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MINOPS PTY. LTD.

SPECIAL PROSPECTING LICENCE 120  
NORTH DUNDAS, TASMANIA.

REPORT ON EXPLORATION ACTIVITIES FOR PERIOD  
15th DECEMBER 1972 to 15th JUNE 1974.

JULY 1974.

C. E. LAYDEN.

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at Razorback, Near Zeehan, Tasmania on behalf of  
Minops Pty. Ltd. March-April 1974 - Scintrex Pty.Ltd.

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INTRODUCTION:

Minops Pty. Ltd. has undertaken exploration for base metals within the areas of Special Prospecting Licence 120 situated in the County of Montagu, Dundas; Tasmania.

Exploration comprised assessment of findings by previous explorers, field inspections; geochemical sampling, a reconnaissance electrical induced polarisation survey and a two hole diamond drilling programme. Results disclose uneconomic tin mineralisation warranting further investigation.

This report summarises the exploration procedures applied during the period 15th December, 1972 to 15th June, 1974 and makes recommendations for continued investigation.

THE TENEMENT AND LOCATIONS.

During the period December 1972 to June 1973, S.P.L. 120 constituted ground previously known as S.P.L. 20 and S.P.L. 99. The licence encompassed 801.28 hectares (1980 acres) located 13 kilometers north-east of Zeehan; 5 kilometres south-east of Renison Bell. (See Fig 1)  
The area is defined:

Commencing at the north-east angle of the area whose grid co-ordinates are 849,550 yards N, 352,980 yards E and being the south-east angle of E.L. 5/63 thence on the east by 180 chains southerly by part of a western boundary of E.L. 1/62 on the south by 110 chains westerly by part of a northern boundary of E.L. 7/68 on the west by 180 chains northerly by an eastern boundary of S.P.L. 27 thence on the north by 110 chains easterly by part of a southern boundary of E.L. 5/63 aforesaid to the point of commencement.

This area is scheduled as Part 1 of the Licence and is subject to the exemption of Mineral Lease 12M/42 of 40 acres located centrally within the area.

During May 1973, Minops Pty.Ltd. applied for a licence to explore the southern half of the previously known S.P.L. 27, 8 kilometers E.N.E of Zeehan. This area was annexed to S.P.L. 120 in July 1973 and scheduled Part 11.

S.P.L. 120 Part 11 is defined

Commencing at the posted notice situated at the south-east corner of the area whose co-ordinates are 843,950 yards N. 348,850 yards E and being a north-west corner of E.L. 7/68 thence 1 mile 16 chains northerly along a western boundary of E.L. 7/68 aforesaid to a point on the southern boundary of E.L. 42/71 thence 1 mile 53 chains westerly along the southern boundary to a point on the eastern boundary of E.L. 2/62 thence 74 chains southerly along the eastern boundary to the south-east corner of that licence and being a point on a northern boundary of E.L. 7/68 aforesaid thence 8 chains easterly 22 chains southerly 1 mile 45 chains again easterly along part of a northern, an eastern and again a northern boundary of E.L. 7/68 aforesaid to the point of commencement.

S.P.L. 120 was renewed in December 1973 to 15th June, 1974 and is currently subject to the application for renewal to 15th December, 1974.

S.P.L. 120 PART 1

GEOLOGY

Rock types contained within S.P.L. 120 Part 1 comprise Proterozoic and Cambrian sediments locally intruded by basic dykes. Blissett (1962) and the Consolidated Syndicate (1967-70) assigned the sediments as belonging to the Oonah Quartzites and Slates of the Upper Proterozoic; Crimson Creek Formation; and the Razorback Conglomerates and Brewery Junction Formation of the Upper Cambrian, Dundas Group.

The Razorback Conglomerates are represented by greywackes and conglomerates and the Brewery Junction Formation by slates, shales, siltstone and greywackes. Middle Cambrian volcanics interbedded with sediments are reported within the vicinity of the Curtain Davis Mine on the Godkin Ridge and neighbouring the Montezuma Falls.

Basic dykes locally intrude the Brewery Junction Formation. Decomposed gabbro is exposed in the Tram Formation cutting immediately west of Frazer Creek and a larger, less decomposed body is present within the western boundary of the property to the north of the Tram Formation.

The rock units are tightly folded along a north trending axis which displays local plunge reversals. Faulting is locally intense with dominant N.N.W and N.N.E strikes.

Mineralisation occurs as fissure veins and may be loosely classified by mineralogy into:

- 1 Silver-Copper-Lead ores with a siderite gangue.

Mineral assemblages are complex and include galena, tetrahedrite chalcopyrite, sphalerite with jamesonite, bismuthenite, arsenopyrite, pyrite and pyrrhotite in a siderite and quartz gangue.

- 2 Cassiterite-Sulphide ores with a quartz gangue.

Mineralogy includes chalcopyrite, pyrrhotite, arsenopyrite and cassiterite.

Ore developments are structurally controlled by shearing with intersections and flexures being most favourable for mineralisation. Although mineralization may persist over considerable strike lengths, mineable ore is limited to low tonnage ore shoots.

#### PREVIOUS EXPLORATION:

S.P.L. 120 was prospected during the late -1890's to early 1900's and supported several short lived mining operations. Principal operations and known production figures were:

## Silver-Copper-Lead Ores:

Mine	Ore(Tons)	Ag(Ozs)	Cu(Tons)	Pb(Tons)
South-West Curtin Davis	600	90,000	65	-
Curtin Davis	922	27,000	32	10
South Curtin Davis	216	35,000	35	8
No 1 Curtin Davis	37	4,255	3.7	-
Block 302	26	2,211	1	-
Great Northern Creek	20	1,500	-	13

Production for Bonnie Dundas, Hecla, Wallace's Prospect, Evenden and Ramsdale operations are unknown.

## Quartz-Arsenopyrite - Cassiterite Ores:

The Frazer Mine and Green's Prospect produced small quantities of cassiterite. Known production from Frazer Mine is 1000 tons of ore for 25 tons of copper and 170 tons of arsenic.

## Alluvial Tin:

Minor amounts of tin have been won from alluvial flats along the Great Northern and Montezuma creeks e.g. Dunn and Archer's alluvial workings.

More recently the area was systematically explored by the Consolidated Syndicate (New Consolidated Gold Fields (Asia) Pty. Ltd.; Mt Lyell Mining and Railway Co. Limited and Renison Limited) during the period 1966-1970 when the property was known as S.P.L. 20. Longreach Metals N.L. continued exploration during 1971-72 when the property was known as S.P.L. 99.

The Consolidated Syndicate's exploration comprised reconnaissance and detailed geological mapping, grid surveys, ground magnetometer surveys, geochemical soil and dump sampling and bulldozed trenching complemented by channel sampling.

Geochemical soil sampling contributed the most significant singular indication of mineralisation. Element distributions reflected locations

of known mineralisation and revealed several areas of high tin, copper and arsenic soil values not readily explained by known mineralisation. The most promising unexplained anomaly comprising high tin and arsenic values and local high copper values is located straddling the ridge to the west of Great Northern Creek immediately north of the Frazer Creek junction. The Consolidated Syndicate termed this location "Anomaly A" and applied more detailed geochemical and magnetometer surveys followed by bulldozed trenching and channel sampling.

The more detailed investigation within Anomaly A did not reveal shearing or vein type mineralisation. The Consolidated Syndicate concluded that mineralisation responsible for the local high soil geochemistry was disseminated and discontinued exploration.

Late in 1971, Longreach Metals N.L. further tested Anomaly A by cutting five costeans and channel sampling. Analyses returned up to 0.33% Sn over 10 feet and 10 locations exceeded 1000 p.p.m. Sn. over 10 feet. Longreach Metals N.L. concluded that the tin values were not related to structural features or sulphides but rather to tin disseminated in sediments and to some extent related to shearing and thus ceased exploration.

