

FINAL REPORT

GEOCHEMICAL ORIENTATION SURVEYS

**FINDONS, KING RIVER – COMPRESSOR CREEK, AND
PINNACLES AREA**

LYELL E.Z. EXPLORATIONS

57 – 166

000

LYELL - E.Z. - EXPLORATIONS

468002

GC5

014

Memorandum to

6th June, 1957

Mr. G. F. Hudspeth,
Manager,
Lyell - E.Z. Explorations.

MICROFILMEDGeochemical Prospecting

In the recent work on the applicability of geochemical prospecting on the West Coast by D. Sampey, it was noticed that the amounts of metal in the soils etc. were low. In his report Sampey states that a more sensitive technique for the evaluation of copper values would be desirable. Such a technique exists in the use of the chemical "Biquinoline" instead of dithizone.

Biquinoline has the added advantage of being a specific for copper (dithizone will also react to lead and zinc) and having a greater pH range over which copper can be determined.

Enquiries from H. B. Selby & Co. Pty. Ltd., Melbourne, show that delivery is four months. The material cost would be £32 per 5 grams; 0.5 grams is sufficient for 1000 samples, or $\frac{3}{4}$ d. per sample.

If the Control Committee agree to the use of geochemical prospecting next season it is recommended that 5 grams of this chemical is purchased.



Geologist-in-Charge.

Copy: Mr. G. Hall.

4th June, 1957

Final Report on Geochemical Orientation Surveys

Findon's, King River-Compressor Creek, Pinnacles Areas.

Contents

1. Collection of samples and preparation for assay.
2. Analytical techniques.
3. Results:
 - (a) Findon's
 - (b) King River-Compressor Creek
 - (c) Pinnacles
4. Conclusion

Appendix - Details of analytical methods.

LIST OF PLANS

- L.E.E. R2 FINDONS WORKINGS (MT. DARWIN)
 GEOCHEMICAL ORIENTATION SURVEY
- L.E.E. Q6 PINNACLES Pb Zn PROSPECT
 OBLIQUE SECTION
- L.E.E. P 9A PINNACLES Pb Zn PROSPECT
 GEOCHEMICAL ORIENTATION SURVEY
 TOTAL METALS
- L.E.E. P 9B PINNACLES Pb Zn PROSPECT
 GEOCHEMICAL ORIENTATION SURVEY
 LEAD
- L.E.E. P 9C PINNACLES Pb Zn PROSPECT
 GEOCHEMICAL ORIENTATION SURVEY
 ZINC
- L.E.E. Q9 GEOCHEMICAL PROFILES
 PINNACLES PROSPECT
-

1. Collection of Samples and Preparation for Assay

Approximately 1 lb. of soil was collected from just below the A1 (humus) soil horizon.

The samples were dried and then sieved on nylon screens and the fraction passing 82 mesh was analysed.

Several coarser fractions from some of the soils with high metal contents were analysed but there was insufficient metal in these coarser fractions for detection.

2. Analytical Techniques (For full details see appendix)

A. Cold citrate extraction and determination of total extracted metals.

This method only extracts "loosely bonded" metal which has been adsorbed onto the soil clay particles. Sensitivity 2 p.p.m.

"Total metals" in quotation marks indicates total extracted metals, when used without quotation marks the verbatim meaning is indicated.

B. Hot nitric acid extraction and determination of lead, copper and zinc.

This method extracts all adsorbed and reprecipitated metal and also some from mechanically dispersed ore minerals. It does not extract all metal still in the sulphide form. Sensitivity 10-15 p.p.m.

C. Potassium pyrosulphate fusion with determination of total metals and copper.

This method extracts all the metal in the soil. Sensitivity 15-20 p.p.m.

This method was only used on a few test samples and did not give any better results than method B. in this instance.

All determinations were carried out using dithizone techniques.

3. Results(a) Findon's

Soil samples from Findon's were analysed for total metals by Method A and for copper by Method B.

Method B did not give detectable results here. This indicates that the total metal content here was lower than the sensitivity of the method.

Method A gave some results but again the sensitivity was not great enough to detect the background values. These results are presented on map R2. Where two values are given they represent the result of re-sampling these stations.

The geochemical anomalies are extremely sharp and very low. They are such that if "blind interpretation" was carried out, the prospect would be given a very low priority. "Blind Interpretation" is interpretation with only geochemical and topographic data available.

These low results are in agreement with the low assays reported by M. L. Wade in L.E.E. Report G7 of 15th January, 1957.

I would agree with M. L. Wade's sampling rather than that of W. H. Cundy in regards to the surface workings. I did not enter the adit but from the appearance of the spoil at its mouth I would again accept Wade's sampling rather than Cundy's.

(b) King River-Compressor Creek Area

Stream sediment samples were analysed for "total metals" by Method A and copper by Method B.

Method B again was not sensitive enough.

Method A gave only two positive results of 8 p.p.m. on the two samples from Compressor Creek. Samples were taken at all sampling stations

shown on map P11, (attached to report GC3, 16/4/57) except at the lowest station in Compressor Creek.

(c) Pinnacles

Soil samples were analysed for "total metals" by Method A and for lead, zinc and copper by Method B.

No copper values were detected.

The results are shown on plans P22 and Q9.

The peaks shown near 2200E in traverses 10450N and 10500N are most likely related to the mineralisation found in the trench in block O.106.

In traverses 10150, 10350 and 10450 the geochemical highs have migrated down slope from the main ore zone. In traverse 10150 this migration is masked towards the bottom by contamination from the nearby dump.

The lack of a reliable high downslope on traverse 10500N is probably due to lack of base metals as here the ore zone is much narrower and the mineralisation is much less intense.

The lack of any reliable downslope anomaly in traverse 10350N is hard to explain but is probably due to the fact that this traverse is almost down a creek and that the soil type in the lower part of the traverse was a red clay loam and not the usual immature grey podsol.

Several random soil samples were collected well away from the mineralisation, and all gave undetectable amounts of metal on analysis.

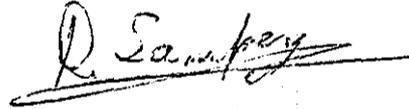
These results do not accurately locate the mineralisation but definitely indicate its presence.

4. Conclusion

It would appear from these results that geochemical testing of prospects is applicable in these areas, especially if a more sensitive

analytical technique for copper is used.

