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ABERFOYLE TIN DEVELOPMENT PARTNERSHIP

TASMANIA

REPORT ON TRINDER/CAMP 30 AREA

EXPLORATION LICENCE 2/63

— FOUNDATION & GEOLOGICAL SERVICES PTY. LTD. —



K.R. GLASSON

May, 1969

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ABERFOYLE TIN DEVELOPMENT PARTNERSHIP

REPORT ON TRINDER/CAMP 30 AREA

TASMANIAN EXPLORATION LICENCE 2/63

1. INTRODUCTION

At the conclusion of the exploration season in March 1968 the plotting of geochemical results over what was called the Camp 30 area, which is situated on the serpentinite belt west of the Huskisson River, revealed a number of nickel anomalies. The serpentinite has large areas covered by laterite and a large magnetic anomaly was obtained in the airborne survey which initially attracted us to the area.

In July 1968 it was decided that additional testing of the geochemical anomalies was warranted since the samples already taken were not restricted to any particular horizon and came mainly from near surface positions. It was decided that drilling to shallow depths (30 - 50 ft) using a core drill would be the best method of testing the lateritic profile.

In November 1968 I visited the area prior to carrying out the testing programme. There were a number of points that had to be checked. Firstly I wished to locate on the ground the position of the seven main anomalies. This would enable a decision to be made as to where the drilling plant could be positioned by helicopter and how much clearing would be required to move the drilling equipment from site to site. As a result of the visit it was clear that the drilling equipment could be landed at anomaly 2 near what I thought was Trinder Creek and at anomaly 7 which was located on a lightly wooded flat top spur. Movement to the other sites would require considerable clearing.

The second point that had to be established was location of permanent water for drilling. Trinder Creek was examined and found to be satisfactory. Polythene piping would be required to convey water to the various drill sites but no difficulties in this matter were anticipated.

The third item was establishing a camp to service the operation. Camp 30, located some three quarters of a mile further north, was not considered suitable. It was obvious that a camp could be set up on Trinder

Creek near anomaly 2 which would be ideal for the purpose.

At a later stage it was found that the creek which I had termed Trinder Creek was in fact Riley Creek, these creeks joining about a quarter of a mile downstream. However by that time the area and camp were known as Trinder and hence to save confusion the name has been retained.

The additional information which I gained on this visit was the fact that the centre of the anomalies coincided with outcrop of serpentinite and was not on the thick lateritic cover. Although this had been noted by the assistant geologists in the 67/68 field season they had not prepared any geological map nor was it mentioned in the report. The observation that anomalies were located on serpentinite made an alteration in the programme necessary. It was decided to schedule the work in two programmes: (1) Establish the camp and cut out grid lines as previously programmed; outcrop mapping around the anomalies and then use a hand auger to test soil and laterite profiles. (2) If the results from (1) were promising a limited amount of core drilling would be carried out to check laterite at depth or the serpentinite for possible sulphides.

2. WORK CARRIED OUT IN PRESENT 68/69 FIELD SEASON

A. PROGRAMME 1

- (a) A heliport was established at anomaly 2 and Trinder camp set up nearby on the creek.
- (b) Line cutters (mainly students) cut the main north - south and east - west axis lines of each of the seven anomalies (Fig. 1).
- (c) All the anomalies were mapped for serpentinite outcrop (Fig. 2).
- (d) Samples were taken as near as possible to the surface of the weathered serpentinite.

(e) All the old pits in the area were sampled near the surface, halfway down and at the bottom.

(f) Auger holes were put down to check variation in geochemical values in the laterite profiles.

(g) Additional lines were cut on the laterite ridge south of Trinder Creek where previous lines had stopped on line R10. These lines, R11, R12, R13 and R14, plus connecting lines F and R10¹¹, are shown on Fig. 1.

(h) Mapping of the rocks to the west of the serpentinite was carried out including Jordan Creek and the track leading to the Pieman and Wilson River junction. By the end of the field season compass and tape traverses linked the Trinder area with Mt. Lindsay.

Discussion on work and results

It must be realised that the programme 1 was quite different from what had been laid down in July 1968. The emphasis was directed towards searching the serpentinites for possible sulphides and clearly defining their outcrop position; also close examination of the variation of the laterite with depth. The complete grid system as drawn up by Mr. Mason was not laid out as the results did not warrant it.

Working with a hand auger it was appreciated that penetration for depths greater than 10 ft was unlikely and in point of fact getting to that depth proved very difficult. The field investigation was carried out under the leadership of Mr. Malcolm Jordan (third year student from Hobart University assisted by students from Sydney and Hobart Universities) and I wish to record the diligent manner in which they carried out the work.

The locations of the auger and sampling programme are shown on Figs. 3, 4 and 5, scale 1" = 100'.

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It will be noted that no co-ordinates have been given to the sheets at this stage. The reason is that it is intended using the co-ordinates of the National Grid in Tasmania and I do not have a copy of the sheet with these grid co-ordinates in Sydney. However this will be carried out on my next visit to Melbourne.

On Figs. 6 and 7 the values for nickel and cobalt have been plotted in profile for all the samples taken this season on the various lines and anomalies which were tested. No attempt was made to contour values since it was felt this would be meaningless. A number of results were apparent from the programme.