References:

S.P.L. 120 Part 1

- A. Geological Survey Explanatory Report Zeehan  
A.H. Blissett  
Tasmanian Department of Mines, 1962.
- B. Renison Limited.  
Progress Report on the North Dundas Project (SPL 20)  
by J. Elders.
- C. New Consolidated Gold Fields (A'sia) Pty. Limited  
Progress Report for the North Dundas Project (SPL 20)  
Tasmania for 1967- 1968 Field Season.  
by D.L. Forsythe.

- D. New Consolidated Gold Fields (A'sia) Pty. Limited  
North Dundas Project, Tasmania (SPL 20)  
Progress Report for 1968 - 1969 Field Season.  
by D.L. Forsythe.
- E. New Consolidated Gold Fields (A'sia) Pty. Limited  
North Dundas Project, Tasmania (SPL 20)  
Report on Follow up work done in 1969-70 Field Season.  
by K. Ferguson.
- F. The Consolidated Syndicate  
North Dundas Project, Tasmania (SPL 20)  
Report on Activities in Winter 1970.  
by K. Ferguson.
- G. Longreach Metals No Liability  
Special Prospecting Licence No 99.  
North Dundas, Tasmania. by R.C. Clare.

#### CURRENT EXPLORATION

Preliminary investigations by Minops Pty Ltd involved the assessment of exploration reportings and plans prepared by previous investigators supported by field assessments of most locations of recorded mineralisation and of areas nominated as significant by previous grass-roots exploration.

#### Historic Locations of Mineralisation:

Economic appraisals were made for the Green's and Wallace's Prospects, The Hecla, Ramsdale, Evenden, Great Northern Creek, Frazer and Curtin Davis group of mines. Observed geological structures, mineralisation and mining development in conjunction with production records and recent grass-roots exploration data indicate that the locations bear little promise of sufficient ore material to justify further exploration. In general, mineralisation development is confined and past mining operations were

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conducted beyond economic limits. With the exception of Frazer Mine and Greens Prospect, no further investigation about these locations is proposed.

#### Grass-roots Exploration 1967-72:

The reconnaissance geological mapping, geochemical soil sampling and magnetometer surveys completed during 1967-72 have adequately explored SPL. 120 Part 1 and additional detailed regional exploration is not justified. The reconnaissance exploration does justify detailed investigation in limited areas. The most promising area encloses the tin and arsenic soil geochemistry anomaly located by the Consolidated Syndicate and named Anomaly A.

The majority of exploration undertaken by Minops Pty.Ltd. has involved the further investigation of Anomaly A.

#### ANOMALY A

Anomaly A forms part of a relatively high tin soil geochemistry zone that extends northerly from the south end of the Godkin Ridge, through Green's Prospect and the Frazer Mine, to and apparently through the S.P.L.'s north boundary approximately 600 metres east of the north-western corner. Anomaly A encompasses tin values in excess of 30 p.p.m. immediately to the north of where the old Williamsford power line crossed the ridge to the west of Great Northern Creek.

Exploration applied within Anomaly A by Minops Pty. Ltd. comprised bulk channel sampling, bulk grab sampling, rock sampling, geological mapping, diamond drilling and a reconnaissance induced polarisation survey.

#### Geology:

Rock types within Anomaly A are Brewery Junction Formation sediments and include siltstone, slates, and dolomitic shales. The basement is poorly exposed with the majority of the area masked by dense vegetation

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and a shallow soil cover. Limited geological mapping has been afforded by exposures in 5 costeans, a water race and creek beds. At surface the siltstones are mainly weathered to clays with resulting loss of most structural features. Dolomitic shales, carrying minor bedded pyrite, present better exposures and contribute to structural interpretation.

#### Structure:

The dominant local structure is a south plunging synclinal fold with a N.N.W. striking axis exposed in Costean A, B & C. Surface and drill core joint patterns suggest that the axial plane is near vertical with minor flexing.

Shearing is evident within the eastern limb of the syncline. The strongest shear strikes N.N.W. with a steep east dip and has been mapped between a trench some 60 m south of Costean E to about 10 m south of Costean C. It is probable that the shear continues north and merges with the synclinal fold axis in the vicinity of Costean B. This shear may extend southerly to recorded mineralisation in a shear on the eastern side of Great Northern Creek. Shearing at the Frazer Mine presents a similar strike and dip and could represent a displacement of the northern shear by E-W faulting. The existence of a common dislocated shear system has not been proven in the field. Drag folding recorded in cores of diamond drill hole SS-1 and, to a limited degree, I.P. survey resistivities indicate that the eastern block of the shear system is down thrown.

Two shears exposed in the east end of Costean E and in the water race to the south are quartz infilled and carry minor pyrite and traces of tin. Float quartz from the shear can be traced to the east of Costean C confirming a minimum shear strike length of 300 metres.

#### Mineralisation:

The mineralisation of greatest interest is contained in the N.N.W trending shear zone. Quartz with pyrrhotite is exposed in a trench 60 metres south of Costean E and bulk and rock sampling reveal tin mineralisation associated with the shear in Costean B and D. Earlier channel sampling

by Longreach Metals N.L. reported slightly low tin values in Costean C and E. Mineralisation is fissure controlled with cassiterite accompanying quartz infilling. Visible cassiterite has only been recorded in Costean B as fine grains 0.5 mm i.e (Rock samples 1004 & 1005 returning 0.37% Sn and 6.7% Sn respectively).

Diamond drill hole SS-1 was designed to test the shear zone below the bulk sampling of Costean D. Poor core recovery and loss of water return within the shear zone resulted in inconclusive testing of mineralisation. Some quartz with pyrite was recovered but it is not known whether this quartz constitutes all the mineralisation or perhaps other mineralisation has been flushed away after grinding. Sample 1003 revealed 0.1% Sn (See Appendix 1)

Partially oxidised sulphides carrying tin are exposed in the south face of Costean C. The sulphides form blebs up to 6 cm wide and dip 60°W (Rock samples R3, 106 & 1009). Diamond drill hole SS-2 was designed to test below the sulphides but no mineralisation was encountered.

Disseminated and bedded pyrite-pyrrhotite is found in dolomitic shales. Drill cores reveal minor pyrite on jointing planes of the dolomitic shales and siltstones and in conjunction with the pyrite-pyrrhotite occurrences, probably account for the high chargeability background.

Quartz veining in the east end of Costean E carry minor sulphides. A tin grade of 0.07% was obtained from bulk grab sample SPL 120/7.

#### Geochemical Sampling:

Six bulk channel samples each of about 100 kg were collected from Costeans B and D to check local high tin values reported within Longreach Metals N.L.'s channel sampling programme. (see Table 1). The bulk channel samples, S.P.L. 120/ 4, 5&6 and bulk grab samples SPL 120/8 indicate that tin mineralisation is associated with the N.N.W striking shear zone exposed within the west of Costean D.

Diamond drill hole SS-1 was designed to test the shear zone in depth. The highest tin value (0.88% Sn) was recorded in Costean B and coincides with the inferred intersection of the N.N.W shear zone with a mapped synclinal axis. The local cassiterite is carried by small quartz stringers (Rock Samples R2, 1004 & 1005) (See Table 2)

Partially oxidised sulphides as blebs up to 6 cm wide controlled by west dipping jointing are exposed within siltstones of Costean C. Grab samples of the sulphides assayed up to 4.7% Sn (Rock Samples R3 109 & 1006). Diamond drill hole SS-2 was designed to test this location in depth.