It must be emphasised that Geochemistry, like Geophysics, should never be applied without adequate geological control.

A handwritten signature in cursive script, reading "D. Sampey", with a horizontal line drawn underneath the name.

D. Sampey.

A P P E N D I XANALYTICAL METHODSA. Cold Citrate Extraction

1. Place 1 scoopful of soil (-82 mesh) in test tube.
(1 scoopful = 100 ± 5 mg.)
2. Add 5 ml. of solution C. which is made by dissolving 25 g. ammonium citrate and 4 g. of hydroxylamine hydro-chloride in 1 lt. of water and adjust p.H. to 8.5 using ammonium hydroxide.
3. Add 50 mg. of hydroxylamine hydro-chloride.
4. Add 1 ml. of 0.001% Dithizone in xylene.
5. Shake vigorously for 5 seconds and allow to settle.
6. If colour of organic layer is green record 0, if it has a purplish tinge record $\frac{1}{2}$, if pink carry out step 7.
7. Add successive 1 ml. lots of dithizone solution until after shaking colour is purple, record a value equal to number of ml. added less one.
8. To convert these values to p.p. million multiply by 4.

B. Hot Nitric Acid Extraction(a) Extraction

1. Place one scoopful (0.1 g.) of soil (-82 mesh) in test tube marked at 10 ml.
2. Add 3 ml. (3 : 1) HNO_3 ($3\text{H}_2\text{O} : 1 \text{HNO}_3$)
3. Boil on hot plate for $\frac{1}{2}$ hour.
4. Remove from hot plate, add water to 10 ml. mark and allow to settle for $\frac{1}{2}$ hour before testing. This is the test solution.

(b) Test for Copper

1. Add 1 ml. of reagent D. (10% ammonium citrate solution) to test tube.
2. Add a 2 ml. aliquot of test solution.
3. Wash down sides of tube.
4. Add 2 drops of thymol blue indicator.
5. Adjust p.H. till thymol blue is just pink, using 1N NH_4OH and/or 1N HCl .
6. Add 1 ml. of 0.001% Dithizone.
7. Shake for two minutes.
8. Allow to settle and compare with standards prepared as above except that in place of step 2., add 0, 1, 2, 3, 4 γ (γ = microgram) of copper and $2\frac{1}{2}$ ml. of Dithizone solution in step 6.

(c) Test for Zinc

1. Add 8 ml. of reagent B. to test tube. Reagent B. is a 6.25% sodium thio-sulphate buffered with sodium acetate - acetic acid buffer.
2. Add a 2 ml. aliquot of test solution.
3. Add 1 ml. of 0.001% Dithizone in carbon tetrachloride.
4. Shake vigorously for 30 seconds.
5. Allow to stand and compare with standards prepared as above except that in place of step 2. add 0, 1, 2, 3, γ of lead and in step 3. add 5 ml. of Dithizone.

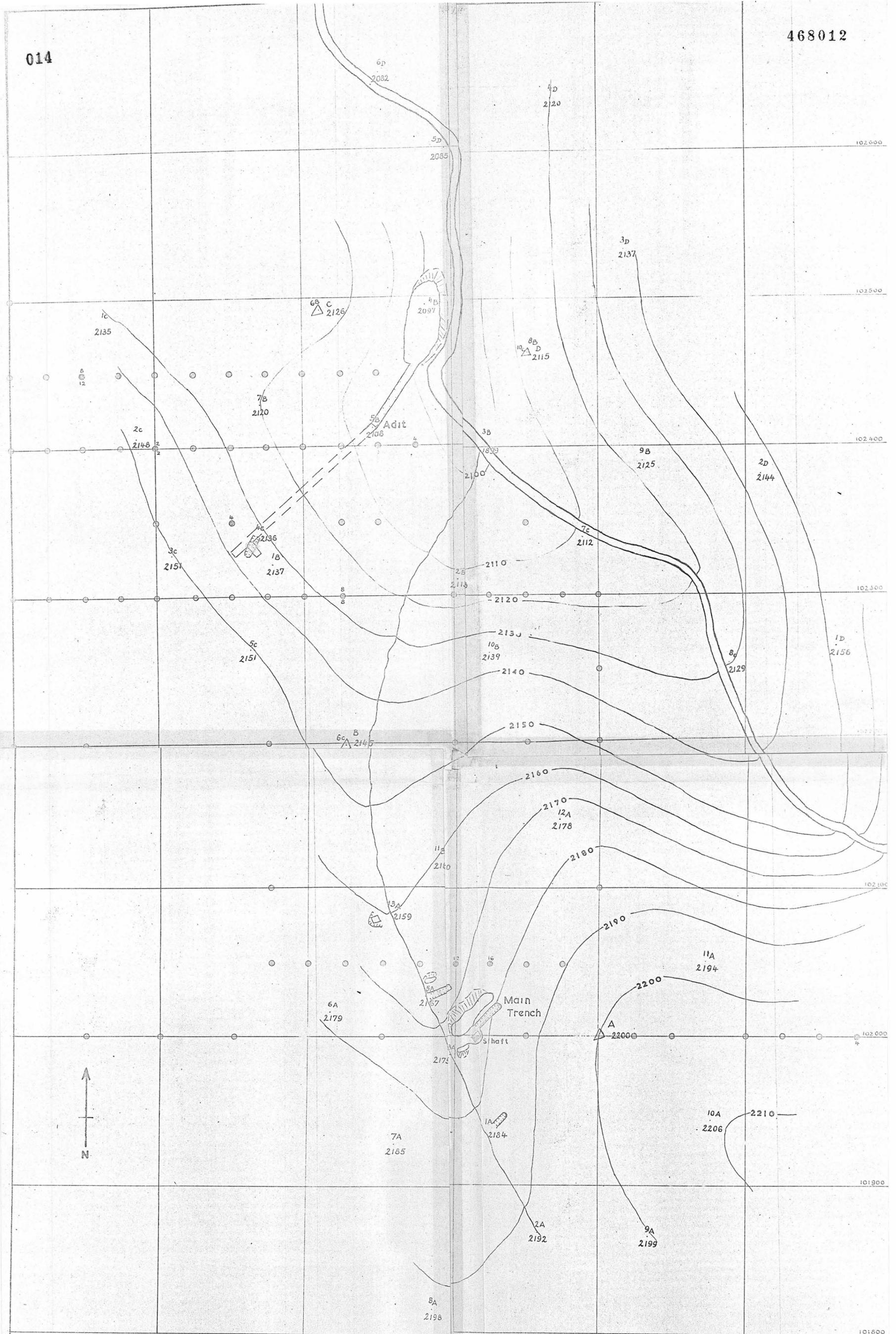
(d) Test for Lead

1. Add 10 ml. of reagent A. to separating funnel. Reagent A. consists of 5% ammonium citrate, 1% potassium cyanide and 1% hydroxylamine hydrochloride solution with p.H. adjusted to 8.5 with ammonium hydroxide.
2. Add a 2 ml. aliquot of test solution.
3. Add 5 ml. of 0.001% Dithizone in carbon tetrachloride.