(a) The results which were obtained from a constant depth (i.e. 12" below surface) confirmed the centres of the anomalies previously obtained in the 1967/68 field season were correct.

(b) Samples taken from the old pits which were put down some years ago on what is now termed line R2 gave results showing very little variation in nickel content from top to bottom.

(c) Where auger holes penetrated to depths of 10 ft the values showed significant increase in nickel content at the bottom of the hole. In each case the close examination of the material showed a light yellow material corresponding to weathered serpentinite.

(d) The best values were obtained from weathered serpentinite and values taken from the laterite profile were always much lower. It can be seen from an examination of Figs. 6 and 7 that there were a large number of samples which gave 10,000 p.p.m. nickel (1.0%) and from other samples on Figs. 3, 4 and 5 values around 2.0% nickel were obtained from a number of lines. Again an examination of Fig. 6 shows that the best concentration of high values was obtained from anomaly 2. Here there is an area

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approximately 400 ft by 300 ft having a nickel value of 1%. Again as shown in Fig. 2 this area represents a zone of outcrop of serpentinite. It would appear from the general distribution of results that the nickel values in the weathered serpentinite follow the main direction of schistosity.

Towards the conclusion of programme 1, I reviewed the results and pointed out what may have been the mechanism of concentration of the nickel values in the weathered serpentinite.

The laterites are probably preglacial in age as can be observed on lines R12, R13 and R14 where tillite is seen to overlap them. Much of the laterite which may have had great thickness has been subject to post-glacial and recent erosion. Hence we can be sure that the fluctuating water table has allowed leaching and deposition of iron and other elements from the serpentinite and the overlying laterite. It is not surprising that no sulphides are visible in the outcrop of serpentinite in the area.

It is possible that nickel has been leached from the serpentinite and deposited in the laterite and then subsequently re-leached from the laterite and redeposited in the underlying weathered serpentinite. Within the laterite nickel is usually "fixed" either in manganese or iron oxides whereas in the serpentinite it would be taken into the clay minerals in the weathered portions. The ultimate source of the nickel could be either in the chlorite minerals or as sulphides.

The result of the investigation in programme 1 showed:

- (a) The nickel content of the laterites did not vary significantly with depth and of the areas tested the laterites were not economic.
- (b) The future of the prospect would depend on intersection of sulphides in the serpentinite with an economic grade.
- (c) The best concentration of nickel was in the weathered serpentinite on anomaly 2 and this would present the best target for deeper testing by diamond drilling.

B. PROGRAMME 2

It was decided to test anomaly 2 by subsurface drilling using B.M.S. core size down to depths of 30 ft. The holes were to be drilled as shown

on Fig. 2 using the centre of the anomaly for the first hole and then drilling four other holes at 100 ft from this point on the cardinal points of the compass. This programme was carried out by driller M. Philpott and supervised by the assistant geologist Mr. B. Allen. Each hole reached a depth of 30 ft and the core was logged in the field and sampled by B. Allen. The sample intervals were normally 3 ft but in fresh core this was increased to 5 ft. On its arrival in Sydney I examined the core and the drill log shown in Appendix B is by me.

From an examination of the core it was obvious that depth of weathering varied from hole to hole and the serpentinite showed alteration or bleaching which might have been due to hydrothermal influences. Extensive veining of the serpentinite showed a network of either sulphides or iron oxides and hence specimens were selected for both petrological and mineralogical determination. The result of this work is shown in Appendices A and C respectively. It should be noted that the specimens selected were from unweathered core and also taken from a sample bag where the position of the core could be estimated only within 5 ft.

Results of Drilling

(a) The values obtained in the drilling were generally lower than for the surface samples.

(b) With the exception of one hole (100^W) the values decreased from approximately 1.0% to 0.3% at the 30 ft depth position. In the hole at 100^W values of 1.0% were obtained throughout but this is the only hole where weathering extended to the bottom of the hole.

(c) The drills failed to locate significant sulphides.

3. CONCLUSIONS & RECOMMENDATIONS

(a) The testing of the nickel anomalies in the Trinder Creek - Camp 30 area has failed to show any significant reserves of economic ore.

(b) The values of nickel in the order of 1.0% are confined to the weathered serpentinite. In the fresh material at depth there is no significant concentration of nickel in the area tested.

(c) The nickel values obtained in the laterite do not show any significant change in different horizons and the overall grade is not economic.

(d) No further work is recommended for the area at this stage.

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APPENDIX A (PETROLOGY)

SPECIMEN NO. 11

Location. 100 ft north of Anomaly 2 centre. Depth 9 - 14 ft.

Description of hand specimen. Highly veined serpentinite.

Description of slide. The chief constituent of the rock is fibrous antigorite. It occurs in aggregates up to approximately 1 mm across. Chrysotile occurs in cross fibre veinlets. Also concentrated in joint patterns and along grain boundaries are opaque granules. These occupy about 10% of the slide. A few large irregular reddish grains are possibly chromite.

SPECIMEN NO. 12

Location. 100 ft north of Anomaly 2 centre. Depth 14 - 19 ft.