TABLE 1

Sample Number	BULK SAMPLING Register Number *	"ANOMALY A" Location +	COSTEANS		
			% Sn	Analyses % Cu	% As
SPL 120/1	733043	Costean B	0.27	0.01	0.1
SPL 120/2	733044	Costean B	0.88	0.01	0.1
SPL 120/3	733045	Costean B	0.07	0.01	0.1
SPL 120/4	733046	Costean D	0.07	0.01	0.1
SPL 120/5	733047	Costean D	0.08	0.01	0.1
SPL 120/6	733048	Costean D	0.16	0.01	0.2
SPL 120/7	733049	Costean E	0.07	0.01	0.1
SPL 120/8	733050	Costean D	0.14	0.02	0.1

\* Department of Mines, Launceston Laboratory reference.

+ See Fig 2.

#### Diamond Drilling:

A two hole diamond drilling programme was undertaken during January 1974, to test below locations of geological - geochemical interest and to gain additional structural information. (See Fig 2 and Appendix 1.)

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TABLE 11

## GRAB SAMPLING - SPL 120 Part 1

SAMPLE NO	REG NO *	LOCATION	% Sn	% Cu	% As	% Pb	Ag g/T	% Zn	%Sb	Au g/T
R2	- +	Costean B ++	0.09	0.032	0.091					
1004	740933	Costean B	0.37	0.08	0.73	0.02	-	0.01		
1005	740934	Costean B	6.70	0.06	0.35	0.16	-	0.01		
R3	- +	Sulphide veinlet	0.29	0.129	0.005					
109	732662		3.00	0.10	0.03					
1006	740932	Costean C + +	4.70	0.06	0.34	0.16	-	0.01		
R4	- +	Costean C + +	0.20	0.035	0.105					
R5	- +		0.11	0.021	0.033					
R6	- +	Costean D + +	0.30	0.020	0.037					
R8	- +	Costean E + +	0.018	0.220	2.56					
R9	- +	Between Costean D & C + +	0.09	0.016	0.026					
1007	740935	Curtin Davis Adit	0.03	0.07	22.6	0.43	16.5	0.01	0.30	0.5
1008	740936	Curtin Davis Adit	0.01	0.15	10.0	0.11	17.0	0.07	0.37	0.5

\* Department of Mines, Launceston Laboratory Reference

+ Analysed by Spectrometer Services Pty Ltd.

+ + See Fig 2.

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Diamond drill hole SS-1 was sited in Costean D and drilled at  $-60^{\circ}$  to the east to test the N.N.W. trending shear zone for mineralisation. Drilling intersected the shear zone at 74 m but, due to very poor core recovery within the zone, the extent of mineralisation is not known. (See Fig 3)

Diamond drill hole SS-2 was sited in Costean C and drilled at  $55^{\circ}$  to the east to test for possible depth extensions of the tin bearing sulphides exposed within the east of Costean C. No significant mineralisation was recorded in SS-2. (See Fig 3)

#### Electrical Induced Polarisation Survey:

A reconnaissance gradient array induced polarisation survey was undertaken by Scintrex Pty. Ltd. within portion of Anomaly A. The survey, done in March 1974, was designed to test the local application of the technique in view to possible future more extensive surveys. (See Appendix 2 ).

The survey employed a time domain system using a Scintrex I.P.R. 8 receiver. Chargeability and resistivity values were calculated for 50 feet spaced receiver stations along Costean B, C, & D within a 2000 feet current electrode dipole centred about Costean C.

The three traverses display similar chargeability and resistivity profiles with resistivities increasing from east to west and chargeabilities from west to east. The distribution of resistivities cannot be directly attributed to rock types. An abrupt change in resistivity is recorded on each traverse at the approximate known or inferred location of the N.N.W. trending shear.

#### CONCLUSIONS:

Exploration by Minops Pty. Ltd. and previous investigators indicate that conditions present within Anomaly A are favourable for lode tin mineralisation.

Favourable features are:

1. Anomaly A is geographically well located with respect to the Pine Hill quartz porphyries.  
The cassiterite mineralisation of the Dundas- Renison Bell districts is understood to be genetically associated with the Pine Hill quartz porphyries or the sponsoring granite stock.
2. Immediately south of Anomaly A the Frazer Mine and Green's Prospect have exposed high temperature quartz veining carrying sub-economic cassiterite.
3. Anomaly A is part of a relatively high tin soil geochemistry zone extending from the south end of the Godkin Ridge, through the known tin mineralisation of Green's Prospect and Frazer Mine to the S.P.L's north boundary. The tin geochemistry is locally supported by high arsenic and copper values.
4. Shear systems are available for fissure controlled mineralisation similar to that of Razorback, Grand Prize and the Federal Lode - Renison Bell.
5. Calcareous rock types are available for stratiform replacement deposits of the Renison Bell type.
6. Soil geochemistry, trench sampling, rock sampling and drilling demonstrate tin mineralisation associated with shearing.
7. Chargeability anomalies revealed by the induced polarisation survey may reflect shear controlled sulphide mineralisation.
8. Alluvial cassiterite deposits in two western tributories of the Great Northern Creek are probably accumulations of material shed down from mineralisation within Anomaly A.

Exploration to this stage has disclosed sub-economic tin mineralisation within Anomaly A and encourages further investigation.

## RECOMMENDATIONS:

To adequately test Anomaly A for possible economic cassiterite lode developments the following work programme is recommended.

1. Reconstruct the Renison Ltd. 1970 grid system to effectively cover a zone 1,400 feet wide from Frazer's Mine to the S.P.L.'s north boundary with a 200 feet by 100 feet grid system.
2. Undertake an electrical induced polarisation survey over the reconstructed grid system with expander surveys conducted over anomalies of interest.
3. Cut bulldozer costeans for geological mapping and sampling over geophysical anomalies.
4. Diamond drill locations as warranted by geological, geochemical and geophysical findings.

The estimated cost of this programme is:-

Grid Reconstruction (16,000 feet)	\$ 700
Induced Polarisation Survey (16,000 feet)	\$ 8,600
Bulldozing of Access Tracks and 1000 feet of Costeans	\$ 7,200
Geological Mapping & Sampling	\$ 1,400
Diamond Drilling (2000 feet)	<u>\$32,100</u>
	<u>\$50,000</u>

SPL 120 PART 11

The geological environment of immediate interest to Minops Pty. Ltd. comprises the northern continuation of structures and rock types associated with the Razorback cassiterite mineralisation. Investigations for the period July 1973 to June 1974 have involved the consideration of reportings and plans prepared by Renison Limited (S.P.L. 27 1970-72) in conjunction with limited chack mapping and partial reconstruction of the Renison Ltd. (1970) and Bureau of Mineral Resources (1962) grid systems.

During the period, active exploration has been undertaken within the Razorback leases and includes surface and underground geological mapping, revision of structural and mineralisation distribution interpretations, ground magnetometer surveys, sampling programmes and an induced polarisation survey.

The assessment and interpretation flow-through will form a foundation for the exploration programme to be designed for this part of S.P.L. 120 and the area to the south covered by S.P.L. 133.

It is proposed that initially grid reconstruction, geological mapping and ground magnetometer surveys will be continued in the vicinity of the Razorback Shear Zone. A comprehensive exploration programme will be prepared on the completion of this work.

## Reference:

- A. Renison Ltd.  
S.P.L 27 South Dundas  
1970- 1971 Annual Report
- B. Renison Ltd.  
S.P.L 27 South Dundas  
1971 - 1972 Annual Report



C. E. LAYDEN  
Regional Geologist

25th July, 1974.

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APPENDIX 1

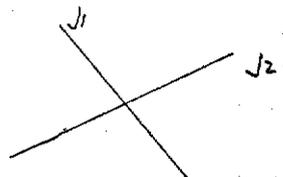
Diamond Drill Logs: SS-1 & SS-2

LOCATION S.P.L. 120  
 SITE  
 BEARING 85° Magnetic  
 ATTITUDE -60°  
 R.L. 498.40  
 DEPTH 89.61 Metres  
 SURVEYS 64° at 88.40 Metres

HOLE No SS-1  
 DRILL Mindrill F30 Wireline  
 DRILLER Associated Diamond  
 Drillers Pty. Ltd.  
 COMMENCED 9th JAN. 1974.  
 COMPLETED 14th JAN. 1974.