4. Shake gently for 12 seconds and allow to settle.
5. Drain organic layer into a test tube containing 10 ml. of 2% potassium cyanide.
6. Shake for 5 seconds and allow to settle.
7. Compare with standards prepared as above except that in place of step 2 add 0, 1, 2, 3 μ of lead.

C. Potassium Pyrosulphate Fusion

1. Add 0.5 g. of soil to test tube.
2. Add 2.5 g. potassium pyrosulphate.
3. Mix and fuse for 2 minutes.
4. Cool while rotating test tube so that melt forms a thin film on wall.
5. Add 15 ml. of 6N hydrochloric acid.
6. Heat in water bath for $\frac{1}{2}$ hour.
7. Cool.
8. Determinations are carried out as in b, c, and d.



○ NEGATIVE SAMPLES

△ POSITIVE SAMPLES
FIGURES IN p.p.m.

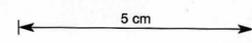
■ MINERALIZATION HERE

FINDONS WORKINGS (Mt. Darwin)

GEOCHEMICAL ORIENTATION SURVEY

Scale

1" = 40'

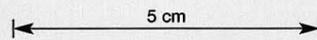


JANUARY 1957

57-166

L.E.E.

R2



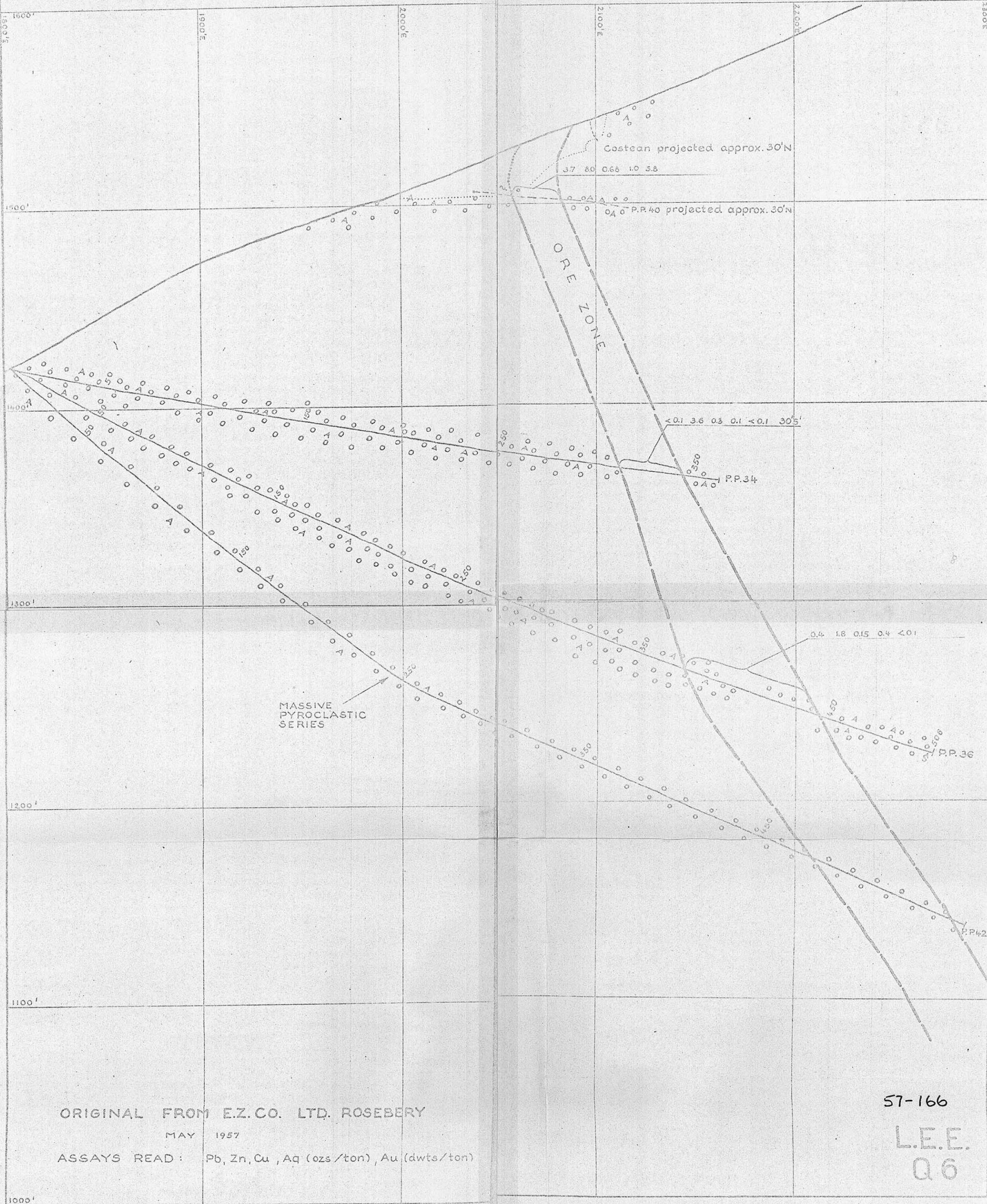
PINNACLES Pb Zn PROSPECT

OBLIQUE SECTION LOOKING 349°
SECTION CROSSES 2000'E AT 10263'N

SCALE: 1" = 40'

PINNACLES GRID

(SECTION 'AB' ON PLAN LEE P9)



ORIGINAL FROM E.Z.CO. LTD. ROSEBERY

MAY 1957

ASSAYS READ: Pb, Zn, Cu, Ag (ozs/ton), Au (dwts/ton)

57-166

L.E.E.
Q6

- < 2 p.p.m.
- 2 - 8 p.p.m.
- > 8 p.p.m.

