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ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

West Coast Mines

# Report on Exploration in EL 1/62 Mt. Black carried out during 1971-72

by

D.H. Reinhardt

Report No. 108

June 1972

AMG REFERENCE POINTS ADDED

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## 1. Introduction

EL 1/62 was granted in January 1962 and is renewable at six monthly intervals. The licence contains the Lead-Zinc-Copper deposits of the Rosebery and Hercules Mines which have minimum recorded production figures of 7,600,000 tons at June 1971 of average grade 5.6% Pb, 18.2% Zn and 0.56% Cu. This report deals with a semi-regional assessment of the area which attempts to trace the extent of the favourable lithological horizons of the mines and to define more favourable areas for detailed exploration.

## 2. Summary

Investigations over some five square miles of the Primrose Pyroclastics has revealed rocks which are potential hosts for Rosebery Type strataform Cu Pb Zn deposits along a strike length of some 4 miles with the possibility of another 2 miles more favourable rocks being found in the next field season.

Geology, Geochemistry, Geophysics, and Diamond Drilling have defined several areas worthy of more detailed investigation. Advances have been made in the structural interpretation of the region south of Hercules Mine which enhances the potential of the area by showing that the Hercules Host Rocks may underly much of the south western part of the Mt. Black licence. The Rosebery Mine Horizon has been traced for 3 miles south of the Residue Dams and interpretation of airborne geophysical data shows that it may persist for another 1½ miles further to the south. The field work has shown the intensive prospecting carried out around the turn of the century and potential ore bodies will almost certainly be blind. Considering the fact that; all other factors being equal; an orebody discovered in close proximity to an existing infrastructure is potentially more profitable than one where these have to be provided, and the favourable environment of the area, it is concluded that a vigorous attempt should be made to assess the area thoroughly over the next 5 to 7 years. It is envisaged that expenditure will increase considerably in the Mt. Black licence to carry out this assessment.

## 3. Recommendations

These will be discussed under the following headings;

### a. Basic Planning

1. Establish an ongoing research programme based upon similar lines to which Brathwaite carried out his Ph D studies.

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The resulting Thesis, although not agreed with in all aspects, placed the geological work in the area on a firm, up to date, scientific basis and has brought forth thought, discussion and action. Similar programmes on areas being explored and tested must benefit geological appraisal out of all proportion to the small $6000 per annum needed to keep such a programme going.

2. Establish a 5 or 7 year plan for exploration work to assess the area, this would include budget proposals etc. and ensure that the progress of the investigations attained the desired level of effort.

3. Investigate alternative, and cheaper means of carrying out major investigation expenditure items such as diamond drilling i.e. use outside contractors; open hole deep drilling for half its depth etc.

b. Proposed Programme for 1972-1973

1. Rosebery Lodes

The area N and S of 68S should be trenched where possible for exposure and rock geochemistry and depending upon results a diamond drill hole drilled beneath the old adits to test the extent and grade of the disseminated mineralisation observed in the dumps and backs.

Two diamond drill holes should be sited on Rosebery Lodes Horizon to test Conductor 17 and also the host rocks, above the siliceous footwall zone. A programme of 3 deep diamond drill holes sited as on Plate 3 is proposed. These are proposed to be drilled over the next 2 years and will test the Rosebery Lodes horizon in depth. Using rock geochemistry on the core obtained from all holes, try to define patterns and trends both within the Host Rocks and in the Footwall Rocks which may be used as ore guides.

2. S. Hercules - White Spur Grid

Extend this grid to the east to cover the eastern limb of Hercules Anticline and the projected southern strike of the Rosebery Mine Horizon. This will also cover anomalies revealed in the TURAIR survey.

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Trench and carry out rock geochemistry on geochemical Anomaly A where possible and in conjunction with 5 line miles of Turam surveying site 3 diamond drill holes to test conductors 4, 7 and 8 and geochemical anomaly A. This drilling will also help to evaluate the structural interpretation proposed for the area.

3. Dallwitz - N. Hercules Grid

Additional line cutting, pegging, mapping and soil sampling is recommended between D 96N and D 32N to more closely define the copper anomaly. Trench and carry out rock geochemistry over these soil anomalies and site 3 diamond drill holes to test the mapped bedded rocks within this horizon. Extend the grid east to cover the area of Conductor 12 and carry out mapping and soil sampling. Reduce grid spacings on the northern end of Hercules Mine and carry out soil geochemistry and Turam traversing to locate Anomaly 53. Approximately 5 line miles of Turam surveying will be required to more closely define TURAIR conductors 11 and 12 and Anomaly 53 on the ground.

4. Colebrook Ridge

The area west of the Primrose Pyroclastics contains sediments contemporaneous with these volcanic, which may be linked with some of the sedimentary lenses mapped in the volcanics. This area also contains massive pyrrhotite bodies similar to those which contain cassiterite at Renison Bell and has several old tin mines along the western side of the ridge. A strong copper nickle anomaly was detected in a stream on the northern side of the Ring River during stream geochemistry. It is proposed to establish a grid over this area, which is heavily timbered, and carry out mapping, soil geochemistry, and magnetics to test the possibilities of

1. Strataform sulphide bodies in sediments the same age as the Primrose Pyroclastics.

2. Massive Pyrrhotite - Chalcopyrite - Cassiterite bodies similar to Renison Bell.

3. Copper Nickle orebodies associated with the ultrabasics on the western side of the ridge.

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To facilitate access to the area a bulldozed track would be pushed to the top of the ridge and along its length.

4. Location Topography and Access

The EL covers 49 square miles on the west coast of Tasmania centredon Rosebery and Williamsford and has a rugged relief with elevations between 300 and 4200 feet. Dense forest with thick "horizontal" undergrowth covers much of the area. Where this has been burnt out during the periodic bushfires the area experiences, it has been replaced with regrowth of equally impenetrable bowera and sword grass. An area on the Mt. Read-White Spur plateau is covered with low button grass and mosses while the gullies disecting the area are densely forested. Access to the area under investigation was confined to cut grid lines between the residue dams and the Mt. Read-Hercules track. By March 1972 a new road had been pushed along the Bald Hill Spur to Mt. Read by the P.M.G. and the baseline of the grid cut along the Stitt. River Valley lies within 1000' of this road. Field work was slow due to the lack of vehicle access, very rough walking conditions, steep slopes, lack of experienced field assistants and severe winter weather.

5. Previous Investigations and Background to Present Investigation

The Company's record in assessing this ground it has held for over 10 years is poor . The only previous attempt at a regional assesment was the Natone Valley Induced Polarisation Survey covered by E.Z. report No. 85. The survey covered an area along the Natone Valley because it was thought that the Rosebery Mine Host Rocks had been faulted to the west on the south end (Cottle pers comm). Other investigations in the area have been attempts at proving continuations of ore in small prospects discovered in the late 1890's and early 1900's. These are covered by Electrolytic Zinc Report No.'s.

14. Lease 291 Williamsford Area Ag Pb Prospect.
16. Black P.A. Tin Mine.
49. 1st Report on Koonya Mine.
59. Jupiter Pb Zn.
46. Report on Dalmeny.
74. Colebrook Prospect.
102. Exploration at Jupiter Copper Prospect.

Report No. 105; "Ore Localisation and Potential for Rosebery and Hercules type Orebodies in Mt. Black Exploration Licence" by R.L. Brathwaitemade a regional assessment outlining the Primrose Pyroclastics as the target area and setting out the features of importance in assessing the area.

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R.L. Brathwaites Ph D study investigated the Rosebery Mine geology in detail and has set a firm geological base for exploration work in the area. During 1969 a stream sediment geochemical survey was initiated as the first stage of an assessment of the EL. This work was completed in areas which were accessible by two day walks by April, 1971. In mid 1970 the author and Geologist G.J. Turner were inspecting outcrop around the new residue dam when fragments of Host Rock were noticed in the fill of the new dam wall. These were immediately traced to the contractors burrow area and subsequently black slate and barite outcrops were found in the Rosebery Lodes area. This information, along with stream geochem. results gave impetus to a more detailed field assessment of the Primrose Pyroclastics.

Areas within the Primrose Pyroclastics were selected on the basis of

1. Presence of strong anomalies in the stream sediment work.

2. Old mapping by Loftus-Hills and Dallwitz which showed the MP-Black Slate boundary of Rosebery Mine continuing south through Rosebery Lodes to a point north east of Hercules Mine

3. Hercules Mine Host Rocks were to be traced north and south to find their relationship with siltstone lenses to the south and north east.

## 6. Field Procedures

1. Grids. See Plate 1. A 5200 ft. long grid was established in August-September 1970, over Rosebery Lodes exposures and to the south. Cross lines 2000 feet long were established at 400 ft. centres. This grid was not worked on until the author was relieved of Rosebery Mine Geology in March 1971. Since then this grid has been extended 2400 feet further south on 800 foot centres.

An 8000 X 4000 ft. grid has been cut south west of Hercules Mine on 800 foot centres and subsequently extended 1200 feet further to the north. Intermediate lines on 200 ft. centres have been established over one area of anomalous soil geochem. values.

A 10400 ft. long grid has been established south from the Rosebery Lodes Grid to the Hercules Mt. Read track with cross lines on 800 ft. centres. This grid was extended to the west across the northern projection of the Hercules Host Rocks.

These grids have been pegged on 100 foot plan intervals making slope corrections with Abney Level or Brunton Compass. Slope corrections commonly exceed 30 ft. in the hundred.

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2. Mapping

Field mapping has aimed primarily at defining lithologies and Brathwaites terminology has been used and rock types related to lithologies in Rosebery Mine where possible. Because of the poor field conditions the mapping is not as detailed as possible but a balance had to be achieved between areal cover and detail and with 800 foot grid spacings it is felt that the aims of the survey have been achieved.

3. Geochemistry

An orientation survey carried out over parts of the Rosebery Lodes Grid in late 1970 indicated that "C" horizon sampling was the best to detect anomalous bed rock values. Of course it is not always possible to sample "C" because of glacials, scree, or poor soil profile, and logs of auger holes have been kept and interpretation takes note of the particular material sampled. Cu Pb Zn Ag Mn Ni Mg Cu and Se have been analysed for at different times but it was found that Cu Pb and Zn were quite satisfactory in showing anomalous bedrock areas.

7. Geology Geochemistry Geophysics

1. Regional Geology

The surveyed area covers part of the outcrop of the Primrose Pyroclastics which are a formation of the Mt. Read Volcanic Group. This group forms part of the Mt. Read Volcanic Arc which extends north from Elliott Bay in the south to east of Waratah where it describes a 100° arc and trends east to Deloraine. The arc was formed along the edge of the stable Tyennan Geanticline in early Cambrian and vulcanism extended along the arc in a relatively narrow belt until late Middle Cambrian. Sediments were deposited contemporaneously along the seaward margin of the volcanics and extended across to the Rocky Cape Geanticline. Consideration should be given to similar conditions existing along the margin of this stable block as existed in the Mt. Read Volcanic Arc with its resulting ore deposits.

The Primrose Pyroclastics consist of several thousand feet of crystal,; vitric and lithic tuffs with some interbedded siltstone - crystal tuff - black slate lenses. Two of these bedded units within the Primrose Pyroclastics contain the orebodies of the Rosebery and Hercules Mines.

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Bedding is not displayed ubiquitously in these Host Rocks but Brathwaite (pers comm.) considers the presence of some bedded units indicating a a sedimentary environment as a necessary part of any sequence which contains ore. The area underwent folding in both the Jukesian Orogeny and the Tabberaberan Orogeny along north south trends and this folding is now being recognised in the southern area of the grid and will be discussed in separate sections.

2. Grid Geology Geochemistry Geophysics

a. Rosebery Lodes. Plates, 3, 4, 5, 6, 7

The sequence has been traced from 700N to 4000 S by diamond drilling and trenching and has overall similarity to Rosebery Mine Sequence (see plate 4 ). Beyond 24S trenching along the old Howard's Mill Tramway shows the sequence coarsening to crystal tuffs. Brathwaite P.42 states that this rock type forms a distinct band above the lead zinc orebodies on the north and south ends of the mine. Similarly to the north and south of the footwall siltstone band in RLP147 154 and 159 we have crystal tuffs. This coarser rock type is interpretted as a lateral and vertical change of facies related to sedimentation around a small basin margin or shallow water areas. Rosebery Mine and Rosebery Lodes may be part of the same basin or separate basins. The actual connection may have been up or down dip of the present surface. If the two areas are part of the one basin it greatly enhances the possibility of finding economic mineralisation south of the Residue Dams. Brathwaite, states that he sees no reason for the black slate lithology to be deposited in separate areas; it should be formed in one sedimentary environ with special conditions of supply and deposition. Geochemistry and mapping indicates the Rosebery Lodes sequence continuing beneath soil and scree cover to 68 S and beyond. At 68 S some 300 feet of chloritic siltstones are exposed in a creek and in two adits driven into the bank. These adits have trace pyrite and chalcopyrite mineralisation exposed in the dump material and in the backs.

At 32 S in a creek bed the footwall rocks are much finer grained and very siliceous and although no Quartz Schist textures are developed this area may be correlated with the Quartz Schist zone of Rosebery Mine.

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The significant mineralisation at Rosebery Lodes is that outlined in RLP 147 154 159 161 and 162. The last four holes each intersected thin; less than 18" of economic grade sulphide on the same stratigraphic level, just above the footwall pyroclastics. This is the same stratigraphic position as the ore in Rosebery Mine. These intersections of strata bound mineralisation indicates the potential of the area. In Rosebery Mine the "Halo" of uneconomic mineralisation (grade or width) can be extensive as shown in plate 3. For the following reasons it is felt that the drilled area at Rosebery Lodes is in this "Halo" zone.

1. Lithologies encountered in drillholes are slightly coarser and less favourable; compare with 12 Level 1500N to 3400N or lithologies in 48R 50R.

2. Barite mineralisation in RLP 147 is increasing in width and % $BaSO_4$ with depth indicating better barite grades deeper.

3. The footwall siltstone band is becoming slightly thicker down dip and to the south indicating a thicker and more favourable development in depth.

4. Mineralisation is becoming finer grained and more characteristic of Rosebery Ore to the Sand in depth as seen in RLP 154 and RLP 159.

Economic mineralisation, if it exists at Rosebery Lodes, could be several hundred feet away from these intersections in the mineralisation plane.

Other mineralisation encountered in short EX holes and on the surface is not in the same stratigraphic position as Rosebery Ore and deeper drilling indicates that it does not persist in depth. The following questions need to be answered by further investigations.

1. Is the mineralisation encountered in RLP 154, 159, 161, 162 increasing in grade and width at depth.

2. Is the sequence becoming finer grained in depth and thus more favourable for ore development.

3. Is a Quartz Schist band being developed in the footwall pyroclastics thus indicating a footwall alteration zone.

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4. Are the gradational lateral boundaries of the footwall siltstone band pitching and opening up more strike length in depth for a more favourable development of lithologies.

Koonya - Grand Centre

These Lead Zinc Copper Iron occurences lie several hundred feet in the footwall of Rosebery Lodes Horizon and their presence indicates that metals were available in the area south of Rosebery Lodes. These occurences in sheared siliceous tuffs may be the trace of mineralizing fluids which moved up into the sedimentary basin. The absence of any large area of favourable Rosebery type Host Rocks detracts from their potential as Lead Zinc orebodies but the area warrants further investigation for copper at a later stage in the programme.

Geophysics

With the depth already achieved by drilling at Rosebery Lodes it is doubtful if geophysics will be helpful in defining deeper drilling targets. Because of potential sulphide thicknesses and depths IP can be ruled out as a tool. The TURAIR survey conducted over the area in March 1972 detected two conductors along Rosebery Lodes Horizon. Conductor 19 possibly detected the mineralisation encountered in the drillholes to 24S while conductor 17 lies along the horizon in an area from 32S to 42S which is underlain by a more siliceous footwall. The geology of the footwall section of the Host Rocks is not known because of lack of exposure and steep slopes which preclude bulldozer trenching. This area warrants further testing.

b. South Hercules - White Spur Grid. Plates, 13 to 21.

Mapping on this grid has revealed several important features of the Geology of this area.

1. Sedimentary units within the volcanics are more extensive than was previously thought.

2. Extensive coarse lithic-tuff-breccia horizons can be traced several thousand feet along strike and are much more common than is apparent in the Rosebery Mine.

3. It appears that a major anticline is present in the footwall of Hercules Mine and on line 00 between 1W and 5W the sequence footwall schists-slate-coarse pyroclastic breccia indicates that the western limb of the anticline has parts of Hercules Horizon preserved.

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This anticlinal structure trends approximately 240° grid and the footwall rocks continue to the east of the present grid. In Rosebery Mine at least 3 periods of sedimentation are represented by the Mine Host rocks and two black slate bands within the Massive Pyroclastics. The numerous bands of sedimentary rocks in the grid area are repeated by a complementary syncline and it is felt that at least 3 horizons of sedimentation are recognisable separated by breccias and crystal and lithic tuffs. The sediments of the Rosebery Group possibly connected with some of these horizons and the Crimson Creek Formation approaches to within a few hundred feet of one of them in outcrop.

As can be seen from Plate 13 most of the area mapped is believed to consist of Hercules Mine hanging wall rocks or their lateral equivalents and Hercules Mine Horizon interpretted as outcropping 11 to 12E on line 48 probably underlies much of the southern part of the grid.

An old adit discovered on line 52S at 10W has galena sphalerite mineralisation in a quartz siderite vein cutting crystal tuffs. The important feature of this mineralisation is the presence of very fine grained sphalerite similar to high grade Rosebery or Hercules ore. This vein is not more than 100 feet from a mapped sedimentary unit along which quartz siderite veins are mapped for in excess of 1000 feet. In and around L lode M lode open cut at Hercules Mine massive quartz is present as a lateral continuation of the orebodies and the possibility that the mineralisation in the adit has been remobilised from orebodies within the bedded unit should be considered strongly.

Cross sections on plate 21 are an attempt to define the structure and although, as these models are applied along strike, variations occur it is felt that they fit the proposed structure reasonably considering the wide grid mapping, poor outcrop, and large changes in elevation.

There are 3 significant geochemical anomalies revealed by soil sampling, see plates 14-20. Anomaly A lies around 8W-15W with a strike of 3400 feet from lines 32S to 66 S. The anomaly is shown by lead and partially by Zn and Cu. Plate 19,20 shows contoured values for Pb and Zn. There is probably significant down hill dispersion on these slopes of up to 40° and the location of sedimentary units is shown for comparison with anomaly peaks.

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Anomaly B lies along the footwall-hanging wall contact of the W limb of the Hercules Anticline which on line 00 has a slate horizon outcropping at 3W. The anomaly runs from 24S to 12 N with Pb, Zn and Cu showing the anomalous zone on 4 lines and Pb alone on the remaining 2. Once again significant downhill dispersion has probably taken place. The anomaly lies 1000 feet vertically below the top of the ridge in steep heavily timbered terrain.

Anomaly C lies along a sedimentary unit from 24S to 12N and is less developed as a thin Pb and in parts Zn and Cu anomaly. This anomaly is some five hundred feet vertically down the hill from Anomaly 2. Lines 40, 48, 64, 72 and 80 show two small mainly lead anomalies over or close to mapped sedimentary units.

The Turair survey completed in March 1972 defined 5 conductors in the present grid area and their positions relative to geochemical anomalies are shown on plate 2 These conductors are No's 3478 and 10 in Seigel's accompanying report where they are discussed in detail. Conductor 10 lies along the Hercules Mine Horizon slightly in the footwall side. Allowing for probable irreducible errors in flight path positioning it is felt that this anomaly reflects mineralisation in the Hercules Horizon. The search for additional ore in Hercules Mine area itself will be the subject of a separate report, with detailed recommendations for final evaluation of Hercules Mine before closure, to be made in the future.

Seigel ranks Conductor 7 as being the most significant, the conductor lies to the east of Geochemical Anomaly A on flight path positioning. The associated sedimentary unit dips steeply west and the position of conductors will have to be checked with ground Turam. There is a possibility that the conductors may in part be related to sedimentary units which have slight or no geochemically anomalous values associated with them.

c. Dallwitz - N. Hercules Grid Plates 8 to 12.

Mapping on this grid has revealed a horizon of fine to medium grained sheared chloritic tuffs which lie east of and along the baseline. On 3 lines 72, 64 and 48 bedded fine grained sediments are found with, on line 72, bedded disseminated pyrite.

Pyrite is found, up to 15% as disseminations in and along the footwall of this horizon from D80N to D48N.

This horizon is a continuation of the Rosebery Mine - Rosebery Lodes Horizon and is overlain to the east by medium to coarse grained crystal, lithic, and vitric tuffs and coarse breccia. A thin 50' thick siltstone lens exposed by the new PMG road near line D32N has a very steep W dip and there is the possibility of folding and flexure along this horizon. This horizon from D32N to D80N has the features which are important for defining areas of favourable interest

a. bedded rocks indicating sedimentary environment.

b. geochemical highs indicating enrichment in metals of economic interest.

c. footwall alteration zone with disseminated pyrite.

Geologically this area is the best target yet found.

The main feature of the mapping north of Hercules is an outcrop of crystal tuffs on line 32N at 29W which may be a lateral equivalent of the Hercules Horizon. No distinct Hercules Host Rocks were mapped for 3200 ft. north of the Mine but exposure is poor.

Soil geochemistry (re plate 12) has revealed a strong copper anomaly from line D48N to D80N. The values 300-500 ppm on 2 lines are very high for the Mt. Black area.

The TURAIR survey has outlined 5 conductors on this grid, No's 11, 12, 13, 14 and 15 in Seigels report. Conductor 11 lies very close to a thin 50 foot thick siltstone lens outcropping near line D32N. The conductor trends to the NW on the northern end but very steep west dips are recorded in this lens. Further investigation of this lens is warranted.

Conductor 12 lies to the east of a strong copper geochemical anomaly over a bedded unit dipping east at 55°. The conductor however lies too far to the east to be related to this feature unless flight path recovery is out. A minor geochemical anomaly on line D64N at E may be related and further investigation is required.

Conductor B is along strike from known pyritic mineralisation as seen in the new road to the PMG repeater station. Geochemical sampling will be carried out over the area but the anomaly is probably related to the known pyrite mineralisation. Conductors 14 and 15 lie, except for their northern extremities in the footwall of the main sedimentary horizon and geochemical sampling in part of

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this area shows low background values. Where these conductors approach the sedimentary horizon near D104N a moderate to strong Cu geochemical anomaly is found and further work here is justified.

Anomaly 53 on the northern strike extension of Hercules Mine warrants further geochemical and geophysical ground follow-up as rocks which may be lateral equivalents of Hercules Host Rocks line on Line D32N at W.

The magnetics over this grid area and to the south, show the general low background of acid volcanic units. Superimposed on this background are a series of thumb-print anomalies of the order of 30 to 100 gammas. The trend probably continues in the area where no magnetics were recorded due to instrument malfunction. Along this trend are Turair conductors 11, 9 and 6 and anomalies 12, 37, 39 and 57 and this trend conforms with the projected southern strike of the Rosebery Mine - Rosebery Lodes - Dallwitz horizon. An access track at present being bulldozed south from the Mt. Read - Hercules Track on the eastern side of the bar has exposed bedded tuffs in this area.

d. Rosebery North End

A test geochemical grid of 3 lines on 800 foot spacings north from 3500N Rosebery Grid areas cut and soil sampled. This was to evaluate the order of geochemical anomalies over known mineralisation. In Rosebery Mine the area from 3500N to 5100N contains ore in Rosebery Mine with mining 500 feet below surface around 3500N and the ore pitches to the N from there. As can be seen on plate 22 the anomalies in soil geochemistry are of low order, similar to Rosebery Lodes; if blind ore bodies are being explored for, then, these anomalies are significant if they are in the correct stratigraphic position.

Turair was used to check the possibility of pitch reversals in the Rosebery Ore body occuring north of 5500N and small orebodies present near surface between the Rosebery Mine and the Pieman River. The Turair revealed a line of very weak conductors 1, 2 and 3 along strike from the outcrop of the Rosebery Ore and at depths consistent with known mineralisation showing the northern pitch demonstrated by 65R. Conductor 3 and in particular anomaly 29 require ground investigation at a later stage when better access becomes available though proposed HEC roads. The magnetic character of the hanging wall rocks of Rosebery Mine must change drastically from the northern to the southern end of the Mine through to Rosebery Lodes or the Mt. Black volcanics extend further to the east than is at present thought in the Mine area.

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Because of the depth to mineralisation in 65R the best method of exploration for the northern continuation of ore in Rosebery Mine may be by a long drive from the northern limits on 17 level of the proposed ore development drive ending at 4600 north. An additional 4000 feet of driving would give access to half way to the Pieman River and would enable fill in drilling between 57R and 65R to approximately 27 level using present drilling techniques. This driving would also allow exploration drilling north of 65R until the limits of the mineralisation were reached.

## 8. References


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D.H. REINHARDT

# APPENDIX 1

DIAMOND DRILL CORE LOGS

RLP 142
RLP 147
RLP 154
RLP 159
RLP 161
RLP 162

FORM No. W.C.M. 404—A 50749

# ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.

ROSEBERY — TASMANIA

72-864 004

HOLE NO. L.P. 142

# DIAMOND DRILL CORE RECORD

765019

| PLOTTED | SUMMARY | | SURVEY DATA | | |
|---|---|---|---|---|---|
| | OBJECT | RESULT | Footage | Direction | Angle |
| 40 Plan<br>40 Sect<br>L.P.<br>100 Plan<br>100 Sect | To intersect the host rock sequence approximately 300 feet below surface and test for mineralisation on line 00 Rosebery Lodes Grid. | Massive pyroclastics for 183¾<br>Black slate from 183¾ to 208. Host rocks from 208 to 240 and footwall pyroclastics from 240 to 648 were intersected. No mineralisation was present. | 100<br>200<br>300<br>400<br>500<br>600 | 273°<br>268<br>268<br>268<br>266<br>260 | -65<br>-47°<br>-34°<br>-25°<br>-18°<br>-15° |

Mine: Rosebery Lodes Prospect
Location: Rosebery Lodes Surface
Co-ords: 1S 118E
R.L.: 559
Direction: 270° R.L. Grid
Angle: -70°
Total Depth: 648'
Hole Size: B.X.W.L.
Date Commenced: 22/12/70
Date Completed: 20/1/71
Logged by: R.L.B.