FROM	TO	DESCRIPTION
0.00		<p><b>SEDIMENTS</b> Weathered yellow to grey siltstones            Grey siltstones are very fine grained with local darker narrow bands and occasional bands of slightly coarsened material ( Due to weathering, core is badly broken and some core lost. Locations between 2.06 and 6.71 are approx only, due to core loss)</p>
4.95		Bedding at 72° to core axis (T.C.A.)
6.10		Jointing at 33° T.C.A.
		Jointing at 43° T.C.A. -angle between joint plane normals at 65°
		Bedding at 72° T.C.A.
		Joint planes crusted (1-2 mm ) with crystalline quartz and limonite ( probably after pyrite).
6.58		Fine hairline fractures sub parallel to core axis, displacing bedding approx 4 mm
7.00		Bedding at 72° T.C.A.
		Jointing at 68° T.C.A.
		Jointing at 37° T.C.A. -all normals approx co-planar
7.50		Bedding at 69° T.C.A.
		Jointing at 48° T.C.A.- limonite crusted
		Jointing at 37° T.C.A.

FROM	TO	DESCRIPTION
		9.82 Bedding at 70° T.C.A. Jointing at 38° T.C.A. Jointing at 27° T.C.A. - Jointing normals co-planar and perpendicular to bedding normal. Crusted limonite on jointing
		10.60 Very minor pyrited bedded with bands of slightly coarser siltstone
		10.70 Minor pyrite and sugary quartz on joint plane.
		11.12 Bedding at 73° T.C.A. Jointing at 34° T.C.A. Jointing at 18° T.C.A. - jointing normals perpendicular.
		13.20 1 cm Limonite and drusy quartz on joint plane at 35° T.C.A.
		13.87 Jointing at 30° T.C.A. showing slickensiding.
		14.63 - 16.38 Core fractured and weathered (yellow siltstone) - not fault?
		16.20 Flexing in bedding to form fold. Immediately below 16.20, sediments relatively fresh blue-grey siltstone with minor weathering along joint plane. Numerous hair line fractures displacing bedding 2-4 mm
		16.70 Bedding at 65° T.C.A.
19.00		DOLOMITIC SHALE hard blue-grey dolomite interbedded with siltstones with limonite crustings on joint planes
	19.44	
19.44		SILTSTONE with limonite crustings on joint planes
	20.80	
20.80		20.80 Bedding at 71° T.C.A. Interbedded dolomite and siltstone with limonite crustings on joint planes
	22.30	
22.30		DOLOMITE SHALE fine grained with occasional siltstone band
		23.05 Bedding at 70° T.C.A.



FROM	TO	DESCRIPTION
		23.05 J1 Jointing at 23° T.C.A. J2 Jointing at 49° T.C.A. - joint plane carries 3 mm veinlet of quartz and arsenopyrite Joint plane normals co-planar
		23.94 Approx 1 cm bedded pyrite at 70° T.C.A. Blebs of pyrite over 5 cm.
		24.10 Joint plane at 32° T.C.A. with actinolite and minor fine pyrite.
		26.48 2 cm irregularly bedded pyrite at 75° T.C.A.
		26.50 Jointing at 45° T.C.A. carrying minor quartz and pyrite.
		26.80 Jointing at 20° T.C.A. carrying pyrite. (Dolomitic shale contains occasional crystals 1mm of pyrite).
		27.90 Bedding at 71° T.C.A. - Hair line fractures displace bedding up to 5 mm abundant.
		31.20 Bedding at 53° T.C.A.
		33.67 Bedding at 74° T.C.A. Jointing at 25° T.C.A. carrying 2 mm pyrite and chalcopyrite.
		35.50 Bedding at 80° T.C.A.
		35.55 2 mm Quartz - calcite veinlet with pyrite at 23° T.C.A. - trace chalcopyrite. Very fine disseminated pyrite adjacent (2 cm) above and below veinlet.
		39.20 2 mm veinlet of arsenopyrite at 46° T.C.A.
		40.15 2 cm drusy veinlet of sulphides at 35° T.C.A. (Sample No 1001) Pyrite 75% Arsenopyrite 15% Chalcopyrite 5%.
	41.82	
41.82		41.82 Siltstones interbedded with dolomitic shales.

FROM	TO	DESCRIPTION
		42.63 Bedded at 81° T.C.A. Jointing at 60° T. C. A. - normal co-planar.
		43.94 1.5 mm veinlet of pyrite-arsenopyrite at 45° T.C.A.
		44.00 Bedding at 75° T.C.A.
		45.88 - 45.93 Blebs and veinlets of pyrrhotite - pyrite at 44° T.C.A. (Sample No 1002)
		47.80 Bedding at 70° T.C.A.
		48.29 3 mm veinlet of arsenopyrite and minor pyrite at 49° T.C.A.
		48.66 Minor local disseminated pyrrhotite
		50.65 2 mm veinlet of arsenopyrite and pyrite at 49° T.C.A.
		51.80 Bedding at 73° T.C.A.
		54.80 Bedding at 75° T.C.A.
		56.00 Jointing at 50° T.C.A.
59.13	59.13	Pyrite at 38° T.C.A. Predomnently fine grained black shale.
		59.48 1 mm veinlet of pyrite quartz and minor cassiterite at 50° T.C.A. Bedding at 70° T.C.A.
		60.35 3 mm veinlet of quartz and minor pyrite at 38° T.C.A.
		60.42- 62.40 Black shale brecciated by fine hairline displacements. Disseminated pyrrhotite approx 5% on fractures.
		62.50 Bedding at 43° T.C.A.
		63.70 Bedding at 32° T.C.A. Jointing at 34° T.C.A. - normals perpendicular
		64.70 - 66.30 Numerous threads and veinlets of pyrite.
		66.30 5 mm veinlet of quartz, arsenopyrite and pyrite at 28° T.C.A.
		67.40 - 68.15 Core broken due to fracturing and acute angle of bedding to core axis.
		68.25 Bedding at 34° T.C.A.
		70.65 Bedding at 15° T.C.A.
		72.60 Several fine ( 1 mm ) pyrite veinlets on jointing at 39° T.C.A. Bedding at 5° T.C.A. - normals of bedding and jointing are perpendicular
		73.40 Bedding at 21° T.C.A.
		73.80 Bedding at 21° T.C.A.

FROM	TO	DESCRIPTION
		74.05 2 cm quartz-pyrite recovered.
		74.07 - 75.59 No core recovery shear zone
		75.59 - 75.80 quartz and pyrite with minor included sediments -- probably shear infilling (Sample No 1003.)
		75.80 - 75.90 Sediments weakly brecciated.
		75.90 Bedding at 34° T.C.A.
		76.70 Bedding at 14° T.C.A. ( Drag folding must be associated with quartz- -pyrite infilled shear).
		78.00 Bedding at 5° T.C.A. ( Bedding steepens rapidly between 79.45 - - 80.30 ).
		80.30 Bedding at 36° T.C.A. - minor blebs of pyrrhotite.
		82.30 Bedding at 25° T.C.A.
		83.40 Bedding at 21° T.C.A.
		84.60 Bedding at 22° T.C.A.
		85.90 Bedding at 30° T.C.A.
		87.00 Bedding at 39° T.C.A.
		88.50 Bedding at 28° T.C.A.
	89.61	HOLE TERMINATED AT 89.61 METRES

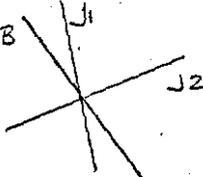
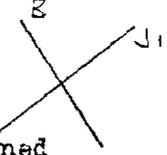
ANALYSIS

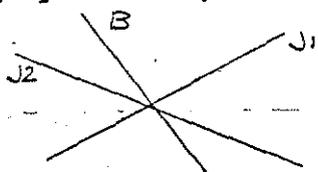
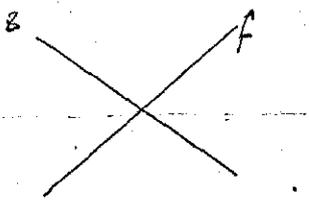
Sample No.	From	To	% Sn	% Cu	% As	% Pb	Ag g/T	Zn %
1001	40.13	40.23	0.19	1.10	6.7	0.01	1.80	0.09
1002	45.87	45.97	0.15	0.12	0.22	0.01	1.80	0.01
1003	75.59	75.90	0.10	0.07	0.73	0.01	-	0.01.

