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GEPHOTO MINERALS REPORT 1974/3

FINAL REPORT ON THE
HEEMSKIRK AREA OF E.L.7/68
WEST TASMANIA

PREPARED BY

GEPHOTO-RESOURCES CONSULTANTS

FOR

TEXINS DEVELOPMENT PTY. LTD.

L. Discala,
7 January, 1974.

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REFERENCES

- APPENDICES:
- I Status Report, Series III, Area 3,
Heemskirk, E.L.7/68, Tasmania.
A.O.J. Cox
 - II Geochemical Laboratory Sheets
relating to this report
 - III List of Drawings
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INTRODUCTION

This report is a summary of the activity undertaken by Texins Development Pty. Ltd. on the Heemskirk section of the area held under Exploration Licence 7/68, West Tasmania. From the time the permit was granted in 1968, the boundaries of this section have been several times modified and the size of the area has been reduced from 117 square miles to 35 square miles.

The Heemskirk section of the E.L.7/68 was not originally included in the 1971 agreement between Texins Development Pty. Ltd. and A.P.M. Minerals Pty. Ltd. Consequently the investigation of the area was often hampered by insufficient budget and personnel allocations, since the main activity was concentrated on the Dundas section of the permit.

In June, 1973 an agreement was made between Texins Development Pty. Ltd. and A.P.M. Minerals Pty. Ltd. on a joint venture exploration of the South Heemskirk Tinfield, with an expenditure commitment up to \$A 20,000 to be spent in the first phase of the exploration, and with the possibility of further commitments if warranted by the results obtained.

The field study of the South Heemskirk Tinfield was undertaken from August to October, 1973 and a particular emphasis is given in this report to the interpretation of the data collected in this latest stage of the Heemskirk exploration.

Geophoto Resources Consultants acted as technical operators for Texins Development Pty. Ltd. in these studies.

EXPLORATION LICENCE 7/68, HEEMSKIRK - HISTORY (Refer Drg. No. H.104)

On 23rd August, 1968 an exploration licence (E.L.7/68) was granted by the Minister for Mines, Tasmania, to Texins Development Pty. Ltd. over two areas of 117 and 17 square miles respectively located in the vicinity of Mt. Heemskirk and Mt. Dundas.

The Heemskirk section was originally designed to encompass part of the Heemskirk stock and of the contact belt, surrounding two smaller areas held by Tasmanian Mineral Development Pty. Ltd. and Electrolytic Zinc Company of A'asia Limited under S.P.L.87 (8 square miles) and S.P.L.22 (15 square miles).

In October, 1970 the area under S.P.L. 87 was relinquished and Texins Development Pty. Ltd. lodged an application with the Department of Mines for a Special Prospector's Licence. The authority was granted on 10th May, 1971 under S.P.L. 95. At the same time 29 square miles of the central part of the Heemskirk permit were relinquished.

Following a correction to the charts of the Department of Mines, carried out early in 1971, some boundary disputes arose between Texins Development and the holders of E.L. 44/70 and S.P.L. 22 about the ownership of the Sylvester and Trial Harbour prospects. The Sylvester prospect was eventually left under the E.L. 7/68 but the northern boundary of the Little Henty area was modified and the Trial Harbour nickel prospect eliminated from the E.L. 7/68 area.

In May, 1972 Texins Development and Minops Pty. Ltd. agreed on the exchange of two areas of 2 square miles each. A 2 square miles area in the vicinity of the Sylvester prospect was assigned to Texins Development, while an area the same size in North Heemskirk was released to Minops Pty. Ltd.

In May, 1973 permission was granted to Texins Development to incorporate the S.P.L. 95 area into the E.L.7/68 area. At the same time, 9 square miles of the area (North Heemskirk) were relinquished.

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At the time this report is being written, E.L. 7/68 Heemskirk covers an area of 35 square miles, the boundaries of which are shown on Drawing No. H.104.

The following are mineral leases held by individuals or companies other than Texins Development Pty. Ltd. at December, 1973, within the E.L. 7/68, Heemskirk, area:

Mineral lease	Area	Holder	Location
90M/47	5 acres	V.G. Midson	South Heemskirk Tinfield
20M/41	40 acres	E.W. Coleman	" " "
146M/69	10 acres	B.R. Cooney and R.P. O'Connor	" " "
103M/71	20 acres	K.P. Cornish	" " "
123M/71	159 acres	E.Z. Co. of A'asia Ltd.	Comstock

For location, see Drawings H.105 and H.106.

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LOCATION AND ACCESS (Refer Drgs. Nos. H.105 and H.106)

The E.L. 7/68, Heemskirk area is located west of Zeehan, on the southern slopes of the Heemskirk Range. For descriptive purposes, the area presently held by Texins Development Pty. Ltd. has been divided into four sections:

1. Sylvester, Doric and T.L.E. prospects
2. Little Henty
3. Tenth Legion
4. South Heemskirk Tinfield (former S.P.L. 95 area)

Main access to areas 1., 3. and 4. is provided by the Zeehan-Granville Harbour gravel road and by numerous branch roads, usually negotiable by 4-wheel drive vehicles, which lead to the old prospects.

The Doric track departs the main road 2 miles from Zeehan and, though steeply graded, is in fair condition all year. Usually in good condition also is the T.L.E. track which starts about 300 ft past the Comstock mine.

Access to the Sweeney prospect is provided by a track connecting with the main road at about 8 miles from Zeehan. After the initial 1,500 ft the track becomes steeply graded and is not negotiable by vehicles. The Coleman track, at 11 miles from Zeehan, approaches within $\frac{1}{2}$ mile the area of the Central Workings of the Federation mine, climbing over the steep southern slope of the range. It is in fair condition except for a part of about 1,000 ft past the Wakefield hut. When it reaches the Cumberland Valley, it links with several old pack-horse tracks going to the main workings areas. (Refer Drg. No. H.111).

The Old Mill track extends as far as the mill site at the Federation mine. From there, a 1,500 ft long, steeply graded, old haulage line is the only connection with the Western Workings of the mine.

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The access to the Little Henty area is more difficult. McLean Creek can be reached by driving past the T.L.E. mine as far as the Swansea mine and by walking about 1 mile in a southwesterly direction across the Mt. Zeehan plateau and down the steep ridge which borders the McLean Valley.

The Fen Creek area was reached by Geophoto personnel, after several unsuccessful attempts, by walking 4 miles (under fly-camp conditions), in a northwesterly direction from the old Powell siding located 14 miles from Zeehan on the old Strahan tramway road.

The siding is now overgrown and not easily recognisable from the road. The old tramway lines, which are reported on the Mineral Chart Zeehan 1S with a north and northeasterly direction from Powell, are covered by very thick scrub. A walking track was cut by Geophoto personnel as far as Shell Creek. From this point it is necessary to climb up the 300 ft high ridge shown on topographic map Zeehan D and walk across the more than 1 mile long, button grass covered plateau to arrive eventually in sight of the Fen Creek Valley.

A shorter way would be that of crossing the Little Henty river, somewhere southeast of Trial Harbour, and walking 2 to 3 miles through the thick scrub in a general easterly direction or, alternatively, to go by boat up the Little Henry River and to negotiate the ridge at a southerly direction.

At the time of the field operations in this area (winter, 1971) it was not possible to check these alternative solutions because of the prohibitive conditions of the Little Henty River.

PHYSIOGRAPHY - REGIONAL

The area is situated within two main physiographic units (Waterhouse, 1916), the Heemskirk Range and the coastal peneplain.

The Heemskirk Range occupies the central and northern portion of the area and is currently interpreted (Blissett, 1962) as the remnant of a broad plateau surface subjected to post Permian faulting and denudation. The highest point is Mt. Agnew at 2,769' A.S.L. The Cumberland Valley, where most of the Federation mine workings are, and which is at an average height of 1,350 ft, was interpreted by Waterhouse as a hanging valley of glacial origin. No evidence of glacialism has been observed by Geophoto in field investigations. Due to the lithologic homogeneity, (the range is composed of mainly granite), the drainage pattern is predominantly dendritic although a rectangular pattern locally develops in areas of intense post Permian faulting.

The coastal peneplain occupies part of the northeastern and all the southern section of the area. Steep ridges and narrow valleys, controlled by the fold structures of the Silurian-Devonian formations, are an outstanding feature of the Little Henty area. A strong control of the topography is provided by the Gordon Limestone formation which often weathers into broad swampy, button-grass covered valleys, such as McLean and Fen Creek Valleys.

CLIMATE AND VEGETATION

The West Coast of Tasmania has a wet and rather cool climate. On the Heemskirk Range rainfall is heavy almost all the year, fog and hail are not uncommon in the winter months and wind is very strong for long periods. The yearly average rainfall in Zeehan is 97.06 inches (data of the Commonwealth Bureau of Meteorology)

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July and August being the wettest months and January and February the driest. The granite area is mainly covered by button grass, except for the southern and western slopes of the range which are heavily timbered. Vegetation is also very thick and with abundant horizontal undergrowth in the Little Henty area, a tangled and almost impenetrable country where travelling is very difficult even in the dry season.

GEOLOGY - REGIONAL (Refer Drg. No. H.107)

The geology of the area was described early in this century by Twelvetrees (1901), Waller (1904), Ward (1912) and Waterhouse (1916). In recent years more information has been provided by Edwards (1953), Blissett (1962), Campana and King (1963), Solomon (1965), Both and Williams (1968), Klosminsky (1969). Contributions by Texins Development Pty. Ltd. both to the regional and local geology of selected areas are available in Geophoto Minerals Reports 1969/5, 1969/26, 1969/32 and 1972/3.

The following is a summary of the stratigraphy and structural setting of the area.

1. Stratigraphy

The oldest rocks represented in this area are the quartzite and slate of the Oonah Formation of probable Proterozoic age, and the argillites of the Crimson Creek Formation of Cambrian age. They outcrop in the eastern and central sections of the area and were intruded in Devonian time by the Heemskirk Granite stock locally undergoing a pronounced contact metamorphism. The granite outcrop extends over an area of about 50 square miles and can be interpreted as an unroofed and deeply dissected cupola of which the North and South Tinfields represent the remnants of the hood, and the barren central part the remnant of the core.

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Recent petrographic studies (Brooks and Compton, 1965, Green, 1966), have pointed out that the "granite" should actually be classified as "adamellite", the ratio of the alkali feldspar to plagioclase being 1/3 to 2/3.

Two varieties of "granite" can be distinguished, the "pink" and the "white", the color depending on the orthoclase content. Heir and Brooks (1966) have postulated two phases of intrusive activity. In the first phase the white granite was formed; in the second the parent magma was intruded and formed the pink variety. Basic and ultrabasic sills and dikes were injected during the Cambrian into the Oonah Formation and overlying Crimson Creek Formation. A partly serpentinised gabbro outcrop at McIvor Hill, and farther southwest a body of serpentinised dunite, outcrops near Trail Harbour. The nickel mineralisation of Trial Harbour as well as the magnetite deposits of the Tenth Legion area are related to these basic intrusions.

2. Structure

Blissett (1962) pointed out that the major structures of the Heemskirk-Zeehan area were produced by the Tabberabberan movements and by the post Permian block-faulting. The Tabberabberan orogenesis took place in Devonian time; the emplacement of the granite is considered as "post-orogenic" and the fault pattern of the orogenesis controlled the emplacement of the granite-related mineralisation of the area. Most of the major faults of the area (for instance, the Tenth Legion Fault) were subsequent to the granite intrusion (post Permian), even though they might have been partly controlled by zones of weakness originated by the orogenesis (Blissett).

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The major Tabberabberan-related structures of the area are:-

a) Heemskirk Anticlinorium (Carey, 1953): Situated east of the granite stock, the southwest flank of this northwest trending structure was intruded by the granite in Devonian time.

b) Little Henty Syncline: Ordovician, Silurian and Devonian formations have been folded into this northwest trending structure situated southeast of the Heemskirk massif in the Little Henty area.

MINERALIZATION

The area is situated within two of the four mineralized zones into which the Heemskirk-Zeehan field has been divided by Williams (1968) with respect to the areal distribution of the principal ore and gangue materials:

The cassiterite zone, which includes the tin lodes within and adjacent to the margins of the Heemskirk Granite (South Heemskirk Tinfield), and

The pyrite zone, which includes the lead-zinc-silver lodes of the Doric, Sylvester and T.L.E. prospects.

1. The Cassiterite Zone

The South Heemskirk Tinfield is a belt 4 miles long and $1\frac{1}{2}$ miles wide, the northern boundary of which can probably be traced at about 1,000 ft north of the Black Face Workings of the Federation mine. Only the mineralized zone within the granite is covered by E.L.7/68.

Several types of cassiterite-bearing fissure veins were earlier described in detail by Waller and Waterhouse. In the Texins area the following types have been observed.

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a) Quartz-tourmaline veins: Usually formed by a central seam of black tourmaline enclosed into a fine aggregate of quartz and tourmaline. Geophoto sampling has confirmed that the tin mineralization is preferentially associated with green tourmaline which can occur both in the central seam and in the groundmass. No preference of the mineralization for either kind of granite (pink or white) has been observed.

b) Pyrite veins: Cassiterite, very fine grained, seldom megascopically recognizable, can occur associated with pyrite crystals, scattered in a fine micaceous matrix. (Pharlap Lode of the Federation mine).

c) Greisen veins: Greisen veins, following the definition given by Waller, were observed by Waterhouse in the area of the Central Workings of the same mine. A pipe of cassiterite-bearing greisen was worked in the early times of the Heemskirk field in the Western Workings of the Federation mine.

d) Pyrite-chalcopyrite-sphalerite-galena-cassiterite veins: These veins occur in the Texins area only in the Sweeney mine.

2. Pyrite Zone

Mostly northeast trending galena-sphalerite veins occur in several prospects of the eastern part of the area. The gangue consists chiefly of pyrite.

Minor amounts of bismuth, molybdenum and wolframium have been reported to occur, associated with cassiterite, in the Western Workings of the Federation mine.

Jamesonite is occasionally present in the complex mineral assemblage of the Sweeney Lode.

MINING HISTORY AND PRODUCTION

After some prospecting parties visiting the Heemskirk massif had reported the occurrence of both alluvial and lode tin, the West Cumberland Mining Company was founded in 1879 and started working on the western slopes of the Cumberland Hill. The following year two more companies were founded, the Cumberland and the East Cumberland, and the so-called "Heemskirk boom" began. Exaggerated reports on the richness of the oreshoots being worked, and the encouraging news from the Mt. Bischoff tin mine of Waratah, which was developing into a successful operation, originated a stampede to peg leases and erect plant, before any serious attempt to prove the value of the findings had been made. At this time the Cumberland dam was constructed to supply power to the many "mines" of the area.

The boom was already over in 1884 when the major companies collapsed, and only minor activity has been carried out in the field since then.

Not very much is known about the production of the field. A summary of the information available in the old reports and in the Blissett's 1962 review of the area is given below.

a) Federation mine

Waller (1902), refers to 720 tons of ore won from the Black Face Lode in early times. The grade was apparently of 1.15% Sn.

In 1920, Loftus Hill, government geologist, was appointed to investigate the economic value of the tin lodes. In his assessment he relied upon the results of the sampling undertaken by A.S. Morton on behalf of the State Mining Engineer in 1914. His conclusions were that the amount of ore available in the five major lodes of the Federation mine (called Black Face, Whip Shaft, Cumberland, Big Trench and Pipe), was:

Proved ore 60,000 tons at about 1% Sn
 Probable ore 400,000 tons at about 1% Sn

Unfortunately his report does not show the computations which support these conclusions. No maps are available and the results of Morton's underground sampling never materialized in a report nor are available in the Mines Department files any longer. Hill's assessment aroused a new interest in the field and in 1926 the Federation Tin Mines Company was formed with the Black Face Lode as the primary target from which ore supplies were to be won. Once again, this company became involved in considerable initial expenditures on a hydroelectric power scheme, aerial ropeway system, a modern crushing and concentrating plant and transport facilities so that, in 1927, as observed by the State Mining Engineer, Federation Tin Mines Company was in the awkward situation of possessing a modern plant but no capital left to start productive operations. Some funds were eventually raised and work started the following year. Only a few records are available on the production but, as Keid (1943) states, it is certain that a detailed sampling campaign undertaken by the company showed that from none of the existing workings was profitable grade of ore to be expected, and that at no time during its 10 years lifetime did the mine return a profit.

Some idea of the grade of the "ore" being mined can be gathered from the following production records.

Year	Ore mined	Concentrates recovered	Tin in ore
1929	1,953 tons	7.7 tons	0.3%
1935	3,392 tons	5.0 tons	0.08%
1936	3,461 tons	10.0 tons	0.17%
1937	4,798 tons	25.0 tons	0.3%
1938	935 tons	4.87 tons	0.3%

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The total production of the Federation Tin Mines Company, before it went into liquidation in 1938, was 107 tons of concentrates with a metallic tin content of 66.03 tons.

From 1939 to 1942, H.B. Geason extracted, from the Western Workings of the Federation mine, ore which yielded 7.5 tons of concentrates with a metallic tin content of 3.58 tons.

b) Montague mine

Only record (Waterhouse, 1916), refers to a total production of 6 tons of cassiterite.

c) Montague extended mine

Blissett (1962) states that 1 ton of concentrates was won with 68% Sn.

d) Prince George, Cornwall

No reliable information. Production must have been very small.

e) Sweeney mine

13 tons of cassiterite were produced from 1903 to 1904 (Waterhouse, 1916). But it is thought that much of it was alluvial cassiterite from the Pikes Creek.

At the present time V.G. Midson holds a 5 acre lease in the Western Workings of the Federation mine and B.R. Cooney - R.P. O'Connor, and K.P. Cornish, hold leases for alluvial cassiterite in the West Heemskirk area. However, very little work is being carried out and no information about production was available to Geophoto at the time of field investigations. Altogether the

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South Heemskirk Tinfield (comprising also mines outside the E.L. 7/68 area) has produced, as reported by Blissett, 766.84 tons of concentrates with a tin content of 477.74 tons.

f) Doric prospect

Worked from 1892 to 1893 by Doric Silver Mining Co. N.L. Only record available is the 1928 production, 30 ozs of Ag - 0.44 tons of Pb extracted.

g) T.L.E. mine

Worked at intervals from 1888 to 1959. Production recorded up to 1911: 300 tons of galena extracted, containing about 200 tons of Pb and 30,000 ozs of Ag. In 1954, R.B. Hill produced 2.8 tons of Pb, 0.74 tons of Zn, 31 ozs of Ag.

h) Sylvester mine

Worked at intervals by small companies and syndicates from 1893 to 1950.

Total production (Blissett):

Ore	1,192 tons	Pb	274 tons	Ag	16,560 tons
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EXPLORATION BY TEXINS DEVELOPMENT PTY. LTD. PRIOR TO JUNE, 1973

The following is a summary of the activity undertaken on the area from 1968 to June, 1973 prior to the Texins-A.P.M. Joint Venture agreement.

1. Regional exploration (Ref. Geophoto Minerals Reports 1969/5, - 1969/32)

Photogeology: Aerial photographs (Runs, Pieman 7, 8, 9, 10, 10A, 11. Scale, 1:35,640; Year, 1956) were obtained from the Lands Department of Tasmania, Hobart, and a photogeological interpretation of the area, with particular emphasis given to the mineralisation control, was carried out in 1970. The final product was a photogeologic map of the Heemskirk area at a scale of 1:25,000.

Field geology: In 1969 J. Klosminsky, graduate student from Czechoslovakia, preparing a Ph. D. thesis at the University of Tasmania, undertook a regional geological reconnaissance of the Heemskirk Granite. His work was sponsored by Geophoto Resources Consultants, and 50 rock samples collected in the field were analysed for Cu, Ni, Co, Pb, Zn and Ag at the Geophoto Geochemical Laboratory (Reg.Drg.H.108). It is deplorable that Dr. Klosminsky failed to honour his verbal commitment of handing over a copy of his thesis to Texins Development Pty. Ltd.

Geochemistry: A stream sediment survey and limited rock and soil sampling were carried out from October to December, 1968.

182 stream sediment samples and 64 rock and soil samples were collected and analysed for Pb, Zn, Cu, Ag and Mo, partly in the Sampley Exploration Services Laboratory and partly in the Geophoto Laboratory. The analysis results of the stream sediment samples are tabulated in Geophoto Minerals Report 1969/5.

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Only weak to moderate Cu, Pb, Zn anomalies were recorded in the area.

2. Doric prospect

The location is shown on Drg. No. H.105.

Geophoto Resources Consultants, on behalf of Texins Development Pty. Ltd., undertook a limited amount of work on this area from June, 1970 to August, 1971, but the results of the investigations were never collated in a report.

Reconnaissance geology: A major northeasterly trending shear zone, controlling the Pb-Zn mineralization in the area, was defined. (Refer Drg. No. H.110).

Geochemistry: A 17,000 line feet grid was laid out in 1970 on a selected part of the area (refer H.110), and a detailed soil sampling survey was carried out over several lines. 140 samples were collected at 10 ft intervals from a depth of 1 to 2 ft. All the samples were analysed for Pb, Zn, Cu and Ag, some 57 also for Sn, W, and Sb. The base line was later, (1971), extended 600 ft southwards and 40 additional samples were collected at 200 ft intervals over the four new, east-west, lines, and analysed for Pb, Zn and Ag. The results are tabulated in the Appendix.

A few anomalously high values were obtained in proximity to gossan outcrops and a small anomaly was outlined between lines 2N and 4N but, basically, no continuity of high metal content values was recorded within the shear zone.

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Rock samples, both from gossan outcrops and dumps, were also collected and analysed for Pb, Zn and Ag. (Ref. Lab. Sheets 512/3 and 727/1). The location of most of them is shown on Drg. No. H.108.

3. Sylvester prospect

The location is shown on Drg. No. H.105.

Reconnaissance geology: The field investigations started early in 1969 with reconnaissance mapping. Follow-up work, including gridding and geophysical and geochemical surveys, was recommended (Ref. Geophoto Minerals Report 1969/26).

Geophysics: A 40,000 line feet grid was laid out and an I.P. survey was carried out by Austral Exploration Services. Several anomalies were recorded and one, on line 00, from 7E to 9E, was considered of primary interest as a possible drilling target (Ref. Geophoto Minerals Report 1969/52).

Geochemistry: Rock and soil sampling were carried out over lines 16N, 24N, 32N of the grid in May, 1970. A total of 263 rock and soil samples were collected at 5 ft intervals and analysed for Cu, Pb, Zn, Ag and Sn. The results are tabulated in the Appendix. (See also Drg. No. H.109).

Drilling: In September, 1970 the I.P. anomaly on line 00 was tested by diamond drilling. A hole, Sylvester No. 1, collared at 00 + 9E + 150 ft South was drilled with azimuth 301^o to a depth of 770 ft. A mineralized zone, 6 ft wide, intersected at 613 ft down the hole, averaged 0.41% Pb, 4.03% Zn and 0.22 ozs Ag. (Ref. Geophoto Minerals Report 1970/78 and Drg. No. H.109). The results were not considered encouraging and no further work was carried out on the prospect.

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4. T.L.E. prospect

The location is shown on Drg. No. H.105.

Only a part of the old workings area is within the E.L. 7/68 area and very little work was undertaken by Texins Development Pty. Ltd. Some grab samples were collected from the dump of the main adit in 1971 and the assay results are in the Appendix on Lab. Sheet 727/1, samples TLE A1, B1, C1.

5. Tenth Legion area

The location is given on Drg. No. H.105.

An exploration programme was undertaken during the period January to April, 1972 with the purpose of investigating the possible extension of the Fe and Pb-Zn mineralization known to occur along the Tenth Legion Fault outside the E.L. 7/68 area.

Field operations (ref. Geophoto Minerals Report 1972/3) consisted of

Geologic reconnaissance

Soil and rock geochemistry: A 19,600 line feet grid was laid out in the area and 252 soil samples were taken at intervals of 25 meters and analysed for Pb, Zn, Ag, Mo, Sn. Lack of outcrops limited the rock geochemistry survey to the collection of 15 samples.

Geophysical surveys: A magnetic and a VLF-EM survey were carried out over the reconnaissance grid. Readings were taken at 25 meters intervals.

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The conclusions were that the mineralization associated with the part of the Tenth Legion Fault within the E.L. 7/68 area was of no economic value and no further work was recommended.

6. Little Henty River area

The importance of this area relies on the known occurrence of the Ordovician Gordon Limestone formation under the Quaternary cover of the McLean and Fen Creek Valleys. It is inferred that the Limestone could be host of a replacement type mineralization as in the case of the Oceana, Austral and Mariposa deposits of the Zeehan area.

Access to the area is very difficult (see section on Location and Access), and only very limited soil sampling was carried out in the McLean and Fen Creek Valleys, in August, 1971.

Altogether 44 soil samples were collected from the two areas and analysed for Pb, Zn, Ag. The results are reported in the Appendix (Lab. Sheet 788/1, McLean Creek, and Lab. Sheet 736/2, Fen Creek). All the samples show very low metal content with the exception of one, sample B2, collected in the McLean Valley, which assayed 700 p.p.m. of Pb. (Sample locations are shown on Drg. No. H.108).

7. S.P.L. 95 area, South Heemskirk Tinfield. (Ref. Geophoto Minerals Report 1971/20)

A limited amount of work was undertaken in this area before the joint venture agreement.

Geology: No regional or detailed mapping was carried out. However, scattered geologic observations were made during the course of geochemical and geophysical traverses, and are reported in Geophoto Minerals Report 1971/20.

Geochemistry: 26 rock samples were collected from dumps and outcrops early in 1971. The results and the sample locations are in Geophoto Minerals Report 1971/20. In September-October, 1971 an additional 32 rock samples were collected in the area and analysed for Cu, Pb, Zn, Ag, Sn, Sb, Mo and Bi. 17 samples were sent to McPhar Geophysics Pty. Ltd. in Adelaide for thin section preparation and petrographic description. The assay results are shown in the Appendix (Lab. Sheets 814/1, 814/2). Sample locations are shown on Drg. H.108. Petrographic analyses are contained in McPhar Geophysics Pty. Ltd. Mineralogical Report N. 768.

Geophysics: A geophysical (VLF, magnetometer, radiometer) survey was carried out over five selected traverse lines early in 1971. The results were substantially negative and are discussed in Geophoto Minerals Report 1971/20.

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EXPLORATION BY TEXINS DEVELOPMENT PTY. LTD. AFTER JUNE, 1973

1. Purpose of the investigation

As mentioned in the Introduction, in June, 1973, Texins Development Pty. Ltd. and A.P.M. Minerals Pty. Ltd. agreed on the joint venture exploration of the South Heemskirk Tinfield (former S.P.L. 95 area), with the object of investigating whether any of the known Sn, and in a lesser degree Pb, Zn, Cu, Mo, Bi and W, occurrences, was likely to develop into an economically attractive proposition. It was intended to establish also whether new exploration opportunities existed. This area was selected because it was felt that the lode tin prospects had not been adequately studied in the early phase of the E.L. 7/68 area exploration, the main activity having been focused on the Dundas section of the permit.

2. Methods of investigation

The area was divided into three work units (ref. Drg. H.106).

- a) West Heemskirk, covering the Prince George, Cornwall and Montague old prospect areas
- b) Federation mine
- c) Sweeney mine

Field operations were carried out during the period August to October, 1973 and included:

Reconnaissance geology: Mapping, at scale 1:5,000, was undertaken only in the area of the Federation mine with the object of studying the structural factors controlling the emplacement of the cassiterite-bearing quartz-tourmaline veins within the granite.

In the West Heemskirk and Sweeney areas, only sketch maps, showing the location of the old workings, the sample locations and the main mineralized trends, were prepared.

Geochemistry: No soil or stream sediment samples were collected because of widespread contamination from the numerous old workings of the area.

Surface outcrops and mine dumps were sampled regularly. Underground sampling was hampered by the deteriorated condition of the old adits, and was undertaken systematically only wherever safe (Sweeney mine).