Description of hand specimen. Dark fresh serpentinite with veins.

Description of slide. This is a fine grained serpentinite consisting predominantly of antigorite. Small granules of opaques (oxide?) are concentrated along former grain boundaries and joints. A few larger grains are somewhat irregular in shape and are possibly chromite. Opaque phases comprise approximately 8 - 10% of the slide. The rock is partly altered (weathered?).

SPECIMEN NO. 13(a).

Location. 100 ft north of Anomaly 2 centre. Depth 19 - 24 ft.

Description of slide. The rock consists mainly of antigorite with an aggregate structure. Some patches are coarse grained and may represent former olivine or pyroxene. The major cross cutting veinlet consists mainly of chrysotile with some quartz and radiating botryoidal material (garnierite?). Small opaque granules occur in a joint pattern through the rock. These are perhaps former grain boundaries. Only oxide material is present together with a few larger (2 mm) reddish brown chromite grains. Opaque material comprises about 5% of the slide.

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SPECIMEN NO. 13(b)

Location. Same as 13(a).

This rock consists chiefly of antigorite which occurs in aggregate. Narrow veins of opaque granules occur along cracks and former (?) grain boundaries. A small number of chlorite grains are present. No original minerals remain. Opaque minerals make up 5% of the rock. A few larger irregular ?chromite grains are present (up to 1.5 mm).

SPECIMEN NO. 14

Location. 100 ft north of Anomaly 2 centre. Depth 24 - 30 ft.

This rock is considerably weathered and consists mainly of antigorite in fairly coarse aggregates. Small granules of opaques (oxides?) are scattered throughout the rock but only comprise about 5% of the rock as a whole. A few large (up to 3.5 mm) reddish brown irregular grains of ?chromite are present. These are associated with quartz and a colourless layer silicate phase.

SPECIMEN NO. 41.

Location. 100 ft east of Anomaly 2 centre. Depth 25 - 30 ft.

Description of slide. This rock is a slightly weathered serpentinite. It contains reasonably coarse grained antigorite clusters and fine opaque granules. Veinlets of chrysotile occur throughout. The opaques are in veins and grain boundaries and occupy less than 3% of the slide.

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iii.

APPENDIX B (DIAMOND DRILL CORE LOGS)

ANOMALY 2. HOLE NO. 2/00.

<u>From</u>	<u>To</u>	<u>Ni%</u>	<u>Co%</u>	<u>Geology</u>
0'	3'			Highly weathered serpentinite highly kaolinised with dark veining
3'	6'	0.86	0.04	Slightly weathered serpentinite with some limonitic veins
6'	9'	0.44	0.03	Weathered serpentinite with some limonitic veins
9'	14'	0.16	0.02	Moderately weathered but very minor limonitic staining - heavily veined with black minerals
14'	19'	0.41	0.03	Very talcose with manganese staining
19'	24'	0.50	0.02	Limonitic with veins of carbonate, gypsum and talcose material - mineral with yellow lustre
24'	30'	0.38	0.02	Heavily veined very fine grained serpentinite

ANOMALY 2. HOLE NO. 2/100 N.

<u>From</u>	<u>To</u>	<u>Ni%</u>	<u>Co%</u>	<u>Geology</u>
0'	3'	1.00	0.08	Probably new hole lateritic and heavily weathered
3'	6'	0.97	0.05	Only few ounces of material - heavily weathered serpentinite with manganese (wad)
6'	9'	1.00	0.06	Only few ounces of material - highly altered serpentinite with kaolin and wad
9'	14'	0.64	0.03	Highly veined serpentinite - possibly sulphide (?) (Specimen taken)
14'	19'	0.34	0.01	Dark, fresh serpentinite with vein of alteration (epidote) possible sulphide (Sample taken)
19'	24'	0.31	0.01	Fresh serpentinite with some veins of carbonate and possible pyrolusite (Specimen taken)
24'	30'	0.31	0.01	Fresh serpentinite with veins of hydrothermal alteration - sulphide (?)

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IV.

ANOMALY 2. HOLE No. 2/100 S.

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<u>From</u>	<u>To</u>	<u>Ni%</u>	<u>Co%</u>	<u>Geology</u>
0'	3'	0.97	0.13	Entirely limonitic and clay
3'	6'	0.72	0.03	Talcosse serpentinite - hydrothermal alteration with fine veining
6'	9'	0.76	0.01	Talcosse-rich serpentinite with kaolin, gypsum and manganese
9'	12'	0.94	0.03	Similar to above but more highly veined
12'	15'	0.79	0.03	Slightly less altered but still bleached and showing close veining
15'	18'	0.38	0.01	Similar to above
18'	23'	0.33	0.01	Altered serpentinite with very close spacing of veins
23'	28'	0.44	0.01	Cellular serpentinite with manganese, kaolin - some secondary silicification
28'	30'	0.29	0.01	Talcosse serpentinite with some veining

ANOMALY 2. HOLE No. 2/100 W.