AREA AT CONTAMINATION

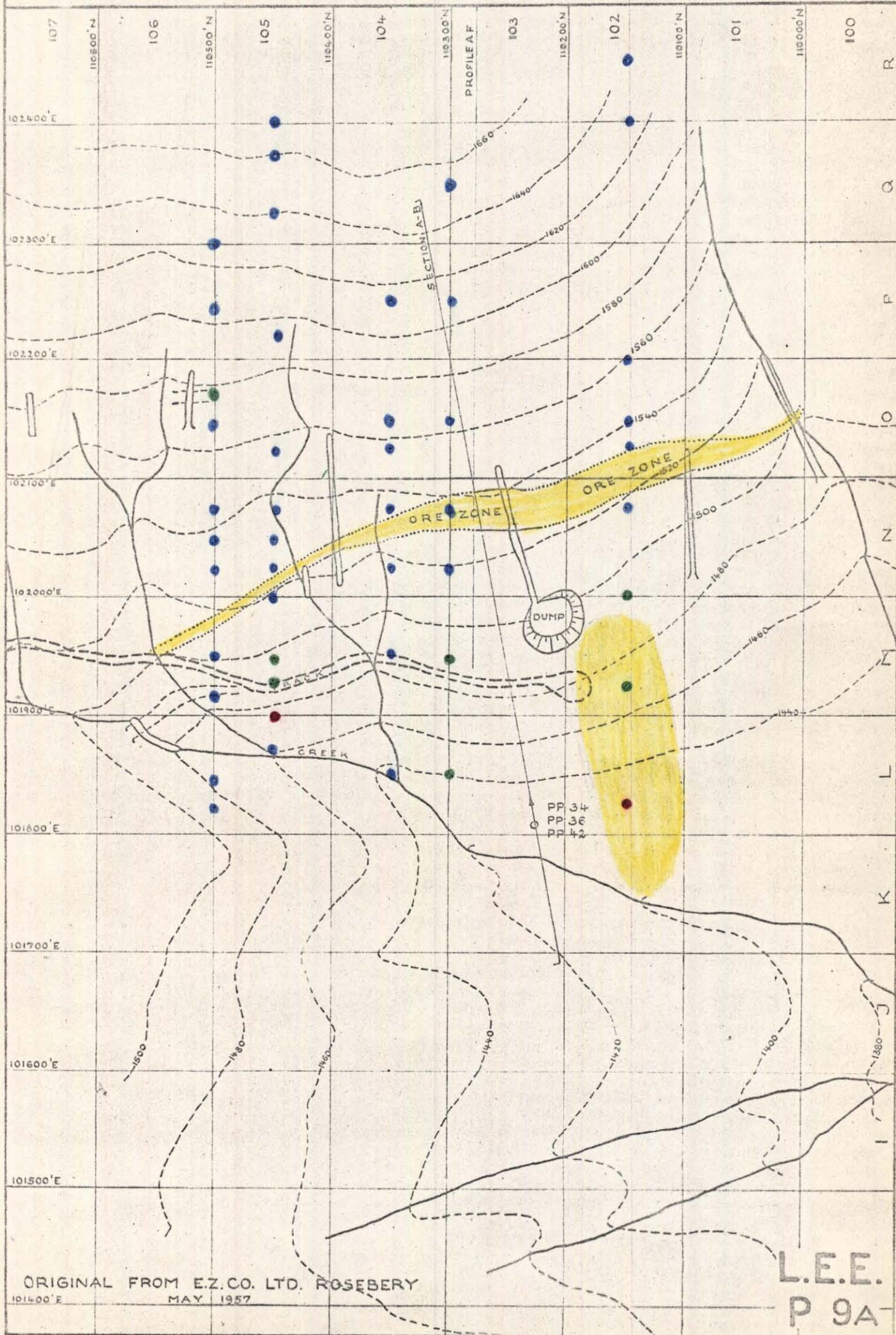
PINNACLES Pb Zn PROSPECT

GEOCHEMICAL ORIENTATION SURVEY.