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | BaSO4% | | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 113 | Coarse grained massive grey green lithic crystal tuff chert fragments up to two inches with abundant disseminated sphene leucoxene blebs, chlorite veinlets throughout. Amygdaloidal rhyolite and andesite fragments up to three inches from 54 to 80 Ft. | | | | | | | | | | | | | | |
| 113 | 134 | Fine grained massive grey granular tuff grades into medium grained grey crystal tuff. | | | | | | | | | | | | | | |
| 134 | 183¾ | Fine to medium grained massive grey crystal tuff gradually becoming coarser with occasional black slate fragments up to two inches. Massive pyroclastic black slate contact. | | | | | | | | | | | | | | |
| 183¾ | 208 | Fine grained rather sheared but relict bedding visible in places, black slate. Fairly abundant carbonate veining. Knife sharp contact with massive pyroclastics, grades, into host rock over three feet. | | | | | | | | | | | | | | |
| 208 | 237 | Fine grained grey and grey green generally massive but locally bedded siltstone (host rock) rather cherty appearance. Pale pink carbonate blebs, at 224 ft. Brecciated zone with chlorite veinlets 232 to 236 ft. | | | | | | | | | | | | | | |
| 237 | 240 | Fine grained massive grey chert. (Core section at 238 ft.) → | | | | | 0.09 | 0.06 | 0.01 | -0.1 | Nil | 0.9 | 0.02 | | | |
| 240 | 252 | Medium grained sheared and brecciated grey green tuff. Scattered pink carbonate blebs and odd pyrite veinlets. (Footwall pyroclastic.) | 251 | 257 | 6 | 6 | -0.1 | 0.06 | -0.01 | 0.6 | Nil | 1.9 | -0.1 | | | |
| 252 | 321 | Medium grained slightly sheared speckled green chloritic crystal tuff, occasional carbonate veinlets. Possibly contains barite especially at 254 ft, finer grained and lighter colour from 283 to 297 ft, occasional small siltstone lenses. Medium grained disseminated pyrite from 303 to 305 ft, disseminated cream carbonate blebs from 312 to 321 ft. Massive carbonate vein (cream) with flourite and pyrite at 318 ft. Very broken core at 313 and 321 ft. | | | | | | | | | | | | | | |
| 321 | 340 | Fine grained massive grey tuff with scattered blebs of fine grained pyrite. | | | | | | | | | | | | | | |
| 340 | 368 | Fine grained massive grey tuff with disseminated pale pink carbonate blebs, and traces of pyrite. Poorly defined quartz schist type, structure from 343ft. onwards. | | | | | | | | | | | | | | |
| 368 | 448 | Fine grained grey to buff slightly sheared cherty with quartz schist structure (eyes or augen of quartz) in places. Locally with disseminated pale pink carbonate, traces of pyrite. Quartz crystals around 426 ft. Very cherty from 439 to 448 ft. | | | | | | | | | | | | | | |

Form No. W.C.D. 404A — A17251

ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.
ROSEBERY — TASMANIA

HOLE No. R.L. P142

165019A

# DIAMOND DRILL CORE RECORD

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | BaSO4% | | | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 448 | 540 | Medium grained green speckled feldspar crystal tuff, rather chloritic with traces ofpyrite, occasional quartz carbonate veins. | | | | | | | | | | | | | | | |
| 540 | 648 | Medium grained variable grey to green locally pink, speckled with feldspar crystals several zones with disseminated chlorite blebs as 571 to 575 ft. and 639 to 648 ft. Abundant streaky and patchy development of pink to red hematite? colour from 544 to 550 ft. Scattered traces of pyrite. | | | | | | | | | | | | | | | |

FORM No. W.C.M. 406 — A 30743

**ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.**
ROSEBERY — TASMANIA

**HOLE No** RLP 147

# DIAMOND DRILL CORE RECORD

765020

| PLOTTED | SUMMARY | | SURVEY DATA | | |
|---|---|---|---|---|---|
| | OBJECT | RESULT | Footage | Direction | Angle |
| 40 Plan<br>40 Sect ✓<br>L.P.<br>100 Plan<br>100 Sect | To test for mineralisation and stratigraphy 300ft below surface on line 4S at Rosebery Lodes | Massive Pyroclastics to 236½ black slate from 236½ to 255¼, host rocks, tuffaceous in parts from 255¼ to 461 and footwall pyroclastics onwards were encountered. Barytic tuff from 336 to 387 was also intersected. | 120'<br>200<br>300<br>400<br>500<br>600 | 270<br>268<br>260<br>253<br>258<br>258 | -61<br>-48<br>-34<br>-31<br>-23<br>-20 |

Mine: Rosebery lodes prospect
Location: Rosebery lodes surface
Co-ords: 238E 400S
R.L.: 606
Direction: 270°
Angle: -70°
Total Depth: 609
Hole Size: BM WL
Date Commenced: 28-1-71
Date Completed: 8-3-71
Logged by: D.H.R.

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | | | | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 84 | Siliceous coarse grained mottled white to olive, lithic tuff with abundant half inch siliceous fragments and minor fine grained tuff fragments. Leaching along joints and veins common section cream coloured from 49 to 64 ft. chloritic stringers in later half with some minor feldspar crystals | | | | | | | | | | | | | | | |
| 84 | 107 | Siliceous fine grained olive grey crystal tuff with trace coarse lithic crystal fragments and minor disseminated sphene - leucoxene. | | | | | | | | | | | | | | | |
| 107 | 134 | Medium to fine grained granular crystal tuff light grey in colour with locally intense zones of chlorite stringers and occasional thin quartz carbonate veins. | | | | | | | | | | | | | | | |
| 134 | 148 | Medium to fine grained granular crystal tuff with slightly developed numerous thin chlorite stringers and minor quartz carbonate veins. | | | | | | | | | | | | | | | |
| 148 | 177 | Light cream to olive grey granular fine grained crystal tuff with minor to trace lithic tuff, numerous thin quartz chlorite veins and thin four to six inch bands of black bedded siliceous rock.<br>At 166 ft. an interbedded black and fine grained siliceous rock and medium to fine grained crystal lithic tuff from 170to 175 ft. | | | | | | | | | | | | | | | |
| 177 | 221 | Medium to locally coarse grained speckled olive grey granular crystal tuff with minor lithic fragments, occasional thin quartz carbonate veins and minor chlorite stringers. | | | | | | | | | | | | | | | |
| 221 | 236½ | Creamy coloured siliceous massive medium to coarse grained quartz feldspar crystal tuff with rare lithic fragments with half to one ich thin slatey band at 226 ft.<br>Sharp contacts with black slate. | | | | | | | | | | | | | | | |
| 236½ | 255¼ | Black slate with numerous thin quarter inch quartz and quartz carbonate veins and minor half to one and half inch quartz carbonate veins, well bedded throughout with only minor contortion. | | | | | | | | | | | | | | | |
| 255¼ | 259 | Contorted fine to medium grained sericitic tuff with minor carbonate blebs and large quartz carbonate veins at 257 and 258 ft. | | | | | | | | | | | | | | | |
| 259 | 276 | Siliceous fine to medium grained olive and grey bedded siltstone with rare thin quartz and quartz carbonate veins.<br>Cherty bands from 268 to 270 and 271½ to 272½. | | | | | | | | | | | | | | | |
| 276 | 283 | Mainly massive chert with interbeds of siliceous fine grained bedded siltstone.<br>Thin chlorite stringers present in fractures in chert. | | | | | | | | | | | | | | | |
| 283 | 294½ | Olive grey medium to very coarse grained lithic tuff with thin interbeds of ine grained bedded siltstone.<br>Blebby carbonate locally developed.<br>Lithic fragments range from chert to siliceous siltstone to fine grained tuff. | | | | | | | | | | | | | | | |

Form No. W.C.D. 404A — A 17251

**ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.**
ROSEBERY — TASMANIA

**HOLE No.** RLP 147

765020A

# DIAMOND DRILL CORE RECORD

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | Ba SO4 % | | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Minor quartz veining present, galena crystal at 283½ ft. | | | | | | | | | | | | | | |
| 294½ | 300 | Fine grained siliceous bedded siltstone with medium grained tuff, interbeds and minpr quartz carbonate gangue and trace pyrite and arsenopyrite | | | | | | | | | | | | | | |
| 300 | 301¾ | Medium grained siliceous tuff with minor coarse grained well crystallined arsenopyrite? and trace tetrahedrite? | 300 | 301¾ | 1¾ | 1¾ | -0.001 | 0.07 | -0.01 | 0.1 | Nil | 2.6 | -0.1 | | | |
| 301¾ | 303 | Chert | | | | | | | | | | | | | | |
| 303 | 305½ | Fine grained sericitic tuff with trace coarse grained well crystallined pyrite with trace chalcopyrite in quartz carbonate gangue vein. | | | | | | | | | | | | | | |
| 205½ | 332 | Medium grained sheared crystal and lithic tuff with minor blebby carbonate in parts. Semi massive stringers of pyrite particularly at 319 and 321 ft. Fine grained siliceous siltstone bands up to three feet thick present and minor to trace quartz carbonate gangue veins, section coarsens to end. | | | | | | | | | | | | | | |
| 332 | 358 | Bedded granular fairly even grained crystal tuff, specked in colour olive grey with siliceous band at 340½ ft. and fine grained band at 342 ft. Local variation in grain size showing up bedding minor to trace quartz carbonate veins. | | | | | | | | | | | | | | |
| 358 | 363 | Barytic medium grained massive tuff with trace to minor pyrite | 358 | 363 | 5 | 4½ | 0.09 | 0.39 | -0.01 | 0.65 | 0.1 | 6.5 | 9.6 | | | |
| 363 | 368 | Barytic medium grained tuff with minor to semi massive porphyry carbonate and minor pyrite as stringers and veins | 363 | 368 | 5 | 5 | 0.05 | 0.10 | -0.01 | 0.7 | 0.45 | 4.0 | 9.6 | | | |
| 368 | 373 | Massive porphyry carbonate grading into fine grained barytic tuff at end of section, trace pyrite present | 368 | 373 | 5 | 5 | 0.06 | 0.07 | -0.01 | 2.45 | 0.65 | 2.4 | 2.4 | | | |
| 373 | 378 | Slightly disseminated to semi massive porphyry carbonate in siliceous medium grained tuff, with trace pyrite | | | | | | | | | | | | | | |
| 378 | 383 | As above, becoming siliceous towards end of section | 378 | 383 | 5 | 5 | 0.03 | 0.13 | -0.01 | 0.9 | Nil | 3.5 | 4.0 | | | |
| 383 | 387 | Interbedded barytic carbonate and tuffaceous siltstone with minor bands of pyrite and thin crosscutting quartz carbonate veins | 383 | 387 | 4 | 4 | 0;06 | 0.34 | 0.01 | 1.6 | 0.1 | 4.8 | 2.0 | | | |
| 387 | 395 | Fine grained and siliceous bedded siltstone with eighteen inches of miassive to semi massive carbonate zones regularly placed throughout. Bands of slightly disseminated pyrite up to half inch wide scattered throughout also. | | | | | | | | | | | | | | |
| 395 | 410 | Medium to coarse grained slightly disseminated blebby carbonate in medium grained locally siliceous and chloritic sheared tuff, with thin half inch quartz carbonate veins and trace chalcopyrite at 406 ft. | | | | | | | | | | | | | | |
| 410 | 413½ | Coarse grained slightly disseminated blebby carbonate in siliceous and chloritic medium grained tuff with trace fine galena and sphalerite, and eight inch quartz carbonate vein at 413 ft. | 410 | 413½ | 3½ | 3½ | 0.40 | 0.38 | 0.02 | 1.07 | 0.68 | 2.2 | | | | |
| 413½ | 429 | Medium grained sheared crystal tuff with abundant to semi massive bands of blebby carbonate with minor fine oolitic carbonate. | | | | | | | | | | | | | | |
| 429 | 448 | Siliceous fine grained slightly chloritic tuff with incipient quartz schist texture and twelve to eighteen inch bands with abundant semi massive carbonate | | | | | | | | | | | | | | |
| 448 | 454 | Medium grained slightly sheared speckled granular crystal tuff with two and half feet containing abundant carbonate blebs at end. | | | | | | | | | | | | | | |

Form No. W.C.D. 404A — A 17251

ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.
ROSEBERY — TASMANIA

HOLE No. RLP 147

# DIAMOND DRILL CORE RECORD

765020B

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | | | | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 454 | 461 | Fine grained sericitic tuff with trace pyrite and a two, six and twelve inch quartz veins at end of section. | | | | | | | | | | | | | | | |
| 461 | 497 | Fine to medium grained siliceous tuff with local coarse bands carrying trace pyrite and minor oval carbonate eyes and some thin quartz carbonate veins. Brecciated from 479 on to 486 ft. | | | | | | | | | | | | | | | |
| 497 | 539 | Massive medium grained grey speckled crystal tuff with minor medium grained blebby carbonate, locally siliceous. | | | | | | | | | | | | | | | |
| 539 | 557 | Fairly siliceous medium grained crystal tuff with rare lithic fragments, minor leaching in first 12 ft. of section. | | | | | | | | | | | | | | | |
| 557 | 609 | Fine to medium grained massive grey speckled crystal tuff lithic and siliceous in parts with minor amounts of quartz carbonate. | | | | | | | | | | | | | | | |

FORM No. W.C.M. 404 — A 50749

# ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.

ROSEBERY — TASMANIA

72-8664 006

HOLE No. R.L.P.154

# DIAMOND DRILL CORE RECORD

765021

| PLOTTED | SUMMARY | | SURVEY DATA | | |
|---|---|---|---|---|---|
| | OBJECT | RESULT | Footage | Direction | Angle |
| 40 Plan<br>40 Sect<br>L.P.<br>100 Plan<br>100 Sect | To test the host rocks for mineralisation 300 feet below surface at 800S Rosebery Lodes. | One foot of low grade ore and six inches of minor mineralisation were intersected from 478 to 479 and 481 and 481½ respectively. | 100<br>180<br>300<br>420<br>500 | <br>295<br>283<br>280<br>280 | -73<br>-65<br>-46<br>-33<br>-29 |

Mine: Rosebery Lodes
Location: Rosebery Lodes Surface
Co-ords: 257E 803S
R.L.: 605
Direction: 270° Rosebery Lodes Grid
Angle: -75°
Total Depth: 547
Hole Size: BXWL
Date Commenced: 12/3/71
Date Completed: 29/4/71
Logged by: D.H.R.

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 104 | Massive slightly mottled cream and olive coarse grained siliceous lithic tuff slightly jointed in parts and with trace chlorite as stringers throughout. Lithic fragments are mainly siliceous recrystallised fragments.<br><br>From 57 feet on thin six inch bands leached and porous scattered throughout section, section becoming granular towards end. | | | | | | | | | | | | |
| 104 | 135 | Medium to fine grained granular massive crystal tuff, dark grey to speckled with numerous anastomosing chlorite stringers several leached sections, vesicules. | | | | | | | | | | | | |
| 135 | 140 | Medium grained massive and speckled crystal lithic tuff with leached quartz veins and thin two inch black siltstone band at end. | | | | | | | | | | | | |
| 140 | 144 | Fine grained siliceous black and grey olive bedded siltstone leached in parts with thin quartz carbonate veins and trace thin sphalerite stringers. | | | | | | | | | | | | |
| 144 | 147½ | Fine grained siliceous olive tuffs with bedding, trace pyrite and minor chlorite stringers. Leached in parts. | | | | | | | | | | | | |
| 147½ | 188 | Fine to medium grained, granular and siliceous in parts, crystal tuff, locally lithic with thin zones of leaching and minor chlorite stringers, trace pyrite on joint surfaces. | | | | | | | | | | | | |
| 188 | 248 | Medium to coarse grained lithic tuff with up to half inch siliceous rock fragments, and up to three inch black slate fragments. Siliceous and contorted in parts and greenish olive speckled colour throughout.<br>Locally very siliceous around 196, 198 and 224 ft. Slight shearing or foliation evident throughout also. | | | | | | | | | | | | |
| 248 | 249½ | Black slate with contorted thin quartz veins with trace pyrite and chalcopyrite, and two, two inch quartz carbonate veins at end. | | | | | | | | | | | | |
| 249½ | 257½ | Medium grained sheared crystal lithic tuff with thick quartz veins grading at 251½ ft. into medium to fine grained sericitic tuff with thin quartz carbonate veins and traces of pyrite. Two inches of medium grained quartz crystal tuff at 256 ft. | | | | | | | | | | | | |
| 257½ | 264¾ | Black slate, contorted in parts with thick quartz and quartz carbonate veins up to six inches, and numerous 1/16" quartz carbonate stringers. Trace sphalerite in two thin half inch veins at 264½ ft. | | | | | | | | | | | | |
| 264¾ | 276½ | Fine to medium grained olive grey, siliceous in parts, bedded siltstone, tuffaceous siltstone becoming slightly coarser towards the end. Thin stringers and blebs of pyrite present throughout, but concentrated in parts. | | | | | | | | | | | | |
| 276½ | 281 | Medium grained grey speckled slightly sheared quartz | | | | | | | | | | | | |

Form No. W.C.D. 404A — A 17251

ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.
ROSEBERY — TASMANIA

HOLE No. R.L.P. 154

765021 A

# DIAMOND DRILL CORE RECORD

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | | | | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | crystal tuff becoming coarser over last twelve inches with trace pyrite. | | | | | | | | | | | | | | | |
| 281 | 293½ | Fine grained black slate with normal numerous fine quartz ~~and quartz~~ and quartz carbonate veins at 286½ ft, carrying minor pyrite and thin quartz carbonate veins with trace sphalerite at 292½ ft. | | | | | | | | | | | | | | | |
| 293 | 312½ | Fine grained grey to olive bedded siltstones with thin up to six inches tuffaceous bands. Locally developed trace pyrite as coarse aggregate. Coarse grained quartz crystal tuff band at 304 ft, section fairly siliceous. | | | | | | | | | | | | | | | |
| 312½ | 362 | Medium grained speckled dark olive grey crystal tuff, fairly massive and siliceous with minor thin quartz carbonate veins throughout and becomes more siliceous and finer grained towards end. | | | | | | | | | | | | | | | |
| 362 | 367 | Fairly siliceous fine grained tuff with minor to slightly disseminated very fine to coarse oolitic blebby carbonate. | | | | | | | | | | | | | | | |
| 367 | 380 | Basically very siliceous fine grained cherty rock with bands of slightly disseminated to semi massive oolitic and blebby carbonate. Trace galena and sphalerite in siliceous bands and better than trace pyrite in carbonate bands. | | | | | | | | | | | | | | | |
| 380 | 390 | Medium grained sheared tuffaceous rocks. Disseminated medium to coarse grained carbonate oolites and blebs. Some thin quartz carbonate veins. | | | | | | | | | | | | | | | |
| 390 | 392½ | Very fine grained cherty rocks grading into cherty tuff with strong jointing. Trace pyrite disseminated. | | | | | | | | | | | | | | | |
| 392½ | 403 | Medium grained sheared tuff with strongly disseminated medium grained blebby carbonate and minor amounts of quartz eyes of quartz with some quartz carbonate. Traces of pyrite throughout. | | | | | | | | | | | | | | | |
| 403 | 408½ | Semi massive coarse grained blebby pink carbonate in sheared medium to fine grained tuff. | | | | | | | | | | | | | | | |
| 408½ | 417 | Very siliceous cherty zone ranging from chert to cherty tuff with bands of medium grained carbonate tuff towards end. Six inches quartz carbonate at 411'. Trace of galena and sphalerite in siliceous zone. | | | | | | | | | | | | | | | |
| 417 | 431 | Fine to medium grained sheared tuff with slightly disseminated fine to coarse grained carbonate blebs and oolites throughout. Matrix throughout slightly chloritic. Rare trace of galena and sphalerite in parts. | | | | | | | | | | | | | | | |
| 431 | 440 | Fine grained sheared sericitic tuff - siliceous in parts with minor thin quartz carbonate veins, some with traces galena, and sphalerite. Minor carbonate blebbing. | | | | | | | | | | | | | | | |
| 434 | 439 | Trace fine pyrite locally developed. | | | | | | | | | | | | | | | |
| 440 | 445 | Fine grain bedded host rock. Slightly tuffaceous in parts with trace to minor fine pyrite as stringers at face. Sphalerite. | 440 | 445 | 5 | 5 | 0.08 | 0.38 | 0.02 | -0.1 | Nil | 3.1 | | | | | |
| 445 | 450 | Slightly tuffaceous sheared host rock with minor disseminated pyrite and trace arsenopyrite with traces of sphalerite in quartz carbonate gangue veins. | 445 | 450 | 5 | 5 | 0.04 | 0.33 | 0.01 | -0.1 | -0.1 | 3.0 | | | | | |
| 450 | 478 | Alternating siliceous fine grained host rock with tuffaceous bands with traces of pyrite and minor quartz carbonate gangue carrying trace sphalerite. Section becoming siliceous towards end. | | | | | | | | | | | | | | | |

Form No. W.C.D. 1044 — A 17251

ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.
ROSEBERY — TASMANIA

HOLE No. R.L.P. 154

765021B

# DIAMOND DRILL CORE RECORD

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE RECD | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz/Ton | Au dwts. | Fe % | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 478 | 479 | Sheared sericitic tuff with thin quartz carbonate gangue veins and minor coarse grained galena and sphalerite and pyritic mineralisation. | 474½<br>478 | 478<br>479 | ¾<br>1 | 3<br>1 | 0.22<br>10.2 | 0.35<br>6.0 | -0.01<br>0.04 | 0.10<br>2.6 | Nil<br>0.25 | 2.9<br>5.1 | | |
| 479 | 481 | Siliceous fine to medium grained tuffaceous host rocks with quartz carbonate gangue veins and trace galena at 480½'. | 479 | 481 | 2 | 2 | 0.33 | 0.41 | 0.1 | 0.70 | 0.15 | 3.0 | | |
| 481 | 481½ | Quartz carbonate gangue veins in sheared sericitic tuff with trace to mineralisation galena and sphalerite. | 481 | 481½ | ½ | ½ | 3.0 | 4.5 | 0.03 | 0.9 | 0.2 | 4.6 | | |
| 481½ | 484 | Slightly tuffaceous sericite schist with thin quartz carbonate veins. Slight loss of core in quartz veins. | | | | | | | | | | | | |
| 484 | 488 | Fine to medium grained sheared sericitic tuff. Trace fine arsenopyrite. | | | | | | | | | | | | |
| 488 | 493 | Fine grained siliceous massive tuff with thin quartz carbonate veins. | | | | | | | | | | | | |
| 493 | 547 | Medium grained olive grey sericitic sheared crystal tuff, siliceous in parts with insipient [illegible] quartz schist texture and minor fine to blebby eyes of disseminated carbonate (typical of f/w tuff). Thin quartz carbonate veins present with traces of pyrite at 520'. | | | | | | | | | | | | |

FORM No. W.C.M. 404—A 50743

# ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.

ROSEBERY — TASMANIA

009

**HOLE No.** RLP 159

# DIAMOND DRILL CORE RECORD

765022

| PLOTTED | SUMMARY | | SURVEY DATA | | |
|---|---|---|---|---|---|
| | OBJECT | RESULT | Footage | Direction | Angle |
| 40 Plan<br>40 Sect<br>L.P.<br>100 Plan<br>100 Sect | To test of mineralisation anddefine stratigraphy 300 ft below surface on 1200S at Rosebery Lodes | One foot of Low grade ore from 499 to 500 was intersected in fine to medium grained bedded siltstone | 100'<br>200'<br>300'<br>400'<br>500'<br>600' | | -72°<br>-66½<br>-58¾<br>-43½<br>-44½<br>-24 |

Mine: Rosebery Lodes Prospect
Location: Rosebery Lodes Surface
Co-ords: 340E 1220s
R.L.: 635
Direction: 270° R Lode Grid
Angle: -75°
Total Depth: 611
Hole Size: EXWL
Date Commenced: 11-5-71
Date Completed: 14-6-71
Logged by: D.H.R.