A total of 107 rock samples was collected and analysed for Sn. Some samples were also tested for Cu, Pb, Zn, Ag, Bi and Sb. The results are tabulated in the Appendix.

Gridding: A 15,600 line feet grid was laid out in the Sweeney area, with north-south orientation, with the twofold purpose of facilitating access to this heavily timbered country and of providing the base for an E.M. orientation survey. The work was carried out by two line-cutters hired at a rate of \$40 per 1,000 ft. A 4,000 line feet grid with north-east orientation was established also in the Federation mine area (Cumberland Valley), prior to undertaking the Pharlap lode E.M. survey. In this case the country was open, button-grass covered, and no line-cutters were hired to carry out the work.

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Geophysics: Very seldom are conductive sulphides associated with cassiterite in quartz-tourmaline veins. This factor limits the usage of geophysical techniques in the area. However, two electromagnetic (vertical loop) orientation surveys were carried out in the area of the Pharlap lode (pyrite-cassiterite) and Sweeney lode (sphalerite, pyrite, galena, cassiterite). In both cases the instrument used was an SS-15 E.M. outfit rented from McPhar Geophysics Pty. Ltd. at a rate of \$16 per day. The outfit basically consists of a transmitter unit (console, generator, coil), a portable receiver with headphones, and a mast assembly (poles, spread bar, orienting board). The outfit has provision for measurement on two frequencies of 1,000 and 5,000 Hz. The generator energised vertical loop is the source of the primary field. A search coil, located in the portable receiver, records the tilt of the resultant field's polarization ellipse at each station. Readings are taken when the signal in the headphones is minimum.

The interpretation of results is given in following sections.

No VLF-EM survey was carried out because of the unfavourable trends of the mineralization in the two areas.

3. Discussion of results (Ref. Drg. Nos. H.106 and H.111).

a) West Heemskirk area (Prince George, Cornwall, Montague mines)

A detailed description of the old workings and of the mineralization appears in Status Report, Series III, appended hereto. The results of the survey were very discouraging and no follow-up work was recommended.

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b) Federation mine area

The mining history of the area and the few available production records have been dealt with under section "Mining History and Production". The following is a description of local structural factors controlling the mineralization and of the main tin lodes occurring in the area. The interpretation is also given of the results obtained from the rock geochemistry and E.M. surveys.

Control of mineralization: Pink adamellite and a fine grained aplite granite are the rock types of the area. The tin mineralization took place in cassiterite-bearing quartz-tourmaline, pyrite and greisen veins which have been described already under section on "Mineralisation".

The emplacement of these veins has been controlled by the joint pattern developed in the "granite" mass. As shown on Drg. H.111, in the central and western part of the area the master set of joints strikes north-east (from 15° to 45°), while the secondary set strikes south-east (about 135°). South and east of the Cumberland Lake the more developed set strikes almost east-west.

The tin bearing veins have been mostly emplaced along the master set of joints, although in the area of the western workings of the mine there are instances of veins following the secondary set (Cross lode, Fowler and Dunn lodes). Some important shoots were located at joint intersections (Black Face lode, Pipe).

The numerous quartz-tourmaline nodules which are a common feature of the area are also reported to be occasionally tin bearing but Geophoto sampling does not show any anomalously high metal content.

The Lodes:

For descriptive purposes the old workings of the Federation mine, with reference to the areas held by the old West Cumberland, Cumberland, and East Cumberland Companies, have been divided into three groups, western workings, central workings and eastern workings. Geophoto Resources Consultants followed the same system, and, with regard to the names of the lodes, have used the terminology introduced by L. Hill (1920). It is also to be noticed that the reported levels of the adits were all computed from the Munroe's shaft, which is located in the central workings, at the summit of the Cumberland Hill (1,350 ft A.S.L.).

The Lodes (western workings) -

1. Whip Shaft Lode

Whip shaft lode was worked by two adits, an open cut and a complicated system of trenches. L. Hill (1920) states that the length of the lode is 180 ft in adit 3 and 350 ft in adit 4. The vertical range was 150 ft, the width 5 ft, and the average content of tin 0.75%.

- Adit 4 (570 ft level), total length 418 ft.

The strike of the lode is here 50° and fine grained cassiterite is associated with quartz-tourmaline veins. A rise connected, at 237 ft from the partal, with adit N 3 and up into the Whip shaft 150 ft higher. It is known that a small shoot averaging over 1% Sn was stoped over a length of 27 ft (Waterhouse, 1916).

- Adit 3 (500 ft level), total length 170 ft.

Waterhouse reports that 300 tons of ore had been won from the lode (grade : 1% Sn).

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- Whip shaft/open cut

Whip shaft/open cut is about 150 ft long, 80 ft wide and 80 ft deep. It started as shaft but was later transformed into an open cut and connected with adit 3. A sample of quartz-tourmaline vein collected by Geophoto from the dump assayed 0.02% Sn (sample Z-6). The tourmaline is of the black type.

2. Fowler and Dunn Lodes

These lodes were worked in early times by the West Cumberland Company and later by Fowler and Dunn Syndicate. The strike is apparently close to 117° , being the secondary set of joints, the factor controlling the mineralization. A shoot was worked by an open cut which, at the present time, is about 100 ft long and 30 ft wide. It is stated (Waterhouse) that 2,000 tons of ore were won with a return of 60 tons of tin oxide. An adit (N. 1, 400 ft level) was driven in a northeast direction on the face of the open cut and, at 66 ft from the entrance, a quartz-tourmaline vein, from 5 ft to 3 inches wide, averaging 0.5% Sn, was intersected. A rise is said to have been driven 30 ft in "ore" material. At 144 ft from the entrance, a winze was sunk to 50 ft and at the bottom some bismuthinite was encountered, but no cassiterite. Montgomery reports that 15 cwt. of concentrates assaying 39% Bi were won. The country rock is from coarse to fine grained pink granite, and narrow quartz-tourmaline veins, striking northeast, are observable on the face. Samples collected by Geophoto personnel from the face, and mainly containing black tourmaline, assayed up to 0.04% Sn (sample Z 4C). At about 100 ft north of adit 1, an open cut, a trench, a shaft and two adits were made to apparently work quartz-tourmaline veins parallel to those worked in the above mentioned adit. A sample collected by Geophoto from the dump and containing a little green tourmaline assayed 0.3% Sn (sample Z 3C).

3. Cross Lode

This lode outcrops on the surface at about 200 ft northwest of adit N. 2, and consists of mainly quartz with minor black tourmaline. It is from 5 ft to 8 ft wide, with strike 125° , and was emplaced along the direction of the secondary set of joints. Several trenches and shafts were dug in the area to work this lode, the tin content of which has been reported as usually low. The best values from Geophoto sampling were from sample Z 9A (0.13% Sn), Z 9D (0.11% Sn), Z 9F (0.14%). Black tourmaline and hematite are abundant. Green tourmaline seems seldom to occur. Hematite is reported to contain some tin (Waterhouse), but the sample collected by Geophoto yielded only 0.03% (Z 9B). The lode is said to have been intersected underground by the Yates adit, which is 60 ft east of adit 1 and was driven in a north-north-easterly direction. Apparently the Cross lode was met at 235 ft from the entrance, and was 5ft 3ins wide, with a strike of 131° and with a vertical dip. However, there are doubts as to whether the mineralization encountered in this adit was actually the Cross lode, or rather a parallel trend. Some bismuthinite is said to be here associated with cassiterite. A sample from a winze sunk to unknown depth assayed (Reid) 3.76% Bi and 0.46% Sn.

4. The Pipe

This funnel shaped ore body was discovered at about 200 ft east of the Yates adit, and is completely different from all the others known in the area. It was originally worked by a shaft, later transformed into an open cut, and two adits were later driven below it following northeast trending quartz-tourmaline veins. The Pipe was formed by two branches, the strike of the main branch being 122° to 174° . The cross-section was almost oval, varying from 25 ft by 15 ft near the surface to 5 ft by 1 ft at the deepest point.

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The Pipe was vertical for 30 ft, then pitched from 9° to 19° to northwest. The main body was followed down for 115 ft while the branch was followed horizontally for 30 ft.

The lode material is very soft (it was extracted by shovels) and consists of a micaceous aggregate with scattered crystals of cassiterite and pyrite. The grade is said to have been very high, ranging from 5% to 23% Sn (Williams). The country rock is formed by coarse-grained pink adamellite which becomes more and more decomposed approaching the Pipe area.

The Lodes (central workings) -

5. Black Face Lode

This Lode outcrops near the summit of the Cumberland Hill and was considered for a very long time to be one of the most promising of the area, but the mining operations, carried out by the Federation Tin Company from 1928 to 1938 and of which mention is made under section "Mining History and Production", have downgraded its importance. The ore shoot was formed at the junction of two northeasterly trends (about 20° and 45°) and was worked by three open cuts, five adits and several trenches and shafts from 1884 to 1938. Its shape is irregular and two main branches were recognised. On the surface the lode area is marked by a prominent outcrop of black tourmaline with minor quartz. The country rock is formed by white aplite which has locally undergone intense weathering. L. Hill reports (1920) that the "proved" length of this lode was 500 ft, the width 28 ft, the vertical dimension "at least 60 ft", the grade 1% Sn. However, in this case also, he does not provide the data on which he bases his computations, and the history of the mining after the report was written suggests that his estimate was very optimistic.

The lode was initially worked by the two open cuts located on the north slope of the Cumberland Hill from which Waterhouse reports 720 tons of ore were extracted in the early days of the field, with a recovery of 12 tons of tin oxide, assaying from 68.7% to 69.4% metallic tin. The grade must have been close to 1.25% Sn.

The lode material is formed by soft, tin bearing, green tourmaline veins and by quartz-tourmaline veins containing also the green variety.

On the south face of the open cut N. 2 (30 ft below the Black Face), quartz-tourmaline veins strike 25° and dip 82° southeast. A sample (Y-16) collected by Geophoto, in which both green and black tourmaline were observable, assayed 0.34% Sn. Another sample (Y-17A) with less green tourmaline assayed 0.25% Sn. A fragment of green tourmaline collected at the base of the face (not in place) assayed 1.4% Sn (Y-17). A grab sample of green tourmaline from the dump assayed 14.8% Sn (K4C). In all cases the occurrence of very fine grained cassiterite with the tourmaline could, megascopically, only be suspected. On the south face of another smaller open cut, 100 ft southwest of open cut N. 2, some northeast trending quartz-tourmaline veins are exposed. Two samples collected in the vicinity of the open cut (not in place) assayed 0.44% Sn (Y-15) and 0.16% Sn (Y-15A).

On the highest point of the Federation lease, about 150 ft southwest of the Black Face outcrop, is the Munroe's shaft. Inaccessible for many years, it is thought by Waterhouse to have been sunk to a depth of 51 ft, and by Waller to a depth of 25 ft. Very little is known about the grade of the lode at this point. Trenches were cut around the shaft in east-west and north-north-westerly direction and exposed some hematite-limonite-black tourmaline rick lode material. Some samples were collected by Geophoto. The best value obtained was that of sample Y-13A with 0.48% Sn.

Three main adits were driven in a south-east direction at different levels from this shaft. They are

- 220 ft level adit, total length 380 ft.

Keid (1943) reports that in the last 60 ft, the adit was in the lode formation. A crosscut was driven southeasterly, from a point close to the end of the adit, to follow the more easterly branch of the lode. A hole drilled towards the face of the cross cut with a declination of 60° yielded negative results. The sampling of the cross cut itself revealed that cassiterite was absent (Blissett, 1962).

- 115 ft level adit, total length 205 ft.

At 40 ft from the end, a rise was put up to an open cut close to the Munroe shaft. Keid reports that the sampling of a short section of the lode, (the length is not reported), yielded 0.05% Sn. At the face of a 120 ft long south-east cross cut, driven from a point close to the rise, six samples collected over a width from 4 ft to 6 ft, assayed from 0.21% Sn to 0.77% Sn (Blissett).

- 85 ft level adit

This adit was driven through lode material for about 40 ft. Waterhouse reports assays over a length of 27 ft averaging 0.5% Sn.

In order to investigate the possibility of a continuation of the mineralisation farther north, some rock sampling was carried down the slope of the Cumberland Hill, towards Packers Creek. At an excavation, 60 ft east of the 220 ft level adit, some quartz-tourmaline veins are exposed. They are from 2 to 5 inches wide and strike from 28° to 80°. No green tourmaline is visible

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in the samples collared which assayed 0.10% Sn (K-5), and 0.15% Sn (K-6). Closer to Packers Creek, a few trenches have been dug across north-east trending quartz-tourmaline veins. The best value obtained was that of K-7 (0.31% Sn).

6. Cumberland Lode

The Cumberland Lode was intersected in the Long Tunnel, the 997 ft long drive cut by the Cumberland Company for the apparent purpose of reaching the Black Face Lode at depth. The Cumberland Lode was intersected at 893 ft from the entrance and cross cuts were driven east and west on the course of the lode. L. Hill reports that the lode was 200 ft long, 5.6 ft wide and averaged 0.61% Sn. From the dump close to the entrance of the Tunnel, Geophoto collected some black tourmaline-rich samples which have assayed up to 0.13% Sn (Y8D) and 0.12% Sn (Y8G).

7. Air Shaft Lode

This lode was worked by a 60 ft deep shaft and was probably intersected also in the Long Tunnel. The strike was 14° , and L. Hill reports an average content of 0.4% Sn.

8. Pharlap Lode

This lode occurs 1,200 ft southwest of the entrance to the Long Tunnel, close to the south boundary of the old 5765/M lease.

The workings consist of a trench, a small open cut, a very short adit and a shaft sunk to a depth of 35 ft (Keid, 1943). On the face of the open cut a set of 25° trending quartz-tourmaline veins is exposed.

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The dump material suggests that a gossan outcrop was probably what first attracted the attention of the old prospectors. The production, unknown but probably very modest, came from the shaft.

The 'ore' consisted of a soft, micaceous aggregate with scattered crystals of pyrite and fine grained cassiterite and was treated by sluicing in the nearby creek. Crystals of pyrite are still scattered on the ground where the sluicing operations took place. A sample (Y-3), collected by Geophoto from the dump, of gossanous material with abundant, up to $\frac{1}{2}$ inch diameter cubic crystals of pyrite, yielded 1.80% Sn when analysed by the A/A routine method, and 3.9% Sn when treated by the more accurate assay method. The results were surprising because neither cassiterite nor green tourmaline had been megascopically observed. More samples of gossan (YA, YB, YC, YD, YE) were collected, but they assayed very low, the best value being 0.14% Sn (sample YA). Inferring that the cassiterite might be associated with the pyrite, some cubes of pyrite were collected, crushed and analysed (samples Y3 - PY). The result was 0.6% Sn by the A/A routine method, corresponding probably to a value of over 1% Sn with the A/A assay method.

Since pyrite is involved, it was decided to investigate the extension of the lode by an E.M. survey. The transmitting section was set close to the face of the open cut, and readings were taken at 20 meter intervals along the six northwest - southeast lines of the Pharlap grid. (See also section "Methods of investigation"). The readings have been plotted on Drgs. H.112 and H.113 as tilt angle profiles and with conventional symbols showing the location of crossovers and inflection points for the two frequencies. The E.M. response was very low and no trend was clearly outlined. It is possible that the pyrite is associated with the quartz-tourmaline veins only over a very short section of the lode, as often occurs elsewhere in the area, or possibly this method is not responsive enough to disseminated conductive sulphides.

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It is unfortunate that an early attempt to doze some trenches perpendicular to the lode had failed because the bulldozer had not been able to negotiate the narrow terminal part of the Coleman track. This failure deprived Geophoto of the possibility of properly sampling the lode, since no mineralization was visible in either open cut or short adit, and the shaft was inaccessible. However, the fact that the quartz-tourmaline veins on the face of the open cut are barren, and that no mineralization has been exposed in the long trench about 250 ft northeast, seem to exclude the possibility that the lode may continue over a payable distance along the strike.

The Lodes (eastern workings)

Minor tin bearing quartz-tourmaline veins, north-northeast striking, were worked in the early days of the field in an area situated at about 1,500 ft northeast of the Black Face. Very little stoping was carried out.

c) The Sweeney mine area

The prospect area is close to the Pikes Creek waterfall, on the southern slope of the Heemskirk Range (see Drg. No. H.106), about 1/4 mile south of the Cumberland Dam. The main lode formation was first exposed in a shallow shaft, 3-4 ft deep, at the top of a steeply graded hill, southeast of the waterfall, and it consists of black sphalerite with a little pyrite, galena, chalcopryrite and jamesonite in a country rock of pink, coarse granite. Two samples collected by Geophoto from the dump assayed: sample SZA = 0.47% Cu, 0.33% Pb, 34.3% Zn and sample SZB = 0.6% Cu, 3.9% Pb, 27% Zn, 3% Sb, 0.12% Sn. Down the hillside, the lode, which appears to strike north-northeast and dip northwest at about 70° - 80°, was uncovered in an open cut where very little mineralization is observable. A sample with some pyrite and

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arsenopyrite, assayed 0.58% Sn. Farther down, a trench has been dug, about 70ft long, with northeasterly direction, but no mineralization is visible. At about 70 ft below the top shaft, an adit was driven with southerly direction, with the purpose of intersecting the lode at depth.

The length of the adit, measured by paces, is about 180 ft. At the time of the visit of Geophoto personnel it was in fair condition, though partly flooded by water at the entrance. The lode formation was intersected at about 45 ft from the portal where minor block sphalerite blebs and pyrite crystals are scattered in a kaolinized granite matrix. At about 70 ft from the portal a cross cut has been driven in an easterly direction for about 16 ft to intersect a vein containing fine cassiterite and pyrite in a micaceous matrix. From this point to the face, the granite is very altered and the lode consists of blebs and stringlets of black sphalerite with pyrite and minor galena.

As already mentioned (section on "Mining History and Production"), very little is known about the production of this "mine". Waterhouse refers to samples from the shaft assaying 0.75% Sn. Reid (1927) reports values up to 2.83% Sn from the opencut, and up to 1% from the adit. Keid (1943) refers to samples taken along the walls of the "main adit" in 20 ft sections assaying from nil to 1.05% Sn.

At this point it must be mentioned that Waterhouse (1916) and Reid (1927) report the existence of a "main adit" situated above the creek and driven in a "northerly direction". The location of this adit is not clear, nor the final length to which it was driven. In reconnaissance work, Geophoto personnel have not been able to find any "northerly" driven adit.

The relative position of the main workings with reference to the base line of the Sweeney grid is shown on Drg. No. H.114. It is only a sketch map and distances and dimensions are to be considered very approximate.

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No systematic surface mapping of the area was carried out because of lack of outcrops, of thick vegetation and uniformity of the rock type. Also, the possibility of undertaking a soil geochemistry survey was discounted because of 1) very steep gradient, 2) contamination from old workings, and 3) colluvial cover north of the Pikes Creek.

The investigations were limited to the underground sampling of the adit and to a reconnaissance E.M. survey.

1. Underground sampling

The chip sampling of the drive was undertaken with the purpose of obtaining a preliminary idea about the Sn content of the lode.

Since cutting samples from the back of the adit was revealed to be difficult and unsafe without previously washing off the dirt from the exposure, (a time consuming operation considered unnecessary at this preliminary stage), it was decided to collect the samples from the east wall of the adit where the mineralisation was clearly exposed.

Chip samples were taken progressively at 1 ft intervals from the face towards the entrance of the adit. The samples were combined every 5 ft in order to obtain sample units of 5 ft exposure along the strike of the lode. In the cross cut the samples were instead taken every 6 inches and combined to give 2 ft sample units.

Altogether, 22 sample units were collected from the main drive and 8 from the cross cut. All the samples were analysed for Cu, Pb, Zn, Ag, Sn and Bi. The results are tabulated in the Appendix (Lab. sheet 1484/4) and the sample locations are shown on Drawing No. H.114.

038 The results look rather discouraging. The best Sn value obtained was from sample XC-2 (cross cut), with 0.48% Sn over a width of 2 ft. The best Zn value was from sample A-2, 4.5% Zn over a strike length of 5 ft. Cu values were generally very low. The richest part of the lode averaged: 0.5% Pb, 1.99% Zn, 0.21% Sn over a strike length of 60 ft.

Very little can be said about width and vertical dimension of the lode. From what can be seen in the adit the average width of the lode should be about 3-4 ft. As for the vertical dimensions, the only information can come from the difference in level between top shaft and adit (about 70 ft). Little stoping was carried out in the adit. There is no information about continuity of the mineralization in the vertical plan. It should also be proved that the lode exposed in the adit is the same uncovered in the shaft.

2. E.M. orientation survey

The survey was carried out to test the northeast and southwest extensions of the lode. The transmitting section was set in the open cut where some lode material was exposed, and the readings were taken every 50 ft along lines 00, 1N, 3S and 7S of the Sweeney grid (see also section "Exploration by Texins Development Pty. Ltd. prior to June, 1973 - Methods"). The results, plotted on Drgs. Nos. H.115, H.116, show a very low E.M. response. On lines 00 and 1N there is a weak indication of a northeast trend which might represent the response of the lode but it was not possible to check the continuity of this indication along more northerly lines because of the prohibitive topography in that portion of the area.

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CONCLUSIONS AND RECOMMENDATIONS

1. In the Heemskirk district, tin mineralization has mostly taken place within the granite stock of Devonian age. Further east, lead-zinc orebodies occur in pre-Cambrian to early-Cambrian sedimentary sequences.
2. Cassiterite occurs mainly in quartz-tourmaline veins, the emplacement of which has been controlled by the joints pattern of the igneous mass.

Although in the past many lodes have been mined, the mineralization is low grade and irregular, the richest oreshoots being small, erratically distributed, often barren or with poorer tin values within less than 50 ft from the surface, and likewise along the strike.

3. The total production of the South Heemskirk Tinfield was 766.84 tons of concentrates with a metallic tin content of 477.74 tons. The bulk of it came from two mines:-

The Federation mine: 322.13 tons of concentrates with a metallic tin content of 193.86 tons.

The Mayne mine (outside the E.L. 7/68 area and within the sedimentary zone at the contact with the granite): 200.35 tons of concentrates with a metallic tin content of 140.22 tons.

4. The Federation mine can be considered as exhaustively tested and worked out as far as surface lode deposits are concerned, the only exception being the Pharlap lode which, however, is not thought to be of any particular economic significance.

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5. The Sweeney lode is relatively untested. However, only deeper exploration by diamond drilling could provide a better assessment of the value of the mineralization, and the discouraging results of the preliminary underground sampling do not warrant further involvement in costly operations.

6. Some authors (Waterhouse, Hill), claim that within the Heemskirk Granite the mineralization should continue, and possibly improve, at depth. However, the statement that cassiterite has been deposited over a vertical range of "at least 1,500 feet" (Hill), if based only on the difference of level between distant mineralization occurrences, can not be accepted as valid because of

- a. The intensive post-Permian faulting of the area and the lack of knowledge about the relative vertical displacements of individual blocks.
- b. The erosion which took place in the original broad plateau of which the Heemskirk massif is the remnant.

The suggestion that the downward limit of mineralization is not likely to be reached by mining operations does not appear to be warranted. There is no geologic evidence that the mineralization should suddenly change at depth. Previous mining experience in the area indicates that in no instances were payable cassiterite-bearing veins found that extended to any appreciable depth.

The tin lodes of the area were found to be lacking in associated conductive sulphides and consequently difficult to detect by geophysical methods. Deeper exploration would rely heavily on intensive drilling programmes involving expenditures which do not appear to be warranted by the results obtained so far.

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7. Field work conducted by Geophoto, and supported by previously published information on the lead-zinc lodes of the eastern section of the area (Doric, Sylvester and T.L.E. prospects), indicates that at the present time the prospects are not of economic value.

The conclusion reached from the foregoing is that no further work is warranted on E.L.7/68, Heemskirk area.

Lanfranco Discala,
7 January, 1974.

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APPENDIX I

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STATUS REPORT

SERIES III

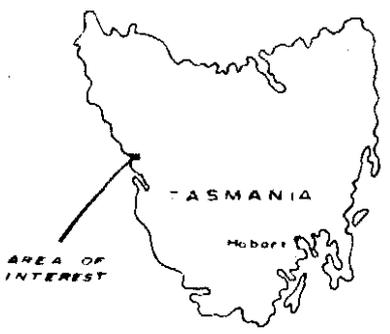
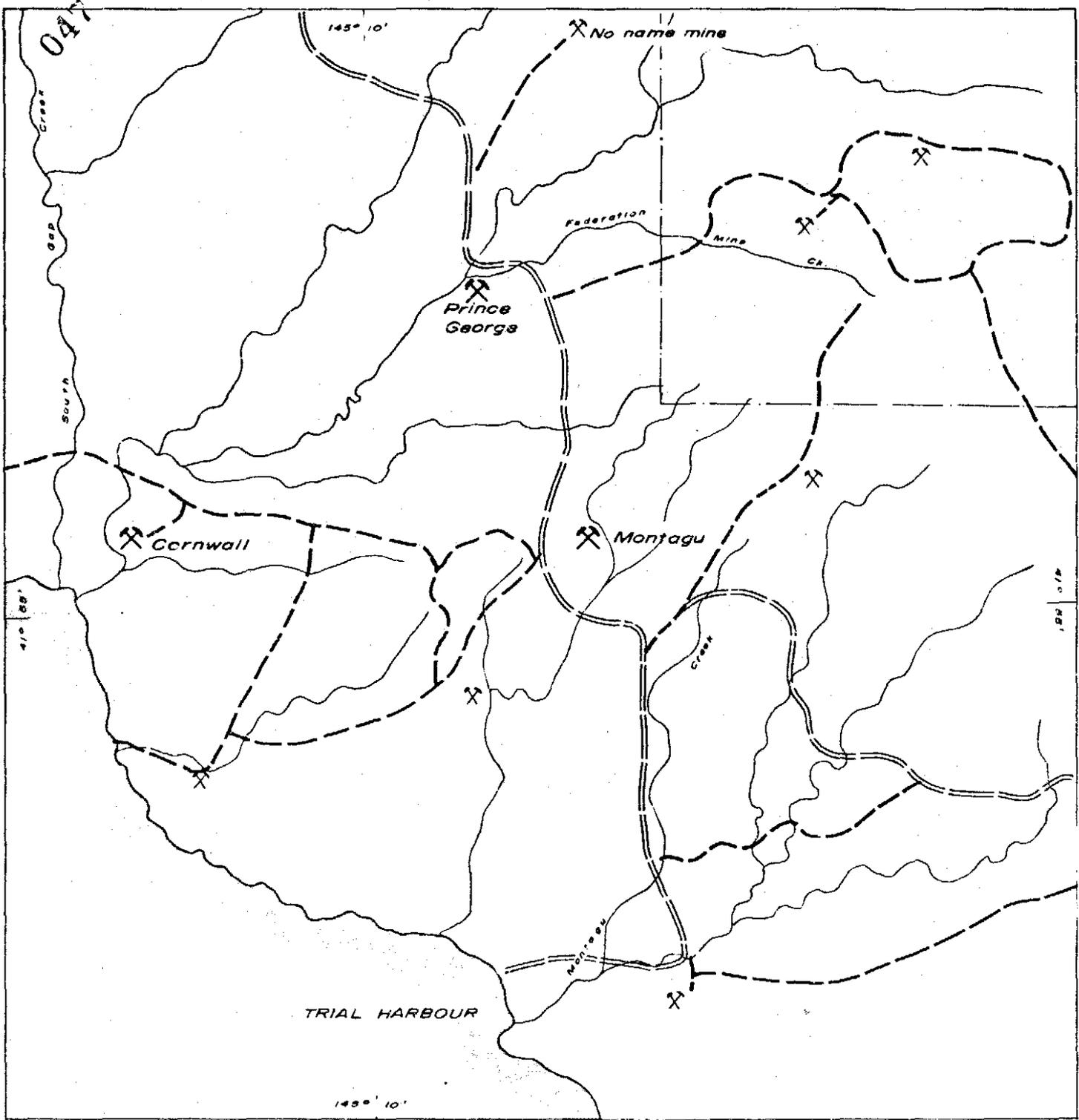
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E.L.7/68, WEST TASMANIA

A.O.J. COX

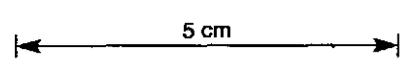
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Individual Workings	



LOCALITY MAP

SCALE 1 : 25000



048

HEEMSKIRK AREAINTRODUCTION

The area examined comprises 4sq. miles of country located entirely within the Heemskirk Granite, near the southern margin of this intrusion. It forms the western end of the former SPL 95 and lies a little to the north of Trial Harbour, about 12 miles from Zeehan.

