VENTURE	AUSTMIN RESOURCES NL

TASMANIA

MOUNT BLACK PROJECT

EL 12/88

DRILL HOLE MBD 2

(SECTION 75,250 N)

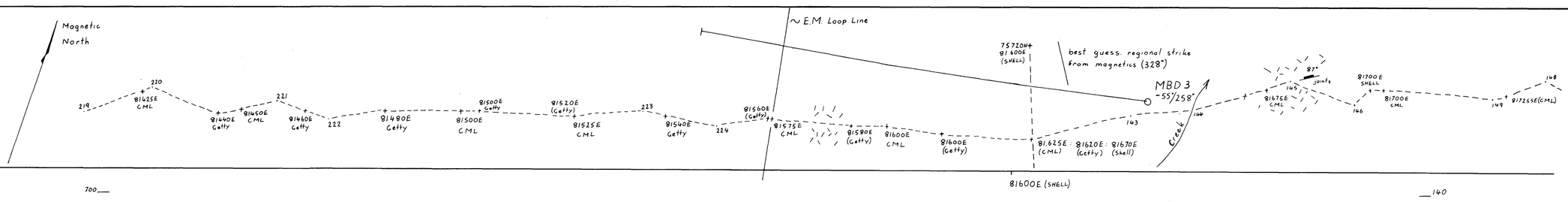
DRAWN: R.Hine, G. Scott	DATE: march 1989	PROJECT No:
SCALE: 1:500	TRACED:	DRAWING No:

89-3000

8753

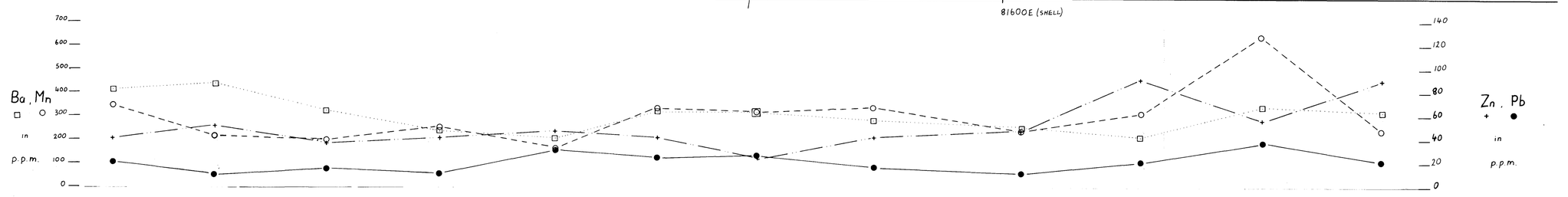
PLAN

75,700 N



PROFILES

75,700 N



SECTION

75,700 N

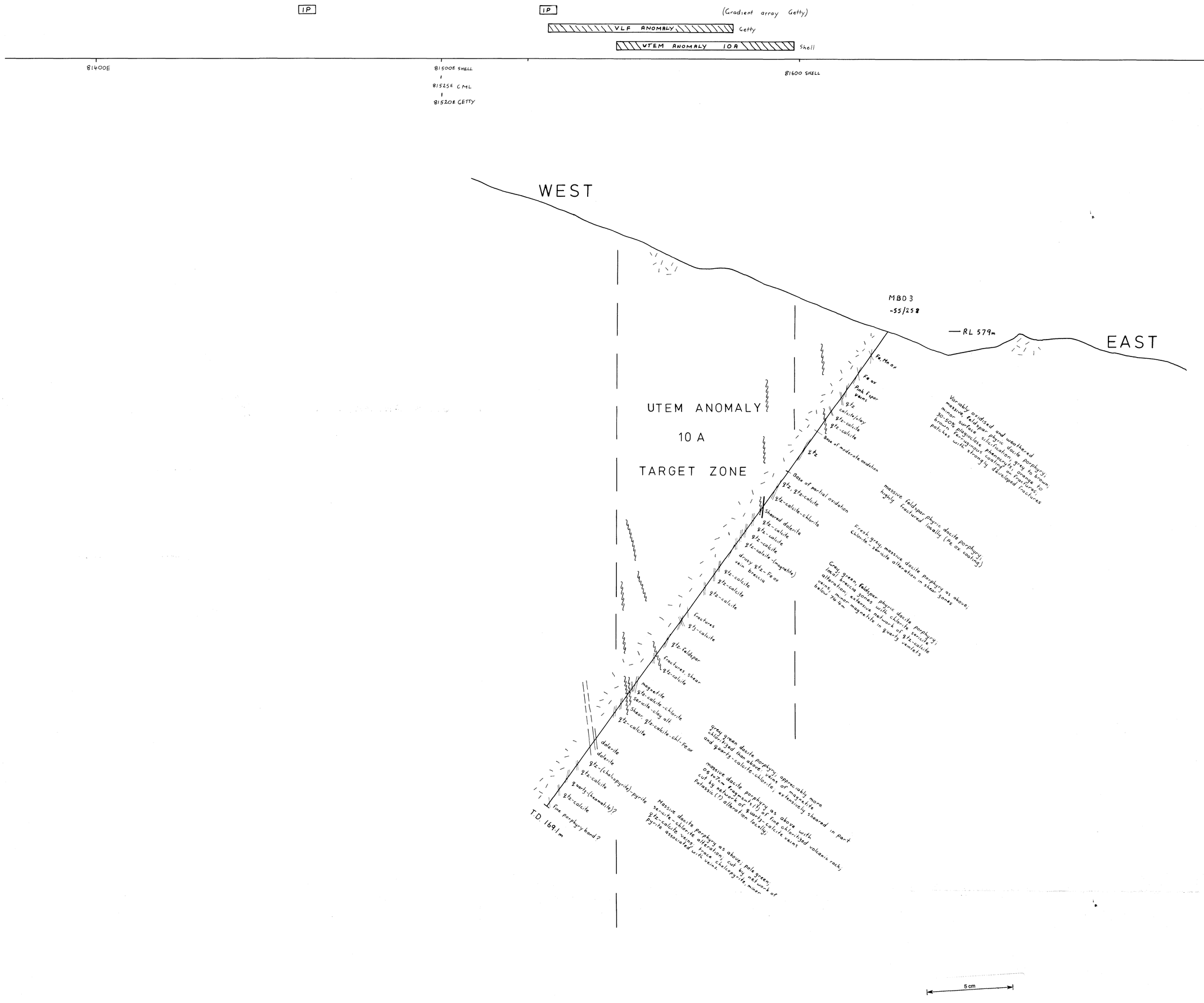


FIG. 11

8753

602186

SCALE
1:500

0 10 20 30 40 50 metres

CLIMAX MINING LTD AUSTMIN RESOURCES NL
JOINT VENTURE

TASMANIA
MOUNT BLACK PROJECT
EL 12/88

DRILL HOLE MBD 3

(SECTION 75,700 N)

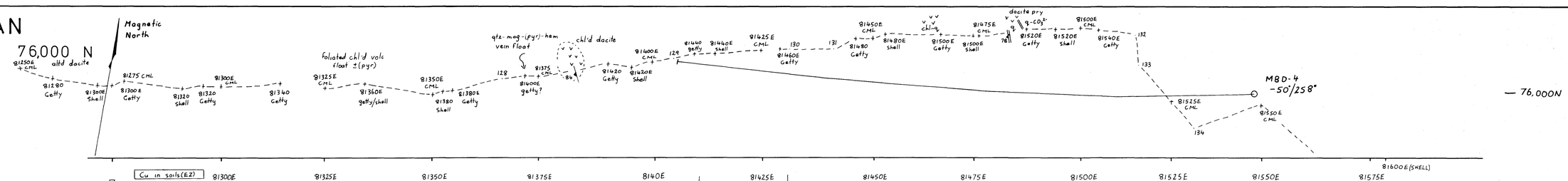
DRAWN: R Hine, G Scott DATE: march 1989 PROJECT No:
SCALE: 1:500 TRACED: DRAWING No:

89-3000

8754

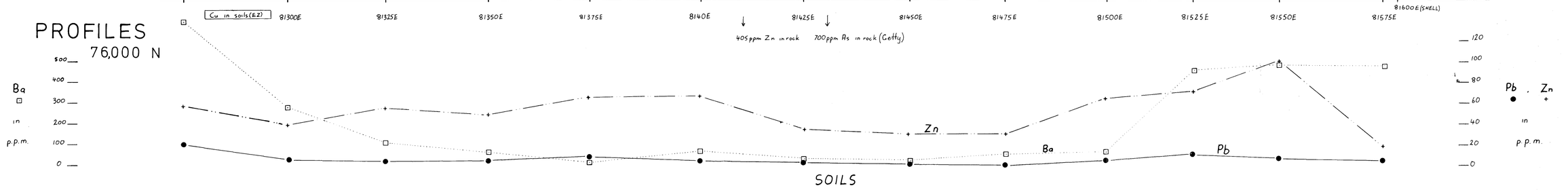
PLAN

76,000 N



PROFILES

76,000 N



MAGNETIC HIGH (DIGHEM)

IP ANOMALY (Getty - EZ)