SCALE: 1" = 100' PINNACLES GRID

TOTAL METALS

468014



ORIGINAL FROM E.Z.CO. LTD. ROSEBERY

MAY 1957

L.E.E.
P 9A

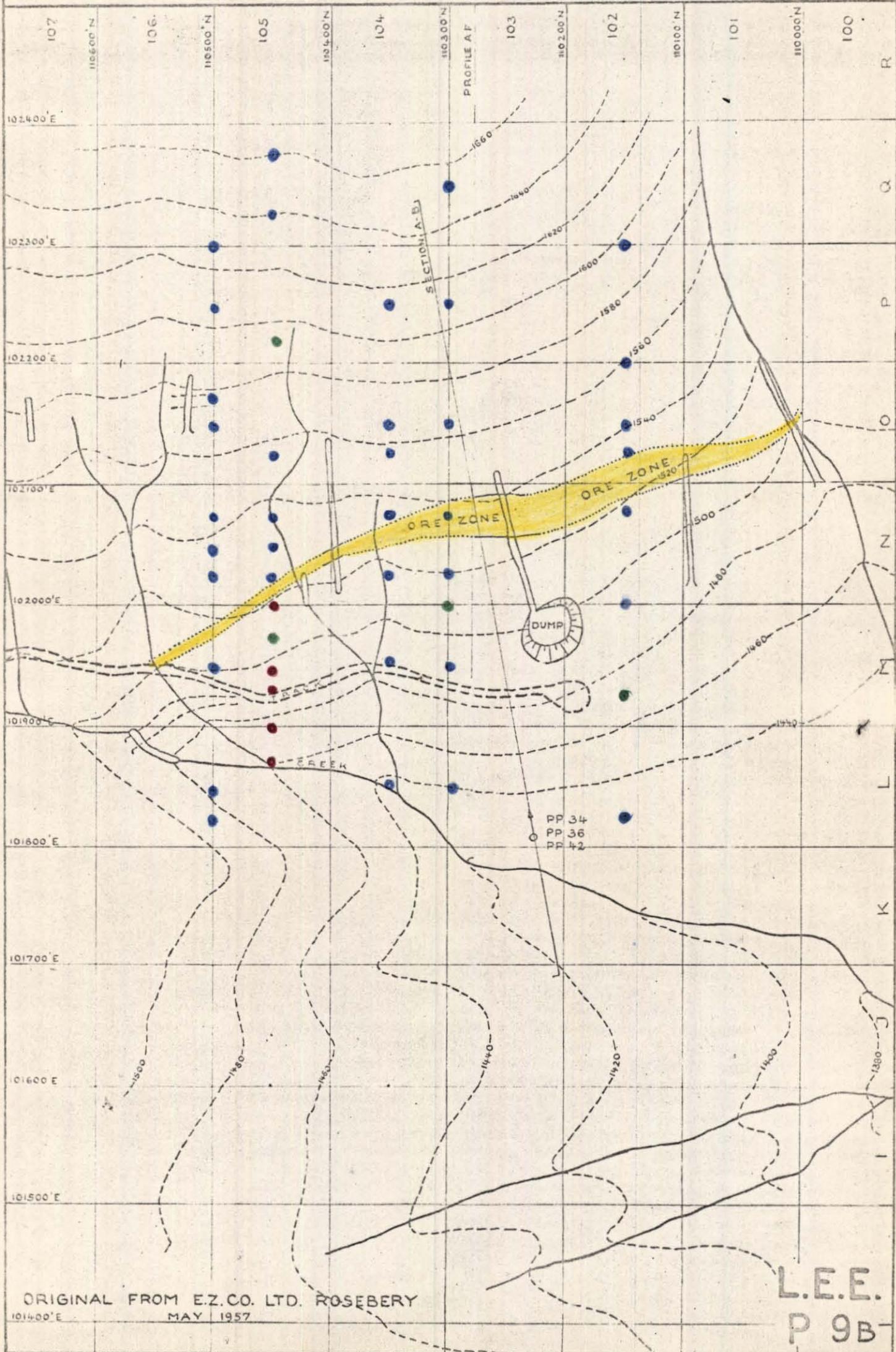
PINNACLES Pb Zn PROSPECT

GEOCHEMICAL ORIENTATION SURVEY
SCALE: 1" = 100' PINNACLES GRID

468015

- A 10 p.p.m.
- 10-40 p.p.m.
- V 40 p.p.m.
- AREA AT CONTAMINATION

LEAD



ORIGINAL FROM E.Z.CO. LTD. ROSEBERY
MAY 1957

L.E.E.
P 9B

011

5 cm

57-166

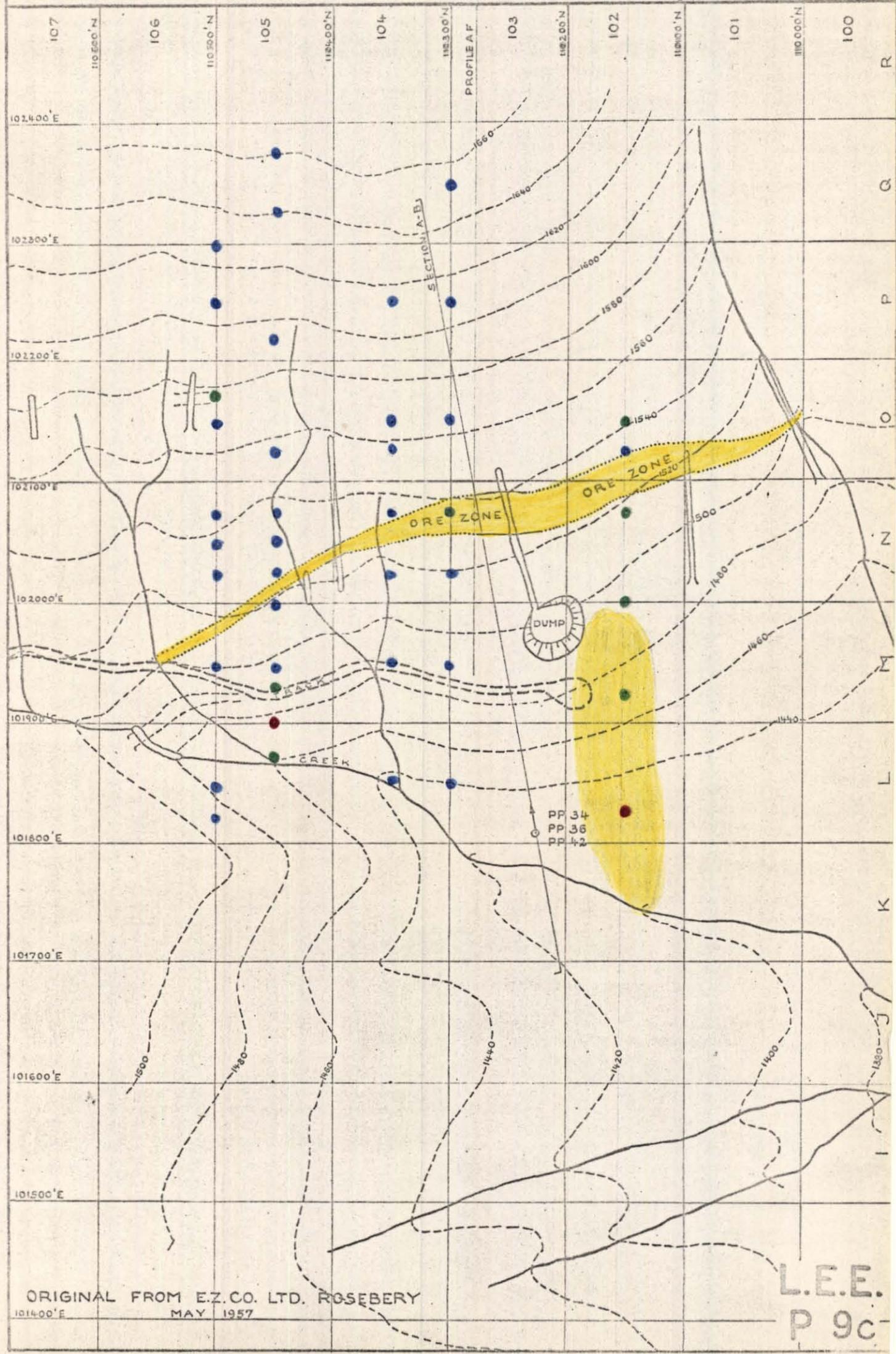
- < 10 p.p.m.
- 10 - 40 p.p.m.
- > 40 p.p.m.
- AREA AT CONTAMINATION