Topographically it may be described as an uplifted, dissected coastal plain. Accessibility and movement is relatively easy, the area being served by the Zeehan-Granville Harbour and Zeehan-Trial Harbour gravel roads. It is open country with only 'button' grass cover on the ridges, but with some scrub in sheltered valleys.

PREVIOUS WORK

This has consisted of

1. A short VLF survey
2. A geochemical drainage survey, covering the whole of the Heemskirk Granite area.
3. A photogeological interpretation.

PRESENT WORK

It was proposed that the Heemskirk area be studied in three sections, comprising

- Area 1. The Federation Mine
- Area 2. The Sweeney's Workings
- Area 3. Sundry mines

This report covers Area 3. The proposal was to:-

- 049
- a. Make a geological assessment of the workings in the area, in an attempt to establish type, extent and controls of the mineralization.
 - b. To follow up this work with trenching and where appropriate with VLF traverses.

In practice a.) added little to what is already recorded in the early literature on the field, and b.) is judged unwarranted. Some time was spent in checking some of the photo-interpreted lineations and the distribution of the granite types.

HISTORY

Alluvial tin was first discovered here in 1876 by a government surveyor and there followed several prospecting expeditions into the Heemskirk area. A mining boom developed in the late 1870's, early 80's, which appears to have had no foundation. Exaggerated reports of the richness of the finds, and the then inaccessibility of the west coast of Tasmania, gave rise to 'gold rush fever'. Speculation was rife and huge sums of money were raised by companies and spent on road making and the purchase of mining equipment, without any serious attempt to prove up ore reserves. By 1884, ten batteries had been erected on this field. There are no records of production for many of these enterprises but it is doubtful whether more than two of these were justified.

The collapse of the boom was even faster than the spectacular rise and by the end of the decade only a few workers remained on the field. Since then some tin has been won, mostly from small scale alluvial prospects.

GENERAL GEOLOGY

Lower Paleozoic rocks, mainly slate, quartzite

050

and sandstone have been intruded by acid igneous rocks of the Heemskirk massif. The granite is considered to be of Devonian age. It may be divided into the more extensive, so-called normal 'Red Granite', and the 'White Granite', with which tin mineralization has been generally associated. The white granite is comprised primarily of white orthoclase and plagioclase, quartz, tourmaline and minor biotite. Generally it is less coarse granite than the red granite. Within the white granite are zones of finer grained rock, richer in tourmaline than the surrounding granite. Nodules of quartz-tourmaline are common in these zones which have been referred to as nodular granite or tourmaline granite belts.

MINERALIZATION

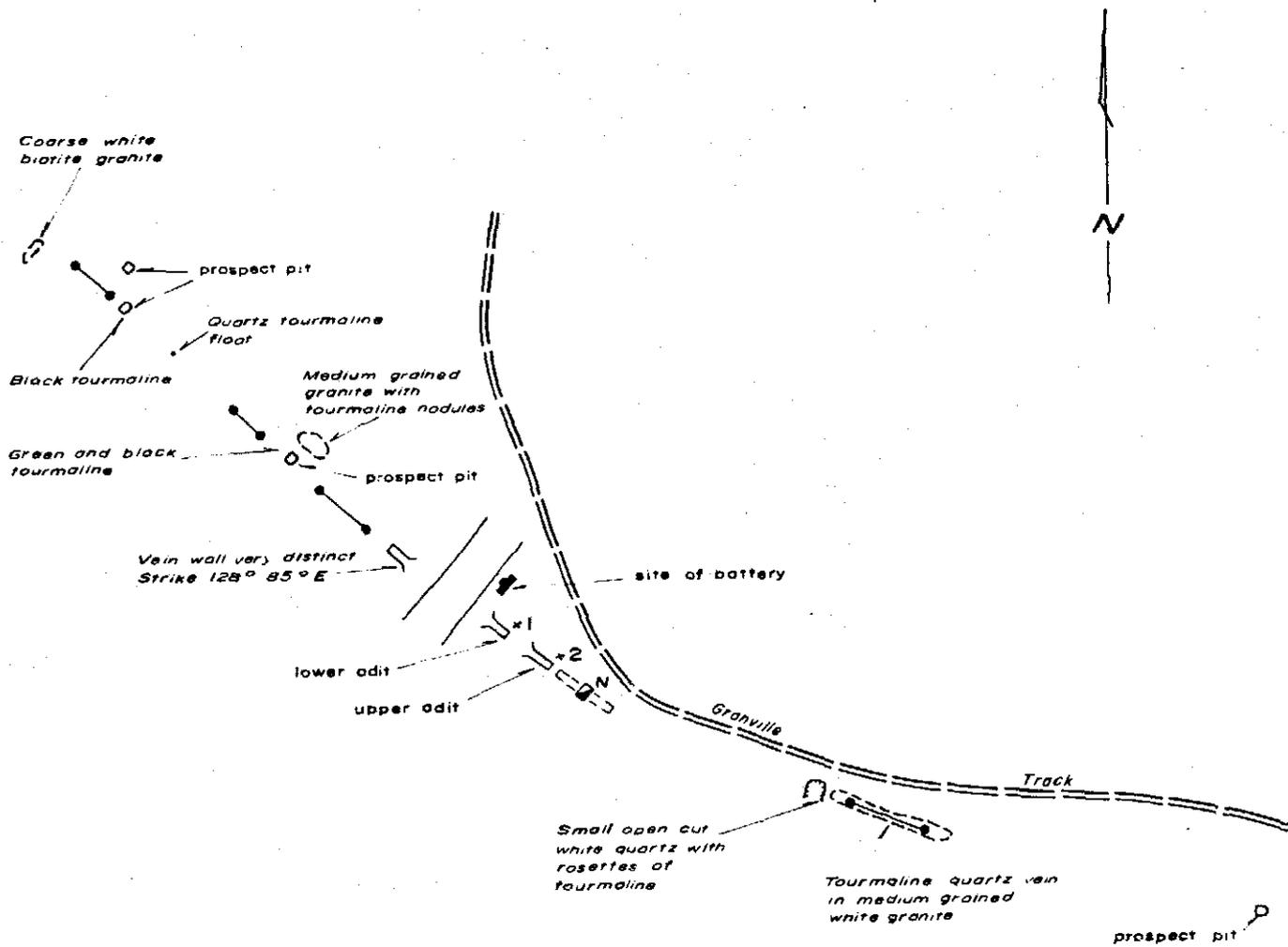
The white granite and to a lesser extent the red granite has been invaded by generally narrow, irregular veins of quartz and tourmaline in varying proportions. Tin in the form of cassiterite is sometimes associated with these veins. The best exposures appear to have been destroyed or covered during mining activity, but typically, the veins are characterised by a central zone of tourmaline, sometimes carrying massive cassiterite, bordered by margins of quartz-tourmaline which may also contain some disseminated cassiterite.

Other workers in the Heemskirk area have described greisen veins, pyritic veins, and pinitoid veins. The first two classes were not noted in the area studied. The pinitoid veins appear to be a variety of quartz-tourmaline vein in which the felspar of the granite wall-rock has been extensively altered to pinite, a complex substance of mica composition.

THE MINES

PRINCE GEORGE MINE

The mine is situated on both banks of Packers

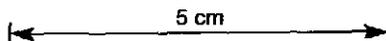


DESCRIPTIONS OF SAMPLES COLLECTED

1	Mainly quartz tourmaline in stringers and pods
2	Irregular veins of quartz tourmaline in fine white granite

PRINCE GEORGE

SCALE 1 : 2000



052

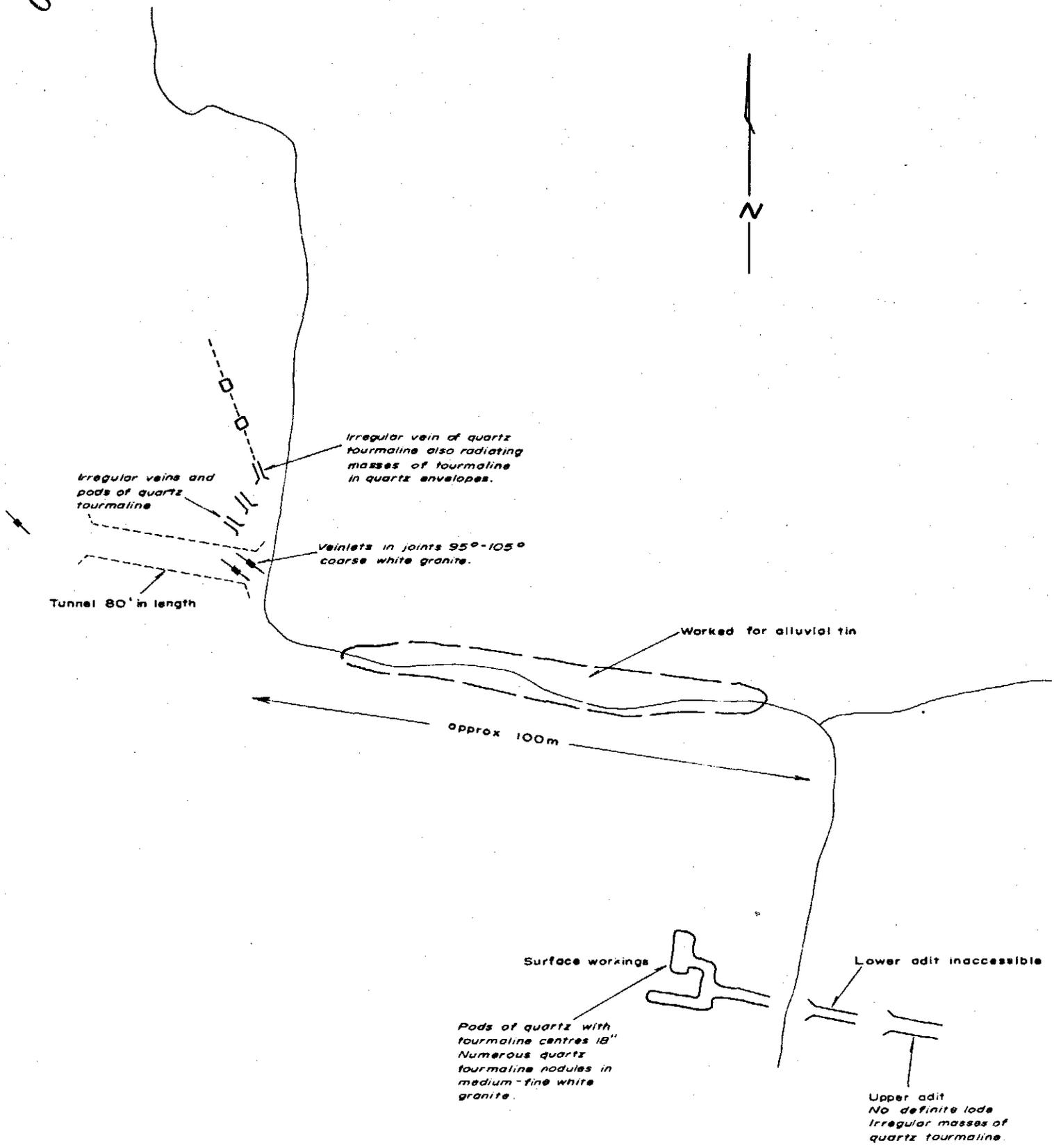
Creek, a little to the west of the Zeehan - Granville Harbour road. The workings consist of adits driven north and south from the creek, together with a 50ft. shaft, all on the same quartz-tourmaline vein. There has been some surface working of the vein and some stopping off the shaft, but there are no production records. Waterhouse (1916), reported that the structure was a typical quartz-tourmaline-cassiterite vein, with a rich centre, with up to 2 inches of massive cassiterite in places. The vein strikes 90° and is vertical. The width of the structure would not exceed 3ft. Waterhouse reported a cross vein in this southern adit which had not been followed. This structure was not observed at the surface. Several prospecting pits have been dug on the lode north west and south east from the main workings. At surface the veins consist mainly of white quartz with tourmaline knots scattered through it. In places the vein splits into several narrow stringers separated by granite. Tourmaline is very common on the dumps and it is probable that cassiterite occurred within the tourmaline in isolated swells or pods along the vein. Cassiterite was not identified in the dumps or in outcrop. Two channel samples were taken.

No further work is recommended.

CORNWALL MINE

This very small mine is situated approximately one mile south west of the Prince George, at the mouth of Packers Creek. There are workings on both sides of the creek.

On the west bank some surface workings are in white coarse granite. From the layout of the workings it



CORNWALL MINE

NOT TO SCALE

would appear that there was no definite lode, rather a series of pods of quartz tourmaline possibly associated with fracturing. In one cut, pods of quartz, several feet long and eighteen inches thick are seen to have cores of tourmaline. There are numerous fine grained quartz-tourmaline nodules in the surrounding granite.

On the eastern bank, two adits have been developed, one above the other. The entrance of the lower one has collapsed. The upper one had been developed in granite and quartz-tourmaline. Again there is no definite lode, the quartz-tourmaline occurring in irregular masses, including a fairly flat lying lens, approximately, 4 feet thick. The dump carries considerable tourmaline, but no visible cassiterite. Some quartz-tourmaline was iron-stained and proved to contain very sparse pyrite.

Further workings lie up-creek about 200 yds. to the north-west. There, a tunnel was initially developed as a means of trucking ore to the battery, situated at the base of the cliffs. The tunnel was later used to direct the waters of Packers Creek to enable the creek bottom to be worked for alluvial tin. It lies on a bearing of 62° and intersects some iron stained fractures striking 95° which approximate to the strike of the joints and some textural variations in the white coarse granite. (Strike 98° - 107°). The granite has undergone considerable alteration.

A little north from the tunnel three short adits have been developed, a short distance apart. They appear to follow irregular veins and pods of quartz-tourmaline. The most northerly follows an irregular

structure, general strike 328° . Two shallow pits have been developed on this structure a short distance up the hill from the adit entrance. The dumps are composed almost entirely of black tourmaline. No minerals of economic importance were identified.

There is no record of production for the Cornwall Mine, but the extent of the workings would indicate it must have been small.

No further work is recommended.

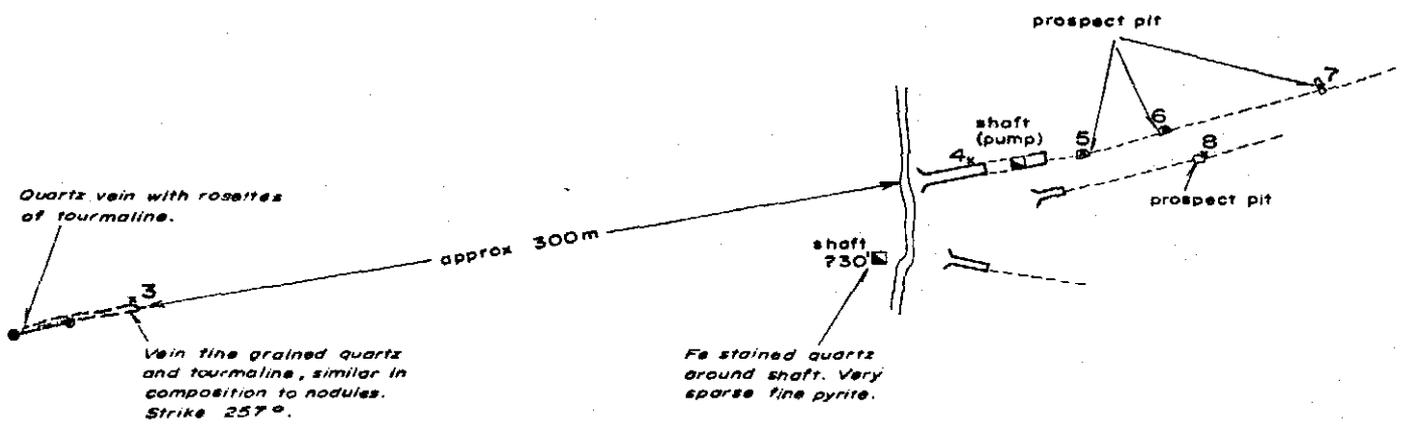
MONTAGUE MINE

The mine is situated on Montague Creek approximately $\frac{1}{4}$ mile north of the Zeehan - Trial Harbour road. Several shafts and adits had been developed on a structure which strikes at 75° - 78° . This has been termed the main lode. A second lode runs N-S and is said to intersect the main lode at the surface in Montague Creek. The intersection was not seen in the examination. A shallow shaft was put down at the junction, and a small but rich shoot of ore was found along the intersection of the lodes. Another shaft (main shaft) was put down a short distance north of this earlier shaft, to a depth of 118'. A drive was put in at the 100' level to intersect the cross lode. A raise was put up following the intersection of the two lodes, encountering another small but rich pod of cassiterite. The quartz-tourmaline vein was 4ft. wide and carried 10" of cassiterite at its centre.

Several prospecting pits were put down on the main lode east of the creek, presumably on pods of tourmaline containing cassiterite.

050

646057

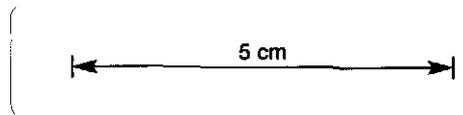


DESCRIPTIONS OF SAMPLES COLLECTED

3	Quartz tourmaline vein
4	Black tourmaline with cassiterite? Dump
5	Several narrow veins of quartz tourmaline 50cm.
6	As above in highly altered granite 70cm.
7	Quartz tourmaline vein. Green and black tourmaline 70cm.
8	Vein, centre tourmaline, margins quartz tourmaline 50 cm.

MONTAGUE EXTENDED

SCALE 1 : 2000



057
It is reported that a 15 head battery was installed in the early 1880's, but that an insignificant quantity of ore was crushed before the mine closed, on the realization that the rich pods were too small and too infrequent to warrant further development.

Several dump samples were taken; results are tabulated.

No further work is recommended.

MONTAGUE EXTENDED

Approximately $\frac{1}{4}$ mile west of the Montague Mine and on the same line and strike, is a group of workings known as Montague Extended. It consists of a shaft and three short adits. Waterhouse reported the presence of cassiterite, and also stibnite, bismuthinite and chalcopryrite in a quartz-tourmaline vein. Cassiterite was tentatively identified in some tourmaline on ore dumps. The only sulphide noted was sparse fine pyrite in quartz. The adits are developed on narrow quartz-tourmaline veins in soft cream altered granite. Several channel samples were taken, results are listed.

An outcrop of quartz-tourmaline vein approximately 300 yds further east and on the same line as the Montague Extended workings was also sampled. (Sample 3).

No further work is recommended.

NO NAME MINE

Some two thirds of a mile north of the Prince George, located at the foot of the Heemskirk Range is a set of workings not identified in the old reports. It consists of a small open cut, which has been opened

058

646059

Minor quartz tourmaline veins
in buff coloured fine grained
granite

Green pinite ?
Kaolin in green talcy
matrix.

Surface working
Quartz tourmaline
on dumps.

Water race, 10' deep
in soft apitic granite

Quartz tourmaline
on dump

OPEN PIT

Adit

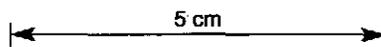
Adit blocked

14
Zone of
haematite
pinite

Slope of soft green
highly altered granite.

Minor quartz and altered
granite along joints

Zone of picrite impregnated
with haematite associated
with prominent pale
joint



NO NAME MINE

SCALE 1 200

059

subsequent to the development of an adit. The length of the adit is not known, it being full of water which has accumulated in the open cut. Another adit is directed towards the open cut but appears to stop short of it.

The creek draining the workings has been worked for alluvials.

From dump material it would appear that the adit went in on a quartz-tourmaline vein, though this was not seen in situ. It is presumed that mineralization of the wallrock warranted the development of the open cut. The wallrock, a medium-fine grained white granite has been altered to a soft, pale green rock composed of quartz grains in a matrix of green pinite. There are two narrow zones of altered granite which have been mineralized throughout with flecks of haematite. One is associated with a prominent joint or fracture, strike 107° . Chip samples were taken on these zones. Other joint sets strike at 93° and 336° , and sometimes contain small stringers or pods of quartz-tourmaline.

SUMMARY

Tin mineralization within the area examined takes the form of pods of cassiterite located sporadically along quartz-tourmaline veins. From the small mines developed on these veins it appears that mineralization is richest where the veins widen, allowing the formation of a central zone of generally well formed tourmaline crystals, in which cassiterite also occurs. The mineralization is typical of the late stage magmatic cycle in which the more volatile constituents of the magma utilize joints and fractures within the consolidated rock as channel ways.

060

Elements present in the volatile fraction form minerals when the physio-chemical conditions are favourable, leading to the formation of mineral zones, roughly concentric around foci within the granite.

It is significant that the most productive mines (still very small), of the area, are spatially higher in the zonal sequence, the Federation being in the Heemskirk Range and Mayne's being in the contact zone. The area examined lies within the granite and has been denuded to a peneplain. A considerable cover of granite and its contained veins has been removed by erosion.

CONCLUSION

From literature and field examination it is evident that the mineralization is patchy, the pods or swells containing the cassiterite being too small and too infrequent to sustain mining. Sulphides are generally not in evidence in this area, and there is little hope of change with increasing depth. This eliminates the possibility of using electrical geophysical methods to locate mineralization. Pyrite and other sulphides are more common in the Sweeney's and Federation workings.

The area is considered to lack potential for exploitable economic mineralization.

No further work is recommended.

SAMPLES AC1 - 14

- | | | |
|------------------------------|--------|---|
| 1. Prince George) | | |
| 2. Prince George) | | Quartz-tourmaline veins.
Channel sampled in adits.
Width 1m. |
| 3. West of Montague Extended | | Quartz-tourmaline. Chip
sample. Width 1m. |
| 4. Montague Extended | | Tourmaline with possible
Cassiterite. Dump Sample. |
| 5. Montague Extended | Width | |
| 6. " " | 50cm.) | |
| 7. " " | 70cm.) | Quartz-tourmaline
veins in granite.
Channel Samples. |
| 8. " " | 70cm.) | |
| | 50cm.) | |
| 9. Montague | | Dump Samples. |
| 10. " | | |
| 11. " | | |
| 12. " | | |
| 13. No Name Mine | | Channel Samples in haematitic
pinitite. (highly altered
granite). |
| 14. " " | | |

---oOo---

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 4th Floor Red Comb House
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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No.: 003901 PROJECT No.: SPL 95 HEEMSKIRK

LAB. SHEET No.: 1416 SAMPLE TYPE: ROCK DATE: 10th September, 1973.

SAMPLE No.	LAB. No.	Cu ppm	Mo ppm	Bi ppm	W ppm	Sn%			
AC 1	73-J-614	BLD	BLD	BLD	BLD	0.06			
AC 2	73-J-615	BLD	BLD	BLD	BLD	0.08			
AC 3	73-J-616	BLD	15	BLD	BLD	BLD			
AC 4	73-J-617	BLD	BLD	BLD	BLD	0.04			
AC 5	73-J-618	5	5	25	BLD	0.04			
AC 6	73-J-619	BLD	2	10	BLD	0.04			
AC 7	73-J-620	BLD	BLD	BLD	BLD	0.28			
AC 8	73-J-621	BLD	BLD	BLD	BLD	0.04			
AC 9	73-J-622	110	20	10	BLD	0.84			
AC 10	73-J-623	175	2	5	BLD	0.06			
AC 11	73-J-624	BLD	15	10	BLD	0.03			
AC 12	73-J-625	115	10	10	BLD	0.04			
AC 13	73-J-626	10	5	55	BLD	0.03			
AC 14	73-J-627	5	BLD	BLD	BLD	0.02			
DETECTION LIMITS ÷		5	2	5	0.02%	0.02%			



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

METHODS:

Cu by GRC No. 1
 Mo Bi by GRC No. 2
 W by GRC No. 4
 Sn by GRC No. 5

Chief Chemist

Ray W. Zerkow

063

646064

194

APPENDIX II

084

646065

GEOCHEMICAL LABORATORY SHEETS

513/1-4

514/1-7

515/1-3

526/1-4

533/1-3

727/1

736/1

736/12

788/1

814/1-2

1461/1-3

1484/3

1484/4-5

1488

065

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No.: 001528 PROJECT No.: EL.7/68 - DORIC

LAB. SHEET No.: 513/1 SAMPLE TYPE: SOIL PROF. DATE: 4th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm
00 + 300W	70-M-317	2	BLD	BLD	5	5	BLD
00 + 290W	70-M-318	5	5	5	25	15	BLD
00 + 280W	70-M-319	5	5	BLD	BLD	BLD	BLD
00 + 270W	70-M-320	2	5	5	15	5	BLD
00 + 260W	70-M-321	2	5	5	BLD	5	BLD
00 + 250W	70-M-322	BLD	5	5	25	10	BLD
00 + 240W	70-M-323	2	BLD	5	BLD	5	FLD
00 + 230W	70-M-324	BLD	BLD	BLD	BLD	5	BLD
00 + 220W	70-M-325	2	BLD	BLD	5	5	BLD
00 + 210W	70-M-326	2	BLD	BLD	15	10	BLD
00 + 200W	70-M-327	2	5	BLD	5	10	BLD
00 + 190W	70-M-328	2	BLD	BLD	5	5	BLD
00 + 180W	70-M-329	BLD	BLD	BLD	5	5	BLD
00 + 170W	70-M-330	2	BLD	BLD	10	15	BLD
00 + 160W	70-M-331	2	BLD	BLD	5	5	BLD
00 + 150W	70-M-332	BLD	BLD	BLD	BLD	5	BLD
00 + 140W	70-M-333	BLD	BLD	5	5	5	BLD
00 + 130W	70-M-334	BLD	BLD	BLD	10	5	BLD
00 + 120W	70-M-335	2	BLD	BLD	10	5	BLD
00 + 110W	70-M-336	BLD	BLD	5	10	5	BLD
00 + 100W	70-M-337	BLD	BLD	BLD	15	10	BLD
00 + 90 W	70-M-338	5	BLD	BLD	15	10	BLD
00 + 80 W	70-M-339	5	BLD	BLD	15	10	BLD
00 + 70 W	70-M-340	5	BLD	BLD	15	10	BLD
00 + 60 W	70-M-341	2	BLD	BLD	40	5	BLD
00 + 50 W	70-M-342	5	BLD	5	15	10	BLD
00 + 40 W	70-M-343	5	BLD	5	20	15	BLD
00 + 30 W	70-M-344	10	5	5	15	10	BLD
00 + 20 W	70-M-345	5	5	10	15	10	BLD
00 + 10 W	70-M-346	5	BLD	10	15	10	BLD
00 BASELINE	70-M-347	5	5	10	10	10	BLD
00 + 10 E	70-M-348	5	10	10	30	5	BLD
00 + 20 E	70-M-349	5	5	15	35	5	BLD
00 + 30 E	70-M-350	5	5	10	25	5	BLD
00 + 40 E	70-M-351	5	5	BLD	35	5	BLD
00 + 50 E	70-M-352	2	BLD	BLD	30	5	BLD
00 + 60 E	70-M-353	5	5	BLD	15	10	BLD
00 + 70 E	70-M-354	2	BLD	BLD	45	5	BLD
00 + 80 E	70-M-355	5	5	5	45	5	BLD
00 + 90 E	70-M-356	5	5	5	50	5	BLD
00 + 100E	70-M-357	5	5	10	40	5	BLD
00 + 110E	70-M-358	5	10	15	10	5	BLD
00 + 120E	70-M-359	5	10	15	5	5	BLD
00 + 130E	70-M-360	5	10	10	15	5	BLD
00 + 140E	70-M-361	10	10	10	10	5	BLD
00 + 150E	70-M-362	5	10	15	10	5	BLD