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 2 | Very sheared and weathered lithic tuff | | | | | | | | | | | | |
| 2 | 24 | Fine grained, weathered in parts, black slate with numerous thin quartz veins and one two inch quartz vein | | | | | | | | | | | | |
| 24 | 40 | Very coarse grained quartz crystal lithic tuff with slate fragments up to one inch and quartz crystals up to quarter inch. | | | | | | | | | | | | |
| 40 | 102 | Coarse grained crystal lithic tuff, moderately sheared but strongly leached in parts. Some black slate fragments up to two inches, some ironstaining in fractured zones, some rocks affected by weathering. | | | | | | | | | | | | |
| 102 | 127 | Medium to coarse grained creamy coloured crystal lithic tuff, slightly sheared, little affected by weathering but leached and jointed in parts accompanied by iron stringers. | | | | | | | | | | | | |
| 127 | 198 | Medium grained massive crystal tuff locally, with sections of fine grained vitric tuff at 130 and 145 ft, faint stratification at 197 ft. | | | | | | | | | | | | |
| 198 | 251 | Medium to coarse grained crystal tuff with scattered lithic fragments, particularly black slate grades into crystal lithic tuff around 227 ft, faint bedding at 248 ft, sharp contact with black slate. | | | | | | | | | | | | |
| 251 | 279 | Fine grained massive black slate with abundant quartz carbonate veinlets, massive quartz carbonate veins at 255 to 257 and at 260 ft. Small lenses of pyrrhotite and pyrite at 273 274 and 279 ft. Small lenses of pyrrhotite and pyrite at 273, 274 and 279 ft. Intensely folded bedding visible at 273 ft. Sharp contact with host rock. | | | | | | | | | | | | |
| 279 | 283 | Fine to medium grained well bedded grey tuffaceous siltstone with trace to disseminated fine grained pyrite, (host rock) | | | | | | | | | | | | |
| 283 | 315 | Medium grained locally bedded crystal tuff with trace to disseminated fine grained pyrite, locally with siltstone interbeds. | | | | | | | | | | | | |
| 315 | 394 | Medium grained quartz crystal tuff. Traces pyrite and several fine grained beds from 389 - 394 | | | | | | | | | | | | |
| 394 | 451 | Medium grained massive crystal tuff. Locally quartz rich Carbonate blebs disseminated throughout and locally abundant | | | | | | | | | | | | |
| 451 | 499 | Fine to medium grained grey siltstone with sections of crystal tuff (Host rock?) Pale pink cream manganese carbonate blebs disseminated through tuff sections larger carbonate blebs and nodules and carbonate beds present in siltstone. Scattered traces fine grained pyrite. | | | | | | | | | | | | |
| 499 | 500 | Semi massive medium grained galena - sphalerite - pyrite as one to two inch massive bands with branching cross-cutting veinlets | 499 | 500 | 1 | 1 | 7.2 | 7.4 | 0.15 | 3.5 | 0.1 | 3.9 | | |

Form No. W.C.D. 404A — A 17251

ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.
ROSEBERY — TASMANIA

HOLE No. RDF 139
7650224

# DIAMOND DRILL CORE RECORD

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | | | | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 500 | 512 | Fine to medium grained siltstone and tuffaceous siltstone with fine grained pyrite disseminated and in stringers. | | | | | | | | | | | | | | | |
| 512 | 611 | Fine grained to medium grained light grey siliceous tuff with disseminated manganese carbonate blebs up to ½ inch in length. Generally shows a foliation imparted by this sericite - chorite foliation. Traces fine grained pyrite (Footwall rocks) more siliceous and lighter coloured from 570. Vertually quartz - sericite - chlorite - carbonate schists. Schistosites with kink folds at 580 and 584 ft. Core rather broken and with quartz vein from 602 - 611. | | | | | | | | | | | | | | | |
| | | Summary log<br>0-251 Massive, Pyroclastics<br>251-279 Black Slate<br>279-512 Host Rocks-siltstone and tuffs<br>512-611 Footwall pyroclastics | | | | | | | | | | | | | | | |

72-864 011

FORM No. W.C.M. 404 — A 50749

# ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.

ROSEBERY — TASMANIA

**HOLE No.** R.L.P. 161

# DIAMOND DRILL CORE RECORD

765023

| PLOTTED | SUMMARY | | SURVEY DATA | | |
|---|---|---|---|---|---|
| | OBJECT | RESULT | Footage | Direction | Angle |
| 40 Plan<br>40 Sect ✓<br>L.P.<br>100 Plan<br>100 Sect | To delineate lithologies and test for mineralisation on 2000S at Rosebery Lodes | Black slates eroded by glacials. Thin bands of trace mineralisation encountered in sericitic tuffs. Foot wall pyroclastics intersected at 274 feet | 100'<br>200'<br>300' | | -34°<br>-31°<br>-30° |

Mine: Rosebery Lodes Prospect
Location: Rosebery Lodes Surface
Co-ords: 1990S 195E
R.L.: 743
Direction: 270°R Lodes Grid
Angle: -32°
Total Depth: 319
Hole Size: AX
Date Commenced: 16-6-71
Date Completed: 30-7-71
Logged by: DHR

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 64 | Glacial boulders of conglomerate quartzite lithic and crystal tuff and porphyritic volcanics. Very poor recovery. | | | | | | | | | | | | |
| 64 | 104 | Cemented Manganese and iron stained very weathered and slightly sheared crystal and lithic tuff. Massive pyroclastic. Some core of quartzite pebbles. | | | | | | | | | | | | |
| 104 | 124 | No core-drillers say black clay or mud. | | | | | | | | | | | | |
| 124 | 136 | Fine to medium grained siliceous sheared tuff-leached in parts with scattered traces disseminated pyrite. Thin quartz veins less than ½ an inch thick carrying trace galena. | | | | | | | | | | | | |
| 136 | 154 | Fine to medium grained sheared. siliceous tuff with occasional thin quartz carbonate veins some with trace galena. Trace amounts fine disseminated pyrite and minor amounts coarse ½ inch blebs of carbonate. | | | | | | | | | | | | |
| 154 | 172 | Fine grained slightly sheared siliceous tuff with abundant stringers and blebs of Manganese Carbonate Some oolitic carbonate present before 164' | | | | | | | | | | | | |
| 172 | 214 | Very fine grained siliceous tuff strongly sericitic in parts and kinked and folded. Shearing fairly strong throughout. Fairly numerous thin <¼" quartz and quartz carbonate veins carrying disseminated galena ans sphalerite. Some very fine disseminated sphalerite around 196' | 194 | 199 | 5 | 3 | 0.26 | 1.20 | 0.02 | 0.2 | -0.1 | 2.1 | | |
| 214 | 225½ | Medium to fine grained sheared bedded sericitic tuff siliceous in parts and traces of galena and sphalerite around 218 and trace pyrite throughout. Folding evident. | 217½ | 219 | 1½ | 1½ | 1.27 | 2.2 | 0.08 | 0.6 | 0.1 | 1.4 | | |
| 225½ | 234 | Fine in parts to medium grained bedded but sheared tuffaceous siltstone with scattered traces galena and sphalerite. Section slightly chloritic with some carbonate locally developed. | 225½<br>229½<br>239 | 227¾<br>231½<br>240 | 2¼<br>2<br>1 | 2¼<br>2<br>1 | 0.31<br>0.36<br>1.12 | 0.64<br>1.0<br>1.04 | -0.01<br>0.02<br>0.03 | 0.2<br>0.45<br>0.5 | -0-1<br>-0.1<br>-0.1 | 1.9<br>2.8<br>2.1 | | |
| 234 | 239 | Siliceous very fine grained chert with chloritic carbonate-pyrite veins at beginning. | | | | | | | | | | | | |
| 239 | 244 | Very fine grained sericitic schist with trace of galena and sphalerite in quartz carbonate veins and scattered pyrite. | | | | | | | | | | | | |
| 244 | 274 | Fine to medium grained in parts sheared siliceous and chloritic tuff. Scattered carbonate blebs throughout. Large quartz veins 249½-254. Local bedding developed in parts. Section very siliceous towards end. 3" band galena, sphalerite and pyrite at 262½. | 262¼ | 262½ | ¼' | 2" | 1.5 | 11.9 | 0.3 | 1.15 | 0.3 | 9.3 | | |
| 274 | 319 | Medium to coarse grained sheared siliceous tuff with numerous coarse grained eyes of carbonate developed some thin chlorite veining is present. Strange dark mineral present in cores of carbonate appearance typical of foot wall rocks | | | | | | | | | | | | |
| | | END OF HOLE | | | | | | | | | | | | |

72-864 012

FORM No. W.C.M. 404 — A 50749

**ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.**
ROSEBERY — TASMANIA

**HOLE No.** RLP 162

# DIAMOND DRILL CORE RECORD

765024

| PLOTTED | SUMMARY | | SURVEY DATA | | | |
|---|---|---|---|---|---|---|
| | OBJECT | RESULT | Footage | Direction | Angle | |
| 40 Plan<br>40 Sect<br>L.P.<br>100 Plan<br>100 Sect | To delineate stratigraphy and test for mineralisation on 2400S at Rosebery Lodes | Massive pyroclastics, Crystal Tuffs and Footwall pyroclastics were intersected with trace mineralisation | 100'<br>200'<br>300' | | -54°<br>-43½<br>-32 | Mine: Rosebery Lodes Prospect<br>Location: Rosebery Lodes Surface 2400S<br>Co-ords: 210W 2390S<br>R.L.: 775½<br>Direction: 270° R Lodes Grid<br>Angle: -65°<br>Total Depth: 337<br>Hole Size: BX WL<br>Date Commenced: 27-7-71<br>Date Completed: 26-8-71<br>Logged by: DHR |

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 56 | Glacial material quartzite and conglomerate boulders with some clay bands | | | | | | | | | | | | |
| 56 | 76 | Very coarse volcanic breccia with fragments up to 3 feet of volcanic material. Feldspar phenocrysts common and rock fairly chloritic in ground mass. Massive pyroclastic. | | | | | | | | | | | | |
| 76 | 86 | Fine grained leached siliceous tuff with minor quartz veins | 86 | 96 | 10 | 10 | 0.08 | 0.08 | 0.01 | -0.01 | Nil | 5.4 | | |
| 86 | 102 | Semi-massive porphyry carbonate in sheared medium grained crystal tuff with cross cutting veins | 96 | 102 | 6 | 6 | 0.03 | 0.08 | 0.02 | - 0.1 | Nil | 2.2 | | |
| 102 | 118 | Medium grained light grey siliceous slightly sheared tuff with numerous carbonate and quartz carbonate veins and rare thin chlorite stringers | | | | | | | | | | | | |
| 118 | 131 | Medium grained grey-green slightly sheared tuff with numerous quartz and quartz carbonate veins up to ½" and minor chlorite stringers. | | | | | | | | | | | | |
| 131 | 157 | Medium to in places coarse grained siliceous tuff - olive coloured to grey granula and fairly massive numerous quartz and quartz carbonate veins. Pheno-crysts of feldspar and odd blebs of plagioclase | | | | | | | | | | | | |
| 157 | 201 | Grey to dark grey very siliceous fine grained tuff with coarse fledspar phenocrysts and some large quartz carbonate blebs. Minor to common quartz carbonate veining. Section coarsens in parts and less siliceous in parts but Feldspar and Quartz carbonate blebs present throughout | 206 | 217 | 11 | 5 | 0.22 | 0.40 | 0.02 | 0.15 | Nil | 5.0 | | |
| | | | 217 | 227 | 10 | 10 | 0.14 | 0.40 | 0.09 | 0.37 | Nil | 3.3 | | |
| 201 | 206 | Coarse grained crystal tuff dark grey to greenish; chloritic in parts with several thin chlorite stringers carrying pyrite around margins | 227 | 237 | 10 | - | 0.17 | 0.35 | 0.01 | 0.12 | Nil | 0.7 | | |
| | | | 237 | 247 | 10 | 10 | 0.13 | 0.26 | 0.02 | 0.1 | Nil | 1.5 | | |
| | | | 247 | 257 | 10 | 10 | 0.17 | 0.38 | 0.03 | 0.2 | Nil | 2.2 | | |
| 206 | 217 | Brecciated and veined light to dark yellow-cream coloured tuff with abundant carbonate and several thin chlorite stringers | 25 | 267 | 10 | 10 | 0.11 | 0.26 | 0.02 | -0.1 | Nil | 1.1 | | |
| 217 | 273 | Fine to medium grained slightly sheared crystal tuff with abundant very fine carbonates oolites + minor disseminated carbonate blebbing and veining. Host rock tuff. Traces of galena and sphelerite at 264' in carbonate. Trace chalcopyrite in chlorite vein at 248 and 249. Section contains coarse carbonate at end. | 267 | 273 | 6 | 6 | 0.10 | 0.11 | 0.03 | -0.1 | Nil | 2.2 | | |
| | | | 273 | 277 | 4 | 4 | 0.05 | 1.0 | 0.03 | 0.25 | 0.1 | 2.6 | | |
| | | | 277 | 282 | 5 | 5 | 0.28 | 0.90 | 0.02 | 0.12 | Nil | 2.8 | | |
| 273 | 284 | Fine grained locally bedded siltstone tuff with traces of galena and sphalerite throughout | 282 | 284 | 2 | 2 | 0.52 | 0.93 | 0.02 | 0.21 | Nil | 2.6 | | |
| 284 | 286½ | Fine grained sericitic tuff with medium grained carbonate blebs and trace sphalerite in some | 284 | 285½ | 1½ | 1½ | 0.12 | 0.22 | 0.11 | 0.1 | Nil | 2.1 | | |
| 286½ | 287½ | Quartz carbonate vein with minor amounts remobilized galena | 285½ | 287½ | 2 | 1 | 2.6 | 1.9 | 0-03 | 1.3 | 0.45 | 2.6 | | |
| 287½ | 297 | Fine grained sheared siliceous tuff with rare traces of galena and sphalerite | 287½ | 297 | 9½ | 9½ | 0.55 | 1.0 | 0.03 | 0.3 | Nil | 1.5 | | |

Form No. W.C.D. 404A — A 17251

# ELECTROLYTIC ZINC CO. OF AUSTRALASIA LTD.

ROSEBERY — TASMANIA

**HOLE No.** RLP 162

765024A

# DIAMOND DRILL CORE RECORD

| FOOTAGE FROM | FOOTAGE TO | DESCRIPTION | FROM | TO | FEET | CORE REC'D | ASSAY DATA Pb % | Zn % | Cu % | Ag Oz./Ton | Au dwts. | Fe % | | | DIPS FOOTAGE | DIPS ANGLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 297 | 302 | Medium to coarse grained siliceous sheared tuff with abundant carbonate blebs and trace of galena in quartz carbonate veins | | | | | | | | | | | | | | |
| 302 | 315 | Medium grained locally bedded granular slightly sheared crystal tuff with bands of disseminated pyrite and quartz carbonate gangue at 303 and 311. Trace chalcopyrite in places of more abundant pyrite. | | | | | | | | | | | | | | |
| 315 | 318 | Slightly disseminated coarse blebby carbonate in sheared siliceous medium grained tuff. | | | | | | | | | | | | | | |
| 318 | 320 | Massive quartz vein | | | | | | | | | | | | | | |
| 320 | 320½ | Disseminated galena and sphalerite. Minor mineralisation in sheared sericite schist. | 320 | 320½ | ½' | ½' | 3.5 | 7.7 | 0.09 | 1.05 | Nil | 5.6 | | | | |
| 320½ | 337 | Slightly sheared medium grained siliceous tuff with abundant blebs and eyes of carbonate - light olive coloured footwall pyroclastics thin quartz carbonate veins with trace of galena and sphalerite | | | | | | | | | | | | | | |

017

APPENDIX 2

765025

# Estimated Cost of Exploration Mt. Black

1972-73

1. Diamond Drilling

a. Scout drilling to test for mineralisation related to geophysical and geochemical anomalies and in geologically favourable rock formations.

8 drillholes averaging 500 feet cost 7.50 per foot

$30000

b. Deep drilling to test for depth projections of known mineralisation and/or favourable rock formations.

1 drillhole 1500 ft. depth cost 9.50 per foot

$14250

2. Geology. Supervision. Planning and Labour.

Personnel Required 1 Geologist
1 Field Assistant
2 Students (part time)

$15000

3. Line Cutting

a. S. Hercules White Spur Grid and intermediate lines on existing grids.

100,000 line feet at $4 per 100 ft. $4000

b. Colebrook - Ring River

100,000 ft. at $4 per 100 ft. $4000

c. Bulldozing for trenching and access $4500

d. Geochemical analysis 2000 at $1.50 $3000

4. Geophysics Turam Surveying; Down hole geophysics. $10000

TOTAL $84750

018

72-864

765026

Appendix 3

REPORT ON TURAIR

AIRBORNE ELECTROMAGNETIC-MAGNETIC SURVEY

ROSEBERY AREA, TASMANIA

ON BEHALF OF

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

OPEN FILE

019

765027

PRIVATE AND CONFIDENTIAL

# REPORT ON TURAIR
# AIRBORNE ELECTROMAGNETIC-MAGNETIC SURVEY
# ROSEBERY AREA, TASMANIA
# ON BEHALF OF
# ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

by

J.G. Linford, B.Sc.(Hons), Ph.D.
Chief Geophysicist.

PERTH, WESTERN AUSTRALIA. APRIL, 1972.

020

765028

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APPENDIX I: LIST OF TURAIR EQUIPMENT

APPENDIX II: SURVEY EQUIPMENT & PROCEDURES SEMI-AIRBOURNE ELECTROMAGNETIC SYSTEM - TURAIR 2


PLATES


Plate 1 - Northern Area - Electromagnetics

2 - " " - Magnetics

3 - Southern Area - Electromagnetics

4 - " " - Magnetics

021

765029

GEOPHYSICAL CONSULTANTS AND CONTRACTORS
1031 Wellington Street, West Perth. W.A. 6005.

## SUMMARY

With the Turair airborne electromagnetic-magnetic method, about 203 line miles of geophysical traverses were flown at the Rosebery Prospect. About 20 square miles were covered with an interline spacing of 500 ft. and a nominal mean terrain clearance of 150 ft.

The anomalous EM responses are plotted on the flight path recovery plan and grouped into conductors. A majority of these anomalous responses have been analysed for depth and conductivity-thickness values assuming that the response is due to a 'thin tabular conductor'.

The amplitude of the anomalous responses are very weak and mainly FSR and are near the noise level of the system. However, such sort of responses are observed over the Hercules Mine. The conductors which are graded by their general characteristics yield several particularly promising conductors and follow-up investigation is warranted.

The magnetics show a central region of low magnetic susceptibility corresponding to the pyroclastics. The surrounding region of intermediate to high magnetic susceptibility relates to a complex basic to intermediate volcanic sequence.

022

765030

# REPORT ON TURAIR
# AIRBORNE ELECTROMAGNETIC-MAGNETIC SURVEY
# ROSEBERY AREA, TASMANIA
# ON BEHALF OF
# ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

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## INTRODUCTION

During early March 1972, Seigel Associates Australasia Pty. Ltd. executed a Turair airborne electromagnetic-magnetic survey over two survey areas near Rosebery, Tasmania on behalf of Electrolytic Zinc Company of Australasia Limited.

The purpose of the airborne geophysical survey was to detect and locate any subsurface conducting zones which may be indicative of sulphide mineralization. In addition the magnetic data, and to a lesser extent the electromagnetic data, can aid the interpretation of geology, being especially useful in covered areas.

The survey areas which cover approximately 20 square miles, are located about a mile north and south of Rosebery (see Figures 1 and 2). The terrain is extremely rugged.

A total of 203 line miles are presented on the flight path recovery plan, 75 traverses being flown. The nominal interline spacing was 500 ft. and the mean terrain clearance of the bird (receiver coils) was about 150 ft.

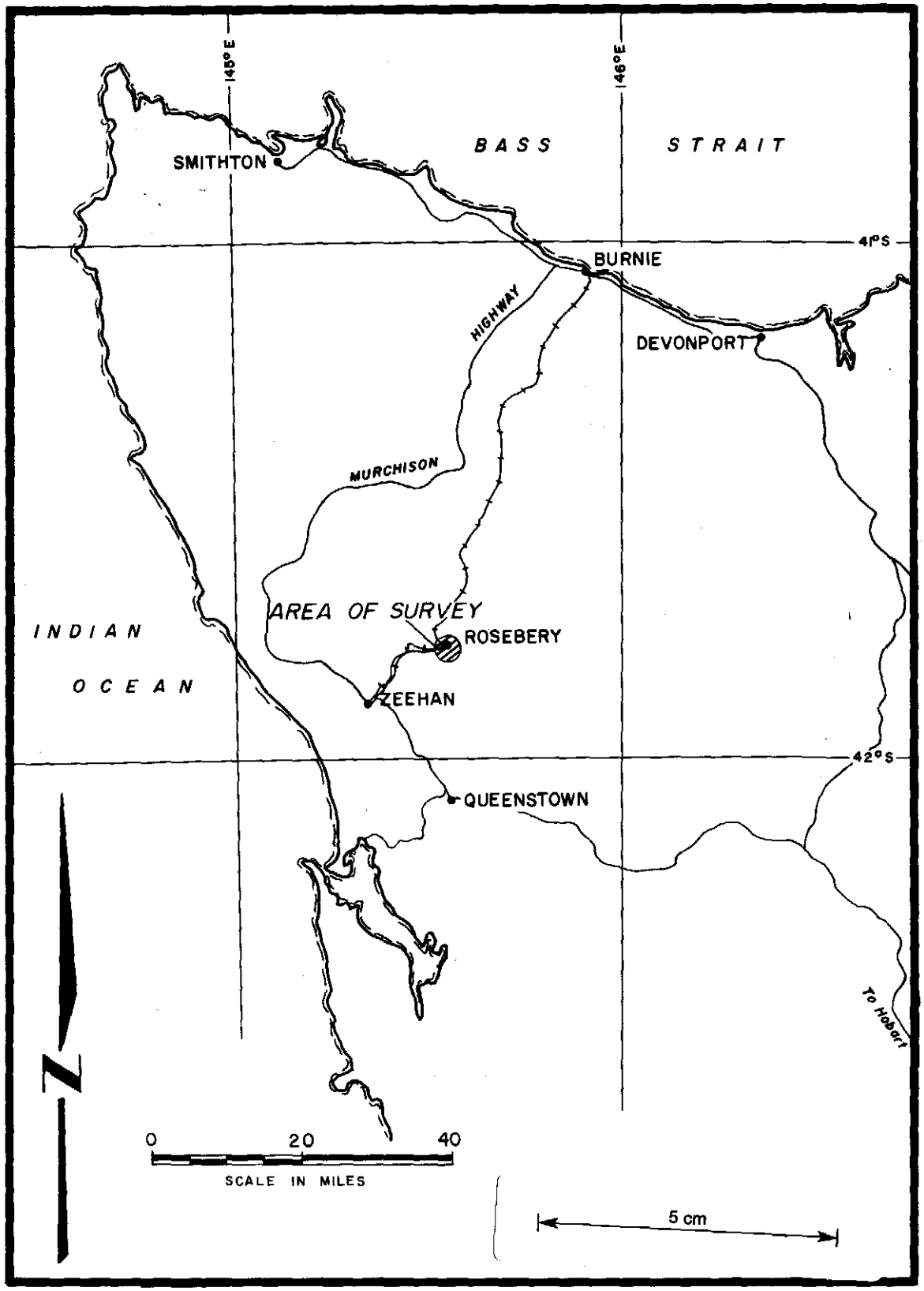
023

Figure 1

765031

# MT. BLACK PROSPECT

## LOCALITY PLAN

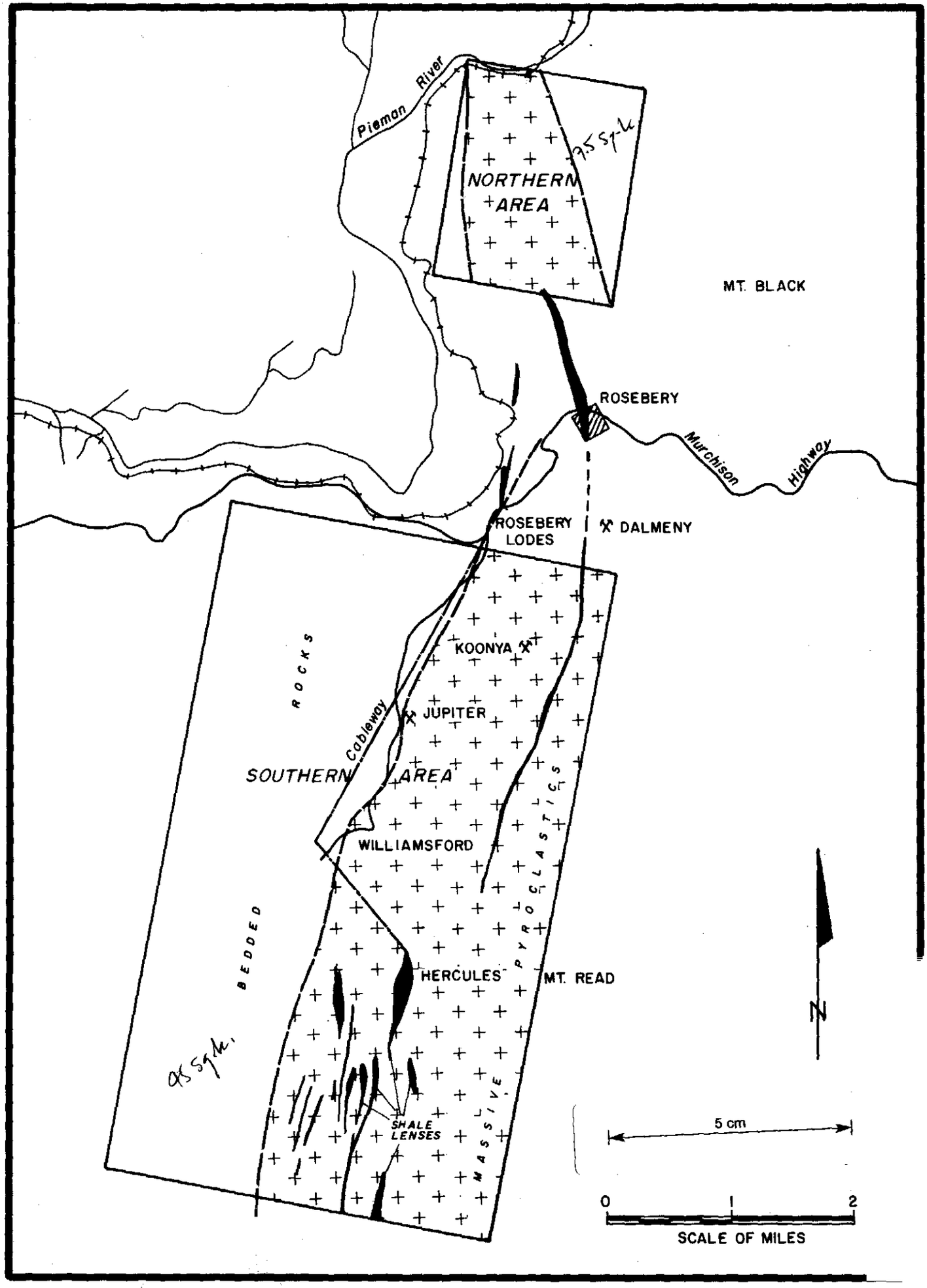


024

# SURVEY AREA PLAN

Figure 2

765032



Measurements of both the electromagnetic and magnetic fields were made and recorded, utilizing a Scintrex Turair-2 unit using 400 Hz and a Scintrex MAP-2 nuclear resonance total intensity magnetometer. This equipment, together with all necessary ancillary equipment was installed in a Bell 206A Jet Ranger helicopter.

The reader is referred to Appendix I of this report for a detailed list of equipment used and to Appendix 2 for a general discussion of the Turair method.

## GEOLOGY

The pyritic Zn-Pb-Cu ore deposit at Rosebery in west Tasmania is situated about 20 miles inland from the coast at an altitude of 550 ft. The area is mountainous with Mount Murchison 4,183 ft., Mount Read 3,660 ft. and Mount Black 3,037 ft. forming the principal topographic features. The vegetation is predominately dense rain forest, the average annual rainfall being 82 inches.

The Rosebery deposit was discovered in 1893 but full-scale production did not commence until 1936, because of difficulties in treating the fine-grained sulphide ore. The deposit is worked by a series of adits from 1,300 ft. above sea level to 200 ft. below sea level.

The general geology (Hall et al, 1965 'Geology of Australia Ore Deposits', P.485-489) of the district consists of folded and faulted Lower Palaeozoic formations. The prominent central formation comprises massive (primrose) pyroclastic rocks, which consist of agglomereates, tuffs and lavas. They are not amenable to replacement and carry little mineralization apart from narrow fissure veins. This formation is flanked on either side by bedded slates, tuffs and sandstones.

The best mineralization occurs in fine-grained tuffaceous shales with the bedded series, chiefly in close proximity to the boundary of the massive pyroclastics where there has been warping as the result of folding and faulting. Where mineralization occurs the rocks are usually highly sheared.

At the Rosebery Mine, the ore, although not continuous, has been proved over a length of more than 5000 ft. and from the surface to an inclined depth of over 2200 ft. The lead-zinc mineralization is restricted to one member of a bedded series of pyroclastic rocks which strike 335° magnetic and dip generally 48° E.