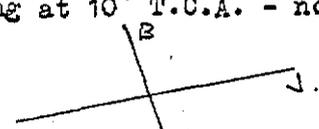
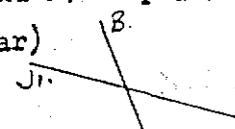
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LOCATION	S.P.L. 120	HOLE	No SS-2
SITE		DRILL	Mindrill F 30 Wireline
BEARING	65° Magnetic	DRILLER	Associated Diamond
ATTITUDE	-50°		Drillers Pty. Ltd.
R.L.	491.50	COMMENCED	16-1-74
DEPTH	46.94 m (154 Ft)	COMPLETED	18-1-74
SURVEY	-55° at 46.94 m		

FROM	TO	DESCRIPTION
0.00		SEDIMENTS Weathered yellow to grey siltstone core fractured between 0.00 -1.91 with core loss.
1.00		Bedding at 85° To Core Axis (T.C.A.) Jointing at 43° T.C.A. Jointing at 30° T.C.A. joint normals at 77°
1.90		Bedding (B) at 55° T.C.A. Jointing (J1) at 60° T.C.A. Jointing (J2) at 33° T.C.A. all normals approx co-planar
		
8.00		Bedding at 64° T.C.A. Jointing at 21° T.C.A. - core irregularly fractured with hair line displacements of bedding
8.50		Bedding (B) at 63° T.C.A. Jointing (J1) at 45° T.C.A.
9.80		Sediments relatively fresh-fine grained hard dolomite on jointing planes
		

FROM	TO	DESCRIPTION
		<p>10.20 Bedding at <math>74^{\circ}</math> T.C.A.</p> <p>11.05 Bedding (B) at <math>77^{\circ}</math> T.C.A.            Jointing (J1) at <math>41^{\circ}</math> T.C.A.            Jointing (J2) at <math>32^{\circ}</math> T.C.A.            (Normals of B &amp; J1 coplanar; normals J1 &amp; J2 perpendicular)</p> 
		<p>12.64 Minor fracture infilled with quartz and minor pyrite at <math>31^{\circ}</math> T.C.A. -Bedding displaced 1 cm by fracture.</p> <p>12.95 Minor scale pyrite on bedding plane at <math>44^{\circ}</math> T.C.A.            ( Bedding angle to core axis becomes more acute between 12.45 &amp; 12.80.            Local bedding change probably sympathetic to minor shearing)</p> <p>13.08 Weak shear 5 mm with slight mashing of sediments at <math>36^{\circ}</math> T.C.A.</p> <p>13.70 Bedding at <math>46^{\circ}</math> T.C.A.</p> <p>14.53 Weak shearing and brecciation with minor pyrite infilling at <math>40^{\circ}</math> T.C.A.            Bedding at <math>26^{\circ}</math> T.C.A.</p> 
16.32	16.32	<p>DOLomite with very minor disseminated pyrite and occasional band of greywacke</p> <p>17.70 Bedding at <math>66^{\circ}</math> T.C.A.</p>

FROM	TO	DESCRIPTION
		19.00 Bedding at 77° T.C.A.
		20.33 to 20.38 Quartzite or greywacke band carrying pyrite at 73° T.C.A.
		21.70 Bedding at 76° T.C.A. Jointing at 10° T.C.A. - normals co-planar
		
		23.00 Bedding at 63° T.C.A.
		26.50 Bedding at 69° T.C.A. Jointing at 36° T.C.A.
		30.06 1 cm weak shear with quartz-calcite and pyrite-arsenopyrite infilling at 24° T.C.A.
		31.10 Bedding (B) at 73° T.C.A. Jointing (J1) at 29° T.C.A. Jointing (J2) at 20° T.C.A. (Normals of bedding and J1 co-planar; J1 & J2 perpendicular)
		
		32.30 Bedding at 64° T.C.A. Jointing at 35° T.C.A. - normals perpendicular
		34.00 Bedding at 66° T.C.A.
		37.00 Bedding at 69° T.C.A.
		39.80 Bedding at 70° T.C.A. Jointing at 22° T.C.A. normals co-planar
		43.00 Bedding at 68° T.C.A.
		43.90 Bedding at 70° T.C.A.
	46.94	Jointing at 36° T.C.A. - normals co-planar HOLE TERMINATED AT 46.94 m

APPENDIX 11

Extract: A Report on Electrical Induced Polarisation  
Surveys at Razorback, Near Zeehan, Tasmania  
on behalf of Minops Pty.Ltd. March-April 1974  
- Scintrex Pty. Ltd.

III - RECONNAISSANCE SURVEY AT SPL-120DISCUSSION

The data is displayed on Plate 3 at the horizontal scale of 1 inch = 200 feet and vertical scales of 1 inch = 10 millivolts/ volt, with resistivity expressed on a two inch log scale in ohm-metres.

The gradient array used to investigate the area had a current dipole of 2000 feet with electrodes placed on line C at 800E and 1200W. A 50 feet potential was used to investigate the resultant primary and secondary potential fields.

All three profiles, B, C and D show a remarkable change in resistivity from in excess of 10000 to 40000 ohm-metres in the west to the order of 400 ohm-metres in the east. It is all the more remarkable as it takes place over just 500 feet. Within this steep change an even more rapid change indicating the contact between material of very different electrical characteristics takes place on lines B, C and D at 220W, 160W and 100W respectively. This probably represents the strike direction in the area.

On all three lines the chargeability rises steeply from west to east from backgrounds of about 30 millivolts/volt

028

to over 50 millivolts/volt in the east. On line D, however, there is a distinct anomaly of some 10 millivolts/volt superimposed on the sharp change in resistivity at 120W. The apparent dip of the source, as judged from the asymmetry of the response with respect to the induced polarization response, is steeply to the east, while the width is estimated to be about 100 feet and the maximum depth to the top of the body at 120W is estimated to be 80 feet.

The appearance of the apparent resistivity and chargeability data on line B infers an almost identical situation to that seen on line D, with the peaks situated just east of the last station read on this line. This however, is supposition.

#### CONCLUSIONS AND RECOMMENDATIONS

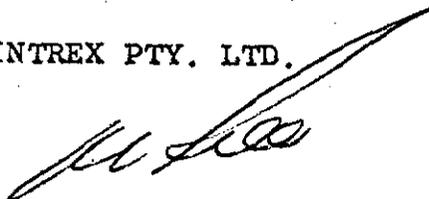
From a geophysical point of view the rapid change in apparent resistivity is considered very significant and this change in electrical properties is due to a change in rock type.

Unfortunately not enough work was done to ascertain the geophysical setup for these anomalous and interesting responses, but investigation of the chargeability high is strongly recommended, particularly on line D at 120W, should geological or geochemical data confirm this anomaly's

interest.

Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

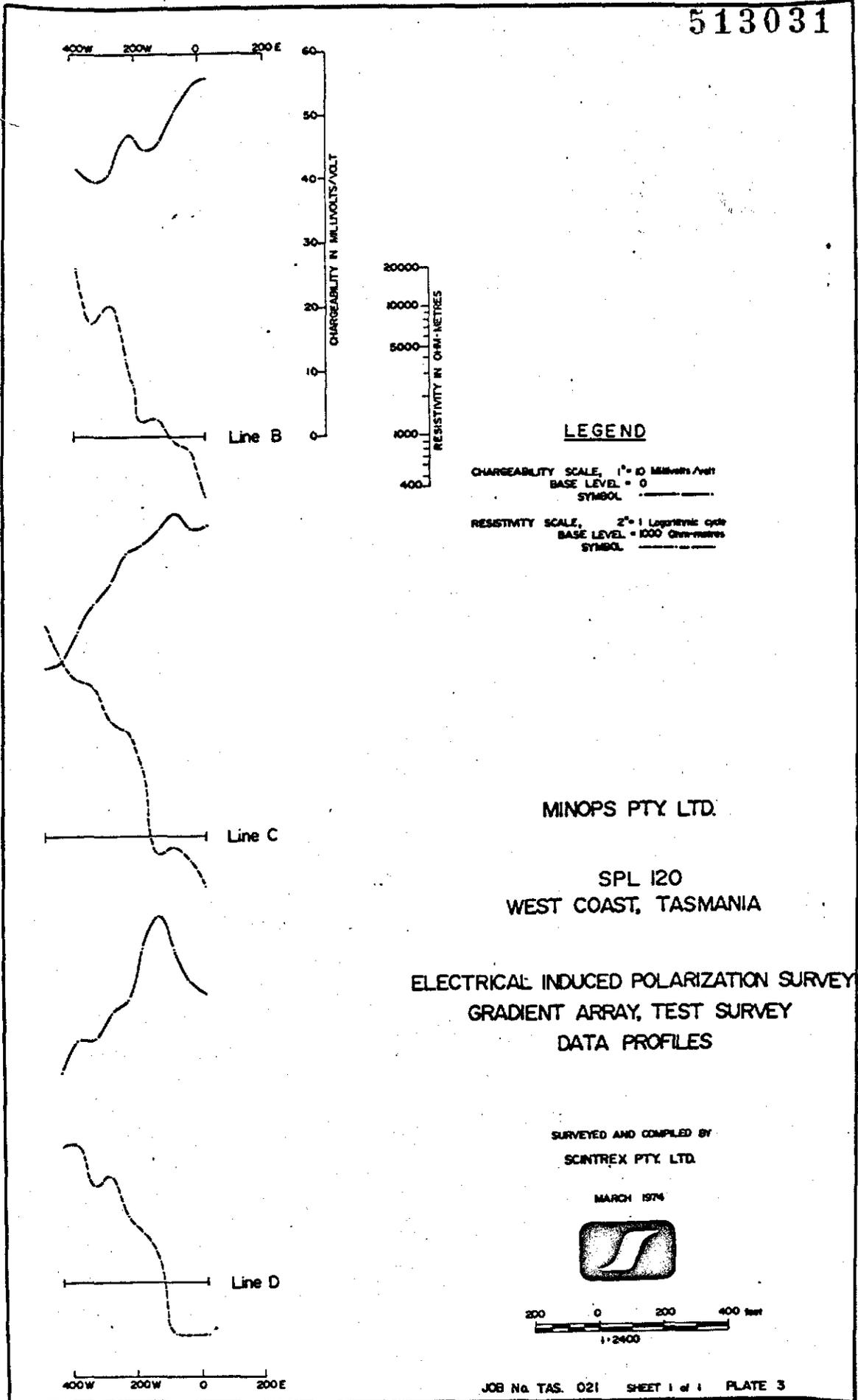


A.W. HOWLAND-ROSE, MSc, DIC, AMAusIMM, FGS.

GEOPHYSICIST

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513031



**LEGEND**

CHARGEABILITY SCALE,  $1^{\circ} = 10$  Millivolts/Volt  
 BASE LEVEL = 0  
 SYMBOL ————

RESISTIVITY SCALE,  $2^{\circ} = 1$  Logarithmic cycle  
 BASE LEVEL = 1000 Ohm-metres  
 SYMBOL ————

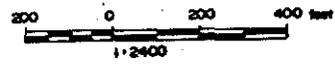
MINOPS PTY LTD.

SPL 120  
WEST COAST, TASMANIA

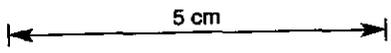
**ELECTRICAL INDUCED POLARIZATION SURVEY  
GRADIENT ARRAY, TEST SURVEY  
DATA PROFILES**

SURVEYED AND COMPILED BY  
SCINTREX PTY. LTD.

MARCH 1974



JOB No. TAS. 021 SHEET 1 of 1 PLATE 3



031

MINOR'S SPL 120

75-1106

2.

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APPENDIX 1.

Sample No	Sr%	Pb%	Ag g/t	Cu%	Zn%	As%	Sb%	Au g/t
1004	0.37	0.02	-	0.08	<0.01	0.73	-	-
Drusy quartz from Anomaly "A", Costean B ( centre SPL 120/2 ).								
1005	6.7	0.16	-	0.06	0.01	0.34	-	-
Drusy quartz from Anomaly "A", Costean B, (centre SPL 120/2 ).								
1006	4.7	0.16	-	0.06	0.01	0.34	-	-
Partially oxidised sulphides from Anomaly "A", Costean C, ( R3 & 109 )								
1007	0.03	0.43	16.5	0.07	0.01	22.6	0.03	<0.5
Gossan sample from Curtin-Davis adit - Godkin Ridge								
1008	0.01	0.11	17.0	0.15	0.07	10.0	0.37	<0.5
Gossan sample from Curtin-Davis adit - Godkin Ridge								

APPENDIX 2 - DIAMOND DRILL LOGS

513033

Hole No SS-1  
 Location S.P.L. 120; Anomaly 'A'; Costean D.  
 Bearing 85° Magnetic  
 Attitude -60°  
 Depth 89.61m

Geological Log

<u>From</u>	<u>To</u>		<u>Description</u>
00.0	16.20	Sediments	Weathered siltstones with occasional veinlets and joint plane encrustings of quartz and limonite. Micro faulting common. Bedding approx 72° to core axis.
16.20	19.00		Blue-grey relatively unweathered siltstone within numerous micro faulting.
19.00	19.44		Dolomite: Hard blue-grey dolomite interbedded with siltstone.
19.44	22.30		Siltstone
22.30	59.13		Dolomite: Hard fine grained blue-grey dolomite with occasional siltstone bands. Minor blebs and veinlets of pyrite mainly on joint planes. 40.15 : 2cm drusy veinlet of pyrite-arsenopyrite-chalcopyrite (Sample 1001). 45.88 - 45.93: Blebs and veinlets of pyrrhotite-pyrite (Sample 1002)
59.13	89.61		Shale: Fine grained black shale with minor disseminated pyrrhotite-pyrite. 74.05 - 75.80 Quartz and sulphides with included sediment - probably infilled shear. 12% core recovery ( Sample 1003).

Hole terminated at 89.61m  
 Acid survey -64° at 88.40m

Analyses:

<u>Sample No</u>	<u>Interval</u>	<u>Sr%</u>	<u>P%</u>	<u>Ag g/t</u>	<u>Cu%</u>	<u>Zn%</u>	<u>As%</u>
1001	40.13 - 40.23	0.19	≤0.01	1.8	1.1	0.09	6.7
1002	45.87 - 45.97	0.15	≤0.01	1.8	0.12	0.01	0.22
1003	75.89 - 75.90	0.10	≤0.01	-	0.07	0.01	0.02

Hole No ss-2

Location S.P.L. 120 Anomaly 'A', Costean C.

Bearing 65° Magnetic

Attitude -50°

Depth 46.94m

## Geological Log:

<u>From</u>	<u>To</u>	<u>Description</u>
0.00	9.80	Sediments Weathered siltstone
9.80	16.32	Hard fine grained relatively fresh dolomite with occasional veinlets of pyrite and joint planes.
16.32	46.94	Dolomite with minor disseminated pyrite and occasional No significant mineralisation.