METHODS:

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Cu, Ni, Co, Pb, Zn, Ag by GRC No. 1

B.L.D. = Below Limit of Detection



D. Loughrey
for Chief Chemist

066

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001528 /29 PROJECT No. EL.7/68 - DORIC PROSPECT

LAB. SHEET No. 513/2 SAMPLE TYPE: SOIL PROF. DATE: 4th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm
00 + 160E	70-M-363	5	10	15	10	5	BLD
00 + 170E	70-M-364	2	5	15	5	BLD	BLD
00 + 180E	70-M-365	2	5	10	5	BLD	BLD
00 + 190E	70-M-366	5	10	10	10	5	BLD
00 + 200E	70-M-367	2	BLD	5	10	5	BLD
00 + 210E	70-M-368	5	5	10	15	10	BLD
00 + 220E	70-M-369	5	BLD	5	10	5	BLD
00 + 230E	70-M-370	2	BLD	5	10	5	BLD
00 + 240E	70-M-371	5	5	10	10	5	BLD
00 + 250E	70-M-372	5	5	10	10	5	BLD
00 + 260E	70-M-373	10	10	10	20	20	BLD
00 + 270E	70-M-374	5	BLD	10	10	BLD	BLD
00 + 280E	70-M-375	10	5	5	10	BLD	BLD
00 + 290E	70-M-376	5	5	10	10	5	BLD
00 + 300E	70-M-377	5	5	5	10	5	BLD
00 + 310E	70-M-378	5	BLD	5	10	5	BLD
00 + 320E	70-M-379	5	5	5	5	5	BLD
00 + 330E	70-M-380	5	5	5	10	5	BLD
00 + 340E	70-M-381	5	5	5	5	5	BLD
00 + 350E	70-M-382	5	BLD	5	5	5	BLD
00 + 360E	70-M-383	5	BLD	5	5	5	BLD
00 + 370E	70-M-384	5	BLD	BLD	15	5	BLD
00 + 380E	70-M-385	10	10	10	10	5	BLD
00 + 390E	70-M-386	10	BLD	5	10	10	BLD
00 + 400E	70-M-387	5	BLD	BLD	5	5	BLD
00 + 410E	70-M-388	5	BLD	5	5	5	BLD
00 + 420E	70-M-389	5	BLD	BLD	15	10	BLD
00 + 430E	70-M-390	5	5	5	5	5	BLD
00 + 440E	70-M-391	5	BLD	BLD	5	5	BLD
00 + 450E	70-M-392	5	BLD	5	5	5	BLD
00 + 460E	70-M-393	5	5	5	5	5	1
00 + 470E	70-M-394	5	5	BLD	5	5	BLD
00 + 480E	70-M-395	2	BLD	BLD	5	5	BLD
00 + 490E	70-M-396	5	BLD	5	BLD	5	BLD
00 + 500E	70-M-397	5	BLD	5	5	5	BLD
00 + 510E	70-M-398	5	BLD	10	15	10	1
00 + 520E	70-M-399	5	BLD	10	10	5	BLD
00 + 530E	70-M-400	5	BLD	5	10	5	BLD
00 + 540E	70-M-401	5	BLD	5	10	5	BLD
00 + 550E	70-M-402	10	5	10	5	10	BLD
00 + 560E	70-M-403	15	5	5	45	20	1
00 + 570E	70-M-404	15	5	5	40	25	BLD
00 + 580E	70-M-405	15	5	BLD	35	20	1
00 + 590E	70-M-406	15	5	BLD	50	20	1
00 + 600E	70-M-407	15	5	BLD	35	15	BLD
00 + 610E	70-M-408	10	10	BLD	25	10	BLD

METHODS:



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D. Langley
for Chief Chemist

067

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001529/30 PROJECT No. EL.7/68 - DORIC

LAB. SHEET No. 513/3 SAMPLE TYPE: SOIL PROF. DATE: 4th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm
00 + 620E	70-M-409	10	5	BLD	25	10	BLD
00 + 630E	70-M-410	10	5	10	15	10	1
00 + 640E	70-M-411	10	5	5	20	10	1
00 + 650E	70-M-412	10	5	5	20	10	BLD
00 + 660E	70-M-413	10	5	BLD	25	15	BLD
00 + 670E	70-M-414	10	5	5	25	10	BLD
00 + 680E	70-M-415	10	5	BLD	30	15	BLD
00 + 690E	70-M-416	10	10	BLD	25	15	BLD
00 + 700E	70-M-417	15	10	BLD	25	15	BLD
2N + 100W	70-M-418	5	5	BLD	5	5	BLD
2N + 90 W	70-M-419	5	BLD	5	BLD	5	BLD
2N + 80 W	70-M-420	2	5	BLD	BLD	5	BLD
2N + 70 W	70-M-421	5	5	BLD	BLD	5	BLD
2N + 60 W	70-M-422	5	5	BLD	BLD	BLD	BLD
2N + 50 W	70-M-423	BLD	BLD	BLD	BLD	BLD	BLD
2N + 40 W	70-M-424	5	5	BLD	BLD	5	BLD
2N + 30 W	70-M-425	5	5	BLD	BLD	BLD	BLD
2N + 20 W	70-M-426	5	5	BLD	5	5	BLD
2N + 10 W	70-M-427	5	5	BLD	5	5	BLD
2N BASELINE	70-M-428	5	5	BLD	5	5	BLD
2N + 10 E	70-M-429	5	5	BLD	5	5	BLD
2N + 20 E	70-M-430	5	5	BLD	5	5	BLD
2N + 30 E	70-M-431	5	5	BLD	10	5	BLD
2N + 40 E	70-M-432	5	5	BLD	5	5	BLD
2N + 50 E	70-M-433	5	5	BLD	5	5	BLD
2N + 60 E	70-M-434	5	5	BLD	BLD	5	BLD
2N + 70 E	70-M-435	5	5	5	5	5	BLD
2N + 80 E	70-M-436	10	10	10	BLD	5	BLD
2N + 90 E	70-M-437	5	5	5	5	5	BLD
2N + 100E	70-M-438	5	BLD	5	15	5	BLD
2N + 110E	70-M-439	2	BLD	BLD	10	5	BLD
2N + 120E	70-M-440	5	5	BLD	10	5	1
2N + 130E	70-M-441	5	5	BLD	15	5	1
2N + 140E	70-M-442	10	10	5	45	10	1
2N + 150E	70-M-443	5	BLD	BLD	10	5	1
2N + 160E	70-M-444	5	BLD	BLD	20	5	BLD
2N + 170E	70-M-445	5	BLD	BLD	20	5	BLD
2N + 180E	70-M-446	5	BLD	BLD	10	5	BLD
2N + 190E	70-M-447	5	BLD	5	70	30	BLD
2N + 200E	70-M-448	45	BLD	5	1270	180	2
2N + 210E	70-M-449	10	BLD	5	60	10	BLD
2N + 220E	70-M-450	5	BLD	BLD	35	5	BLD
2N + 230E	70-M-451	5	BLD	BLD	15	5	BLD
2N + 240E	70-M-452	5	BLD	BLD	5	BLD	BLD
2N + 250E	70-M-453	5	BLD	BLD	5	5	BLD
2N + 260E	70-M-454	5	5	BLD	10	5	BLD

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

J. Deloughrey
for Chief Chemist



068

646069

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001530 PROJECT No. EL.7/68 - DORIC

LAB. SHEET No. 513/4 SAMPLE TYPE: SOIL PROF. DATE: 4th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm
2N + 270E	70-M-455	5	BLD	BLD	10	5	BLD
2N + 280E	70-M-456	2	BLD	BLD	15	5	BLD
2N + 290E	70-M-457	5	BLD	BLD	20	5	BLD
2N + 300E	70-M-458	5	BLD	BLD	15	10	BLD
2N + 310E	70-M-459	5	BLD	BLD	15	5	BLD
2N + 320E	70-M-460	5	BLD	BLD	10	15	BLD
2N + 330E	70-M-461	5	BLD	BLD	5	10	BLD
2N + 340E	70-M-462	5	BLD	BLD	10	5	BLD
2N + 350E	70-M-463	5	5	BLD	30	40	BLD
2N + 360E	70-M-464	5	BLD	BLD	10	15	BLD
2N + 370E	70-M-465	5	BLD	BLD	5	10	BLD

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

D. Loughrey
for Chief Chemist

069

646070

GEOPHOTO RESOURCES CONSULTANTS

Millaquin House
Herschel Street, Brisbane 4000
Telephone 27320



CHEMICAL LABORATORY

4th Floor Red Comb House
Roma Street, Brisbane 4000
Telephone 21 3875

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No.: 001523 PROJECT No.: EL.7/68 - DORIC

LAB. SHEET No.: 514/1 SAMPLE TYPE: SOIL PROFL. DATE: 6th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pt ppm	Zn ppm	Ag ppm	Sb ppm
2S 100W	70-L-1315	10	10	5	40	10	BLD	BLD
2S 110W	70-L-1316	5	10	5	50	20	1	BLD
2S 120W	70-L-1317	5	10	5	15	5	BLD	BLD
2S 130W	70-L-1318	10	10	5	55	15	BLD	10
2S 140W	70-L-1319	10	10	5	55	10	BLD	BLD
2S 150W	70-L-1320	5	10	5	20	10	1	BLD
2S 160W	70-L-1321	3	5	5	45	10	BLD	BLD
2S 170W	70-L-1322	4	10	5	50	15	BLD	BLD
2S 180W	70-L-1323	4	10	5	145	55	BLD	BLD
2S 190W	70-L-1324	4	10	5	135	20	BLD	BLD
2S 200W C2	70-L-1325	3	10	5	410	25	BLD	BLD
2S 210W C2	70-L-1326	15	10	5	1600	30	1	BLD
2S 220W C2	70-L-1327	10	10	5	450	25	1	BLD
2S 230W C2	70-L-1328	35	10	5	2450	65	7	BLD
2S 240W C2	70-L-1329	35	10	5	2400	85	5	BLD
2S 250W C2	70-L-1330	20	10	5	1700	45	4	BLD
2S 260W C2	70-L-1331	30	10	5	1200	55	3	BLD
2S 270W C2	70-L-1332	10	10	5	310	35	1	BLD
2S 280W C2	70-L-1333	25	15	5	1150	60	4	BLD
2S 290W C2	70-L-1334	4	10	BLD	110	10	BLD	BLD
2S 300W	70-L-1335	4	10	BLD	65	15	BLD	BLD
2S 310W	70-L-1336	5	10	5	10	30	BLD	BLD
2S 320W	70-L-1337	5	10	5	15	15	BLD	BLD
2S 330W	70-L-1338	2	10	BLD	5	5	BLD	BLD
2S 340W	70-L-1339	4	10	5	15	20	BLD	BLD
2S 350W	70-L-1340	3	10	5	20	5	BLD	BLD
2S 360W	70-L-1341	5	10	5	15	5	1	BLD
2S 370W	70-L-1342	5	10	5	5	5	BLD	BLD
2S 380W	70-L-1343	5	10	5	5	5	BLD	BLD
2S 390W	70-L-1344	5	10	5	10	5	BLD	BLD
2S 400W	70-L-1345	5	10	5	20	5	1	BLD
2S 410W	70-L-1346	4	10	5	20	5	BLD	BLD
2S 420W	70-L-1347	4	10	5	15	5	BLD	BLD
2S 430W	70-L-1348	3	10	5	15	5	BLD	BLD
2S 440W	70-L-1349	4	10	5	15	5	BLD	BLD
2S 450W	70-L-1350	4	10	5	20	5	BLD	BLD
2S 460W	70-L-1351	5	10	5	35	10	BLD	BLD
2S 470W	70-L-1352	10	20	10	45	40	1	BLD
2S 480W	70-L-1353	10	15	5	35	20	1	BLD
2S 490W	70-L-1354	5	10	5	5	5	BLD	BLD
2S 500W	70-L-1355	5	10	5	BLD	5	BLD	BLD
2S 510W	70-L-1356	5	10	5	BLD	5	BLD	BLD
2S 520W	70-L-1357	5	10	5	5	4	BLD	BLD
2S 530W	70-L-1358	2	5	BLD	BLD	4	BLD	BLD
2S 540W	70-L-1359	4	10	5	BLD	4	BLD	BLD
2S 550W	70-L-1360	5	10	BLD	BLD	4	BLD	BLD

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

Cu, Ni, Co, Pb, Zn, Ag by GRC No. 1
Sb by GRC No. 15

B.L.D. = Below Limit of Detection

Chief Chemist

S. Loughrey



070

646071

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001523/4 PROJECT No. EL 7/68 - DORIC

LAB. SHEET No. 514/2 SAMPLE TYPE: SOIL PROF. DATE: 6th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm	Sb ppm
2S 560W	70-L-1361	5	10	BLD	BLD	4	BLD	BLD
2S 570W	70-L-1362	5	15	5	5	4	BLD	BLD
2S 580W	70-L-1363	4	10	BLD	25	5	BLD	BLD
2S 590W	70-L-1364	4	10	5	20	10	BLD	BLD
2S 600W	70-L-1365	3	10	5	20	15	1	BLD
2S 610W	70-L-1366	2	5	BLD	10	5	FLD	BLD
2S 620W	70-L-1367	2	5	BLD	15	5	BLD	BLD
2S 630W	70-L-1368	2	5	BLD	15	5	BLD	BLD
2S 640W	70-L-1369	3	5	5	10	3	BLD	BLD
2S 650W	70-L-1370	4	10	BLD	10	4	BLD	BLD
2S 660W	70-L-1371	5	10	BLD	5	4	BLD	BLD
2S 670W	70-L-1372	4	5	BLD	BLD	2	BLD	BLD
2S 680W	70-L-1373	2	5	5	BLD	2	BLD	BLD
2S 690W	70-L-1374	2	5	BLD	BLD	3	BLD	BLD
2S 700W	70-L-1375	2	5	BLD	BLD	2	BLD	BLD
2S 710W	70-L-1376	2	5	BLD	BLD	2	BLD	BLD
2S 720W	70-L-1377	3	5	5	BLD	4	BLD	BLD
2S 730W	70-L-1378	5	15	BLD	BLD	3	1	BLD
2S 740W	70-L-1379	2	10	BLD	BLD	4	BLD	BLD
2S 750W	70-L-1380	5	10	BLD	BLD	5	1	BLD
2S 760W	70-L-1381	BLD	10	BLD	5	5	1	BLD
2S 770W	70-L-1382	BLD	5	BLD	5	2	BLD	BLD
2S 780W	70-L-1383	BLD	5	BLD	BLD	2	BLD	BLD
2S 790W	70-L-1384	BLD	5	BLD	BLD	3	BLD	BLD
2S 800W	70-L-1385	BLD	5	BLD	10	3	1	BLD
4S 300E	70-L-1386	4	10	BLD	25	5	BLD	BLD
4S 310E	70-L-1387	3	10	BLD	70	10	BLD	BLD
4S 320E	70-L-1388	3	5	BLD	10	5	BLD	BLD
4S 330E	70-L-1389	2	5	BLD	30	5	BLD	BLD
4S 340E	70-L-1390	3	5	BLD	40	5	BLD	BLD
4S 350E	70-L-1391	3	5	5	10	5	BLD	BLD
4S 360E	70-L-1392	5	5	5	45	10	BLD	BLD
4S 370E	70-L-1393	4	5	5	95	5	BLD	BLD
4S 380E	70-L-1394	10	10	BLD	75	20	BLD	BLD
4S 390E	70-L-1395	5	10	5	50	20	BLD	FLD
4S 400E	70-L-1396	5	10	5	40	15	BLD	BLD
4S 410E	70-L-1397	10	10	5	85	20	BLD	BLD
4S 420E	70-L-1398	4	10	5	50	25	BLD	BLD
4S 430E	70-L-1399	5	10	5	40	10	BLD	BLD
4S 440E	70-L-1400	3	10	5	40	10	BLD	BLD
4S 450E	70-L-1401	4	10	5	40	10	BLD	BLD
4S 460E	70-L-1402	4	10	BLD	35	5	BLD	BLD
4S 470E	70-L-1403	3	5	BLD	35	5	BLD	BLD
4S 480E	70-L-1404	5	5	5	45	5	BLD	BLD
4S 490E	70-L-1405	5	10	5	75	10	BLD	BLD
4S 500E	70-L-1406	4	10	5	50	5	BLD	BLD

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

D. Longway
for Chief Chemist



071
646072

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No.: 001524/5 PROJECT No.: EL.7/68 - DORIC

LAB. SHEET No.: 514/3 SAMPLE TYPE: SOIL PROF. DATE: 6th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm	Sb ppm
4S 510E	70-L-1407	2	5	5	35	5	BLD	BLD
4S 520E	70-L-1408	2	5	5	45	5	BLD	BLD
4S 530E	70-L-1409	2	5	5	40	5	BLD	BLD
4S 540E	70-L-1410	3	5	5	35	5	BLD	BLD
4S 550E	70-L-1411	2	5	5	65	10	BLD	BLD
4S 560E	70-L-1412	BLD	5	BLD	30	35	BLD	BLD
4S 570E	70-L-1413	3	5	5	70	5	BLD	BLD
4S 580E	70-L-1414	BLD	5	5	20	5	BLD	BLD
4S 590E	70-L-1415	2	5	5	5	3	BLD	BLD
4S 600E	70-L-1416	BLD	5	BLD	5	3	BLD	BLD
4S BASELINE	70-L-1417	2	5	BLD	20	10	BLD	BLD
4S 10W	70-L-1418	5	5	5	75	15	BLD	BLD
4S 20W	70-L-1419	5	5	5	60	20	BLD	BLD
4S 30W	70-L-1420	10	10	5	125	25	BLD	BLD
4S 40W	70-L-1421	4	5	BLD	10	5	BLD	BLD
4S 50W	70-L-1422	4	5	BLD	5	10	BLD	BLD
4S 60W	70-L-1423	BLD	5	BLD	5	10	BLD	BLD
4S 70W	70-L-1424	BLD	5	BLD	5	5	BLD	BLD
4S 80W	70-L-1425	2	5	BLD	BLD	5	BLD	BLD
4S 90W	70-L-1426	4	5	BLD	BLD	5	BLD	BLD
4S 100W	70-L-1427	5	5	BLD	BLD	5	BLD	BLD
4S 110W	70-L-1428	5	5	BLD	5	5	BLD	BLD
4S 120W	70-L-1429	BLD	5	BLD	5	4	BLD	BLD
4S 130W	70-L-1430	BLD	5	BLD	5	5	BLD	BLD
4S 140W	70-L-1431	BLD	5	BLD	10	5	BLD	BLD
4S 150W	70-L-1432	BLD	5	5	10	5	BLD	BLD
4S 160W	70-L-1433	3	5	BLD	10	5	BLD	BLD
4S 170W	70-L-1434	2	5	BLD	5	3	BLD	BLD
4S 180W	70-L-1435	4	5	BLD	5	5	BLD	BLD
4S 190W	70-L-1436	4	5	BLD	BLD	5	BLD	BLD
4S 200W	70-L-1437	BLD	5	BLD	BLD	5	BLD	BLD
4S 210W	70-L-1438	5	25	5	25	15	BLD	BLD
4S 220W	70-L-1439	5	5	BLD	5	5	BLD	BLD
4S 230W	70-L-1440	3	5	BLD	10	5	BLD	BLD
4S 240W	70-L-1441	3	5	BLD	5	5	BLD	BLD
4S 250W	70-L-1442	2	5	BLD	5	5	BLD	BLD
4S 260W	70-L-1443	4	5	5	10	5	BLD	BLD
4S 270W	70-L-1444	2	5	BLD	5	3	BLD	BLD
4S 280W	70-L-1445	3	5	BLD	15	10	BLD	BLD
4S 290W	70-L-1446	BLD	5	BLD	15	3	BLD	BLD
4S 300W	70-L-1447	BLD	5	BLD	10	5	BLD	BLD
4S 310W	70-L-1448	BLD	5	BLD	5	4	BLD	BLD
4S 320W	70-L-1449	2	5	BLD	10	5	BLD	BLD
4S 330W	70-L-1450	4	5	BLD	10	5	BLD	BLD
4S 340W	70-L-1451	2	5	BLD	10	5	BLD	BLD
4S 350W	70-L-1452	2	5	BLD	BLD	4	BLD	BLD

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

for Chief Chemist

E. Loughney

072

GEOPHOTO RESOURCES CONSULTANTS

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Telephone 21 3875

646073

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001525 PROJECT No. EL. 7/68 - DORIC

LAB. SHEET No. 514/4 SAMPLE TYPE: SOIL PROF. DATE: 6th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm	Sb ppm
4S 360W	70-L-1453	BLD	5	BLD	10	3	BLD	BLD
4S 370W	70-L-1454	2	5	BLD	5	4	BLD	BLD
4S 380W	70-L-1455	70	5	BLD	5	10	39	BLD
4S 390W	70-L-1456	BLD	5	BLD	10	5	BLD	BLD
4S 400W	70-L-1457	BLD	5	BLD	10	30	BLD	BLD
4S 410W	70-L-1458	BLD	5	BLD	BLD	4	BLD	BLD
4S 420W	70-L-1459	2	5	BLD	BLD	5	BLD	BLD
4S 430W	70-L-1460	BLD	5	BLD	5	5	BLD	BLD
4S 440W	70-L-1461	BLD	5	BLD	10	10	BLD	BLD
4S 450W	70-L-1462	BLD	5	BLD	15	5	1	BLD
4S 460W	70-L-1463	BLD	5	BLD	5	4	BLD	BLD
4S 470W	70-L-1464	BLD	5	BLD	15	5	BLD	BLD

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

E. Longway
Chief Chemist



073

646074

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001523 PROJECT No. EL. 7/68 - DORIC

LAB. SHEET No. 514/5 SAMPLE TYPE: SOIL PROF. DATE: 6th January, 1971.

SAMPLE No.	LAB. No.	Sn %	Mo ppm	Bi ppm	W %				
2S 100W	70-L-1315	BLD	BLD	BLD	BLD				
2S 110W	70-L-1316	BLD	BLD	5	BLD				
2S 120W	70-L-1317	BLD	BLD	BLD	BLD				
2S 130W	70-L-1318	BLD	BLD	BLD	BLD				
2S 140W	70-L-1319	BLD	BLD	10	BLD				
2S 150W	70-L-1320	BLD	BLD	10	BLD				
2S 160W	70-L-1321	BLD	BLD	BLD	BLD				
2S 170W	70-L-1322	BLD	BLD	BLD	BLD				
2S 180W	70-L-1323	BLD	BLD	BLD	BLD				
2S 190W	70-L-1324	BLD	BLD	BLD	BLD				
2S 200W C2	70-L-1325	BLD	BLD	BLD	BLD				
2S 210W C2	70-L-1326	BLD	BLD	BLD	BLD				
2S 220W C2	70-L-1327	BLD	BLD	BLD	BLD				
2S 230W C2	70-L-1328	BLD	BLD	BLD	BLD				
2S 240W C2	70-L-1329	BLD	BLD	BLD	BLD				
2S 250W C2	70-L-1330	BLD	BLD	15	BLD				
2S 260W C2	70-L-1331	BLD	BLD	BLD	BLD				
2S 270W C2	70-L-1332	BLD	BLD	10	BLD				
2S 280W C2	70-L-1333	BLD	BLD	BLD	BLD				
2S 290W C2	70-L-1334	BLD	BLD	BLD	BLD				
2S 300W	70-L-1335	BLD	BLD	BLD	BLD				
2S 310W	70-L-1336	BLD	BLD	BLD	BLD				
2S 320W	70-L-1337	BLD	BLD	BLD	BLD				
2S 330W	70-L-1338	BLD	BLD	BLD	BLD				
2S 340W	70-L-1339	BLD	BLD	5	BLD				
2S 350W	70-L-1340	BLD	BLD	BLD	BLD				
2S 360W	70-L-1341	BLD	BLD	BLD	BLD				
2S 370W	70-L-1342	BLD	BLD	BLD	BLD				
2S 380W	70-L-1343	BLD	BLD	10	BLD				
2S 390W	70-L-1344	BLD	BLD	BLD	BLD				
2S 400W	70-L-1345	BLD	BLD	BLD	BLD				
2S 410W	70-L-1346	BLD	BLD	10	BLD				
2S 420W	70-L-1347	BLD	BLD	BLD	BLD				
2S 430W	70-L-1348	BLD	BLD	BLD	BLD				
2S 440W	70-L-1349	BLD	BLD	BLD	BLD				
2S 450W	70-L-1450	BLD	BLD	BLD	BLD				
2S 460W	70-L-1451	BLD	BLD	BLD	BLD				
2S 470W	70-L-1452	BLD	BLD	BLD	BLD				
2S 480W	70-L-1453	BLD	BLD	5	BLD				
2S 490W	70-L-1454	BLD	BLD	35	BLD				
2S 500W	70-L-1455	BLD	BLD	10	BLD				
2S 510W	70-L-1456	BLD	BLD	10	BLD				
2S 520W	70-L-1457	BLD	BLD	BLD	BLD				
2S 530W	70-L-1458	BLD	BLD	BLD	BLD				
2S 540W	70-L-1459	BLD	BLD	BLD	BLD				
2S 550W	70-L-1460	BLD	BLD	BLD	BLD				

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

Sn by GRC No. 6A
Mo, Bi, by GRC No. 2
W by GRC No. 4A

B.L.D. = Below Limit of Detection

for Chief Chemist *E. Langhorne*

074

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646075

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. Q01523/4 PROJECT No. EL. 7/68 - DORIC

LAB. SHEET No. 514/6 SAMPLE TYPE: SOIL PROF. DATE: 6th January, 1971.

SAMPLE No.	LAB. No.	Sn %	Mo ppm	Bi ppm	W %				
2S 560W	70-L-1361	BLD	BLD	BLD	BLD				
2S 570W	70-L-1362	BLD	BLD	BLD	BLD				
2S 580W	70-L-1363	BLD	BLD	BLD	BLD				
2S 590W	70-L-1364	BLD	BLD	BLD	BLD				
2S 600W	70-L-1365	BLD	BLD	BLD	BLD				
2S 610W	70-L-1366	BLD	BLD	BLD	BLD				
2S 620W	70-L-1367	BLD	BLD	BLD	BLD				
2S 630W	70-L-1368	BLD	BLD	BLD	BLD				
2S 640W	70-L-1369	BLD	BLD	BLD	BLD				
2S 650W	70-L-1370	BLD	BLD	BLD	BLD				
2S 660W	70-L-1371	BLD	BLD	BLD	BLD				
2S 670W	70-L-1372	BLD	BLD	BLD	BLD				
2S 680W	70-L-1373	BLD	BLD	BLD	BLD				
2S 690W	70-L-1374	BLD	BLD	BLD	BLD				
2S 700W	70-L-1375	BLD	BLD	BLD	BLD				
2S 710W	70-L-1376	BLD	BLD	BLD	BLD				
2S 720W	70-L-1377	BLD	BLD	BLD	BLD				
2S 730W	70-L-1378	BLD	BLD	BLD	BLD				
2S 740W	70-L-1379	BLD	BLD	BLD	BLD				
2S 750W	70-L-1380	BLD	BLD	BLD	BLD				
2S 760W	70-L-1381	BLD	BLD	BLD	BLD				
2S 770W	70-L-1382	BLD	BLD	BLD	BLD				
2S 780W	70-L-1383	BLD	BLD	BLD	BLD				
2S 790W	70-L-1384	BLD	BLD	BLD	BLD				
2S 800W	70-L-1385	BLD	BLD	BLD	BLD				
4S 300E	70-L-1386	BLD	BLD	BLD	BLD				
4S 310E	70-L-1387	BLD	BLD	BLD	BLD				
4S 320E	70-L-1388	BLD	BLD	BLD	BLD				
4S 330E	70-L-1389	BLD	BLD	BLD	BLD				
4S 340E	70-L-1390	BLD	BLD	BLD	BLD				
4S 350E	70-L-1391	BLD	BLD	BLD	BLD				
4S 360E	70-L-1392	BLD	BLD	BLD	BLD				
4S 370E	70-L-1393	BLD	BLD	BLD	BLD				
4S 380E	70-L-1394	BLD	BLD	BLD	BLD				
4S 390E	70-L-1395	BLD	BLD	BLD	BLD				
4S 400E	70-L-1396	BLD	BLD	BLD	BLD				
4S 410E	70-L-1397	BLD	BLD	BLD	BLD				
4S 420E	70-L-1398	BLD	BLD	BLD	BLD				
4S 430E	70-L-1399	BLD	BLD	BLD	BLD				
4S 440E	70-L-1400	BLD	BLD	BLD	BLD				
4S 450E	70-L-1401	BLD	BLD	BLD	BLD				
4S 460E	70-L-1402	BLD	BLD	BLD	BLD				
4S 470E	70-L-1403	BLD	BLD	BLD	BLD				
4S 480E	70-L-1404	BLD	BLD	BLD	BLD				
4S 490E	70-L-1405	BLD	BLD	BLD	BLD				
4S 500E	70-L-1406	BLD	BLD	BLD	BLD				

METHODS:



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D. Langford
for Chief Chemist

075

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001524/5 PROJECT No. EL. 7/68 - DORIC

LAB. SHEET No. 514/7 SAMPLE TYPE: SOIL PROF. DATE: 6th January, 1971.