<u>From</u>	<u>To</u>	<u>Ni%</u>	<u>Co%</u>	<u>Geology</u>
0'	3'	1.00	0.23	Mainly limonite
3'	6'	0.86	0.03	Highly weathered serpentinite with gypsum and wad
6'	9'	0.76	0.19	Talcosse serpentinite with very fine veining
9'	12'	1.00	0.07	Similar to above but almost completely talcosse
12'	15'	1.00	0.06	Only few core specimens - highly weathered and much manganese
15'	18'	1.00	0.03	Very little core - entirely limonitic
18'	21'	1.00	0.65	Few ounces of core - limonitic and weathered
21'	24'	1.00	0.60	Similar to above
24'	27'	no sample		No core recovered
27'	30'	1.00	0.75	Only limited amount of core

ANOMALY 2. HOLE No. 2/100 E.

<u>From</u>	<u>To</u>	<u>Ni%</u>	<u>Co%</u>	<u>Geology</u>
0'	3'	0.21	0.06	Mainly laterite (limonite)
3'	6'	0.52	0.18	Laterite
6'	9'	1.00	0.08	Weathered serpentinite with kaolin, manganese and talc
9'	12'	0.91	0.04	Hydrothermal alteration of serpentinite with talc and close veining
12'	15'	0.66	0.02	Similar to above but with small amount of core recovered
15'	20'	0.74	0.06	Heavily veined talcose serpentinite
20'	25'	0.38	0.02	Hydrothermal alteration of serpentinite
25'	30'	0.35	0.01	Much less altered but heavily veined

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ANOMALY 2. HOLE NO. 2/100 E.

<u>From</u>	<u>To</u>	<u>Ni%</u>	<u>Co%</u>	<u>Geology</u>
0'	3'	0.21	0.06	Mainly laterite (limonite)
3'	6'	0.52	0.18	Laterite
6'	9'	1.00	0.08	Weathered serpentinite with kaolin, manganese and talc
9'	12'	0.91	0.04	Hydrothermal alteration of serpentinite with talc and close veining
12'	15'	0.66	0.02	Similar to above but with small amount of core recovered
15'	20'	0.74	0.06	Heavily veined talcose serpentinite
20'	25'	0.38	0.02	Hydrothermal alteration of serpentinite
25'	30'	0.35	0.01	Much less altered but heavily veined

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ANOMALY 2. HOLE NO. 2/100 S.

<u>From</u>	<u>To</u>	<u>Ni%</u>	<u>Co%</u>	<u>Geology</u>
0'	3'	0.97	0.13	Entirely limonitic and clay
3'	6'	0.72	0.03	Talcose serpentinite - hydrothermal alteration with fine veining
6'	9'	0.76	0.01	Talcose-rich serpentinite with kaolin, gypsum and manganese
9'	12'	0.94	0.03	Similar to above but more highly veined
12'	15'	0.79	0.03	Slightly less altered but still bleached and showing close veining
15'	18'	0.38	0.01	Similar to above
18'	23'	0.33	0.01	Altered serpentinite with very close spacing of veins
23'	28'	0.44	0.01	Cellular serpentinite with manganese, kaolin - some secondary silicification
28'	30'	0.29	0.01	Talcose serpentinite with some veining

ANOMALY 2. HOLE NO. 2/100 W.

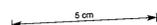
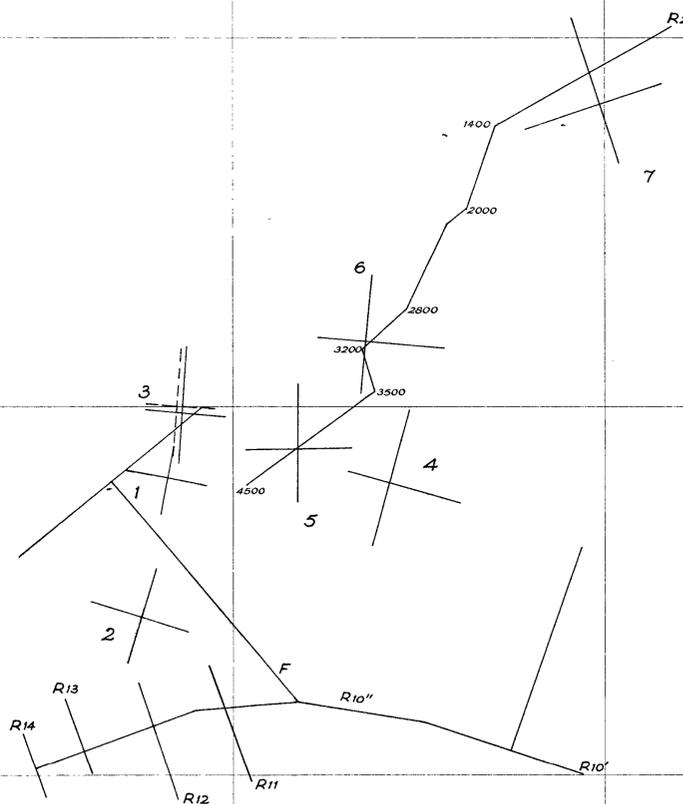
<u>From</u>	<u>To</u>	<u>Ni%</u>	<u>Co%</u>	<u>Geology</u>
0'	3'	1.00	0.23	Mainly limonite
3'	6'	0.86	0.03	Highly weathered serpentinite with gypsum and wad
6'	9'	0.76	0.19	Talcose serpentinite with very fine veining
9'	12'	1.00	0.07	Similar to above but almost completely talcose
12'	15'	1.00	0.06	Only few core specimens - highly weathered and much manganese
15'	18'	1.00	0.03	Very little core - entirely limonitic
18'	21'	1.00	0.65	Few ounces of core - limonitic and weathered
21'	24'	1.00	0.60	Similar to above
24'	27'	no sample		No core recovered
27'	30'	1.00	0.75	Only limited amount of core