PINNACLES Pb Zn PROSPECT

GEOCHEMICAL ORIENTATION SURVEY
SCALE: 1" = 100' PINNACLES GRID

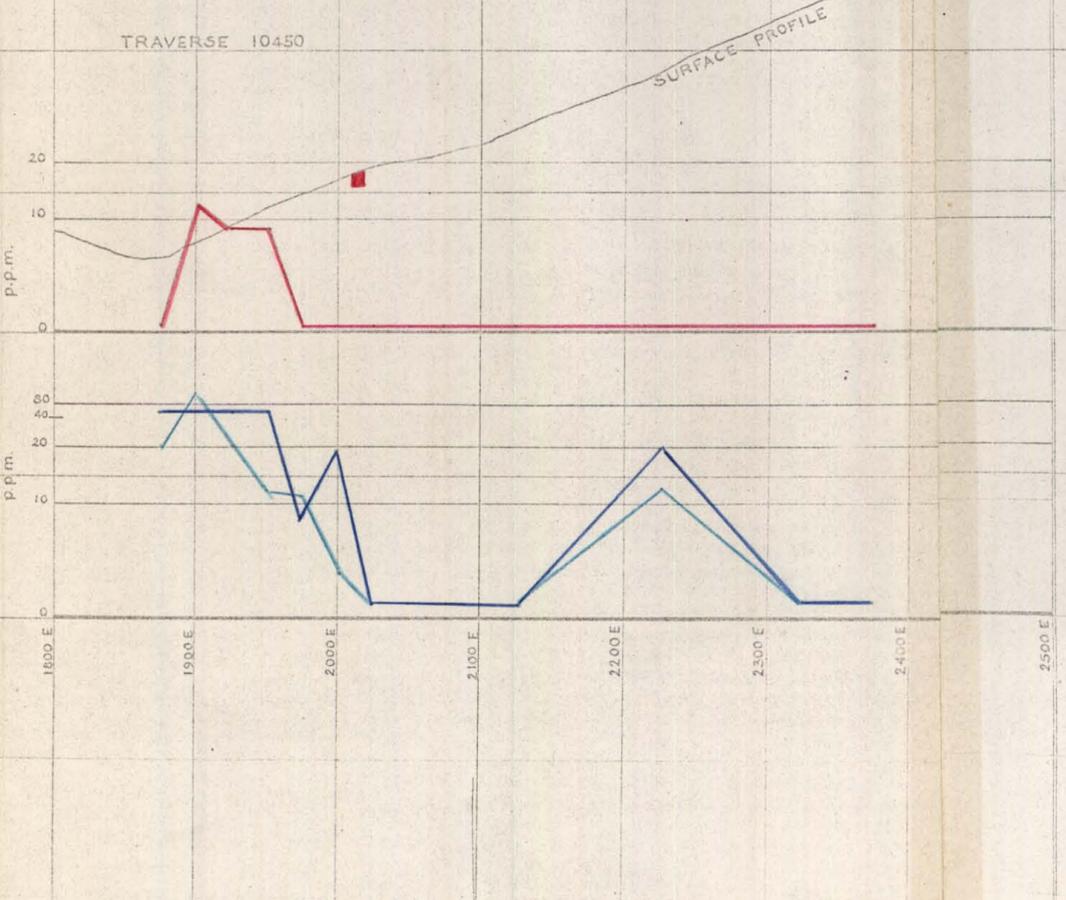
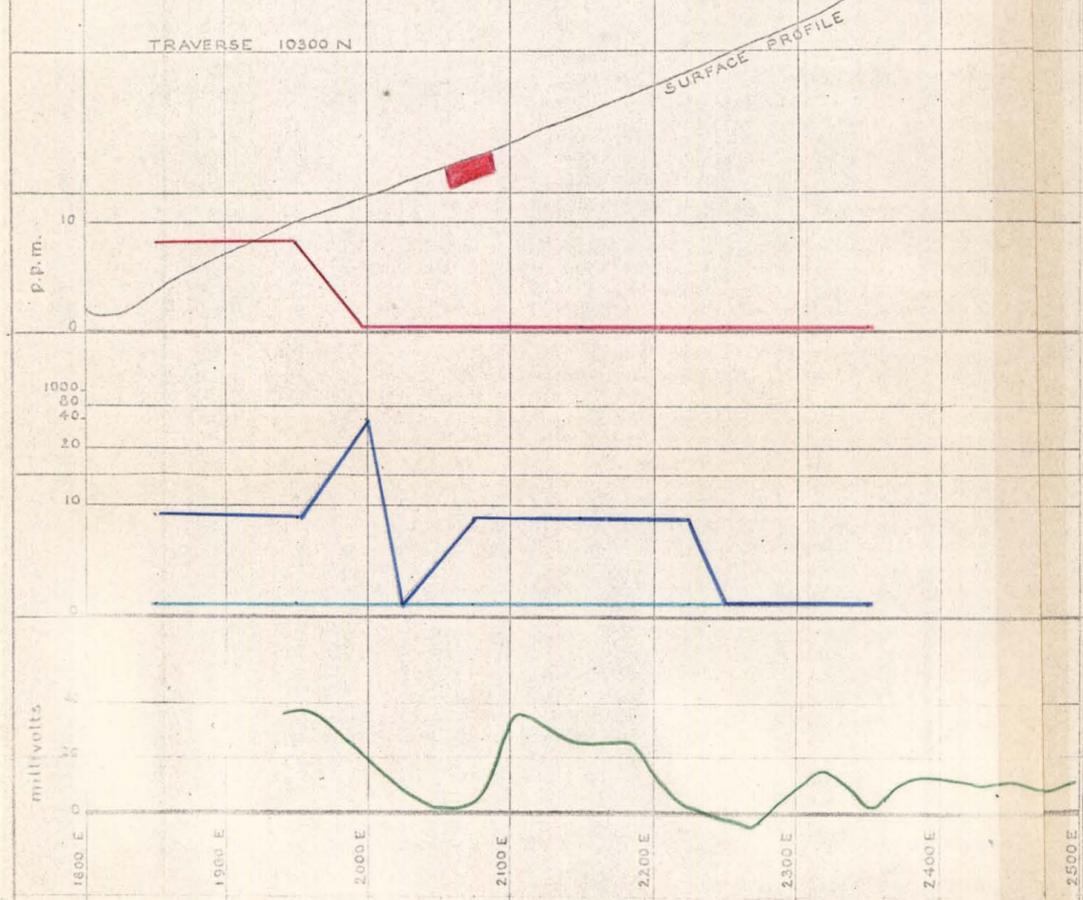
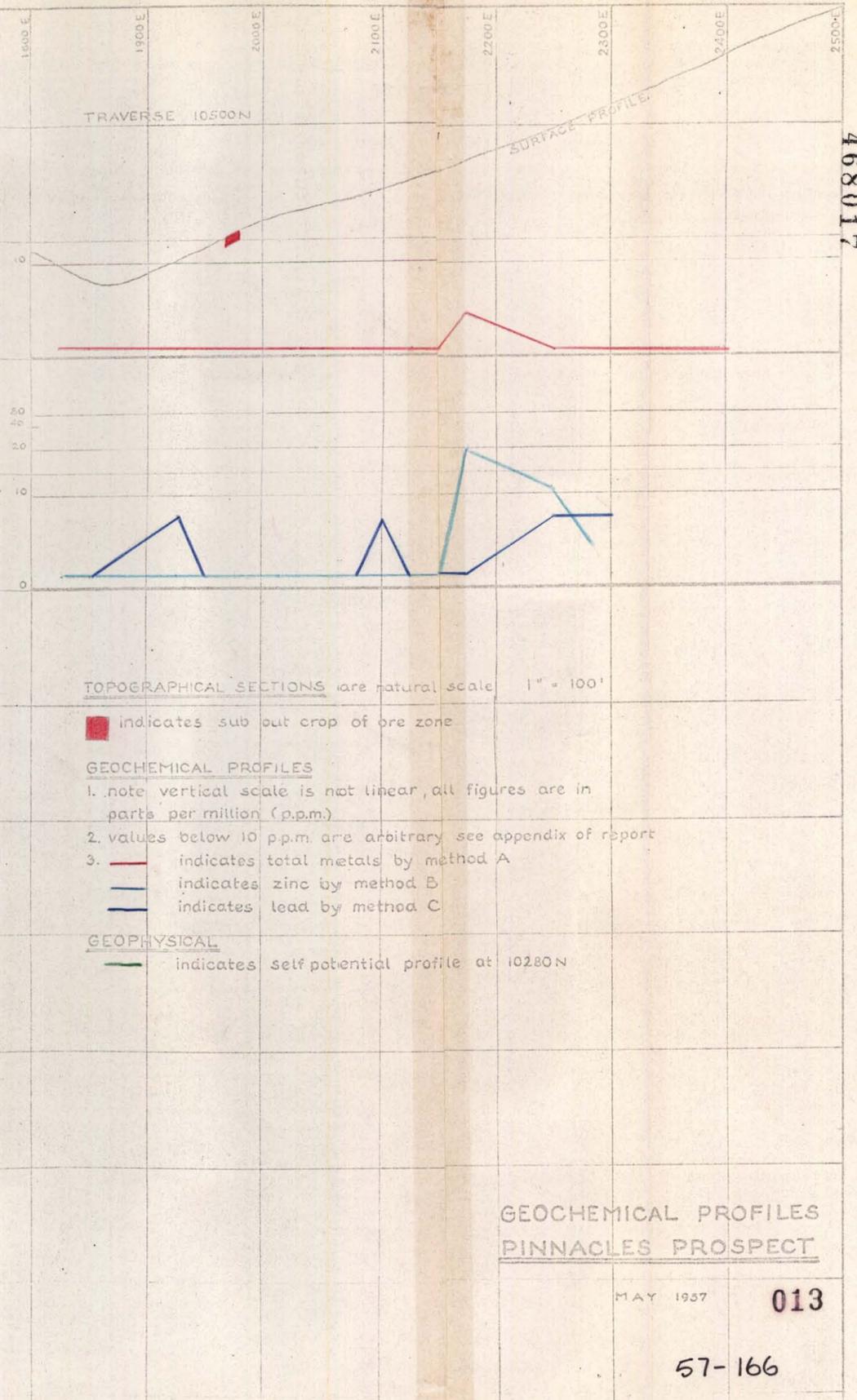
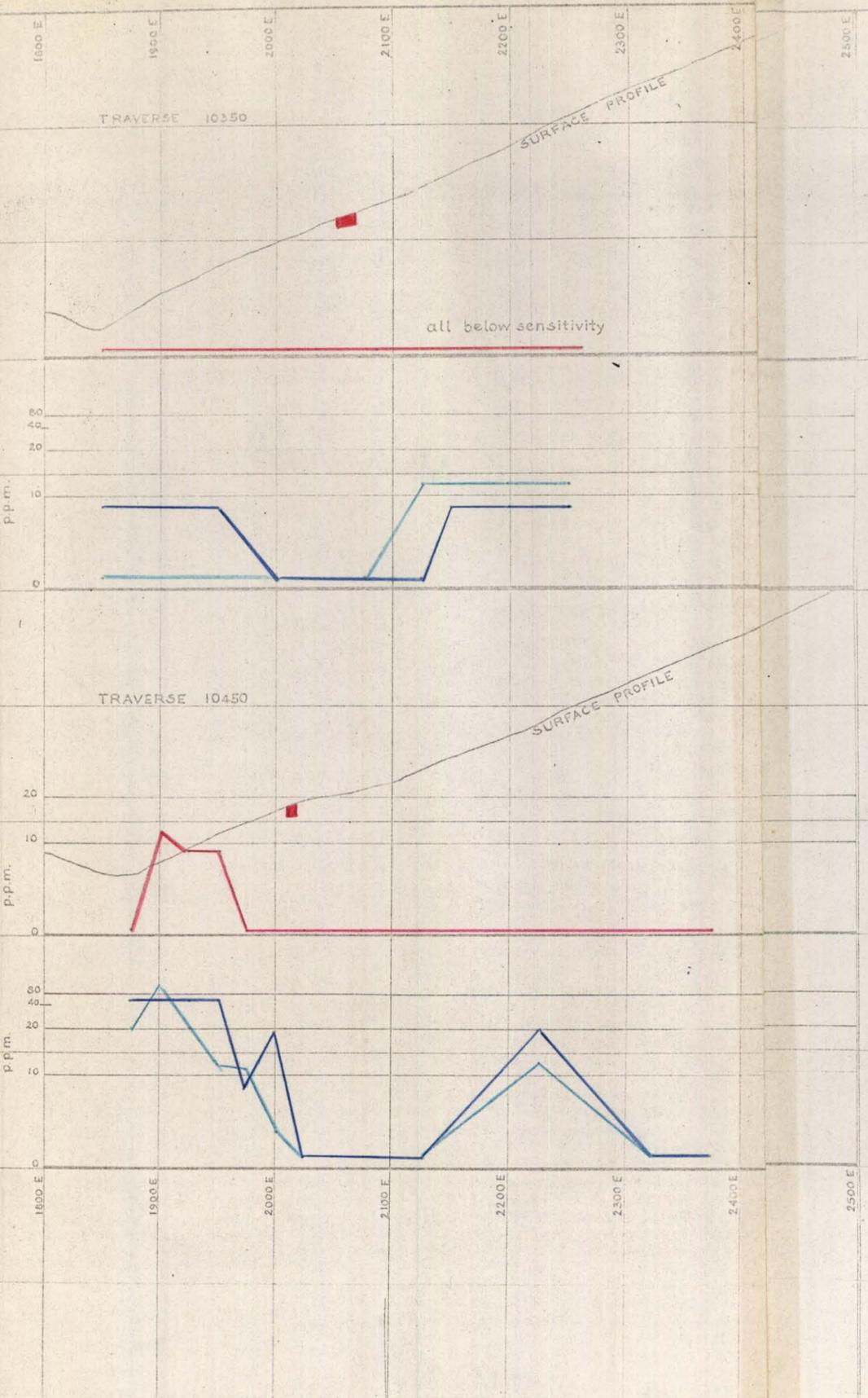
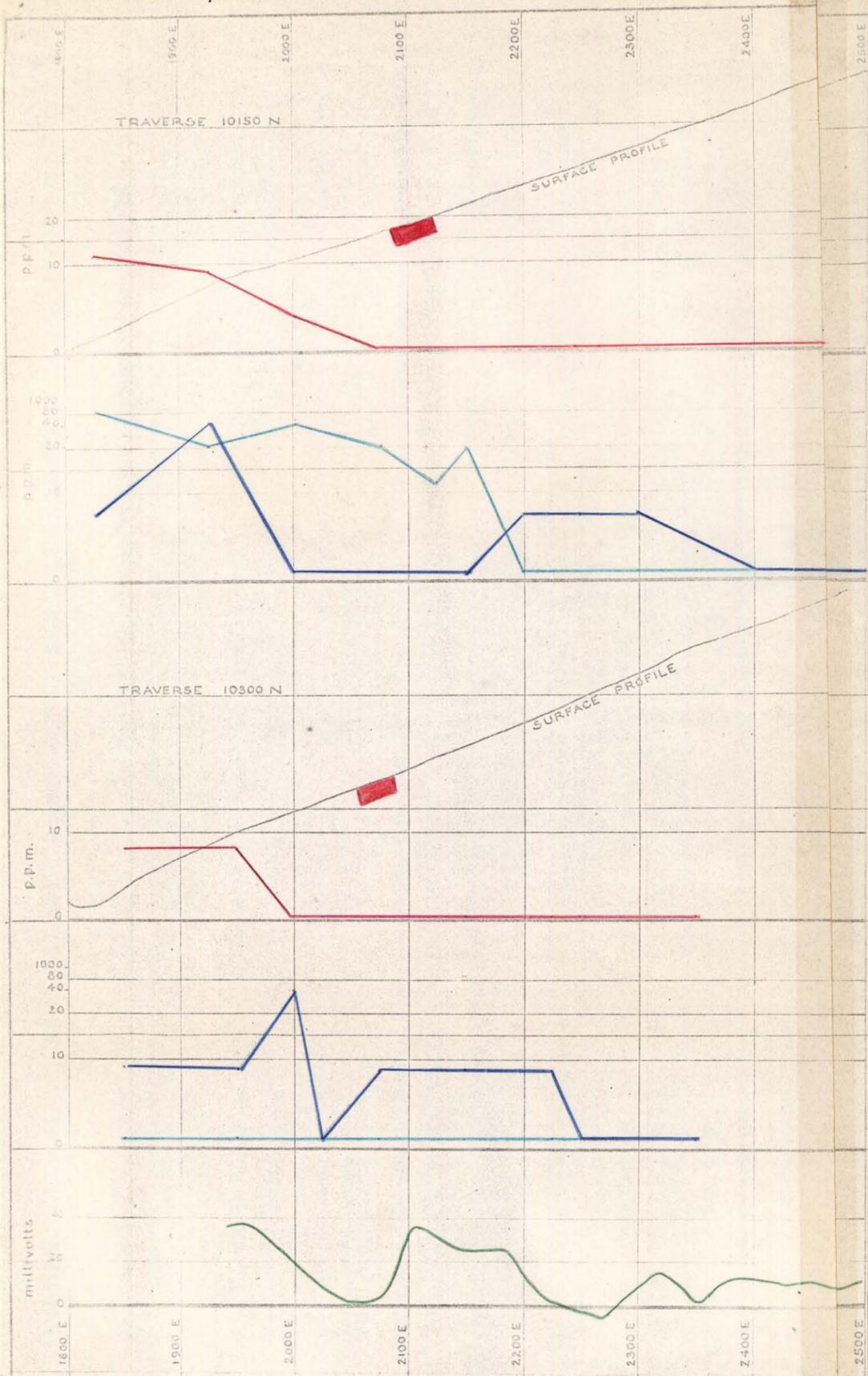
468016

ZINC



ORIGINAL FROM E.Z. CO. LTD. ROSEBERY
MAY 1957

L.E.E.
P 9c



TOPOGRAPHICAL SECTIONS are natural scale 1" = 100'

■ indicates sub out crop of ore zone

GEOCHEMICAL PROFILES

1. note vertical scale is not linear, all figures are in parts per million (p.p.m.)

2. values below 10 p.p.m. are arbitrary see appendix of report

3. — indicates total metals by method A

— indicates zinc by method B

— indicates lead by method C

GEOPHYSICAL

— indicates self potential profile at 10280N

GEOCHEMICAL PROFILES
PINNACLES PROSPECT

MAY 1957 013

57-166

L.E.E.
Q9