At the Hercules Mine which consists of two sections separated by about 1000 ft., the mineralization extends over a total length of 2500 ft. and a vertical depth of 600 ft. The lodes are essentially lenticular

with maximum dimensions of 400 ft. height, 200 ft. length and 60 ft. thickness. They dip 70° E and strike 340 degrees, in contrast to the N-S of the bedded rocks.

The ore bodies at the Rosebery and Hercules Mines are essentially metasomatic replacements of altered tuffaceous shale. The ore is fine-grained and consists of about 75 percent sulphide mineralization. The mineral composition is sphalerite 31 percent, pyrite 37 percent, galena 7 percent with minor amounts of chalcopyrite and other minerals.

A geological map of the area (1 mile = 1 inch) is available. The particular areas of interest are the black shale lenses. These are known to be slightly mineralized in the Rosebery Lodes. Geological and geochemical information has indicated that if there is substantial mineralization present on any of these horizons it may be at considerable depth - at least 300 ft. or more below surface. The general dips of these siltstone lenses varies from 25 degrees to 55 degrees to the east with the shallower dips in the southern part and steeper dips to the north. (See Figure 2 and Plate 3 for an outline of the shale locations).

## PRESENTATION OF DATA AND RESULTS

### (a) Data Presentation

The original data records are presented in a binder, the data being recorded on a 6 channel, heat sensitive strip chart recorder and operated at a speed of 12 cm per minute. The chart is 38 cm wide with each channel being 5 cm wide. The parameters recorded and their details are as follows:

Altimeter: The altitude of the helicopter above the ground is recorded in a linear analog form, where approximately 1 cm = 100 ft. The E.M. bird is 100 ft. below the helicopter. Calibration records of the altimeter are presented in the binder.

Amplitude: The amplitude of the signal output from the preamplifiers is recorded in analog form. It shows the automatic switchings that occur to keep the signal within the necessary amplitude range for the equipment operation.

Electromagnetics: The sensitivity of these records was altered during the survey and the various scales used are clearly shown on the records. The scale mainly used was:

| | |
|---|---|
| Field strength ratio (FSR) | 1 cm = 0.59% |
| Phase difference | 1 cm = 0.28 degrees |

Magnetometer: The magnetic data is recorded on two channels. One channel records the hundreds and thousand digits in analog form, 4 cm = 10,000 gamma, while the other records the units and ten digits in analog form, 5 cm = 100 gamma.

The fiducial marks are recorded on the event marker between the two magnetic channels, the intervals being 1.5 seconds.

The flight records are presented in a separate binder, and show the lines surveyed with each loop and which lines and fiducial points were recovered.

The survey flight lines are shown on the photo-mosaic and its overlay, these being recovered with the aid of the on-board tracking camera and the laydown-photo mosaics. Central points are numbered with their corresponding fiducial number. Each survey line is given a number, regardless of the interline spacing, and a compass direction to indicate the direction of flight.

The magnetic contour interval is 10 gamma.

(b) Analysis

The electromagnetic records are interpreted to determine the presence of conducting bodies and to obtain some information relating to their character. The intervalometer time marks are synchronized with the positioning camera film strip and thereby permit the relating of the conductors with appropriate ground locations. The terrain clearance is obtained from the altimeter data.

Each electromagnetic anomaly is analysed where possible, for the following:

1. Location.
2. Anomalous field strength ratio in percent.
3. Anomalous phase difference in degrees.
4. Relevant magnetic character.
5. Depth estimation of current axis below the ground.
6. Correlation of anomalies on adjacent lines, being indicated by a common conductor.
7. Conductivity-thickness ($\sigma t$) product.

The depth to the current axis is recorded on Plate 1 next to the anomaly. The circles for the anomalies also have a code (see legend Plate 1) for the $\sigma t$:

Category 1, blackened circle, 100 mhos and over;
Category 2, half blackened circle, 10 to 100 mhos;
Category 3, open circle, less than 10 mhos.

## DISCUSSION OF RESULTS

NORTHERN AREA. This area was covered with loop 1 and a total of 30 line miles were surveyed. Plate 1 presents the flight path recovery and electromagnetic interpretation while Plate 2 presents the magnetic contour and interpretation plan.

A total of 33 anomalous electromagnetic responses have been interpreted, however these have extremely weak amplitudes and are mainly phase distortions.

In this rugged area the terrain varies between 500 and 2000 ft. and the recorded altimeter profile varies rapidly between 150 and 500 ft. The electromagnetics show almost uniform background profiles indicating no well-defined anomalies. The FSR profiles do not indicate any anomalous distortions but there is some FSR noise due to bird movement. The bird used for this area was noisy and produced distortions up to 0.3 percent. In mountainous terrain where the helicopter is both climbing and descending with variable speeds, bird movements are expected to a certain extent.

The phase distortions are extremely weak being from 0.05 degrees to 0.15 degrees. This is on the noise level of the system.

The absence of any significant anomalies implies a high resistivity region with no conductive zones. Possibly some responses have been reduced in amplitude because of altitudes flown and the mountainous terrain, and are now within the noise level of the system. It also can be argued that these helicopter altitude and terrain variations, could produce some apparently anomalous responses.

The 33 anomalies, which have been analysed and the various conductors they form, are discussed below and graded in their degree of interest.

Conductors 1 and 2 are defined by a series of very weak phase anomalies of about 0.1 degrees. Assuming a thin tabular conductor at depth, their $\sigma t$ is very poor being very much less than 10 mhos while their depths are about 600 ft. ranging from 380 to 1310 ft. Magnetically, the anomalies are associated with a high region. On line 1W, the black shale associated with Rosebery lode terminates at about 500 ft. west of anomaly 2. In view of the eastward dip, conductor 1 could be associated with the shallowly dipping shales, especially as anomalies 1 and 2 show an increased depth to the east. However the characteristics, as described above, are very poor and the source of these broad phase anomalies is more likely a lower resistivity region. Of little interest.

Conductive region 3 is due to a series of broad phase distortions with amplitudes of about 0.1 degrees. The anomalous region is over the western flank of a magnetic high. If a confined body at depth is assumed, then the depths are several hundred feet and the $\sigma t$ is very low. It is interpreted as a weak slightly conductive region, of little interest. On line 13W within this region, anomaly 29 is formed by a FSR distortion of 0.3 percent and a broad phase anomaly of about 0.1 degree. Possibly the FSR is due to an isolated bird movement, but it warrants some investigation as there is a possibility that the FSR extends to the south. If a strike length of 1000 ft. is assumed, then its $\sigma t$ value is 33 mhos. The depth is 530 ft. Of minor interest.

Conductor 4 is defined by 2 very weak phase anomalies (0.075 degrees) and the depth is about 200 ft. and the $\sigma t$ is negligible. Of little interest.

There are a number of isolated phase anomalies, 3, 9, 12, 13, 18, 25, 26 and 31 which are generally weak, 0.15 degrees or less. Anomalies 9 and 31 are the best defined. The depths of these anomalies ranges from 150 ft. to 510 ft. The $\sigma t$ values are negligible for all these anomalies. Of little interest.

In summary, a region of high resistivity is shown, there being some very weak phase anomalies on the noise level. Anomaly 29, which has a FSR distortion of doubtful origin, probably warrants some investigation.

SOUTHERN AREA. Loops 2 and 3 were used to survey this area. Because of the weather the survey was terminated with parts of it being incomplete: Lines 38 and 39 were not surveyed; lines 40 to 46 were completed in the very late afternoon making the flight path recovery difficult (control points were the loop's wire and the cable); the magnetometer was malfunctioning and rather than repair it, the survey was continued without magnetic records because of the approaching bad weather.

A total of 115 line miles of magnetics and 173 line miles of electromagnetics are presented on the flight path recovery plan on Plate 3 with the electromagnetic interpretation.

The profiles show only extremely weak anomalous responses, and imply a very resistive region. The new bird used on these loops has apparently produced no bird noise, apart from a few lines. Because of this, it is possible to see very weak FSR distortions of about 0.1%, the amplitudes range from 0.06 to 0.4%. These distortions do not normally have any corresponding phase anomalies giving them $\sigma t$ values in excess of 100 mhos (i.e. category 1).

These anomalies are in complete contrast to those shown in the northern area. There are some phase anomalies some of which have corresponding FSR distortions. The amplitudes are usually about 0.1 degrees but a few reach 0.4 degrees.

The terrain is mountainous and its elevation varies from 600 to over 3000 ft. The elevation of the helicopter is variable ranging from about 200 ft. to in excess of 600 ft. There is a possibility that the variation in altitude and terrain could produce these weak distortions or that they are due to rock units. However, as deep conductors are expected, and in view of the altitudes flown, the amplitudes are by a factor or two, near the correct order of magnitude. The detracting feature is the lack of a corresponding phase response. Finally, the FSR anomalies could be due to bird noise. The horizontal bird oscillation produces a readily recognizable wave distortion. However a temporal change in orientation or inclination is another source. For example, when the altimeter shows that the radar is bouncing off the bird. Here the bird is directly below the helicopter and is hanging almost freely and probably at an odd angle. This is an unstable position as the bird is designed to be aerodynamically stable. Anomalies that occur when the bird is in this unstable position are therefore doubtful. These sort of anomalous origins must be kept in mind when considering these very weak

anomalies on the noise level of the detection system. In view of the lack of any other anomalies and the potential of the area, these distortions must be considered. By considering their amplitudes, definition, depth and geological location, it is possible to grade the anomalies. The strike length of the conductor can also be of use in evaluating its significance. Several anomalies in sequence, imply a repeatable distortion, whereas an isolated distortion is probably spurious. However there is no hard and fast rule, as the same topographic feature could produce a series of distortions and the Hercules lodes have small strike lengths.

A total of 99 anomalies have been interpreted and coded. There are a number of anomalies from the cableway which are not analysed. Most of the anomalies are over the pyroclastic rocks. In the discussion below this can be assumed unless otherwise stated. The most favourable geological feature for the anomalies is to be associated with or east of a black shale lens, or on the boundary of the pyroclastic rocks. In evaluating the conductors, the magnetics are not significantly important. If anything, a slightly lower magnetic value is expected overthe shale lens. The anomalies and conductors are discussed below:

Conductor 1 is defined by FSR distortions 1, 6 and 10. Anomaly 1 is well-defined, amplitude 0.15 percent. It has a depth of 300 ft. and a category 1 ~~ct~~. The other anomalies are poorly defined and have very weak amplitudes. The region has lower magnetic values and the strike length of the conductor is 1500 ft. The conductor is about 700 ft. east of a black shale horizon which is probably shallowly dipping to the east giving the conductor some interest, especially anomaly 1. Of secondary interest.

Conductor 2 being weakly defined by anomalies 7 and 11, is several hundred feet further east of conductor 1 and has a depth of 300 ft. Possibly the shales dip almost horizontally, their weak amplitudes (.07 and .18 percent) give the conductor only minor interest.

Conductor 3 is poorly defined by FSR anomalies 2 and 4, the amplitudes are 0.12 and .07 percent and the depths 90 and 340 ft. With these characteristics and not apparently near any geological feature of note, the conductor has little interest.

Anomaly 3 is an isolated FSR response of 0.05 percent, which has a depth of 150 ft. Its weak amplitude, location and lack of any adjacent anomalies (although conductor 4 could be an extension) gives it little interest.

Anomaly 5 has an extremely weak isolated amplitude of 0.08 percent (the altitude is 550 ft.) and a depth of 300 ft. It is of little interest.

Conductor 4 is poorly defined by FSR anomalies 8, 15 and 20. The amplitudes are extremely weak, 0.1% or less and only anomaly 8 has sufficient definition to give a depth (250 ft.) Geologically it is south of several black shale horizons. Of little interest.

Anomaly 9 is part of the conductive response formed by conductors 1 and 2 that is east of a black shale lens, but like anomaly 5 it is almost over the shale. As stated earlier anomaly 1 is probably the best anomaly and to investigate the response east of this lens. Anomaly 1 requires first consideration to these other poorer anomalies.

Anomaly 12- a weak and isolated FSR anomaly with a depth of 300 ft. The amplitude (0.15%) has a reversed response to that observed on the nearby anomalies and what is expected for this side of the loop. Such a response can be due to return currents from adjacent conductors or the dip of the conductor. The probable dip is eastward. Being only an isolated response it has only minor interest.

Anomalies 13 and 14 -two FSR anomalies that have depths of 150 ft. and amplitudes of 0.12 percent. Both are east of a thin black shale lens, but being isolated are doubtful and are of little interest.

Anomaly 16 is a weak reversed FSR anomaly that is similar to anomaly 12. The dip is probably eastward and the depth is 360 ft. Of minor interest.

Anomalies 17 and 18 are poorly defined FSR distortions having amplitudes of 0.1 percent and depths of 260 ft. They are probably within the noise level. Of little interest.

Conductor 5 is formed by two very weak FSR anomalies 19 and 22. Their amplitudes are about 0.12% and depths are 250 ft. and 400 ft. Possibly the anomalies are noise, but their correlation and being on strike with the black shale lens, give the conductor minor interest.

Conductor 6 is formed by two distinct but weak FSR anomalies 21 and 23 that are reversed (an eastward dip). The amplitude of 0.12 percent is very weak while the depth is 450 ft. The altitude indicates a minimum. The strike length is about 800 ft. but it could possibly extend NNW to anomaly 16. Of minor interest.

Conductor 7 which has a strike length of 2000 ft. is distinctly defined by FSR anomalies 24, 25 and 26. The depths ranged from 330 to 220 ft. and show a southward plunge. Anomaly 26 having an amplitude of 0.18 percent is the best defined. The conductor is 1200 ft. east of a black shale lens with a geochemical anomaly to which it is probably related, assuming a shallow dip. Its location and general definition make it of prime interest.

Conductor 8 which would appear to be a possible extension of conductor 7 is poorly defined by anomalies 27, 29 and 31. The depths are 300 - 400 ft. The lack of definition implying it is within the noise level gives it minor interest. Anomaly 27 is a FSR distortion that has a category 1 ~~ot~~ while anomalies 29 and 31 have some phase response and have category 3 ~~ots~~.

Conductor 9 is weakly defined by FSR anomalies 28 and 30. The depths are 300 and 480 ft. and its length is 1000 ft. It is about 2000 ft. east of a black shale lens, giving it a good geological location. However, the anomalies are very weak and poorly defined. Of minor interest.

Anomalies 32, 33, 34, 35, 36 and 37 are isolated phase distortions. The amplitudes are about or less than 0.1 degree making them category 3. Their depths (80, 30, 170, 100, 100 and 410 ft.) are usually shallow. Their lack of correlation and ot give them little interest, although some of them are in interesting geological locations.

Conductor 10 with a strike length of 3000 ft. is defined by anomalies 38, 40, 41, 43, 44, 46 and 47. The depths range from 180 ft. to 600 ft. The conductor is about the black shale of the Hercules Mine. Most of the anomalies are poorly defined and have very weak amplitudes although 47 is well defined. Anomaly 46 is an extremely weak phase anomaly (.06 degrees) and hence has a category 3 ot. Anomaly 43 is also category 3. Of the seven anomalies forming the conductor, only two are category 3 and the remainder are category 1. If only the category 1 anomalies are considered as being due to massive sulphides, then conductor 11 appears to be formed by several small subconductors. Although the location of the ore is not known exactly, anomaly 47 seems to correspond to the Hercules section and anomaly 44 corresponds to the Mt. Read Section. Anomalies 38, 40 and 41, which appear further to the south, show that there is probably an extension to the south of the Hercules Mine.

If anomalies 44 and 47 are solely due to the Hercules Mine, then the anomalies are very weak, 0.12 - 0.15 percent. The type of responses to be expected in similar unknown deposits must also be very weak. On the basis of the present system of grading, the conductor if it was not over the Hercules Mine, would be graded as of secondary interest.

Anomaly 39 is a weak FSR anomaly (0.1 percent) which has a depth of 260 ft. Being isolated and not related to any geological feature are detracting features. Of minor interest.

Anomaly 42 is an isolated phase distortion of 0.3 degrees with a depth of 1000 ft. Being isolated and in view of its characteristics, it is of little interest.

Anomaly 45 is a weak 0.1 percent FSR anomaly with a depth of 330 ft. It is several hundred feet east of the black shales (Hercules) making it relatively promising geologically. Being isolated and very weak, it has only minor interest.

Anomaly 48 is a very weak phase response (0.06 degrees) with a depth of 220 ft. It is in a similar location to anomaly 42, being east of a black shale lens. Of little interest.

Anomaly 49 is due to a broad reversed FSR response of 0.2 percent. The altitude of the helicopter is 600 ft. and rising, while the speed changes rapidly. The depth is about 900 ft. It has a doubtful origin. Of little interest.

Anomaly 50 is on the same line as anomaly 49, and the helicopter's altitude is in excess of 600 ft. It has both phase and FSR distortions. If an altitude of 600 ft. is assumed, the current axis is 100 ft. in the air, implying a bird or instrumental source. A number of other anomalies with current axes in the air were analysed, but are not presented.

Anomaly 51 and 52 correlate to the cableway. There is a series of anomalies due to the cableway which have not been plotted. It is of interest that the character of the anomalies varies and that on some lines no response is shown, presumably due to the altitude flown.

Anomaly 53 is an isolated FSR response of 0.2 percent. It has a depth of 80 ft. and is on strike with the Hercules lodes. In view of the character of the Hercules lodes this is a prime anomaly, however it is shallow, isolated, and the bird is in an unstable position. Of secondary interest.

Conductor 11 which has a strike length of 1500 ft., is defined by FSR anomalies 54, 55 and 56 which have depths of 230, 140, 80 ft. i.e. plunges to the south. The

anomalies become increasingly poorly defined to the north. Anomaly 54 with a depth of 230 ft. and 0.24 percent amplitude is the best defined. There are no nearby black shales. Of minor interest.

Anomaly 57 is a poorly defined and weak reversed FSR response. Possibly it could be an extension of conductor 12. Its depth is 130 ft. and it is about 600 ft. east of a black shale horizon. Of minor interest.

Anomaly 58 is an isolated FSR response of 0.18 percent and a depth of 40 ft. The profile is noisy and bird is in an unstable position. Of little interest.

Conductor 12 is defined by two reversed FSR anomalies 59 and 61, which possibly indicate an eastward dip. Their amplitude is about 0.2%; anomaly 61 is very poorly defined. It is geologically interesting, being about 1200 ft. east of a black shale horizon. Of minor interest.

Conductor 13 is defined by weak reversed FSR anomalies 60, 62 and 63. The anomalies are weak, 0.3 percent, and have variable depths, 180 - 900 ft. The reversed FSR probably indicates an eastward dip. The conductor is about 1000 ft. westward of the black shale horizon. Anomalies 60 and 62 require some investigation; of minor interest. On line 41 and 42 have a series of FSR anomalies that don't correlate to adjacent lines, anomalies 64, 65, 66, 67, 68 and 69. Their amplitudes are 0.18 -

0.3 percent and depths are 490 - 680 ft. Possibly anomalies 64 and 68 correlate. The bird is in an unstable position for many of these anomalies. Anomaly 67 has some phase distortion giving it an $\sigma t$ of 50 mhos. Of little interest.

Anomaly 70 is an isolated reversed anomaly in the moraine deposits with both FSR and phase distortions, but possibly has extensions to the north. Its amplitude is 0.3 percent and 0.2 degrees; the depth is 250 ft., the $\sigma t$ is 25 mhos assuming a strike length of 500 ft. Of little interest.

Anomaly 71 is a very broad distortion with 0.4 percent FSR that gives a depth of 1200 ft. Although it is east of the shale, its lack of correlation and depth makes it extremely doubtful. It is near an unstable bird region. Of little interest.

Conductor 14 (anomalies 72, 78 and 79) and Conductor 15 (anomalies 73, 77, 80 and 82) have a N-W strike and length of 1000 to 2000 ft. They are formed by very weak broad and poorly defined FSR distortions some of which have the bird in an unstable position. Their redeeming feature is the interline correlation. The depths range from 590 to 260 ft. and show a southward plunge. Of little interest.

Conductor 16 is defined by anomalies 74, 75, 76, 81 and 83 which are reversed distortions with both phase and FSR. Probably the dip is westward. The strike length is about 2000 ft. The $\sigma t$ and depths are as follows: 74, 25 mhos; 75, less than 2 mhos, 510 ft; 76, 32 mhos, 240 ft; 81, 7 mhos, 730 ft; 83, 25 mhos, 230 ft. The quality of definition, the depths and $\sigma t$ are variable and the conductor is over the moraine and fluvioglacial deposit and westcott argillite. It is of minor interest.

Anomaly 84 has a normal FSR and reversed phase distortion and associated with a sudden drop in altitude, presumably a hill top. It is isolated and over Munro Creek slate. Of little interest.

On line 50, a series of isolated FSR anomalies 85, 86, 87 and 88 are shown with amplitudes of 0.15 percent and depths from 70 to 310 ft. It is probably just a noisy line, but anomaly 87 which is reversed and has a depth of 160', is over the Koonya diggings.

Conductor 17 which is defined by reversed FSR anomalies 89 and 93, has a strike length of 1200 ft. and possibly extends anomaly 88. The strike is N.E. while the depth is 200 ft. The conductor is also about the black shales. Of secondary interest.

Conductor 18 is defined by anomalies 90, 91 and 95 which have both FSR and phase responses. It is the only conductor that is detected outside the loop and is over the crimson creek argillite. The direction and strike length are N.E. and 1500 ft. The ~~of~~ and depths are: 90, 18 mhos, 180 ft; 91, 12 mhos, 150 ft; 95, 25 mhos 90 ft. Of minor interest.

Anomalies 92, 94 and 97 are isolated, weak FSR responses. Being isolated they lack interest.

Conductor 19 is defined by anomalies 96, 98 and 99. The amplitudesare very weak 0.1% and their depth indicate some inaccuracy - 80, 210, 10 ft. It is over the black shale. Of minor interest.

In summary, the results show a high resistivity region with practical no well-defined and strong anomalies. There are however some very weak FSR anomalies that are interpreted in detail. A majority of these anomalies on evaluation, are shown to be of little interest. However, the remaining anomalies often have consistent and good geophysical characteristics and relate to favourable geology. It would appear that the Hercules Mine is detected by these sort of anomalies.

A summary of the grading is given below:

Prime Interest:

Conductor 7.

Of Secondary Interest

Conductors 1, 10, 17

Anomaly 53.

Of Minor Interest

Conductors 2, 5, 6, 8, 9, 11, 12, 13, 16, 18, 19

Anomalies 12, 39, 45, 57

Of Little Interest

Conductors 3, 4, 14, 15

Anomalies 3, 5, 9, 13, 14, 16, 17, 18, 32, 33, 34, 35, 36, 37, 42, 48, 49, 50, 51, 52, 58, 64, 65, 66, 67, 68, 69, 70, 71, 84, 85, 86, 87, 88, 92, 94, 97

MAGNETICS. The magnetic contour plans and the interpretations are presented for the Northern area (Plate 2, 2 sheets) and the Southern area (Plate 4, 2 sheets).

The magnetic contour enables the magnetic susceptibility of the underlying rocks to be mapped and the contacts of the various rock types and structural features, such as faults and folds to be located. In view of the magnetic complexity, the mountainous terrain and variable helicopter altitude, a more detailed interpretation is considered unnecessary. A geological plan is available, but the aeromagnetic contacts are seen to vary somewhat from the geological map contacts. It is assumed that the geological map being prepared from regional studies, is open to change. It is also possible that rocks of different magnetic character have been mapped as one unit.

On the basis of magnetic susceptibility which is more or less proportional to the anomaly, four main magnetic units have been distinguished.

Rock type A has a relatively high magnetic susceptibility and generally indicates linear and steeply dipping beds. On the basis of magnetics alone, this rock type would normally be interpreted as a basic volcanic flow. On the magnetic contour plans, it relates approximately

values in excess of 1000 gamma. Unit AI is geologically mapped in part as serpentinite and gabbro and indicates a ribbon body with off-shooting lava flows. Unit A2 is within the mapped Crimson Creek Argillites, and implies the presence of a more basic rock unit than mapped.
Unit A3, in the northern area, is within the mapped massive pyroclastics, indicating also a more basic composition than mapped.

Rock type B has an immediate but varying magnetic susceptibility, indicating flows of basic to acidic composition. They are usually defined by magnetic intensities between 600 and 1000 gamma. Unit BI is a large complex bedded and folded region which surrounds Unit AI. It corresponds to the Crimson Creek Argillite. Unit B2 corresponds to six isolated beds of more basic composition in the massive pyroclastics. Possibly they could be resulting from lava flows from the Mt. Black volcanics to the west.
Unit B3 like Unit BI, surrounds Unit A3 and has a complex bedded and folded region with variable susceptibility. The geological map indicates its western half is in the Mount Black Volcanics and the eastern half is in the pyrolclastic rock. Unless the pyroclastic has a region of more basic composition, then it appears that the Mount Black volcanics extend further eastward than mapped.

Unit B4 is south of BI, and although its magnetic magnitude is above 740 gamma and it has been mapped the same as unit BI, it indicates an almost uniform composition.

Rock type C has an essentially uniform and low susceptibility and is indicated by regions less than 700 gamma. In general this relates to pyroclastic rock, rock unit CI, but there are within the general low, regions of lower magnetic intensity, which suggest a greater depth to bedrock or cover. These regions are classified as rock type D. This relates to a moraine and fluvioglacial deposit and river valleys, rock units DI and D2. In the northern region units C2 and D3 are over the pyroclastics. Unit D3 has moraine deposits to the north and south and possibly defines a region of deeper cover. Unit C3 is within the mapped Mt. Black volcanics and possibly defines regions with river valleys and deeper cover.

The shale lenses have little magnetic expression and similarly the Stitt quarzite, Westcott arglittite and Munro Creek Slate have no readily apparent expression.

The major structure shown is an almost north-south trend with folding and faulting in the basic to intermediate volcanics. In the southern area, the faults are mainly SW-NE and in the northern area, E-W. The folding is generally complex and localized.

In summary, the central pyroclastic rocks show low magnetic susceptibility while the surrounding bedded rocks have intermediate to basic susceptibility. This interpretation has provided information about the rock types which corresponds in general, but not in detail, to the presently available geological mapping. Possibly a more direct correlation would be achieved if detailed mapping was carried out.

The magnetics are now compared with the electromagnetic conductors.

In the northern area, conductors 1 and 2 follow the magnetic trend as outlined by Unit A3. However there is little additional useful information.