SAMPLE No.	LAB. No.	Sn %	Mo ppm	Bi ppm	W %			
4S 510E	70-L-1407	BLD	BLD	BLD	BLD			
4S 520E	70-L-1408	BLD	BLD	BLD	BLD			
4S 530E	70-L-1409	BLD	BLD	BLD	BLD			
4S 540E	70-L-1410	BLD	BLD	BLD	BLD			
4S 550E	70-L-1411	BLD	BLD	BLD	BLD			
4S 560E	70-L-1412	BLD	BLD	BLD	BLD			
4S 570E	70-L-1413	BLD	BLD	BLD	BLD			
4S 580E	70-L-1414	BLD	BLD	BLD	BLD			
4S 590E	70-L-1415	BLD	BLD	BLD	BLD			
4S 600E	70-L-1416	BLD	BLD	BLD	BLD			
4S BASELINE	70-L-1417	BLD	BLD	BLD	BLD			
4S 10W	70-L-1418	BLD	BLD	BLD	BLD			
4S 20W	70-L-1419	BLD	BLD	BLD	BLD			
4S 30W	70-L-1420	BLD	BLD	BLD	BLD			
4S 40W	70-L-1421	BLD	BLD	BLD	BLD			
4S 50W	70-L-1422	BLD	BLD	BLD	BLD			
4S 60W	70-L-1423	BLD	BLD	BLD	BLD			
4S 70W	70-L-1424	BLD	BLD	BLD	BLD			
4S 80W	70-L-1425	BLD	BLD	BLD	BLD			
4S 90W	70-L-1426	BLD	BLD	BLD	BLD			
4S 100W	70-L-1427	BLD	BLD	BLD	BLD			
4S 110W	70-L-1428	BLD	BLD	BLD	BLD			
4S 120W	70-L-1429	BLD	BLD	BLD	BLD			
4S 130W	70-L-1430	BLD	BLD	BLD	BLD			
4S 140W	70-L-1431	BLD	BLD	BLD	BLD			
4S 150W	70-L-1432	BLD	BLD	BLD	BLD			
4S 160W	70-L-1433	BLD	BLD	BLD	BLD			
4S 170W	70-L-1434	BLD	BLD	BLD	BLD			
4S 180W	70-L-1435	BLD	BLD	BLD	BLD			
4S 190W	70-L-1436	BLD	BLD	BLD	BLD			
4S 200W	70-L-1437	BLD	BLD	BLD	BLD			
4S 210W	70-L-1438	BLD	BLD	BLD	BLD			
4S 220W	70-L-1439	BLD	BLD	BLD	BLD			
4S 230W	70-L-1440	BLD	BLD	BLD	BLD			
4S 240W	70-L-1441	BLD	BLD	BLD	BLD			
4S 250W	70-L-1442	BLD	BLD	BLD	BLD			
4S 260W	70-L-1443	BLD	BLD	BLD	BLD			
4S 270W	70-L-1444	BLD	BLD	BLD	BLD			
4S 280W	70-L-1445	BLD	BLD	BLD	BLD			
4S 290W	70-L-1446	BLD	BLD	BLD	BLD			
4S 300W	70-L-1447	BLD	BLD	BLD	BLD			
4S 310W	70-L-1448	BLD	BLD	BLD	BLD			
4S 320W	70-L-1449	BLD	BLD	BLD	BLD			
4S 330W	70-L-1450	BLD	BLD	BLD	BLD			
4S 340W	70-L-1451	BLD	BLD	BLD	BLD			
4S 350W	70-L-1452	BLD	BLD	BLD	BLD			

METHODS:



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E. Longway
for Chief Chemist

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001525 PROJECT No. EL.7/68 - DORIC

LAB. SHEET No. 514/8 SAMPLE TYPE: SOIL PROF. DATE: 6th January, 1971.

SAMPLE No.	LAB. No.	Sn %	Mo ppm	Bi ppm	W %				
4S 360W	70-L-1453	BLD	BLD	BLD	BLD				
4S 370W	70-L-1454	BLD	BLD	BLD	BLD				
4S 380W	70-L-1455	BLD	BLD	BLD	BLD				
4S 390W	70-L-1456	BLD	BLD	BLD	BLD				
4S 400W	70-L-1457	BLD	BLD	BLD	BLD				
4S 410W	70-L-1458	BLD	BLD	BLD	BLD				
4S 420W	70-L-1459	BLD	BLD	BLD	BLD				
4S 430W	70-L-1460	BLD	BLD	BLD	BLD				
4S 440W	70-L-1461	BLD	BLD	BLD	BLD				
4S 450W	70-L-1462	BLD	BLD	BLD	BLD				
4S 460W	70-L-1463	BLD	BLD	BLD	BLD				
4S 470W	70-L-1464	BLD	BLD	BLD	BLD				

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

D. Langhorne
for Chief Chemist



GEOCHEMICAL LABORATORY REPORT

646078

FIELD SHEET No. 001538 PROJECT No. EL. 7/68 - and 5 PL 89 - DORIC PROSPECT
AND QUEENSTOWN ROAD PROSPECT
LAB. SHEET No. 515/1 SAMPLE TYPE: STREAM SED. DATE: 6th January, 1971.
SOIL PROF.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm		
A. BS + 900W	70-M-712	4	5	BLD	5	4	BLD		
BS + 910W	70-M-713	2	5	BLD	5	2	BLD		
BS + 920W	70-M-714	3	5	BLD	5	2	BLD		
BS + 930W	70-M-715	4	10	BLD	10	3	BLD		
BS + 940W	70-M-716	3	5	BLD	5	2	BLD		
BS + 950W	70-M-717	3	5	BLD	10	2	BLD		
BS + 960W	70-M-718	3	10	BLD	10	3	BLD		
BS + 970W	70-M-719	3	5	BLD	10	3	BLD		
BS + 980W	70-M-720	2	5	BLD	5	3	BLD		
BS + 990W	70-M-721	3	10	BLD	10	4	BLD		
BS + 1000W	70-M-722	3	5	BLD	10	2	BLD		
		Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm	Sn %	
B. - 80 FRACTION									
QR 1	70-M-723	15	25	25	140	320	BLD	BLD	
QR 2	70-M-724	195	20	10	45	50	BLD	BLD	
QR 3	70-M-725	55	20	5	25	35	BLD	BLD	
QR 4	70-M-726	600	5	5	30	40	BLD	BLD	
QR 5	70-M-727	150	5	5	25	40	BLD	BLD	
QR 6	70-M-728	70	10	5	45	80	BLD	BLD	
QR 7	70-M-729	35	20	5	30	195	BLD	BLD	
QR 8	70-M-730	20	15	10	20	35	BLD	BLD	
QR 9	70-M-731	65	30	15	45	105	BLD	BLD	
QR 10	70-M-732	40	10	5	20	20	BLD	BLD	
QR 11	70-M-733	50	10	10	10	30	BLD	BLD	
QR 12	70-M-734	40	35	25	45	105	BLD	BLD	
QR 13	70-M-735	15	35	25	65	150	BLD	BLD	
QR 14	70-M-736	15	45	25	75	200	BLD	BLD	

METHODS:

This Laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

Cu, Ni, Co, Pb, Zn, Ag by GRC No. 1
Mo, Bi by GRC No. 2
W by GRC No. 4A
Sn by GRC No. 6A
B.L.D. = Below Limit of Detection

Chief Chemist



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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No.: 001538 PROJECT No.: EL. 7/68 and T PL 89 - DORIC PROSPECT
AND QUEENSTOWN ROAD PROSPECT
LAB. SHEET No.: 515/2 SAMPLE TYPE: STREAM SED. DATE: 6th January, 1971.
SOIL PROF.

SAMPLE No.	L.A.S. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm	Sn %
QR 15	70-M-737	10	35	35	130	290	BLD	BLD
QR 16	70-M-738	25	55	25	50	145	BLD	BLD
QR 17	70-M-739	15	45	35	100	250	BLD	BLD
QR 18	70-M-740	25	65	25	55	170	1	BLD
QR 19	70-M-741	15	45	30	75	180	1	BLD
QR 20	70-M-742	15	35	25	65	150	BLD	BLD
QR 21	70-M-743	25	55	25	40	115	BLD	BLD
QR 22	70-M-744	15	45	20	45	130	1	BLD
QR 23	70-M-745	20	40	25	65	175	1	BLD
QR 24	70-M-746	15	30	20	40	110	1	BLD
QR 25	70-M-747	15	25	15	40	105	BLD	BLD
QR 26	70-M-748	10	15	15	40	40	BLD	BLD
QR 27	70-M-749	15	35	20	55	145	BLD	BLD
QR 28	70-M-750	35	35	25	55	150	1	BLD
QR 29	70-M-751	20	25	20	40	115	BLD	BLD
QR 30	70-M-752	40	45	35	65	210	1	BLD
QR 31	70-M-753	45	50	40	70	230	1	BLD
QR 32	70-M-754	40	45	30	70	200	1	BLD
QR 35	70-M-755	35	45	35	55	180	BLD	BLD
QR 36	70-M-756	40	50	40	70	205	1	BLD
QR 38	70-M-757	35	45	30	55	160	1	BLD

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

D. Longley
for Chief Chemist



GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001538 PROJECT No. EL.7/68 - and T PL 89 - DORIC PROSPECT
AND QUEENSTOWN ROAD PROSPECT

LAB. SHEET No. 515/3 SAMPLE TYPE: STREAM SED. DATE: 6th January, 1971.
SOIL PROF.

SAMPLE No.	LAB. No.	Mo ppm	Bi ppm	Sn %				
B. + 25 FRACTION								
QR 1	70-M-723	BLD	5	BLD				
QR 2	70-M-724	15	10	BLD				
QR 3	70-M-725	BLD	5	BLD				
QR 4	70-M-726	BLD	BLD	BLD				
QR 5	70-M-727	BLD	BLD	BLD				
QR 6	70-M-728	BLD	BLD	BLD				
QR 7	70-M-729	BLD	BLD	BLD				
QR 8	70-M-730	25	10	BLD				
QR 9	70-M-731	15	5	BLD				
QR 10	70-M-732	BLD	BLD	BLD				
QR 11	70-M-733	10	BLD	INSUFFICIENT SAMPLE				
QR 12	70-M-734	15	5	BLD				
QR 13	70-M-735	10	15	BLD				
QR 14	70-M-736	15	15	BLD				
QR 15	70-M-737	10	10	BLD				
QR 16	70-M-738	10	10	BLD				
QR 17	70-M-739	BLD	10	BLD				
QR 18	70-M-740	15	10	BLD				
QR 19	70-M-741	BLD	5	BLD				
QR 20	70-M-742	10	10	BLD				
QR 21	70-M-743	20	10	BLD				
QR 22	70-M-744	10	10	INSUFFICIENT SAMPLE				
QR 23	70-M-745	10	5	BLD				
QR 24	70-M-746	15	5	BLD				
QR 25	70-M-747	BLD	BLD	BLD				
QR 26	70-M-748	10	BLD	BLD				
QR 27	70-M-749	BLD	BLD	BLD				
QR 28	70-M-750	15	5	BLD				
QR 29	70-M-751	10	BLD	BLD				
QR 30	70-M-752	25	10	BLD				
QR 31	70-M-753	25	10	BLD				
QR 32	70-M-754	15	5	BLD				
QR 35	70-M-755	15	5	BLD				
QR 36	70-M-756	25	10	BLD				
QR 37	70-M-757	30	10	BLD				

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

E. Long
for Chief Chemist

080

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001531 PROJECT No. EL.7/68 - DORIC PROSPECT

LAB. SHEET No. 526/1 SAMPLE TYPE. SOIL PROF. DATE. 15th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm
2N + 380E	70-M-466	5	15	10	25	10	1
2N + 390E	70-M-467	10	10	10	60	10	1
2N + 400E	70-M-468	2	10	5	30	5	1
2N + 410E	70-M-469	2	10	5	25	10	1
2N + 420E	70-M-470	2	10	10	70	10	1
2N + 430E	70-M-471	40	20	20	1420	180	2
2N + 440E	70-M-472	5	10	5	85	15	1
2N + 450E	70-M-473	5	10	5	80	20	1
2N + 460E	70-M-474	2	10	5	40	15	1
2N + 470E	70-M-475	5	15	10	115	60	1
2N + 480E	70-M-476	60	10	5	35	15	1
2N + 490E	70-M-477	5	20	10	50	35	1
2N + 500E	70-M-478	5	15	5	35	30	1
2N + 510E	70-M-479	15	15	10	45	150	1
2N + 520E	70-M-480	40	25	25	70	270	2
2N + 530E	70-M-481	5	15	10	25	10	1
2N + 540E	70-M-482	5	15	5	35	15	1
2N + 550E	70-M-483	10	20	5	45	15	1
2N + 560E	70-M-484	5	15	5	50	25	1
2N + 570E	70-M-485	5	10	5	35	10	1
2N + 580E	70-M-486	5	15	5	25	10	1
2N + 590E	70-M-487	2	10	5	15	10	1
2N + 600E	70-M-488	5	15	5	40	15	1
2N + 610E	70-M-489	110	25	25	140	60	2
2N + 620E	70-M-490	10	20	10	55	20	1
2N + 630E	70-M-491	45	20	15	115	25	2
2N + 640E	70-M-492	30	20	10	90	20	1
2N + 650E	70-M-493	85	20	20	110	50	1
2N + 660E	70-M-494	45	15	10	75	30	2
2N + 670E	70-M-495	5	15	5	20	15	1
2N + 680E	70-M-496	5	20	10	35	20	1
2N + 690E	70-M-497	5	20	15	75	40	1
2N + 700E	70-M-498	5	20	15	70	30	1
4N BASELINE	70-M-499	5	10	5	65	50	1
4N + 10E	70-M-500	2	10	5	20	10	1
4N + 20E	70-M-501	2	10	5	30	10	BLD
4N + 30E	70-M-502	2	10	BLD	20	5	BLD
4N + 40E	70-M-503	5	10	5	25	10	1
4N + 50E	70-M-504	2	10	BLD	30	10	BLD
4N + 60E	70-M-505	2	5	BLD	15	10	BLD
4N + 70E	70-M-506	2	5	BLD	20	10	BLD
4N + 80E	70-M-507	5	10	5	20	10	BLD
4N + 90E	70-M-508	5	10	BLD	20	10	BLD
4N + 100E	70-M-509	5	10	BLD	15	10	BLD
4N + 110E	70-M-510	2	5	BLD	15	10	BLD
4N + 120E	70-M-511	2	5	BLD	10	5	BLD

METHODS:

This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

Cu, Ni, Co, Pb, Zn, Ag by GRC No. 1

B.L.D. = Below Limit of Detection



Chief Chemist

Ray W. [Signature]

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No.: 001531/2 PROJECT No.: EL. 7/68 - DORIC PROSPECT

LAB. SHEET No.: 526/2 SAMPLE TYPE: SOIL PROF. DATE: 5th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm
4N + 130E	70-M-512	2	10	BLD	15	5	BLD
4N + 140E	70-M-513	2	5	BLD	20	5	BLD
4N + 150E	70-M-514	5	10	BLD	20	10	BLD
4N + 160E	70-M-515	2	10	BLD	20	5	BLD
4N + 170E	70-M-516	2	10	BLD	20	10	BLD
4N + 180E	70-M-517	2	10	BLD	20	10	BLD
4N + 190E	70-M-518	5	10	BLD	20	10	BLD
4N + 200E	70-M-519	2	10	5	25	10	BLD
4N + 210E	70-M-520	2	10	BLD	15	10	BLD
4N + 220E	70-M-521	5	15	5	15	10	BLD
4N + 230E	70-M-522	5	15	BLD	10	10	BLD
4N + 240E	70-M-523	5	15	5	15	10	BLD
4N + 250E	70-M-524	5	15	5	15	10	BLD
4N + 260E	70-M-525	5	10	5	15	10	BLD
4N + 270E	70-M-526	5	15	5	20	10	BLD
CZ 4N + 280E	70-M-527	15	15	5	85	25	BLD
CZ 4N + 290E	70-M-528	5	15	5	55	25	BLD
CZ 4N + 300E	70-M-529	5	15	5	65	30	BLD
CZ 4N + 310E	70-M-530	10	20	5	120	30	BLD
CZ 4N + 320E	70-M-531	20	20	10	240	90	1
CZ 4N + 330E	70-M-532	25	25	20	580	125	2
CZ 4N + 340E	70-M-533	40	20	10	340	140	1
CZ 4N + 350E	70-M-534	30	30	20	690	145	2
4N + 360E	70-M-535	10	20	15	320	75	2
4N + 370E	70-M-536	15	10	5	335	30	1
4N + 380E	70-M-537	60	30	30	850	530	2
4N + 390E	70-M-538	15	20	10	450	30	1
4N + 400E	70-M-539	35	15	10	1850	70	5
4N + 410E	70-M-540	10	15	5	195	35	1
4N + 420E	70-M-541	10	15	BLD	70	30	1
4N + 430E	70-M-542	5	10	BLD	45	10	1
4N + 440E	70-M-543	5	10	BLD	45	10	1
4N + 450E	70-M-544	5	10	5	20	10	1
4N + 460E	70-M-545	5	10	5	20	10	BLD
4N + 470E	70-M-546	10	10	5	20	10	BLD
4N + 480E	70-M-547	5	10	5	35	10	1
4N + 490E	70-M-548	5	15	5	35	10	1
4N + 500E	70-M-549	5	10	5	35	10	BLD
4N + 510E	70-M-550	5	10	5	25	10	BLD
4N + 520E	70-M-551	10	10	BLD	45	10	BLD
4N + 530E	70-M-552	5	10	BLD	70	10	BLD
4N + 540E	70-M-553	5	10	BLD	30	5	BLD
4N + 550E	70-M-554	5	10	5	40	10	1
4N + 560E	70-M-555	5	20	5	65	10	1
4N + 570E	70-M-556	5	5	5	45	10	1
4N + 580E	70-M-557	5	10	5	35	10	1

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

Chief Chemist

Ray W. [Signature]

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646083

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001532 PROJECT No. EL. 7/68 - DORIC PROSPECT

LAB. SHEET No. 526/3 SAMPLE TYPE: SOIL PROF. DATE: 15th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm		
4N + 490E	70-M-558	5	10	5	30	10	1		
4N + 600E	70-M-559	5	10	5	25	10	1		
4N + 610E	70-M-560	5	15	5	25	10	1		
4N + 620E	70-M-561	5	10	5	25	10	1		
4N + 630E	70-M-562	5	15	5	15	10	BLD		
4N + 640E	70-M-563	5	10	5	20	10	BLD		
4N + 650E	70-M-564	5	10	5	10	10	BLD		

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

Chief Chemist

Ray W. G. [Signature]

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083

646084

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001533 PROJECT No. EL.7/68 - DORIC PROSPECT

LAB. SHEET No. 526/4 SAMPLE TYPE: SOIL PROF. DATE: 15th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm		
7N + 300E	70-M-565	5	15	5	20	10	BLD		
7N + 310E	70-M-566	5	20	5	15	10	BLD		
7N + 320E	70-M-567	5	10	5	25	10	BLD		
7N + 330E	70-M-568	5	10	5	20	5	BLD		
7N + 340E	70-M-569	5	10	5	30	5	BLD		
7N + 350E	70-M-570	5	10	5	25	10	BLD		
7N + 360E	70-M-571	5	10	5	25	10	BLD		
7N + 370E	70-M-572	5	10	5	30	5	BLD		
7N + 380E	70-M-573	5	10	5	30	5	BLD		
7N + 390E	70-M-574	10	10	5	25	20	BLD		
7N + 400E	70-M-575	10	10	5	30	20	1		
7N + 410E	70-M-576	5	15	5	15	10	1		
7N + 420E	70-M-577	5	15	5	15	10	BLD		
7N + 430E	70-M-578	5	10	5	15	5	BLD		
7N + 440E	70-M-579	5	10	5	25	10	BLD		
7N + 450E	70-M-580	5	15	5	15	5	BLD		
7N + 460E	70-M-581	5	15	5	15	5	BLD		
7N + 470E	70-M-582	5	10	5	15	10	BLD		
7N + 480E	70-M-583	5	10	BLD	15	10	BLD		
7N + 490E	70-M-584	2	10	BLD	15	10	BLD		
7N + 500E	70-M-585	5	15	BLD	15	10	1		
7N + 510E	70-M-586	5	10	BLD	15	10	1		
7N + 520E	70-M-587	2	10	BLD	25	10	1		
7N + 530E	70-M-588	2	10	BLD	30	10	BLD		
7N + 540E	70-M-589	2	10	BLD	25	5	BLD		
7N + 550E	70-M-590	5	15	5	30	10	1		
7N + 560E	70-M-591	5	10	5	30	5	1		
7N + 570E	70-M-592	5	10	5	30	5	1		
7N + 580E	70-M-593	5	10	5	30	5	1		
7N + 590E	70-M-594	5	10	5	15	10	1		
7N + 600E	70-M-595	2	10	BLD	20	10	1		
7N + 610E	70-M-596	5	10	BLD	15	10	1		
7N + 620E	70-M-597	5	10	5	15	5	1		
7N + 630E	70-M-598	5	10	BLD	15	20	1		
7N + 640E	70-M-599	5	10	BLD	20	5	1		
7N + 650E	70-M-600	5	10	BLD	25	10	BLD		
7N + 660E	70-M-601	5	10	BLD	15	10	1		
7N + 670E	70-M-602	5	10	BLD	15	10	1		
7N + 680E	70-M-603	5	10	BLD	20	10	1		
7N + 690E	70-M-604	5	10	BLD	15	10	1		
7N + 700E	70-M-605	5	10	BLD	20	10	1		
6S + 400W	70-M-606	5	10	BLD	15	10	1		
6S + 410W	70-M-607	5	15	BLD	10	5	BLD		

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

Ray W. Genderson

Chief Chemist

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084

646085

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001535/6 PROJECT No. EL.7/68 - DORIC PROSPECT

LAB. SHEET No. 533/1 SAMPLE TYPE: SOIL PROF. DATE: 25th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm		
4N + 660E	70-M-608	BLD	10	BLD	10	5	BLD		
4N + 670E	70-M-609	BLD	5	BLD	10	5	BLD		
4N + 680E	70-M-610	BLD	15	BLD	10	5	BLD		
4N + 690E	70-M-611	5	5	BLD	15	5	BLD		
4N + 700E	70-M-612	5	10	BLD	15	5	BLD		
6S + 420W	70-M-613	BLD	5	BLD	10	5	BLD		
6S + 430W	70-M-614	5	10	BLD	10	5	BLD		
6S + 440W	70-M-615	BLD	10	BLD	10	BLD	BLD		
6S + 450W	70-M-616	BLD	5	BLD	10	BLD	BLD		
6S + 460W	70-M-617	BLD	5	BLD	10	5	BLD		
6S + 470W	70-M-618	BLD	5	BLD	10	10	BLD		
6S + 480W	70-M-619	BLD	5	BLD	10	5	BLD		
6S + 490W	70-M-620	BLD	10	BLD	15	BLD	BLD		
6S + 500W	70-M-621	BLD	10	BLD	15	BLD	BLD		
6S + 510W	70-M-622	BLD	10	BLD	10	BLD	BLD		
6S + 520W	70-M-623	10	15	BLD	15	5	BLD		
6S + 530W	70-M-624	5	5	BLD	10	BLD	BLD		
6S + 540W	70-M-625	BLD	10	BLD	15	5	BLD		
6S + 550W	70-M-626	BLD	5	BLD	15	5	BLD		
6S + 560W	70-M-627	S A M P L E M I S S I N G							
6S + 570W	70-M-628	5	5	BLD	15	5	BLD		
6S + 580W	70-M-629	BLD	10	BLD	10	5	BLD		
6S + 590W	70-M-630	BLD	5	BLD	10	BLD	BLD		
6S + 600W	70-M-631	BLD	10	BLD	15	5	BLD		
6S + 610W	70-M-632	5	10	BLD	10	5	BLD		
6S + 620W	70-M-633	BLD	5	BLD	15	5	BLD		
6S + 630W	70-M-634	BLD	5	BLD	15	BLD	BLD		
6S + 640W	70-M-635	BLD	10	BLD	10	BLD	BLD		
6S + 650W	70-M-636	BLD	10	BLD	15	5	BLD		
6S + 660W	70-M-637	5	10	BLD	10	5	BLD		
6S + 670W	70-M-638	BLD	5	BLD	15	BLD	BLD		
6S + 680W	70-M-639	BLD	5	BLD	10	5	BLD		
6S + 690W	70-M-640	BLD	10	BLD	10	BLD	BLD		
6S + 700W	70-M-641	BLD	10	BLD	10	5	BLD		
6S + 710W	70-M-642	BLD	10	BLD	15	5	BLD		
6S + 720W	70-M-643	BLD	10	BLD	10	5	BLD		
6S + 730W	70-M-644	BLD	10	BLD	10	5	BLD		
6S + 740W	70-M-645	BLD	10	BLD	10	BLD	BLD		
6S + 750W	70-M-646	BLD	5	BLD	10	BLD	BLD		
6S + 760W	70-M-647	BLD	5	BLD	10	BLD	BLD		
6S + 770W	70-M-648	BLD	5	BLD	10	BLD	BLD		
6S + 780W	70-M-649	BLD	10	BLD	10	BLD	BLD		
6S + 790W	70-M-650	BLD	5	BLD	10	5	BLD		
6S + 800W	70-M-651	BLD	5	BLD	10	5	BLD		
6S + 810W	70-M-652	BLD	15	BLD	15	5	BLD		
6S + 820W	70-M-653	BLD	10	BLD	15	5	BLD		

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

Cu, Ni, Co, Pb, Zn, Ag by GRC No. 1

B.L.D. = Below Limit of Detection

D. Loughrey
for Chief Chemist

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001536/77 PROJECT No. EL.7/68 - DCRIC PROSPECT