Hole terminated at 46.94m  
Acid survey -55° at 46.94m

034

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MINOPS PTY LTD

75-1106 050

513035

REGISTERED OFFICE:  
505 ST. KILDA ROAD,  
MELBOURNE, VIC., 3004  
TELEPHONE: 267 2122

D of M	A.O.	CG	CC&M	D.S.M.E.
RECEIVED				Registrar
11 JUL 1975				E & IL
ANSWERED				
DEPT. OF MINES				
REF: Not				

SPECIAL PROSPECTING LICENCE 120

NORTH DUNDAS, TASMANIA

REPORT ON ACTIVITIES FOR PERIOD  
15th June 1974 to 15th June 1975

June 1975

C.E. Layden

Introduction

Minops Pty. Ltd. has undertaken exploration for base metals within the areas of Special Prospecting Licence 120 situated in the County of Montagu, Dundas, Tasmania.

Activities comprised consideration of previous exploration findings, literature research and reconnaissance field inspections. Results justify continued exploration efforts.

This report summarises activities during the period 15th June 1974 to 15th June 1975 and makes recommendations for future investigations.

Special Prospecting Licence 120 comprises two areas totalling 1310.78 hectares. The area scheduled Part I encompasses 801.28 hectares located 13 kilometres north-east of Zeehan and is defined:

"Commencing at the north-east angle of the area whose grid co-ordinates are 849,550 yards N, 352,980 yards E and being the south-east angle of EL5/63 thence on the east by 180 chains southerly by part of a western boundary of EL1/62 on the south by 110 chains westerly by part of a northern boundary of EL7/68 on the west by 180 chains northerly by an eastern boundary of SPL27 thence on the north by 110 chains easterly by part of a southern boundary of EL5/63 aforesaid to the point of commencement."

This area is subject to the exclusion of Mineral Lease 12m/42 of 16.9 hectares located centrally within the area.

The area scheduled Part II of 509.5 hectares located 8 kilometres E.N.E. of Zeehan and is defined:

"Commencing at the posted notice situated at the south-east corner of the area whose co-ordinates are 843,950 yards N 348,850 yards E and being a north-west corner of EL7/68 thence 1 mile 16 chains northerly along a western boundary of EL7/86 aforesaid to a point on the southern boundary of EL42/71 thence 1 mile 53 chains westerly along the southern boundary to a point on the eastern boundary of EL2/62 thence 74 chains southerly along the eastern boundary to the south-east corner of that licence and being a point on a northern boundary of EL7/68 aforesaid thence 8 chains easterly 22 chains southerly 1 mile 45 chains again easterly along part of a northern, an eastern and again a northern boundary of EL7/68 aforesaid to the point of commencement."

-Page 2-

This area is subject to the exclusion of mining lease 1m/75.

Exploratory activities within SPL120 for the period 15th June 1974 to 15th June 1975 were of a lowkey and restricted to research of previous exploration and field inspections. For much of the period vehicular access to Part I was lost due to storm damage to the North East Dundas Tram Formation and coupled with poor weather conditions during the 1974/75 summer, field operations were obstructed. The demands on personnel involvement in the development of the Razorback tin concentrating plant also added to the suppression of activities within the SPL.

The conclusions and recommendations of the report concerning the period December 1972 to June 1974 remain unaltered with proposals for geological, geophysical and drilling operations in the search of sulphide-cassiterite mineralisation in the vicinity of Anomaly A; SPL120 Part I.

#### Current Investigations

Investigations during the current period have involved the research of previously collected geological and geochemical information, studies of historic plans and reports concerning the Godkin Ridge mineralisation and field inspections.

#### Discussions

##### SPL120 Part I -

Assessment of known geological and allied expressions of this area indicate that the location of greatest and probably only economic potential is that of Anomaly A. Geological mapping, sampling and a limited induced polarisation survey indicates that the location is favourable for cassiterite bearing sulphide mineralisation similar to those of Renison Bell, Grand Prize and Razorback. Previous exploration has disclosed subeconomic tin mineralisation associated with quartz veining and encourage further investigation.

Discussions cont.

Future exploration is to be restricted to a zone some 320 metres wide extending from Frazer's Mine to the northern boundary. Operations will involve geological mapping in conjunction with induced polarisation surveys over a reconstructed grid system. Locations of interest will be costeamed for detailed geological mapping and geochemical bulk sampling to form a basis for a diamond drilling programme. (The application of induced polarisation surveys must await the evaluation of the geophysical technique by the diamond drilling of anomalies presently known along the Razorback Shear Line of mining lease 1m/75.)

SPL120 Part II -

Little exploration has been undertaken in this area by past or present tenement holders and assessment of undertaken work does not encourage the application of high key exploration activities.

When the area constituted the southern portion of SPL27, Renison Ltd. conducted investigations into the economic potential of asbestos development within the serpentinites. Current activities confirm the erratic distribution and poor quality of developments and discourage further investigation.

SPL Part II contains the northerly strike projection of the Razorback Shear Line and consequently merits attention with investigation for Razorback-type sulphide-cassiterite mineralisation on the shear zone. It is proposed that geophysical induced polarisation surveys be conducted over the strike projection of the shear to nominate the shear location for costeaming and sampling and to nominate locations with chargeability characteristics, possible the respons to massive sulphides.

CONCLUSION AND RECOMMENDATIONS

Further exploration is justified in the vicinity of Anomaly A of SPL120 Part I. Recommendations are:

-Page 4-

1. Reconstruct the Renison Ltd. 1970 grid system to effectively cover a zone 320 metres wide from Frazer's Mine to the north boundary with a 200 feet by 100 feet grid system.
2. Undertake geological mapping within the zone.
3. Undertake an electrical induced polarisation survey over the grid system.
4. Costean locations of interest for detailed geological mapping and bulk geochemical sampling.
5. Design a diamond drilling programme if warranted.

Exploration within SPL120 PartII will be designed and undertaken as the extension of investigations conducted about the open cutting operations of mining lease 1m/75.

C. E. Layden

References:

## SPL120 Part I -

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1971-72 Annual Report

K. Minops Pty. Ltd.  
Special Prospecting Licence 120, North Dundas, Tasmania  
Report on Exploration Activities for Period 15th December  
1972 to 15th June 1974 by C.E. Layden