In the southern area, the majority of the conductors follow some structural feature or trend:

Conductors 1, 2, 3, 4, 5, 7 and 8 follow the contour.

Conductor 6 is within a fold in the B2 unit.

Conductors 11 and 12 are about the contact of a B2 zone, which possibly upgrades their significance.

Conductors 13, 14 and 15 follow the trends in the CI unit.

Conductors 16, 17 and 19 follow the low trends in the D2 units.

Conductor 18 is between two magnetic beds in the BI unit and possibly relates to a shear zone or fault.

## CONCLUSIONS AND RECOMMENDATIONS

A total of 203 line miles of traverses were flown at the Rosebery prospect.

In the northern area some extremely weak phase distortions are shown. The results show a region of high resistivity with practically no anomalies that warrant further investigation.

In the southern area there are a number of very weak FSR distortions which are near the noise level of the system. On a detailed evaluation of these responses, some of them show consistent and favourable geophysical characteristics, as well as relating to geological features of interest, in particular, the Hercules Mine. The anomalies and conductors have been graded in degree of interest and apart from those of 'little interest', follow-up investigation is recommended. However, those of prime and secondary interest warrant first investigation. Drilling is not recommended on the basis of the airborne data alone, as there are probably displacements in the flight path recovery, and the depth estimates, because of the very weak amplitudes, probably have some variance.

The magnetics show that the central pyroclastic rocks have a relatively low susceptibility while the surrounding bedded rocks have intermediate to basic

susceptibility. Although there is a general correspondence between the geological map and the magnetics, the results suggest a more detailed geological map would give a greater direct correlation.

We would be pleased to discuss these results at any time, and any follow-up procedures that are necessary. Conductor 7, and the southern part of conductor 10 should be given a full investigation and depending on these results the other conductors can then be investigated.

for SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.



J.G. Linford, B.Sc.(Hons), Ph.D.
Chief Geophysicist.

PERTH, WESTERN AUSTRALIA. APRIL, 1972.

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SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.
GEOPHYSICAL CONSULTANTS AND CONTRACTORS

# APPENDIX I

## LIST OF TURAIR EQUIPMENT

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A. AIRBORNE EQUIPMENT.



LIST OF TURAIR EQUIPMENT

| SCRIPTION | SCINTREX MODEL NUMBER | WT. LBS. | BRIEF SPECIFICATIONS |
|---|---|---|---|
| TURAIR CONSOLE | TAR-1 | 15 | POWER: 20 to 30 V.D.C., 400 mA.<br>INPUT: Preamplified 400 Hz sine wave from bird.<br>OUTPUTS:<br>A. Signal amplitude, meter display<br>B. Amplitude ratio in percent, meter display and recorder output.<br>C. Phase difference in degrees, meter display and recorder output. |
| TURAIR BIRD CABLE ASSEMBLY | TAR-1 | 125 | POWER: Self contained, 36 V.D.C., dry bettery pack - 2 preamps.<br>INPUT: Induced EMF from two horizontal coplanar coils, luV to lmV., sine wave.<br>GAIN OF PREAMPS: AV = 1000<br>OUTPUT: Sine wave to shielded conductors in 100 ft. tow cable. |
| MAGNETOMETER CONSOLE | MAP-2 | 12 | POWER: 24 to 30 V.D.C., 3.2A Max.<br>INPUT: Precession signal from sensor coil.<br>OUTPUT: Total magnetic field intensity in three forms.<br>(1) Digital display, 5 figures.<br>(2) Digital binary coded decimal, 5 decimal places.<br>(3) Analog, 5 V. full scale. Choice of 1000 $\gamma$ full scale or 100 $\gamma$ full scale.<br>SAMPLING RATE: Once per second.<br>ACCURACY AND SENSITIVITY: $\pm$ 1 gamma. |
| MAGNETOMETER SENSOR | 771 021 | 18 | POWER: 3.0A. energizing pulse applied to double coil for 660 msec.<br>OUTPUT: Precession frequency from kerosens atoms within coils. |

# LIST OF TURAIR EQUIPMENT

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| DESCRIPTION | SCINTREX MODEL NUMBER | WT. LBS | BRIEF SPECIFICATIONS |
|---|---|---|---|
| POSITIONING CAMERA (TWO CAMERAS INSTALLED ON TURAIR INSTALLATION) | VINTEN MK III (12v.) | 13 × 2 = 26 | INPUT: 12 V.D.C. pulses from intervalometer. FUNCTION: Camera shutter and film advance actuated once every 1 to 4 sec. to take an aircraft positioning photo. |
| TURAIR RECORDER | H - P MOSELY 7100 B | 22 | POWER: 115V.A.C., 60 Hz, 65 VA INPUT: Analogue voltages representing amplitude ratio and phase angle. Digital voltages for radar altimeter info and fiducial markers. OUTPUTS: Ratio and phase continuously recorded by the two channel pens. Fiducial marks and radar altimeter info recorded by two side pen event markers. Recording done in ink on chart paper. |
| MAGNETOMETER RECORDER | H - P MOSELY 680 | 10 | POWER: 115 V.A.C., 60 Hz, 22 VA INPUT: Analogue voltage representing magnetic field strength, and digital voltage fiducial marks. |
| INTERVALOMETER | EIA-5 | 2 | POWER: 24V.D.C. FUNCTION: Provide D.C. pulse to operate positioning camera at intervals variable from 1 sec. to 4 sec. Simultaneously provides voltage pulses to operate fiducial counters and fiducial marks on recorder event markers. |
| INVERTER | FLITE-TRONICS PC-16 | 16 | INPUT: 28 V.D.C., 10 to 14 AMPS. OUTPUT: 115 V.A.C., 250 VA FUNCTION: Provides power source for two recorders. |

LIST OF TURAIR EQUIPMENT

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| DESCRIPTION | SCINTREX MODEL NUMBER | WT. LBS. | BRIEF SPECIFICATIONS |
|---|---|---|---|
| RADAR ALTIMETER | IN-FLIGHT DEVICES GAR | 2 | POWER: 9 to 30 V.D.C., 1.0 AMP.<br>OUTPUT: Direct readout of altitude above ground level in the range 80 ft. to 3000 ft. Also provides warning if aircraft drops below a pre-set height-above-ground. |
| ALTIMETER CONVERTER | | ½ | POWER: 24 V.D.C.<br>FUNCTION: Converts analogue altitude voltage from GAR to digital altitude voltage for presentation on 7100B side pen. |
| HELICOPTER INTER-COM SET | | 2 | POWER: 24V.D.C.<br>FUNCTION: To provide headset ear-phone and mike communication between pilot, navigator, and operator. |

NOTES:

All instrumentation is mounted on a rack bolted in place on the Bell 206A right hand rear seat. All external equipment (tow cables and birds) is attached to the helicopter by means of the cargo hook only.

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B. GROUND EQUIPMENT



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LIST OF TURAIR EQUIPMENT.

| DESCRIPTION | SCINTREX MODEL NUMBER | WT. LBS. | BRIEF SPECIFICATIONS |
|---|---|---|---|
| 10 KVA MOTOR GENERATOR | | 700 | FUNCTION: To provide 400 Hz ± 10Hz stable, sine wave current into a ground loop of the order of two miles square 10 KVA alternator used is driven by a mechanically- governed 1600 cc Volkswagen engine. |
| MATCHING TRANSFORMER | | 60 | Matches the resistance of the ground loop to the output voltage of the 10 KVA motor generator to obtain the correct current. Primary 240 V., 10 KVA. Secondary taps at 400V., 500 V., 650 V., 800 V., 100 V., 1500 V. |

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LIST OF TURAIR EQUIPMENT

| DESCRIPTION | SCINTREX MODEL NUMBER | WT. LBS. | BRIEF SPECIFICATIONS |
|---|---|---|---|
| OSCILLOSCOPE | SONY 323 | 7 | Calibrating Turair; Trouble shooting |
| SINE WAVE GENERATOR | H-P 208 A | 9 | Calibrating Turair; Trouble shooting |
| VOLTMETER | H-P 427A | 4 | Trouble Shooting |
| DECADE RESISTANCE | | 2 | Trouble shooting |
| DECADE CAPACITANCE | | 2 | Trouble shooting |

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# APPENDIX 2

## SURVEY EQUIPMENT AND PROCEDURES

## SEMI-AIRBORNE ELECTROMAGNETIC SYSTEM - TURAIR-2

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# APPENDIX 2

## SURVEY EQUIPMENT AND PROCEDURES

### SEMI-AIRBORNE ELECTROMAGNETIC SYSTEM - TURAIR-2

In the application of electromagnetic prospecting methods, it has long been recognized that, other things being equal, much greater exploration depths can be attained with systems employing a fixed source than with systems where both source and receiver are moved in unison. This is an extremely important consideration in Australia where surface weathering may extend to considerable depth.

Most present-day airborne electromagnetic (AEM) systems are of the moving source type, and although such systems have tangible advantages over the ground versions, it appears difficult to increase their useful penetration substantially beyond their present range. Under very favourable conditions the better moving source AEM systems may reach exploration depths of as much as 300 ft. or in exceptional cases 370 ft. below the ground surface. This is sufficient for many search problems but in some areas the geologic and topographic conditions necessitate a much deeper penetration to conduct meaningful mineral surveys.

The foregoing considerations have led to the development of the Turair method for the purpose of deep electromagnetic exploration. The system, which can be described as a fixed source, semi-airborne, gradient measuring device, employs a large transmitting loop on the ground as a primary source. The horizontal gradients of amplitude and phase of the vertical magnetic field are measured from the air, along traverse lines across the source and perpendicular to the regional geological strike.

The Turair method, because of its semi-airborne character, is particularly suitable for the detailed, deep investigation of structures having geologically favourable characteristics or a magnetic expression suggesting favourable geology. Because of its potential depth of exploration, it can be employed in areas of deep sedimentary cover, deep weathering, or tall tree cover (tropical area), or in areas where shallower exploration has established the presence of ore deposits and a deeper search is desired. It is, because of its fixed source configuration, less affected by near-surface conduction and can be applied with a very low exciting frequency (e.g. 200 Hz or less). Finally, as a helicopter-borne system it can operate in mountainous topography. Terrain clearance has far less effect on the exploration depth of the Turair system than it has in moving source methods and it can penetrate deep talus cover and valley fillings.

Economic ore deposits may have strike lengths less than 600 ft. If we want to search for such targets, particularly at greater depths, line spacing should not be much greater and for the average survey a line spacing of one-eighth mile should be considered optimum.

## EQUIPMENT

The Scintrex Turair-2 is a fixed source, semi-airborne electromagnetic system designed for helicopter operation.

The system embodies a fixed transmitter on the ground and a receiver carried in the helicopter. The size of the transmitting loop is guided by geological conditions and the character of the survey. A typical loop size is a 2 miles x 2 miles square - other shapes and sizes can be used. The loop is usually laid out from a truck or by helicopter. For airborne placement a special dispensing device is used which feeds out continuously, several miles of wire. The primary field of the present system is excited by means of a 15 Kw motor driven generator which supplies a current of 4-10 amperes into

the transmitting loop. The system can operate at 200 or 400 Hz, the selected frequency depending on the geological conditions in the survey area.

The receiver system comprises 2 horizontal coplanar air-cored coils, rigidly mounted 7 feet apart in a "bird". This bird is towed approximately 100 feet below the helicopter by means of a cable which also carries the electrical signals from the bird. In Australia, measurements are normally taken inside the loop. In environments with more resistive surface layers, such as parts of Canada, measurements are also taken outside the loop, thus greatly increasing area that can be surveyed with one loop.

The quantities measured with this dual coil measuring electromagnetic system are the ratio of the field strength and the phase differences of the alternating magnetic field at the two coils. The changes in field strength ratio and phase difference are expressed in percent and degrees respectively, the noise level being less than 0.1 percent and 0.1 degrees. Both parameters are recorded in analogue form.

Flying towards or away from the loop the amplitude of the field detected at the coils changes gradually but considerably. An automatic switch connected to the signal detector amplifier changes so that the amplified output of the preamplifiers is within the signal strength limitations necessary for the equipment operation. These switching markers are sometimes evident on the recorder charts.

At one or more points during each flight, the scale sensitivities and zero levels are checked by means of calibration and zeroing signals respectively. The reference or zero level for each Turair electromagnetic trace is an arbitrary one, and is obtained empirically from the regional level of each section of a trace.

Since the gradients of the signals recorded within about 600 ft. to the loop sides are too strong, it is not possible to distinguish field changes due to conductors of geologic origin lying in these "blind zone" regions.

The field strength ratio and phase difference are recorded in such a way that flying "towards" the wire of loop's side system, a normal anomaly shows a positive sign (i.e. upward deflection), while flying "away" from the wire the sign is reversed. Reversed anomalies can also be the result of particular geometric situation, e.g. when the source is located on the hanging wall side of a flatly dipping conductor. Man-made disturbances including power lines, pipe lines, metal fences, railways, etc. may cause spurious anomalies. The former are recognizable as such when they appear as cyclic noise of irregular shape and phase relationship. Non-energized, grounded power lines (e.g. 3 phase systems) sometimes give rise to anomalies that are more difficult to identify. Such indications as well as those from pipe lines and metal fences, etc. are however, of short duration and can be distinguished from most geologic sources except for very narrow, near-surface conductors. In some instances, ground investigation may be necessary in order to resolve the ambiguity of possible sources. Although the airborne geophysical crew attempts to note visible man-made conductors of the above type, the ground moves by so rapidly at the low flight elevation employed that 100% recognition of such sources cannot always be expected from the air.

The normal terrain clearance of the bird is 100 - 200 ft. depending on the surface topography, tree cover, etc., with the helicopter 100 ft. above.

72-8664

# ELECTROLYTIC ZINC CO. OF AUSTRALASIA

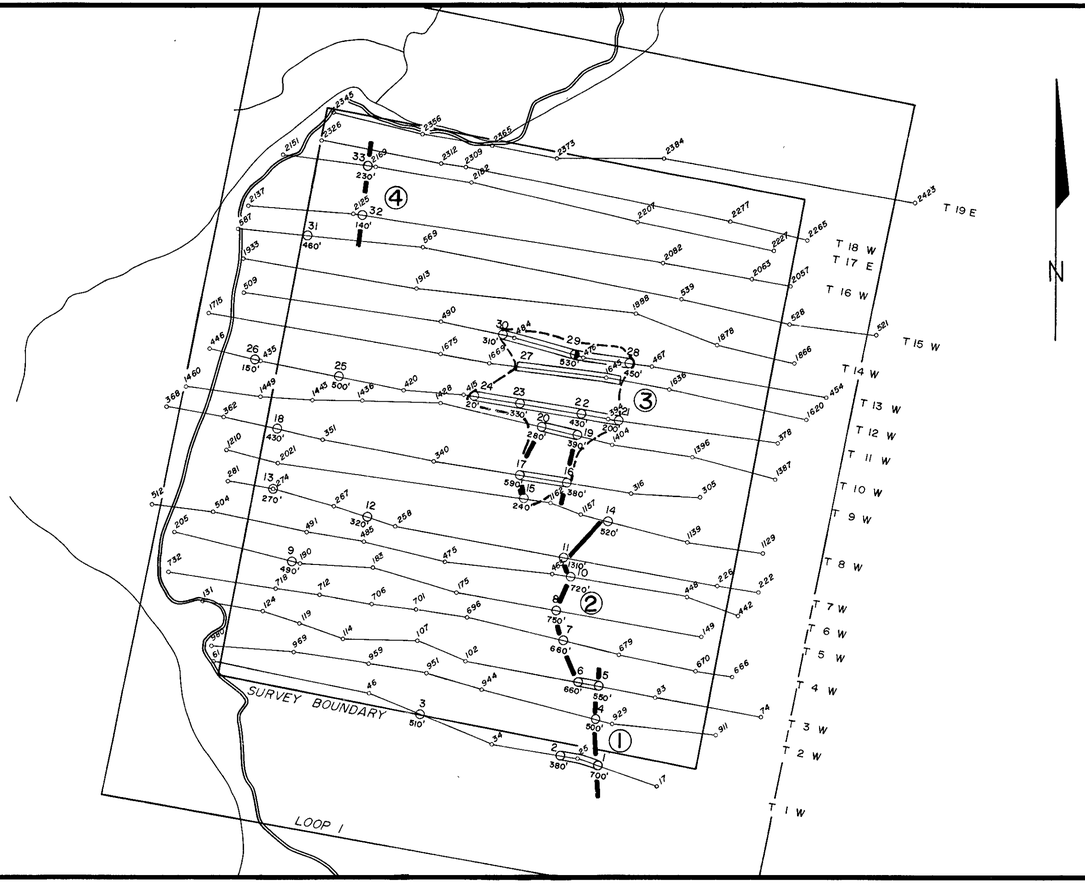
## MT. BLACK PROSPECT
### ROSEBERY AREA
### TASMANIA

## TURAIR AIRBORNE ELECTROMAGNETIC SURVEY FLIGHT PATH AND ANOMALY PLAN

5 cm

SURVEYED AND COMPILED BY
SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.
MARCH 1972

765074




0 2640ft
20 0 20 40
SCALE OF CHAINS

001

JOB Nº. T 1030 SHEET 1 OF 1 PLATE 1

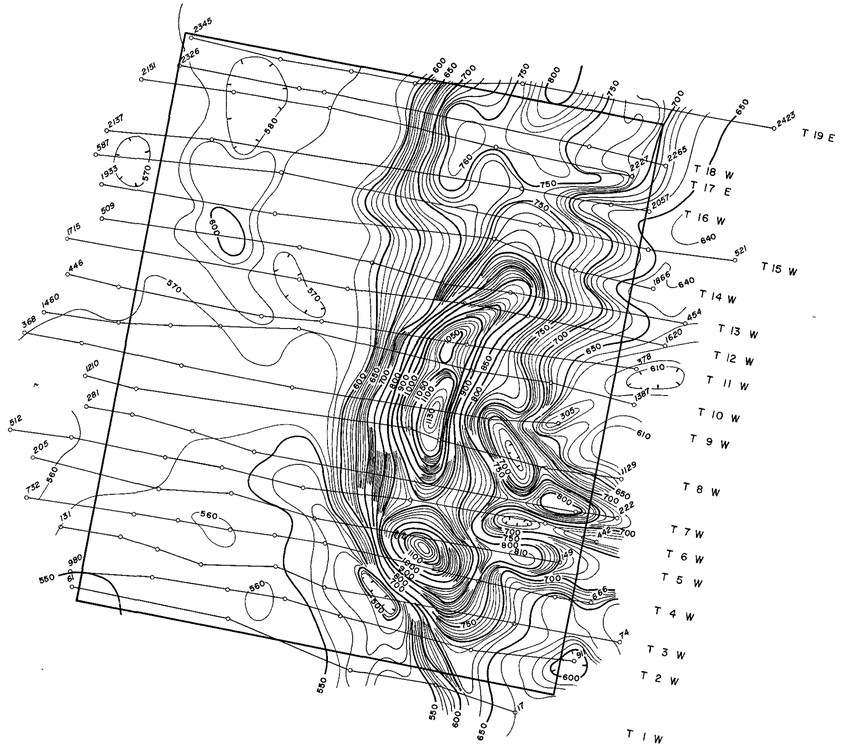
72-864

## LEGEND

T 15 W —— 2157 — *Flight line showing line number and numbered tie points*

600 / 650 — *Isomagnetic contours, 10 Gamma contour interval Add 62,000 Gammas to values shown for absolute total field magnetic intensity.*

*Magnetic low closure*




N

# ELECTROLYTIC ZINC CO. OF AUSTRALASIA

## MT. BLACK PROSPECT
### ROSEBERY AREA
### TASMANIA

## AEROMAGNETIC SURVEY
## MAGNETIC CONTOUR PLAN

5 cm

SURVEYED AND COMPILED BY
SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.
MARCH 1972

765075

20 0 20 40
SCALE OF CHAINS

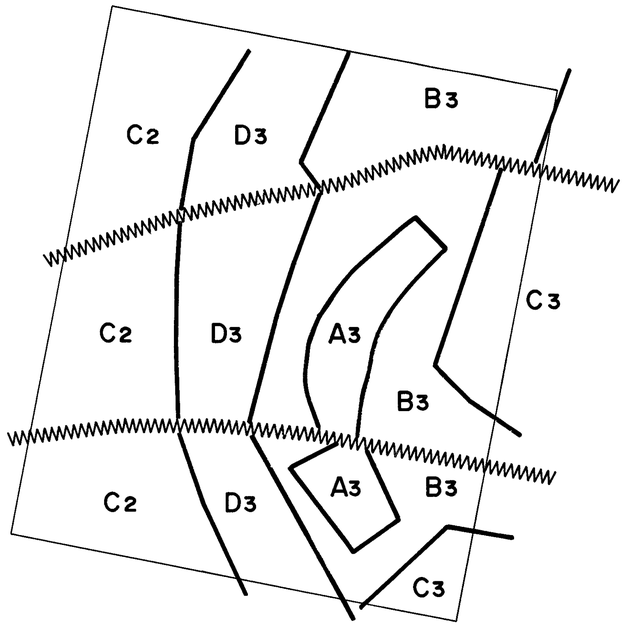
002

JOB N°. T 1030 SHEET 1 OF 2 PLATE 2

72-864

## LEGEND

| | |
|---|---|
| A | Rock type of relatively high magnetic susceptibility |
| B | Rock type of intermediate magnetic susceptibility |
| C | Rock type of low magnetic susceptibility |
| D | Rock type of low magnetic susceptibility but with a greater depth to bedrock or with cover |
| WWWW | Magnetic lineament, possibly a fault |




N

# ELECTROLYTIC ZINC CO. OF AUSTRALASIA

## MT. BLACK PROSPECT
### ROSEBERY AREA
TASMANIA

5 cm

## AEROMAGNETIC SURVEY
## MAGNETIC INTERPRETATION
## PLAN

SURVEYED AND COMPILED BY
SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.
MARCH 1972

20 0 20 40
SCALE OF CHAINS

765076

JOB No. T 1030 SHEET 2 OF 2 003 PLATE 2




ELECTROLYTIC ZINC CO. OF AUSTRALASIA

MT. BLACK PROSPECT
ROSEBERY AREA
TASMANIA

TURAIR AIRBORNE
ELECTROMAGNETIC SURVEY
FLIGHT PATH AND ANOMALY PLAN

5 cm

SURVEYED AND COMPILED BY
SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.
MARCH 1972

765077

20 0 20 40
SCALE OF CHAINS

JOB No. T 1030 SHEET 1 OF 1 PLATE 3

72-864

N

## LEGEND

T 15 W — 1518 — Flight line showing line number and numbered tie points

700 / 750 — Isomagnetic contours, 10 Gamma contour interval. Add 62,000 Gammas to values shown for absolute total field magnetic intensity.

Magnetic low closure

# ELECTROLYTIC ZINC CO. OF AUSTRALASIA

## MT. BLACK PROSPECT
ROSEBERY AREA
TASMANIA

## AEROMAGNETIC SURVEY
## MAGNETIC CONTOUR PLAN

5 cm

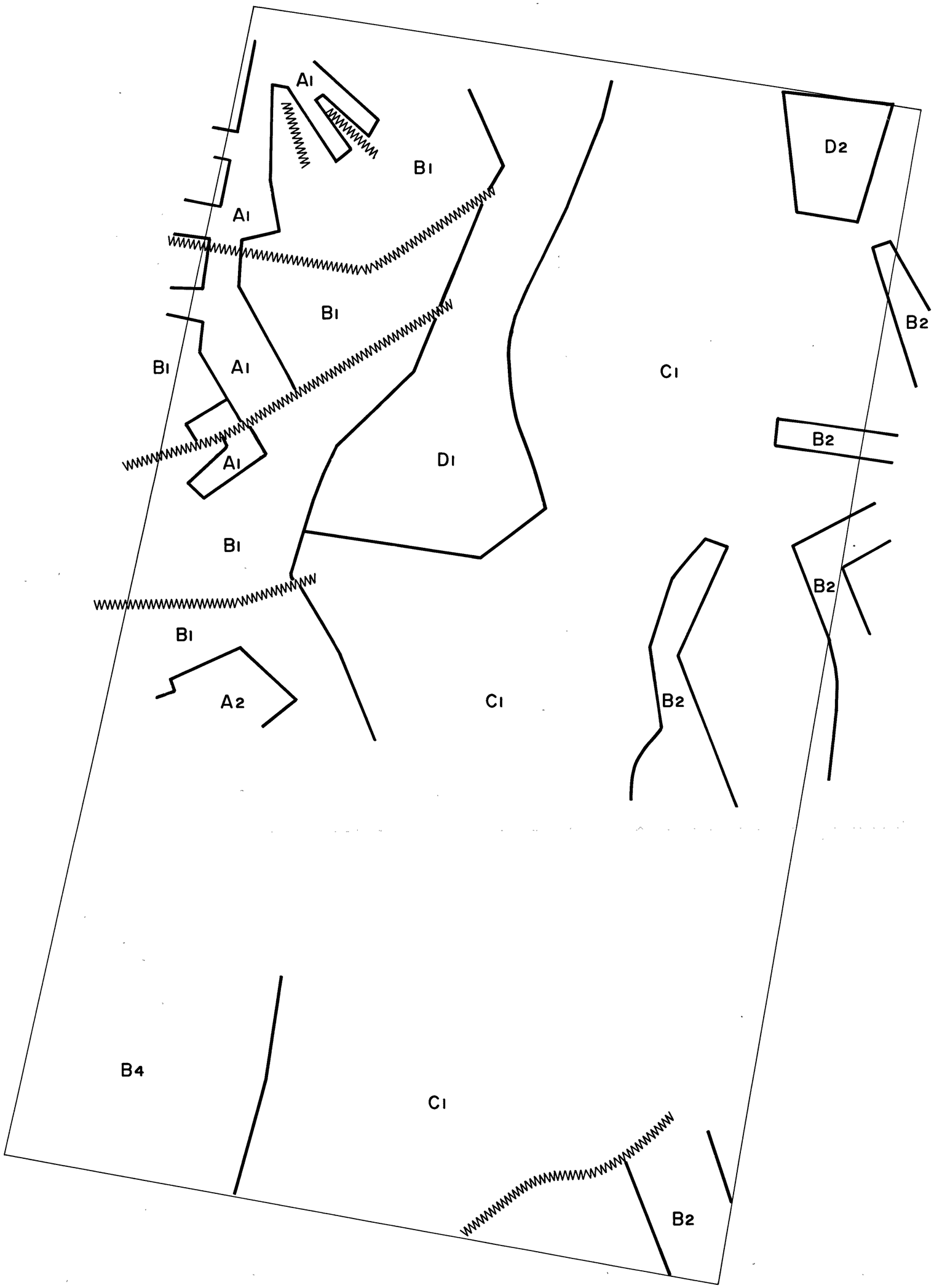
SURVEYED AND COMPILED BY
SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.
MARCH 1972

765078

20 0 20 40
SCALE OF CHAINS

72-864

JOB N°. T 1030 SHEET 1 OF 2 PLATE 4




N

LEGEND

| | |
|---|---|
| A | Rock type of relatively high magnetic susceptibility |
| B | Rock type of intermediate magnetic susceptibility |
| C | Rock type of low magnetic susceptibility |
| D | Rock type of low magnetic susceptibility but with a greater depth to bedrock or with cover |
| WWWW | Magnetic lineament, possibly a fault |

ELECTROLYTIC ZINC CO. OF AUSTRALASIA

# MT. BLACK PROSPECT
## ROSEBERY AREA
TASMANIA

765079

5 cm

## AEROMAGNETIC SURVEY
## MAGNETIC INTERPRETATION
## PLAN

SURVEYED AND COMPILED BY
SEIGEL ASSOCIATES AUSTRALASIA PTY. LTD.
MARCH 1972

20 0 20 40
SCALE OF CHAINS

72-864

JOB N°. T 1030 SHEET 2 OF 2 006 PLATE 4

Pieman River

MT. BLACK.
3037' AMG 380532mE, 5375403mN

EMU BAY RAILWAY

PRIMROSE

ROSEBERY

Rosebery Lodge

Dalmeny

Salisbury

Chamberlain

Koehya

Jupiter

WILLIAMSFORD

HERCULES

MT. READ.
3660' AMG 378848mE, 5366204mN

Murchison Highway

Stitt River

HENTY FAULT

Cmb Ccc Cmc Cwa Csq Ccs Cp Q Oo

## LEGEND.

- Moraine & Fluvioglacial
- Jukes Breccia & Owen Conglomerate
- Crimson Creek Argillite
- Munro Creek Slate
- Westcott Argillite
- Williamsford Volcanics
- Salisbury Conglomerate
- Natone Volcanics
- Stitt Quartzite
- Chamberlain Shale
- Mt. Black Volcanics
- Primrose Pyroclastics
- Sedimentary Lenses
- Serpentinite

# EL1/62. MT. BLACK.
## GEOLOGICAL PLAN
Showing Cut Grids, Proposed Gridlines, and Areas Flown with Turair.

Scale 4"= 1 Mile  Date 6/72.