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A.T.D.P.
TRINDER/CAMP THIRTY AREA

List of Plans

- Drawing No. Fig. 1 - L - 69 - 27 Traverse location
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nickel values
- " " Fig. 4 - L - 69 - 30 Sample locations and
nickel values
- " " Fig. 5 - L - 69 - 31 Sample location and
nickel value
- " " Fig. 6 - L - 69 - 32 Geochemical traverse profiles
- " " Fig. 7 - L - 69 - 32 " " "



A. T. D. P.
 TRINDER / CAMP THIRTY AREA
 TRAVERSE LOCATION

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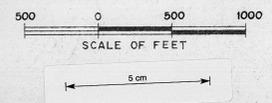
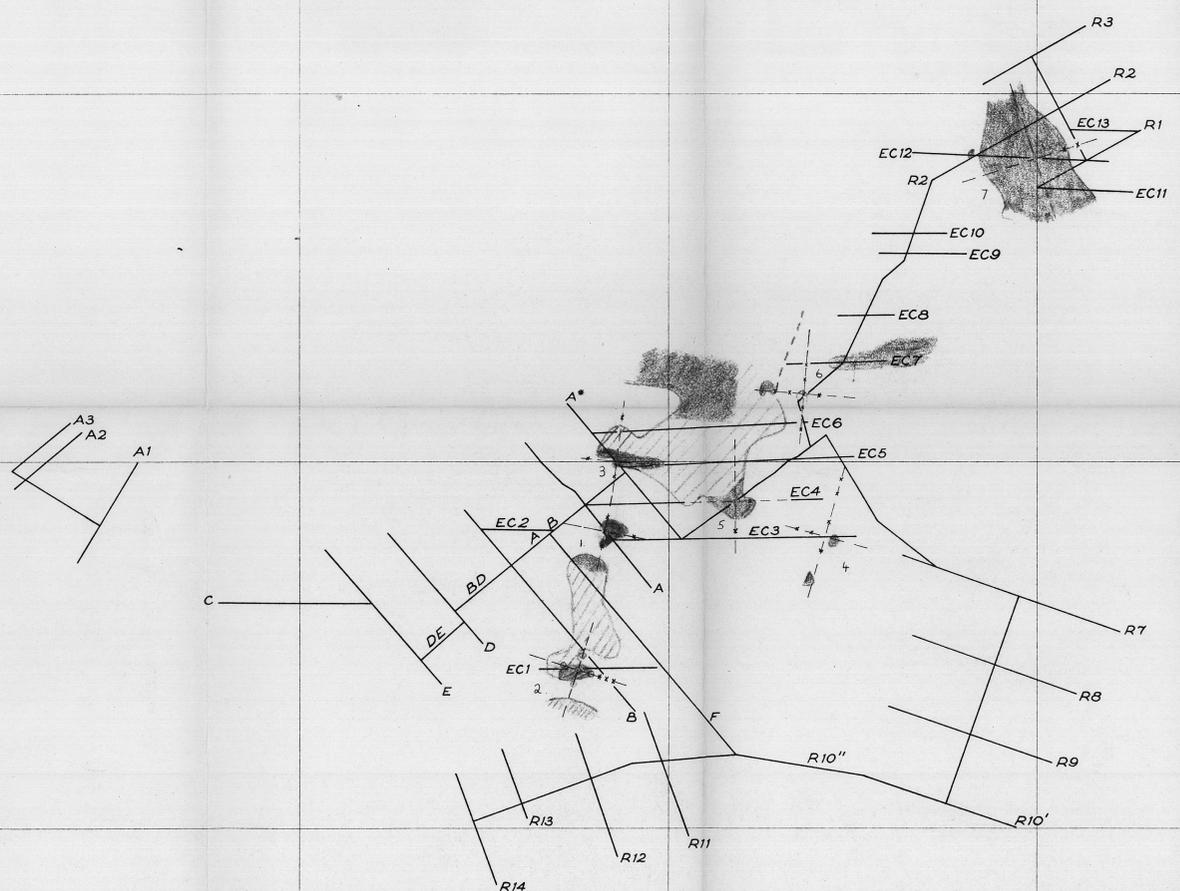
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 Fig. 1-L-69-27