LAB. SHEET No. 533/2 SAMPLE TYPE: SOIL FROF. DATE: 25th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm
6S + 830W	70-M-654	BLD	10	BLD	10	BLD	BLD
6S + 840W	70-M-655	BLD	10	BLD	10	BLD	BLD
6S + 850W	70-M-656	BLD	10	BLD	15	BLD	BLD
6S + 860W	70-M-657	BLD	5	BLD	10	BLD	BLD
6S + 870W	70-M-658	BLD	5	BLD	10	BLD	BLD
6S + 880W	70-M-659	BLD	10	BLD	10	5	BLD
6S + 890W	70-M-660	BLD	5	BLD	10	BLD	BLD
6S + 900W	70-M-661	BLD	10	BLD	10	5	BLD
6S + 910W	70-M-662	BLD	10	BLD	10	BLD	BLD
6S + 920W	70-M-663	BLD	10	BLD	10	5	BLD
6S + 930W	70-M-664	BLD	10	BLD	10	5	BLD
6S + 940W	70-M-665	BLD	10	BLD	10	5	BLD
6S + 950W	70-M-666	BLD	5	BLD	10	BLD	BLD
6S + 960W	70-M-667	BLD	10	BLD	10	5	BLD
6S + 970W	70-M-668	BLD	10	BLD	10	BLD	BLD
6S + 980W	70-M-669	BLD	15	BLD	10	5	BLD
6S + 990W	70-M-670	BLD	10	BLD	10	5	BLD
6S + 1000W	70-M-671	2	10	BLD	10	5	BLD
6S + 1010W	70-M-672	2	10	BLD	10	5	BLD
6S + 1020W	70-M-673	2	5	BLD	10	5	BLD
6S + 1030W	70-M-674	2	5	BLD	10	5	BLD
6S + 1040W	70-M-675	5	15	BLD	10	5	BLD
6S + 1050W	70-M-676	5	10	BLD	10	5	BLD
6S + 1060W	70-M-677	2	10	BLD	10	5	BLD
6S + 1070W	70-M-678	2	5	BLD	10	BLD	BLD
6S + 1080W	70-M-679	BLD	10	BLD	10	BLD	BLD
6S + 1090W	70-M-680	2	10	BLD	5	5	BLD
6S + 1100W	70-M-681	5	10	BLD	10	15	BLD
8S + 600W	70-M-682	5	10	BLD	40	25	BLD
8S + 610W	70-M-683	10	15	BLD	45	30	BLD
8S + 620W	70-M-684	5	10	BLD	40	20	BLD
8S + 630W	70-M-685	5	10	BLD	45	25	BLD
8S + 640W	70-M-686	5	10	BLD	40	30	BLD
8S + 650W	70-M-687	10	15	5	65	25	BLD
8S + 660W	70-M-688	5	10	BLD	35	30	BLD
8S + 670W	70-M-689	5	5	BLD	40	25	BLD
8S + 680W	70-M-690	5	5	BLD	35	25	BLD
8S + 690W	70-M-691	5	10	BLD	40	25	BLD
8S + 700W	70-M-692	5	10	BLD	35	20	BLD
8S + 710W	70-M-693	2	10	BLD	30	10	BLD
8S + 720W	70-M-694	2	10	BLD	30	10	BLD
8S + 730W	70-M-695	5	10	BLD	35	15	BLD
8S + 740W	70-M-696	2	10	BLD	30	15	BLD
8S + 750W	70-M-697	2	10	BLD	30	10	BLD
8S + 760W	70-M-698	2	10	BLD	35	10	BLD
8S + 770W	70-M-699	5	20	BLD	35	10	BLD

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

E. Laughrey
for Chief Chemist

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 001537 PROJECT No. EL.7/68 DORIC PROSPECT

LAB. SHEET No. 533/3 SAMPLE TYPE: SOIL PROF. DATE: 25th January, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Ni ppm	Co ppm	Pb ppm	Zn ppm	Ag ppm
8S + 780W	70-M-700	2	10	BLD	35	10	BLD
8S + 790W	70-M-701	2	10	BLD	40	15	BLD
8S + 800W	70-M-702	2	10	BLD	30	10	BLD
8S + 810W	70-M-703	BLD	10	BLD	10	10	BLD
8S + 820W	70-M-704	BLD	10	BLD	10	10	BLD
8S + 830W	70-M-705	5	10	BLD	15	10	BLD
8S + 840W	70-M-706	5	20	BLD	10	10	BLD
8S + 850W	70-M-707	5	15	BLD	15	10	BLD
8S + 860W	70-M-708	5	10	BLD	10	10	BLD
8S + 870W	70-M-709	5	15	BLD	15	10	BLD
8S + 880W	70-M-710	5	15	BLD	10	10	BLD
8S + 890W	70-M-711	5	15	BLD	10	15	BLD

METHODS:



This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

D. Langhorne
for Chief Chemist

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No.: 007701 PROJECT No. EL.7/68H - DORIC SYLVESTER, EUREKA T.L.E
PROSPECTS

LAB. SHEET No.: 727/1 SAMPLE TYPE: ROCK DATE: 27th August, 1971.

087
646088

SAMPLE No.	LAB. No.	Pb ppm	Zn ppm	Ag ppm	Sn %				
DO 1	71-H-1539	0.60%	24.4%	44					
DO 2	71-H-1540	1.80%	18.0%	10					
E 1	71-H-1541	400	0.26%	4	0.04				
TLE A1	71-H-1542	3.9%	51.6%	86					
TLE B1	71-H-1543	1.15%	62.5%	90					
TLE C1	71-H-1544	2.1%	57.1%	270					
SY A1	71-H-1545	11.4%	18.0%	175					
SY B1	71-H-1546	2.7%	3.1%	42					
SY C1	71-H-1547	2.0%	25.6%	75					

METHODS:

This laboratory is registered by the Pb, Zn, Ag by G.R.C. No. 1
National Association of Testing
Authorities, Australia. The tests
reported herein have been per-
formed in accordance with its
terms of registration.



D. Langhoy
for Chief Chemist

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GEOCHEMICAL LABORATORY REPORT

646089

FIELD SHEET No. 003597 PROJECT No. EL. 7/68(H) - HEEMSKIRK - DORIC - MC LEAN CREEK
LAB. SHEET No. 736/1 SAMPLE TYPE: SOIL PROF. DATE: 2nd September, 1971.

SAMPLE No.	LAB. No.	Pb ppm	Zn ppm	Ag ppm					
D 14 S - 00	71-H-3191	BLD	BLD	BLD					
D 14 S - 2E	71-H-3192	5	5	BLD					
D 14 S - 4E	71-H-3193	5	BLD	BLD					
D 14 S - 6E	71-H-3194	BLD	BLD	BLD					
D 14 S - 8E	71-H-3195	BLD	5	BLD					
D 14 S - 2W	71-H-3196	BLD	BLD	BLD					
D 14 S - 4W	71-H-3197	BLD	BLD	BLD					
D 14 S - 6W	71-H-3198	10	5	BLD					
D 14 S - 8W	71-H-3199	BLD	BLD	BLD					
D 14 S - 10W	71-H-3200	20	5	BLD					
D 16 S - 00	71-H-3201	15	10	BLD					
D 16 S - 2E	71-H-3202	5	5	BLD					
D 16 S - 4E	71-H-3203	BLD	5	BLD					
D 16 S - 6E	71-H-3204	BLD	BLD	BLD					
D 16 S - 8E	71-H-3205	BLD	BLD	BLD					
D 16 S - 2W	71-H-3206	5	BLD	BLD					
D 16 S - 4W	71-H-3207	BLD	BLD	BLD					
D 16 S - 6W	71-H-3208	BLD	BLD	BLD					
D 16 S - 8W	71-H-3209	5	BLD	BLD					
D 16 S - 10W	71-H-3210	5	5	BLD					
D 18 S - 00	71-H-3211	BLD	5	BLD					
D 18 S - 2E	71-H-3212	5	5	BLD					
D 18 S - 4E	71-H-3213	BLD	BLD	BLD					
D 18 S - 6E	71-H-3214	BLD	BLD	BLD					
D 18 S - 8E	71-H-3215	5	5	BLD					
D 18 S - 2W	71-H-3216	BLD	BLD	BLD					
D 18 S - 4W	71-H-3217	5	5	BLD					
D 18 S - 6W	71-H-3218	BLD	5	BLD					
D 18 S - 8W	71-H-3219	BLD	BLD	BLD					
D 18 S - 10W	71-H-3220	BLD	BLD	BLD					
D 20 S - 00	71-H-3221	5	BLD	BLD					
D 20 S - 2E	71-H-3222	BLD	BLD	BLD					
D 20 S - 4E	71-H-3223	BLD	BLD	BLD					
D 20 S - 6E	71-H-3224	BLD	BLD	BLD					
D 20 S - 8E	71-H-3225	10	5	BLD					
D 20 S - 2W	71-H-3226	5	BLD	BLD					
D 20 S - 4W	71-H-3227	BLD	BLD	BLD					
D 20 S - 6W	71-H-3228	BLD	BLD	BLD					
D 20 S - 8W	71-H-3229	10	5	BLD					
D 20 S - 10W	71-H-3230	BLD	10	BLD					
D 22 S - 00	71-H-3231	BLD	BLD	BLD					

METHODS:

This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration.

Pb, Zn, Ag by G.R.C. No. 1

B.L.D. = Below Limit of Detection



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D. Langhrey
for Chief Chemist



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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 003598 PROJECT No. EL.7/68(H) - HEEMSKIRK - DORIC - MCLEAN CREEK
LAB. SHEET No. 736/2 SAMPLE TYPE SOIL PROFILE DATE 2nd September, 1971.

SAMPLE No.	LAB. No.	Pb ppm	Zn ppm	Ag ppm				
A	71-H-3233	BLD	BLD	BLD				
A, B	71-H-3234	SAMPLE MISSING						
A2	71-H-3235	BLD	10	BLD				
A2 B	71-H-3236	BLD	BLD	BLD				
A3	71-H-3237	BLD	5	BLD				
A3 B	71-H-3238	BLD	BLD	BLD				
A4	71-H-3239	15	45	BLD				
A4 B	71-H-3240	BLD	BLD	BLD				
A5	71-H-3241	10	5	BLD				
A5 B	71-H-3242	10	10	1				
AB 1	71-H-3243	BLD	10	BLD				
AB 2	71-H-3244	55	10	1				
B1	71-H-3245	5	BLD	BLD				
B2	71-H-3246	700	25	2				
B3	71-H-3247	5	BLD	BLD				
B4	71-H-3248	BLD	BLD	BLD				
B5	71-H-3249	BLD	BLD	BLD				
B6	71-H-3250	10	BLD	BLD				
B7	71-H-3251	BLD	BLD	BLD				
B8	71-H-3252	BLD	10	BLD				
B9	71-H-3253	5	15	BLD				

METHODS:



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646091

GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 007702 PROJECT No. EL.7/68H- PEN CREEK - HEEMSKIRK

LAB. SHEET No. 788/1 SAMPLE TYPE: SOIL PROFILE DATE: 29th September, 1971.

SAMPLE No.	LAB. No.	Pb ppm	Zn ppm	Ag ppm				
F 1	71-J-1597	20	15	1				
F 2	71-J-1598	20	10	1				
F 3	71-J-1599	90	15	BLD				
F 4	71-J-1600	BLD	BLD	BLD				
F 5	71-J-1601	5	20	BLD				
F 6	71-J-1602	40	10	1				
F 7	71-J-1603	BLD	10	1				
F 8	71-J-1604	25	20	1				
G 1	71-J-1605	5	10	BLD				
G 2	71-J-1606	30	5	BLD				
G 3	71-J-1607	15	10	BLD				
G 4	71-J-1608	20	10	BLD				
G 5	71-J-1609	10	5	BLD				
G 6	71-J-1610	BLD	BLD	BLD				
G 7	71-J-1611	10	2	BLD				
G 8	71-J-1612	BLD	5	BLD				
H 1	71-J-1613	20	10	BLD				
H 2	71-J-1614	BLD	5	BLD				
H 3	71-J-1615	15	20	BLD				
H 4	71-J-1616	20	2	BLD				
H 5	71-J-1617	BLD	2	BLD				
H 7	71-J-1618	BLD	BLD	BLD				
H 8	71-J-1619	10	BLD	BLD				

METHODS:

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Pb, Zn, Ag by G.R.C. No. 1
B.L.D. = Below Limit of Detection



Chief Chemist

Ray W. Mearns

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 007351 PROJECT No. SPL.95 (HEEMSKIRK) - MINE DUMPS AND DIKE

LAB. SHEET No. 814/1 SAMPLE TYPE: ROCK DATE: 26th October, 1971.

SAMPLE No.	LAB. No.	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sn ppm	Sb ppm	Mo ppm	Bi ppm
SW 1	71-K-625	100	1.40%	6000	18	.10%	1.40%		
SW 2	71-K-626	6400	160	770	60	.93%	380		
SW 3	71-K-627	3300	2.30%	10.30%	50	.26%	3.75%		
SW 4	71-K-628	215	850	37.2%	85	.02%	290		
Cor	71-K-642					.03%		BLD	BLD
Pr Ge	71-K-629					.28%		BLD	BLD
Mon W1	71-K-630					.03%		BLD	BLD
Mon W2	71-K-631					.04%		BLD	5
Fed W1	71-K-632					.04%		BLD	20
Fed W2	71-K-633					BLD		15	20
Fed W3	71-K-634					.04%		BLD	20
Fed C1	71-K-635					BLD		30	50
Fed C2	71-K-636					BLD		BLD	BLD
Fed LT	71-K-637					.10%		BLD	BLD
E Col	71-K-638					.14%		BLD	BLD
K 10	71-K-639					.03%		BLD	15
K 13	71-K-640					.04%		BLD	BLD
K 21	71-K-641					.02%		BLD	BLD

METHODS:



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Cu, Pb, Zn, Ag by G.R.C. No. 1
Sn by G.R.C. No. 5
Sb by G.R.C. No. 8
Mo, Bi by G.R.C. No. 2
W by G.R.C. No. 4

B.L.D. = Below Limit of Detection

Chief Chemist

Ray W. Zerkow

J. de

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 007851 PROJECT No. SPL.95 (HEEMSKIRK) - MINE DUMPS AND DIKI

LAB. SHEET No. 814/2 SAMPLE TYPE: ROCK DATE: 26th October, 1971.

SAMPLE No.	LAB. No.	W ppm							
Cor	71-K-642	BLD							
Pr Ge	71-K-629	BLD							
Mon W1	71-K-630	BLD							
Mon W2	71-K-631	BLD							
Fed W1	71-K-632	BLD							
Fed W2	71-K-633	BLD							
Fed W3	71-K-634	BLD							
Fed C1	71-K-635	BLD							
Fed C2	71-K-636	BLD							
Fed LT	71-K-637	BLD							
E Col	71-K-638	BLD							
K10	71-K-639	BLD							
K13	71-K-640	BLD							
K21	71-K-641	BLD							

METHODS:



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Chief Chemist

Ray W. Ford

093

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12 OCT 1973

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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 003102 PROJECT No. HEEMSKIRK 888 (FEDERATION MINE AREA)

LAB. SHEET No. 1461/1 SAMPLE TYPE: ROCK DATE: 9th October, 1973

SAMPLE No.	LAB. No.	Sn %						
X2	73-J-2014	0.03						
Y2A	73-J-2015	0.02						
Y2B	73-J-2016	0.02						
Y2C	73-J-2017	0.03						
Y2D	73-J-2018	0.02						
Y3	73-J-2019	1.80	*					
Y5	73-J-2020	0.03						
Y7	73-J-2021	0.03						
Y8A	73-J-2022	0.03						
Y8B	73-J-2023	0.02						
Y8C	73-J-2024	0.03						
Y8D	73-J-2025	0.08	*					
Y8E	73-J-2026	0.02						
Y8F	73-J-2027	0.03						
Y8G	73-J-2028	0.06	*					
Y11	73-J-2029	0.03						
Y12	73-J-2030	0.03						
Y13A	73-J-2031	0.28	*					
Y13B	73-J-2032	0.06						
Y13C	73-J-2033	0.03						
Y13D	73-J-2034	0.03						
Y14	73-J-2035	0.03						
Y15	73-J-2036	0.18	*					
Y15A	73-J-2037	0.09	*					
Y16	73-J-2038	0.24	*					
Y17	73-J-2039	0.84	*					
Y17A	73-J-2040	0.16	*					
Y17B	73-J-2041	0.02						
Z2	73-J-2042	0.03						
Z3A	73-J-2043	0.03						

METHODS: Sn by GRC NO. 5

* Assay results to follow



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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No. 083102/103 PROJECT No. HEEMSKIRK 888 (FEDERATION MINE AREA)

LAB. SHEET No. 1461/2 SAMPLE TYPE: ROCK DATE: 9th October, 1973

SAMPLE No.	LAB. No.	Sn %						
Z3B	73-J-2044	0.02						
Z3C	73-J-2045	0.30						
Z4A	73-J-2046	0.03						
Z4B	73-J-2047	0.03						
Z4C	73-J-2048	0.04						
Z5A	73-J-2049	0.03						
Z5B	73-J-2050	0.06	*					
Z6	73-J-2051	0.02						
Z7A	73-J-2052	0.02						
Z7B	73-J-2053	0.03						
Z8A	73-J-2054	0.03						
Z8B	73-J-2055	0.02						
Z9A	73-J-2056	0.08	*					
Z9B	73-J-2057	0.03						
Z9C	73-J-2058	0.04						
Z9D	73-J-2059	0.06	*					
Z9E	73-J-2060	0.02						
Z9F	73-J-2061	0.08	*					
Z10	73-J-2062	0.03						
K1	73-J-2063	0.02						
K2	73-J-2064	0.08	*					
K3A	73-J-2065	0.03						
K3B	73-J-2066	0.03						
K4A	73-J-2067	0.03						
K4B	73-J-2068	0.03						
K4C	73-J-2069	>10%	*					
K5	73-J-2070	0.10						
K6	73-J-2071	0.08	*					
K7	73-J-2072	0.24	*					
K8	73-J-2073	0.03						

METHODS:



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GEOCHEMICAL LABORATORY REPORT

FIELD SHEET No.: 003103 PROJECT No.: HEEMSKIRK 888 (FEDERATION MINE AREA)

LAB. SHEET No.: 1461/3 SAMPLE TYPE: ROCK DATE: 9th October, 1973

SAMPLE No.	LAB. No.	Sn %							
K9	73-J-2074	0.04							
K10	73-J-2075	0.06							
K11	73-J-2076	0.02							
K12	73-J-2077	0.03							
K14	73-J-2078	0.06	*						
K15	73-J-2079	0.03							
Z8C	73-J-2080	0.02							

METHODS:



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Chief Chemist

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LABORATORY REPORT

FIELD SHEET No.: 003108 CLIENT: EL.7/68 - HEEMSKIRK 888

LAB. SHEET No.: 1484/3 SAMPLE TYPE: ROCK DATE: 2nd November, 1973

SAMPLE No.	LAB. No.	Cu ppm	Pb ppm	Zn ppm	Bi ppm	Sn %	Sb ppm		
YA	73-K-702				190	0.14			
YB	73-K-703				285	BLD			
YC	73-K-704				210	0.06			
YD	73-K-705				15	0.06			
YE	73-K-706				10	0.03			
S1	73-K-707	70	190	280	230	0.58	180		
S2A	73-K-708	0.47%	0.33%	34.3%	310	0.03	1850		
S2B	73-K-709	0.60%	3.9%	27.0%	20	0.12	3.0%		
KC	73-K-710				10	0.87			

METHODS: Cu Pb Zn Bi by Method 1
Sn by Method 7
Sb by Method 8



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LABORATORY REPORT

FIELD SHEET No. 003109 CLIENT: EL.7/68 HEEMSKIRK 888 Sweeney Prospect
LAB. SHEET No.: 1484/4 SAMPLE TYPE: ROCK DATE: 2nd November, 1973

SAMPLE No.	LAB. No.	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sn %	Bi ppm		
A1	73-K-711	415	0.64%	2.6%	10	0.04	10		
A2	73-K-712	705	0.41%	4.5%	18	0.28	10		
A3	73-K-713	490	0.58%	2.9%	15	0.34	10		
A4	73-K-714	285	0.64%	2.5%	9	0.18	15		
A5	73-K-715	235	1.2%	1.6%	5	0.34	10		
A6	73-K-716	265	0.38%	2.0%	6	0.26	10		
A7	73-K-717	155	0.26	1.8%	3	0.09	15		
A8	73-K-718	130	0.88	0.85%	8	0.36	10		
A9	73-K-719	160	0.45	0.84%	6	0.14	10		
A10	73-K-720	145	0.46	0.95%	8	0.36	20		
A11	73-K-721	60	1150	0.80%	5	0.12	10		
A12	73-K-722	125	860	2.6%	6	0.16	10		
A13	73-K-723	30	410	460	3	0.16	10		
A14	73-K-724	40	250	1520	2	0.06	10		
A15	73-K-725	30	220	1210	1	0.07	<10		
A16	73-K-726	15	115	295	<1	0.03	<10		
A17	73-K-727	25	85	0.27%	1	0.08	20		
A18	73-K-728	10	70	590	1	0.12	<10		
A19	73-K-729	10	55	455	1	0.03	<10		
A20	73-K-730	15	565	0.25%	2	0.22	<10		
A21	73-K-731	5	295	685	1	0.09	<10		
A22	73-X-732	15	180	0.30%	2	0.26	10		
XC1	73-K-733	5	160	410	1	0.32	15		
XC2	73-K-734	10	270	770	1	0.48	10		
XC3	73-K-735	20	135	0.29%	2	0.06	<10		
XC4	73-K-736	5	420	685	1	0.06	<10		
XC5	73-K-737	<5	75	325	<1	0.04	<10		
XC6	73-K-738	<5	50	190	<1	0.02	<10		
XC7	73-K-739	<5	30	160	<1	0.03	<10		
XC8	73-K-740	<5	20	205	<1	0.02	<10		

METHODS: Cu Pb Zn Ag Bi by Method 1
Sn by Method 7



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LABORATORY REPORT

FIELD SHEET No. 003109 CLIENT: EL.7/68 - HEEMSKIRK 888

LAB. SHEET No. 1484/5 SAMPLE TYPE: ROCK DATE: 2nd November, 1973

SAMPLE No.	LAB. No.	Ni ppm	Co ppm	Cr ppm	Cd ppm	Sb %			
A1	73-K-711	10	5	55	115	0.32			
A2	73-K-712	10	5	60	230	0.22			
A3	73-K-713	10	5	55	120	0.31			
A4	73-K-714	10	BLD	75	110	0.45			
A5	73-K-715	10	5	60	65	1.30			
A6	73-K-716	5	5	25	80	0.21			
A7	73-K-717	10	10	70	75	0.15			
A8	73-K-718	10	10	70	35	0.80			
A9	73-K-719	10	10	45	35	0.27			
A10	73-K-720	15	5	60	40				
A11	73-K-721	10	10	35	35				
A12	73-K-722	10	10	45	100				
A13	73-K-723	10	10	70	3				
A14	73-K-724	15	5	65	5				
A15	73-K-725	5	5	45	5				
A16	73-K-726	10	5	40	1				
A17	73-K-727	5	5	30	10				
A18	73-K-728	10	5	25	2				
A19	73-K-729	10	10	20	2				
A20	73-K-730	20	10	65	10				
A21	73-K-731	10	5	35	3				
A22	73-K-732	10	10	45	10				
XC1	73-K-733	10	5	70	2				
XC2	73-K-734	10	10	75	3				
XC3	73-K-735	10	10	70	10				
XC4	73-K-736	15	5	85	2				
XC5	73-K-737	10	5	30	1				
XC6	73-K-738	10	5	45	2				
XC7	73-K-739	10	BLD	50	1				
XC8	73-K-740	10	BLD	55	1				

METHODS: Ni Co Cr Cd by Method 1
Sb by Method B



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LABORATORY REPORT

FIELD SHEET No.: 003110 CLIENT: EL.7/68 - HEEMSKIRK 888 FEDERATION MINE

LAB. SHEET No.: 1488 SAMPLE TYPE: ROCK DATE: 7th November, 1973

SAMPLE No.	LAB. No.	Sn %							
Y3-PY	73-L-36	0.6							

METHODS: Sn by Method 7



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646101

74-988

GEOPHOTO MINERALS REPORT 1974/3

FINAL REPORT ON THE
HEEMSKIRK AREA OF E.L. 7/68
WEST TASMANIA
APPENDIX III

646102

APPENDIX III

LIST OF DRAWINGS

HEEMSKIRK DISTRICT

- Drg. No. H.104 Extensions and reductions to areas held under E.L.7/68.
- Drg. No. H.105 Location map showing exploration status of area.
- Drg. No. H.106 South Heemskirk Tinfield (S.P.L. 95) exploration status of area.
- Drg. No. H.107 Photogeology.
- Drg. No. H.108 Regional sampling surveys.

SYLVESTER PROSPECT

- Drg. No. H.109 Reconnaissance grid.

DORIC AND T.L.E. PROSPECTS

- Drg. No. H.110 Reconnaissance geology.