- Areas Flown Turair
- Cut Grid Lines
- Proposed Grid Lines

5 cm

AMG REFERENCE POINTS ADDED

PLATE 1

765080

72-864

001




## LEGEND.

- Q — Moraine & Fluvioglacial.
- Oo — Jukes Breccia & Owen Conglomerate.
- Ccc — Crimson Creek Argillite.
- Rosebery Group.
  - Cmc — Munro Creek Slate.
  - Cwa — Westcott Argillite.
  - Cww — Williamsford Volcanics.
  - Cos — Salisbury Conglomerate.
  - Cn — Natone Volcanics.
  - Csq — Stitt Quartzite.
  - Ccs — Chamberlain Shale.
- Mt. Read Volcanic Group.
  - Cmb — Mt. Black Volcanics.
  - Cp — Primrose Pyroclastics.
  - Sedimentary Lenses.
  - Serpentinite.
- Turair Conductors.
- Turair Anomalies.

Geochemical Anomalies.
- Strong.
- Moderate.
- Weak.

PLATE 2.

5 cm

EL 1/62 MT. BLACK.

GEOLOGICAL PLAN.
Showing Main Geochemical Anomalies and Turair Conductors.

Scale 4" - 1 Mile. Date 6/72.

72-864

002

765081

LONGITUDINAL PROJECTION.

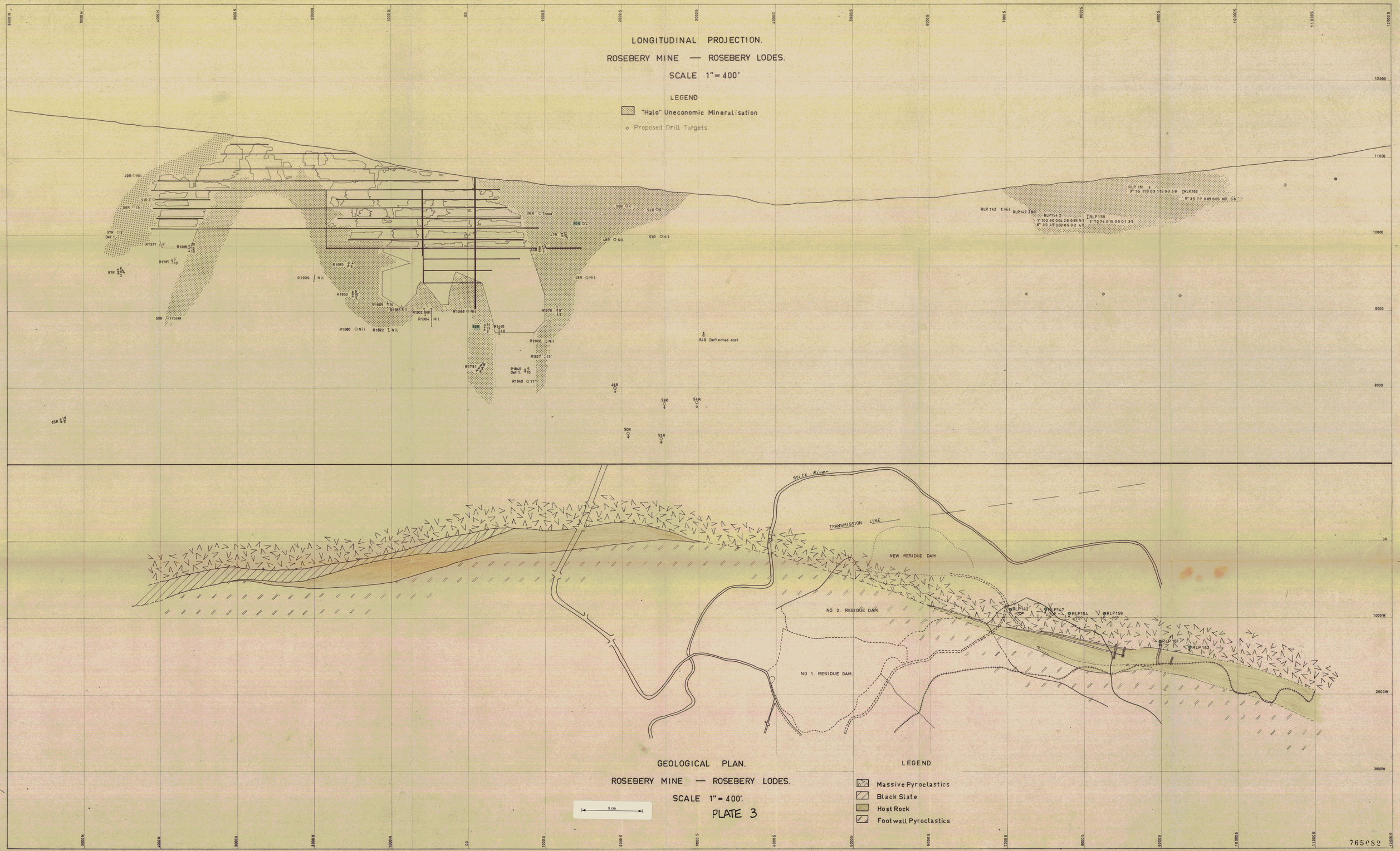
ROSEBERY MINE — ROSEBERY LODES.

SCALE 1" = 400'

LEGEND

"Halo" Uneconomic Mineralisation

o Proposed Drill Targets




GEOLOGICAL PLAN.

ROSEBERY MINE — ROSEBERY LODES.

SCALE 1" = 400'.

5 cm

PLATE 3

LEGEND

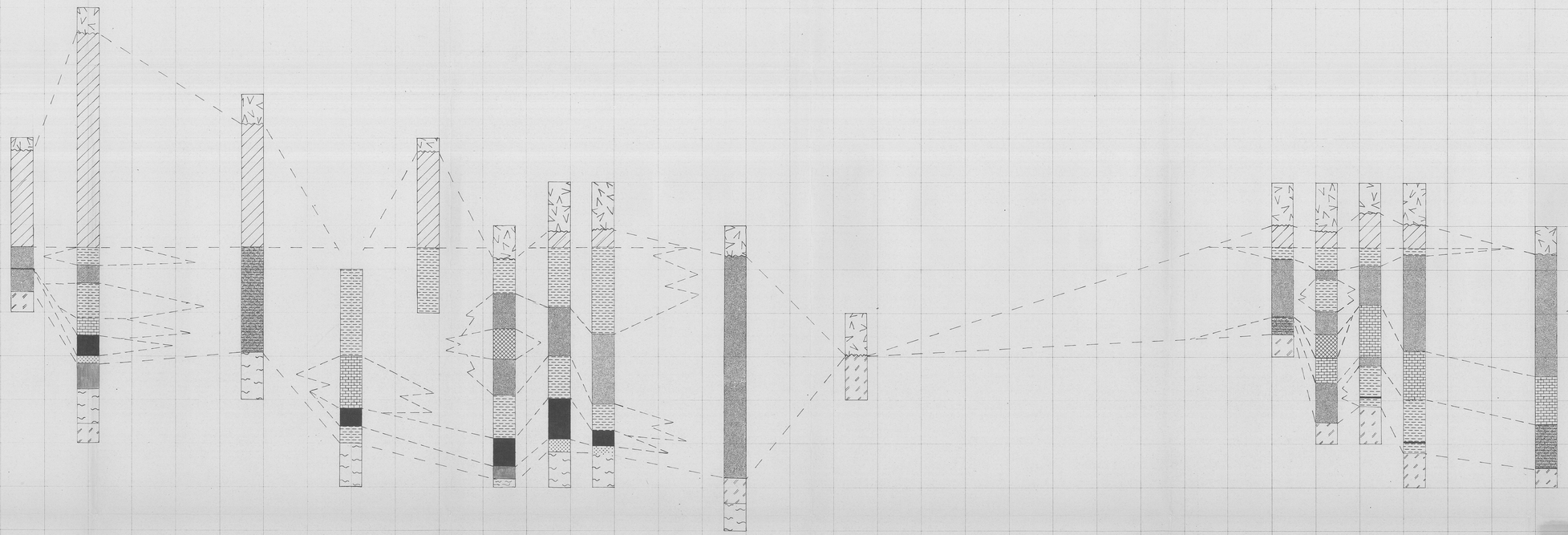
- Massive Pyroclastics
- Black Slate
- Host Rock
- Footwall Pyroclastics

765 C 82

LONGITUDINAL PROJECTION & GEOLOGICAL PLAN.
ROSEBERY MINE — ROSEBERY LODES.

003

6000N 4000N 2000N 00 2000S 4000S 6000S 8000S 10000S 12000S



ROSEBERY MINE

ROSEBERY LODES

Massive Pyroclastics.
Black Slate.
Shale } Host Rocks.
Tuff. }
Barite Mineralisation.
Pb-Zn Ore.
Py-Cpy Rich Footwall.
Manganese Carbonates.
Chert.
Footwall Schists.
Footwall Pyroclastics.

5 cm

ROSEBERY MINE — ROSEBERY LODES.
STRATIGRAPHIC CORRELATION
12 LEVEL HORIZON APPROX.

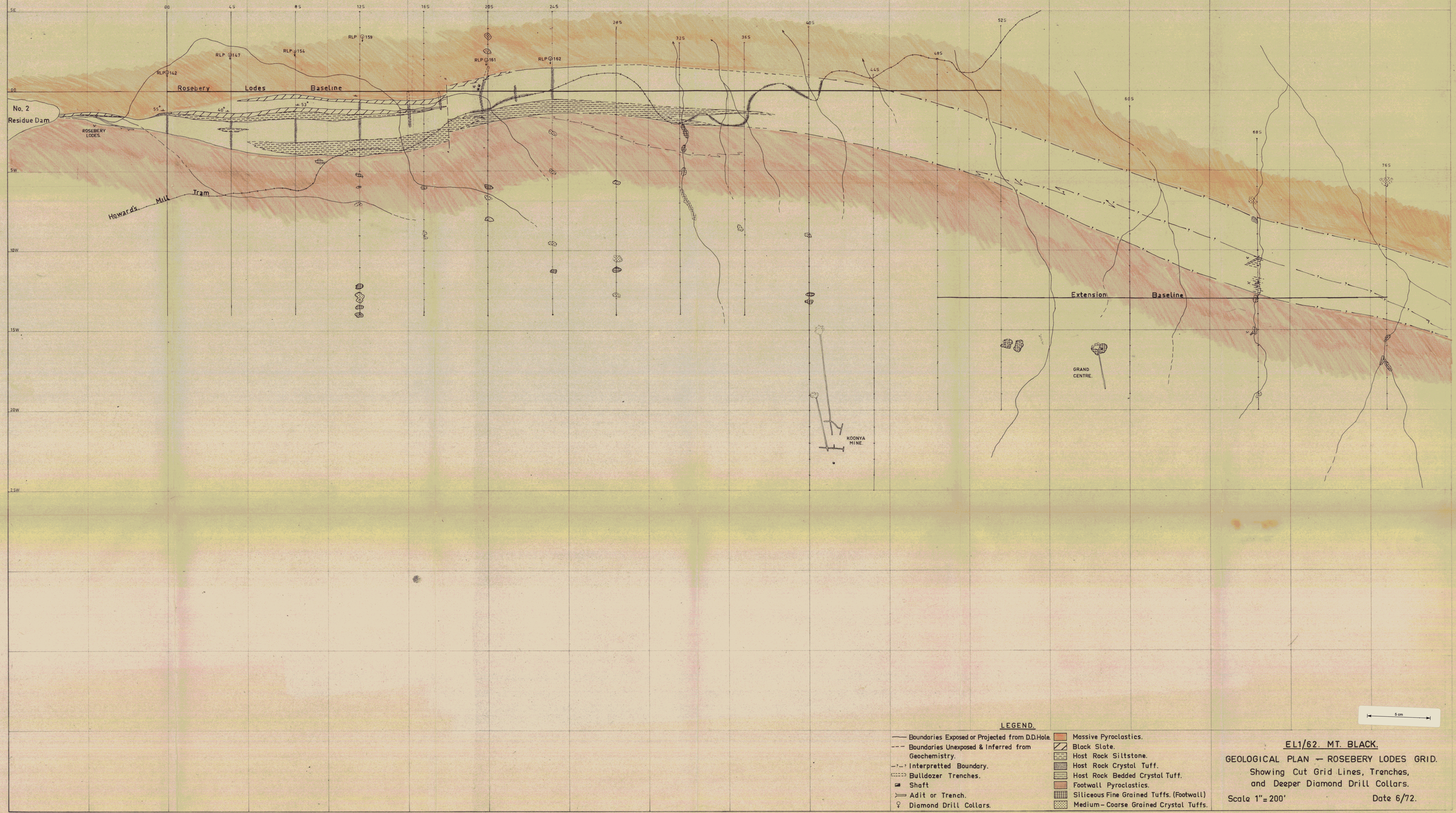
SCALE
Vertical 1"-50' Horizontal 1"- 400'
Date 6/72.

PLATE 4

ELECTROLYTIC ZINC COMPANY OF A|ASIA.
GEOLOGICAL DEPARTMENT.
Copy for: Date:

004

765083




LEGEND.

- Boundaries Exposed or Projected from D.D.Hole.
- Boundaries Unexposed & Inferred from Geochemistry.
- Interpretted Boundary.
- Bulldozer Trenches.
- Shaft
- Adit or Trench.
- Diamond Drill Collars.
- Massive Pyroclastics.
- Black Slate.
- Host Rock Siltstone.
- Host Rock Crystal Tuff.
- Host Rock Bedded Crystal Tuff.
- Footwall Pyroclastics.
- Siliceous Fine Grained Tuffs. (Footwall)
- Medium – Coarse Grained Crystal Tuffs.

# EL1/62. MT. BLACK.

## GEOLOGICAL PLAN – ROSEBERY LODES GRID.

Showing Cut Grid Lines, Trenches, and Deeper Diamond Drill Collars.

Scale 1" = 200'  Date 6/72.

PLATE 5

005

765084

CROSS SECTION 00. R.L.P.142.

CROSS SECTION 4S. R.L.P.147.

CROSS SECTION 8S – R.L.P.154.

CROSS SECTION 12S. R.L.P.159.

CROSS SECTION 20S. R.L.P.161.

CROSS SECTION 24S – R.L.P.162.

LEGEND

- Massive Pyroclastics.
- Black Slate.
- Crystal Tuff. } Host Rocks
- Bedded Siltstone } Host Rocks
- Manganese Carbonates.
- Barite Mineralisation.
- Footwall Pyroclastics.
- Glacials.

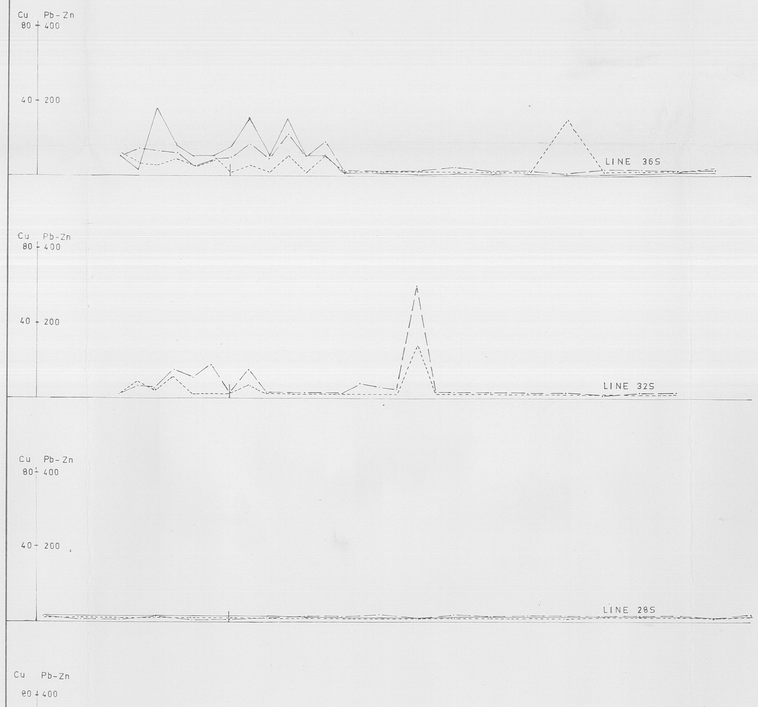
5 cm

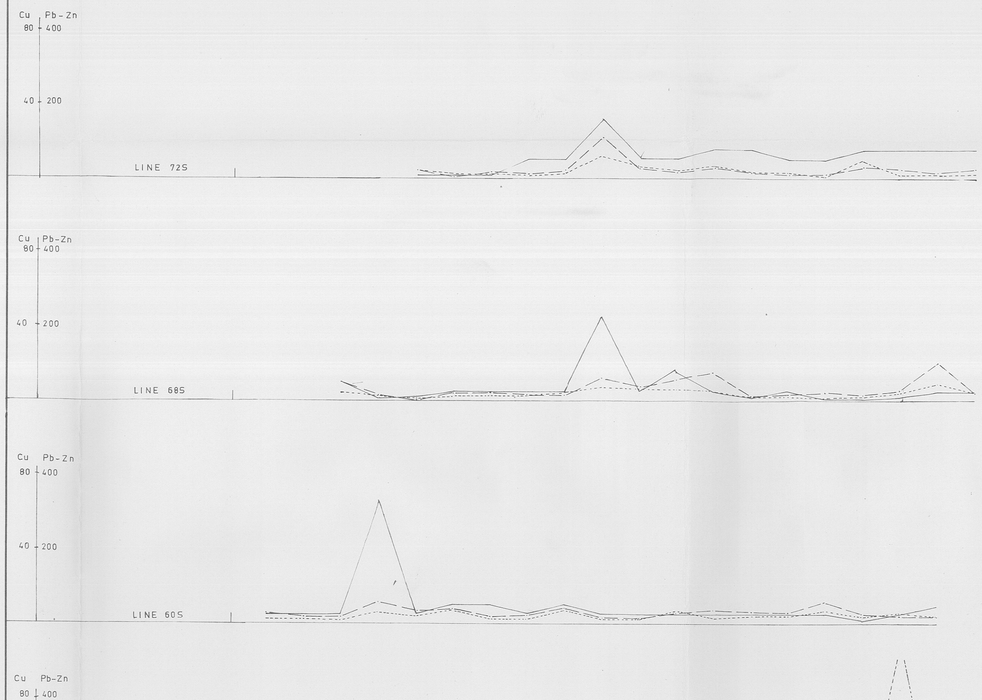
ROSEBERY LODES – DEEPER DRILLING
CROSS SECTIONS SHOWING
R.L.P.142, 147, 149, 154, 161 & 162.
Scale 1"– 40' Date 6/72

PLATE 6

006

765085




Legend
Pb ----
Zn — · —
Cu ——

GEOCHEMICAL PROFILES.

5 cm

PLATE 7

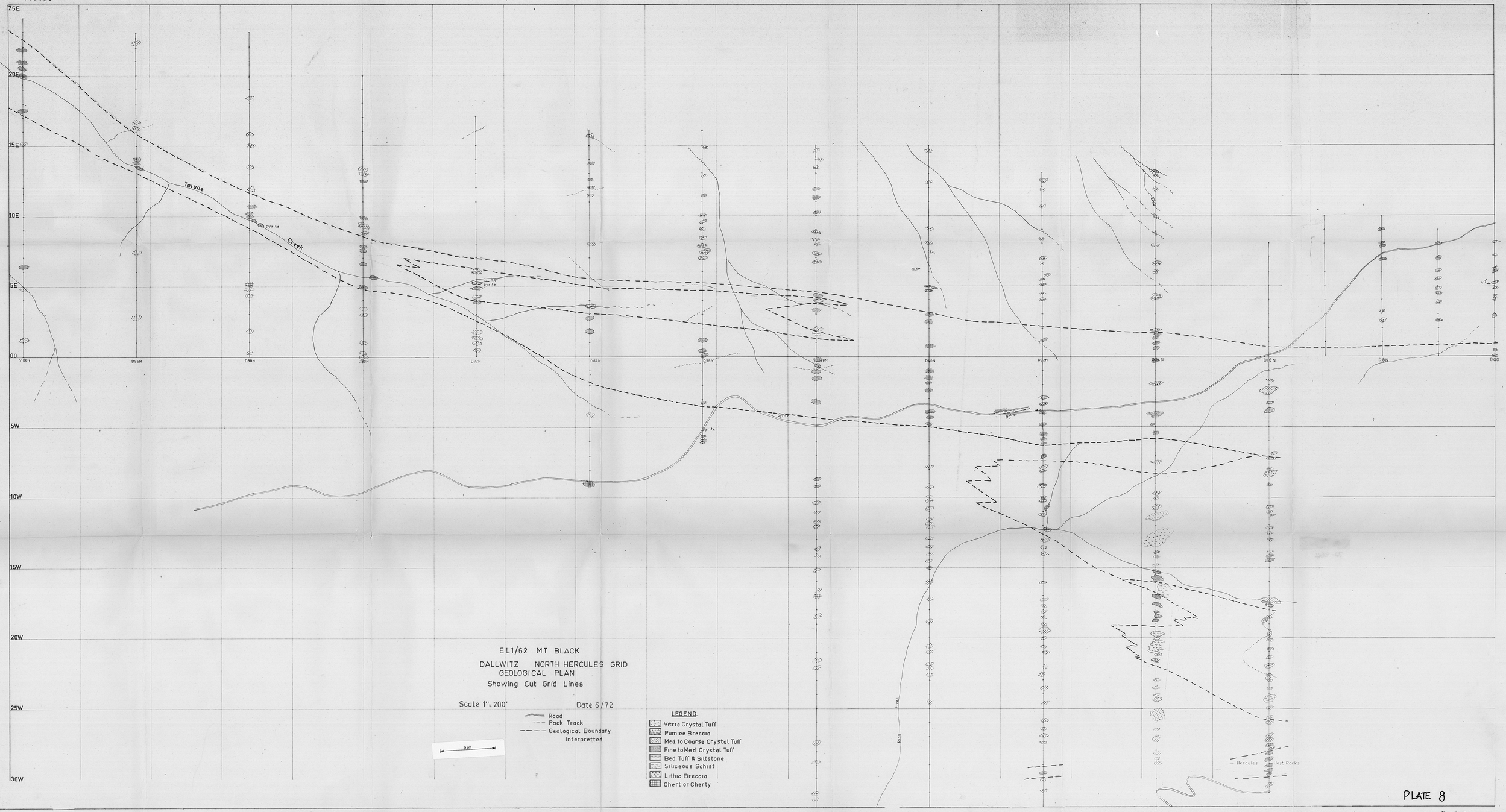
ROSEBERY LODES GRID. 007

765686

E. Z. CO. W.C.M. GEOL. DEPT.

765087

008




E.L1/62 MT BLACK

DALLWITZ NORTH HERCULES GRID
GEOLOGICAL PLAN
Showing Cut Grid Lines

Scale 1"=200' Date 6/72

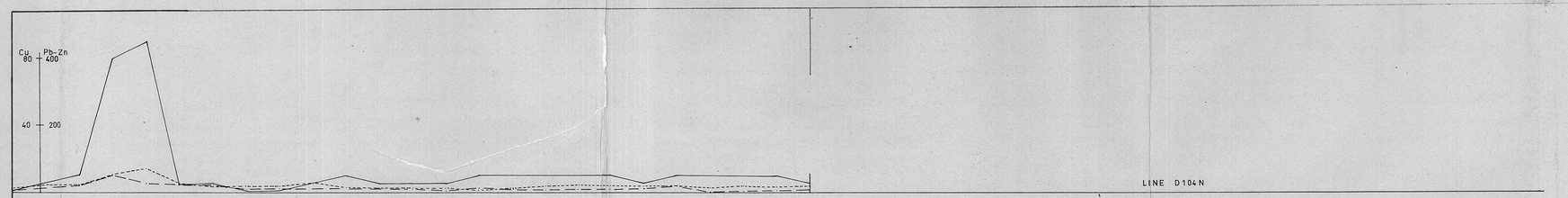
Road
Pack Track
Geological Boundary Interpretted

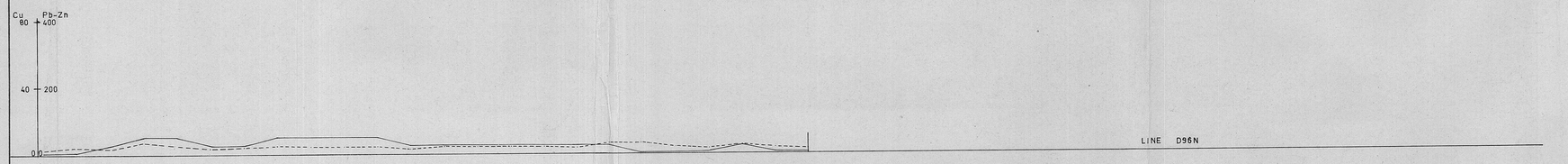
5 cm

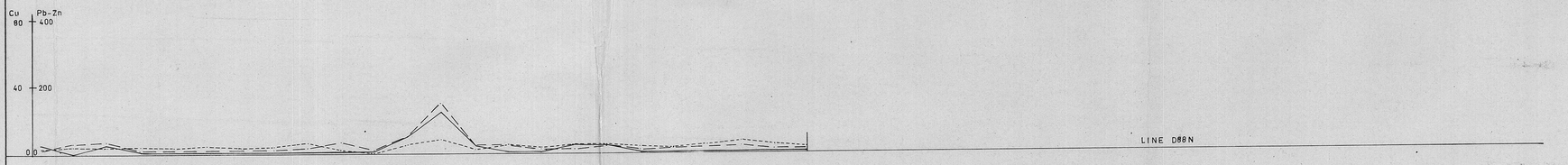
LEGEND.