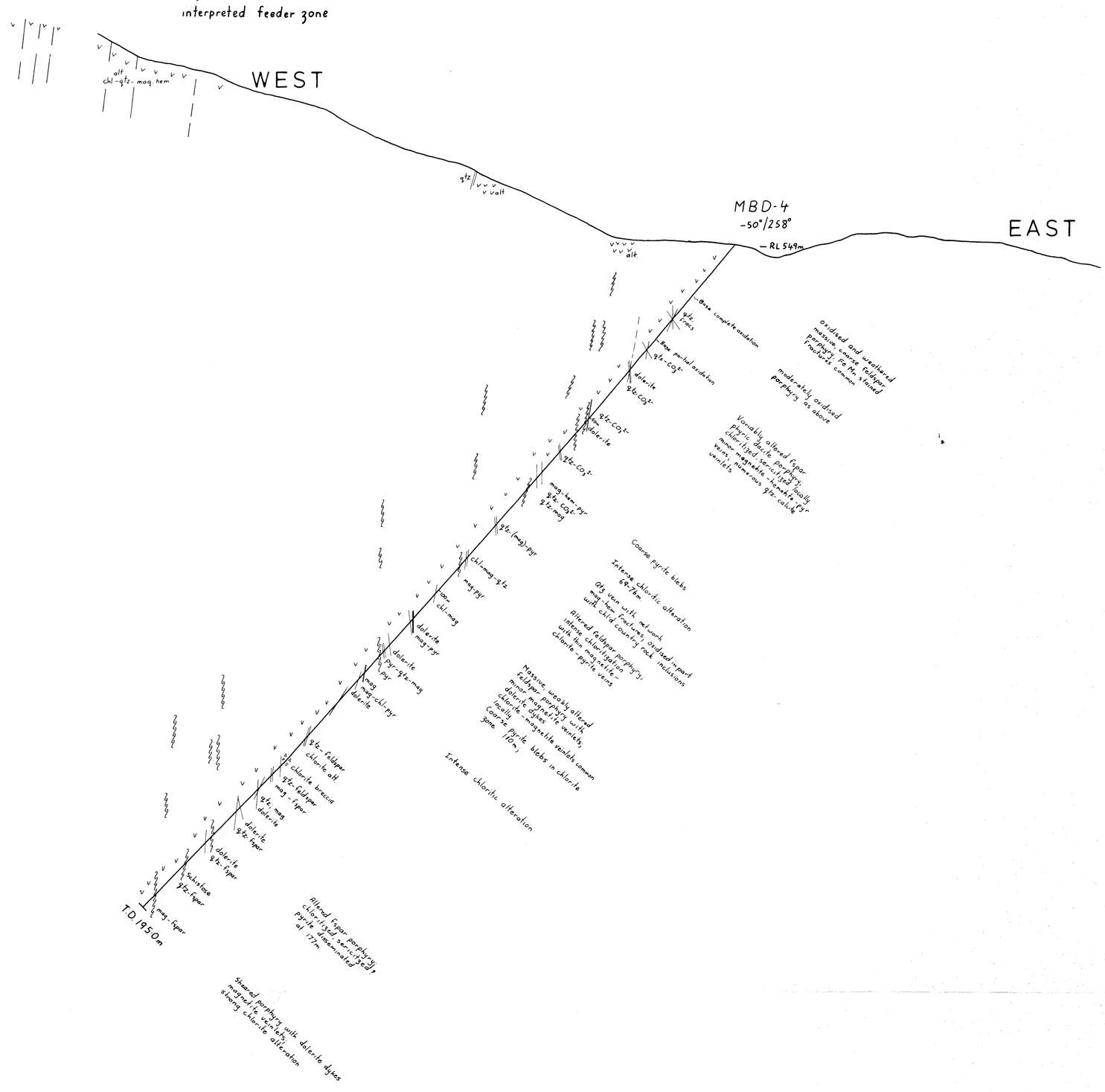
81380 SHELL
81380 GETTY
81350 CML
81400 SHELL
81480 SHELL
81480 GETTY
81450 CML
81,500 Shell
81,575E Shell (approx)
81600E

SECTION

76,000 N

Chlorite-magnetite-(hematite)-quartz-(pyrite) alteration zone

interpreted feeder zone



SCALE
1:500

0 10 20 30 40 50 metres

5 cm

FIG. 12

602187 8754

CLIMAX MINING LTD AUSTMIN RESOURCES NL JOINT VENTURE	
TASMANIA MOUNT BLACK PROJECT EL 12/88	
DRILL HOLE MBD 4 (SECTION 76,000 N)	
DRAWN: R Hine, G. Scott	DATE: march 1989 / PROJECT No:
SCALE: 1:500	TRACED: / DRAWING No:

89-3000