FEDERATION MINE AREA

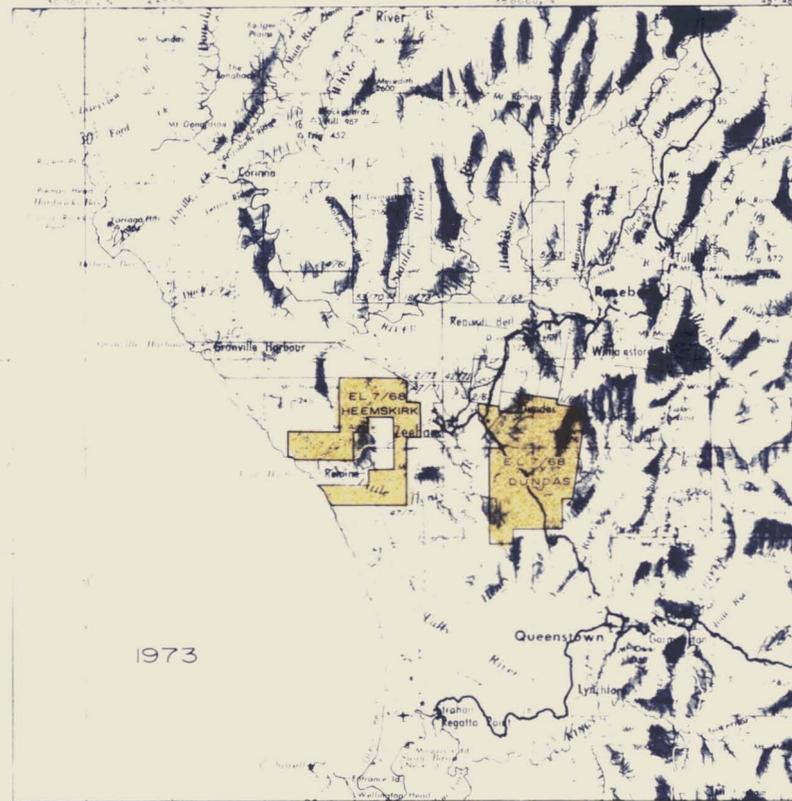
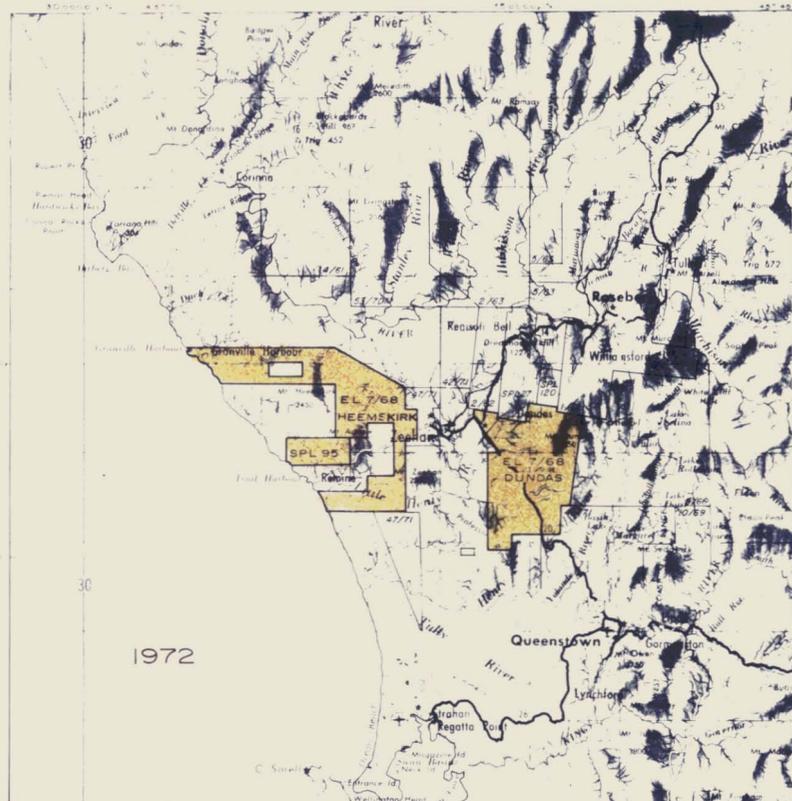
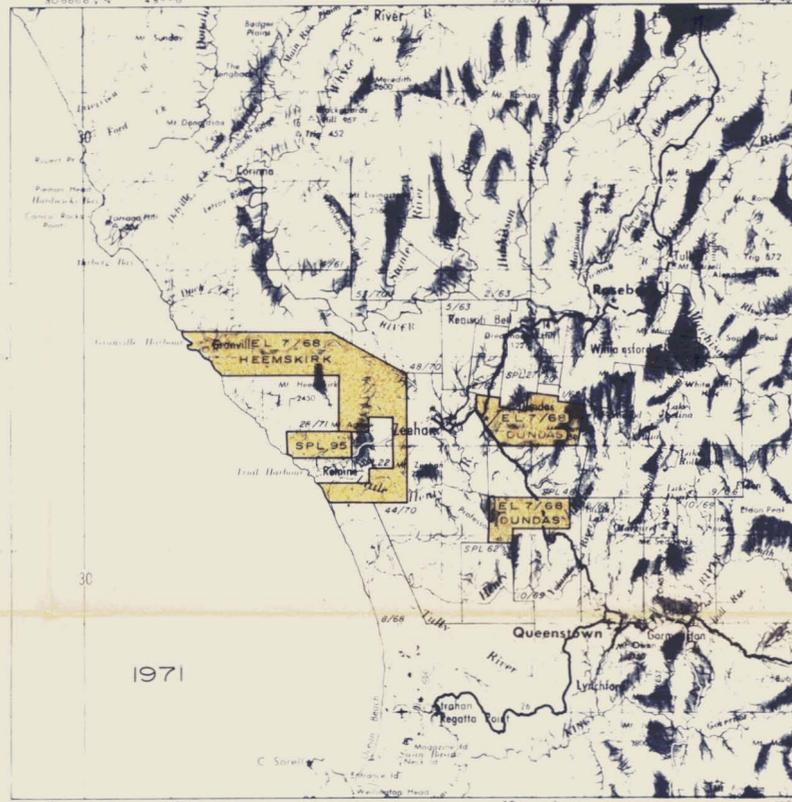
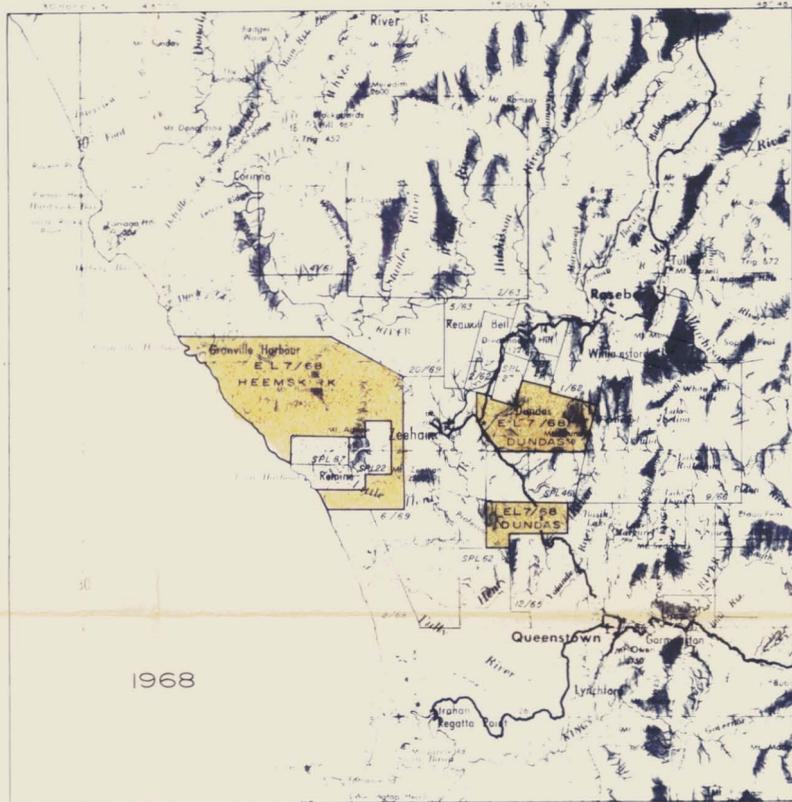
- Drg. No. H.111 Geology and sample locations.

FEDERATION MINE AND PHARLAP LODGE

- Drg. No. H.112 E.M. Orientation survey.
Tilt angle plan.
- Drg. No. H.113 Tilt angle profiles

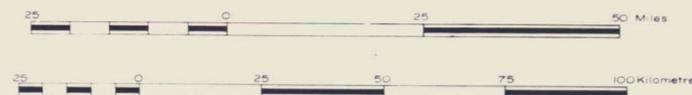
SWEENEY MINE AREA

- Drg. No. H.114 Sketch of main workings showing sample locations.
- Drg. No. H.115 E.M. orientation survey
Tilt angle plan.
- Drg. No. H.116 Tilt angle profiles.



5 cm

Scale: 1:500,000



646104

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TEXAS INSTRUMENTS INCORPORATED
GEOPHOTO RESOURCES
 SYDNEY, AUSTRALIA

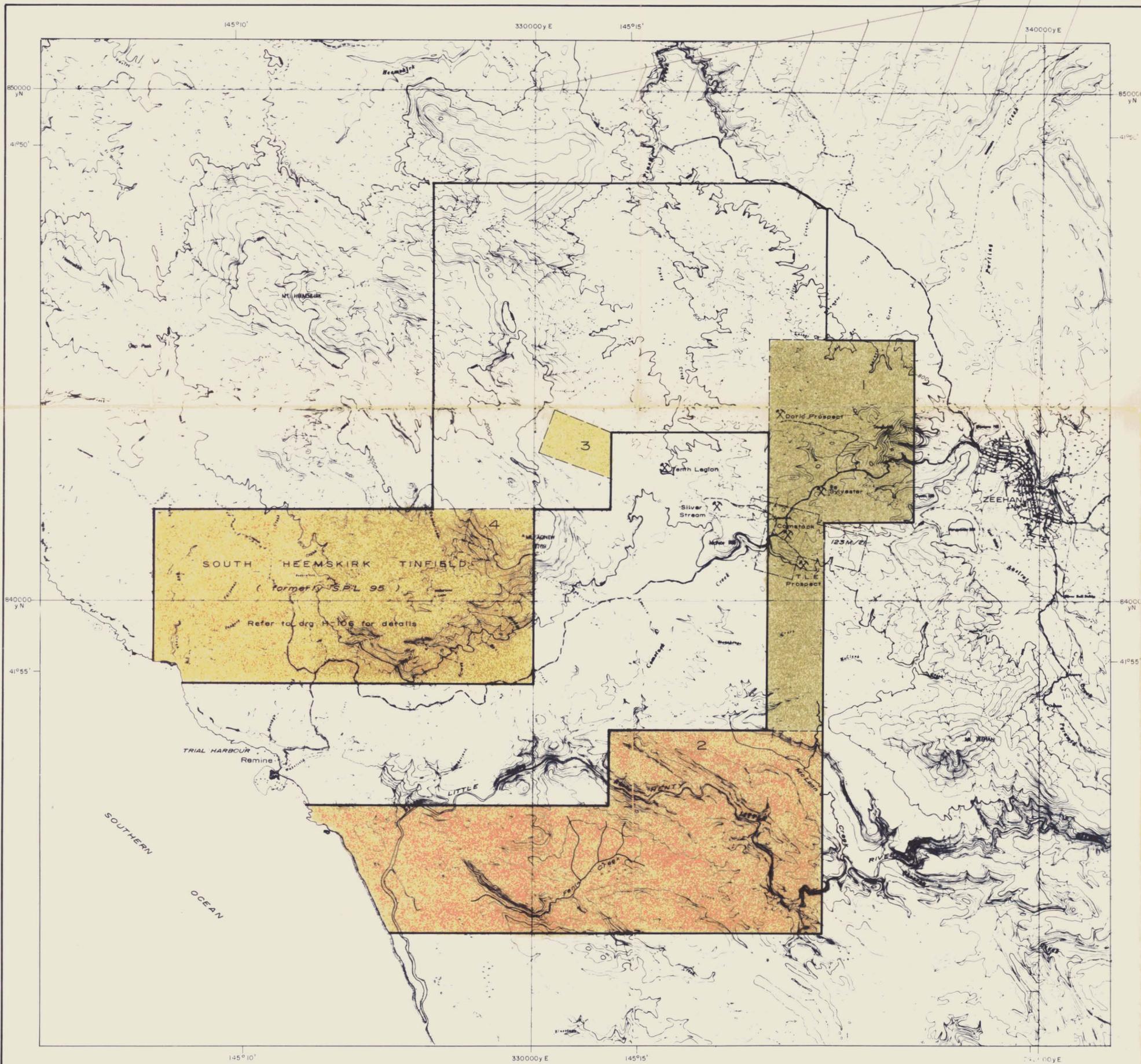
TEXINS DEVELOPMENT PTY. LTD.

EL 7/68 HEEMSKIRK & DUNDAS DISTRICTS, TASMANIA



EXTENSIONS AND REDUCTIONS
 TO AREAS HELD UNDER
 EXPLORATION LICENCE 7/68

PROJECT	888	AUTHOR	L. Discala	DATE	Jan '74	DWG NO	H-104
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REGIONAL
Photogeology
Stream sediment survey

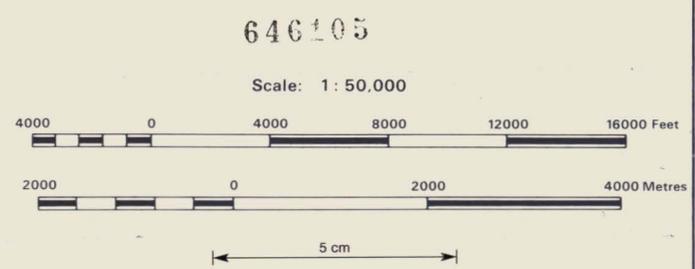
1 SYLVESTER - DORIC - T.L.E. PROSPECTS
Pb, Zn
Grid: Doric - 17,000 line feet
Sylvester - 40,000 line feet
Geol: reconnaissance
Geol: soil sampling, rock sampling
Geop: I.P. over selected lines of Sylvester Grid
Drill: 1DDH - Si, in Sylvester area

2 LITTLE HENTY AREA
Pb, Zn
Geol: soil survey over some traverse lines

3 TENTH LEGION AREA
Fe, Pb, Zn
Grid: 8 lines across the four zone
Geol: reconnaissance
Geol: rock and soil sampling over reconnaissance grid
Geop: magnetic and V.L.F. surveys

4 SOUTH HEEMSKIRK TINFIELD
(formerly S.P.L. 95)
Refer to drg. H-106 for details

- LEGEND
- Gravel road
 - Vehicular track
 - Foot track
 - Watercourse
 - Contours
 - Old prospect
 - Boundary of E.L. 7/68
 - Boundary of Mineral Lease held by others
- Base map compiled from Tasmanian Topographical Series
Zeehan C & Zeehan D.



74-988

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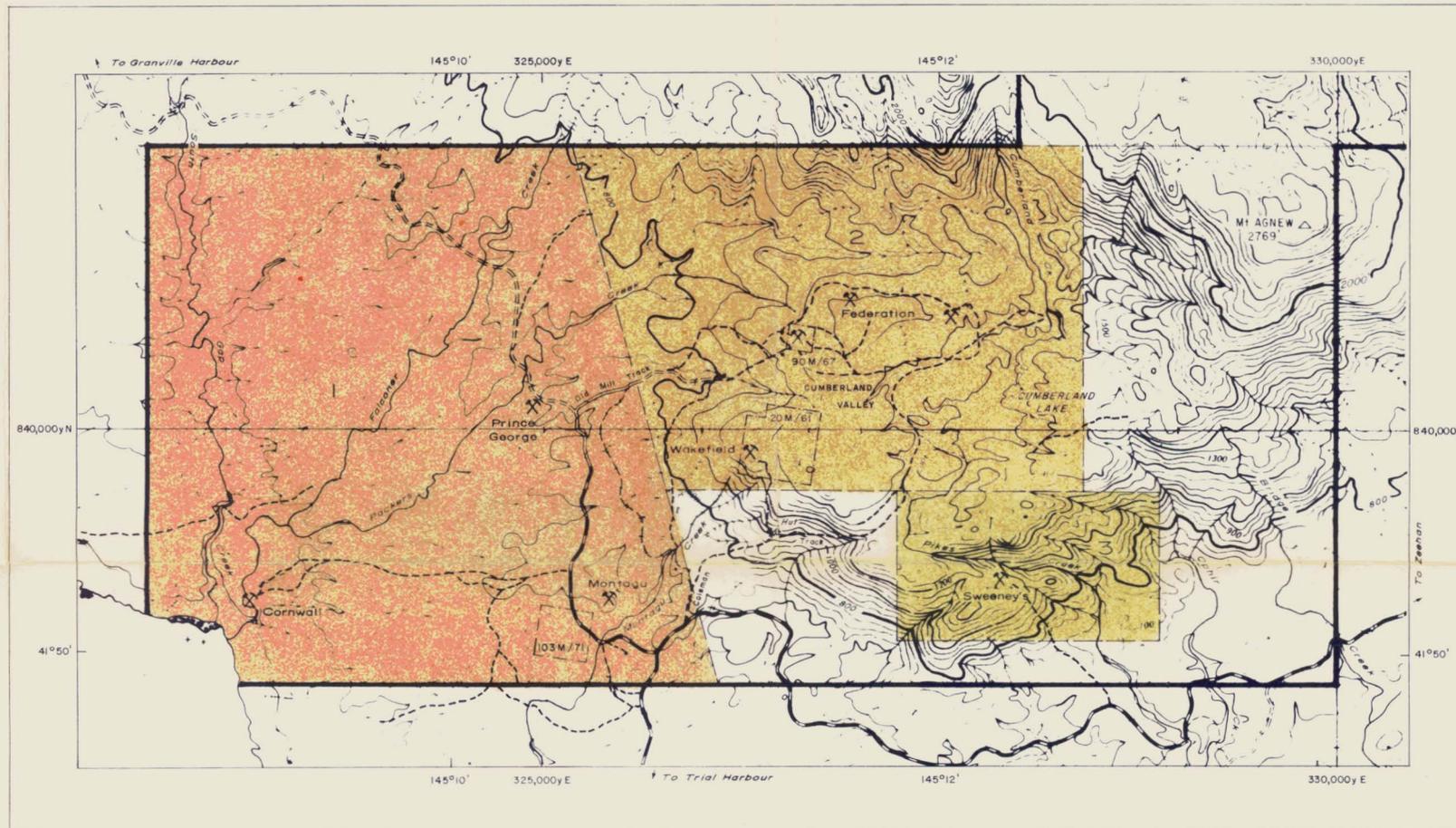
GEOPHOTO RESOURCES
SYDNEY, AUSTRALIA

TEXINS DEVELOPMENT PTY. LTD.

E.L. 7/68 HEEMSKIRK DISTRICT, TASMANIA

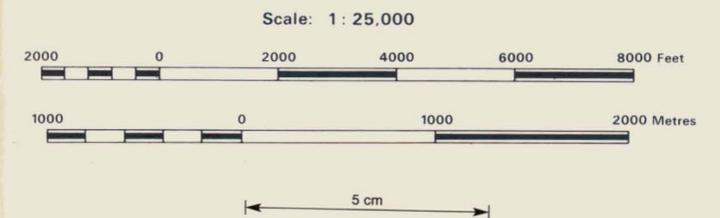
LOCATION MAP
showing exploration status of area

PROJECT	888	AUTHOR	L. Discala	DATE	Jan. '74	DWG. NO.	H-105
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- LEGEND**
- Gravel road
 - Vehicular track
 - Foot track
 - Watercourse
 - Contours
 - Old prospect
 - Boundary of E.L. 7/68
 - Boundary of Mineral Lease held by others.

Base map compiled from Tasmanian Topographical Series
Zeehan C.



REGIONAL

Photogeology
V.L.F. E.M. magnetometer and radiometer

Stream sediment geochemistry
Selective rock geochemistry over mine dumps and outcrops

1 **WEST HEEMSKIRK**
(PRINCE GEORGE, MONTAGU,
CORNWALL PROSPECTS)

Geol. Reconnaissance

Geoc. Selective over mine dumps and outcrops

2 **FEDERATION MINE AREA**

Geol. Mapping at scale 1:5000 of a selected area.

Geoc. Rock geochemistry over mine dumps and outcrops

Geoph. E.M. Orient Survey

Grid : 4000 line ft.

3 **SWEENEY MINE AREA**

Geol. Reconnaissance

Geoc. Rock geochemistry over mine dumps
Underground chip sampling.

Geoph. E.M. Orient Survey

Grid : 15,600 line ft.

646106

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E.L.7/68 HEEMSKIRK DISTRICT, TASMANIA

SOUTH HEEMSKIRK TINFIELD
(formerly S.P.L. 95)

EXPLORATION STATUS OF AREA

PROJECT	888	AUTHOR	L. Discala	DATE	Jan '74	DWG. NO.	H-106
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LEGEND

QUATERNARY	Q	Alluvium
TERTIARY	Tg	Gravels and conglomerate
	Tl	Limestone
	Ts	Sand, silt and clay
PERMIAN	Pc	Cygnel Coal Measures
	Pf	Ferntree Group undivided
	Pw	Woodbridge Glacial Formation
	Pz	Zeehan Glacial Formation
DEVONIAN	Db	Bell Shale
	Df	Florence Quartzite
SILURIAN	Sec	Austral Creek Siltstone
	Sk	Keel Quartzite
ORDOVICIAN	So	Amber Slate
	Sc	Crotty Quartzite
	Og	Gordon Limestone
CAMBRIAN	Om	Moina Sandstone
	Oz	Mt. Zeehan Conglomerate
PROTEROZOIC	Cd	Dundas Group undivided
	Cc	Crimson Creek Formation
	Pua	Oonah Quartzite

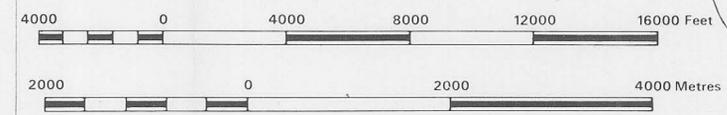
IGNEOUS ROCK

TERTIARY	Tb	basalt
JURASSIC	Jd	dolerite
DEVONIAN	Dg	granite
CAMBRIAN	Eg	gabbro, norite and dolerite
	Es	serpentinite and pyroxene

⊕	Bedding appears horizontal on photograph
— — —	Dip group 1, less than 3°
— — —	Dip group 2, 3° to 10°
— — —	Dip group 3, 10° to 25°
— — —	Dip group 4, 25° to 45°
— — —	Dip group 5, 45° to nearly vertical
— — —	Bedding appears vertical on photograph
— — —	Overtured bedding
— — —	Dip and strike. Amount of dip cannot be determined on photograph
— — —	Trend line or strike of structural grain
— — —	Fault, normal or reverse
— — —	Fault, position indefinite
— — —	Fault, inferred
— — —	Transcurrent fault
— — —	Distinctive lineation. Possible fault or fracture
— — —	Dyke or vein
— — —	Joint
— — —	Anticline. Arrow denotes plunge, dashed where indefinite, questioned where inferred.
— — —	Syncline. Arrow denotes plunge, dashed where indefinite, questioned where inferred.
— — —	Contact, dashed where indefinite, questioned where inferred.
— — —	Change in lithology
— — —	Identifies isolated or faulted segment with labelled area
— — —	Boundary of E.L. 7/68
— — —	Boundary of Mineral Lease held by others

5 cm

Scale: 1 : 50,000



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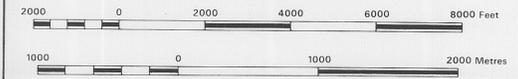
PHOTOGEOLOGY

646107

PROJECT	888	AUTHOR	R.Kopp	DATE	Feb, '70	DWG N°	H-107
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Scale: 1:25,000



LEGEND

- ▲ 1969 stream sediment sample location
- ▼ HK 1969 rock sample location (J. Klesimsky)
- ▼ K 1971 rock sample location
- 1971 soil sample location
- ==== Gravel road
- Vehicle track
- ⌵ Old workings
- ~ Watercourse
- E.L. 7/68 boundary



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REGIONAL SAMPLING SURVEYS

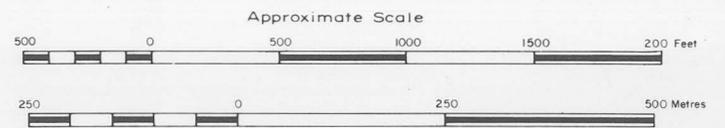
646108



- LEGEND**
- Gravel road
 - Vehicular track
 - Watercourse
 - Contours
 - Shaft
 - Adit
 - Diamond drill hole collar location showing horizontal projection.
 - Boundary of E.L. 7/68
 - Boundary of Mineral Lease held by others

TRUE NORTH

Revised in January, 1974



74-988

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GEOPHOTO RESOURCES

SYDNEY, AUSTRALIA

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E.L.7/68 HEEMSKIRK DISTRICT, TASMANIA

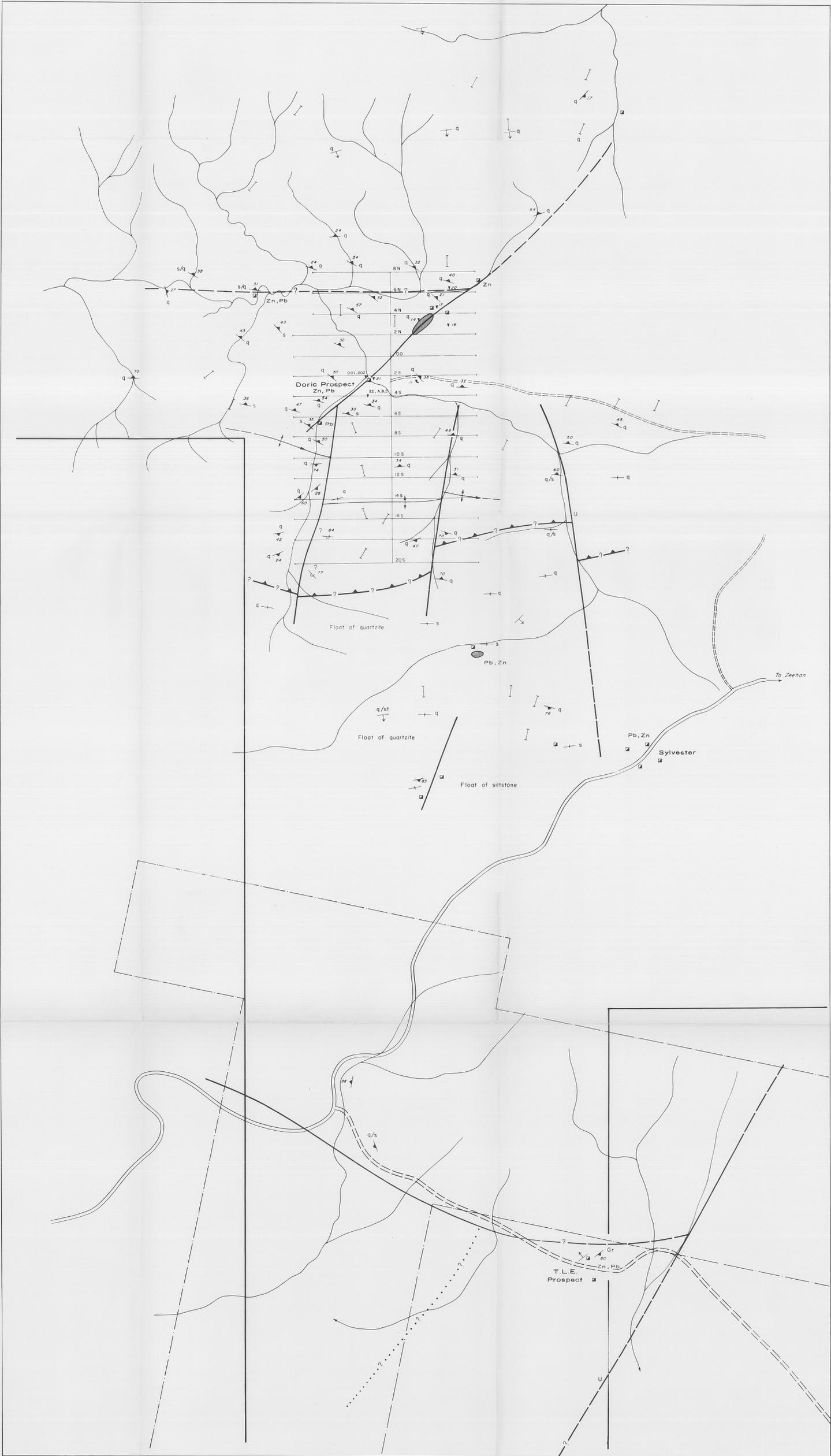
SYLVESTER PROSPECT
RECONNAISSANCE GRID

646109

5 cm

PROJECT	888	AUTHOR	I Neuss	DATE	April '70	DWG N°	H-109
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LEGEND

- ?·?·?·?· Geological boundary - inferred
- ?— Reverse fault - inferred
- ? Fault, dashed where indefinite, questioned where inferred
- ↕ Anticline
- ↗ Strike and dip of beds
- ⊥ Vertical beds
- ↖ Overturned bed
- ⊥ Joints

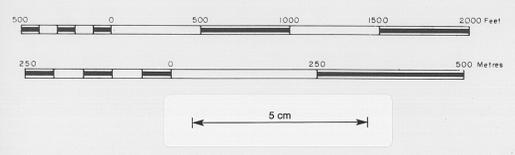
- Old working
- ⊥? Rack (dump, outcrop) sample location
- Geochemical anomaly

- q Quartzite
- s Slate
- q/s Contact quartzite / slate
- gr Greywacke
- st Siltstone

- Gravel road
- Vehicular track
- ~ Watercourse
- Boundary of E.L. 7/68
- Boundary of Mineral Lease held by others

T.N.