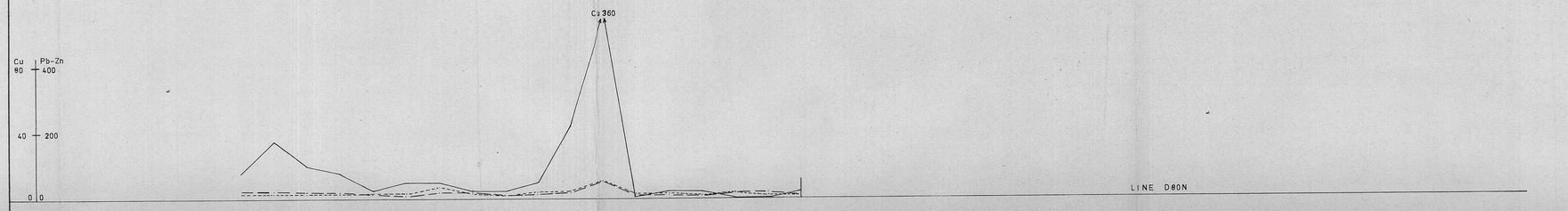
- Vitric Crystal Tuff
- Pumice Breccia
- Med. to Coarse Crystal Tuff
- Fine to Med. Crystal Tuff
- Bed. Tuff & Siltstone
- Siliceous Schist
- Lithic Breccia
- Chert or Cherty

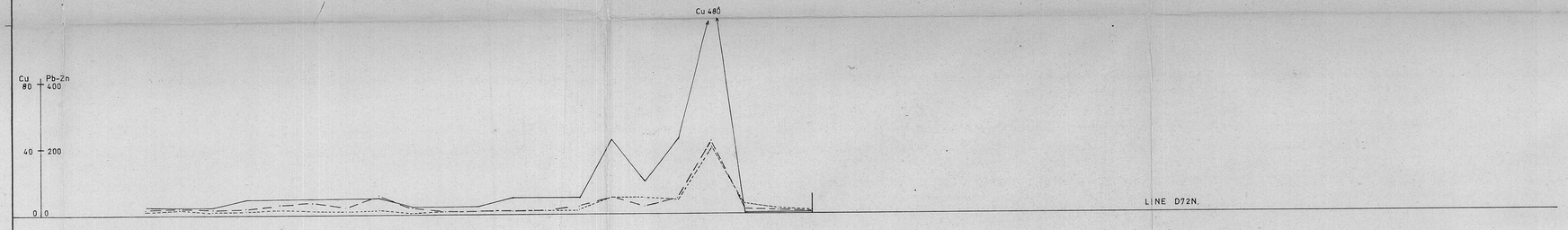
PLATE 8

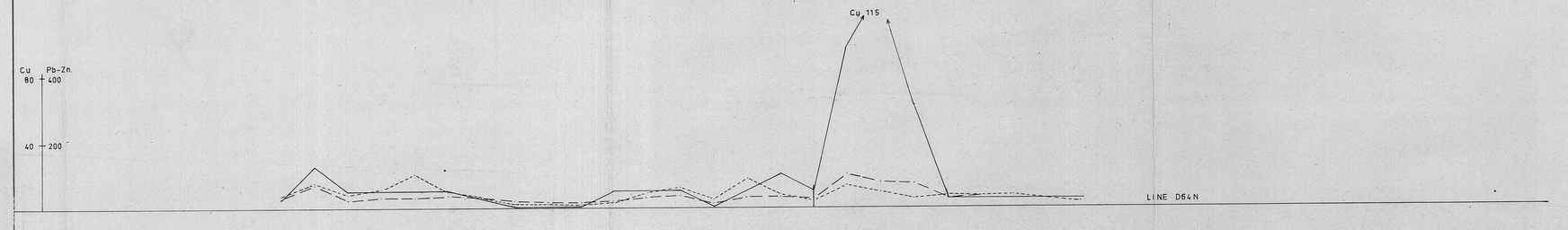


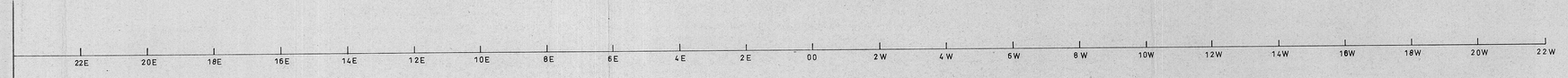




9

5 cm

765088

PLATE 9

GEOCHEMICAL PROFILES.

NORTH HERCULES.

DALLWITZ GRID.

Legend
Pb ----
Zn — · —
Cu ——

E Z CO W C M GEOL DEPT

009

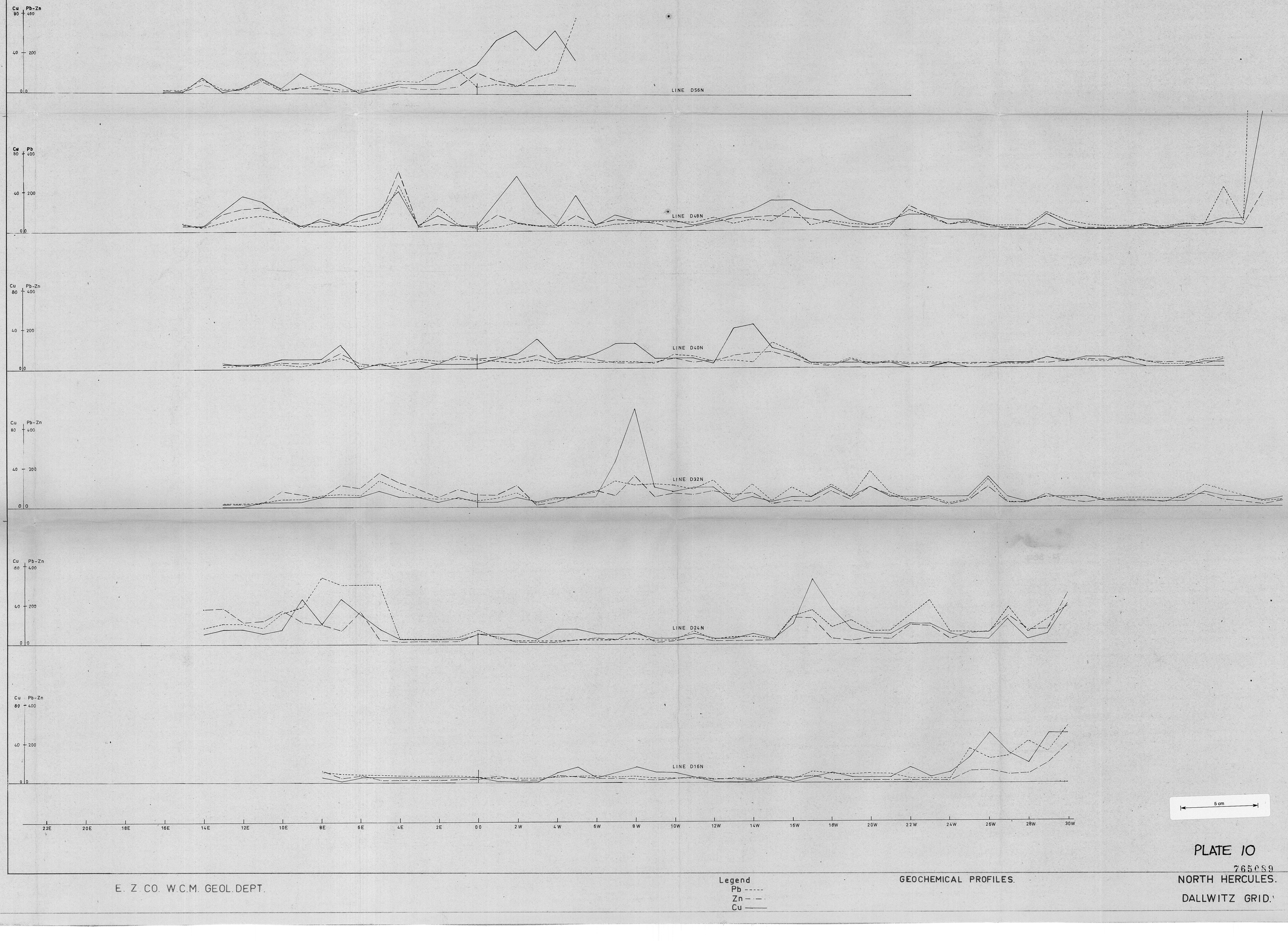



PLATE 10

765089

E. Z. CO. W.C.M. GEOL. DEPT.

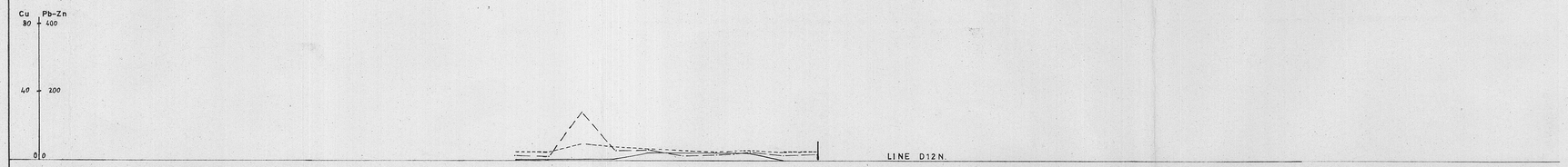
Legend
Pb -----
Zn — · —
Cu ——

GEOCHEMICAL PROFILES.

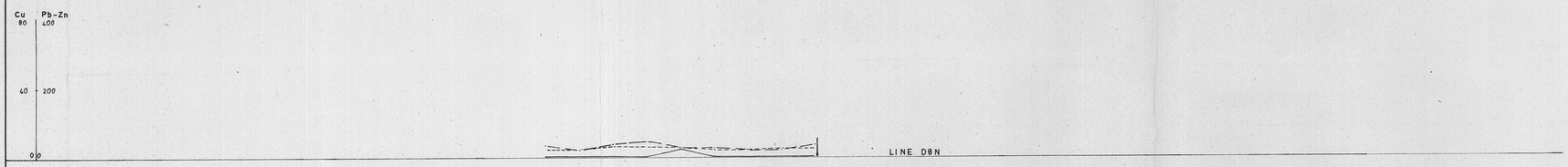
NORTH HERCULES.

DALLWITZ GRID.

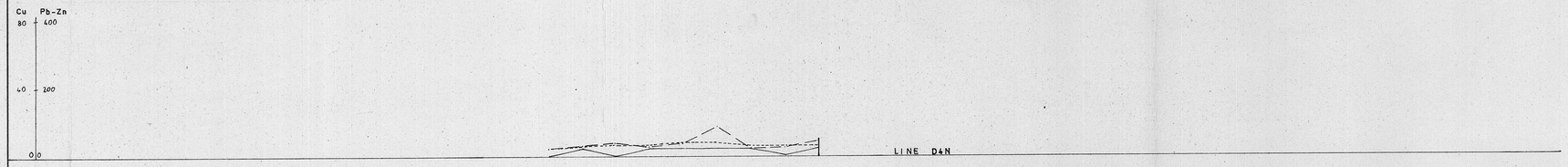
010



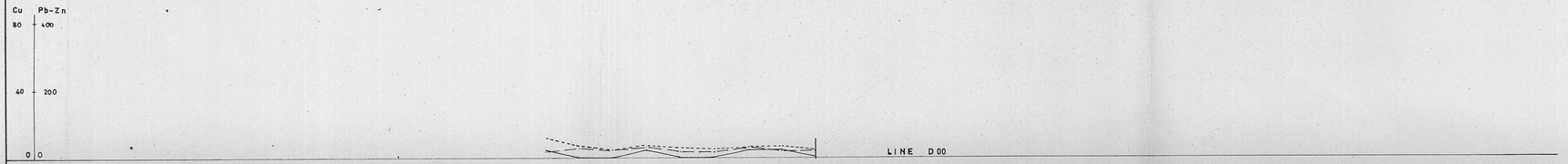

LINE D12N.




LINE D8N




LINE D4N




LINE D00




5 cm

765c90

PLATE 11

E. Z. CO. W.C.M. GEOL. DEPT.

Legend
Pb -----
Zn — · —
Cu ——

GEOCHEMICAL PROFILES.

NORTH HERCULES
DALLWITZ GRID.

011

1500E

1000E

500E

BASELINE

88N

80N

72N

64N

56N

48N

00

500W

EL 1/62. MT. BLACK.
DALLWITZ N. HERCULES GRID.
48N - 88N.
Plan showing Contoured Cu
Geochemical Values.
Scale 1" = 200'. Date 6/72.

LEGEND.

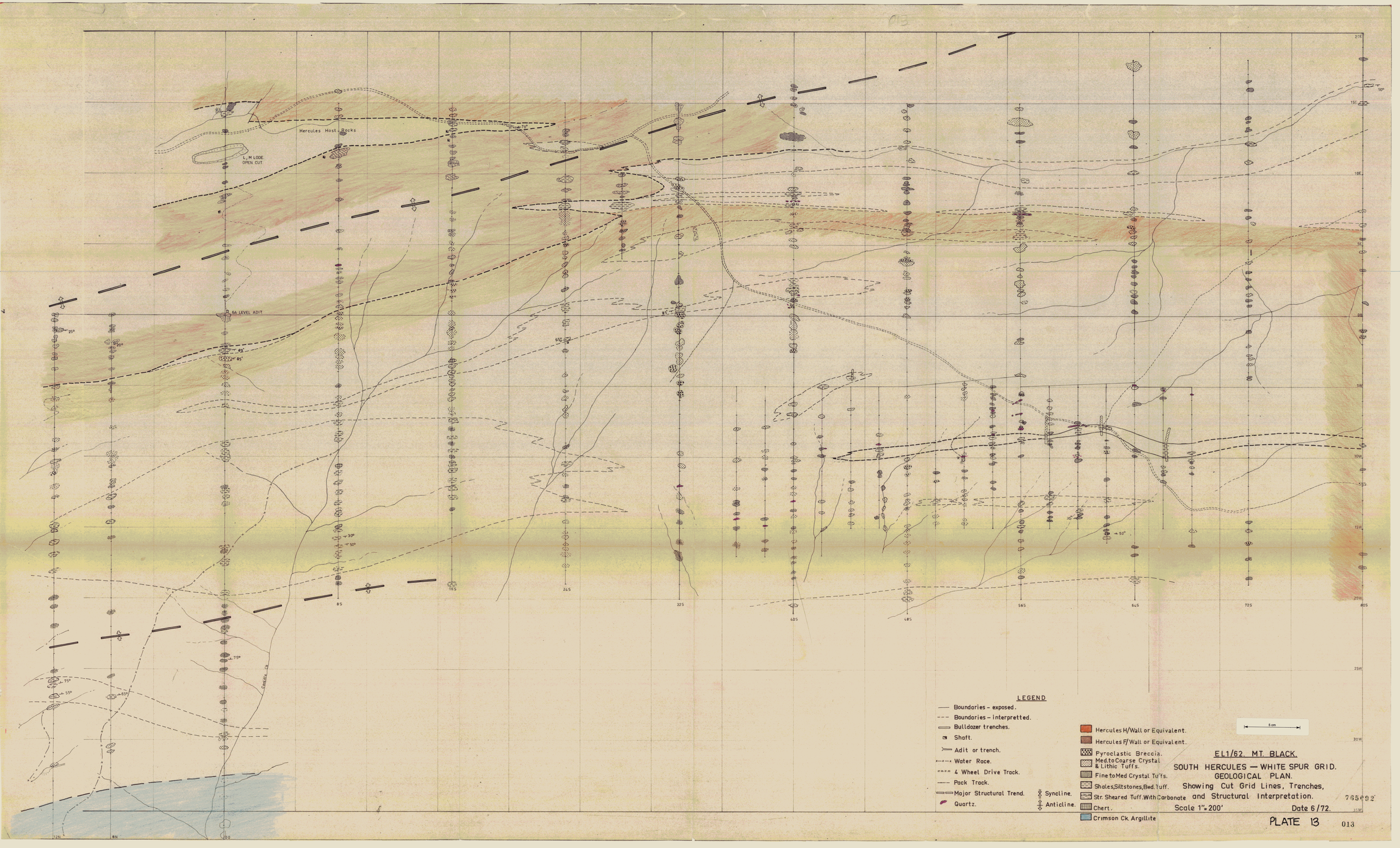
- < 20 p.p.m. Cu.
- 20 - 60 p.p.m. Cu.
- 60 - 120 p.p.m. Cu.
- > 120 p.p.m. Cu.

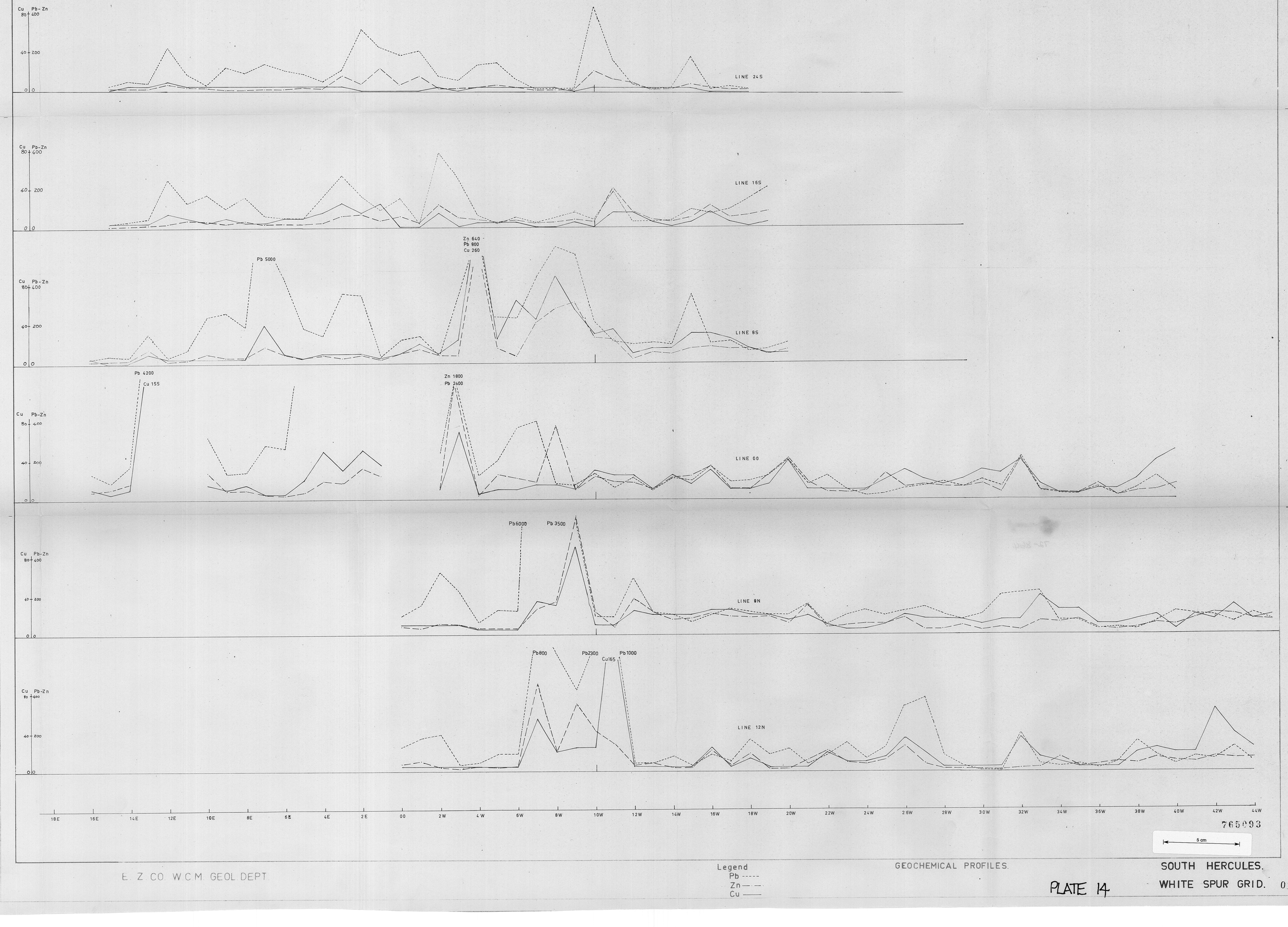
5 cm

765091

PLATE 12.

PLATE 012


Hercules Host Rocks
L, M LODE OPEN CUT
6A LEVEL ADIT
Coolite Ck
LEGEND
Boundaries - exposed.
Boundaries - interpretted.
Bulldozer trenches.
Shaft.
Adit or trench.
Water Race.
4 Wheel Drive Track.
Pack Track.
Major Structural Trend.
Quartz.
Syncline.
Anticline.
Hercules H/Wall or Equivalent.
Hercules F/Wall or Equivalent.
Pyroclastic Breccia.
Med. to Coarse Crystal & Lithic Tuffs.
Fine to Med Crystal Tuffs.
Shales, Siltstones, Bed. Tuff.
Str. Sheared Tuff. With Carbonate
Chert.
Crimson Ck. Argillite
5 cm
EL1/62. MT. BLACK.
SOUTH HERCULES — WHITE SPUR GRID.
GEOLOGICAL PLAN.
Showing Cut Grid Lines, Trenches, and Structural Interpretation.
Scale 1" = 200'
Date 6/72.
PLATE 13
013




Legend
Pb -----
Zn — · —
Cu ——

GEOCHEMICAL PROFILES.

SOUTH HERCULES.
WHITE SPUR GRID.

PLATE 14

014

E. Z. CO. W.C.M. GEOL. DEPT.

Cu 80 | Pb-Zn 400
40 | 200

LINE 44S

Cu 80 | Pb-Zn 400
40 | 200

LINE 42S

Cu 80 | Pb-Zn 400
40 | 200

LINE 40S

Cu 80 | Pb-Zn 400
40 | 200

LINE 38S

Cu 80 | Pb-Zn 400
40 | 200

LINE 36S

Cu 80 | Pb-Zn 400
40 | 200

LINE 32S

18E 16E 14E 12E 10E 8E 6E 4E 2E 00 2W 4W 6W 8W 10W 12W 14W 16W 18W 20W

765094

5 cm

E. Z. CO. W.C.M. GEOL. DEPT.

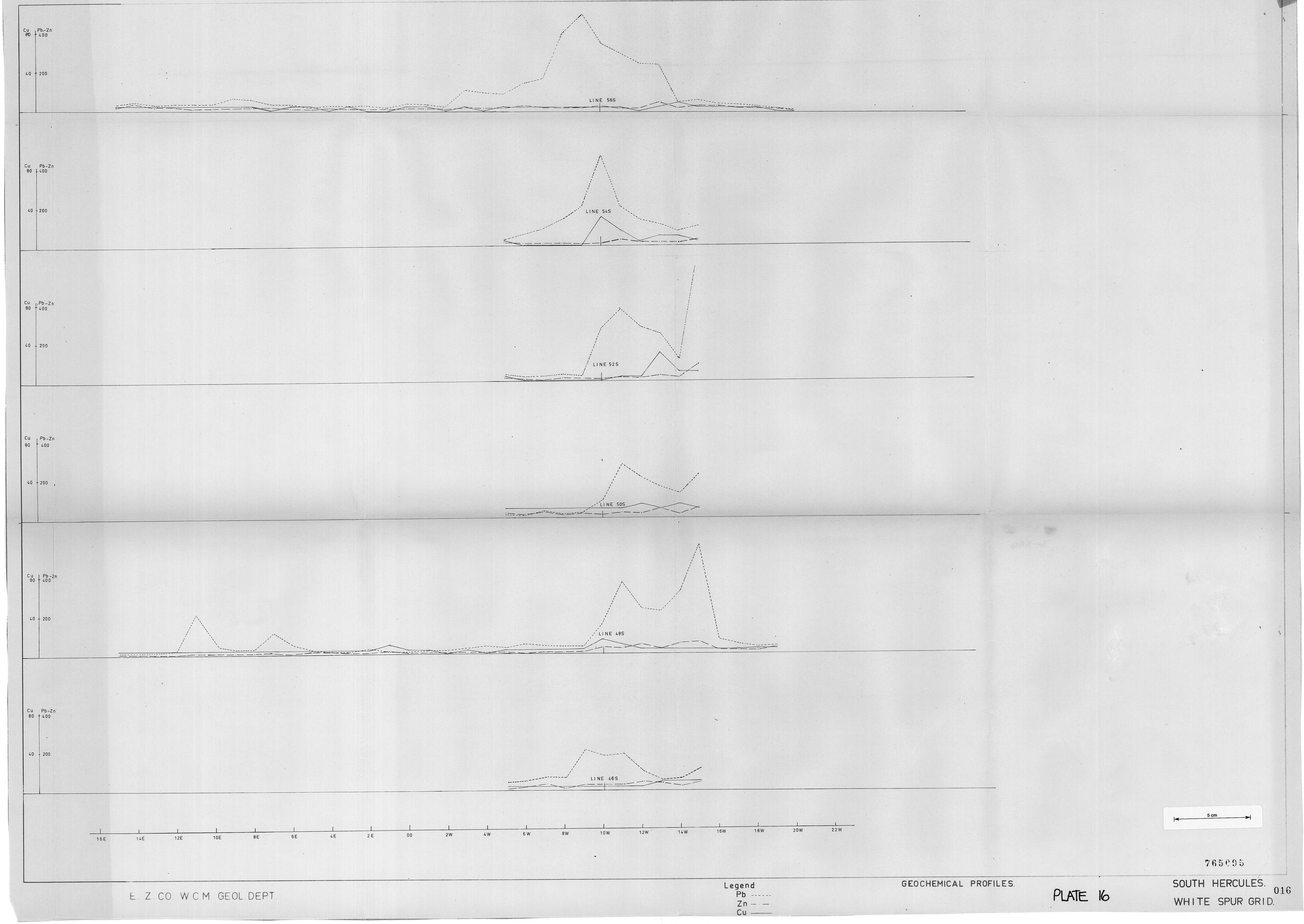
Legend
Pb -----
Zn — · —
Cu ——

GEOCHEMICAL PROFILES.