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350 000 Y E

850 000 N

840 000 N

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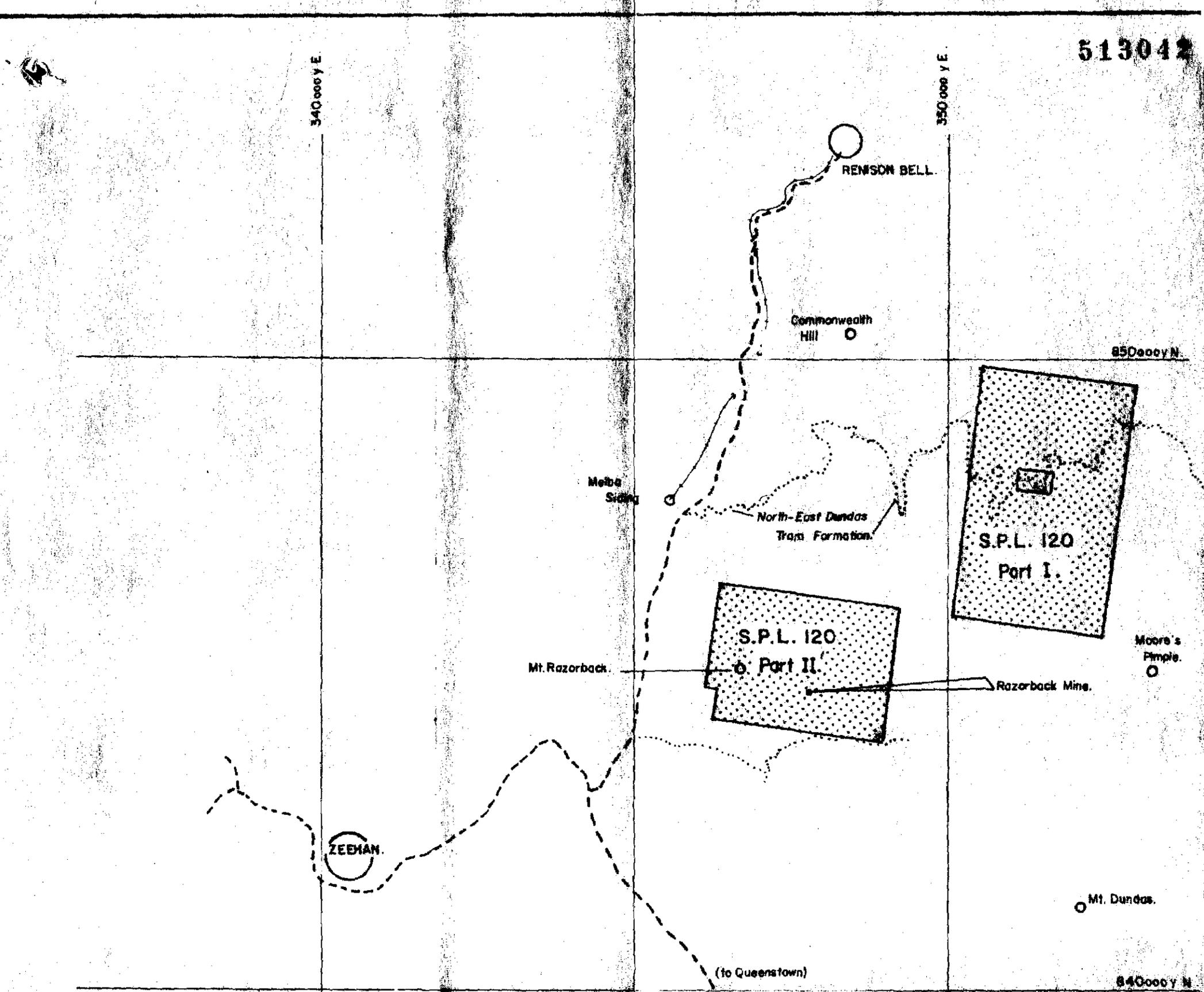
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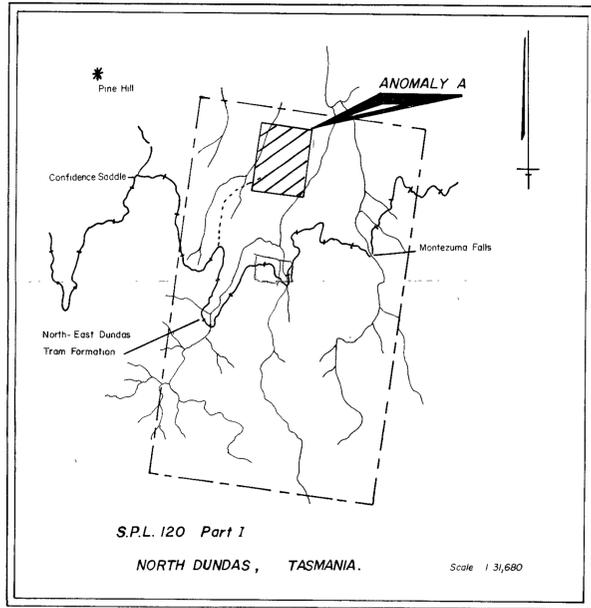
MINOPS PTY. LTD.  
S.P.L. 120.

LOCALITY PLAN.

Scale 1:63360

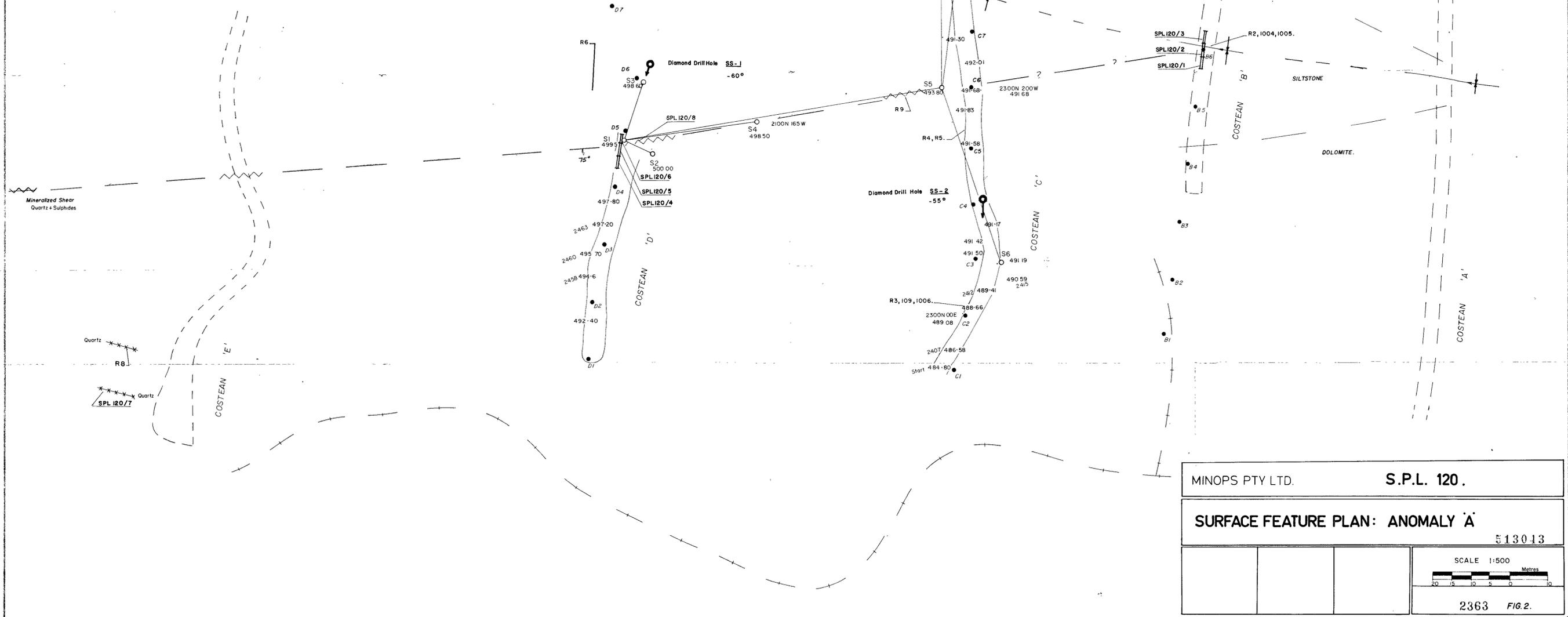
FIG 1.





- SHEAR ZONE
- SYNCLINE AXIS WITH PLUNGE
- MINERALIZATION
- BULK CHANNEL SAMPLE
- ROCK SAMPLES
- DIAMOND DRILL HOLE
- SURVEY STATION WITH REDUCED LEVEL
- SPOT LEVEL
- SPOT LEVEL OF LONGREACH METALS N.L.'S CHANNEL SAMPLE LOCATION
- INDUCED POLARIZATION RECEIVER STATION
- RENISON LTD. GRID PEG
- COSTEAN SURVEYED
- COSTEAN APPROX. LOCATION
- ACCESS TRACK
- WATER RACE
- DRAINAGE

**LEGEND**



MINOPS PTY LTD.	S.P.L. 120.
<b>SURFACE FEATURE PLAN: ANOMALY A</b>	
513013	
SCALE 1:500 Metres	
2363 FIG. 2.	