Approximate Scale



74-988

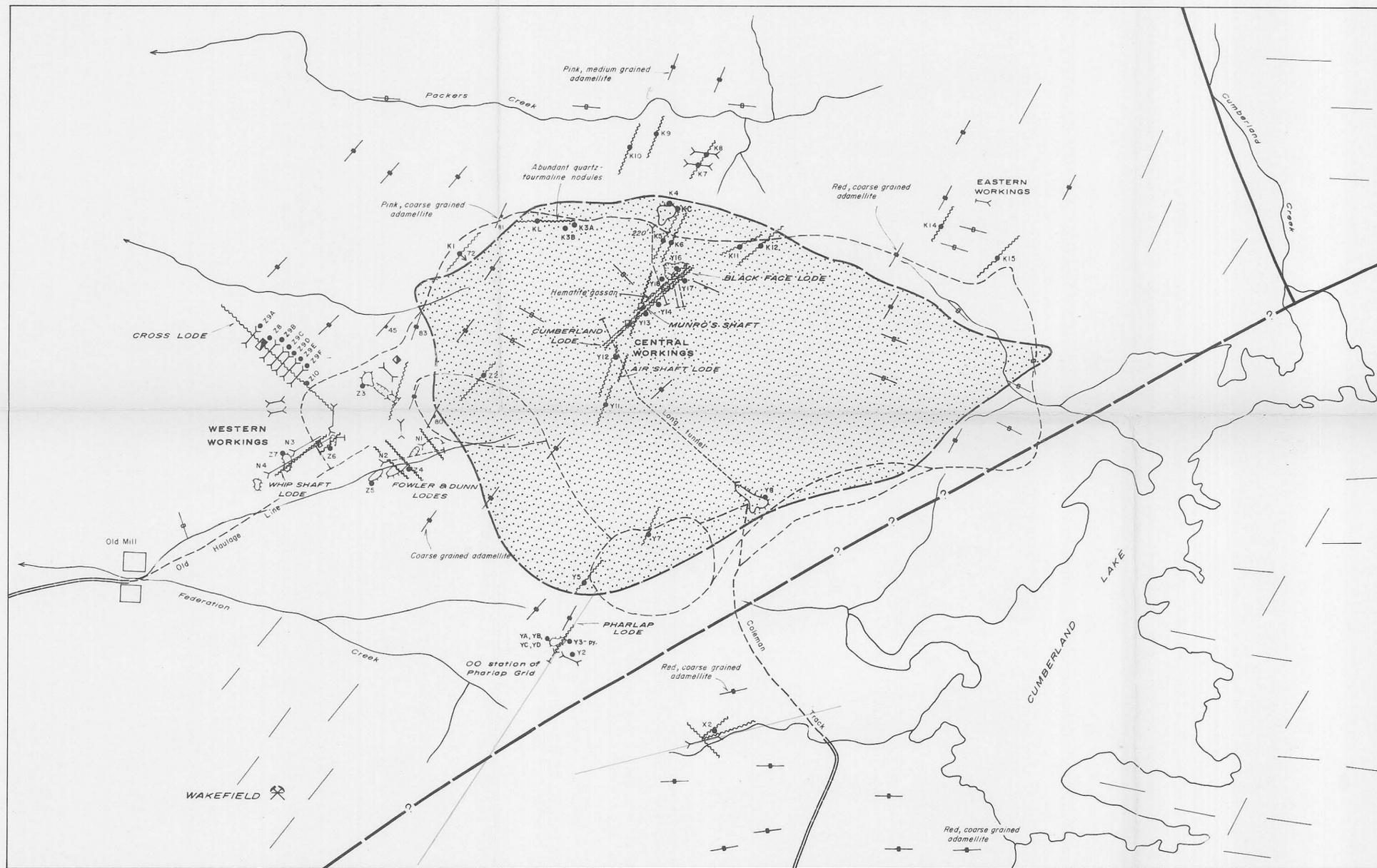
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 E.L.7/68 HEEMSKIRK DISTRICT, TASMANIA



DORIC AND T.L.E. PROSPECTS
 RECONNAISSANCE GEOLOGY
 646110

Compiled from various sources in Jan, '74



LEGEND

Aplite Granite

Lithologic boundary, indefinite

Fault, inferred

Quartz-Tourmaline vein

Master set of joints

Secondary set of joints

Lineament (from aerial photographs)

Trench

Adit
Adit level numbers show depth below Munro's Shaft.

Shaft

Dump

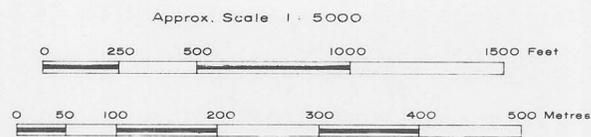
Prospect (abandoned)

Open cut

K3A Sample location

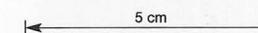
4 wheel drive vehicle track

Walking track



Note: Base map compiled from enlargement of aerial photograph T324-30 Run 10, Pieman. Lands Dept. of Tasmania. (1956)

646111

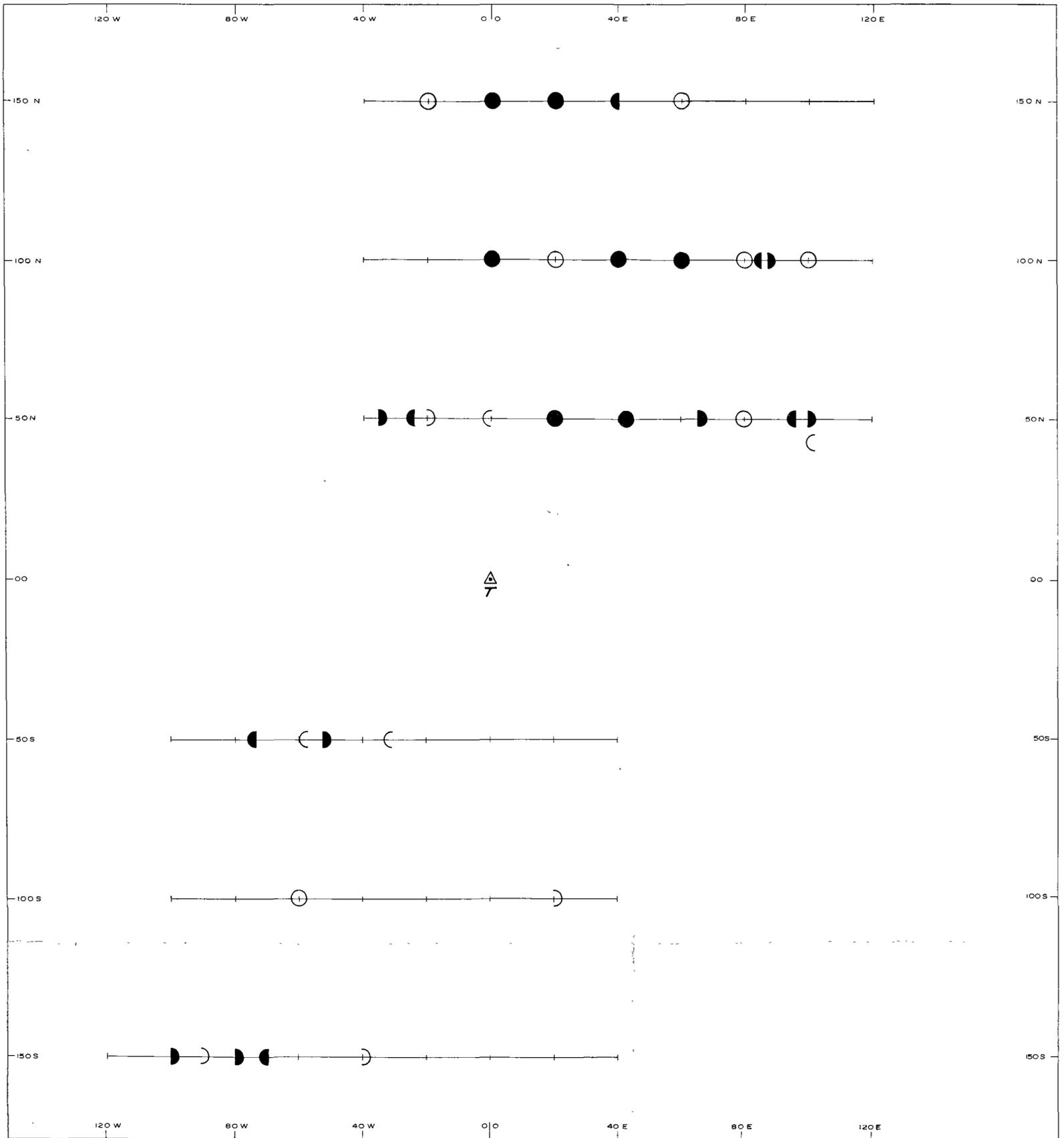


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 TEXINS DEVELOPMENT PTY. LTD.
 EL. 7/68 HEEMSKIRK DISTRICT, TASMANIA.

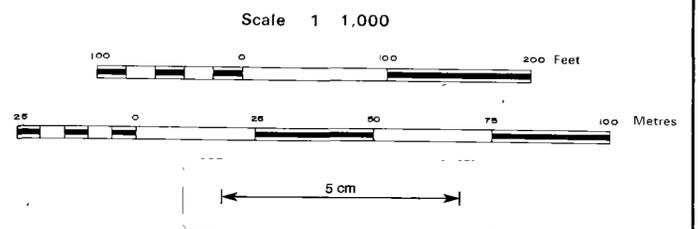
FEDERATION MINE AREA
 RECONNAISSANCE GEOLOGY
 AND SAMPLE LOCATIONS

PROJECT	888	AUTHOR	L.DISCALA	DATE	OCT. '73	DWG N°	H-III
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- ▲ Transmitter station location 00/00
- (Inflection point frequency 1000 Hz
-) Inflection point frequency 5000 Hz
- Inflection point frequency 1000 Hz & 5000 Hz
- ◐ Crossover frequency 1000 Hz
- ◑ Crossover frequency 5000 Hz
- Crossover frequency 1000 Hz & 5000 Hz

Note For location of grid refer to drawing H-111



74-988

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GEOPHOTO RESOURCES

SYDNEY, AUSTRALIA

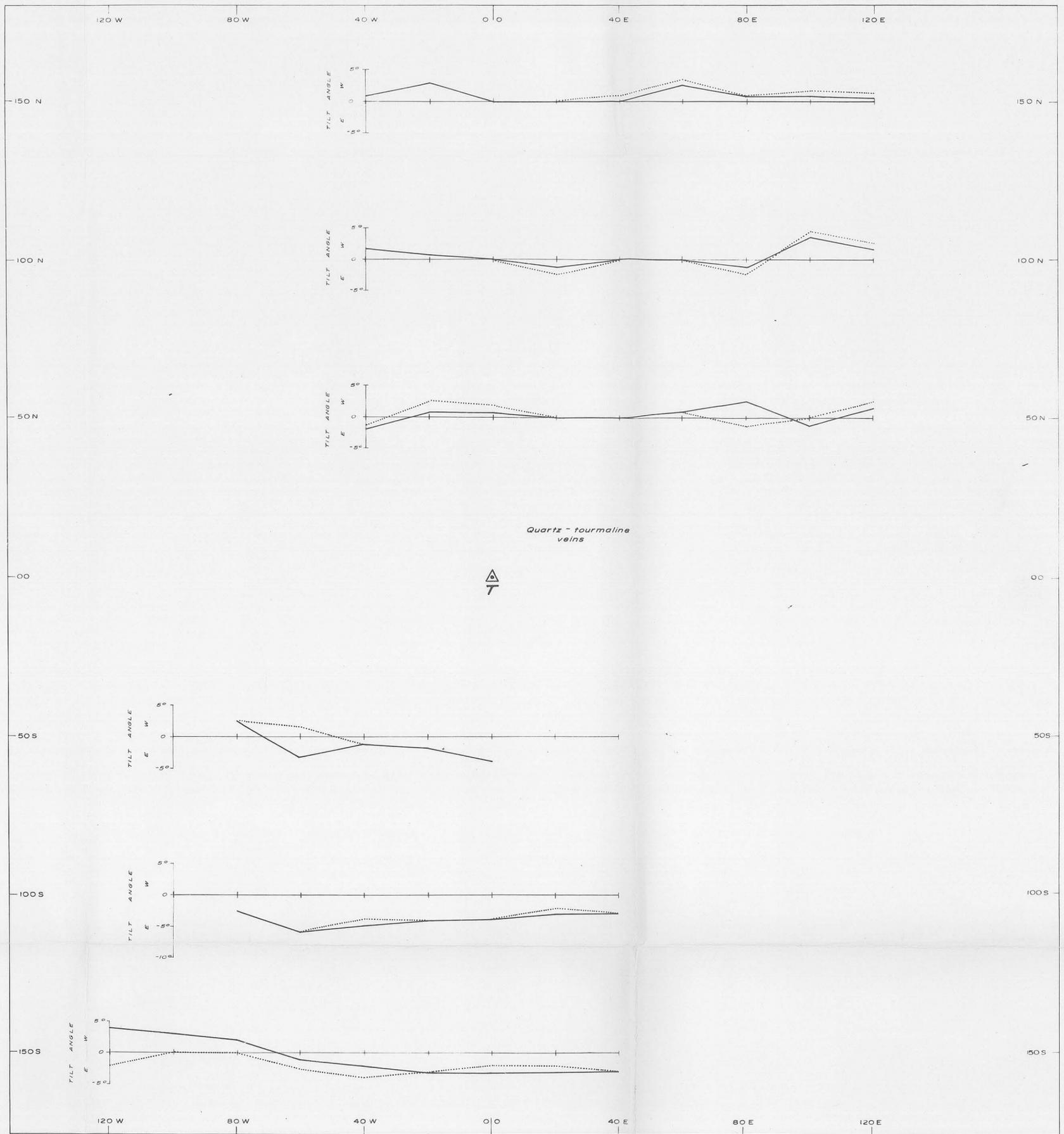
TEXINS DEVELOPMENT PTY. LTD.

E.L.7/68 HEEMSKIRK DISTRICT, TASMANIA

FEDERATION MINE AREA
PHAR-LAP LODE

E.M Orientation Survey
TILT - ANGLE PLAN 646112

PROJECT	888	AUTHOR	L. Discola	DATE	Jan '74	DWG. NO.	H-112
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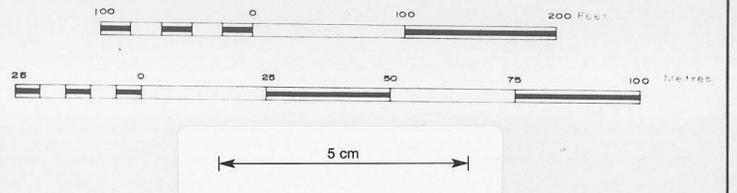
△ Transmitter station location 00/00

— 1000 Hz
 5000 Hz



Note: For location of grid refer to drawing H-111

Scale 1: 1,000



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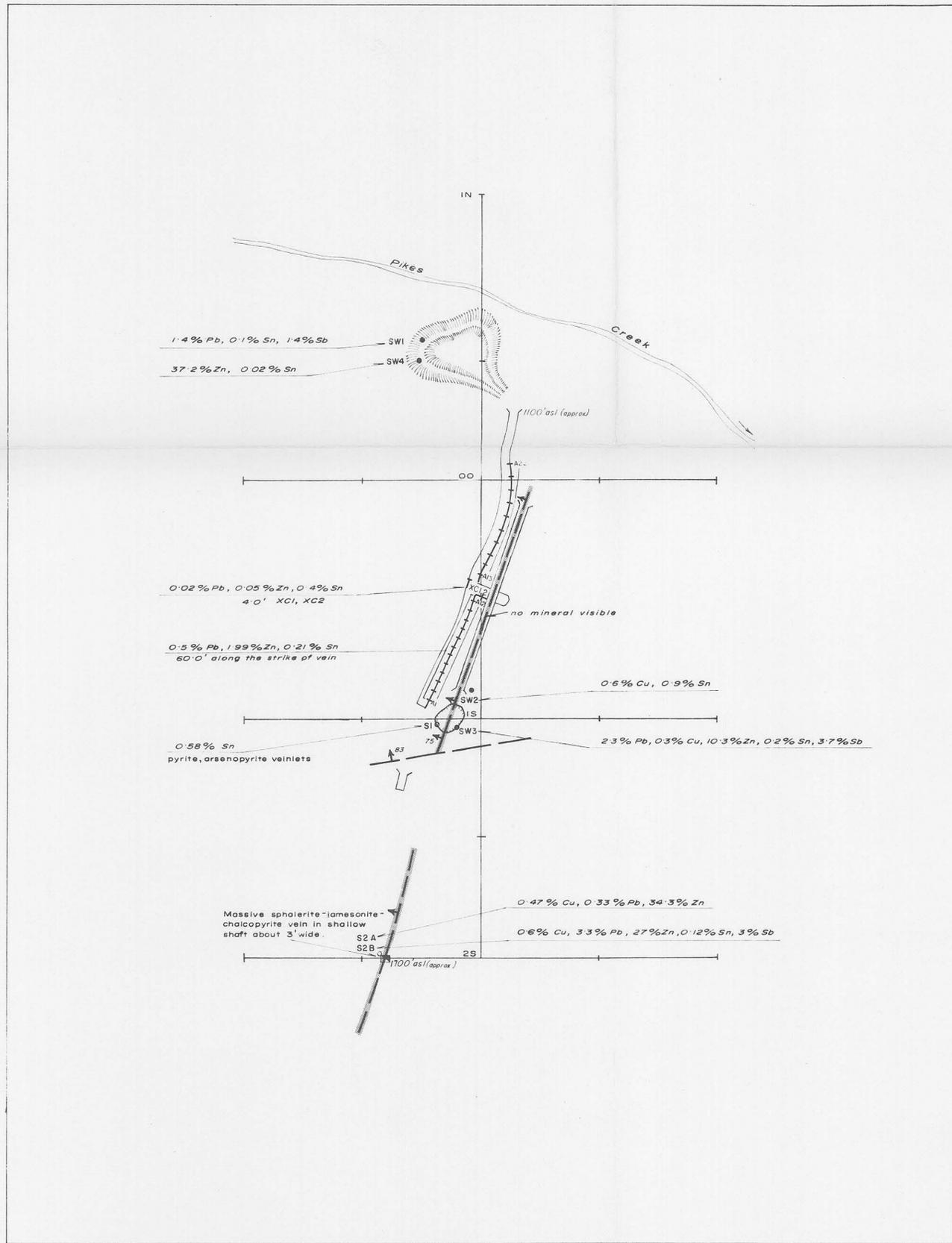
FEDERATION MINE AREA
 PHAR-LAP LODGE

E.M. Orientation Survey
 TILT ANGLE PROFILES



PROJECT	888	AUTHOR	L. Discala	DATE	Jan '74	DWG N°	H-113
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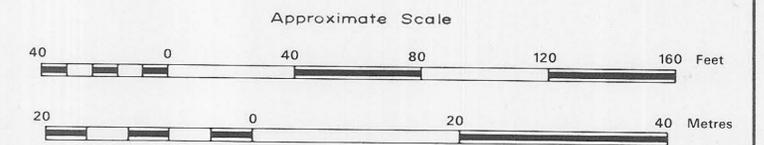
640113



LEGEND

- Fault, dashed where indefinite
- Mineralised vein, dashed where indefinite
- Shaft
- ⊓ Adit
- Open cut
- ⊕ Dump
- ⊖ Trench
- † A12 Drift sample (Assay results on Lab. sheet 1484/4)
- S1 Outcrop sample
- SW1 Dump sample

TRUE NORTH



74-988

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GEOPHOTO RESOURCES

SYDNEY, AUSTRALIA

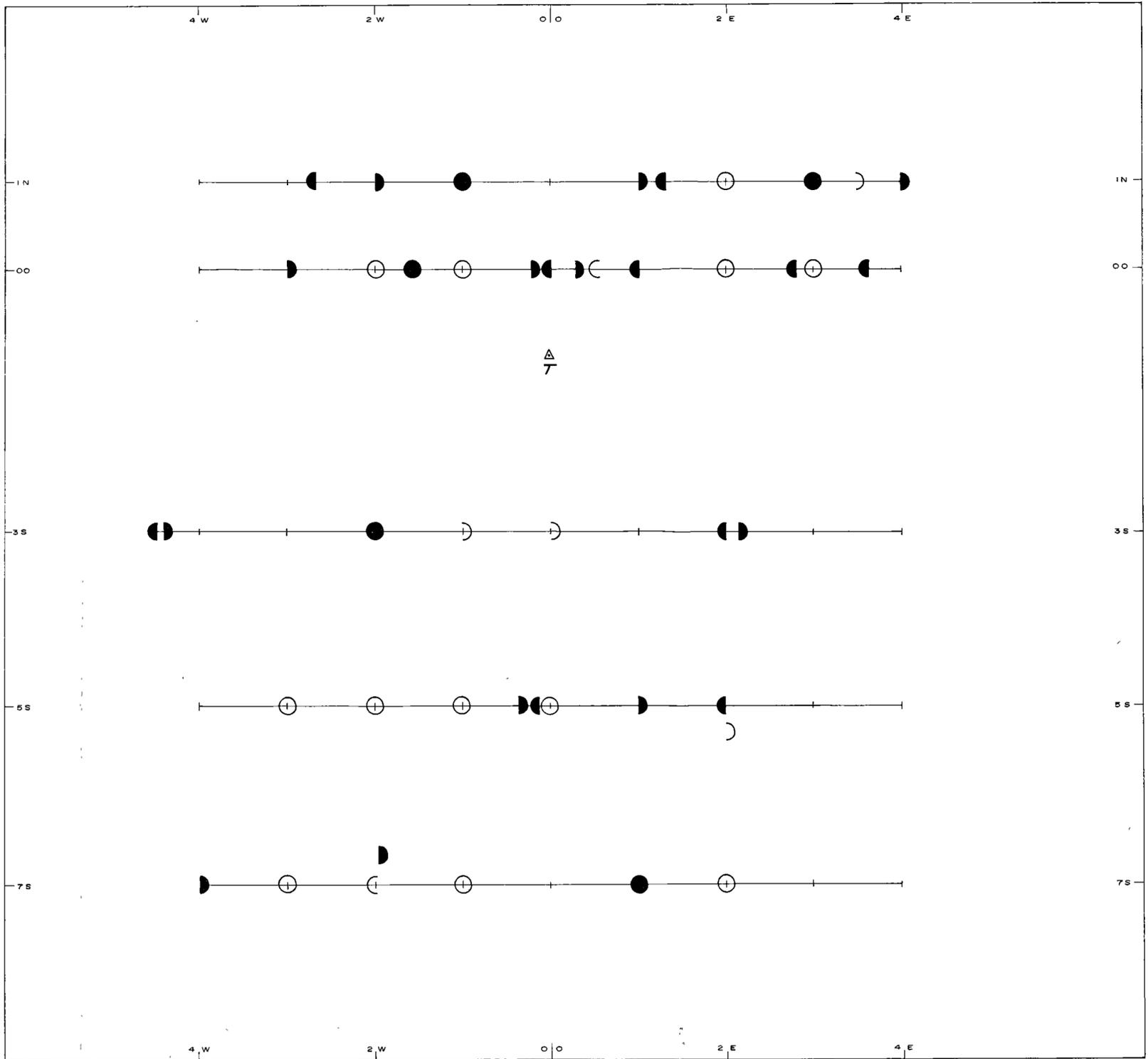
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E.L.7/68 HEEMSKIRK DISTRICT, TASMANIA

SWEENEY MINE AREA

SKETCH OF MAIN WORKINGS
SHOWING SAMPLE LOCATIONS
C46114

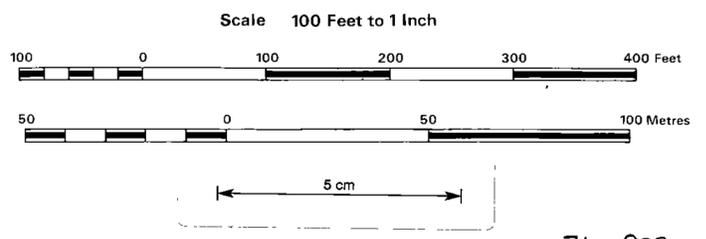
PROJECT	888	AUTHOR	L. Discola	DATE	Jan. '74	DWG NO	H-114
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- $\frac{\Delta}{7}$ Transmitter station location 1S/00
- \circ Inflection point frequency 1000 Hz
- \circ Inflection point frequency 5000 Hz
- \circ Inflection point frequency 1000 Hz & 5000 Hz
- \bullet Crossover frequency 1000 Hz
- \bullet Crossover frequency 5000 Hz
- \bullet Crossover frequency 1000 Hz & 5000 Hz

Note For location of grid refer to drawing H-114

TRUE NORTH



74-988

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GEOPHOTO RESOURCES

SYDNEY, AUSTRALIA

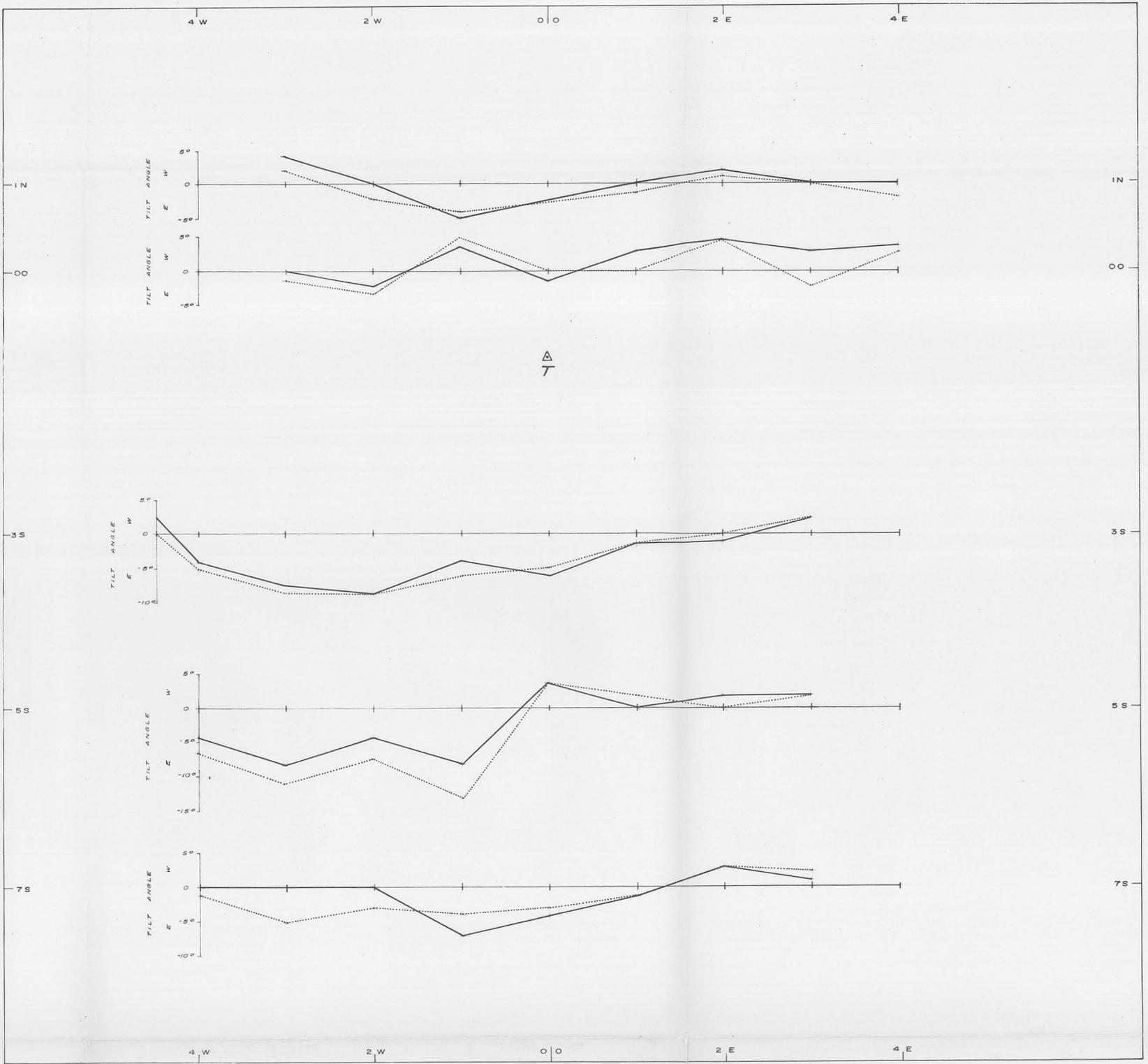
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SWEENEY MINE AREA
E.M. Orientation Survey
TILT - ANGLE PLAN

PROJECT	888	AUTHOR	L. Discola	DATE	Jan '74	DWG N°	H-115
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640115



△ Transmitter station location 1S/00

— 1000 Hz
 5000 Hz

TRUE NORTH

Note: For location of grid refer to drawing H-114

Scale: 100 Feet to 1 Inch



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SWEENEY MINE AREA
 E.M. Orientation Survey
 TILT ANGLE PROFILES

PROJECT	888	AUTHOR	L. Discala	DATE	Jan '74	DWG NO	H-116
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646116