PLATE 15

SOUTH HERCULES
WHITE SPUR GRID.

015




765095

E. Z. CO. W.C.M. GEOL. DEPT.

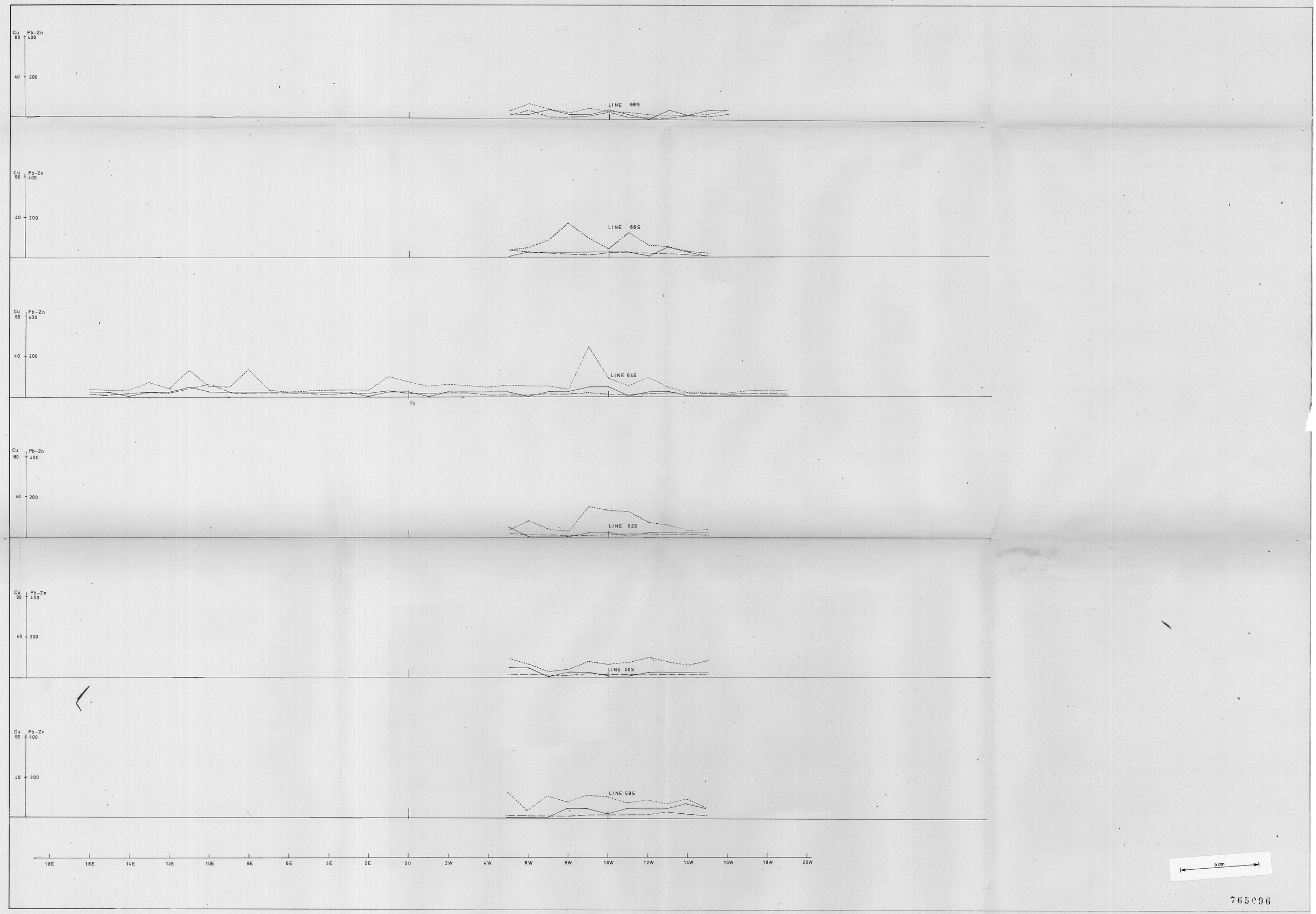
Legend
Pb -----
Zn — —
Cu ——

GEOCHEMICAL PROFILES.

PLATE 16

SOUTH HERCULES.
WHITE SPUR GRID.

016




765096

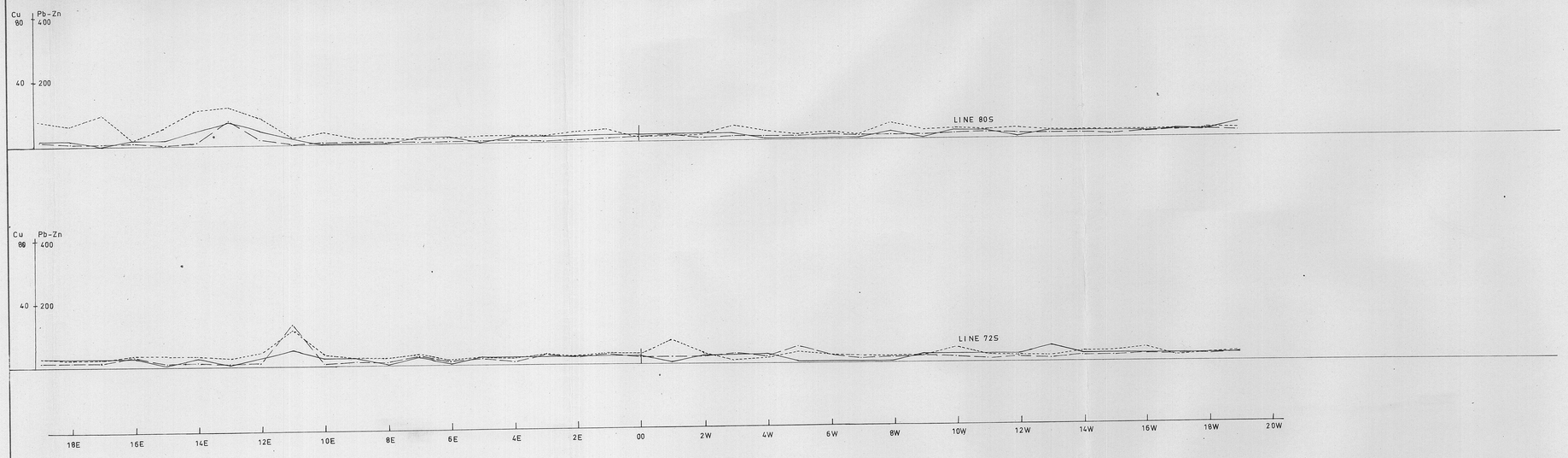
E. Z. CO. W.C.M. GEOL. DEPT.

Legend
Pb -----
Zn -·-·-
Cu ——

GEOCHEMICAL PROFILES.

PLATE 17

SOUTH HERCULES.
017 WHITE SPUR GRID.




5 cm

765097

E. Z. CO. W.C.M. GEOL. DEPT

Legend
Pb ------
Zn -·-·-·-
Cu ———

GEOCHEMICAL PROFILES.

PLATE 18

SOUTH HERCULES.
WHITE SPUR GRID.

018

36S 38S 40S 42S 44S 46S 48S 50S 52S 54S 56S 58S 60S 62S 64S 66S 68S 72S 32S

765098

LEGEND.

- < 40 p.p.m.
- 40–150 p.p.m.
- 150–300p.p.m.
- >300 p.p.m.

5 cm

PLATE 19

EL 1/62. MT. BLACK. 019

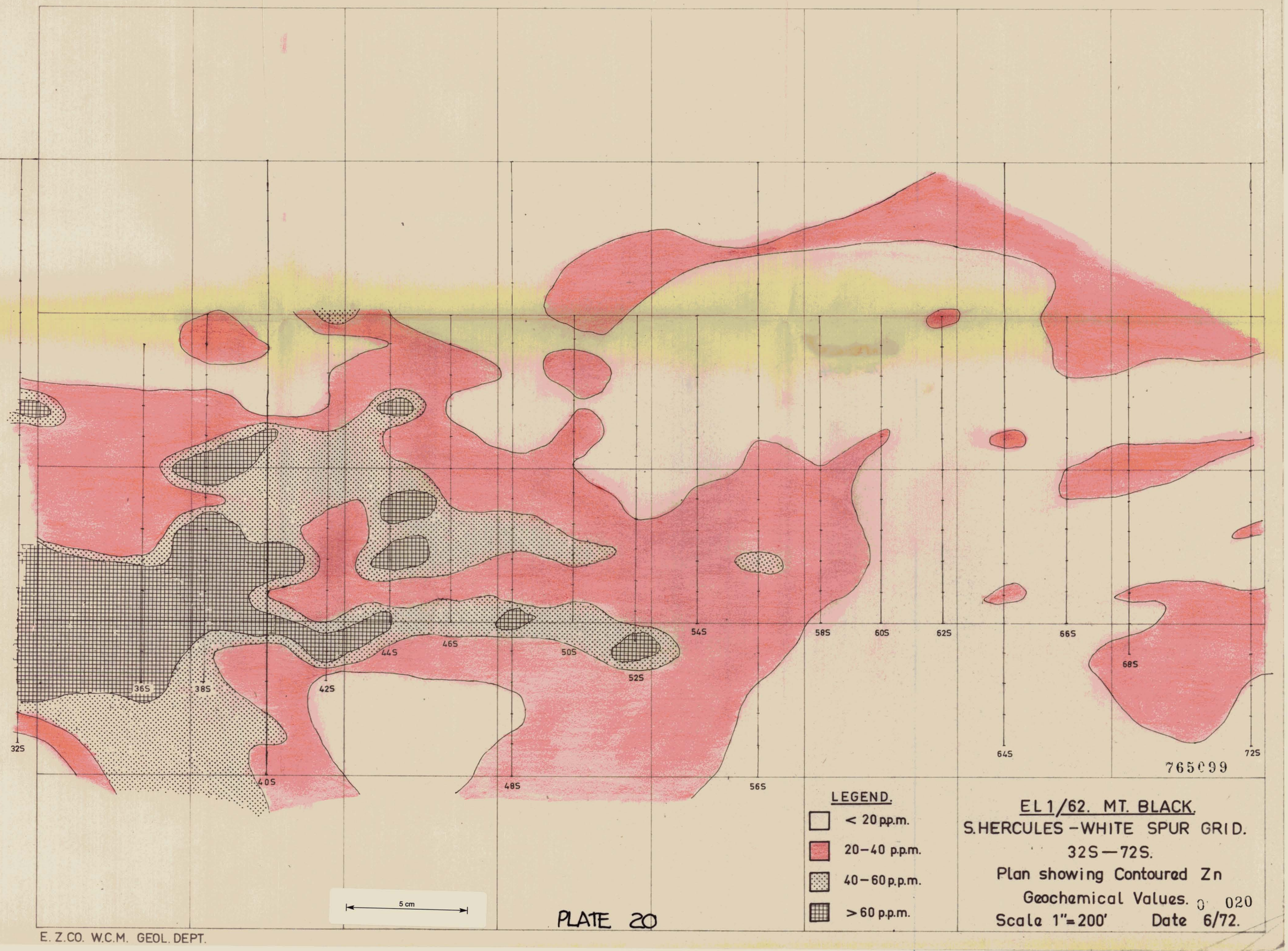
S. HERCULES – WHITE SPUR GRID.

32S – 72S.

Plan showing Contoured Pb Geochemical Values.

Scale 1"= 200' Date 6/72.

E. Z.CO. W.C.M. GEOL. DEPT.




LEGEND.

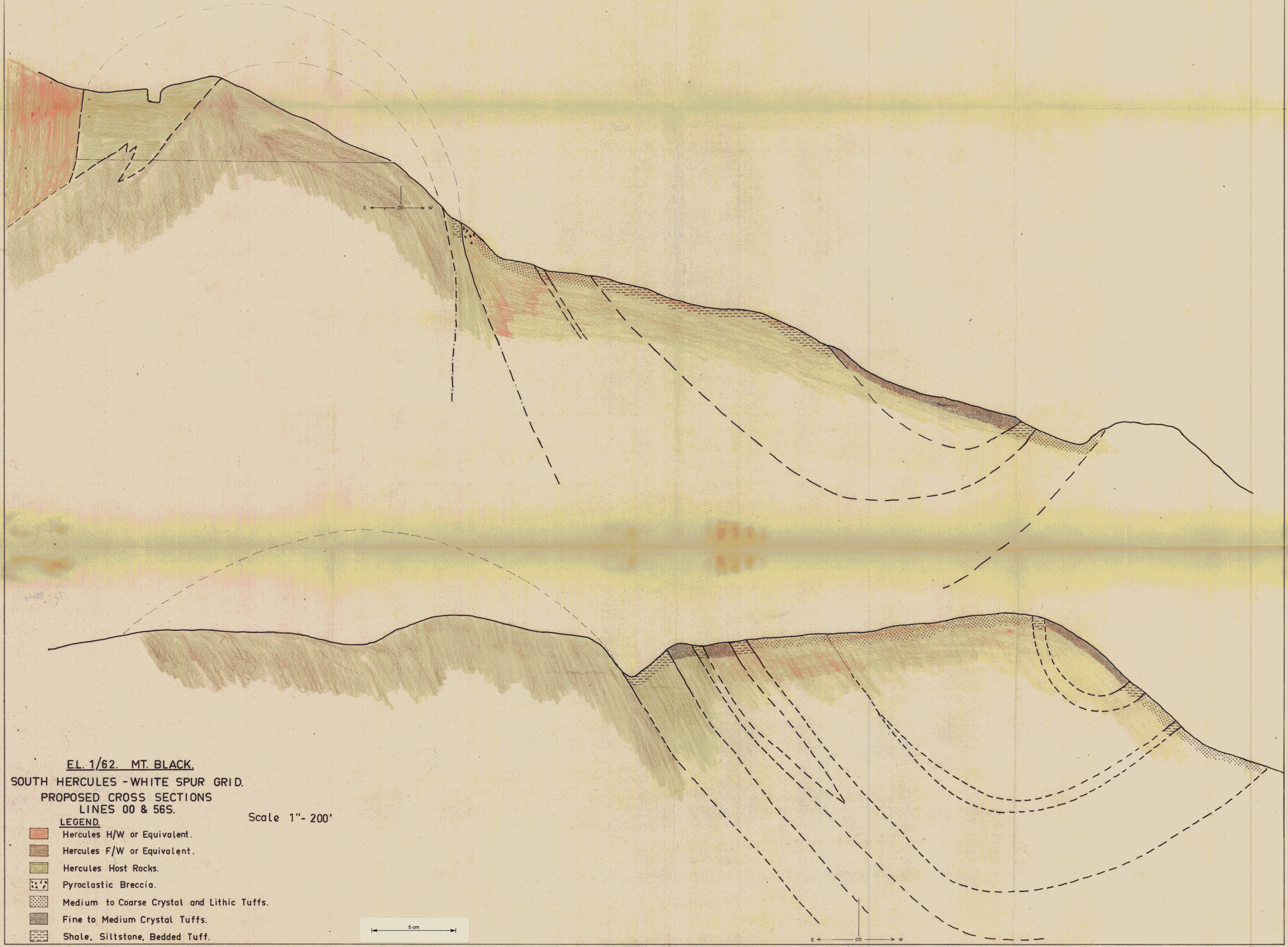
- < 20 p.p.m.
- 20–40 p.p.m.
- 40–60 p.p.m.
- > 60 p.p.m.

765099

EL 1/62. MT. BLACK.
S. HERCULES – WHITE SPUR GRID.
32S — 72S.
Plan showing Contoured Zn Geochemical Values. 020
Scale 1"=200' Date 6/72.

PLATE 20

E. Z. CO. W.C.M. GEOL. DEPT.




E.L. 1/62. MT. BLACK.

SOUTH HERCULES - WHITE SPUR GRID.

PROPOSED CROSS SECTIONS
LINES 00 & 56S.

Scale 1"- 200'

LEGEND.

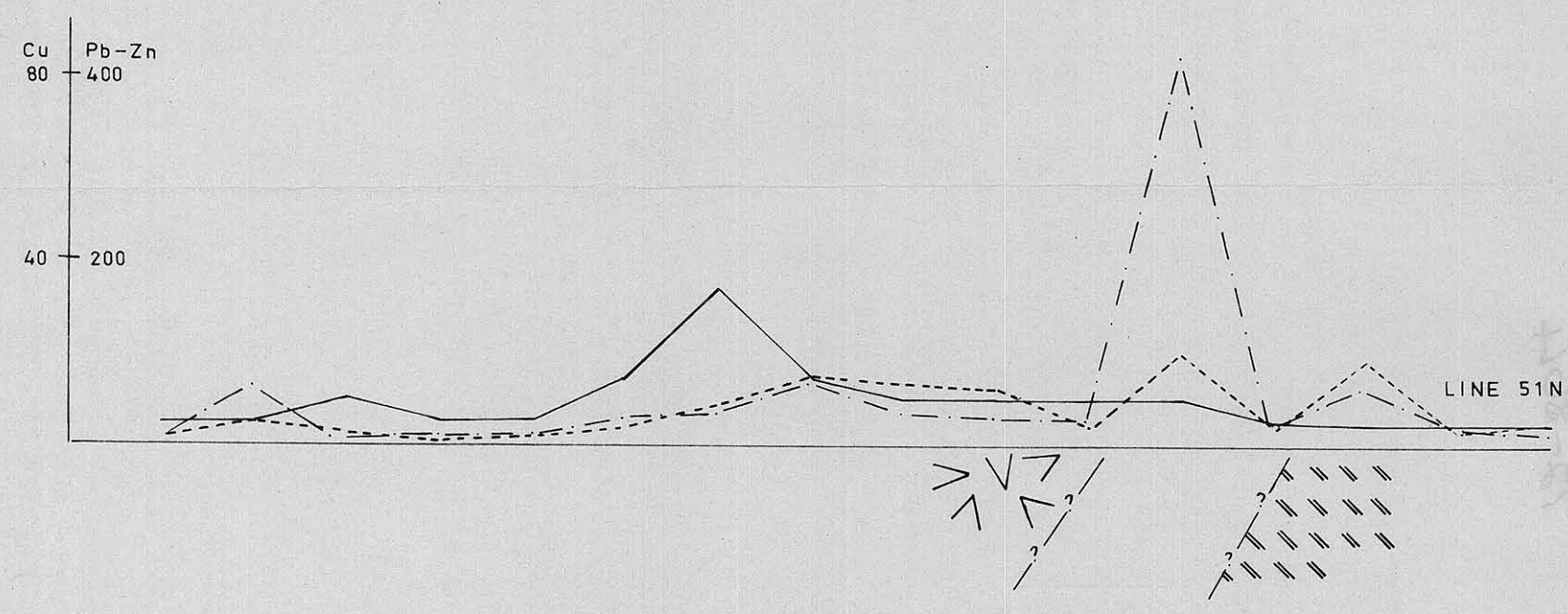
- Hercules H/W or Equivalent.
- Hercules F/W or Equivalent.
- Hercules Host Rocks.
- Pyroclastic Breccia.
- Medium to Coarse Crystal and Lithic Tuffs.
- Fine to Medium Crystal Tuffs.
- Shale, Siltstone, Bedded Tuff.

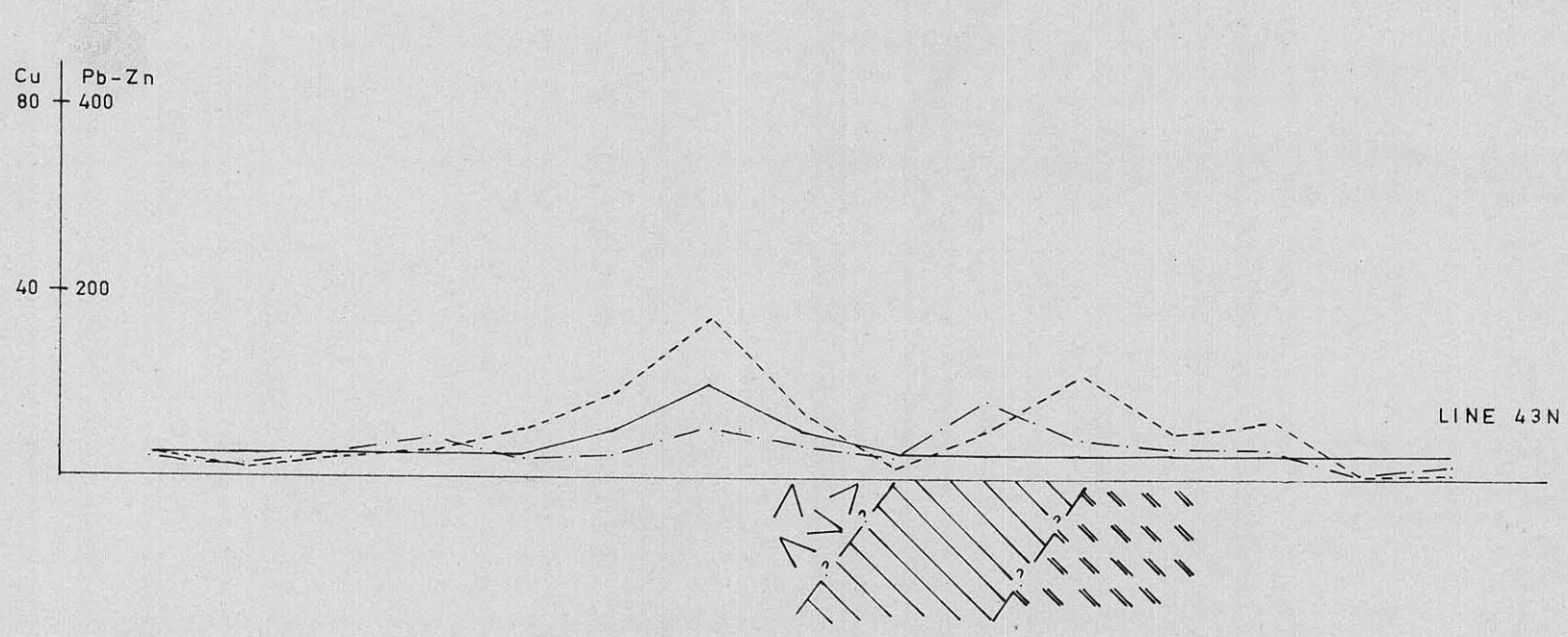
5 cm

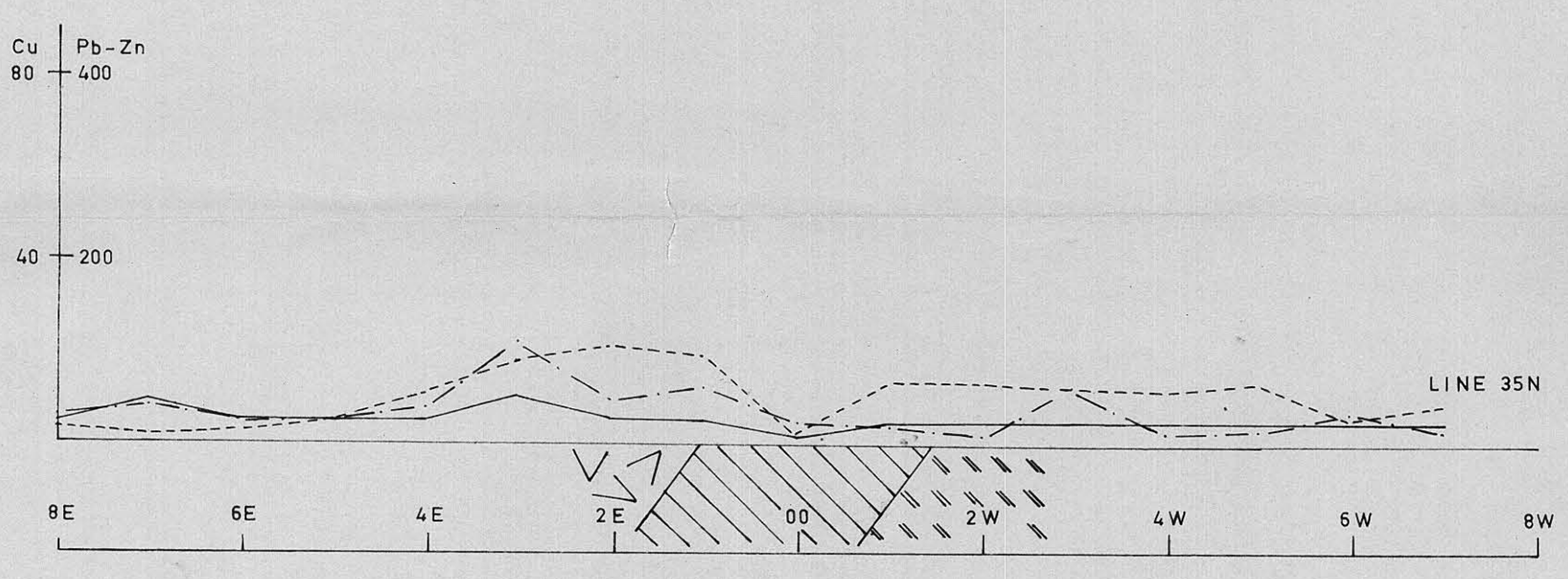
E. Z. CO. W.C.M. GEOL. DEPT.

021 765100

PLATE 21




LEGEND
Pb -----
Zn —·—
Cu ——

MASSIVE PYROCLASTIC.
BLACK SLATE.
FOOTWALL PYROCLASTIC.

ROSEBERY NORTH END GRID.

GEOCHEMICAL PROFILES.

022

765101

5 cm

PLATE 22