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— R6
 — R5
 — R4



LEGEND

■ Serpentinite outcrop
 ▨ Scattered serpentinite outcrop
 □ Laterite

x Auger holes
 ○ Proposed diamond drill position

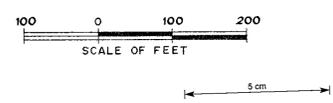
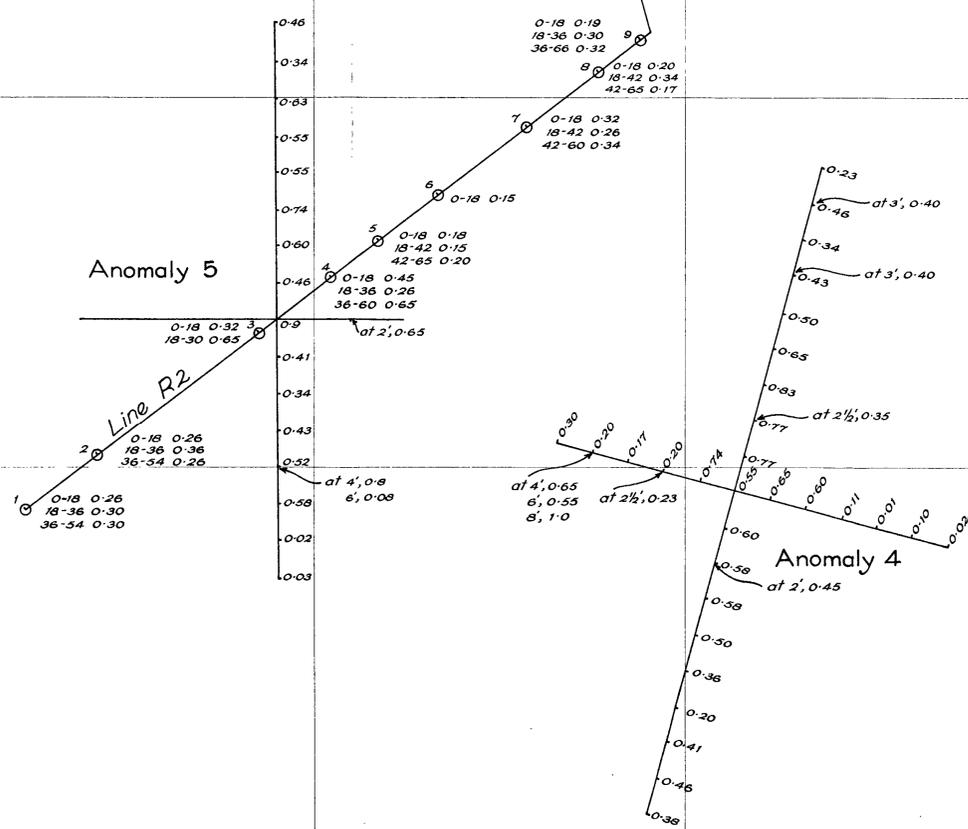
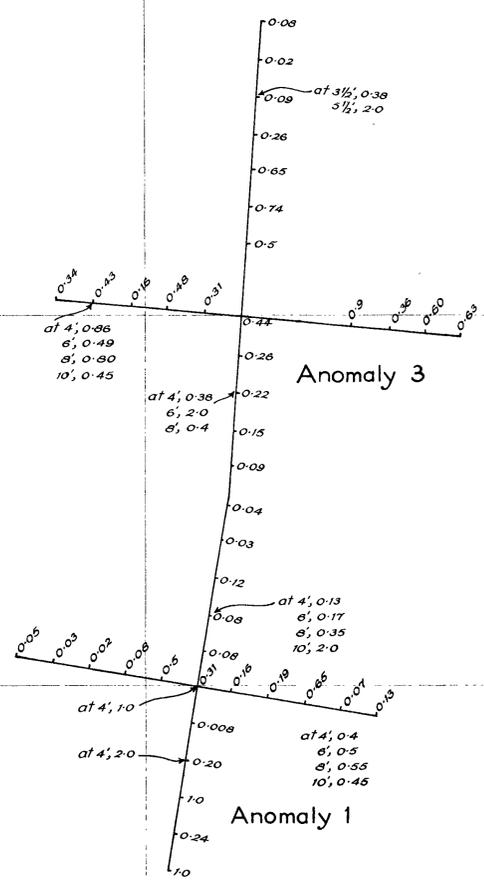
A. T. D. P.
 TRINDER / CAMP THIRTY AREA
 GEOLOGY PLAN

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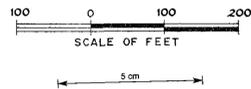
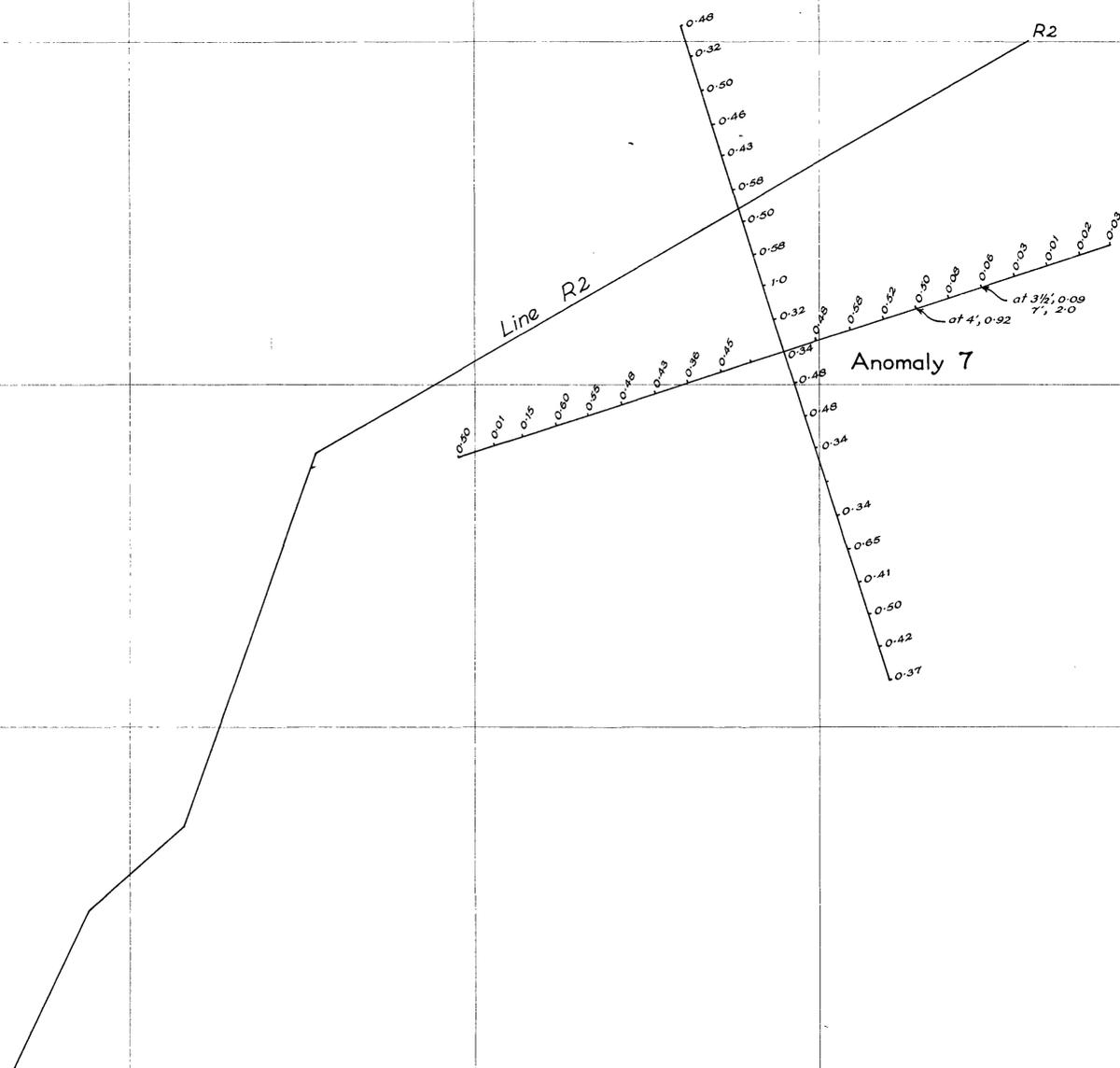
A. T. D. P.
TRINDER / CAMP THIRTY AREA
SAMPLE LOCATION & NICKEL VALUES

69-560

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GEOLOGY - / /
ENGINEERING - / /
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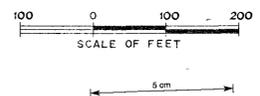
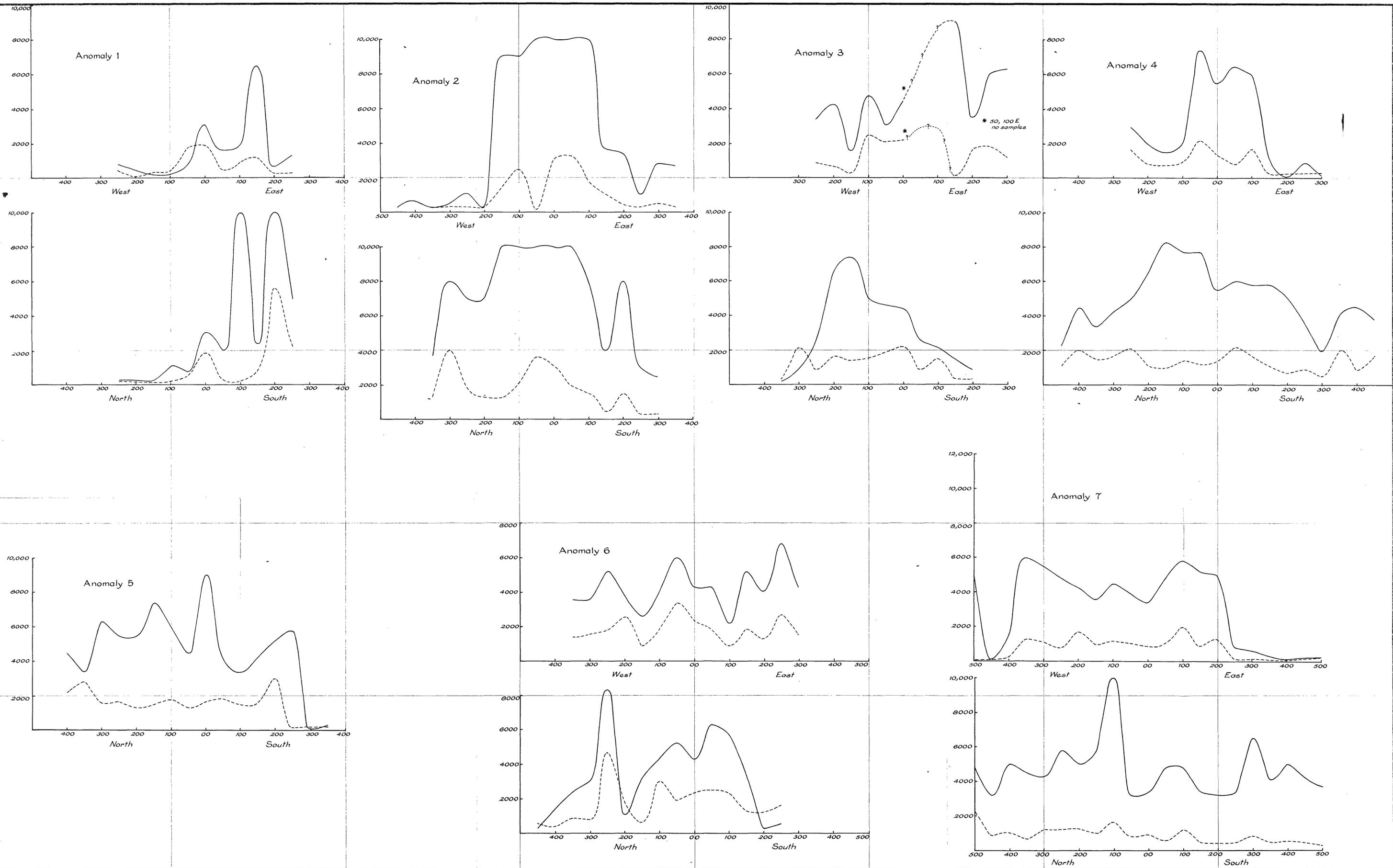


A. T. D. P.
 TRINDER / CAMP THIRTY AREA
 SAMPLE LOCATION & NICKEL VALUES

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GEOLOGY	-	-	/	/
ENGINEERING	-	-	/	/
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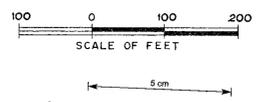
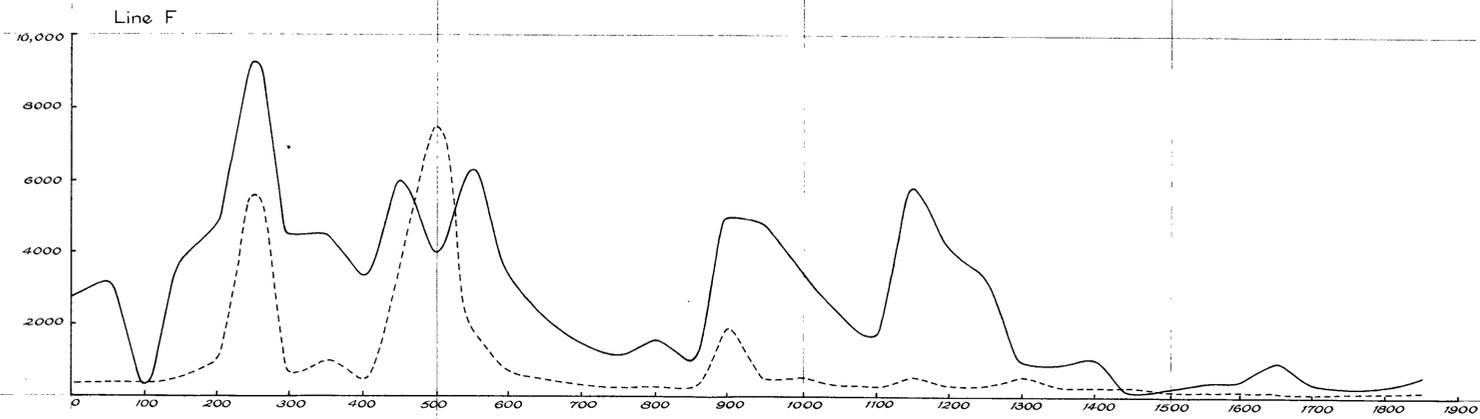
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LEGEND
 P.P.M. Nickel ———
 P.P.M. Cobalt - - - -

A. T. D. P.
 TRINDER / CAMP THIRTY AREA
 GEOCHEMICAL TRAVERSE PROFILES

SURVEY - - - -
 GEOLOGY - - - -
 ENGINEERING - - - -
 DRAWN - - - -
 TRACED - - - -
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LEGEND
P.P.M. Nickel ———
P.P.M. Cobalt - - - -

A. T. D. P.
TRINDER / CAMP THIRTY AREA
GEOCHEMICAL TRAVERSE PROFILES

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SURVEY	-	-	/	/
GEOLOGY	-	-	/	/
ENGINEERING	-	-	/	/
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3453
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